



**A REPORT OF THE NEW JERSEY STATE EMPLOYMENT AND
TRAINING COMMISSION
COUNCIL ON GENDER PARITY IN LABOR AND EDUCATION**

Bridging Gaps: Forging Alliances

5th Annual Women in New Jersey's

Science and Technology Workforce Summit

May 20, 2011

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August 2011

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New Jersey's Council on Gender Parity

Established within the State Employment and Training Commission (SETC), the New Jersey Council on Gender Parity in Labor and Education is the only one of its kind in the United States created by legislation to address issues of gender disparity in labor and education. Beginning with its first meeting over a decade ago, the Council has provided the State with leadership on gender equity issues important to economic and workforce development. The appropriation for the Gender Parity Council also funds gender equity experts to work directly with State Departments to assist them in the implementation of policies and programs in gender-conscious ways. This is a unique role that does not exist in any other form in our state government. Through these and other initiatives, the New Jersey Council on Gender Parity in Labor and Education has made tremendous strides in the advancement of equity in the State.

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Overview

Since its 2000 inception, the Council on Gender Parity in Labor and Education has worked to address gender disparities in New Jersey's science and technology workforce. Through numerous outlets, including the four previous Women in New Jersey's Science and Technology Workforce Summits and original, published research, the Council has contributed insight into women's historic and continued underrepresentation in Science, Technology, Engineering, and Mathematics (STEM) fields. Not only do gender disparities persist today, they do so in a more challenging economic context than New Jersey - and indeed the country - has faced in many years. The Council continues its focus on STEM in an effort to raise awareness, broaden public dialogue, and develop effective policies to address gender inequity in education, recruitment, retention, and advancement in this important sector of New Jersey's economy.

Both the 2010 and 2011 Summits responded to challenging labor market conditions felt throughout New Jersey and the nation as a whole. The Council's efforts to reach out to New Jersey women who have been directly affected by the economic recession uncovered many highly skilled, highly educated women experiencing unemployment for the first time in their lives. Women in STEM careers, many of whom had never before experienced difficulty finding employment, encountered a workforce system that was similarly unaccustomed to serving such a highly educated population. Such women were joined by many others - including those with stable employment but concerns about future prospects, and young women discovering a much different labor market than what they had been taught to expect - in a desire for collegial, productive, and forward-looking dialogue about the challenges and opportunities facing women in STEM careers. With its success in linking together women (and several men) - employed and unemployed, and with a range of expertise, experience, and education - the Summit has provided a rich venue for exploring contemporarily relevant topics such as how to respond to a rapidly changing labor market and how to build upon and connect existing opportunities for women in STEM.

Organized around the theme, *Taking Initiative*, the 2010 Summit addressed the challenges that accompany obtaining, retaining, and advancing in STEM jobs in the current economic climate, both by providing resources and networking opportunities for individuals, and by generating recommendations for improvements to programs and policies that extend well beyond the Summit. One of the key recommendations to emerge from the 2010 Summit was that New Jersey work to strengthen linkages between academic institutions, communities, and state and federal governments and groups, with a particular focus on bridging the gap between academic expectations and industry needs. To address this recommendation, the 2011 Summit brought together representatives, researchers, employees and observers, from both academia and industry around the theme, *Bridging Gaps: Forging Alliances*.

The “gaps” to be addressed are certainly daunting and manifest in a variety of ways. Early on, gaps appear between girls’ representation and performance in high school science and mathematics courses and their pursuit of such subjects as majors in college. While enrollment and performance in high school science and mathematics courses is roughly equal for young men and young women, far fewer first-year female college students than first-year male college students report that they intend to major in STEM disciplines (Hill, Corbett, & Rose, 2010). In fact, women’s representation in STEM professions relative to that of men decreases at every stage of the educational and professional hierarchy.

According to U.S. Department of Education data, the average number of high school credits earned in mathematics and science by both girls and boys has increased over the past twenty years, from 6 and 6.1 for girls and boys respectively in 1990, to 7.4 for both girls and boys in 2009. Over the same period, grade point averages (GPA) in high school mathematics have also increased, though the gap between the GPAs of girls (2.73) and boys (2.57) has increased slightly (Nord et al., 2011). In an interesting reversal, however, boys in 2009 took a greater number of advanced placement (AP) exams in STEM areas than did girls, and their average AP exam scores were either the same or higher than those of girls.

That girls, on average, outperform boys in high school academics is mirrored in undergraduate and graduate education, as women since 1991 have enrolled in and graduated from college in higher rates than men. As of 2009, women accounted for three out of five of all graduate students in the U.S. (Pollard, 2011). Men continue, however, to be disproportionately represented in STEM majors at both undergraduate and graduate levels. As of 2006, women earned more bachelor’s degrees than men in only two STEM arenas: biological and agricultural sciences (60 percent) and chemistry (52 percent). In other fields, including mathematics; earth, atmospheric, and ocean sciences; physics; engineering; and computer science, women account for fewer than half of all degrees awarded, from 20 percent in engineering and computer science to 45 percent in mathematics (Hill, Corbett, & Rose, 2010).

Among those women who “beat the odds” to establish a career in a STEM field, the attrition rate is substantially higher than for men, with the rate for women exceeding 50 percent by mid-career (Schick, Lincoln, & Pincus, 2009). When interviewed about their work experiences, women in STEM careers report hostile work environments, limited rewards and opportunities for advancement, inflexible work schedules, and feelings of isolation (Hewlett, Luce, & Servon, 2008). Moreover, evidence suggests that women’s perceptions of limited options and rewards may be well-founded: using records of awards and distinctions in STEM fields, Schlick, Lincoln, and Pincus (2009) conclude that women receive fewer awards and distinctions than do men, even controlling for their smaller representation in these fields.

Gaps also exist between the efforts and offerings of institutions of higher education and the needs of industry. In an article recently published in *Industry and Higher Education* - a journal whose very existence is testimony to the importance of the relationship between these two institutions – Butson (2011) argues that existing practices in higher education reflect educational theories and norms that may be well-suited to the compulsory education of children but that often fail to adequately prepare individuals “to succeed in their future academic/professional and societal roles (p. 1).” The fact that these practices are both pervasive and comfortably familiar makes them difficult to alter.

Even in relatively advantageous economic times, gaps between women and men, between the student role and the professional role, and between classrooms and careers present serious challenges. The *Fifth Annual Women in New Jersey’s Science and Technology Workforce Summit* takes place, however, within a context of marked and sustained economic uncertainty. In the month of this year’s Summit, New Jersey’s unemployment rate stood at 9.4 percent. Although the state recorded an increase of 30,100 jobs over the first four months of the year, estimates for May suggest a decline of approximately 400 jobs. Jobs growth in some sectors, including the health services industry, professional and business services, and finance, was more than offset by losses in manufacturing, trade, transportation, and utilities, and construction. The state continues to feel the effects of jobs losses in the public sector and in the pharmaceutical industry.

The slowing of job creation in New Jersey and sustained high unemployment mirror trends in the country as a whole. Of particular relevance for this report, there are gender differences in how well individuals are faring in what has been dubbed an economic recovery. A recent PEW Research Center report based on U.S. Department of Labor estimates finds that while the unemployment rate for men has been trending downward, the unemployment rate for women has been trending upward. Of particular note is the fact that women have been losing ground, either in an absolute sense or relative to men, in nearly all sectors of the economy, including in traditionally female jobs. The only sector in which women have gained more jobs than men is the public sector, although recent political and public attention to this arena in a number of states suggests imminent and potentially substantial retrenchment (Kochhar, 2011).

While it is difficult to determine, without further study, how these state and national trends affect the employment, retention, and advancement prospects of women in STEM fields, there is concern that as men have left declining, traditionally male sectors such as construction, for growing and traditionally female sectors such as education and health, historic patterns of gender preference have prevailed. Of course, it is important to note that the recent recession was unusual in its disproportionately negative impact on men’s employment, such that a reversal of this trend during a recovery may be less surprising. However, with the

unemployment rate for both men and women remaining at an alarmingly high level, the individual-level impacts of an uneven and gendered recovery warrant concern and attention.

The 2011 *Women in New Jersey's Science and Technology Workforce Summit* is well-positioned to address concerns at an individual level and to turn the combined expertise, wisdom, and experience of women and men in STEM fields into practice and policy recommendations. The format for the 2011 Summit follows a multi-year history, beginning in 2007. Each year since then, the Council has brought together a diverse group of stakeholders to share perspectives, and develop comprehensive and integrated recommendations for addressing gender issues in STEM education and employment. Representatives from academia, industry, government, community-based organizations, K-12 education, and policymaking groups and institutions have gathered to generate and exchange ideas, collaborate, network, and develop both immediate and long-term recommendations.

Several local, state, and nation-wide recommendations have emerged over the course of the preceding four Summits. Findings and recommendations are detailed in four *Annual Women in New Jersey's Science and Technology Workforce Summit* reports, archived at www.njsetc.net (2007, 2008, 2009, 2010). To frame this fifth *Annual Report*, a list of recommendations from the fourth Summit, which focused on initiative-taking in a challenging economic environment, follows. As noted above, it is the first recommendation that provided the impetus for the fifth annual Summit and this Summit report:

- I. *Strengthen linkages between academic institutions, communities, and state and federal governments and groups, with a particular focus on bridging the gap between academic expectations and industry needs.*

- II. *Broaden and improve existing uses of social media to promote STEM careers.*
 - Provide opportunities for young women considering or entering STEM fields to educate others on effective uses of social media;
 - Develop high-quality social media resources for younger women, including elementary school-aged girls;
 - Encourage investment by current employers in technological skills development for their staff, with an emphasis on ways to use social media for their career development, or to help build networks for their clients or students; and
 - Ensure that tools are in place to ensure the privacy and safety of participants.

III. Expand mentoring efforts across specialties, disciplines, and organizations, with particular attention to the following considerations.

- Emphasize the mentee-driven nature of programs in all materials and presentations;
- Factor geography into the match;
- Whenever possible, prioritize face-to-face meetings;
- Seek diversity in mentors/advisors, including diversity of personal and professional characteristics, perspectives, and career paths;
- Be sure to refresh and replenish mentor networks over time;
- Prepare for challenges related to “down times” in the year (e.g., holidays and summer months);
- Strengthen program oversight, including early identification of problems;
- Establish ground rules and honor them (e.g., confidentiality); and
- Provide structure for mentoring/advising groups (e.g., questions or topics).

Over the past year, the New Jersey State Employment and Training Commission, the Council on Gender Parity in Labor and Education, and the Science and Technology Workforce Committee have responded to these recommendations in a number of ways. The SETC has brought together industry representatives, academic institutions, organized labor, community groups, and state and local government representatives in a committee charged with responding innovatively and flexibly to training, employment, and advancement needs in New Jersey’s health sector. The *LinkedIn* site developed during the planning of last year’s Summit continues to address the second and third recommendations noted above, by providing a social media platform for networking, raising awareness of technical and political developments, connecting individual mentors and mentees, and forming mentoring groups. The topic for the 2011 Summit likewise responds to last year’s recommendations, with this report detailing the practices and policies that either have developed or are recommended for development in response to the goal of “*strengthen[ing] linkages between academic institutions, communities, and state and federal governments and groups, with a particular focus on bridging the gap between academic expectations and industry needs.*”

Bridging Gaps

On May 20th, 2011, representatives from government, industry, K-12 schools, academia, and community-based organizations gathered at the Conference Center at Mercer in West Windsor, New Jersey, for the Gender Parity Council’s *Women in New Jersey’s Science and Technology Workforce Summit*. The Summit would not have been possible without the generous time,

support, and effort of its numerous committee members (*pages 1-2*), who represent a variety of organizations concerned with assisting women in developing their careers, increasing women's participation in the STEM workforce, and preparing a skilled, educated, resilient, and innovative 21st century workforce.

A total of 127 people attended this year's Summit, including teachers, administrators, and students from high schools, community colleges and universities; job seekers; consultants; business and industry representatives; non-profit organization representatives; and representatives from state and local government agencies.

The audience for the 2011 Summit was well-equipped to tackle the theme: *Bridging Gaps: Forging Alliances*. It consisted of individuals and organizations representing critical "junctions" along the STEM "pipeline." In fact, the pipeline image is instructive: an individual STEM career can be viewed as a pipeline with multiple junctions which can alternately facilitate, disrupt, detour, or terminate the career. In short, for women, these junctions appear to be more hazardous – bent or clogged, porous or gaping – than they are for men. The goal of the program was not only to identify problematic junctions but to generate ideas for bridging or repairing them. Thus, the program and policy recommendations generated during the course of the day and presented herein are noteworthy for the extent to which they reflect the combined and collaborative expertise of industry representatives, academic administrators and educators, job seekers, students, government representatives and policy makers, and entrepreneurs.

Opening Remarks and New Jersey Initiatives

The Summit opened with a formal welcome and introduction from Dianne Mills McKay, Chair of the Gender Parity Council, and from Michele Horst, newly appointed Executive Director of the New Jersey State Employment and Training Commission (SETC). Ms. Mills McKay shared a list of the top ten most profitable undergraduate college majors, as reflected by both starting and mid-career salaries. Engineering topped the list, with other STEM professions filling the majority of the remaining nine slots. That these careers are simultaneously among the most profitable and prestigious *and* among the least likely to be selected by women suggests some serious gaps or divergences in the paths that boys and girls (men and women) take from the classroom to the laboratory. She encouraged all those in attendance to see the day as an opportunity to contribute to a broader state, and even national, dialogue on ensuring that many of the country's most skilled and capable individuals, both men and women, are engaged in science, technology, engineering, and math careers.

Ms. Horst addressed another serious gap in the STEM arena: that between individual preparation and industry need. As the newly appointed Executive Director of the SETC, Ms. Horst shared her view of New Jersey's educational and workforce systems as allowing job seekers to fulfill their potential but cautioned that this can only be accomplished by staying continually abreast of what business and industry need now and, indeed, will need in the future. Only then can women and men take full advantage of the education and training opportunities offered to them.

Michele Siekerka, Assistant Commissioner of the New Jersey Department of Environmental Protection, picked up on several of the themes introduced by Ms. Horst, emphasizing that rapidly changing labor needs in STEM fields demand that education, training, and certificate systems respond attentively and nimbly to emerging trends. She shared that New Jersey is uniquely poised to respond to opportunities in sustainable energy initiatives, including in the areas of solar energy, off-shore wind, and biomass.

New Jersey has more solar installations than all but one state in the U.S.; to expand solar energy production and maintain existing installations, the State must equip its workforce for careers in production, installation, and maintenance. By contrast, the development of off-shore wind farms is in an early stage. The State thus has the important and daunting task of anticipating when, over the course of many years, skill sets in wind turbine manufacture and maintenance will be needed so that these stable and well-paying jobs can remain in the State. Lastly, New Jersey currently ships out much of the waste produced in the State to other locales that are able to turn biomass into biofuel. This represents yet another job creation opportunity that addresses goals of both environmental stewardship and state economic growth and that requires policy attention for education, government, and industry sectors. Ms. Siekerka closed by reminding the audience that for New Jersey to take full advantage of any of these opportunities, vibrant and sustainable partnerships will need to be developed between community colleges, other institutions of higher education, state and local government, and industry.

Why So Few?

In February of 2010, the American Association of University Women (AAUW) released a book entitled, *Why So Few? Women in Science, Technology, Engineering and Mathematics*. As its title implies, the report concludes that despite contemporary increases in the numbers of women entering science and engineering fields, they continue to be substantially outnumbered by men, particularly at higher levels of prestige and income. Drawing from eight recent studies on gender trends in science, mathematics, and technology, the authors suggest that social and

environmental factors are key contributors to persistent disparities in gender representation within STEM professions (Hill, Corbett, & St. Rose, 2010).

The report received widespread attention at both state and national levels, launching important conversations about concrete steps that could be taken to address such disparities. Christianne Corbett, Research Associate at AAUW and co-author of the report, set the stage for the Summit by discussing the report's findings and what they suggest about ways to stop the steady "leak" of female talent from the STEM pipeline.

The first social/environmental factor discussed in the report is the widespread belief that intelligence is immutable: that it either cannot be changed or is highly unlikely to change. Research, however, suggests that not only can children "get smarter," but they are more likely to do so if they believe that such a thing is possible. The AAUW report recommends that parents and schools teach children that intellectual skills can be developed, that they give praise for effort rather than for accomplishment, and that they create programs that reward growth and learning rather than performance.

The second factor found to relate to women's underrepresentation in STEM fields is stereotypes: the mere suggestion of the stereotype that girls are "bad at math" can negatively affect their mathematics performance. Thus, the report recommends that girls be exposed to women who are successful in STEM fields and that both girls and boys be educated about stereotype threat. Closely related to the second, the third factor is girls' internalized distrust of their abilities in "male" fields such as engineering and mathematics. In one of the studies reviewed for the AAUW report, girls assessed their performance on a perception-related task *negatively* regardless of how they had actually scored, while, in turn, boys assessed their performance *positively* regardless of how they had performed. This suggests that performance standards in both classrooms and workplaces must be clear and consistently applied.

The fourth social/environmental factor is linked closely to the first: if intelligence is unchangeable, then those skill sets thought to reflect intelligence must be similarly static. Ms. Corbett shared that, *contra* this belief, spatial skills are not innate and unalterable, but can in fact be further developed with training. When young children play with building toys or engage in free-form drawing, their spatial skills can be strengthened; unfortunately, however, such pursuits have long been associated with the play of young boys and not young girls. Ms. Corbett shared with the group that there are puzzles and exercises that can be used to train the spatial skills of both child and adult learners.

The AAUW report also addressed social and environmental factors that may follow even those women who choose initially to pursue STEM careers. Ms. Corbett discussed ways in which the climate of collegiate science and engineering departments can affect outcomes for women

students and faculty. The report recommends three steps that colleges and universities can take to improve retention and outcomes for women students and faculty: offer introductory courses that engage broad applications of science and engineering; provide mentoring for junior faculty; and implement work-life integration policies for faculty, a step which can improve both faculty performance and retention and faculty's ability to model these outcomes for students.

The final social/environmental factor found to influence women's representation in STEM careers is bias, both implicit and explicit. Testing of implicit bias reveals, not surprisingly, that math and science fields are associated with maleness, while humanities and arts fields are associated with femaleness. In addition, such biases find their way into day-to-day classroom and workplace behavior. Studies of these settings suggest that women in male jobs tend to be viewed as less competent than their male peers, while women who are clearly competent are then considered to be less likable. The operation of such biases, perhaps particularly when largely unconscious or unacknowledged, is thought to "wear" on women, likely accounting to at least some degree for their disproportionate number of exits from even well-established STEM careers.

Ms. Corbett closed by encouraging the audience to take AAUW's findings and their implications into consideration when developing recommendations for addressing gaps, both in the pipeline of women scientists and in the fit between individual preparation and industry need.

Moderated Panel - Bridging Gaps: Forging Alliances

Ms. Corbett's eye-opening presentation was followed by a facilitated roundtable, which included both Ms. Corbett and Ms. Sierkerka, as well as Linda Eno, Principal of Monmouth County Biotechnology High School, and Sally Nadler, College Relations Manager for the Professional Services Enterprise Group (PSEG). Ms. Eno shared that the Biotechnology High School stands at the beginning stages of the STEM pipeline. While detailed information on the school's response to gendered "ruptures" in the pipeline are detailed in the section, *Where Do We Go From Here?*, Ms. Eno noted the importance of viewing diversity as a competitive advantage: diversity creates the possibility of adapting to change. Ms. Nadler's comments were consistent with this view. She noted that PSEG is committed to being an "employer of choice" for the diverse workforce of the future, and that by investing in college relations and outreach, the company strives to facilitate the transition of talented women and men from academia to industry.

Panelists responded to questions from audience members, generating several broad recommendations for improving the STEM pipeline for women, from school to college to job to career.

- Schools, colleges, training programs, and employers should create clear performance standards, with an eye toward making sure that standards are not skewed toward “what men are already doing.”
- STEM education should incorporate some degree of training in entrepreneurialism. To this end, Rutgers University is now offering a Master of Business and Science (MBS) degree, which includes 24 credit hours in STEM education and 19 credit hours in business.
- Activities in STEM, beginning early in children’s education, should have real-life relevance.
- Policies intended to improve retention and advancement for women in STEM careers must consider the full context of women’s lives. For example, women may have family responsibilities early in their careers when their earnings are insufficient to cover quality child care.

Breakout Sessions

The Summit included six breakout sessions, each held once in the morning and once in the afternoon, during which participants engaged topics in detail. Each session was facilitated by professionals with expertise in specific topic areas, who served jointly as discussants and resources. Because sessions were designed to encourage an exchange of ideas and information between facilitators and attendees, each session took on a distinct direction and focus, while addressing several STEM-related “gaps.”

Career Brush Up: Key Topics and Current Insights

Discussants: Liz Stueck (Session Chair), Vice President, CareerCentral, LLC; Laurie Cooke, CEO, Healthcare Businesswomen’s Association; Catherine N. Duckett, Associate Dean, Monmouth University School of Science; Laurie B. Myers, Principal, Hallett Davis Strategic Group, LLC; and Patricia F. Pesanello, Senior Managing Consultant, Life Sciences – Strategy & Transformation, IBM Global Business Services

In this session, attendees were provided with information on exploring, growing, and advancing in their careers, as well as transitioning to different jobs or fields. Panelists offered their advice on career shifts, mentorship, networking, lifelong learning and professional development, with each area informed by their personal experience and ongoing work with others. Panelists began

by summarizing the evolution of their own careers, including key decision-points and the actions they took (or wish they had taken) to establish their position, extend their influence, and enhance their satisfaction.

Each panelist presented information on how her career began and evolved over the years to where she is now. The session combined reflections and panelist/audience discussion on several distinct but overlapping topics. These are summarized below, along with recommendations.

Career Shifts and Transitions

Through both personal accounts and responses to the audience, session panelists made two things clear: first, career transitions can be painfully difficult; and second, individuals can take concrete steps to make them less so. Panelists shared how challenging and discouraging times of change – both voluntary and involuntary – have been for them; one noted that while taking her mentor’s advice to “lean into change” had initially seemed counter-intuitive, it had proven extremely helpful.

Although transitions sometimes “hit you in the face,” creating feelings of discomfort, rejection, or failure, it is essential to move beyond these feelings so they do not impede future success. Since self-assessment tends to be harsher for women than for men, they must, in particular, guard against being stifled by negative emotions and perceptions.

Times of career uncertainty can be eased in a number of ways. Asking trusted others for assistance in assessing strengths, even if they come from hobbies or from family life, is an important step. Other ways to “stay positive” include volunteering, providing assistance to someone else in one’s network, setting manageable job search goals, informational interviewing, and reaching out to women in similar fields or with similar experiences. In addition, although taking interim jobs may seem unpleasant or even embarrassing, it can be a valuable way to keep a resume fresh and gain additional skills.

Panelists advised audience members that, when looking to make a career change or shift, it may be helpful to zero in on what differentiates them from other candidates, and to then make sure that such distinctions are reinforced in the resume and self-presentation. Thoroughly researching a department or company is also important; a candidate’s message and self-presentation should fit clearly with the department or company’s strategic priorities and growth areas. An audience member summed up panelists’ advice well: “don’t ask, ‘do you have any jobs?’ Do ask, ‘what do you see as the growing areas in your company/industry?’”

Mentorship

Both having a mentor and being a mentor can be invaluable to growing in a career or developing a new career path. Mentors can be drawn from a workplace, educational institution, organizations related to a field of interest, or from a more far-reaching resource such as the professional networking site, *LinkedIn*. When considering a new job, applicants may find it helpful and illuminating to talk to someone higher up in the organization and ask questions to learn more about their experiences both in the company and in the field. The value of a good mentor is ongoing and lifelong, so maintaining contact with mentors from the past can be very important.

Session Chair, Liz Stueck, shared thoughts gleaned from her own experience with effective uses of mentoring. She noted that she learned a lot from “reverse mentoring” opportunities, including relationships between X and Y generations and “baby boomers.” She connected with the Healthcare Businesswomen’s Association (HBA), where she volunteered, developed a relationship with the organization, and ultimately initiated a group mentoring program. Now, the program is in its fourth year with several hundred graduates. She shared that volunteering at a time when there is uncertainty can help an individual move into new areas. What once was Ms. Stueck’s volunteer work – mentoring – is now her profession and her passion.

Networking

Networking seems to be the number one source of connection in today’s labor market, useful for getting referrals, connecting with opportunities, showing motivation, building relationships, and creating links to desired career fields. Networking, however, is more than a general “meet and greet;” individuals who are reaching out to others should have questions in mind to ask. They should also be attentive not only to what networking can do for them, but to what they – as network resources – can offer to others. For example, one session panelist encouraged audience members to invite young women into their networks.

Panelists advised audience members who are trying to build their networks to target people in terms of specific areas of alignment (e.g., area of expertise, geography, position, institutional affiliation), and to set specific goals (e.g., “I’m going to meet two people, get their business cards, and send them an email.”)

Lifelong Learning and Professional Development

Another avenue for those facing career shifts to pursue is to learn how to weave a story of experience, strengths, and knowledge for self-marketing. The professional “story” should be cohesive and imbued with a personal touch. Other recommendations include asking trusted individuals to review one’s self-presentation, setting goals, using individuals in one’s network to

facilitate introductions, and committing consistently to working on leadership and team building skills.

Examples of self-presentation are available on the HBA website as informational interviews with *Woman of the Year* award recipients (www.hbanet.org, under Woman of the Year).

This session had a great deal of audience participation. The panelist's responses to questions from the audience reflected their knowledge and career experience, and provided excellent feedback to the attendees.

Diversity and Inclusion Fuels Innovation

Discussants: *Forough Ghahramani* (Session Chair), Associate Dean of the College of Health Science and College of Business and Management, DeVry University; *Susan Brooks*, CEO, Heart of New Jersey Girl Scouts; *Len Daws*, Senior Engineering Manager, Lockheed Martin; *Susan Light*, Senior Engineer, Lockheed Martin; *Andrea Hawkins*, Automation, Instrumentation and Electrical Systems Team Leader, ConocoPhillips; and *Melissa Macarski*, Student, DeVry University

A positive relationship between diversity, inclusion, and innovation is becoming increasingly recognized and accepted. People of different backgrounds working together brings multiple perspectives and viewpoints, and creates synergy that improves creativity and generates innovative ideas. With “baby boomers” reaching retirement age in the next ten years, there will be a substantial gap in the number of scientists and engineers needed to fuel innovation. Attracting and retaining talent in STEM careers will become even more critical across the pipeline - in business and industry, government, and academia.

Session Chair, Forough Ghahramani, provided the framework for the panel discussion through her insight into the roles of various stakeholders in attracting and retaining women in engineering, technology, and science. Although a lot has changed over the last century for women in the professional and especially technical arena, additional gains are needed to secure gender parity. The *Diversity and Inclusion Fuels Innovation* session brought together a group of highly accomplished professionals to discuss the opportunities and resources available through various organizations for attracting and retaining women in technical fields.

Forums for Women in University and Corporate Environments

Regardless of the status of gender parity in STEM professions, women need a forum for sharing their issues and concerns, for sharing their knowledge, experience, joys, and disappointments. Women in general, but especially those in non-traditional fields, benefit from a “space” in

which they can become role models for up-and-coming women in their field. They need the opportunity both to recognize one another for their unique accomplishments and to support one another in workplace and academic settings. Overall, gender-based differences add value to the workplace, but also complicate it in a way that makes it vital for women to have their own forum.

Forums for women also facilitate networking and mentoring. Networking with other women forges paths for the next generation of women scientists, technicians, engineers, and mathematicians. Through mentoring, women can have long-term impacts, as well as discrete learning opportunities.

Heart of New Jersey Girl Scouts

Susan Brooks, CEO, described how the modern-day Girl Scouts is breaking barriers using its mission to “build girls of courage, confidence and character who make the world a better place.” Girl Scouts has evolved from “camping, cookies and crafts” to life skills with the aim of “promoting personal growth and leadership development for girls ages 5-17.” One of the Girl Scouts’ key areas is its ESTEEM Program, or Excellence in Science, Technology, Engineering, and Mathematics. The program incorporates the following activities:

- *Imagine Engineering*: Engineers present to Scouts about jobs in engineering;
- Lockheed Martin Science Career Exploration;
- NASA Partnership;
- First Robotics;
- Lighten Up Optical Partnership; and
- Fair Play: Design and Disney.

These programs are addressing the fact that while girls and boys generally begin with the same test scores in math and science, by 8th grade, two times the number of boys as girls report interest in science careers.

All Girl Scouts programming emphasizes hands-on learning and role modeling.

Programs Bridging the Gap between Education and Career Choice

Susan Light, Senior Engineer at Lockheed Martin, reviewed organizations, programs, and tools designed to develop awareness and disseminate information to girls and women at the K-12 and college levels, all with the goal of attracting them to STEM careers.

Several of these programs include:

- IEEE, a non-profit, professional association for the advancement of technology: supports two educational programs, TRY Engineering (grades K-8), and SMART competition (grades 9-12) (www.ieee.org);
- Society of Women Engineers - New Jersey (SWE-NJ): supports an educational program called Prospective Engineering Student Outreach (grades 9-12) (<http://www.njsocietyofwomenengineers.wildapricot.org/>);
- New York State Energy Research and Development Authority (NYSERDA): is teaming with the Interstate Renewable Energy Council for an annual clean air workforce summit (www.nyserda.org); and
- Women in Engineering ProActive Network (WEPAN): maintains a knowledge network data base of studies of diversity and inclusion with excellent information on promoting STEM for girls, and supports a program called Making the Connection (grades K-8 and 9-12) (www.wepan.org).

The thesis underlying these programs is that hands-on activities and programs evoke interest in STEM careers and should be widely disseminated as critical resources. Professional organizations can raise awareness in communities and provide input into public policy by providing information to legislators and citizens.

Programs at Lockheed Martin

Len Daws, Senior Engineering Manager at Lockheed Martin provided an overview of why innovation matters and then described several programs and initiatives at Lockheed Martin. He noted that an astounding 55 percent of New Jersey's workforce will reach retirement age in the next few years. Further, in the next 10 to 15 years, there is projected to be 50 percent attrition across STEM careers. In order to build a pipeline for innovation in the future, we must address these issues:

- How to get people interested?
- How to get them early?
- How to retain them?

Lockheed Martin strives to build and foster a culture of diversity and inclusion where employees are valued and treated with respect. As Lockheed Martin acquired diverse companies, its management recognized the need to build a new corporate culture having consistent goals and objectives, and uniformly high-quality products. Valuing diversity became an important means to achieve these goals and to retain employees.

Consultants and trainers were brought in to design and deliver a diversity program which would address how employees treat one another in a workforce setting and how to build a respectful environment. It was recognized that these values and behaviors had to start at the top among senior leaders who articulate the vision, but also had to be embraced from the bottom-up. An ongoing program called *Crucial Conversations* (teaches communication skills to employees, and focuses on how to talk about one's views, how to present different ideas, and how to manage conflict. Without meaningful dialogue and feedback, a company loses problem-solving input and expertise. If employees are unable or unwilling to speak, then that knowledge does not exist. Lockheed Martin also has Awareness Councils and Affinity Groups at local sites as part of its Diversity and Inclusion program.

Best Practices at ConocoPhillips

Andrea Hawkins, an Automation, Instrumentation and Electrical Systems Team Leader at the Bayway Refinery site of ConocoPhillips, defined innovation as “anticipating change and responding creatively.” With the anticipated retirement of so many STEM field employees, innovative companies will be those that are best equipped to attract emerging diverse talent. Ms. Hawkins shared that ConocoPhillips, with about 30,000 employees in 30 countries, is committed to fostering employees’ individual talents and strengths to create a diverse and resilient workforce.

Ms. Hawkins described some of the “best practices” for attracting and retaining women in STEM fields generally, and in the energy industry in particular:

- Mentoring, including high school mentoring;
- Role modeling, both female role models and males who encourage their daughters; and
- Awareness that good careers with good salaries exist for women in STEM careers.

Student's Perspective

Melissa Macarski, a Biomedical Engineering Technology Student at DeVry University, gave a personal account of how she “found” her future career in engineering. She attributed her success to her parents and to her professors, especially the excellent program at DeVry University, with its extensive support and mentoring program. In addition, Ms. Macarski spoke highly of a program in which DeVry University partnered with ConocoPhillips called *Her World 2011*. Through this program, New Jersey high school girls can learn about career opportunities in engineering and technology.

Ms. Macarski believes that high school guidance counselors and teachers need to become more aware and supportive of opportunities for women in STEM careers and guide them in that direction.

Call to Action

Session Chair, Forough Ghahramani, shared a Call to Action with attendees:

To cause change, women need to seek and accept leadership and administrative roles that influence diversity in recruiting and hiring and in altering the system. Change can be accomplished either through advocacy or by working within the system and leading by example.

If you are a woman who has established herself in her profession, ask yourself at the end of every week what you have done to bring another young woman on board.

Student to Scientist: College to Career

Discussants: Regina Riccioni (Session Chair), Assistant Dean, Douglas Residential College, Rutgers University; Robert Siano, Teacher at the Academy of Health Careers, Hunterdon County Polytech Career Academy; Stephanie Wissel, Postdoctoral Researcher in Science Education, Princeton Plasma Physics Laboratory; Aleta You, Associate Director of the Professional Science Master's Program, Rutgers University; and Candiece White, Director, Women in Engineering Programs, School of Engineering, Rutgers University

This session explored the obstacles facing female students in entering and succeeding in STEM fields. A major hurdle identified by each speaker was the recruitment of female students into generally male-dominated fields, with “leaks” of female students from the sciences starting as early as middle school. The session included a discussion of ways to stop such leaks with successful programs and initiatives already in place that help female students from middle school through graduate school to realize their career dreams in STEM fields. The session was moderated by Regina Riccioni of the Douglass Project of Douglass Residential College at Rutgers University.

The Academy of Health Careers, Hunterdon County Polytech Career Academy

Robert Siano, a teacher at the Academy of Health Careers, Hunterdon County Polytech Career Academy, described his school's efforts to bolster gender equity by exposing students to actual, available jobs and careers beyond the female-stereotyped options, such as nursing and physical therapy. The Academy, limited to twenty high school students, sixty percent of whom are female, has a large proportion of graduates entering the health and medical fields. A major “pipeline problem” to attracting women to STEM fields exists at the level of the high school guidance counselor. Evaluated based on the ranking of the colleges in which their students enroll, counselors often push students into Advanced Placement courses regardless of their

personal interests and fail to provide sufficient information about available career options. Thus, Mr. Siano believes that a crucial step in raising gender parity in STEM fields is improved access to and knowledge of the array of jobs and careers available in such fields. He further expanded this notion by stressing the importance of interdisciplinary studies. In his high school's science program, writing and analytical reading skills are emphasized along with the core science courses in order to broaden students' understanding and appreciation for other disciplines. Such crossing of traditionally distinct disciplines serves to encourage diversity as well as increase tolerance and acceptance of fields beyond one's own.

Rutgers University Women in Engineering Programs

Candiece White, Director for Women in Engineering Programs at Rutgers University, described two programs that aim to boost female participation and success in engineering fields: The Academy at Rutgers for Girls in Engineering and Technology (TARGET) summer program, and the Rutgers University Women in Engineering Leadership League. The former focuses on recruiting middle- and high school-aged girls into the engineering field, while the latter serves to support female college students already pursuing engineering degrees with continued academic and personal support throughout their college years. Ms. White agreed with Mr. Siano about the insufficient resources provided by high school guidance counselors with regard to the range of opportunities in science fields. Her program serves to give young girls a fuller picture of the diverse field of engineering. Ms. White further stressed that another key obstacle is retention rates of engineering students during the college years. Often, minorities in the classroom - female engineering students - are best aided by additional resources, advising, and support, all of which are provided by Ms. White's programs at Rutgers.

Princeton University's Princeton Plasma Physics Laboratory (PPPL)

Stephanie Wissel is a postdoctoral researcher in science education with the Princeton Plasma Physics Laboratory (PPPL). Princeton University, like Rutgers, provides opportunities for female pre-college students to gain insight into the science field and possible careers, especially those in physics and engineering. With plasma physics having one of the lowest percentages of female scientists out of all science fields, PPPL works to try to boost female participation with a number of science education programs for students from kindergarten through high school. In addition, mentorship and professional development are provided to female college students in the physics and engineering department at Princeton. Dr. Wissel, along with the Mr. Siano and Ms. White, considers radical alterations in high school curricula essential to providing all students with more comprehensive and practical understanding of science. In the short-term, programs such as Dr. Wissel's and Ms. White's serve to provide the information and opportunities not currently available in middle and high schools for female students who may potentially enter STEM professions.

Rutgers University's Professional Science Master's Program

Aleta You, Associate Director of the Professional Science Master's Program at Rutgers University, discussed the new Master of Business and Science (MBS) degree. Launched last fall, the program is geared toward those with undergraduate science degrees who want to couple their science backgrounds with business skills. As the government, industries, and non-profits today often seek people with knowledge of both science and business, this degree widens the career paths of graduates. The Rutgers MBS, boasting over twenty concentrations, expands understanding of science topics of interest while providing students with valuable soft skills necessary in the business world.

Social Media Branding and Targeting

Discussants: *Barbara Boshq* (Session Chair), Owner, Boshq Design + Communications; and *Beth Brodovsky*, President, Iris Creative Group, Inc.

Social media is a rapidly evolving aspect of the contemporary workplace and one that - if used well - can assist individuals in beginning, retaining, and advancing their careers. Like all tools, however, social media is not without its disadvantages and potential pitfalls. This session focused on ways that social media can facilitate movement through the STEM pipeline, while guiding audience members through some of its potential hazards and benefits.

Through social media, individuals can connect with people that they may never have found without it, including individuals who may become invaluable network members or mentors. However, because online communication is generally stripped of nonverbal cues and creates a lasting record, being careful and strategic about one's communication is important. Panelists emphasized the value of having a strategy for developing an online presence. Different communication tools (i.e. *LinkedIn*, *Twitter*, *Facebook*, blogs) may have different uses, and, with the persistence and ready accessibility of the Internet, self-presentation is critically important.

LinkedIn and *Facebook* generally have different uses and audiences. *LinkedIn* is generally used for professional or business-related connections; as such, a *LinkedIn* network may be broader and more diffuse than a *Facebook* network. While it is advisable to connect with people on *LinkedIn* via a common connection, an individual user can decide whether to accept "strangers" or strictly those whom she has met or has personal knowledge of. When it comes to providing referrals via *LinkedIn*, however, the panelists recommended that users provide references only for those they know and trust to do the job for which they are being referred. *LinkedIn* also allows users to make their connections lists private so that others do not take undue advantage of these lists.

While *Facebook* is used primarily for social connections, one can start to think about using it for business connections, particularly with acquaintances who may be unfamiliar with one's career or areas of expertise. Since the company is investor-run and profit-driven, privacy settings are changed frequently to open up more information; therefore, users should make sure to keep updating their privacy and account settings. It is also important to note that a *Facebook* connection (i.e. friend) does not have to be permanent; connections can be removed without notification to the individual. For people who would like to limit *Facebook* connections to their personal lives, the panelists suggested inviting business associates to connect via *LinkedIn* rather than *Facebook*.

Panelists also provided suggestions for developing a blog or a Twitter presence, either through one's own account or by developing consistent visibility on the blogs of others. Twitter, in particular, can be useful for building expertise (generally by following others), and demonstrating authority (by building a following). As with other social media, panelists emphasized the importance of having a plan for self-presentation. While articulating views or responding to questions online can lead to being publicly viewed and received as a specialist or expert, users must be sure that they can maintain the kind of consistent, focused, and high-quality participation that will strengthen their online reputation. Panelists suggested that, when thinking about starting a blog, audience members consider the following questions:

- Who is your audience?
- Do you have the time to post and respond regularly?
- Can you come up with at least 6 months-worth of topics?
- What can you say that other people have not said?
- How would you like to be branded?
- What is your passion?

The session also covered ways to use social media for business entrepreneurship, and pitfalls to avoid. Panelists suggested using social media to post successes, to post surveys and discussions, to research what other companies and individuals are doing, and to create a "brand." While it may be tempting for less tech-savvy individuals to use interns to create an online presence, entrepreneurs should be sure that any individual representing the company online is fully aware of the vision for the company. Panelists also recommended that individuals working to create a professional, online presence seek out places where people are asking questions that they can answer, and provide answers, along with links to individual or company websites.

Businesses worry about receiving negative comments via social media outlets, and rightfully so as such comments can prove harmful. Ms. Bosha and Ms. Brodovsky shared how a large corporation hired a team to monitor *Facebook* and *Twitter* for such complaints so that it could

then offer assistance directly to aggrieved users. In this way, service complaints often turned into demonstrations of responsiveness.

Where Do We Go From Here?

Discussants: Bonnie Diehl (Session Chair), Chief Academic Officer, SANS Technology Institute; Linda Eno, Principal, Monmouth County Biotechnology High School; Ellen Mappen, Senior Scholar, National Center for Science and Civic Engagement, Harrisburg University; and Patricia Roos, Professor of Sociology, Rutgers University

This session brought together women engaged in various points along the STEM college-to-career pipeline, to document their observations of and experiences with ways to bridge gaps and stop leakages. It is widely acknowledged that we lose female talent at increasing rates as we move along the pipeline; thus, the goal is to stop the leakage.

High School Education: Monmouth County Biotechnology High School

As the principal of Monmouth County Biotechnology High School, Linda Eno encounters young women at some of the earliest points along the pipeline. The Biotechnology High School is a college preparatory career academy for students in grades 9 through 12, with a competitive admissions process. It was founded with three primary characteristics in mind:

- Small, personalized learning environments,
- Rigorous, integrated academics, and
- Strong partnership with industry, higher education, and community-based organizations.

Students graduate with far more credits in science than are required by the state of New Jersey. Ms. Eno highlighted lessons that have been learned about ways to engage and retain women high school students in STEM studies.

1. Female friendly education: In general, young women tend to be less motivated by competition. Thus, the school is willing to separate girls from boys in order to generate leaders of both sexes. All students at the high school take the same rigorous courses, and all are exposed to materials that are designed to be relevant to their lives.
2. Brand the bling! Be comfortable with an environment that is fun, sexy and colorful.
3. Change the culture: Make an effort to develop bonds among students by modeling working through challenges rather than succumbing to them. One day each month,

students engage in a “Buddy Olympics,” using a progressive leadership model in which everyone is a leader. Based on research suggesting that students who value grades do not take risks, Ms. Eno noted that the school is seeking to build in ways that effort and risk-taking are rewarded. For example, teachers are beginning to use self-evaluation and peer evaluation for effort in group events.

4. Provide mentors: It is particularly important that female students have mentors from primary school through career. Students at the Biotechnology High School spend substantial time during their senior year at internships, allowing them additional access to mentors and invaluable “real-world” experience.

Ms. Eno noted that while the school’s class of 2009 was 45 percent female, the class of 2013 is 57 percent female. She attributes this shift to concerted efforts to recruit female students, including a summer camp for 6th to 8th grade girls. Of 50 women graduates to date, 85 percent have selected STEM majors in college.

Undergraduate Higher Education: Science Education for New Civic Engagements and Responsibilities (SENCER)

Ellen Mappen, Senior Scholar at the National Center for Science and Civic Engagement at Harrisburg University, described SENCER, an innovative program that aims to improve engagement and retention in STEM fields by connecting science education with civic engagement and mentoring. The goals of SENCER are to interest more students in STEM learning, encourage students to connect their STEM studies to other fields, and strengthen students’ science learning and capacity for responsible work and citizenship. To date, SENCER has been implemented in 316 institutions around the country plus 6 regional institutes (www.sencер.net). The pedagogical shift represented by SENCER – its commitment to connecting learning with real-world problems and potential for change – responds directly to the call for an engaged, responsible, and active science to improve the recruitment and retention of young women past high school.

Beyond Higher Education

Patricia Roos, Professor of Sociology at Rutgers University, presented findings from her ongoing research on faculty sex and gender differences at institutions of higher education. She noted that there are often subtle barriers, policies, and procedures that hinder women’s careers. Strategies to address or eliminate these barriers must receive more attention and open discussion. Using data from a 2009 paper published with Dr. Mary Gatta, Dr. Roos described the hypothetical case of “Christine vs. Matthew,” both career university professors. In a side by side comparison, at nearly every point along his career path, Matthew accrues “micro-advantages.”

By contrast, toward the end of Christine’s career, she feels devalued and demoralized by her employer (but satisfied by her professional society and committee work).

The book, *Women Don’t Ask: Negotiation and the Gender Divide* (Babcock & Laschever, 2003), describes multiple “sources” of male-female divergence in workplace experiences and rewards, some of which are directly discriminatory and others of which are substantially more subtle. For example, women are less likely than men to negotiate starting salaries (and to request signing bonuses). Even a \$5,000 difference in one’s starting salary at a first job builds to a \$360,000 different in pay over a 38-year career.

In response to questions from the audience, session panelists offered some job market advice for women. They suggested that, during salary negotiations, one should answer a question with a question, e.g. “What is your salary expectation?” becomes “What is the salary range?” Applicants should also research a prospective position to determine what it is worth (salary.com).

Women Impacting Sustainability Policy

Discussants: Joanne Gere (Session Chair), Owner, BioScience Collaborative; Lori Braunstein, Executive Director and Founder, Sustainable Cherry Hill; Arlene Quinones-Perez, Attorney and Lobbyist, Impact NJ; Pam Mount, Owner and Operator, Terhune Orchards, and co-founder of Sustainable Lawrence; Robin Reenstra Bryant, Manager, Rutherford Downtown Partnership; Chris Sturm, Senior Director of State Policy, NJ Future; and Kelly Mooij, Director of Government Relations, New Jersey Audubon Society

This session built on connections and recommendations made at the 2010 *Summit*, which focused on the emerging green jobs sector. Between the various levels of government and the advocacy groups working to influence them, new sustainability policies are developed and implemented that affect our environment, our institutions, and our daily lives. Session panelists discussed their roles, recent activities, successes and challenges in protecting today’s resources for tomorrow, with discussion including the following components:

- How community action can lead to new legislation;
- How opinions and approaches evolve in response to influence;
- Ways that representatives work with their constituent groups to decide on votes; and
- How to get involved to impact issues that concern you, your business, and your community.

Despite ongoing activism and existing sustainability policies and legislation, New Jersey continues to lose substantial amounts of open space to development. Although the reasons for this are both numerous and complex, one factor is that many special interests benefit from the status quo. Panelists discussed ways that their organizations (listed below) have influenced policy and will continue to do so, despite limited financial resources:

- Sustainable Cherry Hill
- Sustainable Lawrence
- Sustainable Jersey
- Impact NJ
- NJ Future
- New Jersey Audubon Society

Their suggestions for individuals, concerned citizens, emerging groups, and organizations interested in promoting sustainability included the following:

- Connect local community to local government around issues the community has identified as important (e.g., Sustainable Lawrence helped to pass an ordinance to get solar panels installed in schools);
- Find and use “change agents,” the charismatic few who communicate ideas with excitement and thereby motivate others;
- Engage governments and corporations; while grass roots work is invaluable, large scale change requires the engagement of government and corporations;
- Create a “Green Team,” a group that will work on sustainability issues at the town or community level (see <http://sustainablejersey.com/editor/doc/p1111.pdf> for resources);
- Work with constituent groups to build consensus and forge alliances;
- Engage with neighboring communities or organizations;
- Provide educational opportunities for constituents of all ages and levels of engagement;
- Conduct research with clear policy implications (e.g., NJ Future found that greater population density in towns increases the likelihood that residents will walk to work or use public transit);
- Advocate for policies that are consistent with sustainability goals;
- Use external stimuli (e.g., energy prices, grants for solar and wind, town deficits that could be partially addressed by replacing commercial garbage pick-up with composting efforts);
- Play the “inside” and “outside” game: “inside” talking to board members and decision makers, and “outside” getting the message to the public and media;
- Host a conference to develop an agenda and working task force;
- Host an annual Earth Day event;

- Connect with online resources, such as the *Sustainability Collaborative* on LinkedIn, a group which developed from the *Third Annual Women in Science and Technology Summit*.
- Make sure that women’s perspectives are heard, as women’s representation both in elected office and in STEM fields is low.

As Lori Braunstein, Executive Director and Founder of Sustainable Cherry Hill advised, “If the people lead, eventually the leaders will follow.”

LinkedIn

Registrants for the *Women in New Jersey’s Science and Technology Workforce Summit* were invited to join a *LinkedIn* Summit group, created in 2010 in response to previous Summit recommendations to:

- Bring together government, academic institutions, and companies for ongoing collaboration;
- Create a “one-stop” site that provides a portal to social media networks that can be used for career development; and,
- Provide an organizing framework for mentoring efforts.

Eighteen months after its launch, the site has 126 members and has served as a reference point for events, publications, and policy information relevant to STEM professions. The site has also served as a point of contact for a newly formed New Jersey Women in Science and Technology Mentoring Circle, and as a venue through which other mentoring groups have advertised. The Council on Gender Parity in Labor and Education will serve as a liaison between Summit *LinkedIn* group members and Council members, the New Jersey State Legislature, and appropriate State Agencies.

Recommendations

Numerous recommendations emerged from the *Fifth Annual Women in New Jersey’s Science and Technology Workforce Summit*. The focus here is on recommendations that could be implemented at state, local, or program levels; recommendations for individuals seeking jobs or planning career shifts appear throughout the report. Recommendations are grouped below, “along the pipeline:”

- I. Elementary and secondary education
 - a. Build science and mathematics education programs that...
 - i. Reinforce effort and risk-taking rather than accomplishment
 - ii. Reward growth and learning rather than performance
 - iii. Apply learning to real-life problems and needs
 - iv. Incorporate a substantial “hands-on” component
 - v. Are interdisciplinary
 - b. Examine the role of high school guidance counselor; ensure that this role is designed and adequately supported to offer a full range of opportunities to young women and men
 - c. Expose students to women who are successful in STEM fields
 - d. Develop performance standards that are clear and consistently applied
 - e. Expose students to available jobs and careers beyond the female-stereotyped options, such as nursing and physical therapy
- II. Higher education
 - a. Accelerate and spread the development of professional science master's education that...
 - i. has deep knowledge of science
 - ii. is interdisciplinary
 - iii. strongly emphasizes effective communication and problem solving
 - iv. provides an understanding of entrepreneurial skills and technical innovation
 - b. Connect women in STEM majors to resources, advising, mentoring, and support, that will follow them throughout their college years
 - c. Connect learning, both in the classroom and in affinity groups, with real-world problems and real-world efforts to generate solutions
- III. Profession/career
 - a. Develop standards for a “diversity-friendly” company and recognize excellence in valuing and managing diversity
 - b. Develop policies intended to improve retention and advancement in STEM careers by addressing the full context of contemporary family life (e.g. child care supports, paid family and medical leave)
 - c. Develop volunteering programs for those just starting in their careers or facing transitions; provide visibility and recognition of the idea that volunteering builds skills

- d. Develop and support programs such as *Crucial Conversations* (p. 19, <http://www.vitalsmarts.com/crucialconversationstraining.aspx>) that teaches communication skills to employees, and focuses on how to talk about one's views, how to present different ideas, and how to manage conflict.

IV. *Across the pipeline*

- a. Disseminate information at all educational and professional levels about ongoing programs and activities for girls and women in STEM
- b. Develop vibrant and sustainable partnerships between community colleges, other institutions of higher education, state and local government, and industry
- c. Create clear performance standards, with an eye toward making sure that standards are not skewed toward “what men are already doing”
- d. Develop and support forums for women; women in general, but especially those in non-traditional fields, benefit from a “space” in which they can become role models for up-and-coming women in their field, recognize one another for their unique accomplishments, and support one another in workplace and academic settings

The New Jersey Council on Gender Parity in Labor and Education is sharing the recommendations made in these sessions with its members, with the New Jersey State Legislature, and with appropriate State Agencies.

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