



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

Green Now!
Women Leading the Way
in
Science and Technology

**3RD Annual Women in New Jersey's
Science and Technology Workforce Summit
June 5, 2009**

Prepared by

Linda Houser

New Jersey State Employment and Training Commission
Council on Gender Parity in Labor and Education
Center for Women and Work
Rutgers, The State University of New Jersey

In Collaboration with

Suzanne Eng

Center for Women and Work
Rutgers, The State University of New Jersey

December 2009

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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 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 ten years ago, the Council has provided the State with leadership on gender equity issues important to economic and workforce development. Since that time, the Council has published fourteen reports, made numerous policy recommendations, and held six public forums covering three occupational areas with both gender barriers and identified labor shortages in New Jersey: building trades, health care, and technology.

As the Gender Parity Council enters its 10th year, significant and unprecedented opportunities exist to assist New Jersey and the nation in economic recovery. At the Council's annual retreat in July 2009, members identified Council priorities for the coming years, which include applying a "gender lens" to the evaluation and assessment of federal, state, and locally funded workforce services, continuing to address disparities in key employment sectors, and monitoring and addressing the growth of "green" industries, as well as green jobs within existing industries, to ensure that opportunities and benefits are received equitably by both women and men.

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.

Bio-1 WIRED

Bio-1's goal is to make Central New Jersey (CNJ) the next "hot spot" for the global bioscience industry, by creating more high-quality, high-paying jobs and an even more highly skilled workforce. The five-county BIO-1 partnership is named for the Route 1 corridor from Rutgers to Princeton, around which most of CNJ's biotech firms are clustered. The CNJ region, comprising Hunterdon, Mercer, Middlesex, Monmouth, and Somerset counties, has received \$5 million, available under the Workforce Innovation in Regional Economic Development (WIRED) program from the United States Department of Labor, Education and Training Administration (USDOL/ETA). The WIRED grant is being used to transform the rich array of existing bioscience education and training and economic development initiatives into a world class bioscience talent development system. This is the third WIRED investment in New Jersey, making it "the most WIRED state" in the U.S.

Center for Women and Work

As the research arm of the Gender Parity Council, the doctoral-level staff at the Center for Women and Work (CWW), at the Council's request, collects data, conducts research, produces reports and public forums, and makes presentations within the State and on a national level. The CWW works closely with the New Jersey State Employment and Training Commission (SETC) and the Council to follow occupational trends in New Jersey and identify and address current or potential inequities.

Additional Event Co-Sponsors

Bergen County Technical Schools

www.bergen.org

Center for Women and Work, Rutgers University

www.cww.rutgers.edu

DeVry University

www.devry.edu

Division on Women, New Jersey Department of Community Affairs

www.state.nj.us/dca/dow

Fairleigh Dickinson University

www.fdu.edu

The Hartshorn Group

www.thehartshorngroup.com

National Center for Science and Civic Engagement

www.ncsce.net

New Jersey Center for Teaching and Learning

www.njctl.org

New Jersey Department of Education, Office of Math and Science Education

www.nj.gov/education

New Jersey, Eastern Pennsylvania, and Delaware Higher Education Recruitment Consortium

www.njepadeherc.org

New Jersey State Employment and Training Commission

www.njsetc.com

The New Jersey Laborers' Employers Cooperation and Education Trust

www.lecet.org

Nontraditional Career Resource Center, Rutgers University

www.ncrc.rutgers.edu

***Office for the Promotion of Women in Science, Engineering and Mathematics
Rutgers University***

<http://sciencewomen.rutgers.edu>

Rutgers School of Engineering, Office of Student Development

www.osd.rutgers.edu

Rutgers University Professional Science Master's Program

<http://psm.rutgers.edu>

Science Education for New Civic Engagements and Responsibilities

www.sencer.net

Theodolite Human Capital

www.theodolitehc.com

WIRED Bio-1

www.bio-one.org

Overview

Over the past twenty-five years, women have entered careers in science and technology in increasing numbers. However, substantial disparities in representation for both education and employment sectors persist. Women's role in the science and technology workforce has been a key issue for the Council on Gender Parity in Labor and Education since its 2000 inception. Through numerous public forums such as previous summits and original, published research, including *Bridging the Gap: Women in Science, Engineering and Technology* (2001) and *Engineering Their Futures* (2002), the Council has contributed insight into women's continued underrepresentation in Science, Technology, Engineering, and Mathematics (STEM) fields. The Council continues its work in this area in an effort to raise awareness and public dialogue in New Jersey, as well as develop effective policy to increase women's participation and advancement in this important sector of New Jersey's economy.

National trends point to continued cause for concern with gender disparities in STEM. Even as the U.S. unemployment rate tops ten percent, the Bureau of Labor Statistics projects a continuing need for qualified applicants for STEM jobs (*Bureau of Labor Statistics*, 2009). A 2008 study by the Interagency Aerospace Revitalization Task Force concludes that the U.S. is currently failing to produce sufficient numbers of qualified STEM professionals to staff specific emergent growth areas (Interagency Aerospace Revitalization Task Force, 2008). Because women are historically underrepresented in STEM fields, they are poorly positioned to respond to these broad employment trends, as well as to specific policy initiatives including expanded funding for the development of "green jobs."

Currently, women comprise about 27 percent of the science and technology workforce, but only 18 percent of full-professor rank science faculty at four-year colleges and universities (National Science Foundation [NSF], 2009). This signals a persistent gap between women's actual share of the STEM workforce and their access to gender-matched role models at the collegiate level. Moreover, significant variation exists in the extent to which they have made inroads into specific fields within the broad STEM category. As of 2006, women made up 76 percent of graduate students in psychology, 56 percent in biological sciences, and 54 percent in social sciences. However, they comprised only 25 percent of the graduate students in computer science, and 23 percent of those in engineering (NSF, 2008).

Concern also exists with the extent to which women exit their STEM careers at far greater rates than men. Attrition rates for women remain high at over 50 percent by mid-career (Schick, Lincoln, and Pincus, 2009). Hewlett, Luce, and Servon (2008) document factors that contribute to high STEM attrition among women, including hostile work environments, feelings of isolation, inflexible work schedules, limited rewards for activities other than those that are risky or outside the "norm," and limited options for meaningful career advances. Schlick, Lincoln, and Pincus (2009) find that women receive fewer awards and distinctions in STEM fields than do men, even when adjusting for their smaller representation in STEM professions. This, combined with the

relatively small number of women teaching at the university level, limits the extent to which young women are exposed to woman mentors and role models.

Undoubtedly, the reasons for the persistent underrepresentation of women in STEM are both complex and multi-faceted. Moreover, the solutions extend beyond seeding the workforce with encouraging mentors and ensuring equitable distribution of awards and other status markers. The Gender Parity Council is committed to working with its government and university partners on effective responses to this challenging issue.

To contribute to this larger goal, the Council, in 2007, proposed bringing together a diverse group of stakeholders to share perspectives and develop comprehensive, integrated, and nuanced recommendations for addressing gender issues in STEM education and employment. In the spring of 2007, and each of the subsequent two years, representatives from K-12 education, academia, industry, community-based organizations, government, and policymaking groups and institutions gathered to share knowledge and ideas and to construct both immediate and long-term recommendations for continued progress.

Several state-wide recommendations emerged over the course of the first two annual summits. Findings and recommendations are detailed in two *Annual Women in New Jersey's Science and Technology Workforce Summit* reports, archived at www.njsetc.net (2008, 2009). To frame this third *Annual Report*, a list of summarized recommendations follows:

1. *Use multi-media to promote STEM careers:* consider use or creation of an electronic resource portal; and the use of non-traditional media outlets, such as Facebook and MySpace, faith-based organizations, popular television shows, online gaming, and online classroom environments.
2. *Improve workplace climate and work-life balance:* promote “best practice” diversity initiatives; workplace protections; flexible scheduling; and accessible, affordable child care options.
3. *“Market” career pathways in the sciences in higher education:* promote “industry – institutional” partnerships, information campaigns, outreach in academia, teaching fellowships for graduate students in STEM disciplines, and industry involvement in local colleges and universities; and create a student resource guide.
4. *“Market” career pathways in the sciences in K-12 (or P-16) education:* promote STEM awareness in the classroom, parent involvement and awareness, experiential learning, teacher training, and STEM-aware guidance counseling.
5. *Improve mentoring practices:* create a Task Force for Mentoring in New Jersey, formal mentoring programs, and K-8 teacher mentoring; and promote informal mentoring opportunities.

Green Now!

On June 5th, 2009, 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 Third Annual Summit on Women in New Jersey's Science and Technology Workforce. The event was organized with co-sponsorship from BIO-1, a U.S. Department of Labor and Workforce Development Innovation in Regional Economic Development (WIRED) initiative, focused on fostering a high-skill, world-class workforce of bioscience talent in the central New Jersey region. The 2007 summit sponsor, the Office of Promotion of Women in Science, Engineering, and Mathematics (WiSEM) at Rutgers joined eighteen other co-sponsors (*pages 5-6*), representing a broad range of organizations with a stake in increasing women's participation in the STEM workforce.

A total of 188 people registered either prior to or at the event. Of these, half identified themselves as college or university educators (25 percent) or as government representatives or policy experts (25 percent). Other participants included community and professional organizers, industry representatives, K-12 educators, graduate and undergraduate students, researchers, and consultants.

The event was organized in two main parts. After opening remarks, the day began with a presentation on green jobs definitions and a panel session focused on current initiatives in green. The second portion of the event included two breakout sessions during which participants could choose from five topics relevant to the emerging green economy in New Jersey: emerging fields in the green workforce, multimedia and social networking, retooling incumbent workers for green jobs, sustainability policies and initiatives for education and workforce development, and undergraduate science education for a new workforce.

Networking and Opening Remarks

One of the strongest and most well-received components of this year's summit was the extension of opportunities for networking among participants. The registration and breakfast period was structured so as to encourage and facilitate opportunities for information sharing, networking, and generating ideas and agendas for future work.

This period was followed by a formal welcome and introduction from Robin Widing, Acting Executive Director of the SETC, and from Dianne Mills McKay, Chair of the Gender Parity Council. Lisa Jackson, Administrator of the Environmental Protection Agency (EPA), delivered a warm and thought-provoking message, sharing her thanks for the work of the Council as someone who has spent much of her career in New Jersey. She noted, "I know firsthand the value of your efforts in breaking down barriers and ensuring widespread opportunities across New Jersey, to setting a strong example for the rest of the nation; this is especially important in Science and Technology."

Presentation: “Green Jobs and Beyond: Jobs in New Jersey’s Energy Sector”

Jennifer Cleary, Senior Project Manager for the John J. Heldrich Center for Workforce Development at Rutgers University, presented findings from recent research on emerging job areas in New Jersey’s growing energy economy.¹ She began by outlining three key areas of the energy economy: traditional energy (e.g., customer service representatives, line workers, and power plant operators); energy efficiency (e.g., carpenters, electricians, energy auditors, and mechanical/electrical engineers); and renewable energy (e.g., installers, construction equipment operators, and research and development scientists). Though there is no standard definition of “green jobs,” the focus is generally on tasks that assist in some way in the reduction of energy usage and lowering of carbon emissions, with additional goals of protecting both ecosystems and nature and reducing waste and pollution. Thus, green jobs can be understood broadly to encompass many traditional and existing jobs to which can be added a “green layer” of knowledge and skills.

New Jersey is well-positioned to benefit from policies with the potential to stimulate energy job creation, including its Clean Energy Program, the Energy Master Plan and Governor’s Economic Assistance and Recovery Plan, and the federal-level American Recovery and Reinvestment Act of 2009. Ms Cleary cautioned that the effects of current program and policy efforts will not be felt immediately and will certainly be impacted by the broader economic climate. She noted that current expectations are that job demand will develop first in the residential energy efficiency sector, followed by commercial energy efficiency, solar projects, and research and development. The third wave of development is anticipated to be in the area of wind, biofuels, and other alternative energy production methods.

As the job demand picture becomes clearer, so will our understanding of the training needs that must be met. Ms. Cleary ended by describing the persisting need for traditional job skills training, including basic skills needed to perform well on pre-employment tests, English-language skills, work-readiness skills, and general industry knowledge. The emerging energy economy adds to these new and longer-term training demands in the areas of sustainability and systems knowledge, and understanding of green technologies, standards, and processes.

Panel Session: “It’s Easier Than You Think Being Green”

Dr. Mary Murphree, Senior Advisor for the Sloan Center on Innovative Training and Workforce Development and Center for Women and Work, facilitated a panel session focused on current developments in green technologies, training, and development. Panelists included Jennifer Awad, Compliance Director for Bayshore Recycling Corporation; Florence Block, Executive Director of the U.S. Green Building Council, New Jersey Office; Kenny Esser, Governor’s Advisor on Energy for New Jersey; Steven King, President and Chief Executive Officer of the Urban Development Group

¹ Reports cited included “The Workforce Needs of Four Energy Utilities in New Jersey,” funded by PSEG, New Jersey Resources, South Jersey Industries, and Atlantic City Electric; and “Green Jobs in New Jersey’s Energy Sector: Strategies for Building a World-Class Workforce for the State’s Renewable Energy and Energy Efficiency Industries,” funded by the New Jersey State Employment and Training Commission.

International; and Safiyah Sadiq, co-founders in the establishment of The Barack Obama Charter School for Academic Excellence.

Panel members introduced the audience to a number of initiatives and opportunities in the emerging green economy, as well as to ideas for connecting women to these opportunities. It was noted that stimulus dollars focused on green development offer the opportunity to create a skilled workforce, with access to living wage jobs and career advancement. The panel noted that almost three-quarters of firms polled for the report, "Climate Change and the Implications for Policy and Corporate Strategy," indicated their intent to make energy efficiency a moderate to high priority in the next two years, with the goal of cutting costs. This is likely to increase opportunities for employees both externally and from within, particularly for those who can develop expertise in sustainability.

The panel also made recommendations for individuals interested in transitioning into green careers. One approach may be to work towards a green job within one's current workplace, by establishing oneself as a "green advocate," networking with green groups, demonstrating green expertise, and volunteering with green programs. Another approach, applicable to a broad range of occupations, is to pursue additional training and education programs, either adding a "green layer" to existing skills or delving into a new skills area.

As the final portion of the panel session, Ms. Sadiq and Mr. King presented on the proposed Barack Obama Green Charter High School, identifying its mission as follows:

The mission of The Barack Obama Green Charter High School is to prepare students to become informed, engaged and independent critical thinkers and inspire leaders for sustainable development, with a focus on our environment. Students will be educated in a school community that fosters high expectations for both achievement and conduct and facilitates clear connections between the curriculum, the community and the world.

Mr. King and Ms. Sadiq's presentation made clear that the school is positioning itself to address a recommendation that has emerged consistently from each of the previous Science and Technology Summits: promote mentoring in science and technology for women beginning at early ages. Plans for the school include a strong mentoring component, including partnering college-age young women majoring in STEM with interested high school students, and recruiting professional women in STEM fields to provide career mentoring to young women. The school intends to use a combination of education, mentoring, and support to provide students with a broad perspective on green jobs, as well as to introduce them to specific and concrete skills, including solar panel installation, the creation of gray water systems, and organic growing practices. Mr. King and Ms. Sadiq shared that the planned curriculum includes information on energy and environmental policy, the production of alternative fuels, and carbon markets.

Discussion Breakout Sessions

The afternoon was organized into two successive sets of five breakout sessions, during which participants engaged in detailed discussions of each topic. Each session was facilitated by professionals with expertise in the specific topic area, who served jointly as discussants and technical resources. Because sessions were designed to encourage an exchange of ideas and information between facilitators and attendees, each session, though the topic was repeated, took on a direction and focus of its own.

Emerging Fields in the Green Workforce

Discussants: Jennifer Awad, Compliance Director for Bayshore Recycling; Kenny Esser, Governor's Advisor on Energy for New Jersey; Forough Gharamani, Dean of Business Technology at DeVry University (Panel Moderator/Discussion Leader); Dr. Monica Mazurek, Assistant Professor in the Department of Civil and Environmental Engineering, Rutgers University; and Dr. Carey Williams, Equine Specialist and Associate Director of the Equine Science Center at Rutgers University

The panel of experts provided their insight on issues and opportunities in the "real" green economy, with specific emphasis on emerging fields. Panel Moderator Forough Ghahramani provided the following summary and thoughts:

"The next few years will be pivotal as the US and many other nations around the globe undergo a massive shift in the way energy is produced and used in order to avert the effects of global warming. Green Technology will prove to provide the greatest economic opportunity for the U.S. through 2020 and beyond. Breakthroughs in green technology will create thousands of high-skilled jobs for years to come. Factors that influence establishing the U.S. as a clean and green industry leader include the following:

- Energy efficiency technology breakthroughs;
- The nation's environmental and energy policies;
- Investment commitment through funding sources in innovative clean and green technologies and businesses to stimulate the economy;
- Financial incentives for organizations to go green;
- Creating an environmentally conscious public, educated on what is meant by green technology.

"Issues to be addressed include: increasing energy conservation and energy efficiency by reducing consumption, closing the gap between supply and demand of electricity, reducing peak electricity demands, investing in sources for clean technology innovation and new businesses, and, to the extent possible, drawing electricity from renewable sources.

“Energy is a key area of focus for the economic viability of the U.S. It is important that we bring together academia, government, and industry to discuss the opportunities and challenges with a specific emphasis on involving the general public.

“Green jobs in the emerging fields will be a major part of the transformation to the clean energy economy. New Jersey alone could create more than 57,000 jobs by investing in alternative energies, altering its transit infrastructure, and retrofitting buildings to be more energy-efficient. It is essential to identify the jobs and skills.”

One highlight that clearly emerged from this panel discussion is the importance of sustained partnerships linking academic institutions, communities, and state and federal governments and groups. Such linkages create “fertile ground” for cutting-edge research and development and for the pioneering of new, alternative-energy technologies.

Multimedia and Social Networking

Discussants: Dr. Terri Boyer, Executive Director for the Center for Women and Work, Rutgers University; Sonda Sen, President of Sherisen International, Inc.; and Lisa Weisser, Communications and Outreach Specialist for Central New Jersey’s Bio-1 initiative.

This participant-led session opened with the definition of social media as supplied by Wikipedia: “Social Media is content created by people using highly accessible and scalable publishing technologies.”

The Benefits of Social Media Resources:

Conversation first focused on ways that social media resources can benefit girls and women. Participants noted that the “visual blindness” made possible by social media environments has the capacity to reduce gender and other forms of bias and provide a “comfort zone” for participants. The virtual environment can afford the individual greater control over how she is perceived by others. Of course, this is not a benefit to women alone: the relative anonymity allowed by social media can work to the advantage of men as well since they can provide comments and input on topics that they might normally have shied away from as being considered “unmanly”.

Another benefit of social media resources is the opportunity they provide for young women to see and even connect with women in established STEM careers. Although women are underrepresented in STEM fields, and particularly in STEM education, social media environments offer them greater access to a broad audience, and can exponentially increase the impact of these women as role models and mentors. Exposure to women working in these fields can also help overcome stereotypes about women who choose STEM careers.

Moreover, access is not limited geographically; whereas a woman working in technology development in a remote area might be the only woman in her field for miles, social media can provide her access to networks of other women in similar positions, without her having to leave

home. This can help reduce isolation, one of the leading attributions for women leaving science and technology fields.

Next, there is the “social” component of these venues. Research has shown that many women value building relationships in their careers, and are attracted to careers where they can see the impact of their work through mentoring and other connections. Social networking opens opportunities to build relationships both vertically and horizontally within their careers.

Finally, and particularly relevant to early exposure to STEM education, social media open access to resources appropriate to a range of learning styles and thereby enhance the possibility that multiple learning styles can be supported in one environment. This feature has the potential to facilitate learning and make STEM careers accessible and desirable to a broader range of students.

Challenges to using social media for career development:

Safety and privacy issues were a concern voiced by many participants, including identity theft, separation of personal and professional activities, and trustworthiness of systems. Particularly when dealing with at-risk groups like young girls, participants who worked in environments that were creating or using social media made extra efforts to provide safety measures to protect their users.

Access to technology, both from a physical perspective, as well as from a technological literacy perspective, was also discussed. Whereas the “digital divide” in terms of access to broadband may be lessening, there was quite a bit of discussion in this session about generational differences in skills and comfort with using these technologies. Of particular note was how the gender gap played into the generational differences, as many of these skills are acquired through the workplace, and women are much more likely than men to have been away from the workplace for greater lengths of time.

Session participants also discussed issues relating directly to the nature of technology. For example, many web-based resources are transient, and the sustainability and continuity of resources are continually in question. Also, many users noted the difficulty in identifying which social media sites are the “best” for their purposes. Specific subpopulations may flock to particular sites, but this can change, at times seemingly quite quickly. For example, participants noted that *Second Life* is very popular with professional women in mid to late career, but that younger generations are almost completely unfamiliar with it.

Participants noted that they are often unsure of how to most effectively use social media tools to market themselves or their programs, and particularly unclear on how to get this knowledge to women in the science and technology fields. Both breakout sessions on this topic included quite a bit of debate about whether users are investing in their career development, or wasting time, while engaged in social media usage. There was also debate on whether user-generated content is ultimately beneficial, or useless. For example, You Tube has filled many gaps in information that were formerly inaccessible to the broader population as users can create and post any content they want. However, that content is not vetted by any regulated community.

Examples of social media resources for career development:

Session participants offered examples of a number of currently available resources and generated ideas for future resource development. Several suggested creating a “one-stop” site that provides a portal to social media networks that can be used for career development, particularly for women in the science and technology fields. Such a portal could be used to vet resources for quality and utility. One example presented in the workshop was the Bio-1 WIRED website, which points users to networks on Facebook, LinkedIn, and its own career networks.

Another frequently mentioned recommendation was for more resources for younger women, including elementary school-aged girls. Given the focus of this generation on technology and social media, efforts to provide resources and encourage interest in the sciences through these formats are essential. Related to this, participants suggested that the popularity of games in which users create their own online environments (e.g., World of Warcraft), can be taken advantage of by the educational community. Creators of educational environments can learn from such games in the creation of educational tools.

Efforts to expand the use of social media to reach young audiences must be accompanied by the development and deployment of tools to ensure the privacy and safety of participants. A number of participants noted that their sponsor organizations created their own online systems, thereby avoiding some of the privacy risks of public systems, and having greater control over content. One example of this included the Nontraditional Career Resource Center’s student project pages.

Earlier in the session, participants noted that the generational knowledge and skills gap is a serious challenge to the productive and effective use of social media. In order to address this challenge, session participants suggested offering support services or tutorials. For example, LinkedIn has a “Learning Center” for users who are new, or are learning new tasks.

Another way of bridging the technological skills gap and expanding access to and use of social media is to 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. Participants also recommended capitalizing on the now popular use of online classroom environments (e.g. Blackboard and Sakai) and portfolio sites as transferable skills for career development.

Re-tooling Incumbent Workers for Green Jobs

Discussants: Florence Block, Executive Director of New Jersey’s chapter of the U.S. Green Building Council; Sarita Felder, Founder and President of Sarita Felder and Associates, LLC; Dianne Hartshorn, president of the Hartshorn Group; Ann Lee-Jeffs, Product Stewardship and Research and Development Manager, Johnson and Johnson Worldwide Environment, Health, and Safety (J&J WWEHS); Rosemarie Korbela, Human Capital Manager, The Port Authority of New Jersey and New York; Trish O’Keefe, Chief Nursing Officer, Morristown Memorial Hospital; Dr. Gilda Paul,

Director of the New Jersey, Eastern Pennsylvania, and Delaware Higher Education Recruitment Consortium; and Randi Schoenfelder, Managing Partner at Theodolite Human Capital, LLC.

This session focused on a discussion of how individuals can effectively retool themselves and their companies to move toward a more sustainable environment. The two groups who gathered to discuss this topic took on the tasks of defining green jobs, discussing strategies for becoming green employees and for transforming organizations into sustainable enterprises, and developing recommendations for government, industry, and education.

Panelist Sarita Felder discussed the new triple bottom line for business as “People, Planet, and Profit.” This theme brings together the social, environmental, and economic responsibilities that all companies need to use as guiding principles for their work. The tag line also provides some gender balance in its attraction to leaders: stereotypically, women are interested in social responsibility, and men in economic concerns, and this philosophy requires that both aspects be addressed.

Session participants noted that green jobs are not necessarily “new” jobs; rather, they often involve adding a layer of skills to make a job “green.” While this poses a particular gender challenge to re-tooling an incumbent workforce in which women are already under-represented, it might attract to the field some who would not have otherwise considered this career direction.

However, in order to take advantage of the green “trend,” and especially of federal and state funding for re-tooling and re-training the workforce for green jobs, measures need to be in place to ensure that funding is distributed equitably by gender. Participants recommended improvements in efforts to disseminate information to both women and men about retraining programs for green jobs available in the local community, especially at the local vocational-technical schools. Important to this effort is attention to disabusing the public of the notion that vocational technical schools are just alternative high schools. Session participants recommended that efforts be made to increase public awareness and appreciation of vocational schools as avenues for valuable training opportunities.

Specific attention throughout the conversation was given to at-risk populations, such as women in inner-cities and women leaving the prison system. For these vulnerable groups, green jobs offer the potential of a living wage. Particularly for formerly incarcerated women or women on probation or parole, training and employment in green fields may reduce recidivism and secure positive long-term social benefits.

Finally, session participants focused on the fact that green jobs are not an easy way into the workforce, nor are they necessarily a viable option for an unskilled workforce. They are often highly-skilled, and because those skills are an additional layer to the need for math and science skills, language and literacy skills, etc., they only make the skill set more sophisticated. This is an important point for workforce development policies.

Sustainability Policies and Initiatives for Education and Workforce Development

Discussants: Sandra Alberti, New Jersey Department of Education; Gerard Balmir, Jr., Laborers' International Union of North America; Judith Formalarie, New Jersey State Employment and Training Commission; and Joseph Tetteh, New Jersey Commission on Science and Technology

This session opened with brief presentations by each of the panelists, followed by detailed discussion between panelists and participants.

Joseph Tetteh discussed initiatives by the New Jersey Commission on Science and Technology for promoting green technology and exploring ways it can be implemented in the State. The Commission has formed a partnership with the Board of Public Utilities, and is providing funding to New Jersey technology companies for research and development of products.

Sandra Alberti detailed efforts by the New Jersey Department of Education to encourage schools, and especially vocational schools, to include and incorporate green technology into their curricula. School counselors are being equipped to provide relevant and timely green career information to students and parents. In addition, New Jersey students are now engaging in extensive and early career planning through a pilot program using Personalized Student Learning Plans. Schools are being encouraged to model green behavior, including instituting in-school recycling programs and using green technologies for building projects.

Judith Formalarie reported on funds entering the State through the 2009 American Recovery and Reinvestment Act (ARRA), some of which will directly benefit green projects, technologies, and job training. As the SETC develops the state's five-year employment and training plan, the green industry sector is a major focus. Ms. Formalarie also shared information on an exciting and innovative apprenticeship program called NJ Place, through which college credit can be earned for apprenticeship work.

Lastly, Gerard Balmir, Jr., spoke about Local 55, a new union formed specifically for those working in weatherization. The union anticipates substantial growth in weatherization jobs, to continue beyond the initial ARRA funding.

Participants in both sessions held on the topic of Sustainability Policies and Initiatives, noted the importance of efforts to promote career awareness of green jobs, encourage girls and women to pursue STEM courses and education, and break down stereotypical barriers within STEM occupations. Also noted was the fact that expanding entry into green jobs requires not only occupation-specific knowledge and training but also continued attention to "soft" skills and work ethic.

Attendees expressed surprise at the wealth of information available and concern that such information is not more widely known. They stressed the importance of marketing and promotion of various programs and efforts to a broader audience.

Undergraduate Science Education in a New Workforce

Discussants: Dr. Natalie Batmanian, Associate Director for the Promotion of Women in Science, Engineering, and Mathematics; Dr. Bonnie Diehl, Associate Provost for Academic Administration at Fairleigh Dickinson University; Dr. Ellen Mappen, Senior Scholar, National Center for Science and Civic Engagement and founding director of the Douglass Project for Rutgers Women in Math, Science, and Engineering; and Dr. Regina Riccioni, assistant dean at Douglass Residential College, Rutgers University and director of the Douglass Project for Rutgers Women in Math, Science and Engineering.

Session discussants and participants discussed innovations in undergraduate science and technology education, the importance of mentoring, and gender issues in the recruitment and retention of women students.

Session discussants noted that while 30 percent of entering undergraduate students intend to study science and engineering, over half of these students either switch majors or drop out; those who do not complete science and engineering programs are disproportionately women and students of color. Discussants then covered four major areas that colleges and universities can expand in order to increase retention among women students:

- Co-curricular intervention strategies, including skills development and active learning through social action projects;
- Coaching and mentoring;
- Classroom management, especially interactive learning and assessment; and
- Teaching and learning of math and science through the study of civic issues.

To demonstrate current efforts to implement retention strategies, discussants described innovative programs at Rutgers University, including the 1989 opening of the first residence hall in the nation devoted to women pursuing science degrees.

As noted in the *Overview* above, while the ranks of science professionals and students in the sciences are increasingly integrated, the degree of diversity at the uppermost levels of both the profession and its educational sector continues to be low. This presents a barrier to mentoring for women students as faculty tends to mentor students of the same demographic “type.” Dr. Batmanian noted that research suggests that mentoring pairs demonstrate greater satisfaction if matched by race and gender, and that same-race pairs indicate giving and receiving more psychological support than do cross-race pairs. She emphasized that this does not necessarily indicate that cross-race or cross-gender pairs are ineffectual, but rather that mentors would benefit from training.

The panel recommended the following actions for undergraduate science and technology departments:

- Develop a policy for a departmental model of cultural identity;
- Establish a mentoring program for the department or college;
- Establish a benchmarking and monitoring system for mentorship efforts;
- Maintain a list of professional network connections;
- Mandate a course in diversity for graduate students; and
- Create a system through which students can articulate concerns.
- Design science and mathematics courses that teach through the framework of civic issues and civic consequences as a method to engage students in STEM field

Recommendations

Green Jobs Definitions:

At the conclusion of the Summit, participants were asked to develop their own definitions of green jobs, both before and after the summit. Summit participants identified the following as elements of a green jobs definition:

A green job...

- emphasizes
 - ❖ shared responsibility to be green,
 - ❖ sustainability,
 - ❖ energy efficiency,
 - ❖ a healthy environment,
 - ❖ reducing the carbon footprint,
 - ❖ lowering emissions and levels of pollution and waste,
 - ❖ protecting wildlife,
 - ❖ community, and
 - ❖ education;
- connects current businesses to those that are sustainable;
- supports all industries as they become environmentally conscious;
- accelerates the creation of smart, clean, environmentally friendly positions;
- preserves or restores environmental quality;
- has, as a focal concern, the environmental impact of the work;
- has a “net positive” impact on the environment (“is environmentally benign”);
- reinvests in communities;
- encompasses traditional skills and additional skills necessary for emerging green technologies;
- stimulates the economy;
- provides opportunities for advancement;

Several participants noted that, following the forum, they have a much clearer understanding of the diverse areas in which green jobs will be available and of the extent to which policies and procedures will affect all employment sectors.

Summary of Final Recommendations:

Numerous recommendations emerged from the 3rd Annual Women in New Jersey's Science and Technology Workforce Summit. These are presented throughout the report above, along with the presentations and discussions that supported them. A summary of key recommendations is provided below:

I. Facilitate linkages between academic institutions, communities, and state and federal governments and groups.

- Model a program to bring together government, academic institutions, and companies to support cutting-edge research and development, and to pioneer new alternative-energy technologies.

II. Improve and expand employment and job skills training programs.

- Develop our understanding of successful training programs for both traditional jobs skills (i.e., interviewing, work-readiness skills, and English-language skills) and industry-specific skills;
- Monitor the distribution and impact of green jobs training funds by gender;
- Increase public awareness and appreciation of vocational schools as avenues for valuable training opportunities; and
- Target specific at-risk populations of women for training and re-training, including...
 - ❖ those leaving the prison system,
 - ❖ those in inner-cities, and
 - ❖ those in workforce programs related to TANF.

III. Use multi-media to promote STEM careers.

- Create a “one-stop” site that provides a portal to social media networks that can be used for career development, particularly for women in the science and technology fields;
- Develop high-quality social media resources for younger women, including elementary school-aged girls;
- Capitalize on the popularity of games in which users create their own online environments, in the creation of online educational environments and tools;
- Offer support services or tutorials to bridge the generational gap in the use of social media;
- 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.

IV. "Market" career pathways in the sciences in higher education.

- Expand efforts by colleges and universities to increase retention among women students in science and technology through...
 - ❖ Co-curricular intervention strategies, including skills development and active learning through social action projects;
 - ❖ Coaching and mentoring;
 - ❖ Classroom management, especially interactive learning and assessment; and
 - ❖ Teaching and learning of math and science through the study of civic issues.

V. "Market" career pathways in the sciences in K-12 (or P-16) education.

- Continue receiving updates on the development of the Barack Obama Green Charter High School, which will include a mentoring program designed to promote young women's development in sustainability;
- Promote academic curricula that are project-based, rather than theory-based, and integrative, especially in elementary school;
- Provide information to parents about career options and their influence over their child's career choice; and
- Focus professional development of guidance counselors more specifically on directing STEM course choice consistent with student strengths and interests.

VI. Improve mentoring practices.

- Expand efforts by collegiate science and technology departments to...
 - ❖ Develop a policy for a departmental model of cultural identity;
 - ❖ Establish a mentoring program for the department or college;
 - ❖ Establish a benchmarking and monitoring system for mentorship efforts;
 - ❖ Maintain a list of professional network connections;
 - ❖ Mandate a course in diversity for graduate students; and
 - ❖ Create a system through which students can articulate concerns.

The New Jersey Council on Gender Parity in Labor and Education is sharing the recommendations made in these sessions with the New Jersey State Legislature, and with appropriate State Agencies. The Council will host its fourth annual summit on May 21st, 2010, at The Conference Center at Mercer, to continue this timely and important work.

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