



# 100 | Women Leaders in STEM

a publication by STEMconnector™





## ***THE VALUE OF STEM LEADERSHIP.***

Northrop Grumman is proud to salute the top 100 Women Leaders in STEM and our very own Linda Mills, Corporate Vice President, President Northrop Grumman Information Systems Sector. We are honored to come together with other change leaders and visionaries who are helping to ensure our next generation of scientists, technicians, engineers and mathematicians.

***THE VALUE OF PERFORMANCE.***

***NORTHROP GRUMMAN***

**100** | **Women**  
**Leaders**  
**in STEM**

a publication by **STEMconnector™**

**STEMconnector™**.org

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## About the Publishers



**EDIE FRASER**  
Chief Executive Officer  
STEMconnector™

Edie is leading STEMconnector™ bringing information and results to STEM Leaders in every sector and offering more than 15 major products.

Edie has published 10 major reports/publications and has written three books including *Do Your Giving While You're Living*, co-authored by Robyn Spizman. She was publisher of *CEOs Who Get It*; the *CEO Magazine*, *The Diversity Primer* and *The Diversity Officer*.

Edie is proud to have worked with more than 200 Fortune companies on their women and diversity leadership. Edie is also a Senior Consultant to Diversified Search. Prior to joining Diversified, Edie was Founder and CEO of Diversity Best Practices (DBP), a member service for diversity practitioners where she designed the CEO Diversity Leadership program, including the prestigious CEO Diversity Awards. Edie is also the founder of the Business Women's Network (BWN).

Edie has won more than 43 awards for her commitments to women, diversity and philanthropy. She serves on several major boards. She is Vice Chairman of the World Affairs Council of DC and on the national board of SCORE. She has been inducted into the Enterprising Women Hall of Fame and a Founding member of C200. Edie received the Lifetime Achievement award from Diversity Woman Magazine and its Mosaic Award. Edie was on the cover of Women of Wealth Magazine for her philanthropy and mentoring.



**LORENA S. FIMBRES**  
Director, Marketing and  
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Lorena serves as Director of Communications and Marketing for STEMconnector™. In this capacity, she is responsible for brand development and communications strategy. She also works closely with sponsors and partners to ensure the best membership experience.

Fimbres is the executive publisher of the *100 Women Leaders in STEM*, which aims to recognize top women across industries that are making a difference in the development of STEM education and STEM jobs pipeline. Lorena's publications include The American Institute of Architects' *Small Business Resource Guide: Contacts to Contracts* and the 2011 *Women's Business Leadership Tribute*, which profiled 50 top executives from Corporate America.

Lorena is also a Project Manager with Diversified Search, the largest woman owned executive search firm in the United States.

Prior to moving to the United States, Lorena held several positions of increasing responsibility within the Government of the State of Sonora, including the Executive Office of the Governor. Lorena has a passion for politics and her political experience includes campaign management and political marketing. Most recently, she served as a senior member with the executive team that oversaw 101 parallel campaigns at the local and state levels.

Lorena holds a Bachelor Degree in Business Administration from the internationally recognized Tecnológico de Monterrey. A native of Sonora, Mexico, Lorena resides in Washington, DC with her husband Francisco.

# About STEMconnector™

STEMconnector™ responds to the demand from the community working in STEM Education and workforce development for an increased connectivity between entities improving our STEM-skilled workforce. Our mission is to provide information and resources that increase communication, encourage collaboration and promote sustainable and replicable approaches to STEM education interventions. By pursuing this mission we aim to realize efficiency gains through eliminating duplication and quality improvement by sharing best practices. Accomplishing these ambitious goals requires that we leverage our collective experience and that of our partners to develop innovative communications and products that reach diverse audiences in impactful and meaningful ways.

## **STEMconnector™**.org

The STEMconnector™ Directory contains over 3500 profiles of stakeholders in STEM Education and mapping the STEM Education activity of all 50 States and the District of Columbia. Through careful research, we identified these entities and mapped their roles in an intensive 6-month process. We then embedded the fruits of our research into a searchable online database. Since the launch, response has been impressive as hundreds of new organizations have been added to the database and we continue to improve and update existing content in collaboration with the listed entities. The STEMconnector™ Database has given us a tool to establish partnerships with a broad cross section of organizations working in STEM Education to increase our reach and connectivity in regions through working relationships.

## **STEMdaily™**

Content comes in a daily basis from a variety of sources: major news outlets, business wires, blogs and affiliate submissions. We are marketing this product to the entire STEM Education community. STEMdaily™'s aim is to connect the STEM Education by providing reliable and relevant news to a broad audience of stakeholders involved in STEM Education. The newsletter provides summaries of 10-15 stories across 10 different categories with links to the original content in an easy-to-read format.

## **STEM council** a project by STEMconnector™

The aim of the STEM Council Meeting is to lay the foundation for companies to establish internal structures to develop holistic STEM Education Strategies that conform to corporate objectives and strategy. Much like diversity councils serve as organizing structures around the principle of diversity, STEM Councils will bring together different perspectives on workforce needs and community involvement from normally unconnected sectors. Leadership from an executive committee member will be critical in order to ensure that STEM Councils have the resources in order to affect organizational change.

## **TownHall Conference Call** a project by STEMconnector™

The objective of these calls is to convene voices from across the stakeholder community to present perspectives from industry, government, education and non-profits working on these issues. We will continue these calls in 2012 focusing on timely and high profile issues relating to STEM Education and Workforce Development. The TownHall conference calls will convene high-level decision-makers within organizations across the public, private, academic and non-profit sectors with the aim of informing and connecting stakeholders by establishing common goals and patterns of excellence.

### **Directory**

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# **PERSPECTIVES ON WOMEN IN STEM**

# 100 Women Leaders in STEM: An Overview

By Edie Fraser, STEMconnector™

**A**cknowledging role models of STEM leadership is the purpose of 100 Women Leaders in STEM, but it also a “call to action.” As **Susan O’Day** of Disney reflects, “We need to be more aggressive in showing girls and young women role models and highlighting stories of successful leaders.” **Senator Kirsten Gillibrand** adds in her support, pleading that that “we need you.” We need this generation of women to stand up and serve as role models to encourage young women to develop the critical skills needed for the competitive workforce of tomorrow. As **Beverly Willis**, architect, writes, “Women need more opportunities to design and the world needs more women designers... It is urgent that the U.S. attracts more women to these disciplines and motivates them to stay.”

What’s clear to me is that women are a major solution to the STEM workforce deficiency. **Alka Dhillon** is right when she says, “Women and Minorities are important to STEM careers because more women are naturally matriculating by exponential numbers into the workforce every minute.” **Mina Stewart** of Verizon also summarizes the solution, adding “If women and members of other traditionally underrepresented groups joined the STEM workforce in proportion to their representation in the overall labor force, the shortage of STEM professionals would disappear.” Mina finds evidence of this in numbers from the Department of Labor showing that “from the 20 fastest growing occupations projected for 2014, 15 of them require significant mathematics or science preparation.”

The first American woman to fly in space, **Sally Ride**, in discussing women and girls in STEM, puts it bluntly, “The stakes could hardly be higher. Our country needs a new generation of visionary scientists and innovation to ensure our future prosperity.” Additional, **Dr. Annalies Corbin** with PAST Foundation affirms, “The future of our country rests in our ability to both capture and motivate the next generation of innovators.” **Lucy Sanders** of the National Center for Women & Information Technology joins in, stating that senior leaders need to speak out loudly and often about the importance of STEM to this country. A dedicated commitment to share and inspire at all levels is a requisite of leadership states **Sally Shuler** of the National Science Resources Center. **Joann DiGennaro**, President of the Center of Excellence in Education, goes back to the need for innovation and curiosity, expressing, “Only by careful problem solving, the development of critical thinking and excellent verbal and written skills can our workforce tackle critical issues of environment, health, energy, national security and agriculture.” **Melissa Gregson** with Teach for America explains how “education in STEM opens many doors, but it also teaches kids to solve complicated problems, be curious and ask critical questions and develop solutions

to challenges communities face across the country.” Indeed, STEM skills are not only important in training more scientists and engineers, they help the overall health of the workforce. **Sharon Hays** of CSC argues, “Too many young women shy away from studying in a STEM field because they think it locks them into a technical career. Nothing could be further from the truth—a STEM background is excellent preparation for leadership in careers from across the spectrum.”

**Senator Jeanne Shaheen** shares that we need to teach students early “to learn to “Love” the STEM fields.” She is proud to call New Hampshire the home to First Robotics and to have introduced legislation for The Innovation Inspiration Grant program. STEM competitions and grants are critical in inspiring future STEM leaders, just as they are today. **Dr. Laura Stubbs** of Department of Defense shares her personal story and how she is “the beneficiary of a “Women in Engineering” program... This was a big deal for me because prior to the summer program, I never contemplated what it would mean to become an engineer let alone practice as an engineer. I had my heart set of becoming a fashion model.”

**Rhona Applebaum** with Coca-Cola talks about the obligation of leaders and role models to ensure the success of the future generation and integrate STEM genius with business acumen. **Denise Ramos** of IIT comments, “One of the best ways to learn and grow is through good role models.” **Nan Mattai** of Rockwell Collins is one such role model, and states, “I have a responsibility to change the world for young women and underserved populations.”

## The Women of Tomorrow

**Jean Spence** from Kraft Foods adds, “Showing girls there are visible role models every chance we can will also help.” These role models understand their responsibility. When it comes to girls, **Karen Peterson**, through the National Girls Collaborative Project, shares RESULTS in how NGCP’s model “has become more powerful and effective as it has been replicated in 36 states, serving thousands of practitioners who in turn, serve more than 5 million girls across the United States.” **Judy Vredenburg** with Girls Inc. also produces results with their Eureka!® program, which engages girls in exploring STEM to inspire them to pursue post-secondary education and careers in these fields. Eureka!© combines interactive programs, personal development activities, and sports in an intensive experience on a college campus and STEM internships.

If **Anna Maria Chavez** with Girl Scouts of the USA could have a STEM genie, she would ask for: “a robust nationwide mentoring system for girls in middle school that could connect them to women in a variety of STEM fields” and “a STEM resource access center at the na-



tional and/or council level that can provide training, mentoring and resources to all Girl Scouts as they pursue programming in STEM.” It is clear that the entertainment industry has a big role to play. **Laura Kaeppler**, Miss America 2012, expresses that “But we should also rely on pop culture—from movie scripts and storylines to toys to role models like Miss America advocating for STEM.” This is where STEMconnector™ fits in and is the answer to the wishes Ana asks for. We strive to connect and pair all things STEM with those seeking partners. Anyone?

**Karenann Terrell** of Walmart adamantly states that women right “NOW” must know that future leaders will be standing on our shoulders, and women need to speak out and recognize that the pipeline for STEM is long and needs attention. She is joined by others profiled here. **Anna Park** of Great Minds in STEM shares that in the next 100 years, “we must be able to fly, not leap, to keep pace and surpass the global competition in STEM” She urges we do this by having more women pursuing careers in STEM.

### STEM Careers for Women Deserve Major Attention—Bring Support!

**Joan Kelly** of MasterCard puts it simply, “We have to continue to place equal importance to the ‘athletics of the mind’ as we do the traditional athletic programs.”

**Peggy Johnson** of Qualcomm shares, “leaders can help close this gap by encouraging one very large pool of untapped talent—women.” **Jan Morrison** of the Teaching Institute for Excellence in STEM says “It is about a woman creating a STEM world for women!” **Colleen Payne** with MCI Diagnostic Center adds that “the education of women is one of the most important issues facing women not only in our great nation but around the world.”

The universal sentiment from these women role models is that STEM is critical to the advancement of this nation, and it is no exaggeration. Fortunately, these women share the leadership needed to deliver a robust pipeline of women talent. They see the value in mentoring, and it shows in their passion for inspiring women and girls to step up into STEM careers. These 100 Women know we must attract and invest in great STEM teachers in order to advance the skills young women need to be successful in STEM. **Pilar Montoya** of the Society of Hispanic Professional Engineers emphasizes that it is a national imperative that we ensure the brightest minds from the U.S. In STEM are the ones leading the world in the future. **Mimi Lufkin** of the National Alliance for Partnerships in Equity (NAPE) shares, “Stand up for those coming after you, speak up and solve inequalities in your sphere of influence. Women leaders in positions of influence must use their power.”

Though women fill less than 25% of STEM careers today, we see that the numbers are getting better. With the help of these 100 Women Leaders in STEM, the next generation of women can and will make a big difference for STEM jobs and the future competitiveness of this nation. **Lisa Teague** of Rolls-Royce comments that students of all ages should know that STEM jobs are something to which they can aspire. This excitement for STEM will then engage them at every level of their education. As **Nancy Conrad** of The Conrad Foundation says passionately, the promise of innovation and entrepreneurship excites students into STEM careers. This promise is exemplified by the “Innovation Challenge” where smart kids become rock stars.

### STEM is Diverse

**Adriane Brown** of Intellectual Ventures articulates the need for more diversity in STEM, stating, “If we can’t embrace the most basic level of diversity, then we’ve squandered half of the brain power available to us to make the world a better place.” **Lani Hay**, CEO of Lanmark Technology believes that it is important to “honor diversity” as “it is important to level the playing field so opportunities exist for people from diverse backgrounds have access to the education needed to pursue a career in STEM.”

When trying to accomplish the goal of narrowing the diversity gap in STEM, **Lezli Baskerville** of NAFEO, explains, “We cannot realize this goal without broadening the breadth of the STEM workforce and its racial, ethnic and gender diversity.” Historically Black Colleges and Universities and Predominantly Black Institutions “are playing a significant role in moving the nation to this goal.” **Betty Shanahan**, Executive Director and CEO for the Society of Women Engineers states that in order “to be globally competitive, we must take advantage of our competitive advantage—our nation’s diversity.”

### The Time is Now

**Janet Foutty** of Deloitte Consulting, comments that we need to double down on our efforts to encourage, engage and empower women. “There’s no better time to start than today.” These women urge inspiring girls and women to take interest in STEM careers by describing them as they are—challenging and exciting.

As STEM leaders are those we learn from, these women inspire younger girls and all women through the ranks of science, engineering, math and technology. Bayer has contributed important research on women and STEM. Bayer’s **Rebecca Lucore** in discussing leadership, states that often talent gets overlooked or discouraged. Leaders need to be supportive and take action. **Jeanne McCaherty** of Cargill is also an advocate for a supportive

environment for women, adding, “As leaders, we need to provide an environment in which women feel that can contribute, grow and develop and succeed, without having to sacrifice others aspects of their lives.”

### Our Nation’s Competitiveness Revolves Around STEM and Innovation

**Padmasree Warrior** with Cisco states that “having a strong STEM education and workforce focus will continue to drive competitive edge for the U.S. in creating new industries and driving growth in the industry.” This standard theme runs throughout the statements of these women leaders. **Ellen Kullman** of DuPont shares that “the backbone of America’s economy is innovation, and as she and others argue, STEM is all about innovation. **Kim Reynolds**, Lt. Governor of Iowa, champions an innovative economy for her state, saying, “Strengthening STEM education and workforce are critical steps to assure America is competitive in the knowledge-based, global marketplace.” STEM has its part in the consumer marketplace as well. **Xiaochun Luo** from Avon, explains “Utilizing science and technology is the best way to surprise consumers.” **Michele Kang** of Cognosante understands that in order to address some of the major challenges in the health services industry “we need more ‘minds on health’ and more students to pursue a STEM education.” **Lisa P. Jackson**, Administrator of the EPA, affirms that “a strong STEM workforce will only become more valuable as we continue to broaden the conversation and ensure that communities all over our country have the health and environmental safeguards they deserve.”

**Barbara Hulit** of Fluke comments that our nation is “woefully unprepared to sustain the innovation that has made us a world leader.” As **Kris Rinne** of AT&T shares, innovation and technology are at the core of our future. “Without the right people who are prepared to succeed in STEM fields, the economic engine that has fueled the U.S. will simply not be able to continue doing so,” says **Karen Davies** of ATK. **Mary Ann Rankin** from National Math and Science Initiative believes that “encouraging excellence in STEM fields changes young lives and can spark the innovation that our economy needs.” **Deborah Bial** with Posse Foundation remarks that our country depends in part on “our ability to identify, nurture and support young leaders of diverse backgrounds entering the STEM fields, as scientific and technological innovation are inextricably linked to our national health, security and global competitiveness.”

**Jennifer Chayes** with Microsoft Research explains how it is important to develop domestic workforce and keep STEM jobs within our country “We need to train more scientists and technologists to model complex systems and perform large-scale computations on huge data sets.”

Who doesn’t want to go to space? The desire of so many kids to explore the universe has made NASA a crucial advocate of STEM education. NASA’s Deputy Administrator, Lori Garver, is still exploring: “I enjoy facilitating scientific discoveries that change the world and making it possible for our space program to create new capabilities for our nation. STEM is about a legacy because we’re always working on things that advance our capabilities.” As said by many of these women, STEM is about the unknown, about finding new things and challenging what is not yet solved. **Senator Kay Hagan** agrees to this concept when she urges us to think beyond, stating “If we are to win the jobs of the future in today’s global economy, we need to win the race to innovation and discovery.” **Sylvia Acevedo**, Founder of CommuniCard, is right on point when saying that “STEM careers are at the forefront of solving some of society’s most vexing issues and problems.”

### Focus is on the STEM Pipeline

Why Aren’t More Women Graduating with STEM Degrees and What can be done to get them into the pipeline and retaining them in STEM fields? How can we make this a national priority?

*The Department of Commerce’s Economics and Statistics Administration report from August 2011, **Women in STEM: A Gender Gap to Innovation** survey results show that women are vastly underrepresented in STEM jobs and among STEM degree holders despite making up nearly half of the U.S. workforce and half of the college-educated workforce.*

How do we educate girls and women that they have an opportunity to make a greater economic impact by choosing STEM? Women with STEM jobs earn 33 percent more than comparable women in non-STEM jobs—considerably higher than the STEM premium for men, according to a study by Bayer’s Making Science Make Sense.

Far too often, young women who do begin STEM degrees do not finish them. NSF has focused millions on grants to determine how to retain these women, and together with those represented in 100 Women in STEM, we will create the environment needed for young women to succeed. In the spirit of Rosie the Riveter, so, too, will we fight for women and girls in STEM careers. We need to engage girls early on and, most importantly, “keep them on fire” for STEM.

“This research adds an important unheard voice to the national discussion about how we as a country need to broaden student participation in STEM to include more women and minorities,” said Greg Babe, President and CEO, Bayer Corporation. In the U.S. education pipeline,

college STEM departments are important gatekeepers to STEM careers—indeed one of the most important links in the chain. Focus is needed for student and faculty support and universities to make this issue as a priority with plans and commitments. We need to stop the practice of “weeding out” students in introductory STEM courses.

BAE’s **Linda Hudson** affirms, “One of the most important steps to ensure there are more women leaders is to ensure there are more women in the STEM education pipeline in the first place.” **Amy Alving** of SAIC addresses a need to offer robust pathways for career advancement. **Tricia Berry** of the Texas Girls Collaborative Project believes it is important we are active in recruiting women to STEM classes, majors and professions in order to expand the STEM pipeline.

We need to “step up our efforts to build this talent pipeline,” says **Annette Bay** of Marathon Oil. **Laurette Lahey** of Boeing shares a view championed by others that we have to develop a strong pipeline of women in STEM careers and it takes total commitment to a successful pipeline with coaching and mentoring. **Beth Jacob** of Target Technology Services adds that “when we mentor and inspire young people through schools and community organizations that support STEM education, we’re helping to create future leaders for our own organizations.” As **Linda Sanford** from IBM says, “We rely on a pipeline of new talent emerging from universities with firm grounding in math, the sciences and technology.”

**Dr. Cora Marrett** shares how NSF’s Advanced Technology Education program seeks to improve the STEM education that will drive our nation’s economy. The program focuses particularly on community colleges which now enroll 6.5 million degree-seeking students, or nearly half of all college undergraduates. In addition, 5 million students are enrolled in workforce training and other non-credit courses and often receive job offers before they complete their training. **Senator Maria Cantwell** believes this is a crucial step, stating, “In order to maximize STEM-related job growth in the future, we must increase job-training and education in these critical.”

### These Women Leaders Emphasize Being Proactive in Building Awareness

As **Cecilia Kimberlin** of Abbott Laboratories shares, “Leaders play a vitally important role in advancing awareness and action to promote STEM, both inside and outside an organization.” **Neddy Perez** of Ingersoll Rand joins in, stating, “Leaders need to take a proactive role in STEM.” **Diane Bryant** of INTEL states simply that “we need to get women into the career itself,” which starts with awareness.

Giving exposure to women in STEM is the goal of this publication but that’s just not enough. As **Sherry Covell** of Harris says, “The best way to assure that there are more women leaders in STEM is to provide as much STEM exposure as possible to female students in middle school and high school” and throughout their careers. “We must communicate how rewarding and cool a STEM career is,” says **Sophie Vandebroek** of Xerox. **Robin Saitz** of PTC adds that mainstream media can promote women in STEM, and that we must find ways to “celebrate them.”

### Passion is Emphasized by Many

**Carey Smith** of Honeywell Technology Solutions affirms, “STEM gives me passion by developing the young people that will change the future of tomorrow. Encouragement is fundamental to women’s advancement as well as entering STEM careers. **Bernadette Rotolo** of Adecco adds that it is important encourage women by providing opportunities to try new areas in STEM careers. **Heidi Kleinbach-Sauter** with PepsiCo shares that she has passion in getting women excited about the fabulous opportunities in STEM careers.

**Ann Randazzo** of the Center for Energy Workforce Development (CEWD), stresses that STEM is the very foundation of a competitive workforce and that STEM Education and STEM Workforce go “hand in hand.” **Christy Wyatt**, formerly of Motorola, advises individuals entering careers to find something they are passionate about and find people who inspire them. **Lina Young** of Peabody Energy adds that thriving requires leaders who are willing to try something new. One way to inspire passion is by emphasizing fun. **Victoria Rockwell** of the American Society of Mechanical Engineers (ASME) emphasizes that creating women leaders in STEM starts in grade school by presenting STEM subjects as “discovery-based fun.”

**Linda Hallman** of the American Association of University Women (AAUW), points out that AAUW’s research report *Why So Few? Women in Science, Technology, Engineering and Mathematics* is filled with ideas on how to combat bias in education and the workplace. Suggestions include exposing girls to successful role models, teaching about stereotypes and developing a growth mindset to help girls succeed in STEM despite any bias against them.

### What About Mentorship?

According to Catalyst Study released June 12, 2012, “Women are even more likely than men to develop other talent. Sixty-five percent of women who received career development support are now helping to develop new talent, compared to only 56 percent of men. Moreover, 73 percent of the women developing new talent are mentoring other women. This study helps bust the



off-cited “Queen Bee” myth that women are reluctant to provide career support to other women and may even actively undermine each other.” (Catalyst: *The Promise of Future Leadership: A Research Program on Highly Talented Employees in the Pipeline, a longitudinal study on high-potential talent*).

The study makes a comparison between the men and women who are more likely to be developing others:

- Have themselves received developmental support (59%) vs. those who have not received this type of support (47%).
- Were sponsored (66%) as opposed to not receiving sponsorship (42%).
- Are in senior executive/CEO level positions (64%) vs. those at non-managerial levels (30%).
- Are more proactive when it comes to their own career advancement (63%) vs. those who are relatively inactive (42%) with regard to their own career advancement.

It is a universal statement. Mentorship and internships are critical for STEM leaders. Mentoring is a two-way street according to **Victoria Harker** of AES Corporation. “Women need to ensure they have a mentor or sponsor in a leadership position who can help open doors and provide entrée to others on the leadership team,” says **Lynne Doughtie** of KPMG LLP. **Cindy Halsey** of Cessna in discussing mentoring emphasizes connecting young girls with successful women. **Lisa Gable** of Healthy Weight Commitment Foundation says, “The key is mentoring.” **Catherine Didion** of National Academy of Engineering is assertive when describing the need for both mentorship and sponsorship and how both of them are different and important: “Mentors shine a flashlight on all the hidden corners in their organization so their protégé does not trip or fall down while a sponsor shines the light on the individual so that they become more visible and valued within the organization.”

**Madeleine Jacobs** of the American Chemical Society (ACS) is a model in making certain young women are supported. “I will see or talk to any young woman and offer her my time and advice on advancing her career and balancing her personal and professional life....Every individual has a responsibility to mentor girls.” **Janice Chaffin** of Symantec Corporation is strong in her affirmation, “As women leaders we need to pledge our own personal commitment of time and focus to mentoring up-and-coming women.”

**Ellen Smith** of National Grid makes it clear that mentoring needs to start in elementary school. **Susan Opp** of L-3 Communications, adds that not only is mentoring rewarding, it may be advantageous. “By rewarding employees for their meaningful contributions, STEM can lead

the way in achieving equality in leadership positions.” **Linda Mills** of Northrop Grumman shares that there is an obligation to assure that women not only pursue STEM careers, but also graduate. Moreover, once they join the professional ranks, it is important we provide mentoring and leadership support.

**Linda Rosen** of Change the Equation agrees that we must start early and encourage girls from an early age. **Sharon Glave Frazee** of Express Scripts, in reflecting on her own passion for encouraging young girls says, “We need to give passion for learning, encourage them especially as other interests compete for their attention, and provide them with opportunities to apply what they have learned.” Help kids connect the dots and learn how their interest in math and science can lead to an exciting future; one where they can have a better life. **Savannah Maziya**, a South African entrepreneur and CEO of Bunengi Group, says, “We need to showcase STEM careers to young girls early and provide them with the capacity to work themselves up the career ladder.”

**Sondra Barbour** is proud of three women at Lockheed Martin who have risen to top leadership roles there. She urges women to get involved in organizations that educate and inspire tomorrow’s scientists, engineers, and mathematicians.” **Lynn Dugle** of Raytheon advocates that once women enter the workforce, they need to be developed. This is true in the Raytheon Women’s Network, now 6,000 members strong. **Melendy Lovett** of Texas Instruments founded the “High-Tech High Heels” (HTHH) program, which has hosted over 700 girls for a summer physics camp. **Adriana Karaboutis** with Dell talks about the importance of “sharing our *real experiences* around what can be accomplished” to provide a tangible example of what young minds can aspire to.

## The Need for Partnerships

**Beverly Simmons** with Ten80 Foundation explains the urgent need to build partnerships between the education, nonprofit, and corporate sectors as “there are no silver bullets that bridge the gap between what education teaches and industry requires... to deliver truly effective STEM requires a commitment to research, a passion for working with numbers and an entrepreneurial approach to educational reform.”

Adopting schools is a focus at GE, IBM, Battelle and many others. **Charlene Begley** of GE shares the richness and importance of community support with MC2STEM High School in Cleveland. **Dawne Hickton** of RTI International Metals emphasizes partnerships and provides examples of several engineering schools. We need just to open the door and support opportunities, says **Trish Millines Dziko** of the Technology Access Foundation (TAF).



**Jennifer McNelly** with The Manufacturing Institute showcases the impact of their partnerships with Deloitte, Society of Manufacturing Engineers, and University of Phoenix on recognition, research and education in STEM.

**Chris McEntee** of the American Geophysical Union says that the future of our sustainable world depends on STEM and the contributions to its broad societal impact.

**Kimberly Reed** of the International Food Information Council Foundation comments that “we need to encourage our future leaders to focus on STEM and become a part of the solution that will nourish our ever-growing planet.”

### Leaders Admire Leaders

These pages will showcase over 100 Women Leaders in STEM. As mentioned before, it is important to show younger generations the great heights to which they can aspire. **Dr. Mary Good**, Chairman of ASTRA and recognized with the STEM Lifetime Achievement Award in this publication, shares how Marie Curie made an impact in her life: “Reading about her life and work was inspiring and I did follow her in some ways.” It is interesting to see how some of these women leaders admire younger generations. **Beverly Willis**, a legend in Architecture, shares that the woman in STEM she admires is Sheryl Sanberg with Facebook: “She is a 21st century workingwoman role model, a global leader in technology, and for her strong advocacy for the advancement of women’s leadership.”

### Commitment to STEM is Vital to our Country’s Future

According to **Jeniffer Harper-Taylor** of Siemens, “Our leaders need to be fierce advocates for STEM education.” It requires a world-class investment in STEM. **Jennifer Grove** with Southern Company shares in the commitment that we must re-energize our youth. All of these women see their responsibility as leaders. **Dr. Cindy Moss** with Discovery Education is right when she states that the most important trait for senior leaders to possess is the “willingness to take ownership for the quality of STEM education in their region.” **Shirley Malcolm** of AAAS shares that at every stage, people need support. **Marion Blakey** of the Aerospace Industries Association believes STEM careers are important not just for national security, but for job security of individual women. “We need to do a better job of re-training mid-career women by ensuring that they not only have opportunities for advancement but see others senior to them advance up the career ladder,” Blakey says. **Susan Crockett** of General Mills states that senior leaders hone their skills to provide support and mentoring for more junior scientists in STEM disciplines.

**Dr. Reagan Flowers** of CSTEM says it beautifully, “As a leader in STEM education, the guiding principles that motivate the work I do professionally and personally to advance STEM education is engaging, exciting, innovative.” With this, STEM leaders need to serve as mentors.

**Dr. Wanda Austin** of The Aerospace Corporation shares that we need to remember the obstacles faced and take positive action to guarantee that the next generation of girls know that they CAN succeed in STEM fields.

**Phyllis Campbell** of JPMorgan Chase adds that it is STEM education that will enable us to prosper and “create a world that we can’t even imagine today.”

### Advance the Numbers!

Diverse reports including Census, Commerce Department, and Catalyst conclude that:

- Women in STEM are less than 25% of new jobs.
- Women are 3% of Corporate CEOs.
- Women are only 17% of board positions.
- Women are only 17% of Congress.

Together, we can change the numbers. Just take a look at the 178 (and growing!) women’s and girls’ organizations reviewed on the STEMconnector™ site. We urge you to take advantage of STEMconnector™ and explore all the resources we’ve aggregated in pursuing our call to a better country through better connected people and resources.

To the Bayer Corporation for its Survey, the Commerce’s Department’s ESA material, and the Catalyst Report, thank you for your excellent research and contributions in garnering more women in STEM. We will raise the bar!

We would also like to thank Washington STEM, National Science Foundation (NSF), Bayer USA Foundation, Abt Associates/TERC, American Association of University Women (AAUW), Susan Lavrakas with Aerospace Industries Association, Society of Women Engineers (SWE), Center for Energy Workforce Development (CEWD), CSC Corporation, The American Institute of Architects, Girls Inc. and our STEM Solutions Summit partners: US News and World Report and Innovate + Educate for their special contributions to 100 Women Leaders in STEM.

And last, but certainly not least, congratulations and thank you to the over 100 women profiled in this site and their teams for making this publication possible. ■

# Let's Seize The Moment and Live Our Ideals

By Ruby Smith Love, Chief Development Officer  
Washington STEM

**O**ur country is an innovative leader among nations with distinguished democratic principles and a highly educated populous. Yet we see a growing disparity between this ideal and our current reality. This is most striking when considering the inequitable participation of women and, in particular, women of color in science, technology, engineering, and math (STEM) fields.

Why focus on STEM? It's simple: STEM is a game changer. In today's science and technology-rich world, STEM equals opportunity. STEM isn't just for tomorrow's scientists and engineers. Innovation and technology changes have led to demand for STEM competencies beyond traditional STEM occupations. The creativity and critical thinking skills that come with a foundation in STEM are in high demand for many jobs across our nation. Indeed, in the next decade alone, most of the 30 fastest growing careers will require STEM skills. Just as language literacy was a requirement in the 20<sup>th</sup> century; STEM literacy is a requirement in the 21<sup>st</sup>. In sum, STEM is the best ticket to a good job, meaningful career, and a secure future in our global economy.

Yet too often, women are on the sidelines of this growing STEM tide.

Consider the facts: While citing data from the U.S. Department of Labor (2008) and a National Science Foundation study (2007), a recent Girl Scout Research Institute study noted that although women fill close to half of all jobs in the U.S. economy, less than 25 percent fill STEM jobs. Despite the rapid increase of college-educated women, there is a limited crosswalk between those graduating with STEM degrees to those women gainfully employed in STEM careers. The age-old burdens of gender bias, lack of role models, and exclusionary practices along the education continuum have created a difficult road for women pursuing a career in STEM.

Women of color or of indigenous heritage experience even greater challenges resulting in disconcertingly low numbers in the STEM workforce. This has roots in our education system where many engineering and computer science programs at public universities recently graduated their first woman of color in the last ten years.

As our nation seeks to maintain its competitive edge in today's global economy, we can't afford to leave any talent on the table. We need to ignite the imaginations

and capacities of all young people. Engaging women and women of color in STEM is pivotal to this effort. In the 21<sup>st</sup> century, we must train our focus on removing the gendered and racial clouds that hover over STEM fields to engage more women and women of color in STEM.

So what can be done?

The American Association of University Women (AAUW) report on women in STEM provides some clear recommendations that we should rally around. This includes exposing girls to successful female role models in STEM, teaching students about the impact of pervasive stereotypes, helping girls recognize their career-relevant skills, and defining clear performance standards and expectations among others.

We can also support the many excellent efforts across the country working to grow girls' confidence and competence in STEM. At Washington STEM, a nonprofit advancing STEM education in Washington State, we invest in and lift up such breakthrough ideas and promising practices. For example, we awarded a \$23,500 Entrepreneur Award to bring TechREACH, an innovative out-of-school program that engages underserved and underrepresented students, particularly girls, in STEM to students at Ellen Ochoa Middle School in Pasco, where 95 percent of students are eligible for free and reduced lunch. Year-end data collected showed that the girls who participated in the program showed a boost in interest in technology classes and careers.

Finally, we should bring new voices to the table, including those who have historically been left out of this conversation. We experienced the power of such an engagement at *We are STEM*, a Washington STEM hosted gathering for underrepresented and indigenous STEM professionals to connect with and learn from one another. With participants coming to Washington from as far away as Pennsylvania and California, we know that there is passion and dedication in the STEM professionals of color community to inspire the next generation.

Improving STEM education for every student will take all of us working together like never before. Our kids can't wait and neither can our nation. The time is now to tear down the barriers and disenthral ourselves from what we have found comfortable and safe. The time is now to seize this moment and welcome the 21<sup>st</sup> century with a lived equity that matches our proud ideals. ■

# Inspiring Quality STEM Education: A View from the National Science Foundation

By Cora B. Marrett, Deputy Director, National Science Foundation (NSF)

President Obama's Council of Advisors on Science and Technology, or PCAST, depicts STEM education as having two goals: To prepare and inspire students. But, if STEM education in the United States is to fulfill those expectations, then its proponents must also be prepared and inspired. I consider the National Science Foundation to be among the proponents.

The National Research Council report *Successful K-12 STEM Education: Identifying Effective Approaches in Science, Technology, Engineering, and Mathematics* released last fall contains a very encouraging message—coming as it does only a year after another National Academies report described the United States as rapidly approaching “category 5” storm status regarding the nation's needs in STEM education. It was just five years earlier that the same NRC committee had warned of a “gathering storm” based on indications that conditions in education—especially in K-12 STEM education—had steadily deteriorated over the years.

The report on successful schools implies that we, collectively, can deliver K-12 education from rack and ruin, if we understand and underpin the circumstances associated with success. That report observes that education too often lacks the necessary ingredients for success. As a consequence, U.S. students, time and again, compare unfavorably with their counterparts from other nations.

The Program of International Student Assessment, or PISA, provides one example. Among students of 24 nations, U.S. students outperformed those of only four other nations in mathematics. Moreover, three of the countries against which we fared better are defined as developing economies.

The new NRC report suggests the situation is neither entirely bleak nor completely insurmountable. Nevertheless, modifications will require deep inquiry by the various STEM-education sectors into their educational practices and contributions. The report offers encouraging observations for the National Science Foundation in supporting various directions NSF has taken over the years. At the same time, the report identifies important challenges.

The good news is the report highlights the imperative for research on STEM education. Systematic knowledge about policies, practices, and outcomes is critical. Mere hunches or even exciting arguments do not substitute for systematic examination of successful K-12 education, or with successful education at any level. And there is convergence on the likely ingredients of success: Effective instruction and well-prepared teachers.

Often, effective instruction is captured through “authentic experiences” that provide students opportunities to understand how scientific investigations actually take place. If students are to develop that understanding, it is essential that teachers also have authentic experiences. In other words, you cannot advance one category without attending to the other.

We like to think NSF is especially well-suited to promoting authentic experiences. Within our sphere, for example, we focus on education in the context of the several domains of science and engineering, which allows us to incorporate research and developments in those areas into STEM education. This model ensures the knowledge students and teachers receive is at the cutting edge.

However, the report emphasizes the need for more research literature on the elements of successful schools to help us understand how to scale up, expand and extend experiences. The report also challenges NSF—and the nation at large—to attend to the persistent gaps in achievement among students of different racial, ethnic, and socioeconomic backgrounds. In the words of another document from the National Academies, the aim must be success for all. But, we as a nation have not yet met that ideal. It is imperative for the National Science Foundation to join with others to do so.

Similarly, the report also reminds us just how important collaboration is—across fields, institutions, and agencies. More representation across agencies would help achieve our goals. As we further examine the report, we at NSF will be particularly attentive to the connections we must forge to expand successes in STEM education. In doing so, I urge you to regard NSF as a partner in dampening the forces pushing STEM education ever closer to category 5. Together we can avert disaster. ■

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(Adapted from remarks delivered September 20, 2011, at Drexel University regarding the NRC Report: Lessons Learned from Successful Schools)

# American Women More Than Ready to Take Their Place at the Nation's STEM Table

By Rebecca Lucore, Executive Director, Bayer USA Foundation

Science, technology, engineering and mathematics or STEM fields are often referred to as “elite.” Not only because they attract the best and the brightest, but also because those involved are responsible for the scientific and technological advances that shape our world. They quite literally create the future.

Today, women, African-Americans, Hispanics and American Indians make up fully two-thirds of the population (and growing), but only one-quarter or less of the STEM workforce. That means the future is being created without the ideas, input, vision and perspective of much of our citizenry.

And make no mistake, perspective matters.

STEM fields are influential and powerful. Scientists and engineers—and those who fund and support them—choose the topics and the phenomenon to be researched and those that are disregarded. Until women researchers got involved, mastectomies, and not lumpectomies, were considered the best course of treatment for breast cancer. And for years, because there was so little research done on heart disease and women, it was not considered a major women's health issue.

That is why participation by women in STEM matters.

In 2010, we used our *Bayer Facts of Science Education* survey to examine the roots of underrepresentation by polling the nation's female and minority chemists and chemical engineers. We were shocked when 40 percent said they had been discouraged from pursuing STEM at some point in their lives. The majority of them said college was the place it happened and their professors were the people responsible.

That one finding became the impetus of our latest survey. Research, our own included, has shown that girls and boys are equally interested in science. In grade school they believe that science is as much for girls as it is boys. College, it seems, is a key chokepoint in the American STEM education pipeline. It is a point that quite literally makes or breaks the next generation of scientists and engineers, and one where we lose women and minorities.

In polling faculty who chair STEM departments at the country's top 200 research colleges and universities, we wanted to gain a better understanding of the undergraduate STEM environment in which female and minority students make important decisions about their careers and the future.

For female STEM students, the story that emerges from the STEM department chairs is positive. Female students, they say, arrive at college the best prepared academically to study and graduate with degrees in STEM. So, what happens? Why aren't there more women physicists, engineers, mathematicians and computer scientists?

And, if female students are best poised for success, why isn't there more of an effort made to retain them in STEM courses? Only one-third of the institutions represented in the survey have formal STEM diversity programs aimed at women and minorities.

The chairs say their female students have made enrollment gains in certain STEM fields. These gains, however, have not translated into the STEM workforce, the STEM industry boardroom or into STEM academic leadership positions. In fact, only 13% of the STEM department chairs in our survey were female.

Georgia Tech sociologist Dr. Mary Frank Fox and her team have studied undergraduate STEM programs for women at colleges and universities nationwide. They've found ongoing issues with the atmosphere toward women in the classroom, the structure of academic programs, and poor faculty attitudes.

In our own research, more STEM department chairs say traditional introductory academic approaches that weed out students early on from STEM programs are more harmful than beneficial, and more so to female and URM students. Fox's research has found undergraduate STEM teaching environments “often portray science and engineering as highly competitive, masculine fields.”

In February, the President's Advisors on Science and Technology, known as PCAST, issued the report, “Engage to Excel: Producing One Million Additional College Graduates in Science, Technology, Engineering and Mathematics.” Noting that fewer than 40 percent of college students who intend to major in STEM actually graduate with a degree in a STEM field, the report offers concrete strategies for transforming first- and second-year college STEM courses with practices designed to retain more STEM students, especially women and minorities.

Earlier this spring, Dr. S. James Gates, co-chair of the PCAST committee that produced the report, joined other experts at a forum Bayer hosted on how colleges and universities can more effectively recruit and retain women and minorities in undergraduate STEM programs. A number of consistent themes emerged during the course of the forum, including:



**Transform Introductory Undergraduate STEM Courses.** The PCAST report calls for replacing the traditional approach (professor lecturing to large numbers of students in cavernous, impersonal classrooms) with teaching and learning that emphasizes “active engagement.” The former, says PCAST, is particularly detrimental to female and URM students, something confirmed by our latest Bayer Facts survey.

**Foster Collaborative Learning.** The computer science faculty at Harvey Mudd College in Claremont, Calif., and the University of Maryland Baltimore County's (UMBC) Meyerhoff Scholars program both have replaced highly-competitive atmospheres with group learning that fosters teamwork and is much closer to how STEM professionals actually work in a real-world setting.

**Provide Authentic Research Opportunities for First- and Second-Year STEM Undergraduates.** Instead of the classical experiments that produce tried and true results year in and year out, PCAST favors getting freshmen and sophomores involved in real research projects similar to professors' own.

Early engagement and immersion in research is a hallmark of a number of “best practice” undergraduate STEM programs. STEM students doing STEM include UMBC's Meyerhoff Scholars, the Bayer Scholars at Duquesne University's School of Natural and Environmental Sciences and the many undergraduates involved in the National Science Foundation's nationwide Louis Stokes Alliance for Minority Participation or LSAMP program.

**Eliminate the “Macho Effect.”** With the national average of women receiving computer science degrees hovering around 14 percent, in 2005, it was even lower at Harvey Mudd. Concerned, the faculty made a number of institutional changes by redesigning courses and promoting group learning.

Another was eliminating the “macho effect.” This is the classroom environment created when students with more experience are vocal about it and, in turn,

intimidate students with less experience. So, the faculty did something they never thought they would do. They streamed the students away from one another into two separate classes. The group with less programming experience consisted largely of female students, while the more experienced group was male. When they streamed them back together at the end of the semester, they found absolutely no difference in academic performance between the two groups.

With these changes, Harvey Mudd's computer science department has increased the number of female computer science majors triple-fold from 10 percent to between 35 and 42 percent annually.

By eliminating an atmosphere in which the female students feel like second class citizens, Harvey Mudd serves as a model for increasing female participation in a STEM field that continues to have difficulty attracting and retaining women. And it's being emulated by other colleges, including Bucknell University in Pennsylvania and Northwestern University in Chicago.

**Changing Faculty Attitudes.** Inspiring and encouraging faculty to think about culture change involving the redesign of STEM courses is essential, but so is changing their attitudes about who can and cannot succeed in STEM. Bottom line, there's a lot of talent out there and none of it should be wasted.

Public awareness of STEM diversity as a national imperative has grown steadily over the last several years. More than ever, Americans recognize the need to tap the talent and creativity of all of our citizens and ensure everyone, regardless of gender, race or ethnicity, has a place at the STEM table, whether that place is in physics, chemistry, engineering, biotechnology or information technology.

We're at a point in our history where this is our only option for staying America's innovation course. And everyone, including college presidents, chancellors, provosts, professors and department chairs, needs to get on board. ■

# The Experience of Women of Color in STEM

By Lorelle L. Espinosa, Ph.D., Senior Researcher at Abt Associates and Maria (Mia) Ong, Ph.D., Senior Project Leader at TERC

It is well established that the U.S. is facing serious challenges in the production of a highly trained STEM workforce, not the least of which is due to our failure to include students from underrepresented backgrounds—particularly women of color—across the myriad of STEM fields and at all levels of education and industry. As national demographics of college-age students are increasingly comprised of underrepresented minority populations, and as the college-going population remains majority female, it is both timely and imperative that we build the capacity of women of color to assume advanced STEM positions.

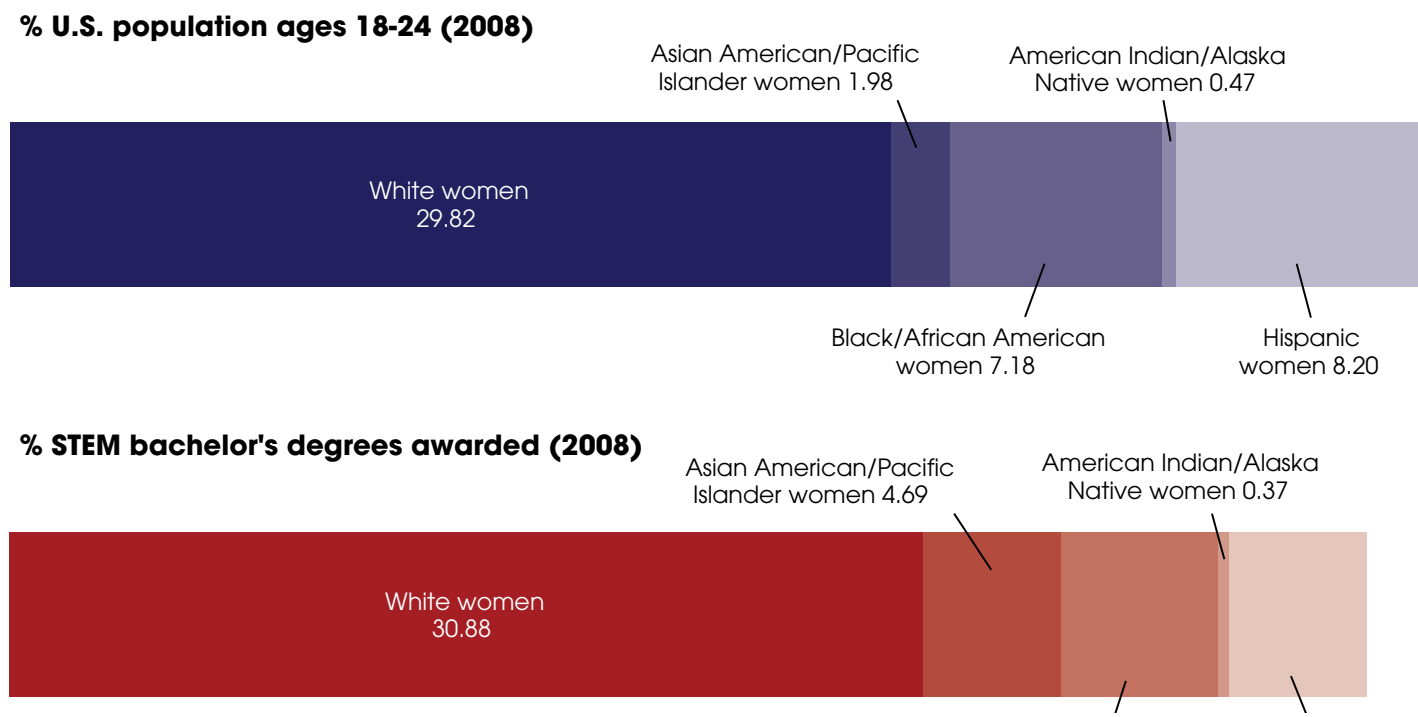
Because of their race/ethnicity and gender, women of color in pursuit of STEM fields are caught in a “double bind”—a challenge first brought to national attention by Shirley Malcom, Paula Hall, and Janet Brown, in their seminal 1976 American Association for the Advancement of Science report, *The Double Bind: The Price of Being a Minority Woman in Science*. Yet, over thirty years later, minority women are still disproportionately underrepresented among women earning bachelor’s and doctoral degrees in STEM fields when compared to their representation within the U.S. population. And while Asian American/Pacific Islander (API) women

are overrepresented among female degree recipients, they are often not promoted to leadership positions, and many API groups remain shut out of STEM higher education and careers, including women from Vietnamese, Hmong, Native Hawaiian, and Filipino communities.

To address these disparities and shed light on the barriers faced by women of color in STEM, as well as successful practices in attracting and retaining women of color in these fields, TERC and the UCLA Civil Rights Project recently led a three-year national synthesis study of empirical literature on this population over the last 40-plus years.<sup>1</sup> While the study focused on postsecondary education and early- and mid-career stages, its findings speak volumes to those challenges and successes that women of color face at every juncture in their pursuit of STEM careers. There emerged evidenced calls to action that have the potential to strengthen education practice and educational policy, as well as future research on this important population:

- **It is not about lack of interest.** In fact, women of color have been observed to have *greater* interest in STEM careers at college entry than their white

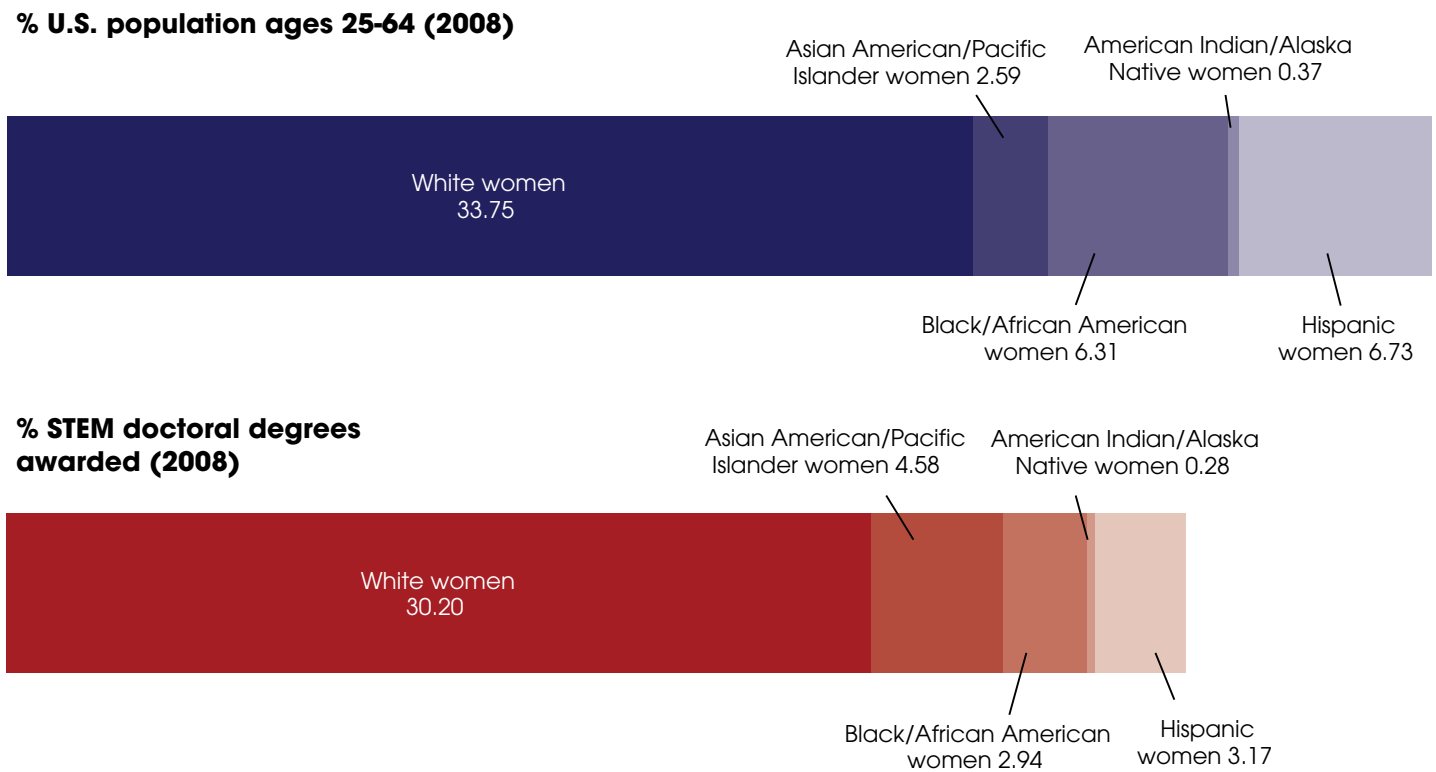
**FIGURE 1. 2008 female U.S. population (ages 18–24) and STEM bachelor’s recipients for selected racial/ethnic groups.**



Source: National Science Foundation, 2011

<sup>1</sup> *Inside the Double Bind: A Synthesis of Empirical Research on Women of Color in Science, Technology, Engineering, and Mathematics* (Pls Maria (Mia) Ong (TERC) and Gary Orfield (UCLA)); NSF-DRL # 0635577.

**FIGURE 2.** 2008 female U.S. population (ages 25-64) and STEM doctoral recipients for selected racial/ethnic groups.



Source: National Science Foundation, 2011

peers. Even on selective campuses, women of color freshman students are several times more intent on pursuing STEM degrees than are white women, yet they leave STEM at higher rates.

- Environment matters.** Many scholars attribute this lost talent of women of color to educational and occupational institutions’ failure to fully develop math and science talent, pointing to the college social and structural environment as the main source for the attrition of women of color in undergraduate STEM education. There remains negative gender and racial climates on college campuses, particularly within STEM departments, that severely discourage women of color from seeking STEM degrees.
- Targeted supports are crucial.** Like all students, women of color face challenges in financing their education, particularly at the graduate level. In addition to financial support, women of color who succeed in STEM received recognition as scientists from faculty and peers, had a strong self-concept in their knowledge of STEM disciplines, and were able to perform this competency through research experiences and other hands-on activities. Nonetheless, isolating peer environments and biased treatment by faculty and fellow students is equally damaging and has the power to dissuade women of color from continuing in their pursuit of STEM.

- Enrichment is key.** STEM-specific supports that target women, minorities, and women of color in STEM— like those funded by the National Science Foundation and National Institutes of Health—have the potential to create safe environments and powerful communities of support and encouragement. Programs that incorporate family and community are also important as women of color often draw upon multiple sources of support when traversing STEM pathways.
- Women empower themselves.** For all the barriers described, many women of color are also highly adept at utilizing their constant struggle as a source of self-empowerment. Thus, creating environments that allow women to tap into this inner-warrior is critical; as are college faculty and student support staff that can recognize and act when women are on the verge of departing from STEM.
- Transition points are important.** We already know that women are lost at every point of transition along the STEM pathway, including from undergraduate to graduate school. There were several instances of women of color experiencing a difficult transition from community-minded undergraduate institutions, such as Historically Black Colleges and Universities (HBCUs) and liberal arts colleges, to research-intensive universities. Just because women of color enroll in graduate education doesn’t mean they don’t still

require active formal and informal supports, including mentoring, especially at the departmental level.

- **Work-life balance is necessary.** Family friendly and other work-life balance policies and practices are of great importance to women of color in STEM. Women of color further take on the additional work of mentoring other young women of color, serving on university committees, and taking on the brunt of “diversity” work within their department or workplace, all of which should be commensurately valued and rewarded. We applaud the National Science Foundation’s formation of a career-life balance initiative for women in STEM and the agency’s consideration of how the lives of women of color may be unique.

Despite a body of empirical research that spans over forty years, there is still much needed inquiry on just what “works” for women of color in STEM. Researchers are wise to examine sub-contexts such as the campus and departmental climates at differing institution types (e.g., community colleges, HBCUs, Hispanic Serving Institutions), including teaching and learning environments. Since each campus environment is different, institutions must assess the distinct challenges facing their women of color and collect and report on data at the intersection of gender and race/ethnicity.

The most understudied population within our synthesis work was that of postdoctoral, early- and mid-career professionals, including women of color STEM faculty. Indeed, we need a national picture of the STEM pipeline for all populations, from K12 to career.

The policy agenda is also clear, with a striking need to build the educational capacity of institutions enrolling a large number of women of color (e.g., community colleges and Minority Serving Institutions) and hold colleges and universities accountable for reaching and maintaining their STEM diversity goals. This further means support for financial aid programs, STEM enrichment opportunities, and supports that explicitly address each step along the STEM pathway. Raising political will is also important—national councils and influential individuals can do more with less in an economically strained environment by raising the issue of women of color in STEM—a practice that can lead to financial investments by private philanthropies and corporate foundations. Finally, it is important that successful efforts are elevated and shared across federal and state agencies and institutions of higher education. Increasing the number of women of color in STEM fields is a distinct challenge worthy of our attention—one that has grown beyond philosophy and into necessity. ■

# This Is A Rosie the Riveter Moment for Women in STEM

By Ana Kay Yaghoubian, STEM Marketing Manager  
American Association of University Women (AAUW)



In *When Everything Changed: The Amazing Journey of American Women from 1960 to the Present*, author Gail Collins discusses women's work throughout the 20th century. She notes that as the workforce grew, society accepted and even encouraged women's participation. They were excused from housewifery to become telephone operators, receptionists, teachers, secretaries—and during World War II even factory workers and welders—because the need for these jobs was desperate. Collins highlights a November 1966 headline in *Time* that sums it up best: “A Good Man Is Hard to Find—So They Hire Women” (and pay them less, but that's another issue).

Women have come a long way, as the saying goes, and Collins' observation about the American workforce still holds true. But instead of retail jobs or office filling, the next frontier for women in the workforce lies in science, technology, engineering, and math (STEM). In the next few years, tech-related fields are expected to produce 1.4 million new jobs in the United States, causing some to worry that Americans will be unable to fill these well-paying jobs.

Women have come a long way, as the saying goes, and Collins' observation about the American workforce still holds true. But instead of retail jobs or office filling, the next frontier for women in the workforce lies in science, technology, engineering, and math (STEM). In the next few years, tech-related fields are expected to produce 1.4 million new jobs in the United States, causing some to worry that Americans will be unable to fill these well-paying jobs.

But how can we come up with the numbers needed to fill these roles and maintain our global competitiveness when research shows women are set up to fail? AAUW's 2010 research report, *Why So Few? Women in Science, Technology, Engineering, and Mathematics*, documents how cultural stereotypes stand in the way of women's success in STEM. The report notes that while there is no difference in average math scores between girls and boys, school-age children learn of the negative stereotypes about girls' math abilities early. This awareness adversely affects their math performance and perception: Even when they have good grades, girls assess their math abilities lower than boys do.

The negative effects of such stereotypes stay with women after graduation. In the workplace women continue to experience bias and even discrimination—both unconscious and explicit—in science and engineering occupations. Women in these traditionally male-dominated fields are more likely to be considered less competent than their male peers. And when they are successful, they are deemed less likable than their male colleagues, which means women cannot be both successful and well-liked, two key components to professional advancement.

Meanwhile, businesses and countries all across the globe are preparing to take STEM to the next level; the United States must do the same if the country is going to survive and thrive among new competition, and we can start with our workforce. We can start with women.

AAUW has worked with educators, parents, journalists, and legislators to implement the best practices from *Why So Few?* to address this issue. We've expanded outreach to policy makers in particular by advocating for legislation that aids efforts to recruit and retain women in the STEM workforce. We have also made STEM a focus of our philanthropy: A large percentage of our graduate-level fellowships go to women pursuing education in STEM fields, and funding is given to community and campus projects that promote STEM fields to women and girls. Currently, AAUW is working to launch two nationwide STEM programs for girls. These programs have already been tested on a local level, and the results show that they are successful in promoting STEM careers to girls and their parents.

The issues of workforce, economy, and innovation surrounding STEM will not be solved without women, but women won't be involved if powerful stereotypes keep them out of the pipeline. Through research, advocacy, philanthropy, and programming, AAUW hopes to make STEM stereotypes a thing of the past and a capable STEM workforce of women and men the key to our future. We can do it. ■



# Workforce Development

By Susan Lavrakas, Director Workforce, Aerospace Industries Association



The Aerospace Industries Association in 2006 established a Workforce Working Group to ensure that sufficient quality and quantities of U.S. engineers and other technical workers would be available to fill the hundreds of thousands of positions that would open in our industry as baby boomers retired in coming years. The

2005 National Academies' report "Rising Above the Gathering Storm," which documented American students' waning interest and disappointing performance in math and science, was especially alarming to aerospace leaders who—while accustomed to cyclical variations in the workforce—viewed the looming retirements akin to falling off a cliff. The Workforce Working Group was tasked with identifying best practices in science, technology, engineering and mathematics (STEM) education and workforce preparation that our companies could rally behind and support more robustly. They were also instructed proactively to collaborate with other stakeholders—business, government, and philanthropy—for alignment and leverage to produce a qualified workforce for the future.

Within months of its first meeting, the Workforce Working Group was made a standing committee of AIA. In 2009 an additional, more senior entity called the Workforce Steering Committee was formed. Members of the Workforce Steering Committee, appointed by and reporting to CEOs of AIA member companies, are the focal point for all STEM education and workforce-related issues in the corporation; and together they guide the projects and activities of the Workforce Committee. Furthermore, industry executives urged AIA to spearhead the formation of a coalition of coalitions, representing many different business and industry groups, to join forces in common cause on workforce issues. Thus, the Business and Industry STEM Education Coalition was launched in 2010. The level of attention and amount of organization and effort at AIA underscores the importance the industry's leaders attach to preparing and attracting a capable and ready 21<sup>st</sup> century workforce that will sustain national security and economic competitiveness.

AIA's interest in and active leadership on STEM workforce predates the 2008 economic downturn, a de-

velopment that both reinforced the importance and increased the urgency of solving the challenge of attracting more American young people into STEM careers. While many American workers have lost their jobs and been unable to find equivalent or any employment, companies in our industry and other high tech sectors have had openings for good, well-paid jobs that we cannot fill. The recession made visible and highlighted the mismatch between the education system and real world employment opportunities.

As a consequence, the conversation has shifted from how does our industry attract its share of the talent pool, to how do we exert leadership and galvanize the business community in partnership with other stakeholders to drive change in STEM education and workforce preparation at the federal, state and local levels. Our executives recognize that the business community must do a better job of identifying and communicating both current and future job opportunities and requirements—in terms of specific characteristics, capabilities and skills—to academic institutions and school systems. Business, government, and education at every level must function cooperatively to inspire, nurture and support young people to fulfilling lives and careers in fields they find most exciting and rewarding.

Given the changing composition of the American workforce, our CEOs are particularly dedicated to attracting and preparing under-represented minorities and females for STEM jobs. Their commitment to diversity and inclusion in the workforce is based on both principle and pragmatism. Since STEM careers are among the most lucrative and rewarding, equity and fairness demand making opportunities in these fields visible and accessible to all students. From the standpoints of competitiveness, security, and economic success, we as companies and as a nation cannot afford to waste any human talent or potential. What is more, business leaders know that diverse teams, bringing multiple perspectives to bear, are stronger and perform more effectively than less inclusive groups.

The 100 Women Leaders in STEM recognized and honored in this publication have made outstanding professional and personal contributions to advancing the STEM workforce—either through achievements as STEM practitioners, or as tireless advocates for expanding STEM education and workforce opportunities to all Americans. We thank and salute them as role models and workforce avatars. ■

# Creating a Culture of Inclusivity for Effective Outreach Programs

By Betty Shanahan, CAE, F.SWE, Executive Director & CEO, Society of Women Engineers

As the number of jobs requiring engineering training grows, women and minorities are severely underrepresented in the number of students preparing for these careers. This imbalance threatens our future economic competitiveness, quality of life, and national security. We need to meet the challenge of increasing the engineering education system with interested, qualified students that reflect the demographic of our country.

The value of increasing the participation in engineering of women and other under-represented populations goes beyond increasing headcount. The full participation of all segments of the American population is necessary to realize the value of diversity. Innovation will flourish when diverse individuals bring differences in perspectives, experiences, communications, and values to a workplace team to collaborate in creative ways to generate new ideas. To be globally competitive, we must leverage our nation's competitive advantage—our diversity.

As science, technology, engineering and math (STEM) professionals, we have a unique insight into how to improve participation in the engineering pipeline. The Society of Women Engineers (SWE) invests significant time and financial resources—donated by our members and partners—into increasing the number of young women who pursue engineering degrees. Stories of successful interventions abound, but we—at SWE and across the engineering profession—have not “moved the needle” sufficiently.

In an effort to recruit more women and minorities into STEM fields, four leading diversity-focused professional engineering societies joined forces to create *Outreach 4 Change* (4Δ <http://outreach4change.org>), made possible through funding from the National Science Foundation (HRD-0937306). 4Δ's mission is to make engineering a possibility for all girls of all races and ethnicities. The American Indian Science and Engineering Society (AISES), National Society of Black Engineers (NSBE), Society of Hispanic Professional Engineers (SHPE) and Society of Women Engineers (SWE) are collaborating to lead an effort to increase the outreach capacity and effectiveness among engineering society leadership, staff and outreach volunteers who are striving to connect and engage girls in STEM.

The objectives of 4Δ are; to build the outreach capacity among professional staff and volunteers who develop and offer these programs, engender a culture of assessment in the outreach community, create cultural awareness and integrate proven practices for under-represented groups into outreach strategic planning and implementation, and create a network of knowledgeable society staff, members and leaders commit-

ted to developing effective K-12 outreach activities with measureable outcomes.

4Δ focuses on creating outreach and educational activities that are research-based, assessment-based and inclusive. This means providing easy access to research that supports STEM outreach; replacing assumptions, whether intended or unintended, with research-based activities; implementing consistent assessment practices; utilizing messages that have been tested to resonate with boys and girls from under-represented groups; and integrating cultural awareness into outreach activities.

4Δ has resources from thought leaders from academia, engineering associations, and industry that cover a breadth of hot topics in outreach education including systematic inclusion, culture of assessment, bias literacy, assessment and proven best practices. 4Δ incorporates the research and recommendations from the National Academy of Engineering's Changing the Conversation (CtC) messaging initiative.

SWE is incorporating 4Δ recommendations within our Society's outreach, including society-level programs; web-based and printed materials for the public; and materials and training available to SWE's 400+ sections. This includes:

- **Member Training** SWE's Maximizing the Message initiative has trained 2,000 members to leverage the messaging research and recommendations of the CtC project and research-based guidelines on mentoring girls
- **Reuse of CTC-branded material:** SWE uses curriculum from WGBH's *Design Squad* and the web-based and print material from *Engineer Your Life* for high school girls and *Engineer Girl!* for middle-school girls. This enables SWE to have effective material and focus on our unique value and expertise— the interaction between a woman engineer and a girl or her adult influencer.
- **Programs for adult-influencers:** SWE's signature events and many local events include parallel sessions for the parents, teachers, and other adults who accompany the girls. These sessions reinforce the messages with the adults, who in turn influence the girls.
- **Assessment** Society-level events utilize outcomes-based assessments to identify what works and opportunities for improvement.
- **Recruiting Diverse Participants** Corroborating the adage “you get what you measure,” the diversity of participants in SWE's society-level programs dramatically increased once demographics were tracked.

For more information, including resources and assessment tools, please visit [outreach4change.org](http://outreach4change.org) or email [4Change@swe.org](mailto:4Change@swe.org). ■

# Workforce Development in the Energy Industry

By Center for Energy Workforce Development (CEWD)

The Electric and Natural Gas Utility industry across the country is facing workforce shortages as aging skilled workers approach retirement and fewer qualified candidates are available to replace them. Some of those workers that were approaching retirement age in the initial Center for Energy Workforce Development (CEWD) studies stayed on to ride out the economic downturn and are set to retire in the near future.

The 2009 CEWD Gaps in the Energy Workforce Pipeline Survey predicted that by 2015, 46 percent of the workforce (approximately 200,000 high-skill, high-wage workers) may need to be replaced due to retirement or attrition. In a 2009 report from the National Commission on Energy Policy, the Task Force on America's Future Energy Jobs concluded that 150,000 new jobs would be needed to design and operate low-carbon power sources in the coming years in addition to those replacements.

While this wave of retirements will create much-needed job openings for an economy now experiencing nearly 10 percent unemployment, it will prove seriously problematic for the energy industry, where workers can't simply step into jobs without appropriate and often expensive and time-consuming training.

The most critical jobs that will need to be replaced include:

- Engineers of all disciplines, with Power Engineers, in particular
- Skilled utility technician positions that would include Lineworkers, Generation Technicians for all fuel types, Transmission and Distribution Technicians and Plant/Field Operators for all types of generation

The technician positions require some post-secondary education but less than a bachelor's degree, with engineering positions requiring at least a bachelor's degree. Candidates for all the positions require extensive on-the-job training to become proficient enough to replace the experienced workforce of today.

From an industry perspective, the goal is clear: We need to hire the right number of people at the right time with the right skills to be successful in the job. Creating a pool of workers to be available for this is where it becomes more complex.

- What is the right number of workers and where will they be needed?

- How long will it take to train them, so that the education starts at the right time?
- How many people are already in the pipeline and how many more need to be trained?
- What jobs will be available and when?
- What skills do workers need and does it differ from company to company and region to region?
- Are there other jobs the students might also be considered for?
- Are there other industries that will be competing for the same talent?
- Do potential employees know about our jobs and the requirements?
- Do different groups of potential applicants need different types of information and support?

As the industry formed CEWD in 2006, these were the questions that drove the strategic development of a structure for workforce development in the energy industry, based on the idea that we can accomplish more by working together than we can do separately.

Energy companies have made significant strides in addressing the skilled worker gap by collaborating on workforce development initiatives to create a new energy workforce pipeline. In the past five years, much of the effort has been spent on building an understanding of industry needs, evaluating national, state and local programs and methodologies; implementing local and regional solutions; and creating the structure and support to meet the needs of students, educators and the industry.

We know that the most effective workforce development initiatives are:

- Collaborations between education, industry and community, like the State Energy Workforce Consortia
- Focused on real jobs and current demand
- Focused on career paths for entry-level employees that lead to future advancement
- Align education from pre-K through age 20+
- Link college credit and work experience

As we move forward, we must focus on how to make the most of what we've learned and apply our resources and our energy to those areas where we can produce the biggest impact. To learn more about the work of Center, contact CEWD Educational Consultant Valerie Taylor at [valerie@cewd.org](mailto:valerie@cewd.org). ■

# A Look to the Future

By CSC Corporation

CSC salutes and congratulates the 100 Women Leaders in STEM who are being recognized for their achievements. And although they are being honored today by their peers, the recognition is far reaching:

- They set a new standard for excellence.
- They serve as a role model for women in their respective industries.
- Their pursuit of excellence in everything they do is contagious: they are innovative, passionate and driven.

As we look to the future, we must look to the next generation for our future IT leaders. As a global company operating in more than 90 countries, CSC constantly seeks the best and brightest talent.

But talent can only be developed by starting with a strong education early, and STEM education cannot be stressed enough. CSC strongly supports initiatives to increase the awareness and importance of STEM education, particularly for women, minorities and the disadvantaged.

Since CSC's beginnings more than 50 years ago, the STEM disciplines have enabled our professionals to innovate and transform the client enterprise while driving the growth of our business. Recently we strongly engaged with efforts to cultivate and enlarge STEM opportunities in many ways, including outreach to groups historically underrepresented in these disciplines:

- As a Gold Sponsor of the STEMconnector project, we provided support that helps stakeholders across the United States connect, share best practices and promote effective approaches to STEM education at all levels, with the ultimate aim of providing for a large and highly skilled STEM workforce.
- In a community near a client site where we help train U.S. Army pilots, we provided support for a grant ini-

tiative to help college students develop expertise in advanced simulation technologies.

- We worked with the Alexandria Seaport Foundation to help apprentices from underserved groups learn to design and construct boats and to promote K-12 STEM education with hands-on learning opportunities.
- We helped improve access to STEM careers for young people in the UK through our participation in the STEMNET initiative, with programs that included hands-on learning experiences at CSC sites.
- We sponsored and provided volunteers for the 66th Annual STEM Fair in Washington, DC, to enable students in grades 6-12 to showcase their research skills and compete for awards and prizes offered by government agencies, businesses and professional associations.
- We sponsored a student team from Wright State University that designed and built a radio-controlled aircraft as part of a national aerospace engineering competition.
- To maximize the efficiency and effectiveness of all these efforts, we formed a dedicated CSC STEM council to promote collaboration and coordinate our STEM activities around the world.
- Inside the company, CSC created the Women in Leadership (WIL) council, a global community of CSC women who are committed to delivering results to our clients and accelerating CSC's growth. WIL is dedicated to attracting, retaining and motivating women with deep industry experience and broad perspective to support our increasingly global and diverse client base. Through resource sharing, mentoring, training and advocacy, WIL strengthens women in leadership roles and those who aspire to them and creates ambassadors for CSC in the business and broader global community.

Congratulations to the 100 Women Leaders in STEM for 2012! ■



# Women in Architecture

By Sherry Snipes, Director, Diversity Center of Excellence  
The American Institute of Architects (AIA)

It all starts with an idea and the courage to ask the right question. A group of women leaders out of the Boston Society of Architects are credited with re-igniting the Women in Architecture Initiative at the American Institute of Architects (AIA). In the words of the inaugural conference Co-Chair, Sho-Ping Chin, FAIA when asked why she proposed and organized the 2009 AIA National Women's Leadership Summit She responded,

"I can't recall a specific chain of events that directly precipitated the first conference. It came about from a more organic and grassroots way. At that time, I did notice several trends that prompted me to explore further.

I was the only female principal at Payette (out of a group of 9). I found that, within the 20 largest firms in Boston, only 15% of the architecture leadership was women. These were disturbing statistics, given that there were 230 female principals registered with the Boston Society of Architects.

Another observation was a noted deficiency of female architect /designers with between 7 to 15 years of experience in my firm. We confronted this trend when we tried to recruit.

Upon further research, we found that after practicing a few years, women had either transitioned out of architecture or transitioned into allied fields. Also, we noted that women were not compelled to return to the profession after starting a family. The percentage of women principals was already low, and we questioned how the effects of this trend would impact developing the next generation of female leadership.

At this same time, I discovered that the percentage of graduates from architecture schools who were women was 50% or higher since the mid-90s. The disparity between the number of women graduates from architecture school and the number of women in leadership positions within architecture firms was disturbing. It eventually led me to seek other interested female principals to discuss these phenomena."

AIA membership equates to roughly 1/2 of the 100,000 architects licensed in the United States. Currently 15% of AIA members are women. Therefore, the AIA continues to focus engaging women and girls in the profession through the AIA Diversity Center of Excellence, led by Sherry Snipes. The women's initiative has a number of goals, 1) to recognize, inform and champion the work being created by women in architecture, 2. to encourage graduates from accredited architecture programs to seek licensure, and 3) to feed the pipeline into the profession through youth programs, particularly diverse youth. The Women's Leadership Summit is now an annual program crisscrossing the country from New York to Chicago to Kansas City and will be held in Phoenix in 2013. According to Snipes, who has implemented leadership programs in multiple industries, "What is unique about the AIA program is the intersection between leadership, design and life. Women from all aspect of design including non-profit and education align on common topics."

The Diversity Center of Excellence has the enviable task of collaborating with member volunteers to design, champion and communicate national and local programs. Through local AIA Chapters and Women in Architecture Committees an impact is being made. Currently 30% of emerging professional women in the AIA are women. To keep this upward trend the AIA supports mentoring programs, such as Shadow and Mattel's "Barbie.... I Can Be An Architect" workshops. The Center for Diversity Excellence also partners with key Girl Scouts U.S.A., National Urban League and the National Organization of Minority Architects to introduce girls and boys to architecture.

The AIA believes that diversity is a cultural ethos—a way of thinking or acting that fosters inclusion, enhancing our membership, our profession, and the quality of life in our communities. By continuing to introduce architecture to students we believe we can encourage the next generation to apply design thinking to create and inspire as much as Norma Sklarek, FAIA, Beverly Willis, FAIA, Jeanne Gang, FAIA, Suman Sorg, FAIA or Dina Griffin, AIA. These women have respectively made significant contributions to the built environment with projects such as the American Embassy in Tokyo (Sklarek), San Francisco Ballet Building (Willis), Chicago's Aqua Tower (Gang), Library of Congress, Coolidge Auditorium (Sorg), and The Modern Wing at the Art Institute of Chicago (Griffin). ■



# Corporate Leaders Are Key to the STEM Cause

By Jamai Blivin, Chief Executive Officer, Innovate+Educate

**S**TEM as defined by wikipedia states: *"The exact definitions of what is within the purview of STEM, and what is excluded, varies from organization to organization. A common definition is emerging, though **misperceptions** remain. In one survey of teachers, they thought it was a new product on the market, or approach to teaching, and the E represented 'Education' instead of 'Engineering.' Another thought it meant 'stem' as related to biology."*

As the importance of STEM education and the relevance of STEM to our country's jobs and global competitiveness becomes more apparent, so has the need for leaders across the country to work *together* to redefine what STEM is....and what the solutions can be to address the skill gap our country faces and how STEM education can address the gaps. STEM is vital to the future of the U.S. economy, and there is a sense of collaboration and partnership today that appears to be stronger than ever in bringing STEM to a new level in the conversation---with policymakers, industry thoughtleaders, educators, and top officials in U.S. government.

So what does this have to do with women? Today, almost 10.6 million women hold master's degrees or higher, compared to nearly 10.6 million men. Women comprise 46.8% of the total U.S. labor force, and are projected to account for 46.9% of the labor force in 201. Women run major corporations such as Pepsi Co, Fidelity Investments, Xerox and Kraft Foods. But, more


importantly, women have a passion for STEM that runs deep. Innovate+Educate employs 7 full time employees of which six are women. We work with educators and policymakers across the U.S. We work with the STEMx leadership of which many are women. Our board of directors of 30 includes some of the top women in STEM in our country's largest companies including Lockheed Martin, Dell Corporation, Rockwell Collins, and Oracle.

The women featured and recognized in this issue are all part of the STEM solution. They represent the leadership of top companies and organizations, all committed to the STEM solution. More importantly, just like Wikipedia....they are redefining the future of our country's education and workforce. STEM is at the heart of this transformation and their work. The nature of women is that we desire to be inclusive and caring. That being said, STEM not only makes sense to the intelligence of these leaders....but also to their hearts. Each of these women have made STEM a priority in their daily lives.... both at work and as volunteers. We go to bed thinking about STEM and wake up thinking about STEM... almost as if we are the "mothers" or "aunts" of STEM.

These 100 Women Leaders in STEM are innovators and they truly know why STEM matters. The Innovate+Educate Board of Directors congratulates each of these women, and additionally recognizes STEMconnector and the many partners that worked diligently to bring this to fruition. ■

# Informal STEM Education + Girls = Success

By Dr. Catherine Cushinberry, Director of Research, Girls Inc.

 Our nation faces an alarming lack of the qualified STEM professionals demanded by today's swiftly-changing, more technological global economy. At the same time, STEM continues to be male-dominated in the U.S., shortchanging us of half our population's potential. An integral part of the solution, along with K-12 and higher education, is informal STEM education. While it has positive implications for all youth, it is particularly key in attracting and retaining women, and especially women of color, to STEM.

Discouragingly, women's participation in science and engineering occupations is about half of what it is in the U.S. workforce as a whole, just 26% according to the National Science Foundation. Women of color hold fewer than 10% of science and engineering jobs, but make up over 17% of the general US population. Black women account for only 1% of our scientists and engineers. The same is true of Latinas.

Statistics in higher education are not much better. The National Science Foundation reports that in 2008, only 11% of women earning bachelor's degrees in STEM were African-American, and just 9% were Latina. These percentages have changed little since 2000.

These gaps owe more to lingering stereotypes than the reality of girls' abilities and interest. For example, test scores in math differ far more by race/ethnicity than by sex. On the 2011 National Assessment of Educational Progress, 73% of girls and boys in eighth grade performed at or above the basic level. However, 84% of White students scored the same, compared to 51% of African-Americans and 61% of Latinos.

Informal education, like afterschool and summer programs, offers unique and vital opportunities for girls to explore and discover STEM free of time limitations, gender-based expectations, and test anxiety. Giving participants as much time as they need to experiment allows them to become comfortable with trial-and-error and develop more complex problem-solving skills.

Informal STEM education can take place in positive, all-girl environments where girls can ask questions and be introduced to diverse STEM role models—girls like Andrea Delgado of Carpinteria, CA. She discovered a love of science in her local Girls Inc. Animal Care Club learning about the biology of lizards, cockroaches,

and a tarantula, and developed the drive and confidence to pursue more STEM opportunities. This summer, she is one of 80 youth selected from over 1700 to attend MIT's Minority Introduction to Engineering and Science program.

At Girls Inc., we assume girls are interested in STEM. We encourage girls to take the lead. We foster inquiry—letting them take safe risks and make big, interesting mistakes that can lead to more inquiry and learning. We encourage them to see themselves as scientists. Most importantly, we expect girls to succeed and help them develop the same expectations of themselves.

And it works.

Virnetta and Veonicca' Greene are African-American sisters who grew up in Birmingham, AL. They participated in informal STEM education at Girls Inc., including hands-on activities on a college campus, and are now engineers. Both credit this involvement as key to selecting and sticking with their career choices. Today, Virnetta is a civil engineer working as a Project Manager in construction at Brasfield & Gorrie in Birmingham, and Veonicca' is a system engineer in the defense industry at Raytheon in Tucson, AZ.

The Department of Labor projects demand in STEM fields to increase, offering higher than average wages and upward mobility. We simply cannot afford to waste the talents of so many within our country. As Girls Inc. board member and Merck & Co., Inc. Executive Vice President and President, Consumer Health Care, Bridgette Heller, says, "Preparing all girls, including girls of color, to be the next STEM leaders is vital to our collective future success."

Schools are powerful players in this, but they cannot do it alone. Informal STEM education provides a critical line to many underserved, underrepresented youth, including girls who can be tomorrow's scientists, engineers, and innovators. ■

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*Dr. Catherine Cushinberry is the Director of Research for Girls Inc. where she oversees program evaluation, measurable outcomes, and secondary data research and analysis. She holds a Ph.D in Human Development and Family Studies from the University of Missouri-Columbia.*

# Why STEM Matters

By Brian Kelly, Editor and Chief Content Officer, U.S. News & World Report



**S**olving the challenge of STEM jobs and education is going to take creativity, intelligence, persistence, and, perhaps most of all, leadership. The women in these pages are among those leaders.

As the community of people and institutions concerned about the STEM challenge has grown, so has the need for

leaders from each of the many affected groups. The mismatch between the number of jobs that require a background in science, technology, engineering, and math and the number of people who have those skills is a national problem—some would say a crisis.

STEM is a key to the future of the U.S. economy, but there is a growing disconnect between the skills that employers need in an increasingly technological world and the talent—or lack thereof—that the education system produces. The STEM challenge extends from preschoolers through literal rocket scientists. It is as much about the decline of middle-class jobs (manufacturing is a high-tech industry) as it is about inventing the next iPad. There currently are 2 million to 3 million unfilled positions in the United States because companies can't find workers with basic technical skills. We'll have about 10 million such openings before the end of the decade. There is evidence that this skills gap is part of the structural drag on the U.S. economy. Americans were shocked when the Russians put the Sputnik satellite into space in 1957 and grabbed a lead in global technology. We responded with a massive push to upgrade math and science education.

The problem now is no less urgent. While our interest has diminished, the rest of the world's has grown. Whether we can muster the same intensity to catch up will be one of the great questions of the next few years.

The women honored in this issue are intent on finding a positive answer. They represent the broad range of companies that understand the critical nature of the STEM challenge. They worry about their own workforce needs, but also the broader problems that unemployment causes for American society. Some of those problems are specific to women and minority communities. While women are well represented in life sciences, they are underrepresented and even scarce in many other disciplines, such as engineering and computer sciences. How to nurture girls to stay focused on math? How to keep women in the early college years from being discouraged with engineering courses? How to create a satisfying work environment for talented female employees in male-dominated departments? Versions of the same issues arise for African-Americans and Hispanics as well.

These are among the questions that the most progressive corporate executives in the fields of human capital—human resources, diversity, workforce planning, corporate philanthropy—are working every day to answer. The 100 Women Leaders in STEM are involved with a variety of programs that help train better teachers, manage after-school enrichment programs and science fairs, and create public-private partnerships with state and local governments to help eliminate the divergence between what schools teach and what employers want.

They all know why STEM matters and they are doing something about it. ■

# Building a STEM career

By Christy Wyatt, formerly Motorola



**M**y first day of college, in what was to be a particularly demanding software development class, the professor told us “look around, two thirds of you will be gone by the end of the first year.” As one of very few women in a room full of men, I felt the entire room looking at me. They all had much stronger academic backgrounds than I did,

so surely I would be the first to go. It was my unwillingness to give in that earned me the highest academic standing of the class that year, and for the rest of my time there. I stayed later, worked longer, and pushed harder. Throughout my career, as well as throughout my life, this scenario has replayed itself often. Whether it has been a new product, a new team to lead, moving my family to a new country to pursue great opportunities – the vision, and the belief that there is a way will carry through the adversity that will surely follow. Never allow others to define what you are capable of.

I have always held to the belief that we learn most directly from our successes, and our failures. The first two things I tell individuals entering their careers are, 1) Find something you are passionate about, and 2) find people who inspire you and that you love to work with. My mentoring philosophy is that to learn together, you have to work together. Giving someone the opportunity to participate in a new part of the business gives them a broader perspective than their role would normally enable, and real-life experience that they can then apply back in their “day job.” To me, mentoring has never been about lunches or inspirational chats. When I am approached by someone early on in their career, I look to incorporate them into work that is connected to the area they are trying to grow into. Not always are they comfortable stepping outside their comfort zone, and I have often had to convince individuals I have believed in to step up to a greater challenge.

I come from a family of builders. My grandfather was always my hero. He moved from Europe after the war as an orchard worker, and eventually started his own construction business. I spent hour after hour in his “shop” watching him build almost anything you could imagine with wood. With technology, I discovered that I could also create and build, and that I could work on products that could change people’s lives. For much of my career, this has largely been around software and mobile technology, and I would be hard pressed to think of another technology area that has been as transformative. Motorola invented the cellular phone! It is a company with a long, rich history of innovation. I have worked with the technologists and scientists in this company create products that have re-shaped the lives of every human on the planet. From emerging markets where this has been their first connection to the developed world, to our own society in North America where we all now believe that every function of your life could be managed from a 4-inch piece of glass in your pocket. When the technologists who build those products see them in the real world...it is like watching your child graduate from college.

One of the most powerful experiences for me in my career has been the turnaround of Motorola, an iconic brand, respected around the world for its rich history of innovation. It has some of the smartest engineers in the world, and has created amazing products. However, it had a disjointed technology strategy, which was causing all of its investment to go into technology areas that did not matter to the customer. We lost a lot of good people, and we turned down a lot of programs we would have loved to have done but just could not justify. We re-built the company from the ground up around our new technology platform and strategy. We were able to rebuild the company based on our ability to innovate and execute. I am extremely grateful to have been a part the team that restored that iconic brand in the market. ■

**SECTION 1**

# **CORPORATE PROFILES**





# Cecilia Kimberlin, Ph.D.

## VP, QUALITY AND REGULATORY, ABBOTT

Cecilia Kimberlin, Ph.D., is Vice President, Quality and Regulatory at the global health care company Abbott. Her responsibilities include overseeing quality assurance and regulatory affairs across the company's businesses worldwide. Appointed to her current role in 2007, she joined Abbott in 1986.

Dr. Kimberlin is the 2012 Chairman of the Board of Directors for the Regulatory Affairs Professional Society (RAPS).

She earned a bachelor's degree in medical technology/chemistry at the University of Louisville, master's and doctorate degrees in microbiology from the University of Oklahoma and completed postgraduate work at the Harvard School of Public Health.

### **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

STEM education is a critical issue in the U.S., as well as other countries around the world. So many aspects of our everyday lives are touched by science, but none more so than our health. We need to inspire the next generation of scientists today, so they can go on to become the inventors of tomorrow's innovative medicines and medical devices. This is important for health care companies like Abbott, but it's also important for everyone—we all depend on innovative medical care.

That's why science education is a key focus for Abbott and the Abbott Fund. Over the past five years, we've contributed more than \$25 million to support programs and exhibits that advance STEM education, reaching more than 1 million young people each year.

### **WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?**

Leaders play a vitally important role in advancing awareness and action to promote STEM, both inside and outside an organization. Internally,

leaders greatly influence an organization's purpose and culture. By recognizing outstanding scientific contributions, leaders prioritize STEM throughout the organization, and also help to attract and retain top STEM professionals with the talents and skills to further advance the business. Externally, leaders need to articulate a clear business case for the value of science and technology with all stakeholders, from the customers we serve, to shareholders, government officials and the communities where we live and work.

### **WHAT PRINCIPLES DO YOU, AS A LEADER, APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?**

There are many opportunities to apply scientific learning and skills—from data analysis, to study design, to critical thinking—to advance problem solving, risk management and decision making across many areas. Whenever I'm working with others, I try to cultivate an environment where scientific approaches are valued by the entire team of colleagues, and recognized for the value they bring to reaching our objectives. This translates to life outside of the lab or office as well; by demonstrating the

application of scientific thinking in our everyday lives, we can all help to raise awareness of the importance of STEM.

### **WHAT IS YOUR CONCEPT OF MENTORING AND SPONSORSHIP OF OTHERS FOR STEM CAREERS?**

I currently serve as the executive sponsor for Abbott's Professional Development Program for quality assurance, a rotational program for entry-level professionals. This is a unique opportunity to work with recent graduates in science and engineering, and help them to see the many diverse career opportunities that are available to them.

Recent graduates often ask me if I still use my Ph.D. science background, now that I'm in management. I help them to see that my scientific background has directly contributed to my success at every step of my career—at first, more through the specific knowledge I gained in academia, but as my career advanced, it became more about the use of a scientific approach, the ability to analyze data and complex problems, to bring ideas forward and to work with others to evaluate new solutions. ■

# Bernadette Rotolo

## SVP, APPLICATIONS DEVELOPMENT AND MAINTENANCE ADECCO GROUP NORTH AMERICA

Bernadette Rotolo is an Information Technology (IT) executive with 15 years of experience. Bernadette started her career in consulting at Accenture, a top IT consulting company assisting clients in the Communications and High Tech industries with their most difficult technology and business challenges. In June 2009, Bernadette came to Adecco Group, the largest staffing company in the world, and is currently the Senior Vice President of Application Development and Maintenance for North America. Bernadette received her Bachelor's from the State University of New York at Binghamton and her Masters from New York University.



### WHAT PRINCIPLES DO YOU, AS A LEADER; APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?

- **Be ethical.** Being ethical will always make you a stronger person both in your personal and professional life.
- **Be confident.** You know more than you think.
- **Listen.** You learn a lot from the things people say or don't say in a conversation that ultimately helps you figure things out.
- **Be focused.** Don't be easily shaken by some setbacks. Learn from them and move forward.
- **Be fair.** Treat people fairly and with respect at work and at home.

### WHAT IS YOUR CONCEPT OF MENTORING AND SPONSORSHIP OF OTHERS FOR STEM CAREERS?

Make yourself available to people who want your guidance. It is always difficult with our challenging lives in and out of work to make time for others, but it is so important to do it. The few minutes can make a big difference in someone's life. One way to be more available is to schedule the time on your calendar. It helps make it a priority and people feel good you care enough to make the time for them.

### WHICH WOMAN LEADER DO YOU MOST ADMIRE, AND WHY?

My mother is the woman leader that I admire the most. She has always been the person in my life who encouraged my education and career development. Her great respect for education coupled with her encouragement that anything is possible gave me great security to pursue my education and my career in technology. She is also a great listener who always gives solid advice and coaching. As a woman leader in business, I pass on my respect for education and encourage young woman to strive to succeed in school and in the workplace.

### WHAT ABOUT STEM GIVES YOU PASSION?

I am truly passionate about encouraging and guiding young ambitious women in school, in my workplace and in my community! I feel my third grade science teacher, my college professors and my women mentors at Accenture and at Adecco played a critical role in shaping my career in technology. It is so important to encourage and give women opportunities to try new areas in the sciences, technology, engineering and mathematics. There will be even more exciting careers in STEM in the future.

### WHAT CAN WE DO TO ASSURE MORE WOMAN LEADERS IN STEM?

We must invest in education attracting strong teachers that are competent and passionate about the STEM subjects. In addition, we should create mentoring programs and internship opportunities giving women options to test new subjects and careers. Finally, educate the parents to be more involved with their children's education and encourage their children to succeed.

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

First, senior leaders need to have high ethical standards to be strong role models. Second, they need to contribute their time, as much as possible. Even speaking at a high school or a mentoring lunch goes a long way for people. I still remember guest speakers in high school who encouraged the students to get involved in NASA. Finally, sponsor these programs with financial support to give the opportunity to a less fortunate member in our respective communities. ■



# *Safety in Numbers*<sup>™</sup>

The decision as to where, when and how troops travel between points A and B has largely been an educated guess, based more on gut instinct than the laws of probability. With IEDs remaining the number one weapon of strategic influence in Afghanistan, Lanmark Technology is taking the guesswork out of military logistics by rapidly providing Counter-Improvised Explosive Device capabilities. Our deployed ORSAs (Operations Research Systems Analyst) use statistical analysis in science and technology, engineering and math, to enable Combatant Commanders to calculate the safest way to move soldiers, munitions and supplies in order to protect our troops, our country and our way of life.

**LMT—Using statistics to ensure our soldiers don't become one.**<sup>™</sup>



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# Dr. Wanda Austin

## PRESIDENT AND CEO, AEROSPACE CORPORATION

Dr. Wanda M. Austin is president and chief executive officer of The Aerospace Corporation, a leading architect for the nation's national security space programs. She assumed this position on January 1, 2008. The Aerospace Corporation has nearly 4,000 employees and annual revenues of more than \$850 million. Austin earned a bachelor's degree in mathematics from Franklin & Marshall College, master's degrees in systems engineering and mathematics from the University of Pittsburgh, and a doctorate in systems engineering from the University of Southern California. Austin was among the first CEOs to support Change the Equation.



### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

Our society is dependent on science and engineering; it's virtually impossible to be successful in today's world without relying on technology in some form. It is widely acknowledged that the majority of jobs in the future will be technology-based. For over a decade, the number of students studying the STEM disciplines has been declining in our country. If this continues, the United States will find itself unable to maintain or advance its own technological systems, or to compete effectively on the world stage.

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

We have to be open to new ideas—not just the ideas themselves, but where they come from. There is a tendency to dismiss ideas that come from young people, due to their inexperience. However, it has always been true that young minds are a fertile ground for new ideas. Today's leaders need to be ready and willing to reach out to our young people, to let them know we value their insight and input.

We also have to learn to look beyond "today." Leaders today can become too focused on the problems immediately facing them. That's understandable; those problems are formidable and need to be solved quickly. But we have to bear in mind that even as we solve problems today there will always be new challenges. So it's essential that we ensure that there will be well-trained experts around in the future to address them.

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

Young girls do just as well as young boys in science and math, but around about the fourth and fifth grades, girls seem to lose interest in those subjects. We must proactively get involved as early as possible with the schools, the students, the parents, and the teachers, to counteract the messages those girls are hearing that math and science are "boys' subjects." We need to encourage successful women science and engineering experts to remember the obstacles they faced, and to take positive action to ensure that the next generation of girls know that they can succeed in the STEM fields—and perhaps make the path a bit easier for them.

### HOW IS YOUR COMPANY INNOVATING TO PROMOTE STEM?

The Aerospace Corporation has a number of programs in place that promote STEM, both our own, "home-grown" programs and in cooperation with local and national efforts. There is the Herndon Science Competition, named for one of our distinguished scientists and mentors. This competition offers diverse middle- and high-school students the opportunity to create innovative science projects and bring them to our campus, where our scientists, engineers, and Air Force customers judge them. Winners receive savings bonds, which we hope they will use toward education. We've also teamed with Industry Initiatives for Science and Math Education, MathCounts, US FIRST Robotics, Change the Equation, and our own Great-LEAP (Greater Los Angeles Education-Aerospace Partnership), which pairs our scientists and engineers with local teachers right in the classroom, to demonstrate real-world applications of science and engineering to the students. ■





# Victoria Harker

**CHIEF FINANCIAL OFFICER/PRESIDENT,  
GLOBAL BUSINESS SERVICES, THE AES CORPORATION**

Victoria D. Harker is CFO and President of Global Business Services of the AES Corporation, a global power company with 2011 revenues of \$22 billion and assets of \$45 billion in 28 countries. She joined AES in 2006 to lead the Global Finance Team in a re-engineering of the company's financial reporting, controls and capital structure. Victoria manages all of AES' Finance and Business Services operations worldwide, which includes IT, Purchasing, Risk and Trading. Before AES, Victoria was the acting CFO and Treasurer of MCI and served as CFO of MCI Group. She serves on the Board of Directors of ITT and Darden Restaurants. Harker is Chairman of the University of Virginia's Board of Managers and is a member of The Economic Club of Washington, D.C.

**WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

In today's highly interconnected and increasingly technological marketplace, it is more critical than ever for the United States to grow its STEM workforce in order to remain competitive and support economic growth.

These programs help propel women and other minorities into fields they typically have not entered, which will bring new perspectives to these fields which will help spur innovation.

STEM education teaches young people the skills employers want most, and encourages them to pursue careers in technical fields that have been, and will continue to be, the key industries that are driving U.S. economic growth.

**WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?**

There are a lot of stakeholders involved in this issue, from students, to policymakers, to school administrators, to multinational corporations. Senior leaders need to take a multifaceted approach to the issue and be able to analyze STEM from varying perspectives.

**WHAT PRINCIPLES DO YOU, AS A LEADER, APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?**

Education is at the heart of STEM and also critical to achieving personal and professional success. In life and in business, I find it is critical to always challenge yourself and continually develop and hone new skill sets. While at AES for example, I initiated the AES Finance Leadership Development Program at the Darden School of Business.

**WHAT IS YOUR CONCEPT OF MENTORING AND SPONSORSHIP OF OTHERS FOR STEM CAREERS?**

Seek out a valuable mentor/mentee relationship: My ideal concept of mentoring occurs when both the mentor and the mentee are learning from each other, symbiotically, and there is often not even an acknowledged "formal" mentoring arrangement. This provides a mutually beneficial experience for both without the added burden of scheduling constructed sessions or read-outs in already busy lives. ■

“...always challenge yourself and continually develop and hone new skill sets.”

# Meg McCarthy

## EXECUTIVE VICE PRESIDENT, INNOVATION, TECHNOLOGY AND SERVICE OPERATIONS, AETNA INC.

Meg McCarthy is EVP, Innovation, Technology and Service Operations at Aetna. Meg also has responsibility for process and performance improvement, procurement and real estate services for Aetna, Inc. Prior to joining Aetna in 2003, she was SVP of Information Technology at CIGNA Healthcare. She has 30 years of information systems and health care operations experience with strengths in hospital, insurance and managed care business and systems. Ms. McCarthy has a Master of Public Health (MPH), Hospital Administration, from Yale University, and a B.A. in Philosophy, Magna Cum Laude, from Providence College. Ms. McCarthy's military experience includes U.S. Navy Medical Services Corps; Lieutenant at Bethesda Naval Hospital; and U.S. Navy Reserves, Lieutenant Commander.



### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

As our economy becomes increasingly technology-driven, nurturing a workforce well-trained in the STEM disciplines is critical to the advancement of our country. By 2018, 8 million jobs in the U.S. economy will require a college degree in STEM. To maintain our global competitive edge, we must put the effort into making these subjects a key focus early on in our classrooms. We also must acknowledge the dearth of women in STEM jobs. There is a ripe opportunity for women to fill non-traditional positions in STEM roles as our workforce grows.

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

As with any dynamic requiring much-needed change, leaders need to keep an open mind and a long-term view as they develop strategic plans. There are plentiful opportunities to support STEM-related education,

training and research in disciplines beyond those we traditionally see women in. It is also vital leaders promote collaboration and development throughout their organizations; non-technical individuals working closely and transparently with STEM roles. I'm also a strong proponent of mentorship.

### WHAT PRINCIPLES DO YOU APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?

As a woman in a STEM leadership role, I try to behave as a role model in my personal and professional endeavors. Professionally, I help clarify the line of sight from the work we do to the importance of keeping our constituents healthy through technology tools and solutions. Innovation and technology drive the future of health care, so the work we do is actually shaping the future of health care. Focusing on core company values, sharing our goals and vision with industry colleagues and business partners, and being an active member

of the health information technology conversation are principles that help me bring STEM to a greater light.

### WHICH WOMAN LEADER DO YOU MOST ADMIRE, AND WHY?

I particularly admire Rear Admiral Grace Hopper—a U.S. Navy officer known for conceptualizing machine-independent programming language and credited for developing COBOL (as well as the term “debugging”). I share with her a history of service in the Navy and a Yale education. As a Navy Admiral, Grace received the Department of Defense Distinguished Service Medal, and has had Navy ships and supercomputers named for her. She achieved great success while simultaneously serving her country and revolutionizing the computer age. An outstanding role model for any woman interested in a STEM career, her accomplishments demonstrate the achievements that are attainable, even in what have been traditional male-dominated fields. ■

“There is a ripe opportunity for women to fill non-traditional positions in STEM roles as our workforce grows.”



# Kris Rinne

## SENIOR VICE PRESIDENT, NETWORK TECHNOLOGIES AT&T LABS

Kris Rinne is responsible for network architecture, service platforms, radio access roadmap and initial implementation, wireless device requirements and certification, network platforms, network performance analysis, and industry standards development at AT&T. Ms. Rinne's career within AT&T and its predecessor companies includes positions as chief technology officer—Cingular Wireless, vice president—technology strategy for SBC Wireless, and managing director—operations with Southwestern Bell Mobile Systems. In 2011, she was named as "The Most Influential Woman in Wireless" by Fierce Wireless and was listed in the Global Telecom Business Power 100 list of the most powerful telecom executives.

### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

In today's world of advancing technologies, it is more critical than ever that a strong focus on science, technology, engineering and math be employed by corporations and educators across the U.S. to ensure our competitiveness in the global economy. Innovation and technology are at the core of AT&T and the need for a highly educated workforce in the areas of STEM is critical to our future. AT&T provides hundreds of millions of dollars to education initiatives each year including internships and job shadowing to help develop and recruit this talent.

### WHO IS YOUR STEM ROLE MODEL AND WHY?

My parents are my STEM role models. In grade school, my mother was my math teacher. She inspired me to pursue a math degree with the intention of becoming a math teacher as well. However, a college professor arranged an interview for me with Southwestern Bell, and it was the math degree that opened the door for a fulfilling and life-long career with AT&T. My father through example (and patience!) gave me a thirst for understanding how things worked!

### WHICH WOMAN LEADER DO YOU MOST ADMIRE AND WHY.

I most admire First Lady Eleanor Roosevelt. Not only was she a brilliant, well-educated First Lady and a close advisor to her husband, President Franklin D. Roosevelt, she was also a mother to six children, an international author, speaker, politician and activist for civil rights. In her advocacy for the formation of the United Nations, she stressed the urgency of understanding other peoples of the world. President Truman called her the "First Lady of the World" in tribute to her human rights achievements.

### OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?

In my role overseeing Network Technologies at AT&T, I have had the dis-

tinct privilege of leading the effort for crafting the strategy and technology evolution that has enabled AT&T to become the global leader in mobile broadband. In 2005, we became the first company in the globe to launch a wide scale deployment of HSPA—the 3G technology that is now the most popular around the globe. This helped revolutionize the way people use their cellphone—from watching videos to uploading photos to their favorite social media site. And we didn't stop there. We now offer widespread, ultra-fast and consistent 4G speeds with two 4G networks (LTE and HSPA+ with enhanced backhaul). This gives us a competitive edge that is unmatched in the world today. ■

"...the need for a highly educated workforce in the areas of STEM is critical to our future."



# Karen Davies

## VICE PRESIDENT, BUSINESS INTEGRATION AND OPERATIONS, ATK DEFENSE

Karen Davies is Vice President of Business Integration and Operations for ATK Defense. She leads the integrated operations function of the \$2 billion business group, with 6,000 employees in 10 states. This includes functional responsibility for operations, quality, safety, environmental, performance improvement and LEAN initiatives, integrated supply chain management, and business systems/IT. She has been with ATK for 32 years in various leadership and business positions.

Karen holds a bachelor's degree in business management and a Master of Business Administration from the University of Utah.



My 9-year-old granddaughter proudly announced last week that she wants to be one of two things—either a paleontologist, or a chocolatier. It gives me great hope for our country's future that she even knows that paleontologists exist, and that she can be one if she chooses. However, keeping her ambition alive, along with the ambitions of our other bright future scientists, mathematicians, and engineers, is one of the most critical challenges that we face. We attract only a small minority of our children, particularly girls, into STEM education and careers. Changing this is critical for the future of our country. Without the right people who are prepared to succeed in STEM fields, the economic engine that has fueled the U.S. will simply not be able to continue doing so.

It's well documented that STEM related businesses and jobs are powerful economic multipliers. My personal passion is around manufacturing, which has the highest multiplier of any business venture—\$1 of manufacturing business creates an addi-

tional \$1.43 of activity in other sectors, more than double the multiplier in a service business. Manufacturing businesses have always required strong engineers and technologists, and that demand is even greater today because of the complexity of the equipment and systems in our factories. I've had the great opportunity to be in the business of manufacturing highly-engineered products in the aerospace and defense industry for my entire career, and every day we rely on scientists, technologists, engineers, and mathematicians to make things work. Without them, we fail.

When I have the chance to address participants in our college internship programs, many of whom are studying STEM disciplines, I always reinforce the importance of a good portion of our best and brightest graduates entering manufacturing businesses. Their experience working with us often surprises them, because it is fun and challenging, and they're exposed to many different uses of their education and creativity. Capturing that message—STEM is fun!—is important.

I remember as a high school student being encouraged by a close family friend to study chemical engineering in college. Unfortunately, I didn't take his advice, because my image of an engineer was someone locked in a dark corner wearing a lab coat, looking at a microscope, and rarely talking to anyone. What I didn't understand then is that an education in STEM opens practically limitless opportunities to some of the best careers you can ever have, and all of them involve other people (and very few dark corners). I've been lucky because my business education and some wonderful mentors provided me a door into a STEM business, but my opportunities would have been wider had I been prepared with a strong education in a STEM discipline.

My passion for STEM centers on the future, especially for our future generations, who will be chartered with keeping the U.S. as an economic and innovation powerhouse. Helping them prepare to meet that challenge is critical. ■





# Xiaochun Luo

## GROUP VICE PRESIDENT AND CHIEF SCIENTIFIC OFFICER AVON

As Group Vice President and Chief Scientific Officer of Avon, Dr. Xiaochun Luo leads Global Research and Development and is responsible for developing and supporting the company's worldwide product lines. She joined Avon in 1999 as Director for Global Hair Care and was promoted to Executive Director in May of 2001 and then Vice President of New Technology & New Product Innovation in December of 2002. Prior to joining Avon, Dr. Luo spent almost 10 years in Global R&D at the Procter & Gamble Company. She holds a Ph.D. in Biochemistry from Purdue University. Dr. Luo and her husband live in the greater New York area, where they are raising their two sons.

### OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?

I'm truly proud of our ability at Avon to convert scientific discoveries into tangible products that excite our Representatives and service global customers. We travel the globe meeting with world-renowned experts in disciplines ranging from biomedical research to optical science and then incorporate their latest findings into innovative products to benefit consumers. That's really very exciting to a scientist—to see effort become reality. One recent example that stands out is our launch of ANEW Genics, a skincare breakthrough that helps women look up to 10 years younger in just eight weeks. Genics was the result of a multi-year journey in which Avon scientists discovered a way to unleash the power of the so-called youth gene and create a revolutionary anti-aging product.

### WHAT ABOUT STEM GIVES YOU PASSION?

Utilizing science and technology is the best way to surprise consumers. Only science and technology can open new doors to give consumers something they didn't know they wanted but love. That's so satisfying!

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

First, as senior leaders, we need to be role models in sharing our passion

about the wonders of science and helping people understand the real-world, tangible benefits of it in their own lives, their communities and in society at large.

Second, these fields are fundamentally about experimentation so I think it's important for senior STEM leaders to encourage their teams to take risks. The nature of scientific exploration means there are inevitably failures, but we cannot punish people for failure or we'll never encourage them to try new things. If scientists don't attempt the big things, then we'll never have the "big ideas."

### WHAT CAN WE DO TO ASSURE THAT THERE WILL BE MORE WOMEN LEADERS IN STEM?

It's great to see more and more women in STEM, but we still have a lot of work to do. We need to highlight and elevate women in STEM so they can serve as role models for the next generation. That's critical.

We also need to plant the STEM seed early. There's still a misconception that girls are not strong in science. So we need to build their confidence in their scientific abilities so they can enjoy and succeed in STEM fields. This means eliminating fear and doubt.

Girls tend to follow the rules and be more risk averse. However, to advance in STEM, girls and boys need to be willing to be mischievous, break some rules, and challenge the status quo.

### WHAT IS YOUR CONCEPT OF MENTORING AND SPONSORSHIP OF OTHERS FOR STEM CAREERS?

It is the responsibility of STEM leaders to do all we can to promote the importance of science and technology. It is essential to expose students early on to real-world science settings, such as laboratories and other research facilities, so they can begin to make the all-important connection between science and its tangible applications. When we have "Take Your Children to Work Day" at Avon Global R&D, we spend a lot of time describing what all our different scientists here do. We try to open their eyes to all the possibilities.

In the workplace, we need to maintain career momentum by making sure STEM employees are well supported, developed and rewarded. At Avon R&D, we recently re-engineered our technical career track for scientists after realizing the traditional Avon track didn't properly acknowledge and reward the accomplishments and talents of scientists. It's a good motivator, and I'm glad we were able to make this happen. ■

# Linda Parker Hudson

**PRESIDENT & CEO, BAE SYSTEMS, INC.**

Named one of Fortune Magazine's 50 Most Powerful Women in Business for the past three years, Hudson leads operations with 2011 revenues of \$14.4 billion and approximately 43,000 employees in six nations. She began her defense career after receiving her bachelor's degree in systems engineering from the University of Florida. Her commitment, passion and dedication to our men and women in uniform and military families are evident in her service on the USO Worldwide Board of Governors and Blue Star Families Board of Directors.



## **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

Recently, there has been a lot of concern about the U.S. slipping as an innovation leader due to waning numbers of STEM graduates. From a defense perspective, the problem is more alarming. Technology and engineering are the lifeblood of our industry. A significant proportion of our industry's engineers are approaching retirement age. At the same time, we see a declining number of U.S. youth pursuing STEM-related careers. That's not just a problem for our industry; it's a problem for our country—so much so that DARPA has called the decline in STEM degrees a national security risk.

## **WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?**

Despite mounting awareness of the problem, our society still tends to subscribe to the same historical stereotypes of what a STEM professional looks like. For decades this has influenced who we recruit, while simultaneously influencing who pursues a STEM education in the first place. Our leaders need to help our nation

break free of this self-fulfilling prophecy. One important way we can begin to do this is by casting our recruiting net more widely into more diverse talent pools where there are large segments of qualified people.

## **WHAT PRINCIPLES DO YOU, AS A LEADER, APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?**

I speak regularly at both industry conferences and to children in our schools. BAE Systems supports programs ranging from NMSI to Reach Out and Read. Personally, I am actively involved in the University of Florida School of Engineering, serve on boards for organizations such as the Smithsonian National Air and Space Museum, and support efforts like Change the Equation.

My role as the first female CEO in a historically male-dominated industry has given me a lot of visibility and afforded me many opportunities to advance STEM education and diversity and inclusion efforts. I mention D&I because I sincerely believe that harnessing diversity (of all sorts) will be essential to strengthening our STEM position here in the U.S.

## **WHAT CAN WE DO TO ENSURE MORE WOMEN LEADERS IN STEM?**

The shortage of women leaders in this country extends far beyond STEM. In Thailand, three out of ten companies have female CEOs. In China, the figure is just under 20 percent. Here in the North America, that number drops to one in twenty. There is clearly something at play beyond young girls not being interested in science and math.

In regards to STEM, one of the most important steps to ensure there are more women leaders is to ensure there are more women in the STEM education pipeline in the first place. To do that, we need to get all kids enthusiastic about STEM at an early age. We need to hold the imagination of young girls as they pass through that critical middle school age when many lose interest. In high school, we need to continue to show young women the exciting careers to which a STEM education can lead. And, of course, we must hire, mentor and promote them. ■



# Rebecca Lucore

## EXECUTIVE DIRECTOR, BAYER USA FOUNDATION

Rebecca L. Lucore has directed Bayer Corporation's, Science, Technology, Engineering and Math (STEM) education partnerships and flagship program Making Science Make Sense® (MSMS) since 2000. Ms. Lucore has worked with several school districts across the United States to assist them in implementing systemic science education reform and is an advocate for diversity and underrepresentation issues in STEM. She is Board President of Achieving Student Success through Excellence in Teaching (ASSET STEM Inc.) in Pittsburgh and serves as an advisory committee member for the National Governors Association's STEM Center and Chairs the Diversity and Underrepresentation Committee for Change the Equation.

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

Senior leaders first need a firm understanding of just how important STEM is to our country's success. They must also acknowledge that a lot of talent often times gets overlooked at best and discouraged at worst. Leaders need to understand just how critical it is to bring all of the nation's talent to the STEM table and then support education programs that do just that. And lastly, it's absolutely critical to provide inclusive learning environments for everyone.

### WHAT PRINCIPLES DO YOU, AS A LEADER, APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?

STEM is all about the "3C's"—curiosity, creativity and critical thinking. Most scientists and engineers don't tackle a problem by knowing the answer at the outset. It's about using the 3C's, over and over again, if necessary, to arrive at the answer. I try to keep this in mind both professionally and personally. As the mother of three young boys, I give myself permission to not know all the answers to their questions, but rather say to them "let's find out together."

### WHAT ABOUT STEM GIVES YOU PASSION?

STEM professionals are on the front lines of innovation. They develop the new processes, products and technologies we use in everyday life—whether it's a new form of "green" energy, a new method of delivering clean water to people in the developing world, a new bridge that cuts our commuting time in half or a new medicine that prevents heart disease.

### OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?

More than 17 years ago, Bayer spearheaded a hands-on, inquiry-based science education program to improve student learning in Pittsburgh, at a time when new education initiatives tended to fail within two years. It's the same time I started my career at Bayer and I've watched as this organization known as ASSET STEM Education grew from two school districts to hundreds of districts across Pennsylvania. Seventeen years later, it's still around and helping prepare tens of thousands of children to be better learners and for their role in the future workforce. And 17 years later, I have an eight-year-old benefiting from the program. Nothing made me prouder than the day he brought home his ASSET science notebook to share with me.

### WHICH WOMAN LEADER DO YOU MOST ADMIRE, AND WHY.

Dr. Jocelyn Bell Burnell, the Belfast-born physicist who, as a young graduate student in the field of radio astronomy at Cambridge University, discovered pulsars in 1967. One of the major scientific discoveries of the 20th century, she was completely dismissed by her professor at the outset, but she persisted when she noticed a consistent blip in the data coming back from her telescope. Of course, her professor went on to win a Nobel Prize for her discovery. When Jocelyn was in high school, her parents had to fight to get her included in science courses. At that time, girls took home economics. But her parents prevailed, and she's gone on to have a stellar career. For her awesome intellect, her sheer tenacity and overwhelming sense of joy and humor, you can't help but admire Jocelyn Bell Burnell. ■



# Laurette Lahey

## VICE PRESIDENT, ENGINEERING, FLIGHT AND CONTROLS, BOEING DEFENSE SPACE & SECURITY

Laurette Lahey is vice president of Engineering, Flight and Controls, for Boeing Defense Space & Security (BDS), ensuring world-class technical integrity for BDS products and services, and engineering excellence in flight sciences and controls applications. Previously, Lahey was director of BDS Flight Engineering for tactical aircraft, tankers and transports, rotorcraft, space exploration spacecraft and satellites. She also led Boeing's Systems Analysis and Integration team for the 767 Tanker aircraft. Lahey began her career as an aerodynamics engineer supporting Boeing's 737, 757 and 777 jetliners, JSTARS surveillance/radar aircraft, B-52 Stratofortress, C/KC-135 Stratotanker, and RC-135 reconnaissance aircraft.



### WHAT IS YOUR CONCEPT OF MENTORING AND SPONSORSHIP OF OTHERS FOR STEM CAREERS?

Mentoring must start by engaging our youth early to inspire pursuit in STEM careers. Industry sponsorship can help educators translate theory into practical application by shaping curricula and through direct engagement in the classroom. Science and robotic competitions are outstanding means to get hands-on experience, instill excitement, and gain confidence in pursuing a STEM career.

Sustaining interest in STEM during the first two years of college is the next challenge; which can be addressed through coaching from advisors, student and industry mentors, and industry sponsorship of projects. One mutually-reinforcing form of inspiration and mentoring is to have engineering students interact with K-12 students through short-term community projects and/or tutoring. Experiential learning during those initial years combined with industry exposure is also recommended to sustain interest and passion.

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

Senior leaders in industry must be able to articulate a sense of urgency and be willing to partner with other industry, community, and educational leaders to support and advance STEM. These leaders must be champions for local and national STEM initiatives through personal engagement and by setting expectations for the employees they lead to get involved in STEM initiatives.

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

First, we have to develop a strong pipeline of women in STEM careers. Although this pipeline has grown significantly in some occupations, college enrollment and graduation data indicate slow if any growth for disciplines such as aerospace, civil, electrical, and mechanical engineering since I graduated from college in the mid-1980s. As noted earlier, sparking an interest in STEM careers at an early age is essential to growing this pipeline. Providing visibility to women leaders and their personal stories to aspiring STEM students and to those early in their careers is needed to instill confidence and provide role models. Most important is providing coaching

and mentoring to women who have chosen STEM careers—to help them succeed in school, find balance between having a family and career, and create opportunity to learn and exercise leadership skills.

### WHAT ABOUT STEM GIVES YOU PASSION?

I concluded at an early age that engineers and scientists were the chief enablers of civilization, and the thought of flight and space exploration was thrilling. My personal inspiration was our nation's journey to space—namely the Apollo and Viking missions. I was fortunate to have a father who worked closely with engineers as an architect and industrial designer and a mother who was an artist fascinated by astronomy and science, so I had plenty of encouragement to pursue my goal to be an aerospace engineer.

I recognize now I had a unique learning environment, and it is a tremendous challenge to create and sustain that spark of interest from an early age through high school and college. For those of us in STEM careers, we have an obligation to inspire the next generation to take on the new challenges of our nation and civilization. ■





# Savannah Maziya

## CHAIRMAN AND CEO, BUNENGI GROUP

Savannah is the Chairman and CEO of The Bunengi Group, a company that operates in Infrastructure, Mining and Agriculture and is fully owned and operated by women.

Savannah has served on various boards including the largest regulator boards in construction, water, finance, food and drug administration in Africa. She chairs the Bunengi Board and is director and shareholder of the largest construction company in Africa. Savannah holds a degree in Finance and Broadcast Science from Bridgewater University in Massachusetts in the USA and an MBA from DeMontford University in the UK.

“We need to showcase STEM careers to young girls who are still in grammar and high school.”

### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT?

I believe that STEM education and workforce are important to the world because this is the area where a lot of innovation will come from and as a world that is struggling with declining economies as well as employment shrinkage, we need innovation to be the catalyst for the creation of new job profiles.

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

- Open and forward thinking mind
- Creative approach to strategy
- Courage
- Ability to communicate effectively

### WHAT PRINCIPLES DO YOU, AS A LEADER; APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?

Training and access to opportunities. Anyone can be trained to operate in the STEM environment as long as they have the right attitude and have access to opportunities.

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

We need to showcase STEM careers to young girls who are still in grammar and high school, so they understand that these careers exist and that women are more than able to take on them. We also have to coach and mentor women in junior professions to provide them with the capacity to work themselves up the career ladder. In South Africa there is an aggressive drive that there should be 50% women representation in all companies and career fields (at all levels). There is also a country focus on STEM—this makes all our personal and company initiatives more sustainable.

### WHAT IS YOUR CONCEPT OF MENTORING AND SPONSORSHIP OF OTHERS FOR STEM CAREERS?

As we are heavily involved in operating in STEM and we are a women owned and run group—we have focused our energies on providing scholarships to college for women who are pursuing a career in STEM, we focus on recruiting mostly women in our business and we have a strong mentorship program where all senior women executives have to mentor junior ones as part of our mandatory Give Back Program. ■

# Jeanne McCaherty

**VICE PRESIDENT/REGIONAL DIRECTOR, NORTH AND SOUTH AMERICAS TEXTURIZING SOLUTIONS, CARGILL INCORPORATED**

Jeanne McCaherty is Cargill Vice-President and Regional Director for North and South Americas Texturizing Solutions business. Jeanne currently has full responsibility for this business that manufactures, trades, and sells food ingredients that give finished food products texture. These ingredients include dairy cultures, food starches, pectins, seaweed extracts, xanthan gum, lecithin, and others. Jeanne joined Cargill's Central Research as a project chemist and has held a variety of technical and business leadership roles in the company throughout her career.

Jeanne has a BS in Chemistry and Biology and a MS in Biochemistry.



## **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

A STEM education provides a solid foundation that is critical to compete in the global marketplace. STEM education helps drive technology advances in new product development and allows new business growth. When applied to corporate opportunities, technology can also reduce costs to keep existing businesses stay competitive. In the end, a STEM education is critical to generate a workforce that will create new business and ensure the competitiveness of our existing corporations.

## **WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?**

It is critical for a company's senior leaders to truly embrace technology and recognize that it is a driver to efficiency, growth, and innovation. In addition, it is important for leaders to provide a forum for talent development and growth so they can retain top STEM employees. Proper recognition and incentives for STEM contributors are also important to have sustainable, robust programs.

## **WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?**

As leaders, we need to provide an environment in which women feel that they can contribute, grow, develop and succeed, without having

to sacrifice other aspects of their lives. Companies must have a culture in which it is okay to choose a senior leadership path and also be able to balance other aspects of their lives.

## **WHAT ABOUT STEM GIVES YOU PASSION?**

I'm passionate about better serving our customers through the application of new technology. I love to be involved in the creation and commercialization of new products that bring differentiation to our customers. This makes our customers more competitive and ultimately makes Cargill more successful. Additionally, I love solving complex problems using technology. Analytical advances have helped us solve problems in ways we never thought possible even a few years ago in our products and our manufacturing processes. And the technology continues to get better and better every year.

## **HOW IS YOUR COMPANY INNOVATING TO PROMOTE STEM?**

Cargill has applied a very disciplined career development approach that helps our employees define their career path. In the STEM workforce, a dual ladder allows employees to determine a leadership track or an individual contributor track. Employees determine their career goals and gaps in skills or experiences to achieve these goals. Overall workforce planning tools are then applied

to assign individuals to new projects or businesses to fill these gaps. This not only is motivating for the employees but also ensures Cargill is maximizing the value these employees can bring to the company. ■

“...a STEM education is critical to generate a workforce that will create new business.”



# Padmasree Warrior

**SENIOR VICE PRESIDENT ENGINEERING  
CHIEF TECHNOLOGY OFFICER, CISCO**

As CTO, Padmasree Warrior helps define Cisco's technology strategy and works closely with the senior executive team and Board of Directors to drive innovation across the company. As an evangelist for what's possible, she pushes Cisco to stretch beyond its current capabilities, not just in technology, but also in its strategic partnerships and new business models. In her role as SVP Engineering, Warrior co-leads Cisco's Engineering organization alongside SVP Engineering, Pankaj Patel. Together, they set the vision and strategy for the organization, as well as lead a team of 22,000 engineers to execute on the group's strategic priorities. Warrior focuses on core switching, collaboration, data center/virtualization and cloud computing, as well as architectures for business transformation.

**WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

Math & science education is foundational to innovation across many industries. Having a strong STEM education and workforce focus will continue to drive competitive edge for the U.S. in creating new industries and driving growth in the industry.

**WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?**

- Know the importance of STEM
- Be advocates for STEM

**WHAT PRINCIPLES DO YOU, AS A LEADER; APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?**

I lead technology and engineering for a technology company, Cisco and Cisco STEM is my profession! I speak at schools and universities to encourage students to pursue STEM education. I also work to influence policy on STEM

**WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?**

- Role models
- Remove barriers for careers
- Flexibility in integrating family and work

**WHAT IS YOUR CONCEPT OF MENTORING AND SPONSORSHIP OF OTHERS FOR STEM CAREERS?**

- Coach – share experiences
- Speak publicly to women in STEM fields

**WHAT ABOUT STEM GIVES YOU PASSION?**

Curiosity is fundamental to many things in life.

“Having a strong STEM education and workforce focus will continue to drive competitive edge for the U.S. in creating new industries and driving growth in the industry.”



# Michele Kang

## FOUNDER AND CEO, COGNOSANTE

Michele Kang is founder and Chief Executive Officer of Cognosante. She is a visionary in health information technology and applies her experience to grow companies, promote entrepreneurship and achieve operational excellence for Cognosante. Prior to founding Cognosante in 2008, Kang led the growth of Northrop Grumman's Health Solutions business. Kang was a management consultant and turned around underperforming businesses and executed profitable growth strategies for Fortune 500 companies. She received a bachelor's degree in Economics from the University of Chicago and a master's degree in Public and Private Management from the Yale School of Management.



### **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

While young girls and boys use technology every day to communicate, play video games, download and listen to music, their interest in majoring in STEM—science, technology,—has steadily declined over the past decade. Fewer students are enrolling in computer science and graduating with computer science degrees. If this trend continues, the technology industry will only be able to fill half its available jobs with candidates with computer science bachelor's degrees from U.S. universities, according to the National Center for Women in Technology.

### **WHAT ABOUT STEM GIVES YOU PASSION?**

As the founder and CEO of Cognosante, a dynamic and growing health IT company headquartered in McLean, VA, I am passionate about technology and am grateful for the opportunities I have been afforded by pursuing a career in a STEM field. In order for Cognosante and other companies in the health IT field to grow and be successful, we need more 'minds on health' and more students to pursue a STEM education to help address some of the major challenges facing the health services industry.

### **WHAT PRINCIPLES DO YOU, AS A LEADER, APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?**

One of my most important roles as CEO is to motivate employees and to provide opportunities to help them find new and exciting ways to contribute to the business. I work to ensure everyone knows the unique work and life experiences they bring to the company are valued and are making a difference. I believe it is critical for employees to know they are accomplishing something exciting and meaningful and to understand the important role they play every day in helping our customers overcome their challenges, solve their problems and fulfill their missions. ■

“...we need more 'minds on health' and more students to pursue a STEM education to help address some of the major challenges facing the health services industry.”





# Sylvia Acevedo

**CEO, COMMUNICARD LLC/COMMISSIONER  
PRESIDENT'S ADVISORY COMMISSION ON  
EDUCATIONAL EXCELLENCE FOR HISPANICS**

CommuniCard LLC provides solutions in education and healthcare for the America's rising generation. Sylvia has served as an executive for several Fortune 100 companies including IBM, DELL and Apple. She started her career literally as a rocket scientist at Jet Propulsion Labs. Sylvia was recently named by President Obama to the White House Commission for Educational Excellence for Hispanics. In September 2011, Sylvia was honored by the Government of Mexico by receiving the Ohtli award, one of its most prestigious civil rights recognitions. She serves on the Board of Directors for the Girl Scouts of the USA and the Ann Richards School for Young Women Leaders. She lives in Austin, TX where the Austin Statesman named her as one of Austin's Heroes.

## **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

In the 21st century, the ability to create and produce technological innovation is absolutely essential for the well being of our citizenry and for our national security interests. The countries with the most scientists and engineers will be able to lead by creating the jobs of the future. It is in America's best interest to have its citizens trained and educated to be able to provide and secure its national resources and interests.

## **HOW ARE WOMEN AND MINORITIES IMPORTANT TO STEM CAREERS?**

Women and America's rising generation of youth make up more than 50% of the workforce. It is absolutely vital that we utilize the capacity and capabilities of the brightest and best of all of our population, including women and the rising generation of youth. People, from all walks of life, bring their own vitality and unique perspective to solutions. Having women and America's rising generation of youth select STEM careers strength-

ens America by diversifying our workforce and increasing the pipeline of STEM talent.

## **WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?**

To increase the number of women in STEM, we have to start by encouraging young women students to pursue STEM careers. Organizations, like the Girl Scouts, who have a reach in all zip codes in the USA, can support the efforts to introduce STEM careers to girls and to help them see that it is a great opportunity for them in college and as a career. Having schools include efforts that are more inclusive of girls in STEM activities will help girls see that STEM is an option for them.

## **WHAT ABOUT STEM GIVES YOU PASSION?**

The ability to create, design, produce and solve problems is one of the key aspects of an innovative society and culture. STEM careers are at the forefront of solving some of society's most vexing issues and problems. Working to problem solve challenges is one of the most exciting aspects of being

an engineer and is a highlight of a STEM career. Creating a product or solution or solving a problem is what excites me about being an engineer.

## **OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?**

The initiative that I am most proud of is using my systems and process abilities to create some of the nation's largest educational mobilization campaigns for America's rising generation. In 6 years, we have reached over 181,000 people and distributed over 160,000 books. The innovation of the mobilization campaign is based on applying engineering process skills to a bring together community partners, educational institutions and the rapidly shifting population of students and their families in entirely new ways that create lasting change. It's been heartwarming and extremely gratifying to see parents become more involved in their child's education and for students to learn about STEM and other careers. ■

# Dr. Sharon L. Hays

## VICE PRESIDENT, OFFICE OF SCIENCE AND ENGINEERING CSC CORPORATION

Dr. Sharon L. Hays, Vice President, Office of Science and Engineering at CSC, leads a team focused on the creation of business opportunities in the emerging climate change, energy and sustainability market. Before joining CSC, Dr. Hays served in the White House Office of Science and Technology Policy as a deputy to the President's Science Advisor. Earlier in her career, she worked on Capitol Hill, serving in several senior staff positions in the House of Representatives. Dr. Hays received her Ph.D. in Biochemistry from Stanford University and holds a BA from the University of California, Berkeley.



### WHY DO YOU BELIEVE STEM WORKFORCE AND EDUCATION ARE IMPORTANT TO THE NATION?

Science and technology will continue to be drivers of economic growth. To remain competitive in an age of increasing globalization, the nation will depend upon scientists, engineers, mathematicians and technologists who can generate the innovative discoveries that will drive the economy of the future. Science and engineering will also be the key to solving many of our planet's most pressing problems, whether it is discovering cures for deadly diseases, developing economically practical clean energy solutions, or finding ways to better protect our troops from harm on the battlefield.

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

It might sound counter-intuitive, but one of the ways we can bring more women into the STEM pipeline is to demonstrate to them that pursuing an education in a STEM field will give them the skills to succeed in any professional endeavor—including careers outside of science and tech-

nology. Too many young women shy away from studying in a STEM field because they think it locks them into a technical career. Nothing could be further from the truth—a STEM background is excellent preparation for leadership in careers from across the spectrum. When I decided to pursue a non-academic career after getting my Ph.D., some of the professors I had studied with made it clear they thought I had “wasted” my graduate training. I disagree; while I’m not a practicing research scientist, I use my STEM training every time I apply the problem solving skills that were honed during my rigorous scientific training. When we imply that training in a STEM field leads only to certain jobs, we’re sending the wrong message, and deterring many of today’s students—some of whom might otherwise become the field’s future leaders—from embarking on STEM-related studies.

### OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?

When I was in graduate school I initiated and led an effort to understand and document the sense of disillusionment that many Ph.D. students in the life sciences were feeling at the time. Their disenchantment stemmed from the fact that their career expectations did not align with the realities of the academic job market, which had tightened considerably since they had embarked on their graduate training. The report that I wrote on my findings gave voice to the students’ concerns and got the attention of policymakers in Washington, DC.

WHAT ABOUT STEM GIVES YOU PASSION?  
My STEM training gave me the ability to approach seemingly intractable problems as puzzles that can be solved with the right application of ingenuity and perseverance. Even though I am no longer a practicing scientist, I find myself using my STEM training to “think like a scientist” in many situations. I am passionate in my belief that pursuing an education in a STEM subject can lead to professional fulfillment in diverse—and perhaps unexpected—fields. ■

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# Adriana Karaboutis

**VICE PRESIDENT AND GLOBAL CIO, DELL, INC.**

Adriana (Andi) Karaboutis is Dell's Vice President and Global CIO, responsible for managing an efficient and innovative global IT enterprise focused on technology breakthroughs for the company and its customers. Prior to her appointment in 2011, Ms. Karaboutis was Dell's vice president of IT supporting the product groups, manufacturing, procurement and supply chain operations. Previous to Dell, Ms. Karaboutis spent over 20 years at Ford Motor Company and General Motors in various global IT and business operations leadership positions. Ms. Karaboutis received a B.S. in Computer Science as a Merit Scholar from Wayne State University, and has completed the accelerated Marketing Strategy Program at Duke University's Fuqua School of Business.

## **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

The nation that masters how to innovate faster and better is a nation that is poised to succeed. Given that, and the fact that 15 out of the 20 fastest growing occupations (per U.S. Department of Labor) involves STEM competencies indicates that a STEM enabled workforce is critical for innovation and success. As we look to Asia and Europe, we see a strengthening of math and sciences while our college entry scores show that on average, less than 50% of our students are truly prepared for college in math and less than 30% in science. If we further look at the statistics for women and minorities, they are even more sobering. If we don't make this a priority for our nation, we will find ourselves challenged economically and socially.

## **WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?**

It is critical for senior leaders to provide mentoring and coaching opportunities in support of building STEM strength at all levels of education.

Sharing our real experiences around what can be accomplished is not only enriching but provides young minds something tangible to aspire to. Real challenges, wins, losses and accomplishments can be very inspiring when they are conveyed on a first-hand basis. In addition to providing time for mentoring, senior leaders need to get actively engaged with schools and educators to provide extracurricular programs that demonstrate how textbook knowledge is applied in the business world and how it is at the core of transformation and innovation in most industries.

## **WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?**

Be an example ourselves. Share our story of how STEM was the foundation for our success. We need to help build confidence in women and demonstrate how science, math and technology is now at the core of everything we do. As one example, the digital environment is ubiquitous and that environment is based on STEM. We should have educators partner with the many professional organizations across the country that are sup-

porting the growth of women and minorities in STEM careers and foster an environment of education and business application in unison. To focus on STEM education is good, to partner it with business/industry focus is great.

## **OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?**

As a past president of the Michigan Council of Women in Technology (MCWT), I watched an organization of extremely motivated women and technology sponsors provide time and funds through our foundation to running summer camps, science competitions, and provide college scholarships and mentoring opportunities for girls and women showing an interest in science, math and technology. To watch elementary school girls build robots out of Legos and put them in motion was hugely rewarding. These programs helped fuel and strengthen the confidence of girls and women and taught them to not be intimidated by careers in technology and sciences. ■



# Janet Foutty

## NATIONAL MANAGING DIRECTOR, US TECHNOLOGY PRACTICE, DELOITTE CONSULTING LLP

Janet Foutty is the National Managing Director for the 16,000 strong Deloitte Consulting US Technology practice. In this role Janet leads Deloitte's technology business across advisory, implementation and sustainment services, with professionals in the US, India and Mexico. She is a member of the Executive Committee and the Board of Directors of Deloitte Consulting and is chairperson of the Deloitte Consulting India Private Ltd Board of Directors. Janet sponsors Deloitte's Women in Technology group and in the community she is a member of The Chicago Civic Alliance Board and the Chicago Metropolitan YWCA Board.



### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

Regardless of gender, as leaders in business, we should be doing everything we can to encourage more women to build careers in any of the STEM fields. To that end, over the years, I have developed a few recommendations that cut across science, technology, engineering and mathematics.

I believe in, and have personally benefitted from, *active mentoring*. I think that leaders have a responsibility to share their experience, insights, and networks with those coming up. The inspiration I received from those who took the time to spend with me both on their journey and guiding me through mine was (and still is!) invaluable.

Current leaders need to work closely with their Human Resources organizations to *make policies more adaptable and enlightened for career/life balance*. If there is one question I receive more than any other as I talk to women in the STEM workforce, it is "How do I manage it all?" I tell them that it is possible, but I also advise them to use every benefit available and work within the system to make

the best decisions for their own specific situation. Be selfish and bold on this front. The system is there to help!

*Work the networks* more than casually. With the instant and always-on communication channels we have at our disposal, we are more connected than ever before (especially true for technology-types). Social media is an effective means of keeping women connected to prospects, openings and development opportunities.

Finally, I believe that encouraging and *working with high school and college women* in the sciences, mathematics and engineering fields can only help drive more and more into the degrees that will pay off in the future—for them and for our businesses. I personally spend significant time with young college women and it is highly energizing and our future!

If there is to be a STEM worker shortage in the future, I suggest the answer (and the workforce) is out there—we just need to double down on our efforts to encourage, engage, and empower them—and there's no better time to start than today.

### OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?

Our Women in Technology (WIT) program has grown significantly in the last few years and I am exceptionally proud of the team's accomplishments. The work of the all-volunteer WIT team each year culminates in a day-long international program that promotes the attracting, retaining, and developing of women in our profession.

In 2011, we spent the day discussing the power and use of an individual's network and strategies for utilizing it to strengthen and develop our careers. On April 28, 2012, we will spend the day discussing effective approaches and tactics for making the most of the many social networks.

I have heard from a great many of the participants who tell me that the WIT program has truly made a difference in their careers and I take great pride in the very visible results across our practice. ■





# Susan O'Day

## SENIOR VICE PRESIDENT AND CHIEF INFORMATION OFFICER, WALT DISNEY COMPANY

Susan leads Disney Technology Solutions and Services, delivering technology capabilities that enable business segment strategies while achieving enterprise efficiency and promoting cross-company collaborative innovation. She is additionally accountable for company wide information technology policy and strategy including information security and technology risk management. Susan joined Disney in 2008 following a 12 year career at Bristol-Myers Squibb, where she served as CIO and VP of Global Shared Services. Susan began her career at CSX Corporation where she spent 11 years in operations research and IT. She currently serves on the Board of Miss Hall's School in Pittsfield, MA.

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

Aside from the obvious benefits of having highly trained and qualified employees and cast members in the STEM disciplines—something that is essential to our company—the increased capability in critical thinking skills and the ability to make data and fact based decisions are an important differentiator.

### WHAT PRINCIPLES DO YOU, AS A LEADER, APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?

Advocacy and involvement. We need to help kids recognize that STEM areas are cool. The stereotypes regarding top STEM students and professionals are slowly changing. I was fortunate to be educated in a single-gender environment where I

was permitted to focus on my studies and encouraged to pursue science and math without the peer and social pressure that many kids are faced with today. We need to celebrate STEM accomplishments as we would athletic, artistic or commercial achievements.

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

STEM allows focused, result-oriented training and education. This builds confidence, self-assurance and provides a solid foundation for woman. We need to be more aggressive in showing girls and young woman role models and highlighting stories of successful leaders. Creating active networking and internship opportunities is also essential in allowing individuals to learn and practice their skills in constructive environments.

### WHAT ABOUT STEM GIVES YOU PASSION?

The opportunities for woman who have capabilities and STEM training are huge, particularly in software engineering. Girls and woman bring a different perspective to complex problems. Software engineering is about looking at desired value, actions and capabilities and translating them into discrete and solvable challenges and opportunities. Then, they need to be applied to software design disciplines to remove complexities. It is exciting and, as a career, very rewarding. We do not have enough girls and young women being trained or working in the field and I want to change that. Many of us who have come up through technology organizations are working to raise the level of dialog on this topic and apply time, energy and resources to make a difference. ■

“We need to help kids recognize that STEM areas are cool”.

# Dr. Cindy Moss

## DIRECTOR OF GLOBAL STEM INITIATIVES DISCOVERY EDUCATION

As director of global STEM initiatives for Discovery Education, Dr. Cindy Moss designs, develops and implements initiatives to inspire students' curiosity in STEM. Prior to joining Discovery Education, Dr. Moss was director of STEM for Charlotte-Mecklenburg Schools and taught high school biology and chemistry. Among her many achievements, she was recognized with a Milken National Educator Award. Dr. Moss holds a bachelors degree in zoology from the University of North Carolina at Chapel Hill, master's degree in science from Syracuse University and doctorate in science curriculum and instruction from the Curtin Institute of Technology in Perth, Western Australia.



### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

STEM education is critical to the future of our country and world because it provides opportunities for students to learn to collaborate, innovate and develop critical thinking skills. Businesses of all types are searching for employees who can communicate, collaborate, use technological tools effectively and possess a variety of problem solving skills. Building STEM literacy among America's next generation of leaders is critical to meet the technology challenges that lie ahead, prepare students for tomorrow's careers and help our nation compete in a global economy.

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

The most important trait for senior leaders to possess is the willingness to take ownership for the quality of STEM education in their region. Adults tend to think that school today is like the school they attended, and as a result they may not question whether science teaching is occurring. Senior business leaders need to meet with school district senior staff to discuss

how they are promoting STEM and find ways to partner to improve STEM education. Senior leaders need to be willing to listen to district leaders about the obstacles that educators face and be willing to help troubleshoot ways to overcome those obstacles.

### WHAT IS YOUR CONCEPT OF MENTORING AND SPONSORSHIP OF OTHERS FOR STEM CAREERS?

As a high school teacher for 20 years and a director of STEM education for 9 years, I know that students need to see people who resemble them in a career, to help them believe they could pursue that option. As a classroom teacher, I developed partnerships with businesses to bring STEM professionals into the school to meet with students and build relationships with them. As a district level STEM leader, I started virtual field trips with local STEM companies to provide opportunities for teachers to deliver STEM learning experiences to their students. Through business partnerships and virtual field trips, students have the opportunity to see the variety of careers available in STEM and that people of all backgrounds and genders can be successful in STEM.

### HOW IS YOUR COMPANY INNOVATING TO PROMOTE STEM?

Discovery Education is a division of Discovery Communications, the leading non-fiction media company in the world. With unparalleled access to the world's premiere educational media, Discovery Education delivers digital content and a variety of learning experiences and initiatives to get students excited about STEM. Discovery also encourages teachers, students and parents to see STEM as a potential career path. Discovery Education's resources enable students to travel the globe without leaving their classrooms and interact with thought leaders in STEM. The resources also help ensure that all students, regardless of their zip code, can have a high quality STEM education. Additionally, Discovery Education provides research-based strategies and professional development to teachers and school administrators to empower them to provide the highest quality STEM education. Discovery also helps teachers celebrate and communicate their successes in STEM to motivate others to innovate in their classrooms. ■





# Ellen Kullman

## CHAIR OF THE BOARD & CHIEF EXECUTIVE OFFICER DUPONT

Ellen Kullman, 56, is the 19th executive to lead the company in 210 years of DuPont history.

She is a member of U.S. President Barack Obama's Council on Jobs and Competitiveness, where she co-authored the Council's recommendations on education and workforce skills. She is co-chair of the National Academy of Engineering Committee on Changing the Conversation: From Research to Action. She is on the board of trustees of Tufts University and the board of overseers at Tufts University School of Engineering.

### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

The backbone of America's economy is innovation and the heart of innovation is science. Engineers are problem solvers that make good ideas into realities. And technology helps us drive innovations with speed and adaptability. From astronauts to social media, from Kevlar® to the NFL—STEM careers are everywhere. At DuPont, we are working to address three big challenges facing society today: 1. How to fulfill the nutritional needs of a growing population, 2. How to increase the availability of alternative energy and 3. How to protect people and the environment. We will do this with STEM know-how. It is how America will remain competitive and how DuPont will continue to deliver solutions.

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

Many leaders have STEM backgrounders so it's easy to start with what we know—how we use STEM in our lives. But we also need to help students see how versatile STEM is. We

need to get involved and be collaborative and work with parents, teachers, schools and government to help address this important challenge for America. We also need to be creative in our efforts. Today's students have different ways of communicating and different priorities. We need to listen to them and learn how we can best reach them. Because at the end of the day, we need them to believe and care that STEM education is important to our future workforce and national competitiveness. The path to STEM education starts early, before kindergarten, and we need to engage throughout the education process, not just at the college level.

### WHAT ABOUT STEM GIVES YOU PASSION?

It's an area where I know I can make a difference. I have three children and I've seen them follow their interests. There is nothing more fun than helping them work toward their dreams. Helping students to see the excitement of science and engineering and pursue it is equally rewarding. I have the great honor of leading one of the oldest science-based manufacturing companies in the world.

Our future depends on a workforce with a strong STEM background. So it is personal and professional pleasure for me to work on STEM. And it is fun when you see that light bulb go off and you know you've helped someone see STEM in a different way.

### OF WHAT ONE INITIATIVE YOU ARE MOST PROUD?

I can't pick a favorite. I am personally proud of the work we did for President Obama's Jobs Council to help crystalize how a child's strong educational background can connect them to the jobs of today and tomorrow, and to put forward recommendations for the public and private sectors to improve the STEM pipeline in America. At DuPont, we have been a supportive of education and the evolution of education as new methods and content are developed since our founding in 1802. Today I'm proud of what we do for students and how we help teachers teach through inquiry based curriculum, seminars and learning experiences. ■

# Sharon Glave Frazee

## VICE PRESIDENT, RESEARCH AND ANALYSIS EXPRESS SCRIPTS

Dr. Sharon Frazee, vice president, Research and Analysis at Express Scripts, leads research that helps make the use of prescription drugs safer and more affordable. Prior to Express Scripts, Dr. Frazee led clinical and outcomes research for companies including Walgreens, Take Care Health Systems, and Landacorp. She was an instructor at North Carolina State University and provided evaluation research for various state and local government agencies before joining the private sector. Dr. Frazee earned her doctorate at North Carolina State University and an MPH from the University of North Carolina – Chapel Hill Gillings School of Global Public Health.



### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

Our industry is rooted in science, technology, engineering and mathematics. Take away any one of those and we fail. Many other emerging industries have STEM as a cornerstone for their workforce. Continued innovation to address the great challenges in healthcare requires a commitment to STEM.

### WHAT PRINCIPLES DO YOU APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?

Two principles are critical to me: Integrity and a passion to find practical applications of science to solve real-life challenges. Scientific and personal integrity is critical—compromise on that and the entire field of science, technology, engineering and mathematics suffers. After that is passion to find real solutions, practical solutions that make a difference in the world. I started in academia and spent years working on integrating theories—very “ivory tower” stuff that was interesting but for me, science really came alive when you applied it to practical problems. When I was able to take theory, combine it use tools like geomapping and statistical and predictive modeling to help solve real problems such as crime, unhealthy behaviors and selecting the right people for healthcare interventions, my passion for applied science took on new meaning.

Rigorous scientific analysis can help us allocate resources most effectively, determine the effectiveness of solutions and even save lives.

### WHAT ABOUT STEM GIVES YOU PASSION?

I grew up in a working class neighborhood in upstate New York. I went to a small Catholic school on a scholarship. I was introduced there to the world of science and math and it opened my eyes to what was possible.

In sixth grade science class, we dissected a cow. Sounds strange nowadays, but in a rural farming community, you needed to understand how things worked, including the animals. In math, we learned probability by looking at the how many eggs chickens would produce and what proportion of female chicks would hatch. Our teachers made math and science relevant to us, using examples we all understood as part of our rural life.

I’m passionate today about STEM because my teachers and other mentors have helped me apply STEM in a practical way. It’s part of my everyday life and not just because I work in a scientific organization. It’s because it was made relevant early on.

### HOW DO WE GET MORE WOMEN INVOLVED IN STEM?

My teachers encouraged me, even though science and math were

nontraditional subjects for girls. They suggested books and helped me discovered how fascinating these subjects could be.

They set me on a path where I found a world beyond my small hometown. I was the first person in my family to go to college, the first to finish an advanced degree and so on.

For two years in a row my team has judged the 4th, 6th and 8th grade science fair at a local school and have hosted a celebration for the top winners each class at the Express Scripts Research and New Solutions Lab. Many of them were young girls from underprivileged backgrounds who happened to think science was pretty cool, kind of like me. For them to succeed, we need to give them passion for learning, encourage them especially as other interests compete for their attention, and provide them with opportunities to apply what they have learned. The best part about working with these kids was seeing them connect the dots and learn how their interest in math and science could lead to an exciting future; one where they could have a better life and help the people around them. They saw the practical side of math and science. One girl said she was going to go home and tell her grandma why she needed to take her medicine. When we add passion to curiosity, amazing things happen. ■





# Barbara Hulit

## **PRESIDENT, FLUKE CORPORATION**

Barbara Hulit joined Fluke Corporation in 2005 as President, the first woman chief executive in company history. She was appointed a Danaher Group Executive in 2008 and Growth & Innovation leader in 2011. Prior to Fluke, Ms. Hulit was a Partner with The Boston Consulting Group. Other previous roles include sales and marketing with Noxell, PepsiCo and MCA. Ms. Hulit serves on the boards of the Pacific Science Center, Partnership for Learning and Washington STEM Center. She earned her MBA from the Kellogg School at Northwestern and BBA in Marketing from the University of Texas.

### **WHY DO YOU BELIEVE STEM IS IMPORTANT TO THE NATION?**

Our nation is woefully unprepared to sustain the innovation that has made us a world leader. Innovation depends on both our current and future workforce possessing solid fundamentals in science, math and the other skills that support technology and engineering. And yet, we lag far behind other countries in STEM proficiencies and graduation rates. Of the 174,000 science and engineering doctorates awarded worldwide in 2006, only 17% were earned by United States citizens. In Washington State, our strong recovery from the recession was in large part due to our strength in science, new technologies and engineering. Think of all that Microsoft, Boeing and Amazon have accomplished. Right now, these businesses have the ability to create high-quality products and services that drive consumption. But to sustain that growth, by 2018, 67% of all jobs in Washington State will require some postsecondary training beyond high school, and even though student participation in STEM subjects is higher in Washington than the national average, we are still not creating enough graduates to meet demand.

### **WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?**

The single most important thing we can do is make sure that girls know, from an early age, that they can succeed in STEM fields. STEM research conclusively shows that by their graduating year of high school, only 10% of women are interested in STEM fields, compared to 35% of men. If the window of opportunity and interest closes early, then the answer has to be a collaborative mentorship effort between families and educators and between government and employers. It's so fundamental. Women are just as capable of STEM as men, but we are losing almost half of our potential STEM workforce before we even start. How can we compete if we're losing half of our talent base? We need a collective effort in early childhood education to help girls understand it's OK to be good at science and math, it's OK to assert yourself, it's OK to be smarter than boys. We have to try harder to stop girls from opting out of STEM fields before they even understand the potential, or the consequences.

### **OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?**

The Washington STEM Center. Too often in dealing with tough issues like STEM education, constituents spend more energy in blaming others than in trying to drive improvements. The WA STEM Center evolved out of the Washington Roundtable, a consortium of business leaders, and the business community's desire to have a more active advocacy role in solving education and workforce training issues. The STEM Center brings together a trifecta of education, community and business leaders to help accelerate STEM education. We're not just talking about the issues, we're actually doing something about it. Washington STEM has already seeded millions of dollars into the teaching community to spur innovation and drive results that can ultimately be shared and leveraged into the broader education effort. I'm proud to be a part of an effort that's having impact in STEM education, an area that's critically important to all of us, to our kids and to our future. ■

# Charlene Begley

**PRESIDENT & CEO, GE HOME & BUSINESS SOLUTIONS/  
SENIOR VICE PRESIDENT AND CHIEF INFORMATION  
OFFICER, GE**

GE Home & Business Solutions is an \$8.5B business that includes appliances, lighting and intelligent platforms. AS CIO, Begley is responsible for GE's Information Technology organization and co-leads GE's Software Council. She also leads GE's Sourcing Council and is a member of GE's Corporate Executive Council. Begley joined GE in 1988 and progressed through leadership roles including vice president, GE Corporate Audit Staff and president and CEO for several GE businesses including GE FANUC Automation, Transportation, Plastics, and Enterprise Solutions. Begley graduated from the University of Vermont. She and her husband have three daughters.



## **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

With the U.S. ranked 17th in Science and 25th in Math among 34 industrialized countries, it is critical to continue to focus on STEM education. This will help increase our competitiveness and improve the talent that makes up our workforce. For GE, innovation is at the core of everything we do and STEM careers are crucial to our success.

## **WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?**

Senior leaders should think about STEM advancement as we do business growth—what can we do to drive continuous improvement and ensure that we are achieving the results we need. For example, MC2STEM High School in Cleveland, OH is a product of GE and the community thinking outside of the box and taking an innovative approach to education. As a result, we have the first STEM school in the country embedded in GE Lighting's Nela Park Campus.

## **WHAT IS YOUR CONCEPT OF MENTORING AND SPONSORSHIP OF OTHERS FOR STEM CAREERS?**

Mentoring is something in which all leaders should participate. We should encourage students to pursue STEM careers, as these careers are the foundation of business and innovation. The best way to help students gain a better understanding of their career options is by seeing these jobs in action. In collaboration with MC2STEM, GE Lighting works to provide students the knowledge and expertise in these fields by partnering them with employee volunteers who serve as buddies and mentors and who provide insight and expose them to educational pathways and career opportunities available. MC2STEM High School gives students exposure to the real-world work environment and culture through hands on experience. Our GE volunteers work directly with the students through tutoring, a buddy program, job shadowing and a simulated New Product Introduction project developed and taught by employees.

## **WHAT ABOUT STEM GIVES YOU PASSION?**

Each time I visit the school in Cleveland, I am energized to see the students applying their knowledge and bringing ideas to life. It is great to see the students get excited in one of their unique capstone projects or working in the MIT Fabrication Lab, the first High School "Fab Lab" in the country. By doing the work versus just reading about it, the students are benefitting from hands on experience and actually applying knowledge to solve real world problems.

## **OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?**

I am proud of the STEM schools and their success. While excelling STEM schools are located all across the country, I take particular pride in the fact that MC2STEM High School is located on our GE Lighting Nela Park campus. This is the first known high school, let alone STEM school, to be located on a corporate campus. We are working to give students first-hand experience and exposure to the real-world work environment and culture. Our GE employees collaborate with MC2STEM staff and students to provide current and real ideas and expertise to project-based learning. ■



# Susan J. Crockett, Ph.D.

## **VICE PRESIDENT AND SENIOR TECHNOLOGY OFFICER FOR HEALTH AND NUTRITION, GENERAL MILLS**

**Susan J. Crockett, Ph.D.**, is Vice President and Senior Technology Officer for Health and Nutrition at General Mills where she leads the Bell Institute of Health and Nutrition. She is responsible for health and nutrition strategy, regulatory affairs, nutrition research and health professional communication. Crockett completed a doctorate in Epidemiology and is a registered dietitian and was Dean of the College for Human Development at Syracuse University from 1990 to 1999. She chairs the Board of Directors of the International Food Information Council and is a member of the Food Forum at the National Academy of Sciences.

### **OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?**

I am most proud of my leadership in General Mills that supports flexibility for the staff of scientists I lead, most of whom are female. The Bell Institute of Health and Nutrition (BIHN) was the first group in our company to adopt a future-of-work model we call Flexible User Shared Environment (FUSE). The model relies on trust-based management and allows people to work efficiently from anywhere. And, while it not only about working from home, when people decide to do that, or when they work anywhere removed from our primary office location, they have all of the technology tools needed to be efficient. When the BIHN converted to FUSE, evaluation showed that collaboration improved 58%, decision speed by 42%, flexibility by 54% and productivity by 55%. People also reported significantly greater satisfaction with work-life balance. After the BIHN piloted FUSE in 2006 and the evaluation was so positive,

the whole company began gradually converting to the FUSE work approach.

In addition to FUSE, the Bell Institute honors all requests for part-time work and we're the only function in the company to do so. I'm proud of my leadership in flexible work approaches because all of the scientists on my team are more productive as a result, our attrition rate is close to zero, and people aren't motivated to drop out when they have small children. I believe that flexibility is one key to allowing women (and men) to succeed and climb the career ladder in science, technology, engineering and mathematics fields.

### **WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?**

Senior leaders must continually work to hone their own leadership skills so they can provide support and mentoring for more junior scientists in

STEM disciplines. Good leaders develop people, organizations and themselves. They inspire and motivate others by providing positive feedback, setting aggressive goals and clear priorities. They add value with superior expertise, but humbly give credit to more junior scientists for their accomplishments. They connect to the outside world, form strong internal networks and encourage innovation and change. Above all, great leaders must engender trust at all levels and demonstrate unquestionable integrity. Being able to demonstrate all of these traits requires that senior leaders must devote time and energy to developing themselves. This is true because their leadership behavior and the role modeling they provide for others are essential to developing others. ■

“Good leaders develop people, organizations and themselves.”



# Sherry Covell

## VICE PRESIDENT, INTEL PROGRAMS, HARRIS CORPORATION

Sherry is responsible for client satisfaction, service delivery, and growth for IT services across the intelligence community. Covell joined Harris in 1995 and most recently served as vice president of Talent Management, responsible for corporate-wide recruiting, leadership and organizational development, and organizational effectiveness. Previous roles at Harris included VP of Business Development for national programs in the Government Communications Systems division, director of Business Development in the proprietary business, and director of Programs for the wireless products group. Prior to joining Harris, Covell held technical, engineering and analyst positions developing and integrating communications systems in support of U.S. government customers, and was a senior staff member with both the MITRE Corporation and Johns Hopkins University.



### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

Senior leaders must recognize the importance of promoting STEM across all facets of their life, both personally and professionally. As advocates for STEM, senior leaders must be comfortable with speaking to the challenges and rewards of an education and career in these fields. They must encourage students and young career professionals to seek out careers in STEM and discuss the importance of STEM to our nation. Senior leaders must be open and honest about the effort it takes to be successful while stressing the fulfillment that can be obtained when working on new technologies. Additionally, senior leaders must be proactive advocates of STEM and use their positional power to promote STEM at every opportunity that comes along.

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

I believe the best way to assure that there are more women leaders in STEM is to provide as much STEM exposure as possible to female students in middle school and high school. It is especially important to provide information, workshops, and career

counseling to females who may be unaware of the opportunities that a STEM education can open up for them. Conducting information sessions and workshops, led by successful women leaders, provides a forum for the young females to ask questions and learn more about all of the possibilities that can result from a STEM education and career path.

### WHO IS YOUR STEM ROLE MODEL AND WHY?

As one of only a handful of female graduates in a STEM curriculum in the early 1980s, I truly respected and admired Sally Ride for all that she has done to promote women in technical fields. She was not only an accomplished physicist and the first woman in space, but someone who truly exemplified professionalism, character, and extreme dedication to her profession. Sally Ride recognized the opportunity to use her "Celebrity Status" and started her own company to create educational programs and products known as Sally Ride Science to help inspire girls and young women to pursue their interests in science and math. Throughout her career, she has always been an inspiration to young women who aspire to a career in a STEM field.

### HOW IS YOUR COMPANY INNOVATING TO PROMOTE STEM?

To motivate and inspire our nation's youth to study math and science and position them for successful careers in technical fields, Harris has established, supported and participated in many educational and mentoring programs. Many of our employees, including executives, work with local schools and youth programs that Harris supports as mentors and tutors to help promote our platform of education. Our Women in Engineering employee resource group and K-12 Outreach program provide volunteers to teach interactive technology workshops and speak about STEM careers. Our company also helped create the Bayside High School Engineering and Technology Academy (BETA) in Brevard County, Florida, which provides rich and rigorous curriculums that prepare students for college and technical careers. At the university level, Harris supports universities by creating world-class learning environments, providing scholarships and endowments, supporting student organizations, sponsoring special events, and encouraging employee participation on advisory boards. ■



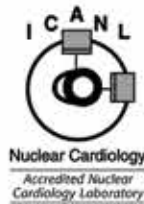


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especially our Founder and CEO  
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# Carey Smith

## **PRESIDENT, HONEYWELL TECHNOLOGY SOLUTIONS, INC.**

Carey Smith is the President of Honeywell Technology Solutions Inc. (HTSI), a subsidiary within Honeywell Aerospace. Since September 2011, Carey has led the HTSI business that provides space, networks and communications, technical services and logistics support for the Department of Defense and civilian customers.

Throughout her career, Carey has managed complex operations across hundreds of worldwide locations, delivered excellent contract performance and consistently demonstrated both top and bottom line growth. Her career in the aerospace and defense industry spans 26 years. Carey has a B.S.E.E. from Ohio Northern University and a M.S.E.E. from Syracuse University.



### **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

The viability and success of our nation depend upon a strong STEM education and workforce. The STEM disciplines are imperative to drive innovation and change which set the future direction and pace of the world.

Facing an aging engineering population coupled with an increased technical skill demand, we need to encourage our younger generation to pursue STEM careers.

### **WHAT IS YOUR CONCEPT OF MENTORING AND SPONSORSHIP OF OTHERS FOR STEM CAREERS?**

STEM sponsorship must start with the earliest education levels. To engage young children in STEM fields, we need to relate to areas that interest them, like space, robotics and computer gaming. Sponsoring children to participate in robotics, Math Counts, science fair, "take your child to work day" and speaking at schools about STEM promotes interest.

Good mentors and role models help individuals understand their field and more importantly focus on lifelong learning and development. Mentorship is particularly important for encouraging women and minorities to enter STEM careers. According to a recent study by NBC, today 76% of all STEM jobs are held by men. Minority

participation also lags. We should increase the diversity of our STEM population to get all of the best ideas.

### **WHAT ABOUT STEM GIVES YOU PASSION?**

When I was young, my father encouraged me to become an engineer. He gave me a tour of the steel mill where he worked and showed me how engineers designed new products and improved processes through automation. At an early age, I knew that engineering was the right career for me since it was one where I could make a difference.

Today, STEM gives me passion by developing the young people that will change the future of tomorrow. STEM education creates critical thinkers and the next generation of innovators who will solve our most difficult challenges, like renewable energy, medical solutions, and advanced transportation.

### **HOW IS YOUR COMPANY INNOVATING TO PROMOTE STEM?**

Math and science education is a key pillar of Honeywell Hometown Solutions. We inspire the next generation to pursue technical fields through programs including:

**FMA Live:** This multimedia show teaches middle school students about physics with hip-hop music, videos and experiments. Sponsored

by Honeywell and NASA, FMA Live travels to ~40 middle schools throughout the U.S. and Canada each year. [www.fmalive.com](http://www.fmalive.com).

### **Honeywell Educators @ Space Academy:**

Honeywell sends 250 teachers every year to the U.S. Space and Rocket Center in Huntsville, Alabama. Participants engage in hands-on activities and teaching techniques through simulated astronaut training and innovative tools that bring science to life in the classroom. <http://educators.honeywell.com/>

### **Honeywell Leadership Challenge Academy:**

Honeywell sends more than 200 children of employees to the U.S. Space and Rocket Center in Huntsville, Alabama to develop skills through science-oriented workshops and exercises which encourage high school students to pursue math and science careers. <http://leadership.honeywell.com/>

### **Honeywell Initiative for Science & Engineering:**

Honeywell partners with universities to inspire students to pursue careers in science through lectures hosted by Honeywell fellows and Nobel laureates on engineering and its impact to research and development, new products and value creation. <http://www.honeywellspace.com/> ■



# Linda S. Sanford

## SENIOR VICE PRESIDENT, ENTERPRISE TRANSFORMATION IBM

Linda Sanford leads the strategy for IBM's internal transformation to becoming the premier globally integrated enterprise. In this role, she is responsible for driving the company's ongoing reinvention spanning technology, operations and culture. Ms. Sanford is a member of the Women in Technology International Hall of Fame and the National Academy of Engineering. She has been named one of the 50 Most Influential Women in Business by Fortune Magazine. A graduate of St. John's University, Ms. Sanford earned an M.S. in Operations Research from Rensselaer Polytechnic Institute.

### HOW IS YOUR COMPANY INNOVATING TO PROMOTE STEM?

Our central value proposition is on delivering technology and expertise in innovative ways to address key problems facing our clients and the world, so clearly we have a vested interest in promoting STEM education. We rely on a pipeline of new talent emerging from universities with firm grounding in math, the sciences and technology. So we've been focused on enhancing STEM education for many decades, dating back to the 1950s when we worked with Columbia University to develop the computer science discipline.

We've also introduced several innovative new programs in the past few years to support STEM. One we call the Transition to Teaching program, which addresses the critical shortage of math and science teachers by leveraging the brains and backgrounds of some of our most experienced employees. Through Transition to Teaching, IBM is enabling its employees to become fully accredited teachers in their local communities when they choose to leave the company, providing tuition reimbursements of up to \$15,000, stipends during student teaching, and online mentoring and other support services in conjunction with colleges, universities and school districts. Our first class of Transition to Teaching "graduates" is now in classrooms in North Carolina and New York, the initiative is now active in the United Kingdom, and we're

pleased that several other companies are developing similar programs.

Try Science, a collaboration of the New York Hall of Science, IBM, and the more than 600 member institutions of the Association of Science-Technology Centers, opens an online world of science and discovery to students who otherwise would have no access to the best museums around the world. The site, available in nine languages, provides interactive exhibits, multimedia adventures and live camera "field trips." A special view for teachers, Teachers Try Science, helps middle school teachers improve their instruction with hands-on projects.

IBM Mentor Place is a key component of IBM's overall commitment to public education and raising student achievement. Through this corporate volunteer program, IBM employees around the world are providing students with online academic assistance and career counseling, while letting them know that adults do care about them. More than 6,000 IBMers in 35 countries are currently participating in the program.

### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

We're living in a competitive world with an incredibly integrated global economy. The key to economic growth is innovation, and the STEM disciplines are essential for innovation. In every industry, the application of technology

is changing the game. We need our young people prepared to become innovators, and a solid STEM education is a core building block. You look at the innovators in just about every industry, and you'll find they have a solid understanding of STEM principles and how to apply them. The way people work is changing. It is becoming smarter, more collaborative, and in many cases virtual thanks to the penetration of technology. Jobs in STEM fields are on the rise and will make up about five percent of all jobs by 2018, according to Georgetown University Center on Education.

### WHAT CAN WE DO TO ATTRACT MORE WOMEN TO STEM CAREERS?

I think we need to frame STEM careers in a way that makes them more appealing to women. I try to stress the importance of collaboration, which many women are naturally adept at and which is so essential to successful technology projects today. Women also tend to like solving problems, so I believe it would help greatly if we could keep it at the level of how science and technology can help to solve really important issues in the world. You have to understand the technology and work with it, of course, but the problems that we're solving are so much more than that—like disease prevention, water quality, and access to health care. The problems of the world are things that we can tackle. That should be appealing to all of us. ■



# Neddy Perez

## VICE PRESIDENT AND CHIEF DIVERSITY OFFICER, INGERSOLL RAND

Nereida (Neddy) Perez, Vice President and Chief Diversity Officer at Ingersoll Rand. She is an internationally known diversity and inclusion practitioner with more than 20 years of experience working with Fortune 500 global corporations in developing and implementing diversity, community relations, social responsibility and employee relations programs. Neddy is a leading force in the work of Corporate and nonprofit STEM initiatives like STEMconnector.org, the Shell Digital Divide and the Houston Technology Center. Her vision and work in the STEM space has resulted in removing economic barriers in numerous underserved communities globally.



### **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

Our nation is at a critical cross roads, many countries are graduating engineers, scientists, medical professionals, accountants and technology experts at faster rate than our nation. In the last 10 years we have lost significant ground in these key business sectors which have resulted in the erosion of our capabilities as a nation to stay competitive economically. We need to do a better job as a country in keeping children in school and getting them interested in STEM.

### **WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?**

Take a proactive role in STEM by finding ways that our companies can invest in offering internships, scholarships and participate in tutoring programs. On a personal or individual basis we can get involved with professional associations or community organizations (like: In Roads or the Boys & Girls Clubs) as mentors and coaches.

### **WHAT PRINCIPLES DO YOU APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?**

I feel that all of us have a responsibility to give back and making the communities we live in better for the greater good of those that will follow us. As leaders we must clear the way for the

next generation and help them reach their full potential. It is critical that we serve as role models, mentors and sponsors to the next generation of engineers, scientists, mathematicians, medical professionals, technicians, computer programs, etc.

### **WHO IS YOUR STEM ROLE MODEL AND WHY?**

My role models have included Lt. Colonel Consuelo Kickbusch who has been a strong advocate for education and Bernard Harris who has been a great advocate for the Math and Sciences fields.

### **WHAT IS YOUR CONCEPT OF MENTORING AND SPONSORSHIP OF OTHERS FOR STEM CAREERS?**

Access to information and tools that encourage people to pursue careers in the STEM space are great. However, a number of studies have shown that mentoring and sponsorship are key to providing encouragement and support. Personally, I don't believe that I would have become a vice president without a number of mentors encouraging me and serving as role models.

### **WHAT ABOUT STEM GIVES YOU PASSION?**

Years ago I created and implemented a global computer donation program to recycle used corporate computers and redistributing them to underserved communities with no

access to technology. The program distributed more than 40,000 computers in over 50 countries. While we had a great impact in many schools, my favorite part was seeing the faces of the children light up when they turned on a computer for the first time. It was wonderful to learn that the computers were not only used to help the children prepare for the future but that many of the schools used the computers to help the local community members learn English, prepare for administrative jobs and entry level business skills need by the parents to help them obtain better paying jobs that helped their families.

### **OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?**

I am most proud of the creation of STEMconnector.org. Two years ago I realized that there wasn't a central clearinghouse for all the great work going on in the STEM space. I shared the vision and idea for creating a portal and online information directory that could become an information clearinghouse like Wikipedia for all things related to STEM. I thought it would be great to have an information resource that corporations, government entities, individuals, associations, etc. could search for grants and best practices. I provided seed money to turn the vision into a reality that created STEMconnector.org. ■





# Diane M. Bryant

## **VICE PRESIDENT/GENERAL MANAGER, DATACENTER AND CONNECTED SYSTEMS GROUP, INTEL CORPORATION**

Diane M. Bryant is vice president and general manager of Intel Corporation's Datacenter and Connected Systems Group which generated over \$10B revenue in 2011. Bryant was corporate vice president and Chief Information Officer (CIO) of Intel Corporation, and the general manager of the Server Platforms Group. In her 27 years at Intel, she has also run the Corporate Platform Office and was Director of Engineering. Bryant received her bachelor's degree in electrical engineering from U.C. Davis in 1985 and joined Intel the same year. She earned an Executive MBA from Stanford and holds four U.S. Patents.

### **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

Innovation is the lifeblood of a corporation like Intel, and it is fed in large part by careers stemming from a science and math foundation. Without this talent, our country's ability to both create and retain good-paying jobs in the United States, and by extension compete in the global business market, is threatened.

### **WHAT ABOUT STEM GIVES YOU PASSION?**

My personal story in a nutshell is that finding engineering changed the trajectory of my life. I was without real direction, thinking my 'career' was likely to be a hair stylist, when a chance comment by a community college classmate about engineering paying well set me on my path. I ultimately joined Intel, and every single day since has been both challenging and inspiring. I would love to introduce other people, beginning with our nation's youth, to the incredible stimulation that my teams and I feel when we embrace new challenges with engineering principles and solve them.

### **HOW IS YOUR COMPANY INNOVATING TO PROMOTE STEM?**

Intel invests around \$100 million each year in programs supporting STEM. That's certainly a lot of money, but Intel does so much more than write a

check. We have an organization within Intel devoted to supporting these programs, and we bring the passion of more than 100,000 Intel employees around the world as volunteers. Programs Intel supports include:

- Annually sponsoring two of the world's largest, most prestigious pre-college science and engineering competitions: The Intel Science Talent Search and the Intel International Science and Engineering Fair. Intel sponsors these activities to recognize and reward bright young innovators and to get the attention of other youth, inspiring them to engage in math and science pursuits.
- Intel is active with FIRST Robotics, which motivates young people to pursue opportunities in science, technology, and engineering.

Both of these activities offer youth real-world, hands-on experience with science and engineering, which we know improves the likelihood that they'll get hooked on subjects and pursue them in college and beyond.

### **WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?**

The solution is both complex and simple. It is complex because it is long-term: we need to first get women into the career itself. Intel recently conducted a survey of US teens to determine what their knowledge and

interest levels were of engineering as a career. We found a number of things that parents and teachers can do to get them engaged, from explaining what an engineer actually does in her job to explaining the impact it has on people and the world around us. We found that to engage girls, particularly, this aspect of being able to create goodness through this career, was most effective. Once they're engaged, though, our job is not finished. We need to hold their interest through college; we can't sugarcoat the fact that engineering is a challenging major. We need to establish that getting through engineering school, like through medical school, ultimately brings great reward in the form of a career that is intellectually stimulating. Then, when women join the engineering workforce, we need to provide them mentors to help them be successful. Though it takes the dedication of others, it is the simple part, because by then they are happy putting those hard-won skills to work, and just need help navigating. ■

# Adriane Brown

## PRESIDENT AND COO, INTELLECTUAL VENTURES

Adriane brings 30 years of leadership experience to Intellectual Ventures where her management and business acumen serve as the cornerstone for IV's strong, global performance and continued success. Previously, Adriane served as President and CEO of Honeywell Transportation Systems. Adriane is recognized for mentoring women in STEM and developing leaders. She serves on the Board of Directors of Pacific Science Center and Jobs for America's Graduates. She has a BS in Environmental Health and a PhD from Old Dominion University, and is a Sloan Fellow with an SM, Management from MIT.



### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

Invention and technology are the drivers of progress and economic growth. Scientists, technologists, engineers, and mathematicians lead the process of research, discovery, and application that make progress possible in our technology-driven world. Study after study has demonstrated that diverse teams almost invariably come up with better solutions than teams that are alike. As a nation, it's important that we encourage and foster STEM careers for both girls and boys. Success here allows us to reap the biggest rewards and economic gains.

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

Senior leaders have an important responsibility to mentor, coach, and encourage the next levels in their organization and for generations to come. They are the ones who can unleash the full brainpower of the people they work with and mentor. They must ask tough questions and

sometimes even advocate for the advancement of those outside the mainstream. As senior leaders, we have to watch for that spark in people and nurture and mentor it when we see it.

### WHAT PRINCIPLES DO YOU, AS A LEADER, APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?

My motto and what I tell young people is to get comfortable with being uncomfortable. I have discovered that the biggest changes and the biggest rewards come when I step outside of my comfort zone and push my limits. If we go through life being comfortable, we can't expect big things to happen. If we continually ask to work on hard problems or put ourselves in situations that are a stretch, we have the opportunity to make big gains.

### WHAT ABOUT STEM GIVES YOU PASSION?

I am passionate about finding the best solutions to the world's big problems and to do that, we need participation from both men and women. Since I graduated from college, we

have made great strides in changing the face of our workforce, but we shouldn't confuse improvement with success. The truth is—women are still woefully underrepresented among the ranks of mathematicians, computer scientists, and engineers. As President of Intellectual Ventures, a company that brings the world's brightest minds together to solve tough problems, I am acutely aware of how the shortage of women in these fields limits our progress. If we can't embrace the most basic level of diversity, then we've squandered half of the brain power available to us to make the world a better place.

### OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?

I support the universal advancement of STEM initiatives; however, girls and women in STEM are disparately underrepresented. I have had the privilege of working with Expanding Your Horizons (EYH) and I have admiration for the incredible work EYH does to open young women's minds to the power of math and science, and to help them see the wonderful opportunities that these fields offer. ■



# Denise L. Ramos

## CEO AND PRESIDENT, ITT CORPORATION

Denise Ramos is chief executive officer and president at ITT. She previously served as senior vice president and chief financial officer, and was responsible for all aspects of financial management and reporting for the global multi-industry company, as well as communication to the investment community. Denise brings a unique background to her role as CEO that combines more than two decades in the oil and gas industry with significant retail and customer-centric experience. She began her career at Atlantic Richfield Company (ARCO) of Los Angeles, Calif., where she spent 21 years in a number of increasingly responsible finance positions, including corporate general auditor and assistant treasurer, the position she held when the company was acquired in 2000 by British Petroleum.

### **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

Today, ITT and all companies across America are in the midst of a global competition for virtually everything—customers, talent, profits, technologies and market share. To ensure our long-term competitive advantage and prosperity, we must peer into the future—the sometimes distant future—and determine the kinds of products and services that will be needed in five, 10 and 20 years from now. We have to be able to look around corners, and this absolutely requires the strategic thinking, problem solving and technological capabilities that STEM encourages. Perhaps just as importantly, technology will continue to be an ever-increasing presence in our personal lives as well, and an understanding of STEM will be critical to navigating our increasingly technological future.

### **WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?**

To advance STEM, we need to engage the broadest possible participation in these fields and draw individuals across race, gender and nationality to study and pursue ca-

reers in science, technology, engineering and math. This requires leaders at every level of an organization to embrace diversity and become ever more open to an infinite variety of thoughts and viewpoints. When leaders create an environment that welcomes diverse ideas, they not only nurture talent across the broadest spectrum. They also deepen the capabilities within the organization and STEM professions, where the ability to work collaboratively, integrate different perspectives and think about problems in new ways is central to success.

### **WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?**

In work, as in life, we learn in many ways—through books, experiences, conversations. However, one of the best ways for aspiring leaders to learn and grow is through good role models. Throughout my career in the oil and gas, retail, and manufacturing industries, my leadership style and capabilities have been enhanced by learning through people who I admire and respect. Looking back, one special role model stands out because I really developed my ability to think strategically and relate to

people more openly and authentically. I also learned that work is not just a job—it's a way of being. Those lessons have deeply influenced me and shaped who and where I am today.

### **OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?**

Earlier this year, following a spin-off transaction that created a “new” ITT, we launched a renewed version of our vision and values that reflects who we are today. I am proud that it carries forward those things that make up the best part of our century-old legacy—our values, capabilities, brands and management system—while integrating our strategy as a global diversified industrial company around leading with technology, differentiating with customers and optimizing our work. However, I am most proud because at the core of The ITT Way—both literally and symbolically—are the ITT people, who every day deliver enduring impact and premier financial performance for all our stakeholders. I couldn't be more proud to be leading this team of high achievers and to see the engagement and enthusiasm they feel for The ITT Way. ■



# Phyllis Campbell

## VICE CHAIRMAN OF THE PACIFIC NORTHWEST REGION JP MORGAN CHASE

Phyllis Campbell is the Chairman, Pacific Northwest for JPMorgan Chase. Previously, Phyllis was the President/CEO of The Seattle Foundation, the largest community foundation in Washington. Phyllis holds an M.B.A. from the University of Washington, B.A. in Business Administration from Washington State University, graduate of Pacific Coast Banking School at the University of Washington. Phyllis is devoted to civic activities focusing on education and human services issues. She currently serves on the boards of Alaska Air Group, Nordstrom, PATH, Initiative for Global Development, US Japan Council and the Diversity Advisory Board for Toyota, North America.



### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE IS IMPORTANT TO OUR NATION?

To prosper in the 21st century market place, America depends on our ability to compete with nations around the world. As such, we need a qualified workforce to meet the jobs of today as well as the future. Our success is to educate and innovate. As our global economy changes, our young people will be called upon to activate their resiliency, and depth of imagination in order to lead innovations. STEM ensures that students have a strong foundation in science, technology, math and the arts. These skills are critical to ensure the students have effective careers in this global economy. Basic skills spark imagination and creation to ensure basic skills combined with the ability to integrate data. STEM education will enable us to prosper and share

the sustainability of our world. Future generations will be finding cures for diseases we may not know exist. It prepares young people for careers to create a world that we can't even imagine today.

### WHICH WOMAN LEADER DO YOU MOST ADMIRE, AND WHY?

My own mother was an inspiration to me. She was raised in Hawaii, in a traditional Japanese American family. As a female, she was not strongly encouraged to excel through higher education. In spite of that, she made her own way to the mainland and obtained her degree in medical technology. She had a distinguished 40 year career in the medical field, becoming a specialist in the field of hematology. ■

“America depends on our ability to compete with nations around the world.”



# Lynne M. Doughtie

## VICE CHAIR-ADVISORY, KPMG LLP

Lynne M. Doughtie currently serves as KPMG LLP's Vice Chair-Advisory and leads the Americas Advisory business. During her 26-year career with KPMG, Lynne has held a variety of leadership positions, most recently as Advisory national managing partner, and has served as KPMG International's Global Advisory Clients & Sectors Leader. Lynne has been named one of *Consulting Magazine's* "Top 25 Consultants" and "Top Women Leaders in Consulting," and been featured in *Diversity Journal's* "Women Worth Watching" and in *Accounting Today's* "Women in Accounting."

### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

When you look at the areas where companies are really innovating and investing in their future, overwhelmingly you see that STEM skills and experience are at the core. At KPMG we work closely with many of the world's leading organizations, most of whom are pursuing some form of transformation to better position their business in a new and quickly shifting environment.

In diverse fields such as energy, transportation, healthcare, telecom and retail, we see common approaches to these transformations. The key skills necessary to execute the changes and manage the new transformed organization are more often than not STEM related. As a business or a nation looking to lead in the future, having a workforce with these crucial skills and experiences will absolutely be imperative.

### WHAT ABOUT STEM GIVES YOU PASSION?

I see the huge and growing demand for people with strong STEM skills and understand well the challenges in expanding this crucial segment of our workforce. Addressing this through a broad approach, bringing together business executives, educators, gov-

ernment officials, technology experts, philanthropists and community leaders, is the only way to really build the pipeline of science, technology, engineering, and mathematics leaders we need to compete in the future.

It's a multi-faceted problem, because so many issues must be addressed, such as how to engage students, to determining how educators, job creators, and skill sets can be aligned - the potential payoff is well worth the effort.

### HOW IS YOUR COMPANY INNOVATING TO PROMOTE STEM?

KPMG actively participates in programs supporting "workforce readiness" which provide students the opportunity to learn directly from KPMG professionals who visit predominately urban schools to talk about careers in professional services. Our people meet with students in small groups to discuss issues in the profession and why we find our jobs satisfying and rewarding.

KPMG works with the National Academy Foundation (NAF), a national network of high school career academies that offer courses guided by both industry practitioners and educators. KPMG consults with the NAF on the accounting curriculum and supports

the courses to ensure that they're relevant to the "real-world" experiences students will face.

### WHAT IS YOUR CONCEPT OF MENTORING AND SPONSORSHIP OF OTHERS FOR STEM CAREERS?

Mentoring relationships are strongly emphasized at KPMG, with more than half of our partners and professionals involved in formalized mentoring arrangements. It's important to recognize the difference between mentors and sponsors. Mentors can play a valuable role in providing career advice and guidance. But sponsors can be absolutely critical to getting ahead—typically they are leaders in the organization who can provide greater visibility and serve as advocates when key opportunities arise.

Too often women select other women as mentors because they find them easier to talk to. Women need to ensure they have a mentor or sponsor in a leadership position who can help open doors and provide entrée to others on the leadership team. Particularly in STEM-related professions that may have a history of mostly male leadership, actively engaging with those in power can be the difference between hitting, or breaking through, the glass ceiling. ■

# Jean Spence

## EXECUTIVE VICE PRESIDENT OF RESEARCH, DEVELOPMENT & QUALITY, KRAFT FOODS, INC.

Jean Spence is responsible for all product and packaging development, research, nutrition, quality, food safety and scientific affairs worldwide. Jean has been in this role since January 2004. During her more than 25 years with the company, Jean has held a number of positions, including Vice President, Worldwide Quality & Scientific Relations; Group Director Research & Development, Beverages and Desserts; Human Resources Manager (Director of Diversity). Jean holds three U.S. and worldwide patents for her development work as a Research Engineer for *Maxwell House* coffee. Jean received a Bachelor of Science in Chemical Engineering from Clarkson University and a Master of Engineering in Chemical Engineering from Manhattan College.



### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

Innovation is critical for countries and companies to compete in the global economy. STEM fields help us to develop science that will become technology that translates into products that consumers around the world want. Since the U.S. only produces about 4% of the world's engineers, we have to focus our public policy on ensuring we can remain competitive.

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

We can encourage girls to stay in math and science in grade school and high school. I have seen it firsthand at my daughter's school: there is peer pressure that makes excelling in math and science difficult for girls. Programs in- and out-of-school that show girls that STEM can be fun need to be prioritized. And, showing girls there are visible role models every chance we can will also help.

### WHO IS YOUR STEM ROLE MODEL AND WHY?

I have many! Leonardo da Vinci for his blending of engineering and art. Thomas Edison for his great contributions and work ethic. Marie Curie

for being the first woman Nobel Prize winner. And Sally Ride for being the first American astronaut.

### OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?

Personally, my husband and I have funded a Professorship in Sustainability at our alma mater, Clarkson University. A great female chemical engineer, Susan Powers, is the recipient of it and we are proud to do our part in supporting our environment and a female STEM leader.

On the professional front, at Kraft Foods, we have supported efforts in diversity for many years. We have 10 employee resource groups, one of which I sponsor. In Research, Development & Quality globally, we have worked hard on diversity—and our results show it! 55% of our employees are women; including 43% of management. In the U.S., we're focused on increasing the number of women and people of color; outside the U.S., we're focused on increasing the representation of women. And I'm proud that Kraft Foods links executive incentive compensation to performance in furthering our open and inclusive environment.

### HOW IS YOUR COMPANY INNOVATING TO PROMOTE STEM?

Kraft Foods works to promote STEM in our workplace and beyond. Most schools we recruit from have a STEM component in their curriculum. Our employee resource groups are active on high school and college campuses—not just recruiting talent—but educating students on the opportunities that exist in related fields. And we partner with several diverse student groups on campuses to help mentor students.

For example, Kraft Foods mentors freshmen and sophomore students in the STEPUP program at the University of Florida's College of Engineering by pairing them with our employees. They mentor students via monthly conference calls to give advice and discuss academic and professional development opportunities. We've also awarded a number of scholarships to under-represented groups in Chemical Engineering, Packaging Science and Food Science at several universities. ■





# Susan D. Opp

**CORPORATE SENIOR VICE PRESIDENT, L-3  
COMMUNICATIONS CORPORATION/PRESIDENT  
L-3 COMMUNICATIONS SYSTEMS GROUP**

Susan D. Opp is Corporate Senior Vice President of L-3 Communications Corporation and President of L-3's Communication Systems Group, providing a variety of sophisticated communications and encryption products and services for U.S. and foreign military customers. A talented engineer and inspirational business leader, Susan holds a B.S. in Electrical Engineering from the South Dakota School of Mines and Technology and an MBA from the University of Utah. Her professional passion is inspiring teams to develop product innovations that address unique customer needs and help to save lives in extreme and demanding environments.

**WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

Strong STEM skills are fundamental to succeeding in the international marketplace where the ability to innovate is essential. The surest path to economic growth and leadership is by helping our younger generations understand the value of STEM education as early as possible.

**WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?**

One of the best things senior leaders can do is to use real world examples to demonstrate the opportunities that a STEM education offers to those who are willing to work hard to achieve results. The essence of a STEM education is coming up with better ways to advance our society. By inspiring a sense of initiative and ownership among students, senior leaders can play a pivotal role in helping them to discover ways to make our world a better and more stable place.

**WHAT PRINCIPLES DO YOU AS A LEADER APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?**

Leaders need to be good listeners. Understanding what is important to

others is the first step toward innovation. Also, it is important to encourage the people on your team to challenge conventional wisdom and take educated risks. And don't forget to lead by example. The best way to get people to do what you want is to show them you are willing to do it yourself.

**WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?**

I believe that the most progressive and effective workplaces are those that foster respect for working hard and achieving results, regardless of gender. A level playing field opens up opportunities and promotes a performance-based workplace environment. By rewarding employees for their meaningful contributions, STEM can lead the way in achieving equality in leadership positions.

**WHAT IS YOUR CONCEPT OF MENTORING AND SPONSORSHIP OF OTHERS FOR STEM CAREERS?**

STEM is an area where mentoring and sponsorship can yield measurable results by encouraging students and those entering the workplace to seek out accomplishments they admire and find ways to build on them. Personally, I favor a combination of "official" and "unofficial" mentoring. The

official programs that require mentor-mentee relationships often pleasantly surprise those who may not have been used to working this way. Some of the best working relationships develop when a senior person takes a promising young engineer under his or her wing because they recognize real potential and wish to nurture it. I encourage both because I've witnessed the great things that can come of them.

**OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?**

I am extremely proud that my colleagues in STEM at the company I lead have put their heads together to come up with innovative products that are actually saving lives around the globe. That is certainly not something every company can say. At L-3, we make products that make our warfighters more efficient and safer in protecting our freedom wherever and whenever the threat arises. That is something we all do with pride and humility. ■

# Lani Hay

## FOUNDER, PRESIDENT AND CEO LANMARK TECHNOLOGY, INC.

Lani Hay is founder, President, and CEO of Lanmark Technology (LMT) Inc. Named one of *Fortune* Magazine's Most Powerful Women Entrepreneurs, Ms. Hay has grown LMT from a one-woman consulting firm to a multi-million dollar enterprise. Prior to forming LMT, she honorably served in the United States Navy as an Intelligence Officer and a Naval Aviation Observer. She holds a BS in Mathematics from the United States Naval Academy, an MBA from the College of William and Mary's Mason School of Business, and a Master's Certificate in Government Contracting from George Washington University.



### **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

In order to ensure and maintain our nation's global presence as a leader in innovation, we need to fully support and fund STEM education throughout all levels of education. A strong education in STEM will promise our nation's workforce is properly staffed with the technical and intellectual minds we need as the world moves towards an ever increasing synthesis of technology into our daily lives.

### **WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?**

A senior leader needs to be progressive, inclusive and forward thinking to effectively support and advance STEM. A progressive mindset is flexible and welcomes new ideas. Additionally, a strong basis in morality is necessary to guide the increasingly complex and ambiguous areas that bridge scientific, technology and medical research.

### **WHAT PRINCIPLES DO YOU, AS A LEADER APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?**

My personal philosophy is to "Honor Diversity". I believe that diversity of

perspective, experience, and opinion is always a good thing. It is important to level the playing field so opportunities exist for people from diverse backgrounds have access to the education needed to pursue a career in STEM. A baseline education in STEM is critical to providing the problem solving and critical thinking skills that are needed to navigate our increasingly complex world.

### **WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?**

Simply by exposing young girls to professional women who have built their careers in STEM and to the vast array of interesting careers in STEM, we can spark an early interest in STEM. The next step is to encourage young girls to consider pursuing studies in STEM. We need to ensure that the future generations of young girls are offered the opportunity to connect with the fundamental ideas and principals of STEM to form a solid foundation that will carry them the rest of their lives.

### **OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?**

LMT provides cutting-edge, mission-support technology and consulting solutions aligned with our national security interests. The innovative

technology and business processes that LMT has developed and implemented have not only resulted in tax payer savings, but more importantly have saved the lives of our military service members serving in harm's way. LMT works closely with the Joint Improvised Explosive Defeat Organization (JIEDDO) supplying subject matter experts who fulfill a variety of technical roles to include establishing JIEDDO's Counter-IED (Improvised Explosive Devices) Operations Research Systems Analysts, OCONUS (Outside the Contiguous United States) ORSA Program. An ORSA is a science professional who produces analytic products to underpin decisions by Commanders, and to enable solutions of varied and complex strategic, operational, tactical, and managerial issues. They provide Commanders an independent evaluation and trending of key issues based on factual current and historical events. Each OCONUS ORSA is deeply embedded into a U.S. military or coalition unit, or headquarters' staff in Afghanistan, to become an integrated part of the commanders or units' support through qualitative and quantitative operational assessments. ■



# Sondra Barbour

**SENIOR VICE PRESIDENT, ENTERPRISE BUSINESS SERVICES  
/CHIEF INFORMATION OFFICER, LOCKHEED MARTIN  
CORPORATION**

Sondra Barbour is the Senior Vice President of Enterprise Business Services and Chief Information Officer for Lockheed Martin. She leads all internal information technology operations, including protecting the corporation from cyber threats, as well as the Corporation's Financial Services and the Environmental, Health and Safety organization. Ms. Barbour is currently a member of the Executive Diversity Council and is the executive sponsor for the People with Disabilities Leadership Forum. Ms. Barbour holds a bachelor's degree from Temple University in Computer Science and Accounting. She is also a graduate of Lockheed Martin's Program Management Development Program.

## **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

For the United States to remain competitive, we must emphasize the importance of STEM education and inspire students to pursue these disciplines. Our nation is becoming more diverse, and at the same time, we're facing a significant challenge as a generation of scientists, engineers and mathematicians retire. There are not enough young people pursuing these important technology positions, which are critical to our national security and economic strength. I believe we need to help fill this gap and encourage future generations, of all backgrounds, to pursue challenging and rewarding careers in STEM disciplines.

## **WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?**

I strongly believe that women in STEM-related fields should get involved in organizations that educate and inspire tomorrow's scientists, engineers and mathematicians. By serving as role models and mentors, women in leadership roles can help young girls discover a potential career in STEM and aspire to become leaders in these fields.

Across industries, we must also continue efforts to create work environments where diversity is a business imperative and considered vital for competitive strength. At Lockheed Martin, our commitment to closing the gender gap can be seen in an upward trend in women in leadership roles within the company. Three of our four business areas are currently led by women including Electronic Systems Executive Vice President Marillyn Hewson who will become our new President and Chief Operating Officer effective January 1.

## **WHAT ABOUT STEM GIVES YOU PASSION?**

My passion for STEM is fueled by the ability to see, over a span of many years, how a young mind was shaped through mentoring and STEM education. Some of the most rewarding experiences in my life have been watching a student or young professional I have mentored overcome obstacles and grow in the pursuit of a STEM career. It's incredibly fascinating to hear about their accomplishments years later and realize the significant roles that each of us can play in helping to inspire a new generation of innovators.

## **HOW IS YOUR COMPANY INNOVATING TO PROMOTE STEM?**

Lockheed Martin's approach to STEM outreach includes non-profit and school partnerships that provide unique and innovative opportunities for our 64,000 engineers to build one-on-one relationships with students as role models and mentors. Through Engineers in the Classroom, our K-12 STEM education outreach initiative, Lockheed Martin engineers work directly with students on programs like FIRST Robotics, Team America Rocketry Challenge, 4-H Robotics Clubs and Project Lead The Way. We also actively support teachers with training and curricula development. In addition, Lockheed Martin has hosted the USA Science and Engineering Festival, the country's only national science festival, creatively promoting STEM through interactive, family-friendly exhibits and fun, engaging speakers.

Lockheed Martin also proudly supports STEM education through corporate giving. In 2011, we dedicated 50 percent of our philanthropy to STEM education programs, which amounted to more than \$13 million. ■



# Annell R. Bay

## VICE PRESIDENT GLOBAL EXPLORATION, MARATHON OIL

Annell R. Bay is vice president, Global Exploration, for Houston-based Marathon Oil Corporation. She joined Marathon in June 2008.

Immediately before joining Marathon Oil, Ms. Bay was vice president, Americas Exploration, at Shell Exploration and Production Company since 2004. Prior to Shell, Ms. Bay held the positions of vice president, Worldwide Exploration in Houston, and vice president, North America Exploration in Denver, for Kerr-McGee Oil and Gas Corporation.

Ms. Bay holds a bachelor's degree in geology from Trinity University in San Antonio, Texas, and a master's degree in geology from the University of Texas at Austin.



### WHY DO YOU BELIEVE STEM IS IMPORTANT TO OUR NATION?

From an energy industry perspective, if our nation is going to chart a realistic path toward achieving energy security, we need a new generation of talent with a strong foundation in science, technology, engineering and math (STEM)—individuals willing to work on multi-disciplined teams and solve the puzzles that could lead to critical new energy resources. Importantly, these are well-paying, exciting, long-term careers with an ongoing focus on advanced technologies. The challenge of meeting the world's growing energy needs—and using best-in-class technology to do it—requires that we step up our efforts to build this talent pipeline. STEM programs can help accomplish that goal by encouraging and preparing the engineers, geophysicists and geologists of tomorrow.

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

It's critical we take active roles in organizations and initiatives that champion STEM programs and become visible role models. I'm particularly proud to serve on the advisory com-

mittee of the Independent Petroleum Association of America's (IPAA) Education Center, whose mission is to provide students with an advanced, multidisciplinary academic foundation in science, math, social studies, English and emerging technology. In the past four years, the IPAA has established four high-school level Petroleum Academies in Houston and Fort Worth designed to introduce and prepare students to pursue degrees in engineering, geology, geophysics and global energy management—excellent paths to careers in the energy business. To learn more about IPAA's Education Center, please visit the IPAA website at <http://www.ipa.org>.

### HOW IS YOUR COMPANY INNOVATING TO PROMOTE STEM?

I'm very proud of our long-standing, proactive efforts at Marathon Oil to promote STEM programs at all educational levels, from elementary and middle school through high school and college. We consider it our responsibility to support initiatives that enhance the education of tomorrow's leaders and increase the number of students earning degrees and pursuing careers in established or

emerging STEM fields. Our company formed an internal STEM Council in 2009 to further develop our strategy and bolster our efforts. These endeavors include classroom activities, where we introduce young students to STEM-related topics, as well as internships, mentoring opportunities and other programs that expose high school and college students to Marathon Oil and the oil and gas industry. We've partnered with a local not-for-profit organization on a program for inner-city high school students that provides meaningful work experience and the confidence that they can succeed as professionals in the corporate world. We're pleased to support GeoFORCE, an outreach program led by the University of Texas at Austin's Jackson School of Geology that encourages students from rural south Texas and inner-city Houston to take on the challenges of a math and science curriculum, pursue degrees in related fields and, ultimately, enter the high-tech workforce. At the college level, we're active in a variety of programs that seek to increase the numbers of minorities and women pursuing technical degrees. ■



# Joan Kelly

## GROUP EXECUTIVE, SOFTWARE DEVELOPMENT MASTERCARD

Joan Kelly is group executive, Software Development, and leads the development of global transaction processing services for MasterCard. With MasterCard for more than 22 years, she was named to U.S. Banker magazine's Top 25 Nonbank Women in Finance in 2008/ 2009; and one of Bank Technology News' Innovators in Financial Services in 2008. She is a board member of the Center for the Application of Information Technology, St. Louis CIO Board of Applications, Fontbonne University. She is a member of Phi Beta Kappa.

She earned a B.S. in mathematics from Washington University in St. Louis.

### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

It's clear that the United States has a lot of opportunity to grow our skills in the area of STEM studies.

We need strong teachers to share their enthusiasm with STEM skills with children, as early as elementary school, so that they develop both an interest and affection for these areas of study early on in their scholastic careers. Studies show that if students see the support and interest in school, and if students can count on their parents to encourage and help them with their advanced math and science studies, the better the students feel about continuing to take courses in these fields in high school and college. Also, students are more apt to choose these fields as majors, as well.

We need to support not only schools, but external organizations that help develop interests in these areas of study, to continue to whet students' appetites for math, science and technology. You see how savvy kids can be when it comes to the latest phones, tablets, computers, and

more—they're hungry for these types of skills! We have to continue to place equal importance to the 'athletics of the mind' as we do to traditional athletic programs.

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

I'm the first one to recognize that these skills can be challenging. But, as leaders, you have to encourage perseverance of your team members to grow these skills. Just because these skills are harder to learn, doesn't mean people should be afraid of them.

### HOW IS YOUR COMPANY INNOVATING TO PROMOTE STEM?

MasterCard is doing a lot to promote STEM.

Internally, we're hiring recent college graduates who are strong in the STEM studies. We like the idea of bringing fresh ideas to the company, as well as the enthusiasm and energy that recent graduates offer.

We have a healthy summer internship program at MasterCard, target-

ed at rising juniors with STEM-focused majors. They are engaged in various technology projects to learn more about the business.

We support a number of organizations that have STEM skills as their focus. We are sponsors and provide volunteers as mentors, judges, and general support for regional and international competitions for the For Inspiration and Recognition of Science and Technology (FIRST) organization. Hundreds of volunteers teach the Junior Achievement curriculum that is based in financial literacy, math education, and entrepreneurship each year to area schoolchildren that, without our volunteers, wouldn't be able to receive the benefits of this strong program. In addition, we support programs that enhance professional development opportunities for math teachers. The more educated math teachers are in what's new in this field, they more confident they are in teaching these new skills to their students, and can help to generate interest in the STEM subjects overall. ■

# Colleen Payne

## FOUNDER AND CEO, MCI DIAGNOSTIC CENTER

Colleen, is a “serial entrepreneur” who has founded six successful companies and is the owner of several businesses. She is founder and CEO of Mobile Cardiac Imaging, LLC, one of the most successful and well-positioned companies in the medical industry and was listed with Inc. Magazine as one of the 5000 Fastest-Growing Private Companies America in 2007, 2008 and 2009. Payne has written numerous leadership and business articles, and has been featured in many publications, including Washington G2, Black Enterprise, Influence Magazine, and Inc. Magazine. Payne has appeared on national and local television with segments on Fox News, ABC, CBS and NBC. She was also named as one of Tulsa’s Most Influential People in 2008, was the SBA’s Oklahoma’s Small Business Person of the year in 2007 and was selected as Business Innovator of the Year in 2003 by Black Enterprise Magazine.



### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

Because Science is one of the most fascinating aspects of the universe, it encompasses everything significant about the lives we lead day to day. STEM creates, stimulate and grows the mind, body and soul of a person. STEM is important because it will create the next level of critical thinkers and innovators of the next generation.

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

Senior leaders need to be critical thinker and innovators that create momentum and pushes the next generation of STEM leaders forward.

### WHAT PRINCIPLES DO YOU, AS A LEADER; APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?

The critical principle that I apply for the advancement of STEM is supporting the next generation of leaders coming up the ladder in STEM, providing and sharing information and support about the importance of STEM and why STEM is a valuable initiative.

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

The education of women is one of the most important issues facing women not only in our great nation but around the world, education for women in STEM is not only one of our biggest challenges but, it will be one of our most successful challenges with STEM initiatives. Dr. Johnetta Cole once said, “When you educate a man you educate an individual, when you educate a Woman you educate a whole family”.

### MY STEM ROLE MODEL

My ninth grade Math teacher, I was so impressed that she demonstrated the skills of being so intelligent, I just admire her for her knowledge and skills in a field I saw as challenging, but she demonstrated in this area with skill and grace.

### WHAT IS YOUR CONCEPT OF MENTORING AND SPONSORSHIP OF OTHERS FOR STEM CAREERS?

I am a true advocate of STEM education because we need critical thinkers for the next generation and having those skill sets will continue to allow this great nation to grow and create powerful innovators and leaders.

### WHAT ABOUT STEM GIVES YOU PASSION?

**I am STEM,** I choose to use STEM as the backdrop of my life, having pursued a career in a STEM area as a Nuclear Medicine Technologist.

### OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?

It is most important that the STEM initiative continues as top priority for this nation. In the science initiative we are seeing more than ever emerging women leaders in Science. We are creating more physicians and scientist due to the STEM science initiative, which is improving our lives as well as our health and wellness.

### WHICH WOMAN LEADER DO YOU MOST ADMIRE, AND WHY?

Mae Jemison—originally from a small southern State earned a degree in chemical engineering and Medicine, and later became the first African American women in Space. ■





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# Jennifer Chayes

## MANAGING DIRECTOR, MICROSOFT RESEARCH NEW ENGLAND/MICROSOFT RESEARCH NEW YORK CITY

Jennifer Chayes is Distinguished Scientist and Managing Director of Microsoft Research New England and Microsoft Research New York City. She is a renowned interdisciplinary scientist, author of over 110 papers and 25 patents, in mathematics, physics, computer science and social sciences. Chayes is a Fellow of the American Association for the Advancement of Science, the Association of Computing Machinery and the Fields Institute. She serves on numerous boards and committees including as Chair of the Turing Award Committee. Chayes' leadership has been recognized with many awards including the Anita Borg Institute Women of Vision Award.



### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

One of America's greatest strengths has been its ability to creatively use science and technology to provide solutions to the challenging problems of the day, and in the process create the businesses of tomorrow. Today, this inventive spirit fuels new ventures from Silicon Valley to Silicon Alley, from web-scale technologies to biotech to environmental start-ups. But many of the nation's high-tech jobs are going unfilled by graduates of U.S. colleges and universities. We need to train more scientists and technologists to model complex systems and perform large-scale computations on huge data sets. We also need a scientifically educated citizenry to understand the choices that face us, and to make wise decisions for ourselves and our children.

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

In order to assure more women leaders in STEM, we must first attract more women into STEM careers. Numerous studies have shown that girls are tremendously excited about math and science until early adolescence,

when they begin to see themselves pursuing non-scientific careers. Why do we lose them? I contend that one reason is that we do not properly represent STEM careers to young women. The media portrays STEM careers as less collaborative and creative than those in the arts and humanities—we see the image of the solitary nerd sitting in front of his computer. However, the reality is much richer. Each and every day, I get to be creative and collaborative doing science and envisioning new technologies. We need to amplify this message to everyone who doesn't fit the standard STEM stereotype, and embrace people who can work collaboratively and design the future.

### WHAT ABOUT STEM GIVES YOU PASSION?

I am incredibly passionate about the interdisciplinary nature of STEM. I have a varied past: a B.A. in biology and physics, a Ph.D. in mathematical physics, post-docs in mathematics and physics, and a professorship in mathematics. Fifteen years ago, I moved to Microsoft to co-found an interdisciplinary group in theoretical computer science, math and physics. And, in the past four years, I co-founded two labs combining mathemati-

cal and social sciences, and even some computational biology. Along the way, I've had the privilege of training over 100 grad student interns and over 50 post-docs in interdisciplinary STEM fields. I am constantly inspired by the opportunity to take insights from one discipline and use them to fuel discoveries in another.

### OF WHAT ONE INITIATIVE YOU ARE MOST PROUD?

I am most proud of co-founding two interdisciplinary labs—Microsoft Research New England and Microsoft Research New York City—bringing together researchers in the mathematical and social sciences. Our labs are helping to establish new fields at the boundaries of machine learning, mathematics and theoretical computer science with economics, sociology and anthropology. These new fields provide the intellectual framework necessary for web-scale technologies, such as online social networks and cloud computing. The research in these labs is enabling us to anticipate and create the technologies of the future, and to provide a venue to train a new generation of interdisciplinary STEM researchers. ■



# Ellen Smith

## EXECUTIVE VICE PRESIDENT / CHIEF OPERATING OFFICER NATIONAL GRID

Ellen Smith joined National Grid in September 2009 and serves as EVP and COO responsible for Electric, Gas and Generation operations. She is also responsible for Construction and Maintenance, Control Center Operations, Operations Performance, Customer Order Fulfillment and Fleet, Material and Logistics. Ellen brings over 25 years of experience in the energy industry gained through leadership positions at GE Energy, Pratt & Whitney and Hess Corporation.

Ellen has a BS in Mechanical Engineering and a MS in Power Systems Engineering and is a Professional Engineer in the state of NY.

### WHAT PRINCIPLES DO YOU AS A LEADER APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?

Women make up more than 50% of the workforce, and as a result, if they need to be well represented in the STEM professions. I have worked throughout my career to be a role model and to support women in engineering and science in the workplace. I look for ways to encourage young women to challenge the traditions, problem solve, innovate and use strategic thinking. We need to continue to make STEM careers and subjects more relevant to attract the young women of today into the profession.

### WHAT IS YOUR CONCEPT OF MENTORING AND SPONSORSHIP OF OTHERS FOR STEM CAREERS?

Mentoring and sponsorships are a great way for young women to experience the opportunities that exist in the STEM fields. These types of programs can help young people translate what they are learning in school to how it applies to real time problems.

However, mentoring needs to start in elementary school and continue through high school. Taking four years of science and math in high school is relevant regardless of what you choose to do for a career. Just think about it—science, math, engineer-

ing and technology—are just critical to almost every profession and to almost every part of life. I believe true mentorship is about helping students understand how these subjects will help them in their everyday lives—while making them fun—that is true mentoring.

### OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?

I have supported women's initiatives at work over the years and continue to be proud of the progress we have made. I am also very proud of my daughter—who at one point did not want to continue with Math in high school and is now an engineering student in college.

### WHAT LEADER DO YOU MOST ADMIRE AND WHY?

I admire just so many great leaders. If I had to pick one—it would be Madeleine Albright. Not only did she become the first female U.S. Secretary of State but the highest-ranking woman in the history of the U.S. government. During her time in government, she faced some very hard challenges, which had huge, important outcomes. She did this with grace and fortitude. She is also a staunch supporter of women helping women. I truly believe that we must support each other as women—especially since many STEM careers have been historically non-traditional for women. ■

“We need to continue to make STEM careers and subjects more relevant to attract the young women of today into the profession.”



# Linda A. Mills

## **CORPORATE VICE PRESIDENT/PRESIDENT NORTHROP GRUMMAN INFORMATION SYSTEMS**

Ms. Mills directs a \$7.9 billion global provider of advanced technology solutions for defense, intelligence, civil agency and commercial customers. With math and computer science degrees, she is the first woman at Northrop Grumman reporting to the CEO running a major business and she strongly advocates for STEM. Among numerous honors she received the 2009 Woman of the Year Award from the Boy Scouts for increasing the number of young people entering STEM fields and the 2011 Women in Technology Leadership Award for developing the future generation of leaders in STEM and cybersecurity.



### **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

Our nation's security and economic prosperity depend on a highly educated workforce with advanced skills in STEM. The shortage of STEM professionals in our country is a major contributor to our sagging innovation and competitiveness. I head a large technology organization that is the leading provider of complex technology and cybersecurity solutions to the U.S. government. We are directly impacted by the shortage of STEM-trained employees who can secure our nation in cyberspace and other national priorities such as health IT.

### **WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?**

We must make this a priority in our public speaking, the organizations we support and in our actions to increase awareness and interest in STEM. It is critical that our youth see STEM as an exciting, fulfilling career to which they can aspire and excel, particularly women and minorities. This year my organization donated \$1 million to the Virginia Initiative for Science Teaching and Achievement, which focuses on improving science teaching and stu-

dent learning at high-need elementary schools. And, we employ several hundred high school and college interns each year to provide first-hand experience.

### **WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?**

Fundamentally, by starting in elementary and middle school to increase the pool of young women interested in STEM, and offering programs that show young women how STEM can be fun and cool, and eventually lead to a great career. For those that elect STEM majors in college, we must work to ensure they graduate and pursue STEM careers. Once STEM-trained women join the professional ranks, it's up to the companies and organizations in the workplace—and in their self-interest—to provide mentoring and leadership training targeted to women in technical fields. Women in leadership roles must be visible to young people and proactive in helping cultivate female technical professionals with leadership potential.

For just those reasons, I'm on the Board of CyberPatriot, aimed at high school students, and the Engineering School Board of Visitors for the University of Illinois. I'm a frequent presenter

at company events for future and current women leaders; and speak externally to the Girl Scouts, Society of Women Engineers, the Black Engineer of the Year conference and other events. Recently, I was delighted to present awards to students on the winning teams for CyberPatriot IV (see below).

### **HOW IS YOUR COMPANY INNOVATING TO PROMOTE STEM?**

By supporting creative ways to excite our nation's youth about careers in STEM. Last year approximately 50% of our corporate charitable giving, which totaled about \$28.2M, was directed towards K-12 education. We support Sally Ride Science Festivals for girls; the Wolf Trap Foundation for the Performing Arts, Early Childhood STEM Learning Through the Arts—a program aimed at grammar school children; and Engineer Girl!

My organization is the presenting sponsor of the Air Force Association's CyberPatriot program, the nation's largest and fastest growing high school cyberdefense competition, designed to excite and motivate young people to pursue careers in cybersecurity and STEM. ■



# Lina A. Young

## SENIOR VICE PRESIDENT, INFORMATION TECHNOLOGY PEABODY ENERGY

Lina A. Young leads all strategic and operational aspects of IT worldwide for Peabody Energy and is a member of the senior management team. Over the past 18 years at Peabody, Lina has served in a variety of management roles. Lina served as SVP of Marketing Commercial Services, overseeing global marketing analytics and contracts, VP of Enterprise Resource Planning leading a major standardization of business processes. In addition, Lina was VP of Benefits, where she implemented industry-leading benefit programs. While active on CIO Councils, she serves on the Board of Directors for the YWCA, and is on the Governance Board with the Family Resource Center. She is a recipient of the 2007 Most Influential Business Women Award and in 2009, she received the Inclusive Leadership Award.

### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

Encouraging and developing our nation's next generation of innovators is paramount in order to compete in the global economy and not get left behind. The U.S. government and private sector both have key roles to play in raising awareness and investments in science, technology, engineering and math (STEM) education. We need to enable programs to attract and retain an increasing number of students and qualified teachers in STEM fields. I also see this need every day in the energy industry. Technology and innovation have helped my company—Peabody Energy—be the global leader in sustainable mining and clean coal solutions. We believe it is important to invest in our future and develop our next generation workforce members, who often come from STEM backgrounds.

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

I believe today's leaders need to be able to understand and navigate our global business environment, which at times can be dynamic. Our world is growing, changing and becoming ever-more connected. Strong business acumen and the ability to communicate and collaborate are essential. Understanding and thriving requires leaders who are willing

to try something new, to always learn and to apply innovation in every aspect. Advancing STEM alongside operational business expertise could be an all-inclusive winning combination that delivers successful results for any organization.

### WHAT ABOUT STEM GIVES YOU PASSION?

What makes me passionate about science, technology, engineering and math is that all of these provide an opportunity to drive change to improve communities and organizations around the world. Advances across STEM fields afford people the skills necessary to compete in delivering innovative solutions and solve challenging problems that make a real difference in our everyday lives.

Technology, science, engineering and math are important drivers behind what we do each day at Peabody. The coal we produce from our mines in the U.S. and Australia enables low-cost electricity and steelmaking that make up our modern lives. Every time we turn on a light, play a song on our iPods or power up a computer, we use energy from coal.

### WHAT PRINCIPLES DO YOU, AS A LEADER, APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?

In today's fast-changing environment, the principles that guide me

are constant across my professional and personal lives. These are, first, to always do the right thing with integrity. Second is to seek out collaboration and be inclusive of diverse thoughts and skills as all of these help develop the best solutions. Finally, I believe in driving results toward a common goal by motivating your team for success.

### WHO IS YOUR STEM ROLE MODEL AND WHY?

My role model is my father. More than 50 years ago, my father left India to pursue an education in the United States in the science field. His dedication enabled him to become an accomplished, world renowned scientist and devoted educator. He dedicated his life's work to cancer research and teaching.

My father taught me about integrity, respecting others, accountability and commitment. He instilled in me how important it is to never give up and to always work hard in accomplishing your goals, despite the challenges and roadblocks that may arise. Most of all, he taught me about the importance of family and giving back to your community. His inspiration and legacy guide me each and every day. ■

# Heidi Kleinbach-Sauter

## SENIOR VICE PRESIDENT, RESEARCH & DEVELOPMENT GLOBAL FOODS, PEPSICO

Dr. Heidi Kleinbach-Sauter is Senior Vice President of PepsiCo's Global Foods R&D with global R&D responsibility for PepsiCo's worldwide innovation platforms for savory snacks and overall foods business. With over 25 years of experience in the CPG Foods and Beverages industry, Dr. Kleinbach-Sauter has a proven track record of leading and commercializing a large number of foods and beverages innovations in more than 10 different categories that have delighted consumers in many parts of the world and have driven impressive business results.

Dr. Kleinbach-Sauter earned her PhD, MS and BS in Food Science/Engineering/Nutrition from Universities in Germany.



### **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

Having worked in a science and technology role in the food industry for more than 20 years I realize the critical importance of continuing to fill our talent pipeline with high caliber STEM talents. Our continued focus on educating and fostering STEM talents will be a pivotal part of keeping our country highly competitive and will secure a sustainable and long term future.

### **WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?**

I have always had tremendous passion to get women excited about the fabulous opportunities that careers in Science and Technology can offer to women. I will stay fully committed to

communicate the power of the STEM network to many women I work with and will encourage these to actively benefit from the many opportunities the STEM network offers, exchanging learnings, sharing experiences and best practices but also to simply enjoy each other as professionals and friends.

### **WHAT ABOUT STEM GIVES YOU PASSION?**

I am tremendously impressed about the holistic network, processes and systems STEM has created to link together Government, Industry, State and Federal STEM organizations to generate synergies, innovation and foster personal connections all with one goal in mind- to continue to outperform the world by building best in class STEM talent.

### **OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?**

I have started my career at the work floor and have diligently worked my way up, always tremendously enjoying what I do, working hard, learning every day, staying humble, nurturing the talent in people I work with and—at the same time—acknowledging that nothing of this would have happened without a loving family always there to support me. ■

“Our continued focus on educating and fostering STEM talents will be a pivotal part of keeping our country highly competitive...”





# Robin Saitz

## SENIOR VICE PRESIDENT, SOLUTIONS MARKETING AND COMMUNICATIONS, PTC

Robin Saitz is senior vice president, solutions marketing & communications for PTC, responsible for the development of messaging, positioning, and integrated marketing programs for the company and PTC solutions. Since joining PTC in 1990, she has served in positions of increasing responsibility within PTC and been deeply involved in the community.

In 2006 Robin was awarded the inaugural PTC Carl Ockerbloom Humanitarian Award for community service. Robin is the Executive Advisor for PTC's "Strategic Partnership" with *FIRST* and on the *FIRST* In Boston Executive Advisory Board. To learn more about *FIRST*, visit [www.ptc.com/go/first](http://www.ptc.com/go/first)

### WHAT PRINCIPLES DO YOU, AS A LEADER; APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?

Professionally, I believe alignment with company goals is the most important principle for advancing STEM. I have spear-headed PTC's involvement in *FIRST* ([www.ptc.com/go/first](http://www.ptc.com/go/first)) because it is aligned with our goals of creating shared value in our communities: Customers, Employees, Partners, and Students. Because of this alignment, our strategic partnership with *FIRST* has grown over the past 6 years to include: co-sponsorship with customers of over 100 teams worldwide, international expansion, hundreds of employee volunteers, donation of our software used to design and manage the robot development process, and STEM curriculum development for schools. Personally, I believe that persistence and networking are key principles for advancing STEM. When I learned about the *FIRST* program 7 years ago, I was stunned to see the weak adoption in my own community. So I went on a personal crusade to introduce key people in the school community, interested parents and professional, and local government officials to the program. Networking and per-

sistence has resulted in an award-winning high school team and more than 2 dozen award-winning middle school and elementary school teams.

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

Mainstream media could do a lot to promote today's women leaders and their STEM-related accomplishments. Celebrate them. Show the general public how cool it is to be a problem solver. I believe when young girls are introduced to women role models, they are more likely to aspire to be like them. Furthermore, today's STEM professionals, regardless of gender, should mentor young women. Bring them on as interns in your companies, visit their schools at all levels and share their story. But we have to get them while they are young, before they have talked themselves out of pursuing a STEM career.

### WHAT ABOUT STEM GIVES YOU PASSION?

My background is in engineering. As a young person, my father, a chemical engineer by training and a manufacturer's sales rep for pollution control equipment, exposed me to his work. He would take me on customer sites and encourage me to pursue my

interests in math and science. In college, I majored in engineering because I saw it as a way to develop innovative, technology-based solutions. As an adult, I've seen how technology advancements have improved the competitive advantage of our customers. I am amazed daily by the way STEM is applied to solve new problems and old problems in new and better ways.

### HOW IS YOUR COMPANY INNOVATING TO PROMOTE STEM?

Beyond our strong partnership with *FIRST*, PTC's global education program is focused on building the engineer of the future. This program has equipped more than 25,000 secondary schools and 1800 universities with the same software that our 27,000 customers use every day to design and manage the development of their products. 45,000 teachers have trained over 10 million students in 30 countries. And we have partnered with companies in the Aerospace and Defense industry to sponsor the Real World Design Challenge, where high school students form teams to help solve problems identified by leading businesses. ■

# Peggy Johnson

## EXECUTIVE VICE PRESIDENT AND PRESIDENT, GLOBAL MARKET DEVELOPMENT, QUALCOMM

Peggy Johnson serves as executive vice president and president of global market development and is a member of Qualcomm's executive committee. Johnson is responsible for commercializing new business opportunities, including incubating early stage initiatives and developing strategic relationships for the company. Johnson previously served as president of Qualcomm Internet Services. Under her leadership, the Brew initiative was developed and commercially launched. The Brew solution pioneered the world's first large-scale mobile app store and inspired the growth of the global ecosystem. Johnson holds a bachelor's degree in Electrical Engineering from San Diego State University.



### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

In the more than 20 years I've been with Qualcomm, I've seen firsthand the impact of wireless technologies. The mobile industry has reached an inflection point where connectivity is poised to affect traditional industries like never before. Our cell phones have become part of the largest communications platform the world has ever known. The possibility that represents to challenging issues such as education and healthcare are mind-boggling. The computing power we used to have on our desk is now in our pocket, and will increasingly be central to how we learn, work and play. Education for all, increased access to information for doctors and patients, social inclusion for remote populations, public safety, commerce, e-governance and more efficient communications are just a few of the ways wireless technologies will play a key role in the 21st century. It's because of engineers and innovators that these achievements were realized. We need to support the STEM cause to continue to evolve the technologies that will improve our lives.

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

STEM degrees have the ability and opportunity to solve larger societal and global problems. Often times, it is up to senior leaders to make that connection obvious. Two impactful ways leaders can advance STEM are to educate at an early age and encourage an entrepreneurial, pioneering way of thinking.

Starting as early as elementary school, leaders can offer priceless mentorship and encouragement to seek professional opportunities in the STEM fields. Fostering and supporting STEM educational programs through college will equip society with bright minds to solve issues taxing our society. I look forward to continuing to help develop the next generation of engineers through supporting STEM programs and organizations such as California Project Lead the Way, through my alma mater, San Diego State University, that provides local schools opportunities to develop the knowledge, skills and confidence required to pursue a career in science, mathematics and engineering.

Lastly, engineers specifically are in great demand in our country and we have simply not kept up with the technical needs required by industry. Leaders can help close this gap by encouraging one very large pool of untapped talent—women. Today women make up just 12% of our graduating engineers. Increasing this percentage will go a long way towards meeting the demands.

### OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?

It is truly exhilarating to be part of a team that is continually innovating. When I was president of Qualcomm Internet Services (QIS) division, we developed and commercially launched the Brew operating system, which made the concept of useful, downloadable mobile applications and services a reality. The Brew solution (now the Brew Mobile Platform) helped developers monetize their applications, birthed the world's first large-scale mobile app store and inspired the growth of a global ecosystem that has generated billions in revenues to date. ■





# Lynn A. Dugle

## VICE PRESIDENT RAYTHEON/PRESIDENT, RAYTHEON INTELLIGENCE AND INFORMATION SYSTEMS

Lynn A. Dugle is a Raytheon Company (NYSE: RTN) vice president and president of Raytheon Intelligence and Information Systems (IIS). Prior to her role at IIS, Dugle was vice president, Engineering, Technology and Quality for Raytheon Network Centric Systems, and was responsible for the function's strategic direction, leadership and operations. Before joining Raytheon, Dugle held officer-level positions with ADC Telecommunications and served as a Texas Instruments vice president for Quality at the Defense Systems and Electronics Group. Dugle earned two bachelor's degrees from Purdue University and an MBA from the University of Texas at Dallas.

### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

STEM education is critical to our country's economic competitiveness and national security. Raytheon, as a defense and technology leader, employs 45,000 engineers and scientists. Our defense, intelligence, and civilian government customers depend on Raytheon to provide the best solutions to protect our national interests. And Raytheon depends on a steady supply of talented people educated in STEM disciplines to support our customers' missions.

However, according to the National Center for Education Statistics, 15-year-old U.S. students recently ranked 25th in math and 17th in science out of 34 countries. If these statistics do not improve significantly, America could lose its technological edge, which would have profound consequences.

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

Senior leaders need to appreciate and promote the important role that STEM education has in our country's economy and security. I am privileged to work with a true STEM

leader in Raytheon CEO Bill Swanson, who for years has been a champion in promoting STEM education. He currently serves as the Honorary Chair of the national MATHCOUNTS program and has led our company with STEM initiatives like MathMovesU, which works to create an awareness and appreciation of math in young people. Like many other leading CEOs, Bill is a wonderful example of a leader effectively advancing STEM and more people across industry should follow his example.

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

A recent CNN report (May, 2012) indicated that women make up nearly half of the U.S. workforce, but they hold less than a quarter of the jobs in science, technology, engineering and math. So clearly, we must do a better job of encouraging women to pursue STEM educations and careers.

Once they enter the workforce, the talents of these women then need to be developed. At Raytheon, we offer meaningful career opportunities for women through our Engineering Leadership Development Program. Established in 2000, ELDP provides intensive technical and management training. We also have a resource

group called the Raytheon Women's Network that focuses on sharing best practices and enhancing leadership skills. To date, this network has grown to 20 chapters with 6,000 members across the country.

### HOW IS YOUR COMPANY INNOVATING TO PROMOTE STEM?

Raytheon has a proud history of innovation and technology leadership dating back to 1922. Recognizing that STEM is critical to our success, the company has worked for years on our MathMovesU initiatives, which have touched the lives of 3 million students, teachers and parents by engaging children early so they develop a passion for mathematics. This year, Raytheon introduced MathAlive!, which will bring to life the math behind the fun experiences in their everyday lives such as designing video games or riding snowboards. MathAlive! debuted at the Smithsonian in Washington, D.C. and will go on a multi-year tour of science centers and museums throughout the nation. We have also partnered with Walt Disney Imagineering to develop The Sum of All Thrills™ at Epcot where kids "engineer" an amusement park ride and then experience the thrill of riding it. ■



# Nan Mattai

## SENIOR VICE PRESIDENT, ENGINEERING AND TECHNOLOGY ROCKWELL COLLINS

Nan Mattai is senior vice president, Engineering & Technology for Rockwell Collins. In this role, she serves as the chief engineer, responsible for guiding the global engineering workforce, the direction and development of future technology solutions and technology investment decisions. She was appointed to the position in November 2004 and is a corporate officer of the company. Prior to this, she served as Vice President, Engineering for the defense business segment.

Mattai holds a Master of Science degree from the University of Windsor, Canada and has completed all coursework for a doctorate in physics.



Engineering and science are at the heart of our global economic expansion, offering a clear way toward future growth, creating new technologies to address 21st century grand challenges and promising generations of young people rewarding careers.

But as a senior executive of a global aerospace and defense company, I am all too aware that I travel in a rarified crowd: a woman—particularly a woman in an executive leadership role—in the field of science and engineering.

The National Science Foundation indicates that little more than 25 percent of mathematical and computer scientists are women in the United States. For engineering, that percentage drops to under 12 percent. While people once explained this disparity through innate biological differences, today young women are earning high school math and science credits at the same rate as young men and are earning slightly higher grades in these classes, suggesting that the raw abilities are equally shared. That doesn't mean there aren't differences in how genders learn and work. Several studies suggest women prefer to work in collaborative teams, rather than in

highly competitive environments. So, we need to get the message out that women are creative, we work well in teams, we are collaborative and articulate...all key skills for success in engineering.

And that's my role, as well. From my earliest days in university, I knew I had to work harder, prove myself more often and hope that my accomplishments would be recognized. Today, as part of the mantle I've assumed as a women leader in engineering, I know that I have a responsibility to change the world for young women and underserved populations. I do this by sharing my experiences, serving as a role model and mentor and seeking to dispel the myths and biases that still pervade our culture. I view it as my charge to educate our young women that the career path of science and engineering can be personally and financially rewarding and show them that their perspectives, insights and experiences can greatly enrich the exploration for solutions and impact our society.

I am fortunate that my company is committed to the advancement of STEM and so, with this support, we have focused our outreach efforts in four areas:

- First, engage early. Research shows most young women choose STEM fields by age 11, and younger people are natural scientists, curious to gain a greater understanding of the world around them.
- Second, promote team-based, hands-on education to engage and deepen young women's understanding and experiences with STEM concepts early.
- Third, foster creativity and imagination in a welcoming environment, encouraging an inquisitive, problem-solving mindset that will be necessary in their career.
- Finally, develop partnerships between education and industry that expose female students to the breadth of opportunities available, introduce them to woman role models and provide a system of support and encouragement throughout their education.

It's up to this generation of women engineers to usher in the next, sharing our stories, our knowledge and our achievements. Through that dialogue—and our modeling of fulfilling careers—we can show the young women of today that they can change the world through science, technology, math and engineering. ■



# Lisa Teague

## **DIRECTOR, RESEARCH AND TECHNOLOGY STRATEGY ROLLS-ROYCE CORPORATION/LIBERTYWORKS®**

After obtaining bachelor's and master's degrees from North Carolina State University, Lisa Teague joined Detroit Diesel Allison (now Rolls-Royce Corporation) in Indianapolis in 1983. She has held a variety of technical and managerial positions in Engineering and spent 2 years in the U.K. on assignment with Rolls-Royce. In her current role as Director, Research & Technology Strategy, she is responsible for the planning, execution, and global coordination of R&T activities in Indianapolis. The Engineering Employee Development group also resides in her organization, joining together coordination of university research activities with employee development and STEM support.

### **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

We need people to take an interest in STEM careers so we can continue to produce the technological innovations that have made this country a world leader in so many different areas. For economic and national security reasons, and as the world continues to grow technologically, we need STEM graduates. Even if students don't choose STEM as a career, having more people with an appreciation of math and science principles makes us, as a nation, better equipped to participate in resolving today's global and technological challenges.

Personally, I have really enjoyed my career as a Mechanical Engineer working in the aerospace field. I want our next generation to have the same opportunities that I've experienced. I value having a job that creates something of value—in my case, gas turbine engines—that allows people to travel and, through defense aviation, makes our nation more secure. We provide jobs for people with a variety of skills as we design, produce and support our products that pro-

vide economic and national security. I want aerospace to continue to be a strong industry in this country. And for that to happen, we need students to take an interest in and ready themselves for STEM careers.

### **WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?**

I look to leaders to understand that we all have a shared interest in supporting STEM activities, and it is not something that just happens at the college recruiting level. We need to do what we can to interest students at all ages so they will become both interested and ready (particularly in taking math courses) to tackle STEM fields of study. Students at all ages need to know this is something to which they can aspire, so it is important that we engage them at every level of their education.

I also look to leaders to understand the benefits of having a diverse workforce. In the span of my career, I have gone from being "the" woman in the group, where everyone seemed to know who I was because of my gender—to enjoying a much better level

of diversity in our workplace and feeling much more of an integral part of the group. I think we have made improvements in areas such as management behavior and inclusiveness that help us obtain more from a diverse workforce: color, gender and diverse views and perspectives.

### **WHICH WOMAN LEADER DO YOU MOST ADMIRE, AND WHY.**

I admire former Secretary of State Condoleezza Rice for her achievements as a world leader. She is so accomplished in multiple areas. As a (former) amateur musician myself (hoping to get back to it!), her skill as a concert pianist gives me hope that you can indeed grow and be accomplished in different areas. In my industry, Carol Hallett, former U.S. Customs Service Commissioner and current member of the Rolls-Royce North America board of directors, inspires me for her achievements in the aerospace industry. At a women's leadership conference, she gave advice on mentoring that I found particularly insightful and that I pass along to all the younger engineers that I mentor or advise. ■

# Dawne Hickton

## VICE CHAIRMAN AND CHIEF EXECUTIVE OFFICER RTI INTERNATIONAL METALS, INC.

Dawne Hickton is Vice Chairman and Chief Executive Officer of RTI International Metals, Inc., one of the world's largest producers of advanced titanium products used in technologically sophisticated applications in the commercial aerospace, defense, propulsion, medical devices, energy, industrial and chemical markets. Ms. Hickton has been a member of RTI's board since 2007. Ms. Hickton has over 20 years of diversified metals experience, including 10+ years in the titanium industry spanning several business cycles. She serves on the Executive Committee of the Aerospace Industries Association and is a director of public, private and educational institutions.



### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

STEM education is critical to maintaining the United State's standing as a global leader in innovation and to our ability to meet future workforce demands. We are one of the most technologically advanced nations in the world, yet we are losing ground in the global talent war. Due to significant gaps in the U.S. educational system, we are not adequately preparing today's high school and college students to meet the growing demand for technologically skilled workers. I believe our commitment to STEM Education can fill this gap and ensure that the United States remains a global innovator.

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

Supporting and advancing STEM is a long-term challenge. The most important trait senior leaders need to meet that challenge is commitment. We must be committed over the long haul to developing and promoting practical and meaningful resources for students pursuing STEM careers. That means supporting rigorous math and science classes and offering internships, mentoring and scholarships

—particularly for women and minorities who make up a smaller percentage of college students and the STEM workforce.

And our commitment doesn't end in the classroom. We must develop meaningful opportunities for STEM students and employees to hone their skills and advance their careers. RTI has apprenticeship, co-op engineering and internship programs for college students and a defined technical career track for our employees.

### OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?

For more than 10 years and before STEM, RTI has focused on efforts to build a robust pipeline of engineering and technology talent for future job openings. One successful initiative is our partnership with Youngstown State University in Ohio. At the onset of the partnership, YSU students were offered internships or became employees at one of our Ohio facilities. The partnership has progressed to many other initiatives, most notably RTI employees have: (a) served as advisers in the design of the PhD Material Science and Engineering curriculum; (b) served as mentors and sponsors of the school, the profes-

sors and the students; (c) served as judges on competitive programs that recognize the technical and professional skills and achievements of the students; and (d) hosted tours of its Niles, Ohio facility for both professors and students. An RTI-nominated STEM student recently won a \$2500 scholarship from the International Titanium Association.

We've also partnered with top engineering schools such as Georgia Tech, Virginia Tech, Ohio State University, and the University of Pittsburgh to offer internships and to hire talented STEM graduates.

### HOW IS YOUR COMPANY INNOVATING TO PROMOTE STEM?

RTI has committed the time and talents of some of our top executives to the task of developing new ways to promote STEM. Our Executive Vice President of Technology and Innovation, Steve Giangiardano, serves on the AIA's STEM steering committee and has worked informally to "adopt" and mentor local high school physics students. Our Chief Human Resources Officer, Jeff Smith, serves on the AIA's STEM Workforce Committee seeking innovative ways to grow the STEM workforce. ■





# Amy Alving, Ph.D.

## SENIOR VICE PRESIDENT AND CHIEF TECHNOLOGY OFFICER, SAIC

Amy Alving, Ph.D., is the chief technology officer and senior vice president at SAIC. Alving joined SAIC in 2005 as the CTO for the Engineering, Training and Logistics Group, and later served as the corporate chief scientist. Prior to joining SAIC, Alving served as the director of the Special Projects Office at DARPA; was a White House Fellow (1997–98) serving at the DOC; and was an associate professor of aerospace engineering at the University of Minnesota.

Alving graduated from Stanford University with a B.S. in mechanical engineering and from Princeton University with a Ph.D. in mechanical and aerospace engineering.

### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

STEM is important from an economic standpoint because technology powers innovation, and innovation drives a strong economy. More fundamentally, STEM education and workforce are important to mankind because technology improves lives. From refrigeration that enables a safe food supply, to medical cures for life-threatening disease, to airplanes that connect the most distant lands, human-created technologies have made the world better and safer. They're the result of the hard work of generations of people educated in science, technology, engineering and math, and the innovations that will create our future will rely on the same.

### WHAT ABOUT STEM GIVES YOU PASSION?

STEM fields are exciting because they allow us to understand—and change—the world. Science is about understanding how the world works at the most basic level: how stars are made, what creates volcanoes, how

cells replicate, what drives electron behavior. Each answer is fascinating in its own right, like a mystery that humans have learned to solve. The more we learn, the more we're able to understand other aspects of nature—and to predict the way the world behaves. From there, it's a short leap to technological innovation, applying the underlying laws of nature to make the world a better place. I love all facets of that cycle, from expanding our basic understanding of the physical world to addressing some of the most important problems faced by society.

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

In the workplace, our leaders need to ensure that STEM careers are attractive by offering robust pathways for career advancement in technical fields. They also need to recognize the special needs of technical professionals, for instance by offering relevant opportunities to maintain currency and growth in fast-changing technical fields. In the community,

they need to help spread the word about what STEM careers can offer. And in the political arena, they can help maintain support for world-class educational programs.

### OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?

I'm very proud of SAIC's K-12 STEM program, with its focus on empowering our employees to engage in their communities. SAIC started the program a few years ago, and the response of our colleagues has been tremendous. They volunteer in support of hundreds of STEM events and activities in communities around the country. Their participation breathes life to the vision underlying SAIC's program, "exponential inspiration". SAIC employees volunteer their time and knowledge in order to get kids excited about STEM, and these kids get their friends interested as well. At the same time SAIC employees also draw in their colleagues, so the "exponential" growth happens on both sides. The more people we can get involved in generating interest in STEM, the more likely we are to be successful. ■

# Jeniffer Harper-Taylor

## **PRESIDENT, SIEMENS FOUNDATION**

As President of the Siemens Foundation, Jeniffer Harper-Taylor leads one of the nation's preeminent nonprofit organizations dedicated to STEM education. During more than a decade of service she has impacted students, teachers and schools on a national scale, introducing tens of thousands of young people to opportunities in STEM. Today she oversees an annual investment of more than \$7 million in innovative education programs that support, recognize and encourage the scientists and engineers of tomorrow. Ms. Harper-Taylor is active on a number of fronts to close the minority gap in STEM and is considered a leader in STEM education outreach advocacy and appears regularly in the media.



### **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

Our ability to meet the global challenges of the 21st century depends on STEM education. We need to train the next generation of world-class inventors, doctors, scientists and engineers, and that requires a world-class investment in STEM.

### **WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?**

Our leaders need to be fierce advocates for STEM education. They need to be engaged in and excited by STEM topics and passionate about making the case for STEM as a national priority.

### **WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?**

We need to create a culture that celebrates math, science and technology at all levels of society. We should look to develop more public-private partnerships and collaborations between academia, the business community, government, nonprofits and the media that inspire women to become more actively engaged in STEM.

### **WHAT IS YOUR CONCEPT OF MENTORING AND SPONSORSHIP OF OTHERS FOR STEM CAREERS?**

It all comes down to education. We need to take a comprehensive approach to advancing STEM education from elementary school through graduate school with a national commitment to creativity, flexibility and innovation in engaging students and educators to the possibilities that exist when you pursue STEM disciplines as a career. We need to do better at making STEM topics relatable to students—everyday lives and interests. We need programs that challenge students and educators to do original research and learn through inquiry at the earliest possible opportunity. And we need to do a better job of recognizing and rewarding students and teachers who are successful in STEM.

### **WHAT ABOUT STEM GIVES YOU PASSION?**

I have the opportunity to interact on a regular basis with educators and students all across the country who are doing amazing work in STEM. Their ingenuity and energy are a constant source of inspiration. ■

“We need to train the next generation of world-class inventors, doctors, scientists and engineers, and that requires a world-class investment in STEM.”



# Jennifer Grove

## WORKFORCE DEVELOPMENT COORDINATOR GULF POWER COMPANY/SOUTHERN COMPANY

With over 17 years experience at Southern Company, Jennifer is responsible for educational partnerships to grow Gulf Power's future workforce and enhance Northwest Florida's economic development position. These programs span the entire talent supply chain, beginning with early learning programs and continuing to elementary energy career and STEM awareness programs, high school talent pipeline programs, and post-secondary technical partnerships. Jennifer helped found and serves on the Executive Committee of the Florida Energy Workforce Consortium and is actively engaged in leadership of many other workforce development/ education organizations including Workforce Florida, Inc., STEM*florida*, and the Florida Education Foundation.

### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

To ensure our country has the talent we need for the economy we desire, it is critical we re-energize our youth around science, technology, engineering and math. We must develop critical thinkers who are curious and can apply academic principles in workplace settings. It's imperative not to isolate STEM education from workforce education as if they are an either/or proposition. We must ensure STEM education is taught in an applied workforce-relevant setting so students can transfer that learning to multiple contexts.

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

As business leaders we have to assist in helping students learn how to apply academic principles by providing resources—guest instructors, student internships and teacher externships.

We must support STEM project-based learning opportunities. These programs often are more costly and time-consuming and therefore not included in "standard" instruction. This could take the form of robotics competitions, labs, or workplace learning opportunities.

Further, we must ensure that academics are integrated with career and technical education and vice versa. We must engage to ensure that STEM programs focus on preparing all students for college and work and are not isolated to a limited population.

Finally, we have to understand many students struggle early in their elementary education with math and science. We have to address early childhood development as not just the precursor to reading, but as a foundation to all education, including STEM. We have to focus on the entire talent supply chain—from birth through post-doctoral work—to determine how we can best support movement of talent through this educational pipeline.

### OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?

I am most proud of the development and growth of the Gulf Power Academy, our flagship talent development pipeline program that launched at Pensacola's West Florida High School of Advanced Technology in 2001. This career academy offers students in grades 9–12 an opportunity to "major" in Gulf Power and experience careers in our company and industry. Through curriculum designed by our industry,

mentors at Gulf Power, and work opportunities, these students are able to prepare for and make more informed decisions about their path following high school graduation. Since the first graduating class in 2005, Gulf Power has hired 49 graduates from this program into power generation, distribution, customer service, and engineering careers.

### WHICH WOMAN LEADER DO YOU MOST ADMIRE, AND WHY.

I most admire Susan Story, President and CEO of Southern Company Services. In her time as President and CEO of Gulf Power Company, Susan was a strong voice in our region and state on how businesses must engage in education—not because it is the right thing to do for the community (though it is) but rather as an imperative for business success. Susan continues to lead by example through her support of Southern Company Workforce Development strategy focused on career and STEM awareness, talent pipeline preparedness and key external workforce development partnerships, such as the Center for Energy Workforce Development. ■



# Janice Chaffin

## GROUP PRESIDENT, CONSUMER BUSINESS UNIT SYMANTEC CORPORATION

Janice Chaffin leads Symantec's Consumer Business Unit, which includes Symantec's market-leading Norton™ brand. Since assuming her role in 2006, Chaffin has expanded the Norton portfolio to address the post-PC era of multiple devices and exploding data. Under her leadership, Norton has received nearly 600 awards for its superior products, achieved its highest-ever customer loyalty, and grown revenues for 14 consecutive quarters.

Chaffin previously served as Symantec's first Chief Marketing Officer and spent 21 years at Hewlett-Packard. Chaffin graduated from the University of California, San Diego and earned an M.B.A. from the University of California, Los Angeles.



### HOW IS YOUR COMPANY INNOVATING TO PROMOTE STEM?

Innovation requires diversity of perspective and a work culture that fosters a curiosity and willingness to challenge basic assumptions. At Symantec, we advocate a climate of respect and encourage employees to open their minds and think about ideas from a variety of viewpoints because we believe this fuels innovation.

We have created our own internal group—the Symantec Women's Action Network (SWAN), which reaches out to young girls encouraging them to pursue careers in Science, Technology, Engineering, and Math (STEM). Additionally, Symantec has proudly participated in groups and with external agencies that foster innovation principles—we are one of the founding signatories of the Women's Empowerment Principles.

### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

Technology is one of the fastest growing industries in the U.S., yet if current trends continue we will not have the talent we need to fill the jobs of the future. Currently, women and minorities are significantly under-represented in the technology industry. We need to expand the talent pool and build

a long-term pipeline of women and minorities interested in technology. I believe very strongly that a climate of openness and respect for diverse perspectives encourages innovation, productivity, and competitiveness.

Initiatives like the STEM Education and Workforce Challenge put forth a concerted effort and investment that will help ensure that our country continues to be competitive in the global economic marketplace.

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

As women leaders we need to pledge our own personal commitment of time and focus to mentoring up-and-coming women. When I was 14, I worked after school as a janitor in a medical office. The nurse who ran the office was the first professional woman I ever knew. She inspired me to reach further. As I move through my career, I have looked for opportunities to engage and help young women understand that it is possible to be a wife, mother, and leader. We can make a difference as a mentor, teacher or friend.

### WHAT ABOUT STEM GIVES YOU PASSION?

Discovery itself gives me passion. Finding answers to the unknown is

exciting. Maybe it is a natural curiosity that I was born with, but STEM is at the root of how we live our lives, innovate within business, evolve as a society, and make the world a better place. Without this drive to discover, the world would be a stagnant place with many more problems that would never be solved. ■

“We have created our own internal group—the Symantec Women's Action Network (SWAN)...”



# Beth M. Jacob

## EXECUTIVE VICE PRESIDENT, TARGET TECHNOLOGY SERVICES/CHIEF INFORMATION OFFICER, TARGET CORPORATION

Beth is responsible for the IT operations for the company's stores, distribution centers, headquarters locations and international facilities. Every week, Target serves nearly 30 million guests (our term for customers), and Beth's team supports nearly every area of our business to help create a great guest experience. She leads a team of more than 8,000 technology professionals in a global operation, and works with senior leaders to help achieve Target's goals. Beth earned a bachelor of science degree in retail merchandising from the University of Minnesota in 1984 and an MBA from the same institution in 1989.

### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

The fields of science, technology, engineering and math (STEM) open doors. They offer strong earning potential in challenging careers, and provide pipelines for innovation ensuring our country's long-term relevance in a global economy.

Over the past decade, U.S. job growth in this sector has increased three times more than other fields, and there's strong potential for STEM workers to contribute to our economic growth.

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

Leaders should understand the potential of STEM and promote its positive impact.

At Target, we believe a strong technology foundation helps fuel our growth.

When we recognize that technology enables our business, we can attract top talent that helps drive the innovation that's critical to our success.

### WHAT CAN WE DO TO ENSURE MORE WOMEN LEADERS IN STEM?

Women are underrepresented in STEM-related roles, and we have to do more to teach females about career possibilities and set expectations

that they can be successful in these fields.

Companies must ensure that interviewing, hiring and development practices are free from biases, which requires a commitment to diversity. At Target, embracing diversity means recognizing that each of us is unique and that we benefit from everyone's diverse experiences. A diverse team builds an inclusive culture that fuels innovation.

Mentorship is critical to creating a supportive environment. Target offers programs that connect team members with mentors, and we promote several internal networks, including one specifically for women in technology.

Our Target Women in Science and Technology (TWIST) network provides opportunities for skill development, while fostering an inclusive environment for women. TWIST also partners with companies to provide events on emerging technologies to connect our team to industry leaders.

TWIST develops and engages women and also reaches students. The team volunteers at schools and shares exciting work happening at Target to inspire students with real-life applications of STEM.

Organizations of every size can actively create a supportive environment for women in STEM.

### HOW IS YOUR COMPANY INNOVATING TO PROMOTE STEM?

Target focuses on innovation to deliver a superior guest experience. The world is becoming increasingly mobile, and we've been working in this space for several years. For instance:

- Target was the first major national retailer to launch a scannable mobile coupon, allowing guests to redeem offers from mobile devices at checkout.
- We were recognized three years in a row by the Academy of Digital Arts and Sciences with a Webby Award for our iPhone app in the mobile shopping category.
- Last year, Target launched a new version of Target.com that moved us from an Amazon.com-based site to one we developed. The new site offers features that encourage guests to create product reviews, add photos and videos, and interact with other guests.

We offer an experience that extends beyond our stores. Social media channels allow us to connect with guests and offer great deals to make their Target experience the best it can be. Through technology, we deliver a differentiated experience that's personal, simple, and accessible.

Technology and STEM professionals are instrumental in bringing this to life. ■

# Alka Dhillon

## FOUNDER AND CHIEF EXECUTIVE OFFICER TECHNALINK, INC.

Alka Dhillon, Founder and CEO of Technalink (2000-present) has a wealth of strategic market penetration and development experience with a background in business development and growth strategy. Ms. Dhillon is actively involved and passionate about NFTE – Network For Teaching Entrepreneurship. She is a firm believer that the children are our future and it is through entrepreneurship that they can realize their dreams and deepest intentions. Ms. Dhillon is a recipient of the 2012 BRAVA! Women Business Achievement Award Presented by SmartCEO for being one of the Top 25 female CEO's in the Washington, DC area. Ms. Dhillon holds a B.S. Degree in Economics and Spanish from the University of Virginia.



### **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

I feel that focusing on advancing our upcoming generations through STEM enables us to Seize The Evolutionary Moment. All that is evolving hinges on innovation and creativity which are the building blocks of STEM and therefore those of our future. We can either attend the party or be the one's hosting it—the choice is ours.

### **HOW ARE WOMEN AND MINORITIES IMPORTANT TO STEM CAREERS?**

Women and Minorities are important to STEM careers because more women are naturally matriculating by exponential numbers into the workforce every minute. If those 2 vital groups do not have the proper STEM education or training we will be doing a disservice to our progression as a nation first, and globally second. We will never be able to advance at the rates necessary to keep up with innovation and growth. STEM is not the future, it is part of our every day

lives now and we need to be able to participate effectively.

### **WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?**

We can assure more women leaders in STEM by starting to instill the belief and confidence in our little girls that they can actually have a future in the STEM world. We must let them know that they can dare to dream and those dreams will manifest. Once they have this solid belief, they will be properly equipped and passionate about learning about STEM. Then, we as a nation need to give equal opportunities to girls and women to actually gain experience in STEM related jobs and allow them to become leaders as they would in any other field.

### **WHAT ABOUT STEM GIVES YOU PASSION?**

The creative aspect of STEM gives me passion. Creativity is the seed for innovation and manifestation. I love that there are no boundaries with STEM.

Anything that one can imagine can become a tangible reality and allow us to progress in a way that positively impacts the planet. STEM allows us to grow consciously and productively so that we can truly make a difference in the experience we have during our journey through life.

### **WHO IS YOUR STEM ROLE MODEL AND WHY?**

Edie Fraser, CEO of STEMconnector, is my STEM role model. Her irrepressible spirit and unwavering commitment to women and girls in STEM related fields is unrivaled. Many people jump on the STEM bandwagon because it is the hottest show in town at the moment. Edie truly champions this movement and lives her life to mentor and advance women and girls in their careers. She gives opportunities and open doors that would have remained closed for so many women. She is a true inspiration to humanity and it is an honor to be in her presence and her friend. ■





# Melendy Lovett

## SENIOR VICE PRESIDENT/PRESIDENT, EDUCATION TECHNOLOGY, TEXAS INSTRUMENTS, INC.

Melendy Lovett is senior vice president of Texas Instruments (TI) and president of TI's worldwide Education Technology business, which focuses on market-leading educational technology to improve teaching and learning of math and science.

Previously, Lovett served as vice president of the company's human resources organization where she was responsible for TI's worldwide compensation and benefits programs.

Lovett holds a bachelor's degree in management and management information systems from Texas A&M, and a master's degree in accounting from the University of Texas-Dallas. She is also a Certified Public Accountant.

### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

Horace Mann once defined education as the "great equalizer." STEM education is the new "great equalizer" for today and our future workforce.

The United States could not be a leader in creating innovative, world-changing products and companies without having a globally-competitive STEM workforce.

Texas Instruments and other high-tech industries are dependent on having a strong workforce with creativity and innovative ideas.

Statistics show that the US STEM workforce is aging while jobs requiring specialized training are growing at five times the rate of other occupations.

The STEM workforce is a vital foundational element for the U.S. to sustain its capacity and increase global competitiveness for technological innovations.

### WHAT ABOUT STEM GIVES YOU PASSION?

I am fortunate to serve in a role that enables me to clearly see the value that strong math and science education has for students. At TI Education Technology, we create products that inspire academic achievement and build confidence for all students in these subjects.

I have seen firsthand how STEM education can remove barriers, level the playing field and lead to a path out of poverty and onto a road to success for disadvantaged students. This positive impact is one that continues to drive my passion in this field.

### OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?

I am most proud of High-Tech High Heels (HTHH), a program I founded in 2001 to close the gender gap in STEM and prepare girls to pursue degrees in these fields. The program started with twenty women leaders of TI, as well as support from the TI Foundation and Public Affairs.

The HTHH program offers professional development and training for counselors and teachers and offers a two-week summer physics camp for girls. Since 2001, we have hosted more than 700 girls. Immersed in physics learning, the girls also visit corporate campuses, hear from STEM role models, and learn to visualize themselves in a future STEM leadership role.

Most of the girls are minorities from economically disadvantaged backgrounds. Through this work, I've seen STEM education transform these girls' lives and provide a world of opportunity. I'm not only proud but honored to be a part of this program.

### HOW IS YOUR COMPANY INNOVATING TO PROMOTE STEM?

At TI, we listen to the needs of our customers. Their needs and improving student learning are what drive the innovation in our products, services and solutions. TI continues to invest in education technology to help educators meet their goals and improve student achievement in math and science.

TI MathForward is our research-based, pre-algebra and algebra-readiness program that fosters mathematics achievement for students.

In 2004, TI collaborated with Richardson Independent School District (RISD) tapping into national and local experts to customize and localize research to create a comprehensive mathematics intervention program to address existing gaps.

Today, thousands of students and educators in districts across the country achieve mathematics success through TI MathForward.

We will continue to provide innovations like MathForward in technology, professional development and other supplemental, learning material to ensure teaching effectiveness and student success. ■

# Cindy Halsey

## VICE PRESIDENT, INTERIOR DESIGN, ENGINEERING AND DEVELOPMENT, CESSNA (A TEXTRON COMPANY)

Cindy leads Cessna's interior design, interior engineering and industrial design for all Cessna products from new cabin concepts to unique creations for customer aircraft. Cindy has a bachelor's degree in Interior Design and Architecture from the University of North Texas, and is a graduate of the Sr. Executive Leadership Program at Duke University and Executive Leadership Program at the Thunderbird School of Global Leadership.

Cindy has two sons and resides in Wichita, KS with husband, Larry. Cindy, Larry and their boys are accomplished Black Belts in Tae Kwon Do and avid snow skiers.



### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

STEM education is critical in preparing the next generation of leaders, innovators, critical thinkers and educators for real world challenges and solutions. Education is a key differentiator in the development of top talent by positioning highly qualified individuals to better compete in a global economy.

Improving science and mathematics education in the K-12 years is vital to our country's ability to sustain our competitive advantage. Creating a STEM pipeline for future leaders broadens the knowledge of teachers, better prepares students for entry into higher education and creates a skilled workforce to support compa-

nies that fuel America's economy in critical areas.

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

Awareness and advocacy in the earliest stages of education is important along with the understanding of all the facets of STEM. Students in elementary and middle school need exposure to how a solid STEM education translates to real world jobs and innovations. For some senior leaders, the STEM acronym might be new, but the content and importance is well-valued. Our company relies on the innovation and critical thinking of our people; their individual accomplishments, and our company's ultimate success, can be attributed to STEM degrees.

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

By engaging young girls at an early age, we can open their minds to the endless possibilities are available with these degrees and how competitive they can be with anyone, anywhere. By connecting young girls with successful women in STEM through mentoring, awareness and leadership development they will understand that anything is possible.

### WHICH WOMAN LEADER DO YOU MOST ADMIRE AND WHY?

Ursula Burns, Chairman and CEO of Xerox, began her career as an engineering intern and through her leadership in research and product development activities was instrumental in the company's success. Mostly, I admire her positive outlook toward all that she does. ■

“Improving science and mathematics education in the K-12 years is vital to our country's ability to sustain our competitive advantage.”



# Rhona S. Applebaum

**VICE PRESIDENT, CHIEF SCIENTIFIC AND REGULATORY OFFICER, THE COCA-COLA COMPANY**

Dr. Rhona S. Applebaum is the Vice President and Chief Scientific and Regulatory Officer at The Coca-Cola Company where she leads Global Scientific and Regulatory Affairs (SRA), including The Coca-Cola Company's Beverage Institute for Health and Wellness. SRA is responsible for driving evidence-based research and education programs in energy balance, health, physical activity, and food safety; advancing regulatory science strategies; communicating company positions on SRA matters; providing systems guidance on SRA strategic priorities and expanding networks and partnerships with key stakeholder groups to advance dialogue and understanding concerning our products, ingredients, policies and programs.

## **WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?**

I firmly believe they must be active listeners and able to assess capabilities, competencies and passions of individuals and identify opportunities where STEM can make a difference for ensuring success from a business, national, global and societal perspective. They must understand the importance of STEM as a both a critical enabler and a foundation for future innovations that will make a positive difference for all sectors and ultimately the public. As Leaders and role models for the next generation, we have an obligation to ensure Senior Leaders align and integrate STEM genius with business acumen for continued success.

## **WHAT IS YOUR CONCEPT OF MENTORING AND SPONSORSHIP OF OTHERS FOR STEM CAREERS?**

Foremost, it's important to be available—as both a resource and a 'sounding board' to let the individual think their situation or problem through. I try to be available to all folks interested in STEM, regardless of gender. I did not have a female mentor in my career, but I was fortunate to have male mentors who were

'gender neutral' and assessed people based on their skills, determination and content of their character. At this stage in my career, mentoring those seeking a career in STEM is a priority.

As a mentor for women, I try to emphasize that though perfection is a goal, it need not be their entire focus if they intend to be a catalyst for positive change and progress. This is not an easy behavior to accept, especially for women. We are neither raised nor trained to accept 'being mediocre'—ever—and though we need accuracy to do what we do as STEM professionals, we often equate accuracy with being perfect, and they are truly different. Accepting that it is OK to be comfortable with mediocrity isn't easy, and truly a learned behavior that's required for success in today's world. This in no way should be interpreted as denigrating the importance of having high standards and striving to do and be your best. I suggest they view their career as a trajectory—that's always pointed North, but one that will also have a few 'lag phases' and dips every so often, and that is acceptable. In fact, it's true to life!

## **WHICH WOMAN LEADER DO YOU MOST ADMIRE, AND WHY.**

I admire Dr. Margaret Chan, Director-General of the World Health Organization. I admire Dr. Chan because of her passion to improve public health globally. Based upon what I've seen, she recognizes that in order to develop workable, sustainable solutions to the complex public health issues we face, it will take partnerships and collaborations across all sectors—including business, governments and civil society—to achieve positive changes to advance public health. Not everyone is as enlightened as Dr. Chan and it takes vision and courage to realize that the status quo isn't working and to solve today's public health problems requires a multi-disciplinary approach, new thinking, creative partnerships, realistic expectations and effective communications. I know of no better role model to admire and emulate. That old saying, "Imitation is the sincerest form of flattery" is beyond appropriate here. ■



# Mina Stewart

## VICE PRESIDENT, SERVICE DELIVERY & ASSURANCE NATIONAL OPERATIONS, VERIZON

Mina currently leads an organization of over 1,700 employees spread throughout the United States. The team is responsible for the overall end-to-end build of Verizon's Wireline network infrastructure and circuit level provisioning across the network. Central to Mina's successful leadership is her strong belief in the positive influence technology can have on children. She strongly supports community outreach efforts that help the underprivileged, at risk and disadvantaged with mentoring, training and exposure to technology. Mina holds an M.S. degree in Management Information Systems from the University of Maryland.



### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

Science, technology, engineering, and math (STEM) education creates critical thinkers and innovators. Locally and globally, people with STEM degrees are helping create treatments and cures for diseases, generating ideas for sources of energy, increasing awareness and tools to strengthen security, and providing devices that have quickly become part of our day-to-day lives from the telecommunications industry. Their work improves all of our lives.

It is clear that most jobs of the future will require a basic understanding of math and science—10-year employment projections by the U.S. Department of Labor show that of the 20 fastest growing occupations projected for 2014, 15 of them require significant mathematics or science preparation.

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

With the rate at which technology is advancing, it is more important than ever that a senior leader exemplifies the following:

1. Encourage change and nimbleness
2. Motivate employees to operate from a place of passion and curiosity
3. Act with a sense of purpose,
4. Display a strength in cognitive ability, and
5. Empower team members to feel confident in their abilities, challenge status quo, and disagree respectfully with others at all levels of the organizational hierarchy.

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

Although great advancements have been made in the area of STEM, women still lag far behind in STEM fields. According to the Congressional Commission on the Advancement

of Women and Minorities in Science, Engineering and Technology Development, if women and members of other traditionally underrepresented groups joined the STEM workforce in proportion to their representation in the overall labor force, the shortage of STEM professionals would disappear. The barriers and obstacles to women's advancement are numerous and complex including gender bias and a lack of mentoring. I think to gain additional traction; we need to get to young girls. Studies have shown focus in the sciences drop off as girls approach junior and high school. We need more programs specific to girls during their early education.

### WHAT IS YOUR CONCEPT OF MENTORING AND SPONSORSHIP OF OTHERS FOR STEM CAREERS?

I think it is very important to communicate, to today's youth, the importance of STEM. I set aside time to mentor college interns, as well as, sponsor youth related technological programs on behalf of Verizon. ■



# Karenann Terrell

**EXECUTIVE VICE PRESIDENT/CHIEF INFORMATION OFFICER, WAL-MART STORES, INC.**

Karenann Terrell is executive vice president and chief information officer for Wal-Mart Stores, Inc. She has responsibility for the company's global technology systems. Karenann joined Walmart in 2010 as EVP of Information Systems. She previously was chief information officer of Baxter International, Inc. Karenann served as chief information officer of the Chrysler Group and Mercedes-Benz North America. She began her career at General Motors.

Karenann serves on the board of directors for Women in Technology International and is a board member of Purdue University. Karenann has a bachelor's degree and master's degree in Electrical Engineering.

## **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

Innovation built America. Whether during the industrial revolution or the information revolution, it all comes down to innovation. In our future, it will be even more critical that core science and technology be at the root of innovation. Without a foundation and passion for STEM in the next generation, our ability to be the world's innovators will not be true in the future as it has been in the past.

## **WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?**

Leadership has two sides of the coin to be effective when it comes to STEM. One is around inspiring people and the other is in finding and nurturing the talent of the individuals you manage. Both are critical for STEM because finding THAT type of talent and protecting and growing it is special... and it's rare.

## **WHAT PRINCIPLES DO YOU, AS A LEADER; APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?**

I see the future through the lens of sciences and technology. Not just because I'm a technical professional but because I see future innovation in many areas converging through the lens of technology. Technology enables closer communities for shopping, it enables capability to collapse borders in terms of real time communication. I am committed and passionate about enabling our future.

## **WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?**

Just because we aren't represented in great numbers today, doesn't mean we can't be better represented in terms of leadership in the future. We know that science and technology will be pervasive in the future. What it takes for us to get from where we are today into a future of higher representation are vocal role models. It will take women right NOW who know that future leaders will be

standing on our shoulders and we are going to have to speak out and recognize that the pipeline for STEM starts at the high school and college level and not the entry level job level. The way that we're going to get more representation is to move backwards in that pipeline. What I can do, what we must all do is inspire and support that next generation.

## **WHAT ABOUT STEM GIVES YOU PASSION?**

Technology is going to fuel the world. It's going to be the fuel of innovation. It's going to be the fuel of productivity. It's going to be the fuel of politics, entertainment, education and retail. What's not to be passionate about when you can see the whole world as enabled through technology? It's as if you can see the next natural resource that's going to be required for success in any world. That's what gives me my passion. ■

# Sophie Vandebroek, Ph.D.

## CHIEF TECHNOLOGY OFFICER, XEROX/PRESIDENT XEROX INNOVATION GROUP

Sophie Vandebroek is Xerox's Chief Technology Officer and president of the Xerox Innovation Group, leading Xerox's research centers in Europe, Asia, Canada and US, including the Palo Alto Research Center.

Dr. Vandebroek is a Fellow of the Institute of Electrical & Electronics Engineers, and was inducted into the Women in Technology International Hall of Fame. She is a director of Analogic and Nypro, and serves on the US National Academies Committee on Science, Technology & Law.

Vandebroek earned a MS degree in engineering at KU Leuven, Belgium and received a Ph.D. in engineering at Cornell University.



### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

A strong STEM workforce is of critical importance to our nation. They are technology entrepreneurs creating jobs so our society can thrive. They are inventing and building solutions for big problems such as climate change, health care, hunger, and security. STEM individuals make our nation and the world a better place.

In order to solve these big technological and scientific problems one must be able to deeply understand how our current solutions work, be able to improve them or invent disruptive alternatives. For that a STEM education is a ticket to the game.

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

First of all, girls must experience early on how much fun science is. My children treated the world as their laboratory. Nena, my now-23-year-old engineer daughter, and her brothers spent afternoons digging for bugs, building their fort, constructing dams, and redecorating my kitchen with "science" experiments. There were plenty of messes to clean up, but I loved it.

Secondly, middle and high schools engineering classes can give girls a

taste of engineering. Hands-on experiences, such as the FIRST Robotics competition, are critical to gaining confidence.

Thirdly, it is important to have women role models that are balancing a successful career and a happy family. Women leaders need to share how they are prioritizing family while running successful organizations.

Finally, we must communicate how rewarding and cool a STEM career is.

### WHAT ABOUT STEM GIVES YOU PASSION?

I collaborate daily with passionate people who are envisioning and creating the future. Xerox's STEM researchers are applying imaging algorithms, which currently enable our fastest printers to consistently print high-quality images, to monitoring infant heart rates in India. In France we are mining patient records to detect hospital acquired infections very early on. Researchers are creating greener cities by mining traffic data and minimizing unnecessary driving. We are enabling justice faster by giving lawyers the tools to mine huge amounts of documents without human intervention. At PARC, we have created a new low-cost way to get clean water. Given how critical the shortage is for drinkable water, this

is very exciting. The impact STEM researchers are making on the world is larger now than it has been in many decades.

If you believe as I do, that there is no greater calling than solving the big technological and scientific problems, then together we must inspire young people to become scientists and engineers. Our viability as a thriving human society and as a nation depends on them.

### HOW IS YOUR COMPANY INNOVATING TO PROMOTE STEM?

Xerox's CEO Ursula Burns is a founding member of Change the Equation, a White House initiative advancing STEM. Xerox also helped found FIRST Robotics and continues to support many FIRST high-school teams.

The Xerox Science Consultant Program is one of the longest running industry-education partnerships. For over 40 years, Xerox scientists and engineers have made science fun for hundreds of thousands of elementary students.

Finally, we invested several hundred million dollars in grants to fund universities throughout the US. Thousands of students have received educational assistance through Xerox's Technical Minority Scholarship Program. ■





# Instilling confidence by inspiring it.

Deloitte is proud to support and applauds the 2012 honorees of the 100 Women Leaders in STEM.

We respect your leadership and your commitment to increasing the number of women that enter science, technology, engineering, and math.

Congratulations to today's role models for tomorrow's leaders.

**[www.deloitte.com](http://www.deloitte.com)**

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**SECTION 2**

# **NON-PROFIT/ FOUNDATIONS PROFILES**



# Marion C. Blakey

## **PRESIDENT AND CEO, AEROSPACE INDUSTRIES ASSOCIATION (AIA)**

Marion C. Blakey is president and CEO of the Aerospace Industries Association. AIA is the most authoritative and influential voice of the aerospace and defense industry, representing over 340 leading manufacturers and associate members.

Ms. Blakey became the eighth chief executive of the association in 2007. Before that, she served a five-year term as administrator of the Federal Aviation Administration. As FAA administrator, Blakey regulated the nation's airways as well as operated the world's largest air traffic control system managing 44,000 employees and a \$14 billion budget. During her tenure, the traveling public experienced the safest period for air travel in the United States' history.

### **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO THE NATION?**

We need an education system that is able to produce the high-tech workforce that will keep the United States competitive with the rest of the world. Competitiveness is more than just tools on the factory floor or experiments in the research lab. Intellectual capital drives innovation. You can't put up fences around innovation; you just have to be faster and more nimble than your competitors. That boils down to education in our STEM subjects starting in grade school right through advanced education curriculum.

### **OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?**

The Aerospace Industries Association, along with a number of partners, just completed the 10th annual Team American Rocketry Challenge. It was very heart-warming to have the opportunity to be part of the awards ceremony this May. The contest chal-

lenges middle and high school students to design, build, test and fly a rocket with raw eggs as the payload. This year the rockets had to reach 800 feet during a 43- to 47-second flight. Over the last decade, more than 60,000 young people have participated in TARC. In a 2010 survey of TARC alumni, four out of five respondents said TARC has had a positive impact on their course of study, while 92 percent of participants said they would encourage a friend to pursue STEM-related careers.

### **WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?**

There are a number of practices that will result in more women in STEM: mentoring, promoting qualified individuals and leading by example. In the aerospace and defense industry, we're seeing a number of women being appointed into senior positions and a few are becoming CEOs of major, publicly traded companies. However, we need to do a better job of retaining mid-career women by

ensuring that they not only have opportunities for advancement but see others senior to them advance up the career ladder.

### **HOW IS YOUR ORGANIZATION INNOVATING TO PROMOTE STEM?**

AIA is very active in promoting STEM with our members and in the business community. I believe that aerospace and defense companies are leading the business community in their commitment to STEM. We have to. Due to national security requirements for our workers to have security clearances, we rely on home-grown talent for a lot of our workforce rather than outsourcing. AIA is a founding member of the Business and Industry STEM Education Coalition, a group of more than 40 associations that represent employers of STEM professionals. The coalition has pledged to work with federal, state and local governments and private sector stakeholders to grow our STEM workforce. ■



# Chris McEntee

## EXECUTIVE DIRECTOR AND CHIEF EXECUTIVE OFFICER AMERICAN GEOPHYSICAL UNION (AGU)

Ms. McEntee has made her mark as an association leader and innovator, building a record of achievement in leading large organizations through changes in strategy, governance, membership, programs, and the fluid public policies that confront them. She is an American Society of Association Executives Fellow and recipient of the *Women Who Advance America* award. McEntee was also named to Crain's Chicago Business "Under 40 Movers and Shakers". McEntee holds a master's degree in Health Administration from The George Washington University, a bachelor's degree in Nursing from Georgetown University, and is a graduate of Northwestern University's Kellogg School of Management Advanced Executive Program.



### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

A solid and thriving STEM community is essential to building the foundation for public wellbeing and our nation's economic future. AGU's mission focuses science for the benefit of humanity. With the strains placed on society by a growing population and limited resources to maintain a healthy ecosystem, we must create and sustain a steady pipeline of talented people who can rise up and conquer these challenges, both now and in the future.

### WHAT ABOUT STEM GIVES YOU PASSION?

Globally, we face so many difficult challenges—ensuring that families have access to a clean and adequate water supply, providing communities with efficient, effective, and sustainable sources of energy, establishing and supporting a foundation on which business can thrive. Our long term success in solving these problems hinges on the strength of our STEM workforce. STEM, at its core, is about problem solving and solutions, about making a difference in communities around the world and helping to build a better, more sustainable future. The opportunities for students considering a career in STEM, or for those who are just starting out in their career, to have a broad societal impact are practically lim-

ited. That is an incredibly inspiring message, and we need to use all of the resources at our disposal to share it as broadly as possible.

### OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?

It's our breadth and depth of programming that truly makes me proud. AGU offers an assortment of opportunities that expose students, teachers, and life-long learners to the freshest, most accurate scientific knowledge and the excitement of discovery. Our multi-staged approach to educational outreach includes activities that make Earth and space science fun and interesting for a variety of audiences and age ranges. It also includes research competitions for high school students, networking and mentoring opportunities for undergraduate/graduate students and early career scientists, along with programming to strengthen the skills of instructors at all education levels. And, with all of these initiatives, we strive to reach a broad array of groups to ensure that the Earth and space science talent pool reflects our nation's diverse population.

### HOW IS YOUR COMPANY INNOVATING TO PROMOTE STEM?

AGU is undertaking a new innovative effort to support two-year colleges. Two-year colleges play a vitally important role in the higher education

system in the U.S.—including attracting a large population of students from underrepresented groups—but when it comes to STEM, many students from these institutions do not finish their degrees or succeed in transferring to and completing programs at four-year colleges. Fixing this 'leak' in the STEM pipeline is at the heart of a new effort we are putting together: Unique Research Experiences for two-year College faculty And Students (URECAS). Supported by a grant from the National Science Foundation, URECAS is intended to support and foster the educational careers of two-year college students, and ultimately create pathways for them to enter the workforce. URE-CAS planning will bring together two-year college Earth and space science faculty who are conducting research with their students and faculty from four-year programs who have successfully transitioned two-year college students. This allows us to increase awareness of existing Earth and space science research programs, helps us to identify relevant barriers to participation for both students and faculty, and begin to foster best practices for creating a career pipeline from early interest in a science career through doctorate level study. ■

# Dr. Mary L. Good

**DEAN EMERITA, DONAGHEY COLLEGE  
OF ENGINEERING & INFORMATION  
TECHNOLOGY, UNIVERSITY OF ARKANSAS  
ALLIANCE FOR SCIENCE & TECHNOLOGY  
RESEARCH IN AMERICA (ASTRA)**

Photo: Jason Masters / Little Rock Soirée Magazine

## **WHY DO I BELIEVE STEM EDUCATION AND WORKFORCES ARE IMPORTANT TO OUR NATION?**

Today's world is being driven by technology and world economies are competing to capture the development of new technologies and to bring the production of those technologies to their home countries. For the United States to thrive and to provide a sustainable economic environment for our citizens we must capture our share of this activity both at the creative end and in the production end. This is true whether the activities result in manufacturing new products or new services. To achieve our share of this economic activity we must have a workforce who can provide the creativity for new technologies, who can utilize and manage technical systems and that can be productive in modern manufacturing or frontline services. All of these workforce arenas require STEM education which provides life-long learning skills, critical thinking skills, and problem solving ability. The foundation for much of this education is mathematics- the language of the twenty-first century. A significant portion of our workforce must master these skills at the post-secondary level if we are to maintain the standard of living to which the United States has grown accustomed.

## **WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVE SUPPORT AND ADVANCE STEM TODAY?**

First, our leaders need to understand that what we have accomplished in the past will not necessarily provide for the future. The global economy of today has many very competent players around the world and we can capture our share of the economic pie only if our policies provide the necessary foundation for our citizens to succeed. First among the necessary infrastructures is access to quality STEM education at all levels, K12 through doctoral programs. All students must be introduced to STEM principles to be good citizens in this technological world and an adequate STEM workforce must be capable of supporting a creative, vigorous STEM centered industry. This requires STEM individuals with education / training from vocational schools, two year colleges and four year/graduate institutions. We must have highly trained individuals who will be the creators of the next wave of technological development whether it is in nanotechnology, quantum electronics, or any of the other embryonic technologies now being explored in laboratories around the world. This implies adequate R & D support for universities and national laboratories and incentives for industrial investment in new technologies.

## **WOMEN IN STEM?**

My role model growing up was Marie Curie. Reading about her life and work was inspiring and I did follow her in some ways. I was in graduate school in the 1950's when the whole area of nuclear energy and radioactivity was new. I had the opportunity to get a graduate fellowship in inorganic and radiochemistry funded by the Atomic Energy Commission. I was one of only two women in my graduate cohort and the other woman left the program after her Master's degree. Since then I have been committed to getting other women into STEM fields where I found such satisfaction and a sense of doing something exciting. I have been pleased with the advancement of women in STEM fields; although we have not utilized them to the extent we should. However, there are now great role models for girls to emulate like Mechanical Engineer, Ellen Kullman who is CEO and Chairman of the DuPont Company or Ursula Burns, Mechanical Engineer, Chairman and CEO of Xerox Corporation.



Dr. Mary L. Good is the Emerita Dean of the College of Engineering and Information Technology (E.I.T.) at the University of Arkansas Little Rock and is presently serving as a Special Advisor to the Chancellor for Economic Development. The E.I.T. College of UALR has developed nationally recognized programs in System Engineering, Information Quality, Nanotechnology, Modeling and Simulation and Construction Management. Good presently serves on the boards of Saint Vincent Health System, and Delta Bank and Trust, both of Little Rock.

Previously Dr. Good served as the Under Secretary for Technology for the Clinton Administration in the U.S. Department of Commerce. In addition Dr. Good chaired the National Science and Technology Council's Committee on Technological Innovation, and served on the NSTC Committee on National Security.

Before the Clinton Administration, Dr. Good was the SVP for technology at Allied Signal, Inc., where she was responsible for the centralized research and technology organizations with facilities in Morristown, NJ; Buffalo, NY; and Des Plaines, IL. She was a member of the Management Committee and responsible for technology transfer and commercialization support for new technologies. This position followed assignments as President of Allied Signal's Engineered Materials Research Center, Director of the UOP Research Center, and President of the Signal Research Center. Before joining Allied Signal, she was professor of chemistry at the University of New Orleans and professor of materials science at Louisiana State University, where she achieved the

university's highest professional rank, Boyd Professor.

Dr. Good was appointed to the National Science Board by President Carter in 1980 and again by President Reagan in 1986. She was Chairman of that Board from 1988 until 1991, when she received an appointment from President Bush to become a member of the President's Council of Advisors on Science and Technology (PCAST). Dr. Good has also served on the boards of Rensselaer Polytechnic Institute, Cincinnati Milacron, and Ameritech and was a member of the National Advisory Board for the State of Arkansas.

Dr. Good is an elected member of the National Academy of Engineering, a past president of the American Chemical Society, is Past President and a Fellow of the American Association for the Advancement of Science, and a member of the American Institute of Chemists and the Royal Society of Chemistry. She has been active on the Board of Directors of the Industrial Research Institute, Oak Ridge Associated Universities, and the National Institute for Petroleum and Energy Research. She has served on advisory panels for the National Research Council, the National Bureau of Standards, the National Science Foundation Chemistry Section, the National Institutes of Health, and NASA, and on the executive committee for the International Union of Pure and Applied Chemistry.

Dr. Good received the National Science Foundation's Distinguished Public Service Award, the Albert Fox Demers Medal Award from Rensselaer Polytechnic Institute, the American Association for the Ad-

vancement of Science Award, the American Institute of Chemists' Gold Medal, and was chosen Scientist of the Year by Industrial Research and Development magazine. She was elected as a Foreign Member of the Royal Swedish Academy of Engineering Sciences in 1990, became a member of the Tau Beta Pi Association (the Engineering Honor Society), was awarded the Charles Lathrop Parsons Award of the American Chemical Society and received the Industrial Research Institute Medalist Award. In 1997, she received the Priestly medal from the American Chemical Society, the highest award given by the association. She has published over 100 articles in refereed journals and is the author of a book, Integrated Laboratory Sequence, published by Barnes and Noble. In 2004 she received the National Science Foundation's Vannevar Bush award for public service.

Dr. Good has served as Chairman of ASTRA, the Alliance for Science & Technology Research in America since its founding in the year 2000. ASTRA is a Washington, D.C.-based science policy organization focusing upon the role of R&D investments, competitiveness, innovation, and STEM workforce development in the U.S. economy.

Dr. Good received her B.S. in chemistry from the University of Central Arkansas and her M.S. and Ph.D. degrees in inorganic chemistry from the University of Arkansas. Her awards and honorary degrees include the College of William and Mary, Polytechnic University of New York, Louisiana State University, Michigan State University, Duke University, University of Michigan, and Colorado School of Mines. ■





# Shirley Malcom

**DIRECTOR OF EDUCATION AND HUMAN RESOURCES,  
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF  
SCIENCE (AAAS)**

Shirley Malcom is Director of Education and Human Resources at the American Association for the Advancement of Science. There, she develops programs to improve the quality and increase access to education and careers in STEM. Dr. Malcom holds a PhD in ecology from Penn State. During the Clinton Administration she served on the National Science Board and President's Committee of Advisors on Science and Technology. Dr. Malcom is a trustee of Caltech and a Regent of Morgan State University. In 2003 she received the Public Welfare Medal of the National Academy of Sciences.

## **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

Every aspect of our personal and public lives depends on technology, knowledge of STEM and/or the products of knowledge and invention of scientists and engineers. From the availability of quality food and safe drinking water, to transportation, communications, health care, national security and the economy, STEM is the engine that makes it all go. We also have challenges that must be addressed that will also depend on STEM: meeting the global energy needs and food security requirements of the planet without doing irreparable harm to the environment; supporting wellbeing of populations across the globe to promote peace and security, including within our nation.

## **WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?**

We start early with young women, and give them opportunities to lead. We support them with encouragement and mentoring. It is also im-

portant to help mid-career women find and use their voices and talents. In many cases they have valuable things to offer, but they have not been asked or have been expected to defer to others. We ask them and include them. And we support senior women who are already there. We need to think of it as a life cycle issue; at every stage people need support—to imagine themselves as leaders, to find themselves as leaders and to be supported as leaders.

## **WHAT ABOUT STEM GIVES YOU PASSION?**

There is always something new and exciting, something to look forward to, something to discover about ourselves and our world. And even when experiments don't work, you still learn from them. What more could you ask for!

## **OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?**

I am proud of our efforts to share science with all kinds of people. We have had any number of variants of programs of outreach, where we partner

with a community group or women's organization, build capacity within the organization to run their own programs, nurture and support them and then send them on their way, stronger and enabled to do STEM programming themselves. That kind of capacity building is very satisfying.

## **HOW IS YOUR ORGANIZATION INNOVATING TO PROMOTE STEM?**

We discovered a long time ago that we will never have a staff large enough to reach all of the people we want to/need to reach. So we have been looking at other ways to extend our reach. We work with scientist-engineers who volunteer in schools and after school settings; we work with groups who work with people, perhaps around other issues, and help them see the STEM connections to their issues; and we are moving much more into using technology, including games, to teach more about STEM. This way we can bring STEM to people more on their own terms... meeting them where they live and work. ■

# Linda Hallman

## EXECUTIVE DIRECTOR AND CHIEF EXECUTIVE OFFICER AMERICAN ASSOCIATION OF UNIVERSITY WOMEN (AAUW)

As the executive director and CEO of the American Association of University Women (AAUW), Linda D. Hallman, CAE, is a nationally respected leader with more than 20 years of executive-level experience. Now in her fourth year at the helm of the 130-year-old organization, Hallman has championed women and girls in science, technology, engineering, and mathematics (STEM). Under her leadership, AAUW has made women in STEM a priority for the organization's advocacy, programming, and research, awarding millions in fellowships and grants and publishing internationally recognized research on the topic.



### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

In the next six years, the United States is on track to have more than 1.4 million tech-related jobs. These jobs are critical to our global competitiveness. According to the Congressional Commission on the Advancement of Women and Minorities in Science, Engineering, and Technology Development, if women and members of traditionally underrepresented groups joined the STEM workforce in proportion to their representation in the overall labor force, the shortage of STEM professionals would disappear.

As an untapped talent pool, women are a key part of the solution. Because women offer different perspectives and approaches to problem solving, recruiting and retaining them in these fields can open the door for new innovation. It's not a coincidence that tech companies with a high representation of women on their senior management teams have stronger bottom lines than companies with few or no women on those teams. Diversity leads to innovation, and innovation leads to profit.

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

AAUW's research report *Why So Few? Women in Science, Technology, Engineering, and Mathematics* is full of ideas about how to combat gender bias in education and the workplace. Exposing girls to successful female role models, teaching girls and boys about stereotype threat, and developing a growth mindset are just a few of the recommendations the report lays out. If we dispel the notion that boys are "naturally" better than girls in mathematics, then men and women should experience fewer gender biases in the workplace. From middle schools into labs and board rooms, women face stereotypes that have real and measurable impacts on their performance. Leveling the playing field requires that we put these stereotypes to rest.

### WHO IS YOUR STEM ROLE MODEL AND WHY?

AAUW is proud to have among its members Mae Jemison, a woman I hope girls are learning about in school. Jemison knew from a young age that she wanted to go into space, and she broke color and gender barriers to become the first African American woman to do so. Her

career path encompasses everything we as Americans value—hard work, perseverance, and the belief that anything we dream we can do.

### HOW IS YOUR COMPANY INNOVATING TO PROMOTE STEM?

AAUW is expanding two exciting programs that help girls see themselves as the STEM professionals of tomorrow. Tech Trek, a weeklong camp for girls on college campuses, comes from AAUW of California. Now in its 14th year, this program has served more than 8,000 girls, providing them with women STEM role models and a budding interest in STEM.

Our second program, Tech Savvy, was started by the AAUW Buffalo (NY) Branch. It's a daylong program that lets girls explore STEM careers and work on important skills such as public speaking and negotiation, while their parents learn about STEM career paths and college financing to help their daughters pursue their dreams. ■



# Madeleine Jacobs

## EXECUTIVE DIRECTOR AND CHIEF EXECUTIVE OFFICER THE AMERICAN CHEMICAL SOCIETY (ACS)

Madeleine Jacobs is Executive Director and Chief Executive Officer of the American Chemical Society, the world's largest scientific society with 164,000 members; 43 journals; *Chemical & Engineering News (C&EN)* magazine; Chemical Abstracts Services; and educational programs. Jacobs spent 35 years in science journalism and public affairs at C&EN, the Smithsonian Institution, the National Institutes of Standards and Technology, and NIH. She serves on boards of numerous scientific nonprofits and has won awards for journalism and mentoring women and minorities. She has a B.S. in chemistry and a Doctor of Science (honorary) from George Washington University.

### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

In the mid-20th century, the great mathematician and philosopher Bertrand Russell wrote: "Almost everything that distinguishes the modern world from earlier centuries is attributable to science." The standard of living that most of us enjoy today and hope to extend to our fellow residents on Earth depends on innovations in science and engineering. I want to be sure that the United States is a leader in accomplishing this important and aspirational goal.

### WHAT PRINCIPLES DO YOU, AS A LEADER, APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?

I will see or talk to any young woman and offer her my time and advice on advancing her career and balancing her personal and professional life, and I will accept appointments on boards of directors of organizations which work to advance the STEM cause and work hard to help them achieve their goals by giving my time, talent, and treasure.

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

Every individual has a responsibility to mentor girls from the time they are very young to ensure that they have the same opportunities and the same self-confidence as men. We need to ensure that girls have opportunities to excel in math, science, and engineering and the self-confidence to know that there are no limits to what they can achieve. Every organization has the responsibility to educate its employees, leaders, and boards of directors on subtle and overt forms of discrimination that hold women (and minorities) from achieving their full potential and of contributing their full potential to the advancement of organizations and the nation.

### WHO IS YOUR STEM ROLE MODEL AND WHY?

Mary Good, who currently serves as Head of the Alliance for Science & Technology Research in America (ASTRA), is hands down my role model. Mary has done it all, and is still doing it, as Dean Emerita at the University of Arkansas. She has been a leader in STEM in industry, academia, and government—all at high levels. And she has been a devoted wife, mother,

and friend and has been a continuing mentor to women at all levels.

### OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?

I am most proud of the ACS Scholars Program, launched in 1995, to increase the number of under-represented minorities in the chemical sciences. The goal of the program is to promote inclusion in the chemical enterprise by helping develop the next generation of scientific talent to reflect our nation's diverse society. Although it is a college program for gifted African Americans, Latinos, and Native Americans, more than 100 of its participants have earned Ph.D.s in the chemical sciences, a startling statistic for a program little more than 15 years old. ACS maintains an average of 350 students in the program at all times and disburses about \$1 million in scholarships annually. Since its inception, the ACS Scholars Program has awarded over \$14 million in direct financial assistance to more than 2,500 students. This program was honored in 2001 with a Presidential Award for Excellence in Science, Mathematics, and Engineering. ■



# Victoria Rockwell

## PAST PRESIDENT, AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

Victoria A. Rockwell is Past President of ASME and is director of Investment Development for Houston-based Air Liquide USA, LLC. Rockwell joined Air Liquide in 1996. She worked previously at the Hoechst Celanese Corp. Specialty Chemicals Division, Charlotte, N.C., and Union Carbide, Tonawanda, N.Y.

She is currently on the board of the Engineering, Science and Technology Council of Houston and serves as immediate past president. Rockwell earned a B.S. degree in applied science and mathematics from Empire State College in 1976, and a B.S. in mechanical engineering from Union College in 1978.



### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

They are key drivers to current and future economic success. We need a technically literate society that will embrace the future, not fear it.

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

A visionary ability to do what's needed to ensure a STEM literate workforce is essential.

### WHAT PRINCIPLES DO YOU, AS A LEADER, APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?

I advocate for STEM as vital to precollege curriculum for all students grades K-12 and constantly seek to engage educators, legislators, parents and colleagues in the STEM discussion. I also support programs like Engineers Week, Future City, BEST, FIRST Robotics, Science Fairs, and so on, both as an employer and as a leader in the engineering professional arena.

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

The quest to bring more women leaders in STEM starts in grade school. STEM subjects should be presented

in grade school both as discovery-based fun and as a way to help people. STEM subjects are often presented as hard and difficult or as subjects only for boys—a bias that is implanted in girls at an early age. This is what attracts girls—their desire to help people and do something that makes a difference in the world.

### WHO IS YOUR STEM ROLE MODEL AND WHY?

I can't say that I have a STEM role model. I value the work that ASME has done to bring awareness to the need for STEM education.

### WHAT IS YOUR CONCEPT OF MENTORING AND SPONSORSHIP OF OTHERS FOR STEM CAREERS?

We should do everything we can to promote and encourage STEM careers. It is not just about mentoring or sponsoring an individual.

### WHAT ABOUT STEM GIVES YOU PASSION?

STEM can solve the grand challenges we face. Mathematics is a language common to all cultures and does not change from nation to nation. STEM provides a forum for open communication.

### OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?

I am most proud of a new recognition that ASME introduced into the EWeek portfolio—the DiscoverE Educator Awards. All of us who are in STEM fields can look back at a teacher who inspired us. Those teachers are the unsung heroes and more need to be recognized. I am proud that ASME acted on that fact and that I was part of the inauguration of the program.

### HOW IS YOUR COMPANY INNOVATING TO PROMOTE STEM?

My company Air Liquide USA LLC supports STEM education programs in communities across the US. Supporting K-12 STEM programs is a way that we help promote not only a technically literate society but also help to develop future workforce needs.

### WHICH WOMAN LEADER DO YOU MOST ADMIRE, AND WHY.

Recently, I met two inspiring young women in South Africa, Mabohlale Mampuru and Naadiya Moosajee, founders of a group called South African Women in Engineering. These are the kinds of women I most admire. They see a problem and they do something personal to make change happen. ■



# Beverly Willis, FAIA

## CHAIR, BEVERLY WILLIS ARCHITECTURE FOUNDATION (BAAF)

Beverly Willis is an architect and visionary. After 50 years in practice, she founded the Beverly Willis Architecture Foundation (BAAF.org) whose mission is to expand knowledge of women's contributions (engineering, architecture, technology) to our built environment. By uncovering the lost histories and preserving the current legacies of these women, they become, for the first time ever, part of history. Previous public service includes: executive committee, National Academy of Science's Board on Infrastructure and Constructed Environment; chair, Federal Facility Council; US delegate, United Nations Conference on Habitat I; and Founding Trustee, National Building Museum, Washington, DC.

### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

As an architect with an engineering background, I live every day with the knowledge that while 'women,' as the saying goes, 'hold up half of the sky,' in architecture, women only comprise 18% of the profession and 8% in engineering. Realize as you walk down the street in your town that most of what you see—the places where we live, work, study and play—have been designed almost exclusively by men. Both men and women enter the STEM professions with a passion to make our built world a better place to live. However, women need more opportunities to design and the world needs more women designers.

The STEM disciplines underpin architecture, engineering and building practices. Without STEM knowledge, our buildings, roads, trains, airports, bridges, indeed the whole infrastructure of cities and towns, cannot be built to meet the needs and challenges of our daily lives. Just as important, the US cannot compete with other nations without STEM knowledge—an economic impact that every US citizen will feel in their pocket book. It is urgent that the US attracts more women to these disciplines and motivates them to stay, as the drop-out rate is an alarming 70%, ten years after graduation.

### OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?

BAAF is a national research and educational not-for-profit 501(c)(3) organization working to change the culture of the building industry so that women's work, whether in contemporary practices or within historical narratives, is acknowledged, respected, and valued. BAAF achieves its mission by documenting women's work, educating the public, and transforming industry practice through collaborations with museums, professional organizations and other groups in the areas of architecture, design, engineering, technology, real estate, and construction.

In 2010 the Foundation inaugurated the Industry Leaders Roundtable, a consortium of the world's largest global leaders in engineering, architecture and building, providing a platform for the introduction of new ideas in management, technology, recruitment, metrics and innovation.

A global transformation is changing STEM disciplines. Firms can become more competitive after they integrate women into the transformed workplace, develop women leaders, and understand women as clients. BAAF created the Industry Roundtable to share cutting edge research, ideas and strategies as well as to advance women leaders. This annual program brings together a

select group of leaders from some of the world's largest architecture, engineering, and construction firms (whose combined employees total over 100,000 of whom only 15–20,000 are women).

### WHICH WOMAN LEADER DO YOU MOST ADMIRE, AND WHY.

I greatly admire Sheryl Sandberg because she is a 21st century working-woman role model, a global leader in technology, and for her strong advocacy for the advancement of women's leadership. Sandberg is also a mother of two. Currently COO for Facebook, she possesses an impressive industry background with experience at Google, as its Vice President of Global Online Sales and Operations. She also was involved in launching Google's philanthropic arm Google.org. Prior, she worked with the US Department of Treasury, as Chief of Staff. In 2012, she was named by Time magazine one of the 100 most influential people in the world. Senior leaders need knowledge of new management systems and cutting edge technology to effectively support and advance STEM. ■



# Ann Randazzo

## EXECUTIVE DIRECTOR, CENTER FOR ENERGY WORKFORCE DEVELOPMENT (CEWD)

Ann Randazzo is the Executive Director of the Center for Energy Workforce Development (CEWD). She assumed this position when the organization was incorporated in March 2006. Ms. Randazzo has extensive experience in the energy industry including information technology, finance and customer operations in management positions with Georgia Power, a Southern Company. Prior to her involvement with CEWD, she provided strategic planning consulting to electric utilities, concentrating on Human Resources, Training and Development, and Organization Effectiveness through her consulting firm, Randazzo Consulting.



### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

STEM is the very foundation of a competitive workforce. My education is in Math, which has prepared me for every job I have had in my career. Math is not just about the numbers, it's about logic, critical thinking, and the ability to start with a basic concept and build on it. I can't think of a career where that isn't important. STEM education provides the ability to learn and grow and that turns a job into a career.

In the energy industry, STEM Education and Workforce go hand-in-hand. CEWD has been focusing on career paths for in-demand position, including lineworkers, pipefitters/pipelayers/welders, plant operators, technicians, and engineers, all which require STEM skills. We are finding the incoming workforce has deficit in many of the STEM areas, especially math. By partnering with their state and local education systems, CEWD member utilities are working to improve these skills and help students better understand how STEM is used

on a daily basis in the workplace. We've even developed a math bootcamp specifically for the energy industry to help build these skills.

### WHAT ABOUT STEM GIVES YOU PASSION?

My philosophy is that STEM is for everyone. There seems to be more awareness of the importance of STEM careers, but the focus is on the traditional STEM careers, such as engineers and scientists. However, we see in the energy industry that STEM skills are just important for someone who is, say, a technician as is for an engineer. We need to start stressing the importance of STEM education for all, regardless of career one's career pathway. This is a message that the energy, manufacturing and construction industries are promoting together.

### OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?

While CEWD has many initiatives for which I am proud, I would have to say the development of an industry-recognized credential that has been accredited by the American Nation-

al Standards Institute (ANSI). The 130-hour assessment-based certificate program is called *Energy Industry Fundamentals* and is a comprehensive introduction to the energy industry. Based on support by CEWD members and The Bill and Melinda Gates Foundation, we are able to offer all course materials, including instructor guides, student guides and labs, free of charge. Several states have adopted the credential as part of the career and technical education program, including Florida and Georgia.

### HOW IS YOUR COMPANY INNOVATING TO PROMOTE STEM?

CEWD integrates the STEM message whenever we talk about energy careers. We've even trademarked a statement that encompasses our philosophy *Energy Careers: Putting STEM to Work™*. Recently, we developed a set of career pathway interactive roadmaps that demonstrate this concept and the progression of career options for in-demand jobs in the industry. These are available at [www.getintoenergy.com](http://www.getintoenergy.com). ■





# Joann DiGennaro

**PRESIDENT, CENTER FOR EXCELLENCE IN EDUCATION (CEE)**

Joann P. DiGennaro is the President of the Center for Excellence in Education. She established the Center with the late Admiral H.G. Rickover in 1983 to nurture high school and university scholars to careers of excellence and leadership in science, technology, engineering and mathematics, and to promote collaboration among future scientific and technological leaders in the global community. Ms. DiGennaro has negotiated educational science programs with 52 nations to date.

Ms. DiGennaro received her BS Degree from Purdue University, her MS from the University of Maryland, and her Juris Doctorate Degree from George Mason University.

## **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

The challenges of this decade and onward will be met by addressing the question: "What are they learning in U.S. Colleges and Universities?" Only by careful problem solving, the development of critical thinking and excellent verbal and written skills can our workforce tackle critical issues of environment, health, energy, national security and agriculture.

Innovation and global leadership in STEM are dependent on rigorous curricula for K-16 students, including the recognition that profoundly talented students in math and science also must have their potential met.

## **OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?**

The Research Science Institute, the USA Biology Olympiad and the Teacher Enrichment Program sponsored by the Center for Excellence

in Education are its most esteemed programs recognized nationally and internationally. The Center has never wavered from continuing to sponsor its programs cost free for all students competitively selected to attend which thereby levels the playing field for young scholars from diverse economic backgrounds.

The RSI was extended to young scholars in Saudi Arabia for the first time in 2011. The Center is very proud that it is the first academic program in the Kingdom for high school students where females study alongside males to pursue STEM careers.

## **WHICH WOMAN LEADER DO YOU MOST ADMIRE, AND WHY?**

Angela Merkel of Germany and Lady Margaret Thatcher of the United Kingdom are my role models for their focused analyses of the needs and challenges of their respective nations, and for their unwavering

strength and principles, regardless of political pressure. I believe that their leadership has been/was enriched from having analytic training in science and math.

## **WHAT ABOUT STEM GIVES YOU PASSION?**

My passion is to excite secondary school and university scholars along with teachers in STEM to foster creativity and to fall in love with scientific and technological exploration to answer exciting questions about the universe.

Mastering science and technology is not about what is known, but what is not known. There is nothing more thrilling in academics than to help others reach for the flight of fancy, to ask seemingly absurd questions, and then EUREKA....to better understand the riddles of the universe science, technology, engineering, art and math (STEAM). ■

# Linda Rosen

## CHIEF EXECUTIVE OFFICER, CHANGE THE EQUATION

Linda Rosen is the CEO of Change the Equation. Dr. Rosen has a proven track record in providing leadership to the business community in its mission to improve science, technology, engineering and mathematics (STEM) learning. Her career has focused on scaling up research-based best practices.

Previously, Dr. Rosen was the Senior VP for the National Alliance of Business; a Senior Advisor to U.S. Education Secretary Richard Riley and led the National Commission on Mathematics and Science Teaching for the 21st Century; and the Executive Director of the National Council of Teachers of Mathematics.



### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

From making critical decisions about our health care, our finances and our retirement to using smartphones and computers, we use STEM knowledge and skills every day. They illuminate the ever more complex issues that govern the future of our democracy, and it reveals to us the beauty and power of the world we inhabit. Most important, STEM is an economic imperative. Over the past 50 years, technological innovation has accounted for almost half of our nation's economic growth, and almost all of the 30 fastest-growing occupations in the next decade will require at least some background in STEM. Even during the past three years of high unemployment, job postings in STEM fields outnumbered qualified unemployed people by almost two to one. STEM is an engine of economic growth.

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

A recent study by Identified, a data company, showed that engineering can be a clear path to the corner office. Combing through millions of professional profiles on Facebook to learn more about the typical CEO, the study found that CEOs were about as likely to have been engineering majors as business majors. Those who hold ad-

vanced degrees were about three times as likely to have an engineering degree as an MBA.

Maybe this shouldn't come as such a surprise. Engineers create things. They bring new ideas to market. They find new solutions to knotty problems. They invent. They see opportunity where others see insurmountable challenge. Those leadership traits are what will advance STEM learning in our nation's classrooms.

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

One of the most important things we must do is to encourage girls from an early age. Research suggests that many young girls succumb to the stereotype that they are less adept than boys at mathematics. The stereotype is pervasive and unfortunately flourishes well into adulthood without a grain of truth. Since mathematics is the language of STEM, these early biases, however subtle, have big consequences later on. Women are far less likely than men to go into areas like engineering, computer science, and physics. At a time when we need all hands on deck, that's a lot of talent to squander.

### WHAT ABOUT STEM GIVES YOU PASSION?

I am especially drawn to mathematics that involves creative problem-solving grounded in logical thinking. It was my seventh grade teacher who,

on the first day of school, introduced me to the binary system and other number bases. I was completely captivated that what I thought were immutable truths—like  $1 + 1 = 2$ —could be represented differently yet retain the same meaning. Every day in math class from that point on was an adventure. A literate nation not only reads, it computes, investigates and innovates. I am driven to find ways to spark a similar sense of wonderment in all young people.

### OF WHAT ONE INITIATIVE YOU ARE MOST PROUD?

The mission and accomplishments of Change the Equation make me proud. During our inaugural year, we released powerful Vital Signs reports on the condition of STEM learning in every state. We harnessed the best thinking and resources to develop tools to foster effective philanthropy and, we expanded select, high-quality STEM learning opportunities to tens of thousands of students nationwide. And that's just the beginning: new Vital Signs, a database of effective programs, and tens of thousands of middle students exploring the excitement of STEM are coming soon! ■



# Nancy Conrad

## FOUNDER AND CHAIRMAN, CONRAD FOUNDATION

Nancy Conrad is the Founder and Chairman of the Conrad Foundation. She created the Foundation in 2008 to energize and engage students in science and technology through unique entrepreneurial opportunities. The organization's flagship program, the Spirit of Innovation Challenge, is a global competition challenging students to combine education, innovation and entrepreneurship to create products that address real-world challenges and global sustainability. By enabling young minds to connect education, innovation and entrepreneurship, the Foundation helps provide a bold platform for enriching the innovative workforce of the future.

### **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

We must embrace the power of collaboration. No one program or system is going to be the right or best solution for all participants. Time and again we discover every child, educator and community has different needs and goals. Through collaboration and reciprocal endorsement, we reach greater numbers and achieve unprecedented success. It is important to leave a better country for our children but it is equally important to leave better children for our country.

### **WHAT ABOUT STEM GIVES YOU PASSION?**

The hallmark of America's culture is innovation and entrepreneurship. It's how we got to the Moon. It's how companies like Apple, Facebook and Google were formed. It is how our country will continue to explore the universe, discover cures for disease and become good stewards of the world we share with our global neighbors. The sciences are the tools

we need to achieve these goals. Providing young people with the skills to use these tools is a necessity to be successful in our pursuits.

### **OF WHAT ONE INITIATIVE YOU ARE MOST PROUD?**

In the five years since the inception of the Spirit of Innovation Challenge, we have engaged students in 42 states and more than 10 countries. Through virtual collaboration, there are teams comprised of students from different locations around the U.S. which we consider a perfect example of 21st century education. In fact, we have reached in excess of 17,000 students with our outreach efforts and engagement in our online community and more than 200 STEM educators from year to year. The Conrad Foundation supported the conceptualization of more than 350 new products and innovations, and more than 20 percent of conceptualized products and innovations are in development.

### **HOW IS YOUR COMPANY INNOVATING TO PROMOTE STEM?**

The Spirit of Innovation Challenge is where smart kids become rock stars! Our annual competition challenges high school students worldwide to use science, technology, engineering and math skills to develop commercially viable products while addressing global/local challenges and sustainability. The flagship program of the Conrad Foundation, the Spirit of Innovation Challenge creates incentivized learning opportunities for students and teachers as they unify their classroom knowledge with innovation and entrepreneurship.

### **WHICH WOMAN LEADER DO YOU MOST ADMIRE, AND WHY.**

Hillary Clinton is a woman I greatly admire. She is a rock star wife, visionary leader, a global game changer, caring mother, and influential diplomat. For me, she is representative of all that is admirable in women: keen mind, good heart, passion and graciousness. ■

“It is important to leave a better country for our children but it is equally important to leave better children for our country.”



# Reagan Flowers

## FOUNDER AND CHIEF EXECUTIVE OFFICER, CSTEM

Dr. Reagan Flowers is the founder and CEO of CSTEM. Her pragmatic understanding of effective STEM education reform in classrooms globally has been instrumental in assisting with closing the achievement gap among ethnic-minority and underrepresented students. Dr. Flowers has led the organization in unprecedented expansion of services and revenue growth since its founding in 2002, having impacted more than 50,000 children and grown revenue from \$5k to \$3 Million. She holds a Ph.D. from the Union Institute & University, MA from Prairie View A & M University of Texas, and BS from Texas Southern University.



### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

STEM education integrates learning and it allows students to experience the relevancy of classroom content and its connection to the real world. In order for STEM education to be impactful in closing the achievement gap, it must be connected to current and future workforce trends. Nationally, ethnic-minorities and females are underrepresented in many STEM industries, which limit their participation in a variety of well-paid, high-growth professions. The underrepresentation of minority groups and women in STEM denies the nation the full benefit of their talents and denies science and engineering the rich diversity of perspectives and inspiration that drive those fields.

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

Distinguishing characteristics or qualities of effective senior STEM leaders are forward thinking, visionary, passionate, and innovative in respect to design and implementation.

### WHAT PRINCIPLES DO YOU, AS A LEADER; APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?

As a leader in STEM education, the guiding principles that motivate the work I do professionally and personally to advance STEM education is what I refer to as the “wow and opportunity factor”. It is essential that STEM education is engaging, exciting, innovative, creative, support exploration, and allow for discovery. The “wow and opportunity factor” I employ ensures that the implementation of STEM education programs and curriculum development remain focused on teacher development and student engagement in STEM.

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

It is essential that current STEM leaders serve as mentors, provide targeted leadership opportunities, and have increased visibility to serve as role models to women.

### HOW IS YOUR COMPANY INNOVATING TO PROMOTE STEM?

CSTEM’s targeted efforts for more than ten years is directly impacting STEM teaching and learning and

transforming classrooms into innovative places that connect to the real world. Using the CSTEM Challenge competition model, more than 50,000 students and teachers have been impacted. Annually, the competition supports the participation of both teachers and students over the course of 8 months during their academic calendar year. Participating schools are required to partner and collaborate to form Pre K through 12th grade teams.

The STEM content the teachers are trained on supports the implementation of our project-based learning model which is multidisciplinary. CSTEM ensures that the playing field is leveled by providing the same amount of training, support and resources to each of the schools. The cross curricular design integrates the learning experience through communications, science, technology, engineering, mathematics, social studies, and art. Students are provided opportunities to innovate in areas of robotics, geographical information systems (GIS), green (environmental stewardship), creative writing, social media, and visual arts. ■



# Karen Peterson

**CHIEF EXECUTIVE OFFICER, EDLAB GROUP/PRINCIPAL INVESTIGATOR, NATIONAL GIRLS COLLABORATIVE PROJECT (NGCP)**

Karen Peterson, M.Ed., is the Chief Executive Officer of the EdLab Group and has served for more than twenty years in the education system as classroom teacher, university instructor, program director, and researcher. She is the Principal Investigator for the National Girls Collaborative Project, funded by the National Science Foundation (NSF) to increase the capacity of girl-serving STEM organizations via a strategic collaboration model. She is also Principal Investigator for SciGirls and the Computer Science Collaboration Project, which all address gender, racial, and socioeconomic underrepresentation in STEM.

## **HOW IS YOUR ORGANIZATION INNOVATING TO PROMOTE STEM?**

The EdLab Group is a dynamic organization dedicated to educational innovation, developing and implementing programs and projects that create meaningful and widespread impact. We deliver programs statewide, regionally, nationally and internationally. Our staff has expertise in managing and scaling up large projects that include professional development for educators, informal educational experiences for youth, and exemplary practice dissemination for practitioners. EdLab staff have collaboration expertise to improve the organizational effectiveness and reach of programs dedicated to expanding opportunities in STEM and digital inclusion. We enable professionals across projects and communities to generate creative solutions and strategies that maximize benefit beyond that which one project or

community could accomplish. EdLab Group is unique in using collaboration as a catalyst for organizational capacity building, educator professional development, and improving access to STEM for underrepresented groups.

We created and manage the National Girls Collaborative Project (NGCP) which uses a unique collaboration model to increase the quality of science, technology, engineering, and mathematics (STEM) programming and strengthen the capacity of STEM practitioners through dissemination of research-based training and strategies, leveraging existing resources, and facilitating collaboration among its constituents. The result of this model is a national organization that has become more powerful and effective as it has been replicated in 36 states, serving thousands of

practitioners who in turn, serve more than 5 million girls across the United States.

The NGCP model implements creative strategies to reach diverse groups. By reaching practitioners and organizations who serve underrepresented girls, collaborating with K-12 school counselors, and strengthening the capacity of Regional Collaboratives to implement and sustain the model, the project adds knowledge to the field about effective engagement and outreach strategies for underrepresented girls in STEM, enhancing the effectiveness and sustainability of girl-serving organizations, and collaborations between school counselors and STEM practitioners. The NGCP's collaborative model transforms the way practitioners and educators work to advance girls participation in STEM. ■



# Judy Vredenburg

## PRESIDENT AND CEO, GIRLS INC.

Judy Vredenburg brings lifelong passion for supporting girls and young women to her role as President and CEO of Girls Inc., the nonprofit organization that inspires all girls to be strong, smart, and bold through life-changing programs and experiences. At Girls Inc., Judy is leading a charge for growth, including expansion of programming that helps girls discover an interest in science, technology, engineering, and math. Previously, she was President and CEO of Big Brothers Big Sisters of America and CEO of Chess King, a division of Melville Corporation.



### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

Nearly all of the thirty fastest-growing occupations in the next decade require at least some STEM knowledge, but girls and women continue to lag in these fields, particularly “hard” sciences like physics, computer science, and engineering. Women of color are even less likely to enter these careers. It is particularly important to reach out to women and girls to ensure we are maximizing our collective potential.

That’s why at Girls Inc. we grow girls’ skills and confidence in areas, including STEM, with research-based, hands-on activities and mentoring relationships in a positive, all-girl environment.

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

Support programs in and out of school that expose girls to STEM as a possibility for their futures. From day one, give girls safe spaces to problem solve.

Educate girls about the gaps that exist and infuse the self-reliance to be successful. Lastly, find diverse women role models who make STEM come alive and demonstrate that scientists have full, interesting careers and lives.

### WHO IS YOUR STEM ROLE MODEL AND WHY?

One of our alumni: Bianca Bailey. Bianca grew up in Dallas raised by a single father. At Girls Inc. she was introduced to engineering and met women scientists. She was one of only a few African-American girls in her science-focused high school and was often teased. Girls Inc. was her haven, encouraging her to keep going.

In May, Bianca graduated from Howard University with a degree in Chemical Engineering. She was campus President of Engineering Without Borders and traveled to Kenya and Sudan. She mentors girls in STEM at our Washington, DC affiliate. In 2011, the White House honored Bianca for her leadership in encouraging girls in STEM.

Bianca is headed to the University of Illinois Urbana-Champaign to get her Masters in Environmental Engineering. She plans on pursuing a Ph.D. and working in international development. Every time I hear an update from her, I am inspired to make certain every girl has the opportunity to discover her passion and the skills and support she needs to succeed in any field.

### OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?

Girls Inc. Eureka!® engages girls ages 12 to 18 in exploring STEM with the long-term goal of inspiring them to pursue post-secondary education and careers in these fields. This multi-year effort combines interactive programs, personal development activities, and sports with an intensive experience on a college campus and STEM internships.

We are currently working to expand this incredible program in scope and reach to give more girls this critical exposure to STEM, college, and the workplace.

### HOW IS YOUR ORGANIZATION INNOVATING TO PROMOTE STEM?

At Girls Inc. we are providing experiential learning opportunities for girls who would never otherwise have access to them. Our work is enhanced by our many corporate partners who contribute funding, expertise, and employees’ time. We are collaborating locally, regionally, and nationally with companies to bring more high quality STEM programs and experiences to girls and we are always seeking to increase capacity to reach even more girls. ■





# Anna Maria Chávez

## CHIEF EXECUTIVE OFFICER, GIRL SCOUTS OF THE USA

Anna Maria Chávez was appointed chief executive officer of Girl Scouts of the USA on August 24, 2011. Prior to her appointment, she served as chief executive officer of the Girl Scouts of South-west Texas. Before joining the Girl Scout organization, Ms. Chávez served as deputy chief of staff for urban relations and community development for then-Governor of Arizona Janet Napolitano, the current U.S. Secretary of Homeland Security. Ms. Chávez holds a law degree from the University of Arizona and a bachelor's degree in American history from Yale.

### WHY DOES STEM MATTER TO YOUR ORGANIZATION?

Girl Scouts of the USA is committed to ensuring that every girl has the opportunity to explore and build an interest in science, technology, engineering, and mathematics. The strength of our nation depends on increasing girls' involvement in STEM, and in helping them to develop critical thinking, problem solving, and collaboration skills that are so important in life and in becoming future STEM leaders. While the percentage of careers that require advanced STEM education increases, an alarmingly high percentage of girls lose interest in STEM subjects early in their development.

### WHAT IS YOUR ORGANIZATION DOING ABOUT IT?

Girl Scouts is the world's preeminent organization dedicated solely to girls and their development. For 100 years, Girl Scouts has offered experiential learning in a nurturing environment. Our national program portfolio threads STEM learning throughout our unique leadership journeys and innovative skill-building opportunities. Our girls explore and develop skills and qualities that will serve them all their lives creating future leaders in STEM. If the U.S. is to maintain its competitive advantage in the global economy,

we need to ensure that our entire population of young people, especially girls, is educated in STEM fields.

### HAS YOUR ORGANIZATION BEEN SUCCESSFUL AT REACHING ITS STEM GOALS?

By combining our girl-learning environment, our unique national program, our unparalleled delivery infrastructure, and our proven expertise in working with partners, we offer powerful STEM learning experiences for girls across all sectors, including girls in traditionally underserved and underrepresented communities. For example, programs such as Girl Scouts Forever Green, which encourages girls to lead their families, schools, and communities in improving the environment and protecting natural resources. Also, by reaching underserved girls, such as with the AT&T supported IMAGINE: Your STEM Future and Imagine Engineering funded by the National Science Foundation. Both programs offer girls from low-income and underserved communities the chance to experience STEM and plan for futures in STEM fields.

### IF YOU COULD HAVE THREE WISHES GRANTED BY THE STEM GENIE, WHAT WOULD THEY BE?

1. The entertainment industry (film, television, publishing, etc.) would

create compelling, exciting stories featuring characters who are scientists (and not necessarily scientists who are stopping a meteor from hitting Earth!) where most of those characters are women.

2. The development of a robust nationwide mentoring system for girls in middle school (where they often lose interest in STEM) that could connect them to women in a variety of STEM fields. This would offer all girls the opportunity to be inspired and encouraged by women who have successfully pursued STEM careers.
3. Creating a STEM resource access center at the national and/or council level that can provide training, mentoring and resources to all Girl Scouts as they pursue programming in STEM.

### BEYOND YOUR ORGANIZATION, WHAT ONE THING SHOULD BE DONE NOW TO HELP SOLVE THE STEM CRISIS?

Putting as much effort into supporting STEM students to "succeed" in college as it took into creating the pipeline and resources to get them into college. Designing the support structure and resources at the university level that help all types of STEM learners create a STEM identity. ■

# Anna M. Park

## EXECUTIVE DIRECTOR AND BOARD MEMBER GREAT MINDS IN STEM (GMIS)

Great Minds in STEM, a non-profit organization based in California, is celebrating its 24th year of servicing communities around the country by providing stellar and innovative national STEM programming. In 2011 alone, the GMIS team produced and executed programming that directly reached over 30,000 people.

Ms. Park received her J.D. degree from the University of Southern California and her B.A. from the University of California, Berkeley. Ms. Park also serves on additional non-profit boards and is a guest speaker or volunteer at many professional and student STEM events.



### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

The future success of the United States will greatly depend on our ability to encourage, educate, and support individuals who are passionate, curious and dedicated to STEM fields. We are still a relatively young nation and when we review our growth in STEM over the last 100 years the leaps we took were amazing. Now for the next 100 we must be able to fly, not leap, to keep pace and surpass the global competition in STEM. It is also a matter of national security as the way wars are fought, defended and won has changed dramatically. The continued successful defense of our country from future attacks will greatly depend on our military branches and intelligence agencies being able to have the best and brightest leaders, troops and civilians who are STEM trained and prepared.

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

The most important thing we can do to have more women leaders in STEM is to expose and engage young girls, early-on, to participate in STEM hands-on activities, programs, camps, career days and college campus competitions. If a young

lady today wants to become a singer, she knows she must practice, train and prepare her voice on a daily basis and there are many opportunities for her to perform at her school, church, community center or through competitions. She can even post her singing on YouTube. If the same young lady wants to be an engineer or scientist the opportunities to practice, train and prepare for these careers are not as obvious or ubiquitous. There is even less access to STEM activities and competitions in underserved communities. Unless there is a STEM professional in the family, most students, especially female students, also lack access to female STEM role models. GMIS is proud to have launched our *Viva Technology* K-12 STEM Education program ten years ago to fill this need in our underserved communities for young women and men. Additionally, GMIS has been documenting and showcasing the achievements of Hispanic women in STEM for the last 23 years and we are honored to share their stories to students across the country!

### OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?

GMIS has many outstanding programs and initiatives so it is a chal-

lenge to focus on just one as our scholarship recipients, College Bowl participants and award winners are all stellar role models. So with this said, the newest initiative I am most proud of is our *STEM-Up Initiative* which is building STEM capacity in a low-income, underserved community comprised of over 92,000 residents with a school-age population of approximately 20,000 students in Boyle Heights, a community in East Los Angeles, California. Such a large scale undertaking is a unique approach to STEM education. *STEM-Up* drives transformative change by leveraging the existing cultural richness of the community toward STEM. We have developed a menu of inter-related opportunities that engage students, parents, teachers, administrators, government agencies, corporations and community-based organizations around STEM hands-on activities, role models, and career options. *STEM-Up* is a five-year performance based contract awarded in 2008 from the U.S. Department of Defense, administered by the U.S. Army Corps of Engineers, Los Angeles District Office. ■





# Lisa Gable

## **PRESIDENT, HEALTHY WEIGHT COMMITMENT FOUNDATION (HWCF)**

Lisa Gable is the President of the Healthy Weight Commitment Foundation, a CEO-led initiative aimed at helping to reduce obesity, especially childhood obesity, in America. She is also Chairman Emeritus of the Pacific Research Institute and serves on the board of Girl Scouts of the USA.

Gable was U.S. Commissioner General to the 2005 World Exposition, Aichi, Japan and held personal rank of Ambassador. Other experience includes her tenure as Global Brand Identity Manager for INTEL Corporation, as a Director, Lovelace Respiratory Research Institute and as a Commissioner, the President's Commission on White House Fellowships.

### **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

When I lived in Silicon Valley in the 90's, I saw the launch of the dot.com era and the birth of mobile computing. We led the global market because of a relentless pursuit of creativity and unfettered innovation. Can America remain a global game-changer? I recognize that there will be ebbs and flows in America's leadership, but we need to get back the edge.

### **WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?**

The key is mentoring. We need to actively create initiatives that help girls link life experiences to STEM subjects, so that the path forward is never broken. A high school extra curricular program can help make the connection to the college internship or scholarship opportunity.

As leaders, we need to do a little more hand-holding. Most importantly, the process should support the potential for all girls, not only star students.

### **WHO IS YOUR STEM ROLE MODEL AND WHY?**

Former Congresswoman Heather Wilson she was the first female veteran to be elected to Congress, is a distin-

guished graduate from the Air Force Academy and a Rhodes Scholar. She has worked on key issues from military intelligence and defense technology to Medicare and children's health. Heather demonstrates that with solid grounding in math and science, a woman can provide leadership in the broad landscape of politics. Most importantly, Heather has been a mentor to many women, focusing on supporting military women in their careers.

### **WHAT ABOUT STEM GIVES YOU PASSION?**

I have seen the personal benefits of creativity unleashed and supported. The rapid advancements in medical technology have had a direct and real impact on my own family members who have suffered from cancer and heart disease. Mobile computing has allowed me as a working mom to multitask, check emails from a playground or participate in a meeting on the other side of the globe without having to be there in person.

I have heard leaders like Andy Grove outline a vision of where the world could be and then make it a reality. I have seen my husband, a former Apple executive and entrepreneur, sit around the table with other engineers and product marketing gurus

and dream up the next technological advancement that changed how we do something as basic as reading a book or listening to the radio.

The passion and drive of these individuals not only benefits our lives, but also keeps us engaged and always thinking about "what is next"?

### **OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?**

In the early 90's, I drove the development of a coalition comprised of Intel leadership, the school district, parents, teachers and administrators and a major accounting firm to build a model elementary public school, Kyrene La Mirada.

Teachers were provided internships at Intel's Chandler manufacturing site and Intel site managers served on the school's executive program and management design committee. Today the school continues to be one of the top performers in the state. ■



# Kimberly Reed

## EXECUTIVE DIRECTOR, INTERNATIONAL FOOD INFORMATION COUNCIL FOUNDATION (IFIC)

Kimberly Reed is Executive Director of the International Food Information Council Foundation. Previously, she served as Senior Advisor to U.S. Treasury Secretaries Henry Paulson and John Snow; Director of the U.S. Treasury Department's Community Development Financial Institutions Fund; Counsel to the U.S. Congress; and Vice President at Lehman Brothers. Kimberly earned a law degree from WV University College of Law and dual undergraduate degree in biology and government with a minor in chemistry from WV Wesleyan College. She currently serves on the Alzheimer's Association National Board of Directors and WV Wesleyan College Board of Trustees.



### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

STEM, especially in the agriculture, health, and nutrition areas, is vital to feeding our world. Between now and 2050, our planet's population will increase by 2 billion people—from 7 billion to 9 billion—and, according to the United Nations, we will need 100 percent more food and 70 percent of it must come from efficiency-enhancing technologies. In my current position, I enjoy sharing this message with young people through an IFIC Foundation initiative, "Understanding Our Food," and the Alliance to Feed the Future. We need to encourage our future leaders to focus on STEM and become a part of the solution that will nourish our ever-growing planet.

### WHO IS YOUR STEM ROLE MODEL AND WHY?

My STEM role model is U.S. Surgeon General Regina Benjamin. She, like me, comes from rural America. Dr. Benjamin's life has been one of service. She founded a rural health clinic in Alabama and, through determination, kept it in operation despite the damage of Hurricanes George and

Katrina and a massive fire. She now shares this passion as "America's Doctor." She provides the best scientific information available to improve the health of our nation, especially as we address the problem of non-communicable diseases like heart disease, cancer, and diabetes.

### OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?

In my personal capacity, I am a National Board Member of the Alzheimer's Association. I served as Co-chair of the 2012 Alzheimer's Advocacy Forum, which set a new record as the world's largest gathering of advocates—nearly 800 from all 50 states—who are devoted to ending Alzheimer's Disease and traveled to Washington, D.C. to share this message with the U.S. Congress. Not only is this "disease without a cure" affecting 5 million Americans, like my grandmother, and 15 million family members and friends who are providing unpaid care, it will cost the nation \$200 billion in 2012. I am doing all that I can to build support for research to find treatments that cure, delay, or prevent this disease.

### WHICH WOMAN LEADER DO YOU MOST ADMIRE, AND WHY.

I most admire Margaret Thatcher, who was the longest-serving British Prime Minister of the 20th century, and the only woman ever to have held the position. One of my favorite Thatcher quotes is: "I do not know anyone who has got to the top without hard work. That is the recipe. It will not always get you to the top, but should get you pretty near." Baroness Thatcher's life embodies this hard work and her foundation was in STEM, as she graduated from Oxford University with a B.S. in Chemistry. She specialized in X-ray crystallography under the supervision of Nobel Prize-winning chemist Dorothy Hodgkin, worked as research chemist at British Xylonite Plastics and Lyons & Company focusing on ice cream preservatives, studied law in her free time, and became a barrister before embarking on her remarkable political career. Above all, the number one reason why I admire and am inspired by the "Iron Lady" is her steadfast commitment to the cause of freedom around the world. ■



# Jennifer M. McNelly

## **PRESIDENT, THE MANUFACTURING INSTITUTE (MI)**

Jennifer was appointed President of The Manufacturing Institute, the non-profit affiliate of the National Association of Manufacturers, on April 1, 2012. Jennifer is driving an agenda focused on improving and expanding manufacturing in the United States. Jennifer has extensive experience in workforce development, employer engagement, and business. She is a proven leader at the Institute as the chief architect of one of the organization's flagship initiatives, the NAM-Endorsed Manufacturing Skills Certification System.

### **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

The United States is the world's largest manufacturing economy, producing 21 percent of global manufactured products. In the last two years, manufacturers have added almost 500,000 new jobs. While manufacturing remains an important economic force in regions across the country, it now confronts some serious challenges: access to an educated and skilled workforce. Over 80% of manufacturers report moderate to serious shortages of skilled talent in the hiring pool, notably in skilled production, which has left 600,000 jobs unfilled today. Manufacturing has changed dramatically in this country, moving from a labor-intensive, low skill manufacturing base to a highly skilled, automated, and advanced manufacturing base. Applied STEM skills are not only a deficiency in today's talent pool and critical to filling the skills gap, but are being increasingly important to the innovation and productivity that make U.S. manufacturing competitive in the global marketplace.

### **OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?**

The NAM-Endorsed Manufacturing Skills Certification System is a series of

nationally portable, industry-recognized credentials based specifically on employer-identified skills. These credentials, and the training required to obtain them, certify that an individual possesses the basic skills necessary for a career in manufacturing and ensures that they are useful nationwide and across multiple manufacturing sectors. We consider these programs to be Applied STEM pathways for students, bringing real-world experience and application into the classroom and exciting the next generation of skilled manufacturing talent.

### **WHAT ABOUT STEM GIVES YOU PASSION?**

Over the past few months, STEM has enjoyed something of a national spotlight. STEM is certainly deserving of the recognition because it is an industry that is truly vital to our economic and national security, as well as our identity as a nation that invents and makes things. In the end, nothing gives me more passion for STEM than seeing a young student build and launch their first rocket or meeting a middle-aged adult who is pursuing an industry-recognized credential to return to work. At the end of the day, my passion is deeply rooted in impacting individuals, and STEM is the avenue in which this impact will happen at its greatest.

### **WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?**

We must first understand the challenges and solutions for attraction, retention and advancement of women in manufacturing fields. The Manufacturing Institute is partnering with Deloitte, Society of Manufacturing Engineers and University of Phoenix to deploy "STEPping it Up for Women in Manufacturing," an initiative focused around recognition, research and education. The first annual STEP Awards will identify and highlight women—from the factory floor to the C-suite—who have demonstrated science, technology, engineering and production excellence in manufacturing. These women have contributed to the competitiveness of their company and have a positive impact on the industry as a whole. These women will be the face of women in manufacturing, making a powerful statement about the quality of women in the advanced manufacturing workforce and empowering other women to understand and pursue career opportunities in the industry. ■

# Laura Kaeppler

## MISS AMERICA 2012

Laura Kaeppler has been traveling the country on behalf of the Miss America Organization, focusing on promoting education for young women and her personal platform: mentoring children of incarcerated parents.

Much of Laura's time is spent encouraging young women to pursue studies in STEM subjects in an effort to bridge the gender gap among an already pressing issue.

Laura's passion for mentoring began in high school when her father served 18 months in prison for a white collar crime. Inspired by her experience, Laura remains an advocate for children of incarcerated parents.



### **WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?**

To begin, we should be looking for ways to engage all children in STEM. This means teachers AND parents working to find every day ways to engage kids in new explorations. We need to inspire interest and instill confidence in young girls and young women who show an interest in STEM and support girls-only programs and forums. At a young age, we need to celebrate pioneers and trailblazers from Mae Jemison and Ursula Burns to Jane Goodall and Stephanie Kwolek. But we should also rely on pop culture—from movie scripts and storylines to toys (Legos for girls and Barbie as a computer scientist) to role models like Miss America advocating for STEM.

### **WHAT IS YOUR CONCEPT OF MENTORING AND SPONSORSHIP OF OTHERS FOR STEM CAREERS?**

The opportunity to travel the country as Miss America provides me with a voice and access to so many Americans, young and old and a platform to address today's pressing issues. Mentoring is about inspiration and guidance and I believe the message

can't just be about "stay in school" anymore but rather "what do you love to learn and how can we learn new things together?" Our hope is to open the eyes and minds of young girls about STEM subjects and how they too can help shape our country's future. That's inspiring for any age.

### **WHAT ABOUT STEM GIVES YOU PASSION?**

As I look at the statistics and see that 49% of female students say that they chose a STEM profession to help make a difference in our world, I become even more passionate about promoting this type of education. Every day I meet children from all walks of life throughout my travels and they share amazing stories about their hopes and dreams. If we can channel those dreams into applied sciences and formal education and an application of their personal interests then we can foster them into reality rather than simply smiling with pride.

### **HOW IS MISS AMERICA INNOVATING TO PROMOTE STEM?**

Miss America is known and loved for helping to fulfill the dreams of our nation's young women. Last

year, the Miss America Organization made available more than \$45 million in scholarships to help turn those dreams into reality. I've watched lives change because of the scholarships from our pageant program. We are now expanding our mission to encourage more girls and young women to pursue their dreams of a higher education and to attain the goals that will take them into their future. As Miss America 2012, I have been touring the country to encourage all young women to pursue a college education, and focus on driving interest in the arts, as well as science, technology, engineering and math; promoting STEM education. Our efforts support the national momentum to focus on female students who are currently underrepresented in STEM professions. We were already at the forefront of women's scholastic achievement and now were being even more targeted at our approach. ■





# Mimi Lufkin

## CHIEF EXECUTIVE OFFICER, NATIONAL ALLIANCE FOR PARTNERSHIPS IN EQUITY (NAPE)

Mimi Lufkin's career path includes being a high school teacher, a teacher educator, the director of a state professional development in gender equity program, the Director of Development for a community college and the executive director of a rural women's microenterprise development agency. In 1994, Mimi became the National Alliance for Partnerships in Equity's (NAPE) Chief Executive Officer where she leads a consortium of state and local agencies focused on increasing access, equity and diversity in education and workforce development. Mimi has a B.S. in animal science, a M.S. in agricultural sciences and a M.A. in educational administration.

### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

The STEM enterprise is the critical driver of innovation in the global economy. In addition, as our society becomes more complex, STEM literacy is necessary to make informed decisions as a citizen. The United States can no longer afford to engage only a shrinking portion of its workforce in STEM careers. In the very near future 80% of the entrants into the workforce will be women and people of color – both who are significantly underrepresented in the STEM workforce. If the U.S. economy is going to recover and play as a leader in the global marketplace, we must change the culture and face of the STEM workforce today.

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

Women leaders in positions of influence must bring their valuable perspective and experience to the table and support the advancement of other women in STEM. Leadership is using your position of power and influence to help create a culture of inclusion for everyone in STEM such as: mentoring other women to take on leadership opportunities; removing barriers for those coming after you; standing up, speaking up and solving inequities in your sphere of influence;

balancing work and family through example and by supporting family friendly workplace policies; and by being a role model for the men and women who work with you and for the young women in your community. As a senior leader in STEM we all must get involved in a project that encourages more women and girls to enter the STEM pipeline.

### OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?

In my almost eighteen years with the National Alliance for Partnerships in Equity (NAPE) I am most proud of the organization membership's tenacity to continue to push the envelope regarding equity in education and workforce development. The men and women in this organization have been dedicated to its equity mission even during times when federal and state safeguards, policies and resources have been declining. The vision of NAPE and the NAPE Education Foundation's leadership to embark on the creation of the STEM Equity Pipeline™ in 2007 has resulted in a suite of high quality professional development programs for school and college administrators, faculty and counselors that are resulting in significant increases in the participation and completion of women in STEM programs of study.

### WHO IS YOUR STEM ROLE MODEL AND WHY?

My personal passion regarding a women's full participation in family, society and career was fostered early on by my parents who instilled in me the sense that I could do or become anything that I wanted to. Although it sounds a bit trite, I did believe it and internalized it, which in many ways inoculated me against the inequities I experienced and observed as a woman growing up in a society that continues to struggle with stereotypes about gender roles. I was born into a family of women with strong wills and personalities. In particular, I distinctly remember as a young girl hearing about the adventures of my Great Aunt Janey Hart –piloting her own plane to exotic places or sailing around the World—which only reinforced my inspiration that women could do anything if they only put their mind to it. It wasn't until later in my life that I discovered her role in advocating for gender equity in STEM as one of the Mercury 13—the first women to be trained as astronauts who were never allowed to fly in space due to the prejudices of the time. I will never forget her asking me a few years ago at my grandmother's, her sister's, funeral about my work and having her look at me with the most curious expression saying "We aren't there yet, are we?" ■

# Lezli Baskerville

## CHIEF EXECUTIVE OFFICER, NATIONAL ASSOCIATION FOR EQUAL EMPLOYMENT IN HIGHER EDUCATION (NAFEO)

Constitutional rights attorney and policy/advocacy maven, Lezli Baskerville, is CEO of NAFEO, the membership association of HBCUs and PBIs. She provides international voice for blacks in higher education, leads campaigns to increase support for HBCUs, a \$13B business. Key to her success is telling "The Greatest Stories Never Told,"<sup>1</sup> about HBCUs: they graduate 22% of blacks with S&E bachelor degrees; are baccalaureate origins for 40% of African Americans pursuing graduate education in STEM, and 30% of African Americans who receive a PhD in STEM. They model cost containment, community-based research, and serve as Communiversities.

<sup>1</sup> This is the title of an anthology of stories about great HBCU alumni by David Garnett.



### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

President Obama called for an America that is "Built to Last...a country that leads the world in educating its people...(A)n America that attracts a new generation of high-tech manufacturing, high-paying jobs." We cannot realize this goal without broadening the breadth of the STEM workforce and its racial, ethnic and gender diversity. America's Historically Black Colleges and Universities (HBCUs) and Predominantly Black Institutions (PBIs) are playing a significant role in moving the nation to this goal. For example, among public four-year colleges, 31.1 percent of black students at HBCUs are majors in engineering or science compared to 25.9 percent at non-minority-serving institutions. Among private, not-for-profit, four-year schools, 27.0 percent of black students at HBCUs major in engineering and science compared to 20.8 percent at non-minority-serving institutions. With more strategic investments in these institutions, HBCUs can lead America from "Good to Great" to a "Built to Last," high-tech manufacturing, globally competitive economy.

### HOW CAN WE ASSURE MORE WOMEN IN STEM?

That the gap between boys and girls who score as "mathematically

gifted" has decreased, from 13:1 to 3:1 is debunking the myth that boys have innate mathematic abilities superior to girls. Roughly the same number of boys and girls graduate from high school prepared to pursue math-intensive majors. Despite the nearly parallel preparation, female freshman are less likely than males to pursue majors in STEM. Data suggest that social and environmental factors lead more men into STEM, and that more women can be moved to STEM success in environments that lead girls/women to understand and appreciate the power of their potential in math-intensive fields.

Family, faith and fraternal organizations must continue to play even greater roles in steering girls/women through STEM. HBCUs, especially Spelman College and Bennett College are engineering unique programs to assist women to understand their STEM prowess and to prepare for STEM success. The ADVANCE program is having promising results in the academe. President Obama's acknowledgement of the importance of increasing the number of girls/women in STEM to stimulate our economy, and his "all hands on deck" call to the private, philanthropic and public sectors to prepare, engage, support and elevate girls/women in STEM through modeling and mentor-

ing, is sure to have a tremendous affirmative impact.

### WHO IS YOUR STEM ROLE MODEL/WHY?

My twin sister, Honorable Renee Baskerville, M.D., is my STEM "shero." She's a woman of faith/ fortitude, substance/service, virtue/valiance, with an indomitable Spirit; a proud mother of a positive young man. She is a pediatric/adolescent primary care and school physician; health educator; healer of body/mind/spirit; mender of lost and fallen youth, who has served the residents of Essex County for three decades. Dr. Baskerville is a former Montclair School Boardmember, poised to begin her second term as Forth Ward Town Councilor in Montclair.

Her path from Pierpont Drive to pediatrician; through math-intensive courses, and the politics of being a woman of color in a highly competitive white male, exclusive club, with no mentor, to her current privileged places of service, was filled with adversities. Her passion to serve humanity, courage to face and overcome seemingly insurmountable odds; her sense that while her destiny was uncertain, her ability to shape her destiny was an imperative, and her unflinching faith, lead her through. ■





# Lucy Sanders

## CEO AND CO-FOUNDER, NATIONAL CENTER FOR WOMEN & INFORMATION TECHNOLOGY (NCWIT)

Lucy Sanders is CEO and Co-founder of the National Center for Women & Information Technology (NCWIT), a consortium of more than 300 corporations, universities, and non-profits working to increase the participation of girls/women in computing. Lucy has an extensive industry background, having worked in R&D executive positions at AT&T/Lucent and Avaya Bell Labs. In 1996, Lucy was awarded the Bell Labs Fellow Award, the highest technical accomplishment bestowed at the company. A recipient of numerous other awards, she recently was named by the U.S. Secretary of Commerce to serve on their Innovation Advisory Board.

### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

Our global economy demands the specific skills embodied in science, technology, engineering, and mathematics (STEM) education to remain innovative and competitive. Companies seek these skills across the economy as they look to expand their workforces. Yet the United States is falling behind in this area at all education levels, and it's critical that we address it; we must create those skills that will in turn create the products and industries of the future.

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

Senior leaders need to speak up loudly and often about the importance of STEM to our country. They also need to drive their beliefs into the accountability systems of their organizations, assuring that STEM workers are retained and advanced once they enter the workforce. This is especially important for those under-represented in the STEM disciplines.

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

My current work centers on increasing girls' and women's participation in computing, a critical STEM discipline, and one in which they are significantly under-represented. At NCWIT, we have found to accom-

plish our goals that we need to work in every part of the U.S. computing ecosystem: at the K-12 level, we must make sure every student has access to rigorous and relevant computing education before leaving high school, and we need to especially encourage girls to participate and persist into post-secondary education; at the post-secondary level we need to develop innovative recruiting strategies and degree paths; at the corporate level we must work harder to retain technical women, who leave their technical jobs at a rate of 56% by mid career (twice the quit rate of technical men).

### WHAT ABOUT STEM GIVES YOU PASSION?

Right now, women are not helping invent the technology upon which our world increasingly depends. I can't wait to see what innovative products and services they will create, once they have critical mass on technical design teams and in technical leadership positions.

### OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?

In addition to my work at NCWIT, I am most proud of my technical accomplishments, including leading efforts in the early commercialization of Voice over IP (VOIP) and multi-media communication. ■

“Senior leaders need to speak up loudly and often about the importance of STEM to our country.”



# Dr. Mary Ann Rankin

## **PRESIDENT AND CHIEF EXECUTIVE OFFICER, NATIONAL MATH AND SCIENCE INITIATIVE (NMSI)**

Dr. Mary Ann Rankin joined the National Math and Science Initiative as President and Chief Executive Officer in 2011. Previously, she served as Dean of the College of Natural Sciences at The University of Texas at Austin for 17 years. As dean, she oversaw construction of five science buildings and the creation of the UTeach program. After earning her B.S. degree from Louisiana State University and a Ph.D. from University of Iowa, she served as a National Institutes of Health postdoctoral fellow at Harvard University. Dr. Rankin is on the board of Southwest Research Institute.



### **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

If we want to keep the American Dream alive and grow our economy, more of our students need skills in math and science. That's the currency of the 21<sup>st</sup> Century.

### **WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?**

- Vision
- Commitment
- Focus on proven programs with metrics that show they work.

### **WHAT PRINCIPLES DO YOU, AS A LEADER, APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?**

It's essential to hold to core values: focus on programs that build student and teacher success.

### **WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?**

Start early by having teachers encourage more girls to pursue STEM

subjects (as we do in our AP training program and UTeach teacher prep program). If we train more women in STEM fields there will be more in the pipeline.

### **WHO IS YOUR STEM ROLE MODEL AND WHY?**

Tom Luce for his selfless dedication and clear vision for critical problems and effective solutions

### **WHAT ABOUT STEM GIVES YOU PASSION?**

It's importance for personal and national achievement—encouraging excellence in STEM fields changes young lives and can spark the innovation that our economy needs.

### **OF WHAT ONE INITIATIVE YOU ARE MOST PROUD?**

UTeach—34 universities will be implementing this proven program to recruit and train more math and science teachers this fall. More than 5,500 STEM majors are now enrolled and studying how to become effec-

tive math and science teachers—that's real progress for our country.

### **HOW IS YOUR COMPANY INNOVATING TO PROMOTE STEM?**

NMSI is changing school culture across the United States by training thousands of teachers from middle-school through high school to teach more rigorous math and science courses and inspire more students to pursue STEM careers.

### **WHICH WOMAN LEADER DO YOU MOST ADMIRE, AND WHY.**

U.S. Senator Kay Bailey Hutchison, who has been a staunch supporter of higher education during her political career, and a champion for STEM education in particular. ■



# Annalies Corbin, Ph.D.

## **PRESIDENT AND CHIEF EXECUTIVE OFFICER THE PAST FOUNDATION**

Annalies Corbin is the President and CEO, and founder of the PAST Foundation. Under her direction PAST has successfully emerged as one of the nation's leading developers of PreK-12 bridge programs, STEM teachers professional development, and STEM ethnographic knowledge capture. Her ground-breaking STEM bridge program with the Nebraska Zoo School excavating Yellowstone's historic Marshall Hotel earned her the 2001 National Park Service award. Currently, she leads the Ohio STEM Learning Network's Technical Assistance team helping STEM hubs and emerging schools throughout Ohio build sustainable networks and programs. Dr. Corbin received her doctorate from the University of Idaho in History and Historical Archaeology.

### **HOW IS STEM RELATED TO THE PAST FOUNDATION?**

The PAST Foundation was established in 2000 by an international group of Anthropologists, field and research scientists, museum curators and educators with the single purpose of connecting scientific research with classrooms and other public arenas. The key to PAST is a deep understanding of STEM school's fundamental systems and design principles. Anthropology by its very nature looks at the interdependencies of systems. PAST finds the resonating links within communities, business, education and regions to create unique learning environments specifically suited to place, culture, and time.

### **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

The future of our country rests in our ability to both capture and motivate the next generation of innovators. These next generation STEMists are out there sitting in our schools bored, unengaged and dropping out on a daily basis. A solid STEM education tailored to reach each and every child with an aim to not only provide a quality education but to instill in them the qualities of an entrepreneur, the vision to dream, the skills to problem solve and the drive to be a fully contributing citizen is essential to

ensuring workforce and economic development in the future.

### **WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?**

I feel strongly that one of the single most important qualities that effective leaders need today is the ability to see meaningful connections. When talking about STEM education we often find ourselves lost in the mountains of data being generated regarding the leaking pipeline, or the grim forecast of pending baby boomer retirements on the horizon and forget that many of the short term solutions are right in front of us if we can simply make the right connections. While we collectively roll up our sleeves to tackle the national problem for the long haul, we can also have a substantial impact on a local level by simply connecting students with meaningful opportunities to experience STEM careers and opportunities in real time. Whether internships, apprenticeships, learn and earn strategies, or out of school experiences there are many meaningful ways to connect students to STEM.

### **WHAT PRINCIPLES DO YOU, AS A LEADER, APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?**

Years ago I met a young man at an after school arts program in Columbus Ohio that profoundly changed

my view of the world. This after school program was a haven of innovation, creativity, and social support for an urban community at risk. As funding for the arts waned across the country, after school programs were scrambling to reconstitute themselves into that next thing that could be funded. This young, articulate, creative young man took it upon himself to stroll the neighborhood asking other teens to join him in imagining what that next great thing would be. When I asked him why he went door to door to ask such a question he responded quite simply, "because I want to know when the dream died. If I know when the dream was no longer possible for my friends then maybe I can make sure the dream can live for my brother and sisters."

I cannot imagine a world in which there are no dreams, no aspirations and yet this young man forced me to take notice that dreams were being lost on every street corner, every school, and every home within my community. Both personally and professionally I see a STEM education as just good education. At PAST we strive to ensure that every teacher and student we touch has the skills and experience necessary to recognize that there is no box, that there are no limits and that every citizen has a substantial contribution to make to our community. ■

# Dr. Deborah Bial, Ed.D

## **PRESIDENT & FOUNDER, POSSE FOUNDATION**

Deborah Bial, EdD is a nationally recognized leader in higher education. As president and founder of The Posse Foundation, she has helped shape the dialogue around diversity, access, and equity. Posse has sent more than four thousand young people across the United States to college. They have won nearly \$500 million in scholarships and are graduating at a rate of 90 percent. In 2010 President Obama selected Posse to share in his Nobel Peace Prize award. A distinguished visiting fellow at Harvard University's Graduate School of Education, Bial received a prestigious MacArthur Fellowship in 2007.



### **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

The Posse Foundation believes that a brighter future for our country will depend in part on our ability to identify, nurture and support young leaders of diverse backgrounds entering the STEM fields, as scientific and technological innovation are inextricably linked to our national health, security and global competitiveness.

### **OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?**

The Posse Foundation has launched its innovative STEM program by adapting its liberal arts model for students who wish to pursue science, technology, engineering, and math. By sending students to college as a team, or Posse, they will be better able to support one another through graduation.

### **WHICH WOMAN LEADER DO YOU MOST ADMIRE, AND WHY?**

We are very proud of our women's STEM Posse at Bryn Mawr College. This fall, Bryn Mawr will accept its first all-women's STEM group from Boston. They will follow the lead of the highly successful Science Posse program at Brandeis University, which saw its first Science Posse attain a 100 percent graduate rate in 2012. ■

“...a brighter future for our country will depend in part on our ability to identify, nurture and support young leaders of diverse backgrounds entering the STEM fields...”





# Dr. Sally Ride

## **PRESIDENT AND CHIEF EXECUTIVE OFFICER SALLY RIDE SCIENCE**

Sally Ride, an acclaimed NASA astronaut, is President and CEO of Sally Ride Science, and Professor (Emeritus) at the University of California, San Diego. Dr. Ride is best known as America's first woman in space aboard the Space Shuttle Challenger in 1983. Dr. Ride has received numerous honors and awards. She's written science books for children and developed education projects designed to fuel middle school students' fascination with science. In 2001, Dr. Ride founded Sally Ride Science, to pursue her long-time passion: motivating girls and young women to pursue careers in science, math and technology.

### **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

In today's global environment, it's an economic imperative that STEM learning is a priority in our nation's schools. A strong STEM foundation gives students the skills and knowledge they need to compete on an international level, as well as to be a productive citizen in a democracy.

Most important, STEM is where the jobs are. Change the Equation's Vital Signs report, "STEM Help Wanted," paints a bright picture for individuals with a STEM background. An analysis of online job postings and unemployment data found that across the STEM fields, job postings outnumbered unemployed people by almost 2-to-1. And the forecast for job growth in STEM is strong.

By showing students that STEM is creative, collaborative, fascinating, and fun, we can inspire them to think about their future and better prepare them to pursue a wide range of exciting opportunities.

### **WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?**

Effectively supporting and advancing STEM requires leaders who are not afraid of making bold decisions. Leadership is about passion, an uncompromising vision, and a yearning

to continually improve. This includes a vision of what is required to prepare the workforce of the future. The most effective STEM leaders not only envision what our schools can be, but actually transform that unique vision into a reality by promoting high expectations and creating structures that promote effective STEM teaching and learning.

### **WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?**

Scientists and engineers are often portrayed as geeky Einstein look-alikes, and our culture still leads too many girls think science is hard and not cool—and not for them. Unfortunately, perceptions can become reality, and that's why I have devoted my life to getting young people, especially girls, excited about science. The stakes could hardly be higher. Our country needs a new generation of visionary scientists and innovators to ensure our future prosperity. Half a century ago, President Kennedy rallied the nation around "one of the great adventures of all time," the race to send an American to the moon. That effort inspired a generation, including me, to see an exciting future for ourselves in science. We need today's leaders to rally our women leaders of tomorrow.

### **OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?**

While being the first American woman to fly in space was an amazing experience that has allowed me to be a role model to many young girls, I am most proud of the Sally Ride Science Academy. Through the support of ExxonMobil, we provide professional development for 4th-8th grade teachers to give them the tools they can easily take back to their classrooms and more effectively ignite students' interests in STEM.

Teachers are invaluable assets who encourage students to study hard, believe in themselves and reach for the stars. I fondly remember my 8th grade teachers and the hopes and dreams I had for the future. It was a time when science was a national priority, and the space race was exciting and inspirational. The Sally Ride Science Academy aims to capture that excitement and inspire today's teachers to improve learning so that all students have a chance to fulfill their dreams. ■

# Betty Shanahan

## EXECUTIVE DIRECTOR AND CHIEF EXECUTIVE OFFICER SOCIETY FOR WOMEN ENGINEERS (SWE)

Betty Shanahan became the executive director and CEO for the 20,000 member Society of Women Engineers (SWE) in 2002. Previously, Betty spent 24 years in development, engineering management, and marketing management for the electronics and software industries. Betty has earned a B.S. in electrical engineering from Michigan State University, a Master of Software Engineering from the Wang Institute of Graduate Studies, and an M.B.A. from the University of Chicago. Betty participates in forums that advance the engineering profession, including the National Academy of Engineering's committee for "Changing the Conversation" in the public understanding of engineering.



### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

Recent reports, such as the National Academies' report, *Rising Above the Gathering Storm*, concluded that increasing the number of students entering and succeeding in the STEM fields was critical to prepare our nation for the future. The foundation of US competitiveness in the global economy is the innovation fueled by STEM professionals. But approximately two-thirds of our future workforce—women, people of color, and people with disabilities—remains minimally tapped as a source of future engineers. For example, women have earned 58% of all bachelor's degrees since 2002 and they have earned about half of all science and engineering bachelor's degrees since 2000. But the participation of women varies greatly between STEM disciplines. For example in 2009 women earned only 18% of engineering degrees.

The value of increasing the participation in engineering of women and other under-represented populations goes beyond increasing headcount. The full participation of all segments of the American population is necessary to realize the value of diversity. Innovation will flourish when the richness of different perspectives, approaches, experiences, and values are leveraged as a workplace team

collaborates in creative ways to generate new ideas. To be globally competitive, we must take advantage of our competitive advantage—our nation's diversity.

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

More women leaders—and leaders from other demographics under-represented in STEM—will emerge when current leaders in industry, government, and academia invest in changing organizational culture. Attrition of women in engineering today has much to do with a culture that presents subtle obstacles rather than the overt discrimination of the past.

Recent studies, such as *Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering* and *STEMMING the TIDE: Why Women Leave Engineering* remind us that women and girls still face barriers to their success during academic preparation for STEM careers and in the engineering workforce.

For female students, unwelcoming classrooms, outdated teaching styles, and a lack of accommodation for different social or cultural experiences can all add up to create an environment that students decide to leave rather than thrive in. This affects all students, men as well as women.

However, students who are already marginalized as "non typical," or who are severely under-represented, as are women in engineering, experience these adverse environments more keenly.

For women who complete engineering studies, research indicates that the workplace climate was a strong factor in their decisions to not enter engineering after college or to leave the profession of engineering. Workplace climate also helped to explain current engineers' satisfaction and intention to stay in engineering. Research shows that women engineers who worked in companies that valued and recognized their contributions and invested substantially in their training and professional development, expressed greatest levels of satisfaction with their jobs and careers.

In addition to programs for women to support their retention and advancement in engineering studies and workforce, the Society of Women Engineers advocates with government, academic institutions and employers to invest in creating climates where each individual can authentically contribute. The return on that investment will be greater innovation and creativity. ■



# Pilar Montoya

**CHIEF EXECUTIVE OFFICER, SOCIETY OF HISPANIC PROFESSIONAL ENGINEERS INC. (SHPE)**

Pilar is CEO of the Society of Hispanic Professional Engineers, aimed at increasing the number of Hispanics contributing to the nation's innovation and technology future. Since September 2009, she has helped raise over \$8.2 million dollars for the organization, manages the organization's \$6 million budget, national governmental relations, Corporate relations, program delivery and over 318 SHPE chapters nationally. Montoya has been recognized as both a community and business leader. She has been recognized for her achievements by Hispanic Business Magazine, the California Assembly, the national American Cancer Society, the Child Abuse Prevention Council and numerous business organizations.

**WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

The capacity of the United States to once recapture the leading position as a global innovator and technological leader is vitally dependent on our countries ability to include the fast growing population of Hispanics. Diversity in the workplace and access to quality STEM education are a national imperative that when met will ensure that the brightest minds from the US are the ones leading innovation and technological solutions to global, environmental, health and critical issues. SHPE ensures that the

brightest young minds in our schools have access to STEM education and that Hispanic professionals have the tools, training and access advance in their career and continue to contribute to global innovation.

**WHO IS YOUR STEM ROLE MODEL AND WHY?**

The Society of Hispanic Professional Engineers counts on numerous dedicated, brilliant minds who today are not only developing highly technical, creative solutions using math and science, these same individuals give to local elementary, high school and

universities to inspire others like them to pursue degrees and careers in STEM. They are truly the role models that are making tremendous impact in our nation. They are silent giants that are creating in their fields and also touching numerous lives each day. I thank the many dedicated SHPE chapter members—both student and professional—for their dedication to our mission and vision and for ensuring that the number of Hispanics pursuing degrees and careers in STEM continues to grow. ■

“The capacity of the United States to once recapture the leading position as a global innovator and technological leader is vitally dependent on our countries ability to include the fast growing population of Hispanics.”



# Melissa Gregson

## MANAGING DIRECTOR, STEM INITIATIVE TEACH FOR AMERICA

Melissa Gregson serves as the Managing Director of Teach For America's STEM Initiative. After graduating from MIT with a B.S. in Biology, Melissa joined Teach For America where she taught middle school science at MS 321 in New York City. In 2008, she joined Teach For America's staff in Boston as the Recruitment Director for MIT and other Boston area schools. She believes passionately that all children should have the opportunity to experience the wonder of math and science. She resides in Washington, DC.



### WHY DO YOU BELIEVE STEM WORK-FORCE AND EDUCATION ARE IMPORTANT TO THE NATION?

STEM holds incredible potential for our nation. Currently, in the U.S., there are many available jobs in STEM fields, and millions of kids who are not achieving at levels that will make them competitive for these positions when they enter the workforce. In 2009, only 34% of 4th graders nationwide, 11% of African-American students and 14% of Latino/Hispanic students, scored proficient in science. We know our kids are smart and have incredible potential, but currently are not receiving the quality of education they deserve in these disciplines. An excellent education in STEM opens many doors, but it also teaches kids to solve complicated problems, be curious and ask critical questions and develop solutions to challenges communities face across the country.

### WHAT CAN WE DO TO ASSUME MORE WOMEN LEADERS IN STEM?

To invite more women into the STEM field, we will need to change the perception that it's a male dominated field and celebrate the female leaders currently in it. People like, astronaut Sally Ride, have done incredible work to advance the field and also

send a positive message to young girls and women that they too can be successful in math and science fields. In addition to creating highly visible examples of successful women in STEM, having strong mentors and role models to provide personal support and encouragement to young girls is deeply important. For example, I decided to study biology because Mrs. Schwartz, my phenomenal middle school science teacher, challenged me and made science really fun and accessible.

### OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?

I am most proud of the initiative that Teach For America launched in 2006 to bring more STEM teachers into low-income communities. In light of the national need to grow the pool of talented STEM teachers, we have worked incredibly hard to recruit and prepare more STEM teachers. Since the initiative launched in 2006, we have brought over 7,000 STEM teachers to low-income communities across the country—1,800 new STEM teachers last school year alone—making Teach For America one of the largest providers of STEM teachers nationwide.

Beyond our own work to recruit more math and science teachers, I'm incredibly proud to be part of the 100Kin10 Initiative. It's so exciting to see so many talented people and effective organizations collaborating to ensure more kids are getting access to an excellent STEM education. Working together has the potential to amplify our efforts and will be crucial to achieving our goals in STEM education.

### WHAT ABOUT STEM GIVES YOU PASSION?

There are so many things that get me excited about STEM. Personally, I grew up in a household where, instead of recapping the day at the dinner table, my family and I solved math problems together. I also had STEM teachers who challenged my thinking, made me work really hard and taught me to think in new, critical, ways. Professionally, there is nothing like watching a STEM teacher ignite passion and fire in their students. I derive so much motivation just from watching these teachers excite a new generation of scientists. STEM gives us the tools we need to explore the world, seek answers to the challenges we face today and search for solutions to the challenges we will face tomorrow. ■



# Beverly Simmons

## FOUNDER AND CO-CHAIR OF BOARD OF DIRECTORS TEN80 FOUNDATION

Beverly Simmons has been recognized as Teacher of the Year, GA Middle Grades Team of the Year and as a GA finalist for Presidential Awardee for Excellence in Science and Mathematics Teaching. Her informal science experience includes Spirit of Ford Conference Center, and the NEW Detroit Science Center. Simmons is Co-founder of Ten80 Education and currently serves as Founder and Co-Chair of Ten80 Foundation Board of Directors. Programs developed through her work with Ten80 include the Ten80 Student Racing Challenge: NASCAR STEM Initiative, a version of which has recently partnered with the US Army.

### WHAT PRINCIPLES DO YOU, AS A LEADER, APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?

To deliver truly effective STEM requires a commitment to research, a passion for working with numbers and an entrepreneurial approach to educational reform. My partners and I have lived and breathed active collaboration, inquiry based learning in science, technology, engineering and mathematics for more than 15 years now. We have tried to look at education through the eyes of engineers as we crafted and tested solutions and partnerships. There are no silver bullets that bridge the gap between what education teaches and industry requires but many of us are dedicated to that cause. Our first Engineer-Educator team began piloting in 1997: some of our current STEM industry mentors are students from those early pilot programs.

### OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?

Helping the Ten80 Student Racing Challenge: NASCAR STEM Initiative grow to a significant national pro-

gram and competition has been a rewarding process. Students optimize a 1:10TH scale radio controlled car during a collaborative points competition. Teams use math modeling in every facet of the curriculum and are encourage to engage in "creative engineering." NASCAR and the US ARMY chose to partner with this program because they knew it embodied the real thrill of science, math, engineering, and technology: tackling something that seems "impossible" whether it is the ability to: fly; orbit the earth; talk to someone 15,000 miles away, decrease your energy consumption by 25% (per lap) for a long distance endurance race or shave 1/10th second off a pit stop.

### HOW IS YOUR COMPANY INNOVATING TO PROMOTE STEM?

NASCAR may look like it is about competition but winning each race takes collaboration and teamwork. NASCAR garages and ARMY Bases are full of engineering and technical talent. This expertise is available to teachers and students working with Ten80 Education. Ten80 in turn "teams" en-

gineers with educators. These teams offer a powerful combination of skills. The elements of STEM, Science, Technology, Engineering and Math, are all performing arts, and to become proficient in any craft it is necessary to "play the real game." Ten80 Student Racing Challenge utilizing a platform of 1:10th scale electric Radio Controlled cars is a hands-on, math focused STEM program that "plays the real game." It is a "little league" or "practice league" for STEM careers.

### WHAT ABOUT STEM GIVES YOU PASSION?

In the words of R. P. Feynman, "the pleasure of finding things out."

Science is about real tangible things that move, fly, explode, burn, haul loads, float, record images, stop diseases...all the interesting exciting "stuff" of the times in which we live. The language all scientists use is mathematics, the study of patterns. With math modeling available to the general public through modern technologies like graphing calculators, anyone can learn to speak this language. This is an exciting time for STEM. ■

# Jan Morrison

## PRESIDENT, TEACHING INSTITUTE FOR EXCELLENCE IN STEM (TIES)

Jan Morrison's unique expertise supports clients in crafting a STEM education vision and blueprint for innovative STEM school design that prepares all students for college and career pathways. In the past five years Morrison has: served national clients, including the OSTP, NASA, PBS Kids, DoL, NGA, The Bill and Melinda Gates Foundation, and Clinton Global Initiative; worked with 18 states to launch innovative statewide STEM initiatives and networks; and delivered STEM education to numerous schools across the country. Morrison also advises corporations like General Electric, Intel and Chevron on their STEM education agendas.



### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

"A nation is predicated on a robust future; the future depends on workforce innovation that will make life better for its people—gainful, strong and healthier. STEM has always been a part of this, we're just now revisiting the how-to and looking at it a different way."

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

"Leaders need to be able to understand a good idea when they see it. They must enable talent from within their organization and must also understand the limitations of themselves and the organization they represent. Only then can they go after partnerships that complement and advance their thinking. They cannot 'own it' as that will only lead to tunnel vision; they must be a part of the movement! They must be comfortable with being disruptive and must manage and find the perfect balance of risk."

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

"We need to be more than just a role model; we need to take their hand. Girls must be able to count on themselves from the moment they come into this world and that comes from enjoying the challenges that are before them and loving every second of what they do. When they ask why, nurture the why. We shouldn't look to them to be boys; they are not going to be male scientists and engineers, they are going to be female scientists and engineers. It's not about a woman fitting into a man's world, it's about a woman creating a STEM world for women!"

### WHO IS YOUR STEM ROLE MODEL AND WHY?

"Leon Lederman. He won a Nobel Prize in Physics. He had the guts early on to recognize that he needed to be directly involved in his students' lives so that all the work he did and could bring to the world to advance mankind's understanding of the universe wouldn't fall on deaf ears. And he has an amazing sense of humor!"

Kathy Sullivan. She was the first woman in space and fixed the Hubble Space Telescope. I know her quite well. She focused her life and devoted herself to STEM. Nobody has the enjoyment that she has around the work—it just oozes from her."

### OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?

"I'm most proud of the schools that I've been associated with creating. These schools have set the world on fire for those children. I've encountered the hardest of children, in the hardest of times, with the hardest subjects doing phenomenal work and finding a future that they would never have had. I can't believe I've had the chance to be a part of the students' lives. There isn't anything more important than those children's and families' lives." ■





# Trish Millines Dziko

**CO-FOUNDER, EXECUTIVE DIRECTOR  
TECHNOLOGY ACCESS FOUNDATION (TAF)**

Trish Millines Dziko is the Co-founder and Executive Director of the Technology Access Foundation (TAF), which equips students of color for success in college and life through the power of a STEM education. Prior to founding TAF, she spent 15 years working as a designer, developer and manager in the high tech industry. Trish has also served on numerous boards of organizations that focus on children and education. Trish has received dozens of local and national awards for her work educating children of color.

## **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

My generation did the most to advance STEM—particularly in the area of technology and bioengineering—yet we seem to be doing the least to continue building a system to launch the next generation forward on to greater things. We can't afford to lose more minds to poverty, or to lose more jobs to nations that are better prepared. Most importantly, we can't afford to miss out on what any one of these students has to offer.

## **WHAT PRINCIPLES DO YOU, AS A LEADER; APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?**

**Focus on the vision**—getting 20,000 students of color per year graduating high school on time and ready for STEM related majors.

**Stay close to the ground**—While I keep tabs on policy, I stay keenly aware of the most important, high impact changes that need to happen in order to fully support students in their academic pursuits.

**Trust my team**—I supply the vision and lead the organization through whatever strategies we've decided on, but I'm not the one with all the ideas and all the knowledge. My direct reports educate me daily and

together we chart the direction of the organization.

**Educate advocates**—many people don't understand STEM or how it applies to a K-12 student. This is the one part of my job that flows over to my personal life because it is important for everyone to understand how important STEM literacy is to our children's future and what role they can play to advocate and get involved.

**Continuous Improvement**—no matter how good things are, there is always room for improvement.

## **WHAT IS YOUR CONCEPT OF MENTORING AND SPONSORSHIP OF OTHERS FOR STEM CAREERS?**

I see my role as one who opens doors and supports readiness to walk through them. I often talk about this in the context of James Brown's song "I don't want nobody to give me nothing. Just open the door I'll get it myself". That's what the students I work with need—a high bar, support to get there and opportunities to use what they know so they can grow into people who have career choices.

## **OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?**

The opening of TAF Academy and the formation of a new kind of school model—Partner Schools. In Washington State charter schools are not al-

lowed, so starting innovative schools require a different approach. In 2008 TAF partnered with Federal Way Public Schools to open a 6th–12th grade neighborhood STEM school. One of our primary goals at each TAF Academy is to enlist students as active participants in their own education. We help students cultivate a keen awareness of the critical contributions they are capable of making in a world that knows fewer and fewer limits.

TAF Academy impacts students by:

- Implementing a project-based curriculum focused on college readiness, STEM and civic engagement;
- Giving students the skills to become leaders and innovators in STEM-related fields and in their communities;
- Giving all students the support they need to sustain a high level of academic achievement; and
- Providing them with daily opportunities to examine the issues, topics and problems they'll face throughout their adult lives.
- Students' experiences in and outside of class teach them how to turn knowledge and understanding into application outside of class, through disciplined inquiry, written and verbal communication, and practice in real-world STEM environments. ■

# Tricia Berry

## DIRECTOR, TEXAS GIRLS COLLABORATIVE PROJECT (TGCP)

Tricia Berry has 19 years of industry, nonprofit and community leadership and expertise in STEM education, STEM program assessment, STEM marketing/communication, and gender-focused STEM strategies. She leads the Texas Girls Collaborative Project, creating connections to advance gender equity in STEM. She cofounded 825 Basics, LLC, providing career strategies based on the engineering design process that enhance workplace and career success. Concurrently, she directs The University of Texas at Austin Women in Engineering Program, leading efforts to recruit and graduate engineering women. Berry's previous employment at Dow Chemical initiated her engineering career and passion for STEM.



### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

STEM will solve the grand challenges our world is facing such as an aging infrastructure, access to clean water, and securing cyberspace. It starts with STEM education in the formal classroom and in afterschool programs, museums, summer camps and other informal education settings. Through education, we must get kids first excited about STEM and then continue to engage them so they pursue STEM coursework, majors and careers. We must have a diverse, educated STEM workforce to create the interdisciplinary and global solutions that will transform our lives and make the world a better place as we move into the future.

### WHAT PRINCIPLES DO YOU, AS A LEADER, APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?

One of my guiding principles is that knowledge is power. The more we know and the more we share, the more we all gain. The more we can educate about STEM, the more excited teachers, students, parents and the public will be about STEM career possibilities. I use every opportunity I can to educate others on STEM issues

such as inclusive STEM messaging, stereotype threat in STEM classes and fields, and the amazing career opportunities where STEM professionals will make our world a better place. I mentor students, volunteer for STEM non-profits and K-12 STEM advisory boards, and work at home with my own kids to create LEGO® masterpieces.

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

We must actively recruit women to STEM classes, majors and professions and grow the pipeline of women leaders in STEM. We need to showcase how STEM is making our world a better place and impacting our health, happiness and safety. We can participate as mentors in MentorNet ([www.mentornet.net](http://www.mentornet.net)) and be Fab-Fem role models ([www.fabfems.org](http://www.fabfems.org)), sharing our experiences with young women and encouraging them to pursue their passions through STEM careers. Those of us leading in STEM must be visible and vocal.

### WHAT ABOUT STEM GIVES YOU PASSION?

My own experiences as a STEM student and professional fuel my passion for STEM. I had amazing teachers

and parents who encouraged me continually in STEM and who never made me doubt my abilities, question my choices, or wonder if girls should not be heading into STEM majors. I have had fabulous mentors and role models throughout my professional career who have encouraged me to follow my engineering, education and entrepreneurial dreams. I want all students to have the encouragement and opportunity to pursue their STEM dreams and to understand the valuable critical thinking skills, financial freedom, and workplace flexibility a career in STEM can provide.

### OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?

I am most proud of the Texas Girls Collaborative Project and the work we have done to change the landscape of STEM programs and collaborations across Texas and beyond. STEM organizations, educators and advocates across traditional silos of formal education, informal education, for-profit, non-profit, government and industry are more connected across the state, allowing us to leverage best practices, share resources, and excite more kids about STEM. ■



*"Focusing on advancing our upcoming generations through STEM enables us to Seize The Evolutionary Moment. All that is evolving hinges on innovation and creativity which are the building blocks of STEM and therefore those of our future. We can either attend the party or be the one's hosting it - the choice is ours."*  
----- Alka Dhillon | CEO, Technalink



## ***Congratulations to all 100 Women Leaders in STEM, especially our own Alka Dhillon!***

Technalink is a leading Certified Woman (EDWOSB) and Minority 8(a) and 8(a) STARS 2 IT Services and Management Consulting Firm. With headquarters in Mclean, Virginia we support over 16 government agencies, both DOD and Civilian, and over 30 Fortune 500 companies worldwide.

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**SECTION 3**

# **GOVERNMENT PROFILES**



# Kim Reynolds

## LT. GOVERNOR, STATE OF IOWA

Kim Reynolds served as Clarke County Treasurer starting in 1994 until she was elected to the Iowa Senate in 2008. On June 24, 2010, Reynolds was named former Governor Terry Branstad's running mate, and on November 2, she was elected lieutenant governor of the State of Iowa. Reynolds was named co-chair of the Iowa Governor's Science, Technology, Education and Math Advisory Council, along with University of Northern Iowa President Ben Allen in September of 2011. She also serves as co-chair of the Iowa Partnership for Economic Progress board, which was created in October 2011.

### **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

Strengthening STEM education and workforce are critical steps to assure America is competitive in the knowledge-based, global marketplace. Students deserve to be well prepared in STEM subjects, so they have the opportunity to pursue exciting STEM careers when they grow up. This will make it possible for business and industry to count on a robust STEM worker pipeline to continue to fuel the innovation that makes the United States a great nation.

### **WHAT PRINCIPLES DO YOU, AS A LEADER, APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?**

The overarching principle driving my commitment to the STEM cause is creating opportunity. As co-chair of the new Iowa Governor's Science, Technology, Engineering and Math Advisory Council, I am working to encourage student interest and achievement in STEM while mapping STEM education through economic development. The council recently announced the location of six new regional STEM network hubs, which will provide access to outstanding

STEM education programs all across Iowa. While Iowa now has some great STEM education programs in some communities, whether students have access depends on where they live. The six regional hubs will change that.

### **WHAT IS YOUR CONCEPT OF MENTORING AND SPONSORSHIP OF OTHERS FOR STEM CAREERS?**

One of the avenues we are pursuing in Iowa is encouraging more companies to offer students STEM internships, so they can see how what they learn in class has real-world application. This already is happening in some places, but we want to expand this effort. Another avenue is business and industry offering K-12 teachers summer externships, so they can take that experience back into their classrooms. Again, this is under way, but needs to expand.

### **WHAT ABOUT STEM GIVES YOU PASSION?**

My passion for STEM grows out of recognizing it can change individual lives for the better as well as contribute to a higher quality of life for Iowa and the nation. When I look at the disappointing share of students who are well prepared in STEM subjects, I know we must resolve to work harder

together to address this shortcoming. For example, just 34 percent of U.S. eighth-graders were proficient or advanced in math on the 2011 National Assessment of Educational Progress. The percentage is exactly the same for Iowa, which led the nation in eighth-grade math two decades ago, but now ranks 25<sup>th</sup>. We can't accept the status quo.

### **OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?**

I am most proud of helping to get the new Iowa Governor's STEM Advisory Council off the ground. I have the privilege of co-chairing the council with University of Northern Iowa President Ben Allen, and working with the 38 other members appointed in September 2011 from agribusiness, advanced manufacturing and education, among other sectors. This public-private initiative, which aims to better engage young people in STEM and energize STEM economic development, recently received generous support from the Iowa Legislature to fulfill that mission. Iowans appreciate the importance of STEM, and I am honored to help lead this effort. ■

# Dr. Laura Stubbs

## DIRECTOR, SCIENCE AND TECHNOLOGY INITIATIVES U.S. DEPARTMENT OF DEFENSE

Dr. Laura Stubbs was appointed as the Director, Science and Technology Initiatives in December, 2011. Her prior appointment was as the Director, Requirements and Strategic Integration (RSI), effective July, 2010. Both appointments are in the Office of the Secretary of Defense. Prior roles included Chief Learning Officer and technical Branch Head at the Naval Surface Warfare Center, Carderock Division. Dr. Stubbs has over 25 years of military, private and public sector experience in Technology Transfer, Quality and Supply Chain Management. She entered the U.S. Navy as the first African-American Naval Nuclear Power School instructor. She left active duty and continued in the Navy Reserve where she retired as a Captain.



### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

Exposure of the first Law of Learning! The more exposure that women receive throughout their educational experience and work life, the more seeds will be planted that will help position women to accept future opportunities in leadership positions.

I am the beneficiary of a “Women in Engineering” program effort that started over 35 years ago. I had the opportunity to attend such a program at a mid-western university. This was a big deal for me because prior to the summer program, I never contemplated what it would mean to become an engineer let alone practice as an engineer. I had my heart set on becoming a fashion model.

I attended an all girls high school. At the end of my junior year, my math teacher announced that the University of Notre Dame would hold an 8-week “Women in Engineering” course over the coming summer. My classmates and I joked that engineers drive trains but I took the brochure home. My mother, a teacher, said, “Great! You’re going!” That summer, I was exposed to a sampling of various engineering majors – chemical, mechanical, industrial. We also earned college credit for the course. I returned to my school and declared that I would be an engineer. My classmates laughed saying that I was nei-

ther the smartest in the class nor did I have the best grades. I grew determined to not only become an engineer but excel. The summer program included a review of math, chemistry and physics fundamentals, etc. The program provided me with a huge advantage over my classmates because I was exposed to the engineering curriculum and, more importantly, exposed to what would be required of me in order to succeed. I immediately know that, “I can do this.”

It is often said that luck is where opportunity meets preparation. Exposure is a close associate of that concept. The more encouragement and exposure one receives, the more confident and successful they can become. That success is sometimes viewed as lucky because there are elements of timing, sponsorship, etc. but the preparation has played a large part in that success.

Our goal as technical professionals is to provide experiences to our younger generations, including our young ladies; mentor them throughout their careers, create an environment where it is OK to fail and recover and encourage them to assist others along the way.

### WHO IS YOUR STEM ROLE MODEL AND WHY?

My STEM role models are too numerous to name. I was fortunate to have

role model like my former Dean and the former Deputy at NSF, Dr. Joseph Bordogna, who is never too busy to return an email or phone call from the other side of the world to answer a query or respond to my concerns. I was fortunate to have a role model in Ms. Cora Ingram, Director of Multicultural Program at the University of Pennsylvania and a 1997 recipient of the Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring. Ms. Ingram is still at Penn providing counsel and direction to countless students AND faculty far reaching to other programs.

There was Admiral Hyman G. Rickover, the father of the Nuclear Navy, who selected me to teach at the Naval Nuclear Power School. Other professors from my alma mater, Drs. Jacob Abel and Ira Cohen, both deceased who were both tough but fair and who demanded my best in the classroom—no excuses, just the excellence. I was fortunate to have role models like the technician who I worked with during my summer internship at a local utility. He taught me that it is the intangibles like positive work relationships in addition to the technical competency that will help me to be successful at work. I follow that guidance, The Golden Rule, in my interactions with people—treating people as I would like to be treated. ■





# Lisa P. Jackson

## ADMINISTRATOR, ENVIRONMENTAL PROTECTION AGENCY (EPA)

With over 25 years of environmental experience, Administrator Lisa P. Jackson leads EPA's efforts to protect the health and environment for all Americans. She and a staff of more than 18,000 professionals are working across the nation to usher in a green economy and to address health threats from pollution in our air, water and land. Raised a proud resident of New Orleans, Administrator Jackson is a summa cum laude graduate of Tulane University and earned a master's degree in chemical engineering from Princeton University.

### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

These fields are the future of the global economy, for everything from clean energy innovation, to medical breakthroughs, to clean drinking water for people around the world, to cutting edge information technology. If we want to lead the world in the jobs of tomorrow, we need to train more STEM innovators today.

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

Whenever I meet with young women, I encourage them to forget the stereotypical vision they have of a scientist. Fields like chemical engineering and other STEM areas don't have to mean white coats and test tubes if you don't want them to. As a staff scientist for the EPA, I spent a lot of my time interacting with communities, and talking to people about the work we were doing. I think it's important to show young people – women and men – that STEM careers aren't just sitting in a room doing differential

calculus. They will have opportunities to make a real difference in the world, and change people's lives for the better.

### WHAT ABOUT STEM GIVES YOU PASSION?

The ability to help people and find solutions to the challenges we face. I was getting my education in chemical engineering around the time of the Love Canal incident in New York. Tons of toxic waste and chemicals buried in the ground years before had begun to leak into people's homes, making them sick and endangering their children. I knew that chemical engineers had created the mess, and now it was up to chemical engineers to clean it up.

### OF WHAT ONE INITIATIVE YOU ARE MOST PROUD?

I'm proud of the work we've done to ensure that science and scientific integrity are the backbone of every decision, policy and action at the EPA. Science is the most important factor in our work, and is critical in exploring and explaining environ-

mental problems. It's also vital for developing the innovations that solve those problems. We have made it a point to expand our conversation on environmentalism to every community, especially those that might not have weighed in on environmental issues in the past—and that includes encouraging more STEM participation in minority and low-income communities. A strong STEM workforce will only become more valuable as we continue to broaden the conversation and ensure that communities all over our country—from inner-city Los Angeles to rural Pennsylvania—have the health and environmental safeguards they deserve. We want to make sure everyone has a voice and a chance to participate in the work of protecting their own health. In the 41 years since the EPA was founded, environmental protection has moved forward hand-in-hand with scientific advances and new awareness, and the history of cleaning up our nation and our planet has been a history of cleaner, more innovative technologies. ■

# Catherine Jay Didion

## SENIOR PROGRAM OFFICER, NATIONAL ACADEMY OF ENGINEERING (NAE)

Catherine Didion is a Senior Program Officer at the National Academy of Engineering (NAE). Her portfolio includes the Diversity of the Engineering Workforce Program with a charge to provide staff leadership to NAE's efforts to enhance the diversity of the engineering workforce at all levels. In addition, Didion is the Director of the Committee on Women in Science, Engineering, and Medicine. This is a standing committee with a mandate to work as a focal point on gender across the three National Academies – National Academy of Sciences, National Academy of Engineering and the Institute of Medicine.



### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

All effective leaders need to be able to convey their message, its importance, and equally critical why their audience should care about the message – What does it mean to them? How will it impact their lives? If this latter aspect is not articulated in straightforward language and through effective channels including social media, there will be diminishing support for STEM. The National Academy of Engineering (NAE) has a project, Changing the Conversation, that focuses on reshaping public opinion of engineering including the development of an online “toolkit” of resources ([www.engineeringmessages.org](http://www.engineeringmessages.org)) that can be used in community building efforts.

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

We will have more female leaders in STEM when we focus not just on recruiting women into entry level positions but when we have equal emphasis on retention at mid-career and advancing women into leadership roles. Too often we construct career path-

ways that do not provide “off ramps” or “rest stations” for women (and men) who are talented yet have personal obligations that they are not willing to ignore. This is unfortunate not only for these individuals who may get sidelined but also for society as we need leaders who through their set of experiences, professional and personal, approach problems and their solutions differently.

### WHAT IS YOUR CONCEPT OF MENTORING AND SPONSORSHIP OF OTHERS FOR STEM CAREERS?

Mentoring and sponsorship are both necessities in successfully climbing any STEM career ladder but are fundamentally very different. Mentoring usually focuses more on providing information and guidance that may not be available in any printed or downloaded format but is needed for the protégée to be successful in their current role. Sponsorship is less about providing knowledge and more about helping the individual you are sponsoring to gain access and endorsement. The best analogy I know to explain the difference is that a mentor shines a flashlight on all the

hidden corners in their organization so their protégé does not trip or fall down while a sponsor shines the light on the individual so that they become more visible and valued within the organization.

### HOW IS YOUR ORGANIZATION INNOVATING TO PROMOTE STEM?

The NAE through its web site EngineerGirl! ([www.engineergirl.org](http://www.engineergirl.org)) is engaging middle school and high school girls in understanding how engineering and other technical fields can provide them the tools to pursue rewarding careers that can make a tremendous difference in their communities. Many of these students opt out of math and science electives without understanding the enormous range of careers that they have discarded through their choice of classes. The web site hosts a gallery of women engineers who share advice through an “Ask An Engineer” column and provide students an opportunity to discover how the stories of these women and their engineering careers echo many of the students’ own dreams and ambitions. ■



# Dr. Cora Marrett

## DEPUTY DIRECTOR, NATIONAL SCIENCE FOUNDATION (NSF)

Cora B. Marrett is deputy director of the National Science Foundation, the federal agency that supports research and education in all fields of science and engineering. Throughout her career, Dr. Marrett has been a leader in America's STEM enterprise, where she has pioneered organizational changes to meet critical challenges in education, the workforce and broadening diversity in STEM. Besides several top leadership roles at NSF, Dr. Marrett has held positions on faculties, in academic governance and professional societies. She holds a Ph.D. in sociology from the University of Wisconsin-Madison.

### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

America has always aspired to be a society that embraces learning as a fulfilling and rewarding activity of everyday life—as well as a path to national prosperity. Economic growth in advanced economies like the United States is driven by the creation of new and better ways to produce goods and services, especially in high-tech industries.

But despite high national unemployment numbers, we hear time and again that many, many jobs in high-tech industries are going unfilled because workers don't have the necessary skills to succeed. Survey after survey shows that American students are consistently being outperformed by their foreign counterparts in STEM subjects. Numbers of foreign undergraduate and graduate students seeking STEM degrees in their countries dwarf those of American students seeking the same degrees here at home. Students today are less educated than the previous generation.

A learning society ensures that all citizens have the opportunity to develop their full potential both in the classroom and on the job. When some young people have more opportunity than others for quality education and training, we all pay. One study concluded that "educational gaps

impose on the United States the economic equivalent of a permanent national recession" amounting to trillions of dollars of lost productivity.

The solution lies in removing barriers not only for students from different demographic groups, but among other key players such as high schools, community colleges, universities, and the private sector. Collaborations with high schools can help reduce the barriers that students face in making the transition to colleges and universities. Cooperation between industry and educators can inform the design of programs and provide opportunities for students to gain needed workplace skills.

NSF's Advanced Technology Education program, or ATE, aims to improve the education of science and engineering technicians for the high-technology fields that drive our nation's economy. ATE focuses particularly on community colleges, which now enroll 6.5 million degree-seeking students, or nearly half of all college undergraduates. An additional 5 million students are enrolled in workforce training and other non-credit courses. These students often receive job offers before they complete their training and remain in high demand.

A solid grasp of STEM knowledge is critical not only to our nation's prosperity but to a well-informed citizenry who will ultimately decide in the vot-

ing booth the social, economic or even moral value of scientific and technological advances.

### WHAT CAN WE DO TO ENSURE MORE WOMEN LEADERS IN STEM?

Developing ways to get more and different people into the STEM "pipeline" is only part of the solution. Keeping them there is another. While women have made significant gains in higher education—accounting for about 41 percent of all new PhDs in science and engineering—they occupy only about 28 percent of full-time tenured or tenure-track positions in academia. Women now represent the largest growing segment of our science and engineering workforce.

Family formation, notably marriage and childbirth, accounts for the major loss of female talent from the job pool between the receipt of a PhD and achievement of a tenured position in the sciences. Family-friendly policies help prevent them from being forced to make difficult decisions.

NSF's Career-Life Balance Initiative is a set of policies and practices that aims to increase the placement, advancement, and retention of women in STEM disciplines. Career-life policies for young researchers do exist, but are currently spread across federal research sponsors and academic laboratories in an inconsistent patchwork. ■



# Sally Shuler

## EXECUTIVE DIRECTOR, NATIONAL SCIENCE RESOURCES CENTER (NSRC)

Sally Goetz Shuler is Executive Director of the National Science Resources Center (NSRC), an organization founded by the National Academies and Smithsonian Institution. As a co-founder of the NSRC in 1985, she has created an organization that is transforming K-12 science education programs for millions of students based on research and promising practices in the United States and around the world. In the past five years she has received five awards: the Purkwa Prize; International Science Education Award; Tommy Award; Washington State Advocacy Award; and the National Science Teachers Association Distinguished Service Award.



### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO THE NATION?

Science, technology, engineering, and mathematics (STEM) education are the underpinnings of our democracy, a robust economy, and security as well as critical in preparing our students and future citizens to make informed, rationale decisions about their lives, including health. Effective STEM education, is, in itself, an innovation engine, and more urgently needed now than ever before to address such major issues as climate change, international/national security, conservation of resources, disease epidemics, water, and other health threats, trade, and more. In President's Obama's words, "...we know that the nation that out educates us today will out compete us tomorrow. And I don't intend to have us out-educated" (Obama, 2009).

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

Unfortunately, our education system still operates in a vacuum from its customers. As a nation, we need informed, passionate, diverse, and committed leaders who can break

the vacuum seal, open communication, and establish mutual accountabilities between all stakeholder groups, connecting and engaging the formal education system with the workplace as well as informal learning environments. These leaders need to lead a truly systemic approach to the problem, one that engages participants at every level, from students and classroom teachers through the highest levels of district, state, and national leadership. To be an effective leader today, it is critical that leaders remain focused on a strategic vision that will leverage resources and engage diverse stakeholders representing business, education, and government. They need to have knowledge about research and best practices, and a long-term commitment to translate this knowledge into strategies that systematically take proven methods to scale.

### WHAT PRINCIPLES DO YOU, AS A LEADER, APPLY TO YOUR PROFESSIONAL AND PERSONAL LIFE TO ADVANCE THE STEM CAUSE?

I believe that leadership is exciting, rewarding, and challenging on a daily basis. It requires a dedicated commitment to share the vision and

inspire people at all levels to dream, participate, and make a difference. Both in my professional and personal life, I believe it is important to not only "do things right, but the right thing" when pressured otherwise.

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

To assure we inspire and retain more women leaders in STEM, we need a dedicated, long-term approach at every level of the system. This approach needs to begin in the early years by providing all students, including young girls, with the opportunity to have access to exciting STEM education programs that are not only cognitively demanding but also relevant and interesting. As students move through the system, they also need internship opportunities at the middle school, high school, and academic level to provide real-world examples of how STEM is used in the real-world. In addition, there needs to be much more attention to the important role of mathematics, especially in middle school and beyond. This area of the curriculum needs to be seen as exciting and important to their lives as well as future STEM careers. ■



# Lori Garver

## DEPUTY ADMINISTRATOR, NASA

Lori Garver is the Deputy Administrator for NASA, where she provides overall leadership, planning, and policy direction for the agency to achieve NASA's mission: to reach for new heights and reveal the unknown to benefit all humankind. Inspired by her parents to pursue a career in public service, Garver's focus turned to space when she went to work for Senator John Glenn from 1983 to 1984. She is a passionate advocate for human spaceflight and scientific discovery, and as a space policy expert has advised Presidents & companies on maintaining the United States' leadership in exploration and discovery.

### WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?

NASA has a critical need for new people to enter the pipeline of STEM studies and become the exploration leaders of tomorrow. For our nation to reach higher in space, send humans to new destinations in the solar system and develop the groundbreaking science missions and space and aeronautics technologies of tomorrow, we will need talented and innovative STEM professionals.

STEM proficiency leads to good jobs, and a robust STEM pipeline is good for the economy and the overall health of aerospace worldwide, which improves the quality of life around the globe.

### WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?

Those of us in senior positions in aerospace need to convey our passion for aeronautics and space exploration and share why we feel that way.

We must demonstrate how our work benefits people around the world and how young people entering

STEM fields can make a difference. We should support education and hands-on opportunities to participate in missions and flying research experiments in space. We can do this by developing effective partnerships with industry, academia and non-profits to create mentorships, share our pool of knowledge and convey our passion.

### WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?

One of the best ways is to ensure that girls become interested in STEM subjects at a young age and then encourage and support that interest throughout their academic careers. By highlighting successful women in STEM, we convey the excitement that this wonderful field offers. Educational forums and other public events that give visibility to women working in STEM right now are great conduits for reaching and inspiring these students. We must give girls a challenge, but also plant the seed that it's a challenge they can meet if they work hard. STEM fields of study are hard, but with passion and a desire to create something new for the world, anything can be accomplished.

### WHAT ABOUT STEM GIVES YOU PASSION?

I love space. I want to go there. I enjoy facilitating scientific discoveries that change the world and making it possible for our space program to create new capabilities for our nation. STEM is about a legacy because we're always working on things that advance our capabilities. Sometimes these things take years to come to fruition, but the diligence pays off. We know if we reach a little higher, we will be able to do things that seemed impossible even a few years ago.

### OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?

Women@NASA is a website that continues to expand the resources available to girls to see examples of women who have overcome great odds and worked hard to succeed in the aerospace field. These women are not just scientists and engineers, but support NASA in a variety of ways. They all have made significant contributions to NASA. I am very proud of this NASA website for showing that women from diverse backgrounds have found a common thread of professional fulfillment supporting our nation's space program. ■

# Maria Cantwell

## US SENATOR, WASHINGTON

Maria Cantwell is known for being an independent and forward-leaning voice in the Senate. She is a tireless advocate and an effective legislator who routinely works across party lines on behalf of Washington's working families and businesses, the nation's environment and security, and to provide economic opportunity for Americans today and in the future.



### **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

Investing in STEM will ensure that we continue to train the best scientists, mathematicians and engineers right here in America. Workforce projections for 2014 by the U.S. Department of Labor show that 15 of the 20 fastest growing occupations require significant science or mathematics training to successfully compete for a job. It is critical to invest in our workforce to prepare our students for careers in STEM and to create jobs.

### **WHAT TRAITS DO SENIOR LEADERS NEED TO EFFECTIVELY SUPPORT AND ADVANCE STEM TODAY?**

Leaders should possess creativity, curiosity and a willingness to think outside-the-box to support innovative strategies to integrate STEM into education. In order to maximize STEM-related job growth in the future, we must increase job-training and education in these critical areas today—fast. That's going to require a more creative approach to educate the next generation of scientists, mathematicians and engineers.

In Washington state, the Meade School District is creating an alternative to the traditional high school experience that will be a new acad-

emy focused on 21st century readiness. The academy will focus on preparing students to enter a global economy that demands innovation and creativity.

### **WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?**

Only about 4 percent of women who attend college pursue the field of engineering, compared to nearly 20 percent of men. We must support have to support STEM education for women at all stages of education. STEM is key to creating high-wage jobs and increasing global competitiveness. Increasing the number of women and under-represented minorities in STEM education and occupations will help us build a better future for the country.

### **WHAT IS YOUR CONCEPT OF MENTORING AND SPONSORSHIP OF OTHERS FOR STEM CAREERS?**

Ongoing exposure and support—inside and outside of the classroom. Women need to see other women working in STEM fields, in the labs or research organizations, not just one-time exposure during a classroom lecture.

### **WHAT ABOUT STEM GIVES YOU PASSION?**

STEM provides an opportunity to create high-paying jobs in Washington

state and around the nation for generations. Washington state already ranks first in the nation in the concentration of STEM-related jobs – and job demand is growing. By 2018 the state will need to fill nearly 300,000 STEM-related jobs, according to a study conducted by Georgetown University. That's an incredible opportunity to create jobs—but only if we increase investment in STEM education today.

### **OF WHAT ONE INITIATIVE ARE YOU MOST PROUD?**

Something I'm very proud of is the America COMPETES Reauthorization Act, which President Obama signed into law in January 2011.

The Act invests in STEM education and research and the the National Science Foundation (NSF) and the National Institute of Standards and Technology (NIST). The law also promotes education of teachers to ensure that they are equipped with current skills and credentials to teach STEM courses. I co-authored a provision in the Act to invest in clean technology research in order to help jumpstart this growing area of our economy. This provision helped support more than 100 research projects nationwide. ■





# Kirsten Gillibrand

## US SENATOR, NEW YORK

Kirsten E. Gillibrand was sworn in as United States Senator from New York in January 2009, and in November 2010, she won election to the seat with 63 percent of the vote. Prior to her service in the Senate, Gillibrand served in the United States House of Representatives, representing New York's 20th Congressional District. Using her seat on the Environment and Public Works Committee, Senator Gillibrand has worked to increase investment in infrastructure, including drinking water and sewer systems, rural broadband, health care information technology, and renewable energy, working closely with the Obama Administration and Senator Charles Schumer to ensure that New York gets its fair share of federal dollars.

### **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

Over the last decade, the fastest growing occupations required proficiency in the fields of math and science. That pace will surely increase in the next decade. To make sure we are filling the jobs of the future here in New York and across America, we have to make sure we are educating our children at a level that prepares them for the economy of the future. Other countries like China and India are outperforming our students today.

According to the Bureau of Labor and Statistics, 8 out of the 9 fastest-growing occupations require proficiency in STEM disciplines. Across New York, STEM-related jobs are expected to grow by over 33,000 jobs by 2018.

As we still recover from the economic crisis, it is my firm belief that empowering women is the key to a growing economy and a thriving middle class. That means we must prepare young women today with opportunities to excel in the fields that will define the economy of our future – like science, technology, engineering and math.

### **WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?**

We need young women today to be the ones who develop the next big ideas that spark new businesses that create the jobs of the future. Women represent 43 percent of our workforce but make up only 23 percent of scientists and engineers. And while women earn nearly 60 percent of all bachelor's degrees, less than 20 percent graduate with engineering degrees.

To encourage more women to lead in the fields of math and science and in emerging high-tech careers, I introduced legislation that will promote a strong STEM education and build a workforce to help America remain a world leader in innovation economy. The E2 for Innovation Act would create a targeted effort to expose elementary, middle and high schools students to science and engineering. I've also introduced proposals to spark greater interest in STEM learning and draw more STEM teachers to educate students.

Women can really make a difference and succeed in STEM-related fields. It is critical that our young girls are

taught that through science, technology, engineering and math, they have the ability to help people and improve their communities.

### **WHO IS YOUR STEM ROLE MODEL AND WHY?**

The iconic "Rosie the Riveter" campaign forever changed the landscape of our nation's economy and increased opportunity for American women in the workplace. My grandmother was a riveter, my great aunt, my great grand-mother was a riveter—they literally went to the arsenal and worked during World War II to make a difference. By the end of war, six million women entered the workforce.

Today, we face a critical shortage of STEM proficient workers. We need that same call to action for this generation of women. The invitation, "we need you," and the statement that "you can do it," can actually make the difference. If we are going to out-innovate, out-educate, out-compete other countries as President Obama has aimed to do, it will be only if women are leading the way. ■

# Kay Hagan

## US SENATOR, NORTH CAROLINA

For more than 12 years, Senator Kay R. Hagan has been a champion for North Carolina families, our military and veterans, sound fiscal policy and quality education. She and her husband, Chip Hagan, have lived in Greensboro for more than 30 years, where they raised their three children: Jeanette, Tilden, and Carrie. After 10 years in the North Carolina State Senate, Senator Hagan was elected to the U.S. Senate in 2008 by North Carolinians seeking an active, effective leader who would bring North Carolina ideas and values to Congress.



### **WHY DO YOU BELIEVE STEM EDUCATION AND WORKFORCE ARE IMPORTANT TO OUR NATION?**

What's true in North Carolina is true across the country: if we are to win the jobs of the future in today's global economy, we need to win the race to innovation and discovery. The biggest challenges of the next century—from communications to medicine to clean energy—require a workforce that's well-versed in the STEM fields.

### **WHAT CAN WE DO TO ASSURE MORE WOMEN LEADERS IN STEM?**

We must counter the notion that the STEM field is a "male-only" club. The contributions of women to science and technology—from Rosalind Franklin to Marie Curie—have long played an important role in the global quest for innovation. But today,

women only account for 40% of our nation's science and engineering degrees, and just 25% of math and computer science jobs. The challenges of the next century are too great for half our population to sit them out.

### **HOW ARE YOU INNOVATING TO PROMOTE STEM IN YOUR STATE?**

Our country requires a workforce highly skilled in science, technology, engineering and mathematics (STEM). However, I am concerned that our efforts in these critical areas lag behind those of other advanced nations. The ESEA Reauthorization bill that the Senate HELP Committee marked up, and that I support, creates a new focus on improving STEM instruction and student academic achievement in STEM subjects.

This piece of the legislation would create a new STEM program that will award grants to states, to create programs that aim to recruit, train and support excellent STEM teachers, providing them the tools necessary for success. It would also engage students and get them excited about STEM subjects through competitions and exposure to STEM careers.

We know that in today's economy the ability to think critically and creatively are key to a successful career. Not just in North Carolina but across the country, jobs are going to young people who can think, understand, analyze, and communicate. Too few North Carolina students are receiving the education necessary to be successful in our economy. ■

“We must counter the notion that the STEM field is a ‘male-only’ club.”



# Jeanne Shaheen

## US SENATOR, NEW HAMPSHIRE

The only woman in U.S. history to be elected both a Governor and a United States Senator, Jeanne Shaheen has been committed to serving the citizens of New Hampshire for decades. She has served in the United States Senate since 2009 and is a member of the Senate Committee on Energy and Natural Resources among others. As a long-standing advocate for energy efficiency, Shaheen created programs while Governor that saved New Hampshire families and businesses over \$1 billion through energy efficiency. In the Senate, Shaheen introduced bipartisan legislation that would create a national energy efficiency strategy to foster job creation, save businesses and consumers money and reduce pollution.

America's future depends on continuing to be the global leader in science and technology. America makes the best, most innovative products and services, and that ingenuity and excellence is our chief economic strength as a nation.

But we are in danger of losing that edge. Science, technology, engineering and math—what we call the STEM fields—are the skills that drive innovation.

Jobs in the STEM fields are expected to be the fastest-growing occupations of the next decade. However, not enough students in our country are pursuing an education in STEM subjects to keep up with the increased demand.

We need to encourage students, as early in their education as possible, to learn to love the STEM fields. We need to recognize that not all students learn the same way and that hands on learning can make a huge impact in whether a child decides that he or she "loves" a subject or "hates" it. And we need to introduce

students to mentors in the STEM fields, role models make a difference to the career decisions our children pursue.

I have introduced legislation in the Senate, the Innovation Inspiration School Grant program, which will provide new incentives for our schools to think outside the box and embrace extracurricular and non-traditional STEM education programs. It establishes a competitive grant program that will encourage schools to partner with the private sector for financial support and to find mentors who can serve as guides to students.

I am proud that New Hampshire is the home to the FIRST Robotics program. For over a decade, teams of students have been designing robots to compete against one another in regional, then national, competitions. I have seen students in New Hampshire work together to create amazing robots. Not only do these children learn important lessons directly relating to STEM subjects, but they learn how to collaborate and cooperate with each other. These truly are skills for life

It is these kinds of non-traditional STEM programs that make a difference in the students' lives and inspire them to continue in STEM careers or postsecondary education. Research shows that 99 percent of students who participate in FIRST Robotics graduate high school and almost 90 percent go on to college. Once in college, these students are nearly seven times more likely to major in engineering and twice as likely to major in computer science. They are also significantly more likely to attain a post graduate degree.

Our nation needs to take action and set a STEM agenda that will preserve our nation as the most competitive and dynamic economy in the world. We should all work together to be sure the students of today get the tools they need to be the leaders of tomorrow. ■





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CSC Chief Diversity Officer