Challenges and Opportunities for Women in Science

ASPB Women in Plant Biology Luncheon
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Status of Women in Science across the World

Women remain under-represented in R&D in every region of the world. The world-wide average is 29%. Just one in five countries has achieved gender parity, whereby 45% to 55% of researchers are women. (2015 or latest available data)

<table>
<thead>
<tr>
<th>Region</th>
<th>% of Women in R&amp;D</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America and Western Europe</td>
<td>32</td>
</tr>
<tr>
<td>Central and Eastern Europe</td>
<td>40</td>
</tr>
<tr>
<td>Latin America and the Caribbean</td>
<td>45</td>
</tr>
<tr>
<td>Central Asia</td>
<td>47</td>
</tr>
<tr>
<td>Arab States</td>
<td>40</td>
</tr>
<tr>
<td>Sub Saharan Africa</td>
<td>30</td>
</tr>
<tr>
<td>East Asia and the Pacific</td>
<td>23</td>
</tr>
<tr>
<td>South and West Asia</td>
<td>19</td>
</tr>
</tbody>
</table>

Proportion of Women Researchers in East Asia & Pacific

Source: UNESCO Institute of Statistics
Women Researchers as Percentage of Total

Source: OECD Main Science and Technology Indicators 2016, and NSF S&E Indicators 2016
Opportunities for Women and Men in Science

The World Needs People Trained in STEM!

• In 2015, countries adopted the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (SDGs).

• Achieving the SDGs 2, 3, 6, 7, 9, 13, 14, and 15 would require advancement in science and technology, and scientists’ active societal engagement.
Expanding Opportunities for Women and Men in Science beyond Academia

Academic Positions vs. PhDs in Science and Engineering

While universities are bringing more Ph.D. students and postdocs onto campus, they aren’t hiring many more full-time professors. (Based on US data)

Career Opportunities for Women and Men in Science beyond Academia

- Industry sector R&D (Pharmaceutical, Chemical, Agricultural, Biotechnology, Energy, IT, Manufacturing, etc.)
- Government laboratories
- Government agencies
- International organizations
- Private foundations
- Teaching at PUI, Community Colleges, Secondary schools
- Publishing house
- Journalism - Media
- Law firm
- Financial services industry
- Consulting
Opportunities for Women in Science

Increased realization that involving women and other under-represented groups contributes to new knowledge creation, safe and effective products, and increased profits.

Gendered Innovations

“How can we harness the creative power of sex & gender analysis for discovery?”

Dr. Londa Schiebinger
Director, Gendered Innovations in Science, Health & Medicine, Engineering, and Environment
Stanford University

https://genderedinnovations.stanford.edu/
Signs of Increased Efforts to Promote Participation of Women in STEM Research

In the US, NSF has promoted participation of under-represented groups in STEM (women is a big part of this group) with the 1997 revision of its Merit Review Criteria: Intellectual Merit and Broader Impacts. More recently other funding agencies are making serious efforts to increase participation of women in their research funding programs.


- Athena SWAN ([http://www.ecu.ac.uk/equality-charters/athena-swan/](http://www.ecu.ac.uk/equality-charters/athena-swan/)): Several funding agencies now require Athena SWAN’s accreditation when applying for a grant, including Science Foundation of Ireland and National Institute of Health Research in UK

- NIH policy on inclusion (2016)
What is Preventing Women’s Full Participation in STEM?

**Virginia Valiant** (1998) “... men and women alike have implicit hypotheses about gender differences—gender schemas—that create small sex differences in characteristics, behaviour, perceptions, and evaluations of men and women. Those small imbalances accumulate to advantage men and disadvantage women.”

**National Academies of Science: Committee on Science, Engineering, and Public Policy.** (2007) “The fact that women are capable of contributing to the nation’s scientific and engineering enterprise but are impeded in doing so because of gender and racial/ethnic bias and outmoded “rules” governing academic success is deeply troubling and embarrassing.....”
Challenges for Women’s Full Participation

Maintaining a Work-Life Balance

• Every working person’s challenge, more so for women due to the role assigned to women

Unconscious (or Implicit) Bias

• Known to impact women and under-represented groups more negatively
Unconscious/Implicit Bias

• All of us has unconscious/implicit bias.

• Bias is a consequence of stereotyping that is often subliminal and unintentional. Subject of bias, or the nature of bias, is different from an individual to individual depending on his/her environment while growing up.

• Unconscious/Implicit bias resides outside of awareness*. It often contradicts our conscious beliefs, which are intentional and controllable.

• Unconscious/Implicit bias links social groups according to characteristics that generate relative disadvantages for some groups.

• Unconscious/Implicit bias serves as a shortcut in our decision making process.

*Harvard’s “Project Implicit” https://implicit.harvard.edu/
Unconscious Bias Schema

Stereotype Threat

Stereotypes are widely held, fixed concepts that present oversimplified views of particular groups. Stereotype threat refers to the behaviour of individuals who are members of stereotyped groups. Members of negatively stereotyped groups may underperform when reminded of their group membership.

Privilege - Group Characterization

Privilege is a systemic form of advantage for those to whom it is granted. Beneficiaries receive more positive evaluations. We feel more comfortable around people with the same privilege (people like us) and treat them more favorably (In-group). The reverse occurs with people who do not share the same privilege.

Micro-Aggression

Everyday acts of exclusion against underrepresented groups that denigrate their capabilities. Micro-aggression includes behaviors such as interruption, translation, misidentification, exclusion, and marginalization.
Unconscious Bias is most extreme when…

• Individuals are tired, rushed or cognitively burdened
• Individual demographic traits are rare (“tokens”) in a group making decisions and/or a group being evaluated
• Valid performance information is lacking
• Evaluation criteria are vague or ambiguous

We can minimize its negative impacts by:

• Recognizing that we all have unconscious biases,
• Understanding how yours can manifest, and
• Avoiding situations where UB can become extreme
Can an individual make a difference? Yes, you can!

- Real life examples:
  Dr. Mary Clutter (NSF)
  Dr. Nancy Hopkins (MIT)

- Make conscious effort to recognize professional accomplishments of female students and colleagues, and to promote them

- Be a good mentor (break the stereotype threat) [my mentors below]

- Be a good role model

Dr. Masayuki Katsumi  Dr. B.O. Phinney  Dr. Mary Clutter  Ms. Holly Schauer  Dr. Beth Gantt
Okinawa Institute of Science and Technology Graduate University (OIST)

- 5-year PhD program
- No Department – 59 independent faculty units to be expanded to 100 faculty units by 2023
- Faculty on the US-style Tenure Track appointment with generous research funding
- Supported by the Japanese government
- International Environment
Equality and Diversity at OIST

https://groups.oist.jp/ged/work-life-balance
# Percentage of Women at OIST

<table>
<thead>
<tr>
<th>Job category</th>
<th>April, 2014</th>
<th>April, 2015</th>
<th>April, 2016</th>
<th>January, 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executives</td>
<td>11.1%</td>
<td>27.3%</td>
<td>28.6%</td>
<td>33.3%</td>
</tr>
<tr>
<td>Managers</td>
<td>14.3%</td>
<td>16.2%</td>
<td>21.4%</td>
<td>26.8%</td>
</tr>
<tr>
<td>Admin staff</td>
<td>73.2%</td>
<td>73.3%</td>
<td>71.7%</td>
<td>70.1%</td>
</tr>
<tr>
<td>Faculty</td>
<td>15.2%</td>
<td>17.6%</td>
<td>16.0%</td>
<td>21.4%</td>
</tr>
<tr>
<td>Researchers and Technicians</td>
<td>28.7%</td>
<td>34.6%</td>
<td>34.0%</td>
<td>32.2%</td>
</tr>
<tr>
<td>Students</td>
<td>28.3%</td>
<td>34.6%</td>
<td>34.0%</td>
<td>34.0%</td>
</tr>
</tbody>
</table>

Newly hired faculty: FY2014 (1F・2 M), FY2015 (1F・2M), FY2016 (4F・5M)
Apply to OIST PhD Program
• Online application (free)
• 3-5 references
• Official transcript
• Statement of purpose
• TOEFL or IELTS score

Internationally Competitive Student Support
• Tuition cost covered (0.54 million JPY)
• RAship (2.4 million JPY per year)
• Student rate on-campus housing
• Family support- Child Development Center
• Travel support for domestic/international conferences
• Personal computing support

www.oist.jp
ありがとうございます！

Thank You