Women in IT: the untapped talent pool
Westnet - 1/6/16

Marla Meehl - Manager of Network Engineering and Telecommunications Section (NETS)
Megan Sorensen - Network Administrator, Idaho State University
Why am I talking to you about this today?

- I am a woman who has been in a technical career for more than 30 years
- I have seen a pretty consistent 10% women in my field for those 30 years
- I have become involved in two gender diversity efforts in IT
- Through these efforts, I have become much more aware of the magnitude and scope of the problem
- I have become much more aware of the value of diversity
- I hope to bring awareness to others about the issue and possible steps each of us can take to influence change
Percentage of Bachelor's degrees conferred to women in the U.S.A., by major (1970-2012)

Data source:nces.ed.gov/programs/digest/2013/Tables.asp
Author: Reedy Ollins (reedyollins.com / @reedollins)
Note: Some majors are missing because the historical data is not available for them
### By the Numbers

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>57%</td>
<td>Percent of professional computing occupations in the 2014 U.S. workforce held by women</td>
</tr>
<tr>
<td>26%</td>
<td>Percent of professional computing occupations in the 2014 U.S. workforce held by men</td>
</tr>
<tr>
<td>6%</td>
<td>Percent of corporate Chief Information Officer (CIO) positions held by women in 2014</td>
</tr>
<tr>
<td>1.2 million</td>
<td>Number of U.S. computing-related job openings expected by 2022</td>
</tr>
<tr>
<td>39%</td>
<td>Percent of these jobs that could be filled by U.S. computing bachelors degree recipients by 2022</td>
</tr>
<tr>
<td>56%</td>
<td>Percent of Advanced Placement (AP) test-takers in 2014 who were female</td>
</tr>
<tr>
<td>47%</td>
<td>Percent of AP Calculus test-takers in 2014 who were female</td>
</tr>
<tr>
<td>20%</td>
<td>Percent of AP Computer Science test-takers in 2014 who were female</td>
</tr>
<tr>
<td>49%</td>
<td>Percent of 2014 Intel Science and Engineering Fair (ISEF) finalists in Biochemistry who were female</td>
</tr>
<tr>
<td>32%</td>
<td>Percent of 2014 ISEF finalists in Mathematics who were female</td>
</tr>
<tr>
<td>24%</td>
<td>Percent of 2014 ISEF finalists in Computer Science who were female</td>
</tr>
<tr>
<td>57%</td>
<td>Percent of 2013 bachelors degree recipients who were women</td>
</tr>
<tr>
<td>18%</td>
<td>Percent of 2013 Computer and Information Sciences bachelors degree recipients who were women</td>
</tr>
<tr>
<td>14%</td>
<td>Percent of 2013 Computer Science bachelors degree recipients at major research universities who were women</td>
</tr>
<tr>
<td>37%</td>
<td>Percent of 1985 Computer Science bachelors degree recipients who were women</td>
</tr>
<tr>
<td>7%</td>
<td>Percent decline in the number of first-year undergraduate women interested in majoring in Computer Science between 2000 and 2014</td>
</tr>
<tr>
<td>26%</td>
<td>Percent of computing workforce who were women in 2014</td>
</tr>
<tr>
<td>3%</td>
<td>Percent of computing workforce who were African-American women in 2014</td>
</tr>
<tr>
<td>5%</td>
<td>Percent of computing workforce who were Asian women in 2014</td>
</tr>
<tr>
<td>1%</td>
<td>Percent of computing workforce who were Hispanic women in 2014</td>
</tr>
</tbody>
</table>


**Note:** Some data is extrapolated from various sources.

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**Women and Information Technology**

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Material from the National Center for Women in IT (NCWIT)

- Although women today comprise half the world’s population and more than half of the U.S. professional workforce, they play only a small role in inventing the technology of tomorrow.
- The lack of girls and women in computing and technology represents a failure to capitalize on the benefits of diverse perspectives:
  a. In a world dependent on innovation, it can bring the best and broadest problem-solvers to the table
  b. At a time when technology drives economic growth, it can yield a larger and more competitive workforce.
- Women represent a vastly untapped talent pool.
- Groups with greater diversity solve complex problems better and faster than do homogenous groups, and the presence of women in a group is more likely to increase the collective intelligence (problem-solving ability, creativity) of the group.
- Companies with the highest representation of women in their management teams have a 34% higher return on investment than did those with few or no women.
- Gender-balanced companies:
  a. Demonstrate superior team dynamics and productivity.
  b. Produce work teams that stay on schedule and under budget.
  c. Demonstrate improved employee performance.
Material from the National Center for Women in IT (NCWIT)

- Computing-related jobs are interesting, well-paying, secure, and abundant, so why aren’t more women working in this creative field that produces the technology that is central to our daily lives?
  - At the high school level most high school students are unaware of computing as a field of study or profession, and they have had little experience with or exposure to it.
  - Girls in particular typically are not encouraged by their parents, teachers, and counselors to pursue computing or engineering subjects.
  - At the postsecondary level female students end up not choosing to study computing or engineering in college because they have had little prior exposure to or experience with computing, and little or no encouragement from adult influencers and peers.
  - Female undergraduates often find themselves either as the only female in a class or one of just a few. This can, of course, be alienating.
  - Media portrayals of IT careers generally depict the employees as predominantly male and socially deficient.
Material from the National Center for Women in IT (NCWIT)

- In industry, it can be disconcerting to be a woman in a male dominated field.
- Unconscious biases operate in classrooms and workplaces despite our best intentions - losing women in IT due to this
  - Work environment
  - Job descriptions
  - Resumes
  - Interviews
  - Promotions/advancement/training opportunities
- Shortage of male advocates:
  - Men are often the leaders, power holders, and gatekeepers in the computing workplace so enlisting men’s participation is vital for change efforts to be truly effective.
  - Women report that support and encouragement to pursue and persist in technical careers often comes from men and is vital.
  - Gender reform is not a women’s issue; it is also about men - women and men need to work together as allies in order to change work culture.
My Gender Diversity Activities

- Internet2 Gender Diversity Initiative - co-chair
  - The Internet2 Gender Diversity Initiative Steering Committee has been charged by Internet2 to create and implement a program that provides support for emerging information technology women professionals to attend Internet2 technical conferences, thereby supporting their entry into the information technology field and the Internet2 community.

- Women in IT Networking at SC (WINS)
  - As the result of a NSF-funded partnership between the University Corporation for Atmospheric Research (UCAR), the Department of Energy’s Energy Sciences Network (ESnet) and the Keystone Initiative for Network Based Education and Research (KINBER), five women received funding to participate in the 2015 Supercomputing Conference (SC15) while gaining valuable hands-on training in building one of the world’s premier IT networks, known as SCinet.
  - WINS is an effort to expand the diversity of SCinet volunteer staff and provide professional development opportunities to highly qualified women in the field of networking.

- Both efforts hope to help women establish “professional networks” of women, which is critical to success and personal satisfaction in the field
Related Organizations

- **The National Center for Women & Information Technology (NCWIT)**
  - A non-profit community of more than 600 universities, companies, non-profits, and government organizations nationwide working to increase women's participation in computing and technology. NCWIT equips change leaders with resources for taking action in recruiting, retaining, and advancing women from K–12 and higher education through industry and entrepreneurial careers.
  - [https://www.ncwit.org](https://www.ncwit.org)

- **Society of Women Engineers (SWE)**
  - Stimulate women to achieve full potential in careers as engineers and leaders, expand the image of the engineering profession as a positive force in improving the quality of life, and demonstrate the value of diversity.
  - Provide an organization that fosters mentoring, and the development of professional and personal networks.
  - [http://societyofwomenengineers.swe.org/](http://societyofwomenengineers.swe.org/)

- **Educause Women in IT Constituent Group**
  - Collects and disseminates effective practices in the recruitment, retention, and advancement of women in higher education IT.
  - [https://educause.edu/discuss/information-technology-management-and-leadership/women-it-constituent-group](https://educause.edu/discuss/information-technology-management-and-leadership/women-it-constituent-group)
Promoting equality is about making sure everyone has access to these opportunities -- regardless of the nation, families or circumstances they are born into.

Our society must do this not only for justice or charity, but for the greatness of human progress.

Today we are robbed of the potential so many have to offer. The only way to achieve our full potential is to channel the talents, ideas and contributions of every person in the world.
SCinet - The Fastest Network Connecting the Fastest Computers

- SC15 was once again host of one of the most powerful and advanced networks in the world - SCinet
- Created each year for the conference, SCinet brings to life a very high-capacity network that supports the revolutionary applications and experiments that are a hallmark of the SC conference
- SCinet links the convention center to research and commercial networks around the world
- SCinet serves as the platform for exhibitors to demonstrate the advanced computing resources of their home institutions and elsewhere by supporting a wide variety of bandwidth-driven applications including supercomputing and cloud computing
- Volunteers from academia, government and industry work together to design and deliver the SCinet infrastructure
- Industry vendors and carriers donate millions of dollars in equipment and services needed to build the local and wide area networks
- Planning begins more than a year in advance of each SC conference and culminates in a high-intensity installation in the days leading up to the conference.
SCinet - The Fastest Network Connecting the Fastest Computers

- SCinet relies upon over 80 miles of fiber optic cable that is installed in the convention center - this year in Austin, TX
- SCinet is configured, maintained, and ultimately disassembled by a workforce of around 150 volunteers
- These volunteers are distributed across 19 teams that are each focused on one unique area of the overall network implementation
- All 19 teams are critical to creating SCinet, which must seamlessly serve the nearly 13,000 bandwidth-hungry attendees of the annual SC conference
WINS

- WINS team: Mary Hester (ESnet), Wendy Huntoon (KINBER), Marla Meehl (UCAR), Lauren Rotman (ESnet), Jason Zurawski (ESnet)
- 19 highly qualified applicants
  - The candidates applications were reviewed by an expert panel of research and education community leaders, including: Wendy Huntoon (lead), Greg Bell (ESnet), John Hernandez (UCAR), Jennifer Schopf (IU), and Linda Winkler (ANL)
- WINS awardees:
  - Sana Bellamine, CENIC, Measurement Team
  - Debbie Fligor, University of Illinois, Routing Team
  - Amy Liebowitz, University of Michigan, Commodity Team
  - Megan Sorensen, Idaho State University, Wireless Team
  - Kyongseon (Kathy) West, Indiana University of Pennsylvania, Network Security Team
WINS

- WINS was highly successful from the SC leadership, mentors, awardees, and WINS team feedback received
  - Surveys solicited and received from all mentors
  - Surveys solicited and received from all awardees

- A number of report outs planned to communicate problem and project as well as expand the awardees personal and professional network
  - Westnet
  - Quilt
  - CENIC
  - iLight
  - KINBER
  - MERIT
  - I2 Global Summit
WINS

- Working to secure ongoing funding for the WINS project
  - NSF
  - DOE
  - Quilt
  - SC
  - Vendors
SCinet Experience - Meg

- Mentors for Wireless Team: Matt Smith (NOAA-Boulder) and Mark Mitchell
- Goals: When I first arrived my goals were to be helpful and learn as much as I could
- Duties:
  - Interact with other networking groups to solve cross team issues
    - bittorrenting
  - Deploy wireless solutions such as Tripods
    - Trouble Zones
  - Hunt Rogue access points
  - Monitor and tweak wireless network as needed
  - Learn as much as possible
SCinet Experience - Meg

- **Benefits:**
  - This experience made me realize I am not alone
  - Being able to meet other women in networking specifically
  - Confidence level where it should be.
  - SCinet is instrumental to building a professional network
  - Your organization benefits, being around others in the industry and learning from them.
  - Before this I knew maybe 15 people involved with networking.
  - The benefits of this opportunity are ongoing and still revealing themselves
SCinet Experience - Meg

- Would you participate in SCinet again
  - Yes, just for the learning environment alone is worth participating. Everyone was willing to teach others.
  - Also the opportunity to build your professional network is extremely valuable.

- Would you recommend SCinet and WINS to others
  - Yes, definitely!
Discussion and Questions