

# **Task Force on the Status of Women and Information Technology:**

**Report to the Governor and Legislature of Maryland**

## **In the Center of the Storm: Addressing the Challenges of Maryland's Tightening IT Labor Market**

*October 16, 2006 (REVISED)*

*The following recommendations were developed in  
accordance with Maryland Law - Section 2 of Chapter  
489, Acts of 2004*

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- The Honorable H. Victoria Goldsborough, Town of Denton, Council Member
- Linda Gooden, President, Lockheed Martin Information Technology
- The Honorable Jeannie Haddaway, District 37B, Caroline, Dorchester, Talbot, and Wicomico Counties
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- The Honorable Sally Jameson, District 28, Charles County
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- Beth Perlman, Chief Information Officer and Senior Vice President, Constellation Energy
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- Donna Stevenson, CEO, Early Morning Software, Inc.
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- Margie Kelbel, Senior Marketing Strategist, Department of Business and Economic Development
  - *Appointed to staff the Task Force*

## EXECUTIVE SUMMARY:

The U.S. National Academies of Science and Engineering and the Institute of Medicine recently released a report entitled “Rising above the Gathering Storm” with a strong and clear message – take action now to address the challenges of a growing global competitiveness or be prepared for the consequences to which a shrinking science and technology talent pool will lead. That report has led to a hailstorm of discussion and debate, including a focused reception on May 17, 2006 at the National Center for Women and Information Technology meetings in Washington, D.C. It became clear that among the business, education, and government participants from across the U.S., only Maryland had a plan of action to address the declining participation of women in IT. That plan began in 2004 with the legislatively created statewide Task Force to address the challenges of ensuring a diverse, highly skilled workforce in information technology (IT) and related fields.

Today, Maryland faces unemployment rates at 4.5%<sup>1</sup>, an aging technology workforce<sup>2</sup>, and the relocation of 100,000 jobs to the region<sup>3</sup>, most of which will be in engineering and IT. The storm is no longer looming; it is upon us. Time has effectively run out for employers who are scrambling to hire employees from among the declining pool of graduates in IT and related technology fields. Too many students in Maryland and across the U.S. still have the false impression that there are no jobs in these fields. New enrollments in computer science departments have dropped by 46 percent since 2001<sup>4</sup>. Current gaps in statewide data collection for both the education and business sectors currently hinder efforts to strategically address growing workforce shortages. The challenges of recruitment are quickly becoming the challenges of retention as businesses seek to hire employees from anywhere they can be found.

Maryland cannot wait for recommendations and federal actions, but instead must *today investigate strategies and develop a plan for implementation of the strategies to address the challenges that will better meet the state's workforce demands in all career areas where technology is used. Current research indicates that increasing women's participation in IT and related technologies is the fastest and potentially most effective method for addressing the looming workforce shortages as women increase their participation in the labor market and their enrollment and graduation in colleges and universities around the US and in Maryland.* In addition, Task Force members concluded from their two years of study that by focusing on the needs of those less likely to participate in the IT workforce, specifically women, Maryland could effectively address the issues affecting the lack of participation of all groups from secondary education through leadership levels in the workforce.

Given the charge, the Task Force on Women and IT focused on developing a comprehensive statewide women and information technology plan with strategies for implementation and public promotion. The recommendations of this report include input from men and women in the leadership of every state agency that touches economic and workforce development, major businesses and associations, and state legislators. Together, they created a comprehensive plan to address the IT workforce shortage in Maryland to ensure that the State leads the nation in providing a high standard of living for its citizens, a high quality workforce for growing businesses, and a strong technical base for enhanced economic competitiveness.

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<sup>1</sup>Maryland Department of Labor. (August 24, 2006). *Maryland Career and Workforce Information*. Retrieved September 3, 2006 from <http://www.dllr.state.md.us/lmi/laus/maryland2006.htm>.

<sup>2</sup>National Science Board. (May 2004). *Science and Engineering Labor Force Highlights*. Retrieved September 3, 2006 from <http://www.nsf.gov/statistics/seind04/c3/c3h.htm>.

<sup>3</sup>Fenton, Justin. (May 19, 2006). *Base-linked Jobs Begin to Arrive in Maryland*. Baltimore Sun.

<sup>4</sup>CRA Taulbee reports. [www.cra.org/statistics](http://www.cra.org/statistics). Accessed. October 13, 2006

The Governor and Legislature of Maryland charged the Task Force on Women and Information Technology with:

1. Studying the issues relating to the declining involvement of girls and women in information technology;
2. Studying the impact this decline has on the overall technology literacy of Maryland's workforce;
3. Studying the impact of this decline on the future of the information technology workforce in Maryland;
4. Creating awareness throughout the state on the issue of women and information technology and the findings of this Task Force;
5. Identifying and examining existing programs and services, laws, and regulations with respect to identifying practices that best address the issue in education and workforce development;
6. Investigating strategies to address the challenges that will better meet the State's workforce demands in all career areas where technology is used;
7. Developing a statewide comprehensive women and information technology plan and strategies for plan implementation and public promotion of the plan; and
8. Facilitating coordination and communication among state and local agencies and organizations regarding achieving the goals of the plan.

Following two years of in-depth research and committee work, the Task Force concluded that it is imperative for Maryland's economic future that the following outcomes be achieved:

1. Expand educational opportunities that will significantly increase student enrollment, retention, and graduation rates leading to increased employment, placement and career growth for women in the IT workforce and related technology fields; and
2. Develop strategies that support the recruitment, retention, and advancement of women in IT and related technologies in the workforce.

To support this vision, the Task Force developed the following recommendations:

#### **K – 12 Education**

- I. Provide significant statewide support for effective informal education programs with demonstrated success in encouraging interest in science and technology among students, particularly girls, minorities, and economically disadvantaged students.
- II. Develop a targeted information campaign and market to parents and community members such that (1) technology literacy is perceived to have equal importance and value to reading and mathematics literacy, (2) diversity is valued and supported at all levels of education and the workforce, and (3) IT careers are seen as viable career opportunities for all.
- III. Referencing the National Academies' recommendations<sup>5</sup> and Maryland Professional Development Standards, strengthen the skills and compensation of 5000 current teachers and hire 200 new Highly Qualified Technology Teachers by providing summer institutes, grants for master's programs, computer science advanced placement teacher training, and other options to achieve this goal.
- IV. Support the implementation of the Technology Literacy Standards for every child in grade 8 by 2010.

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<sup>5</sup> Augustine, Norman. (October 20, 2005). *Rising above the Gathering Storm: Energizing and Employing American for a Brighter Economic Future*. Retrieved September 3, 2006 from [http://www7.nationalacademies.org/ocga/testimony/Gathering\\_Storm\\_Energizing\\_and\\_Employing\\_America2.asp](http://www7.nationalacademies.org/ocga/testimony/Gathering_Storm_Energizing_and_Employing_America2.asp)

- V. Deliver consistently across all twenty-four school systems one credit of rigorous and engaging technology education for every child by 2010.
- VI. Ensure all students have access to statewide pathway programs for IT and related technology fields.
- VII. Improve data collection from education, government, and business sectors to better understand the current state, measure progress towards goals and identify effective strategies to achieve all outcomes.
- VIII. Expand options beyond the current advanced placement computer science assessment course, including providing statewide a rigorous computer science survey course accepted for credit by Maryland Higher Education and engaging to a diversity of students.

### **Post-secondary Education**

- IX. Develop a collaborative statewide strategy by 2008 to enhance pathways to IT careers among the K-12 community, universities, and colleges with a focus on the recruitment, retention, and graduation of women.
- X. Provide access to electronic and/or traditional mentoring for every computer science and engineering college student through employment to increase retention.

### **Workforce**

- XI. Support the work of the Governor's Workforce Investment Board's (GWIB) IT cluster to co-host with the Task Force a formal Governor's CEO/MD leadership summit to facilitate discussion on diversity efforts, changing cultures, and expectations of workers.
- XII. Create an organized network to support, mentor, nurture, and provide role models to women in the IT workforce, including senior-level professional women.
- XIII. Corporations should focus on and be rewarded for gender inclusiveness, such as employee-centered care, friendly and flexible working conditions, and a healthy work-life balance.
- XIV. In collaboration with the GWIB, host a meeting of state workforce and education leaders with business representatives to explore new options for increasing access to security clearances.
- XV. Collect and disseminate data on women's participation in high-tech industries in Maryland. Using this data, create strategies to elevate women business owners and women in senior-level professional roles to the boards of businesses in the industry.

### **From the recommendations come the following implementation strategies.**

Create and fund a statewide public-private resource center entitled the Maryland Women in Technology Collaborative to plan, recommend policy, provide advocacy, and monitor efforts to achieve the recommendations of the Task Force. Funding must be renewable every five years until goals are set and achieved. Connect the statewide public-private resource center to businesses, state agencies, higher

education and K-12 organizations to support their initiatives, build collaborative synergy, disseminate effective practices, and achieve recommended actions. The Center's purpose would be as follows:

- a. Collect data needed for baseline target setting and outcome evaluation relating to the current status of elective IT class enrollment and retention in secondary education and at the postsecondary level to understand the differing challenges, opportunities, programs, and efforts for increasing women's participation in IT and related technologies.
- b. Develop targeted collaborative teams representing business, government and education to create awareness of the issues and implement solutions.
- c. Fund strategies in support of improving quality science and technology education and opportunities beginning in K-12 education through college and university (including community colleges) to the IT workforce.
- d. Provide support for media to improve the image of these career options for all, particularly women.

*RECOMMENDED FUNDING:*

The Taskforce recommends full funding for plan implementation and is requesting \$500,000 annually for five years for start-up, staffing, and resource development. Funding will be matched by private investment in a ratio of one to one. The National Science Foundation and other federal funding will be sought to create a statewide resource with a national and international reach.

*In conclusion, the Task Force appreciates the vision of the Maryland legislators and the governor in establishing this Task Force and looks forward to obtaining the funding and support needed to achieve the above initiatives.*

The following pages provide detailed findings that support these recommendations.

## FULL REPORT:

The National Center for Women and Information Technology (NCWIT) posits that the reason no one nationally has successfully addressed the declining participation and low numbers of women in information technology is because “scientific studies are immature” and “best practices lack rigorous testing.” Carnegie Mellon Professor Lenore Blum, a leading researcher in this area, states that “the reasons for women entering – or not entering – the field of computer science have *little* to do with *gender* and a *lot* to do with *environment* and *culture* as well as *perception* of the field.” She concludes that efforts to address the declining percentages of women in information technology (IT) will also encourage the involvement of men and enhance the participation of other non-traditional groups, such as African Americans.

The Task Force divided its tasks into four areas of focus: primary and secondary education, post-secondary education, workforce recruitment and retention, and women in leadership. The Task Force used this framework to address its charges. After two years of committee work, reviewing research, and talking to leading US experts, the Taskforce was able to **Develop a statewide comprehensive women and information technology plan and strategies for plan implementation and public promotion of the plan (Charge #7).**

To the extent possible, the Task Force looked at national and statewide data on IT in education and the workforce, disaggregated by gender. One outcome of the series of meetings the Task Force has held is the recognition of the important role that gender and cultural differences play within organizations. *The IT culture—whether within educational institutions or businesses—is traditionally not supportive of the many roles women play in society.* This recognition led to an understanding that varying strategies will be needed for addressing girls’ and women’s full participation in information technology and related fields. These recommendations are only a beginning point.

## OUTCOMES:

All efforts should do the following:

- Map the recommended plan and strategies to current statewide activities and connect strategies to key findings,
- Involve institutional or organizational leadership to implement the initiative recommendations,
- Implement, evaluate, and report on programs that impact women and IT that were developed prior to or as a result of these recommendations so that knowledge can be captured about effective practices, and
- Disseminate information about the programs and opportunities to other colleges and universities and businesses in Maryland and beyond.

Recommendations were based on the Taskforce findings that resulted from the following two charges:

**Study the issues relating to the declining involvement of girls and women in information technology (Charge #1).  
Study the impact this decline has on the overall technology literacy of Maryland's workforce (Charge #2).**

| Key Findings K - 12  | Impact  | Recommendations  |
|--|---|--|
| Existing research has identified many barriers to girls' full participation in IT which is informed and reinforced by multiple people and cultural factors. <sup>6</sup> National and statewide data on effective practices in the recruitment and retention of students, particularly girls, suggests that informal education avenues are effective in recruiting girls in IT. <sup>7,8</sup> | By secondary school, many girls opt out of choices that could engage their interest or encourage their participation in IT or related fields. Informal education programs for middle school children have demonstrated a statistically significant impact on girls' (and boys) interest in IT and related technology careers, like engineering. | I. Provide significant statewide support for effective informal education programs with demonstrated success in encouraging students' interest in science and technology, particularly girls, minorities, and economically disadvantaged students.   |
| There is little awareness of the career opportunities that the IT and related technology fields offer. In fact, the misconception of there being no jobs in IT is still prevalent due to media reports on outsourcing and the impact of the dot-com bubble burst.  | Students are being discouraged from entering IT and engineering fields by well-meaning parents, teachers, and counselors who are simply misinformed.  | II. Develop a targeted information campaign and market to parents and community members such that (1) technology literacy is perceived to have equal importance and value to reading and mathematics literacy, (2) diversity is valued and supported at all levels of education and the workforce, and (3) IT careers are seen as viable career opportunities for all.                                     |
| The Maryland State Department of Education (MSDE) Teacher Staffing Report for 2005-2007 declared both technology education and computer science (grades 7 – 12) to be content areas with critical shortages of teachers. (p.v)   | The shortage of teachers will impact school offerings and the quality of classes related to technology education and computer science.  | III. Referencing the National Academies' recommendations <sup>9</sup> and Maryland Professional Development Standards, strengthen the skills and compensation of 5000 current teachers and hire 200 new "Highly Qualified Technology Teachers" by providing summer institutes, grants for master's programs, computer science advanced placement teacher training, and other options to achieve this goal. |

<sup>6</sup> Sanders, Jo (June 2005). *Gender and Technology: A Research Review*. Retrieved September 18, 2006 from <http://www.josanders.com/pdf/gendertech0705.pdf>.

<sup>7</sup> The Urban Institute Education and Policy Center. (December 2005). *Summary Report on the Impact Study of the National Science Foundation's program for Women and Girls*. Retrieved September 4, 2006 from <http://www.nsf.gov/pubs/2001/nsf0127/nsf0127.pdf>.

<sup>8</sup> Morrell, Claudia, Shelia, Cotten, Shelia, Sparks, Alisha & Spurgas, Alyson. (November 2004). *Computer Mania Day: An Effective Intervention for Increasing Youth's Interest in Technology*. Retrieved September 4, 2006 from <http://www.umbc.edu/cwit/pdf/Computer%20Mania%20Day.pdf>.

<sup>9</sup> Augustine, Norman. (October 20, 2005). *Rising Above the Gathering Storm: Energizing and Employing American for a Brighter Economic Future*. Retrieved September 3, 2006 from [http://www7.nationalacademies.org/ocga/testimony/Gathering\\_Storm\\_Energizing\\_and\\_Employing\\_America2.asp](http://www7.nationalacademies.org/ocga/testimony/Gathering_Storm_Energizing_and_Employing_America2.asp).



| Key Findings K - 12  | Impact   | Recommendations  |
|--|--|--|
| MSDE is providing national leadership in its early adoption of Technology Literacy standards by Grade 8 (TL8). Their efforts will help ensure that all students are technologically literate in Maryland.  | Charge # 3 to the Task Force cannot be completed until technology literacy is defined and efforts implemented.   | IV. Support the implementation of the Technology Literacy Standards for every child in grade 8 by 2010   |
| All Maryland high school students are required to take one credit in Technology Education as a graduation requirement. Local school systems must align curriculum to the Technology Education Voluntary State Curriculum.  | Current technology education varies from school system to school system with varying levels of rigor and exposure to IT. MSDE is currently working with local school systems, post-secondary partners, and industry representatives to develop rigorous statewide pathway programs of study. These programs consist of a sequence of courses that prepare students for both career and post-secondary opportunities. Several of the IT programs lead to industry-recognized certification. | V. Deliver consistently across all twenty-four school systems one credit of rigorous and engaging technology education for every child by 2010.<br><br>VI. Ensure all students have access to statewide pathway programs for IT and related technology fields.   |
| (1) Statewide quantitative data collection is available through the Career and Technology Education (CTE) completer programs in IT and technology-related areas, but not available for elective courses outside CTE. (2) In addition, while there are many non-profit, educational, and business efforts in Maryland that are working to increase the recruitment and retention of all IT students, including women, little is known about their success in reversing statewide downward trends. | (1) Enrollment information in elective IT classes must be done on a county by county basis, which makes statewide data collection very time intensive and evaluation of statewide program impact over time by gender difficult. (2) There is no unified coordination to address this knowledge gap creating duplicative efforts and challenges with resource allocation.   | VII. Improve data collection from education, government, and business sectors to better understand the current state, measure progress towards goals and identify effective strategies to achieve all outcomes.  |
| While girls make up 56% of the total advanced placement test takers and 48% of the AP Calculus test takers in 2005, they represented only 15% of the AP Computer Science test takers nationally and 15.7% in MD. <sup>10</sup>   | There is a growing national concern that the AP test is a programming-focused assessment and not an introduction to the field of computer science, which discourages many students, including girls.   | VIII. Expand options beyond the current advanced placement computer science assessment course, including providing statewide a rigorous computer science survey course accepted for credit by Maryland Higher Education and engaging to a diversity of students. |

<sup>10</sup>College Board. (2005). Maryland *Totals: School AP Grade Distribution by Total and Ethnic Group*. Retrieved September 4, 2006 from [http://www.collegeboard.com/prod\\_downloads/student/testing/ap/sumrpts/2005/xls/MARYLAND\\_Summary.xls](http://www.collegeboard.com/prod_downloads/student/testing/ap/sumrpts/2005/xls/MARYLAND_Summary.xls).

| Key Findings Post-Secondary   | Impact   | Recommendations  |
|---|--|--|
| (1) The participation of undergraduate women in computer science has declined from 37% in 1985 to 22% today. <sup>11</sup> (2) The fastest-growing major segment of higher education is community colleges <sup>12</sup> , which also serve, on average, larger percentages of women. | With women composing 43% of the total workforce <sup>13</sup> and declining in their participation in IT <sup>14</sup> , the pool for workers continues to narrow. Current issues in computer science limit transferability of courses between institutions because of differing computer languages (Java versus C++) and use of operating systems (Windows versus Linux) making students repeat multiple classes. | IX. Develop a collaborative statewide strategy by 2008 to enhance pathways to IT careers among the K-12 community, universities, and colleges with a focus on the recruitment, retention, and graduation of women.     |
| Colleges and universities are challenged to deliver retention programs for women or men in IT programs due to limited resources.  | In a three-year evaluation study of factors affecting student retention in science, technology, engineering, and mathematics (STEM) conducted at UMBC (CWIT supported), mentoring was the only statistically significant factor and positively impacted students' GPAs.  | X. Provide access to electronic and/or traditional mentoring for every computer science and engineering college student through employment to increase retention.  |
| Key Findings Workforce  | Impact   | Recommendations  |
| Small group discussions with new IT workers indicate that factors that have historically discouraged women from technology careers (work life balance, unfriendly culture) may be discouraging men as well.   | A recent verbal report by a local aerospace company to the Task Force based on a focus group of employees indicated that areas that were deemed traditionally women's concerns are now concerns for both sexes and many ethnic and racial groups.  | XI. Support the work of the GWIB-IT cluster to co-host with the Task Force a formal Governor's CEO/MD leadership summit to facilitate discussion on diversity efforts, changing cultures, and expectations of workers. |

<sup>11</sup>National Center for Women and Information Technology. (2006). *By the Numbers*. Retrieved from September 4, 2006 from [http://www.ncwit.org/pdf/2006\\_NCWIT\\_Statistics.pdf](http://www.ncwit.org/pdf/2006_NCWIT_Statistics.pdf).

<sup>12</sup> National Science Board. (2004). *Science and Engineering Indicators Higher Education in Science and Engineering*. Retrieved September. 4, 2006 from <http://www.nsf.gov/statistics/seind04/c2/c2s1.htm>.

<sup>13</sup> The U.S. Equal Employment Opportunity Commission (2005). *Annual Report on the Federal Work Force- Fiscal Year 2004*. Retrieved September 4, 2006 from <http://www.eeoc.gov/federal/fsp2004/section1a.html>

<sup>14</sup> Stephan, Paula & Levin, Sharon. (2004). *Retention of Women and Underrepresented Minorities in the IT Workforce*. Retrieved September. 4, 2006 from [http://www2.gsu.edu/~ecopes/itworkforce/reports/it\\_kansas.pdf](http://www2.gsu.edu/~ecopes/itworkforce/reports/it_kansas.pdf)

| Key Findings Workforce  | Impact   | Recommendations  |
|---|--|--|
| <p>(1) Retention in IT differs by gender, but not by race, with women leaving at a higher rate than men within a six-year period.<sup>15</sup> (2) In Maryland, women have reported anecdotally a lack of incentive to remain in the IT workforce because of a lack of flexibility, the absence of a strong corporate commitment to help working mothers in the 24 hour/7 days a week environment of IT, and a culturally insensitive work environment. This needs more research.</p> | <p>Retention is a growing issue as employees learn that company jumping can net them significant salary increases and bonuses. Women report leaving IT careers soon after entering. A major IT company reported they are experiencing an inverted pyramid – too few new employees entering, making the business unstable and unsupportable. Smaller companies and new start-ups with smaller margins for increasing salaries may be threatened. New technology start-ups and larger companies may be hesitant to expand business into Maryland because of the extremely tight technology labor market.</p> | <p>XII. Create an organized network to support, mentor, nurture, and provide role models to women in the IT workforce, including senior-level professional women.</p> <p>XIII. Corporations should focus on and be rewarded for gender inclusiveness, such as employee-centered care, friendly and flexible working conditions, and a healthy work-life balance.</p> |
| <p>Many businesses in Maryland are limited in their ability to hire from abroad because of security issues. Businesses that are not constrained by the need for U.S. workers have already outsourced technology-related workforce needs, often to India, and will continue to do so because of the shortage of workers, not only because of the lower costs.</p>  | <p>Businesses like Constellation Energy are outsourcing IT jobs to India. Businesses that need security-cleared workers are struggling to identify and hire needed employees, creating a challenge to their ability to conduct and expand business.</p>  | <p>XIV. In collaboration with the GWIB, host a meeting of state workforce and education leaders with business representatives to explore new options for increasing access to security clearances.</p>   |
| Key Findings Advancement  | Impact   | Recommendations  |
| <p>Nationally, women make up 50.6% of management professionals, but only 15.7% of the next level of corporate officers. In technology companies, women corporate officers make up only 11%.<sup>16</sup> In Maryland, this data is not collected.</p>   | <p>(1) According to Catalyst, a research company, Fortune 500 companies with the highest percentages of women corporate officers experienced, on average, a 35.1% higher return on equity (ROE) and 34.0% higher total return to shareholders (TRS) than those with the lowest percentages of women corporate officers.<sup>17</sup> (2) The absence of women in representative numbers in the IT industry may hinder women's progress toward economic parity and constrict women's contributions in the construction of the technologies</p>  | <p>XV. Collect and disseminate data on women's participation in high-tech industry in Maryland. Using this data, create strategies to elevate women business owners and women in senior-level professional roles to the boards of businesses in the industry.</p>  |

<sup>15</sup>Catalyst, via Fortune magazine, 2003; "Employment Outlook: 2004 – 2014."

<sup>16</sup> Catalyst. (2005). *2005 Catalyst Census of Women Corporate Officers and Top Earners of the Fortune 500*. Retrieved September 4, 2006 from <http://www.catalystwomen.org/files/exe/2005%20COTE%20-%20Executive%20Summary.pdf>.

<sup>17</sup> Catalyst. (2005). *2005 Catalyst Census of Women Corporate Officers and Top Earners of the Fortune 500*. Retrieved September 4, 2006 from <http://www.catalystwomen.org/files/exe/2005%20COTE%20-%20Executive%20Summary.pdf>.

## **IMPLEMENTATION:**

Given the findings, their impact, and the recommendations, the Task Force undertook the following charge in support of implementation.

### **Identify and examine existing programs and services, laws, and regulations with respect to identifying practices that best address the issue in education and workforce development (Charge #5).**

Title IX of the Education Amendments of 1972 requires all entities receiving any form of federal financial assistance to prohibit sex discrimination in their education programs or activities.

At the post-secondary level, the Task Force hosted informal conversations with representatives from colleges and universities. It was recognized early that there existed a wide knowledge gap relating to current efforts in support of all students, but particularly girls and women in computing. The following existing efforts were uncovered at the locations identified:

- *Outreach efforts to K-12 community in IT, including camps and informal education* UMBC, UM College Park, Johns Hopkins University (JHU), Morgan State University (MSU), Anne Arundel Community College (AACC), Towson University (TU), and Washington College
- *Campus-based scholarship programs for academically talented, underrepresented IT students* UM College Park, UMBC, TU, Loyola College (LC)
- *Scholarship programs for economically disadvantaged IT students* Community College of Baltimore County (CCBC), LC, UMBC
- *Cohort building efforts for women in IT* UMBC, College of Southern Maryland, CCBC, JHU
- *Curriculum Revision Initiative* JHU
- *Retaining Women in the Workforce* Association for Women in Computing, Baltimore Chapter; Association for Women in Computing, Johns Hopkins Student Chapter; Baltimore Web Women

Each conversation with an institutional representative revealed additional, unknown programs and efforts, many with limited or no evaluation elements to measure program success.

### **The Task Force recommends the following elements be funded for implementation.**

Create and fund a statewide public-private resource center entitled the Maryland Women in Technology Collaborative to plan, recommend policy, provide advocacy, and monitor efforts to achieve the recommendations of the Task Force. Funding must be renewable every five years until goals are set and achieved. Connect the statewide public-private resource center to businesses, state agencies, higher education and K-12 organizations to support their initiatives, build collaborative synergy, disseminate effective practices, and achieve recommended actions. The Center's purpose would be as follows:

- a. Collect data needed for baseline target setting and outcome evaluation relating to the current status of elective IT class enrollment and retention in secondary education and at the postsecondary level to understand the differing challenges, opportunities, programs, and efforts for increasing women's participation in IT and related technologies.
- b. Develop targeted collaborative teams representing business, government and education to create awareness of the issues and implement solutions.
- c. Fund strategies in support of improving quality science and technology education and opportunities beginning in K-12 education through college and university (including community colleges) to the IT workforce.
- d. Provide support for media to improve the image of these career options for all, particularly women.

**The implementation strategy supports the following:**

**Create awareness throughout the State on the issue of women and information technology and the findings of this Task Force (Charge #4).**

On October 26, 2006, the Task Force, under the leadership of the Maryland State Department of Business and Economic Development (DBED) and in cooperation with the University of Maryland, Baltimore County's Center for Women and Information Technology (CWIT) and Maryland Technology Development Corporation (TEDCO), will host a statewide forum to address Maryland business needs to recruit, retain, and retrain employees by targeting women in order to maintain a productive workforce. The forum will:

1. Achieve Objective Number 4 of the Governor's Task Force Legislation- "Create awareness throughout the State on the Issue...."
2. Serve as a resource fair for women entrepreneurs in biotech, IT, and engineering related areas.
3. Provide information relevant to the interests of the target group.
4. Connect to current organizations supporting women in IT and related fields, such as Women in Bio, the Tech Council of Maryland, the Greater Baltimore Technology Council, and the Society of Women Engineers (SWE).
5. Highlight opportunities for leadership development.
6. Release a website highlighting products and services for current and future women technology entrepreneurs, business professionals, and students in Maryland.
7. Form a new Maryland-focused women and technology network for mentoring and resource support.

**Investigate strategies to address the challenges that will better meet the State's workforce demands in all career areas where technology is used (Charge #6).**

Several strategies are currently underway in Maryland:

1. At the secondary level, Montgomery County Public School (MCPS) System, under the leadership of MCPS director Shelley Johnson and Montgomery County Council member Nancy Floreen, has prepared a series of recommendations to support a more diverse workforce through

their *Montgomery County Task Force on Girls and IT*. That Task Force identified the following actions to ensure that girls and other underrepresented groups within MCPS are prepared to enter the workforce with the critical skills needed:

- a. Create a comprehensive marketing plan to raise awareness among parents/guardians and educators that the skills and talents of girls and other underrepresented groups are vital to technology-related professions.
  - b. Partner with business and higher education to create a seamless K-16 educational system that aligns curriculum and creates technology pathways.
  - c. Institute an accountability and review system to measure progress and ensure student success.
  - d. Require technology-related units or coursework for all K-12 students by 2010, providing appropriate professional development for educators.
2. The GWIB is developing a series of industry-specific workforce strategies led by employers in Maryland. They have already finished a number of industry scans and are shortly to be turning to the area of IT. The Task Force and GWIB have agreed to work together closely and supportively toward shared goals.
  3. MSDE has created a Career Development Advisement System that includes career awareness activities for the K-12 community, including parents, teachers, counselors, and students. This can be used to help these populations understand the findings of the Task Force (i.e. girls' lack of interest in IT careers).
  4. Concerned by the increasing demand for a talented IT workforce and the concurrent decline of women in IT courses and careers, five Maryland colleges and universities representing research, independent, comprehensive, historically black, and community colleges and universities began discussions for creating change after members realized the distinctive nature of the barriers and opportunities that exist for women among the different post-secondary education populations and their unique missions, cultures, and administrative frameworks. The Consortium will submit a proposal to the National Science Foundation (NSF) in May 2007 for funding that would achieve the following four objectives:
    - a. Create a statewide scan of all colleges and universities in Maryland to develop a clear picture of women's recruitment, enrollment, retention, and graduation in IT post-secondary education in Maryland and map the barriers, current programs, and resource gaps that exist.
    - b. Based on the scan and current research, implement new or continue current activities as needed by type of institution to enroll and retain women in IT to graduation and assess long-term sustainability. Efforts will address three areas:
      - o Improve campus climate in IT programs and departments,
      - o Create community among the participating post-secondary education partners, and
      - o Create a purposeful resource for Maryland's colleges and universities as well as the nation.
    - c. Push to sustain demonstrated effective practices by reporting all outcomes to the leadership in Maryland, including to this Task Force on Women and IT to support the development and institutionalization of new statewide policies, practices, and resources that will

successfully encourage the recruitment, selection, enrollment, and degree completion of women in IT at every college and university in Maryland.

- d. Establish a repository for knowledge gained about effective practices to broaden participation of women in IT.

If funded, the effort would complement and expand upon the support provided by state funding requested here.

**Facilitating coordination and communication among state and local agencies and organizations regarding achieving the goals of the plan (Charge #8).**

A research-based center should be an independent entity that can serve all communities involved, including colleges and universities, the K-12 community, businesses, and government with a focus on the goal to increase the participation and leadership of women in IT and related fields. Achieving this goal will benefit the entire technology pipeline in Maryland by addressing challenges that currently impede the State's ability to ensure both a diverse and a wide pipeline of workers in IT. Such a public-private resource center would develop a healthy workforce to ensure a competitive economy and secure future for all Marylanders. In addition, the Center would serve as a national and international model for moving from knowledge to action to address shared challenges.