Welcome to:
Mentoring Excellence and Diversity in Science

**Agenda**

1. Lunch, Introductions, Meeting Goals
2. Challenges to career progression
   - Assessment & Bias
3. Aids to career progression
   - Education
   - Transparency
   - Mentorship
3. Discussion
4. Next steps
Mentoring Excellence and Diversity in Science

Goals

1. Informal mentorship
2. Assessment: How is UTSC/ Your department doing?
   • Identify issues that would benefit from discussion or action
   • Communicate these to the administration
Perception of barriers to career progression

- June 2010
- 10,000 scientists with PhD invited to respond
- 1,301 qualified surveys completed
  - 57% women, 43% men
  - Women: 45 – 49; Men: 55 to 59
- Error: ±4.2% @ 95% confidence level

AAAS (Science) – L’Oreal survey
<table>
<thead>
<tr>
<th>Challenge</th>
<th>Females</th>
<th>Males</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grants/funding</td>
<td>62%</td>
<td>76%</td>
</tr>
<tr>
<td>Work-life Balance</td>
<td>61%</td>
<td>48%</td>
</tr>
<tr>
<td>Gender Bias</td>
<td>52%</td>
<td>2%</td>
</tr>
</tbody>
</table>

AAAS (Science) – L’Oreal survey

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**TABLE B4-1**  Speakers at 2004-2005 Scientific and Professional Society Meetings, by Sex

<table>
<thead>
<tr>
<th>Conference (2004-2005) d</th>
<th>% of Invited Speakers Who Were Women</th>
<th>Total Number of Invited Speakers</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Association for Artificial Intelligence (AAAI)</td>
<td>17</td>
<td>12</td>
</tr>
<tr>
<td>American Chemical Society (ACS)</td>
<td>18</td>
<td>174</td>
</tr>
<tr>
<td>American Society for Cell Biology (ASCB)</td>
<td>36</td>
<td>22</td>
</tr>
<tr>
<td>American Society of Mechanical Engineers (ASME) e</td>
<td>6</td>
<td>17</td>
</tr>
<tr>
<td>International Conference on Computer Graphics and Interactive Techniques f</td>
<td>17</td>
<td>78</td>
</tr>
<tr>
<td>Oceanic Engineering Society Meeting g</td>
<td>4</td>
<td>72</td>
</tr>
<tr>
<td>Federation of Clinical Immunological Societies (FOCIS) h</td>
<td>22</td>
<td>480</td>
</tr>
<tr>
<td>Society for Neuroscience (SFN)</td>
<td>9</td>
<td>11</td>
</tr>
</tbody>
</table>

**Comparable data on gender differences in:**
- nominations & elections to prestigious societies
- nominations & awards of prestigious prizes

**Tower, 2008**

Just perception?


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Just perception?


% of women in lecturer/instructor positions or not ranked:

Life Sciences: 60%

Physical & computer sciences, engineering, math: 29.1%

2008-2009

Just perception?

Strengthening Canada’s Research Capacity: The Gender Dimension. Panel report 2012

Figure 1. Growth in University Enrolment since the 1920s

(Data Source: Statistics Canada, n.d.b; n.d.c.)

Expert panel on women in university research, Council of Canadian Academies

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Just perception?

Figure 3. Canada Compared to the EU and the U.S.: Similar Profiles

This figure depicts the proportion of female and male students and academic staff in a typical academic career in Canada, the U.S., and the EU, 2007.

Expert panel on women in university research, Council of Canadian Academies

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Just perception?

Canada Research Chairs program

CRC 2003 (first year).
17% awarded to women
  • Settlement with Canadian Human Rights Commission over charge of discrimination

Canada Excellence Research Chairs 2008 (first year).
0% (n=19) awarded to women
0% (n=36) of short-listed proposals
  • Strengthening Canada’s Research Capacity: The Gender Dimension. Panel report 2012
Not just *perception*

**Who becomes a PI (principal investigator)?**

25,604 published scientists
1583 (6.2%) became PI’s

200 metrics of publication output

**Model:** Strongly predictive of who becomes a PI

Factors (in order of relative importance):
1. Impact factors
2. Number of publications
3. **Gender**
4. Citations/Impact Factor

Van Dijk et al 2014. Current Biology
Who becomes a PI?

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“Men are overrepresented as PIs, yet even after correcting for all other publication and non-publication-derived features, being male is positively predictive of becoming a PI.... Given the same publication record, men are more likely than women to become PI’s.”

Van Dijk et al 2014. Current Biology
Not just perception

www.pipredictor.com

PIPredictor - Predict your probability to become a Principal Investigator (PI)

Updates (November 2014):
- The PubMed database was updated to include publications up to November 2014
- The submission form can now handle last name with apostrophe (e.g., O’Hara)
- The submission form can now handle multiple last names

Input your last name:

note: if you have MORE than one last name, list both of them separated by a comma (e.g.: OldName, NewName)

Take career length into account?  ○ Yes  ○ No

Input your papers’ PubMed IDs (you can use the frame below to easily obtain them): (what’s this?)
note: if you are NOT the first author but have equal contribution, add a trailing asterisk to that PMID (e.g., 23565960*)

If you don’t feel like waiting, enter your email (we won’t save it after sending results):

Submit  Paste Example  Clear Input

60137 PI predictions so far
Estimated run time ~9.1 seconds

Van Dijk et al 2014. Current Biology

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Career challenges & schema

- **Schema**: categorical assessments of individuals and relationships between individuals

- **Shape expectations & evaluations**

- Can lead to unconscious or **implicit**, rather than overt bias
Unconscious bias

*Bias* – evaluation of one group and its members relative to another

Expressed directly: “I like whites more than blacks.”

Explicit/Conscious = Person is aware of his/her evaluation

Expressed indirectly: Sitting further away from an black person than a white person

Implicit/Unconscious = Person doesn’t perceive or endorse evaluation

*modified from T De Mello

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Career challenges & Gender: Gender schema

Assessment & Granting success

• Swedish Medical Research Council
• Post-doctoral fellowship competition (1995)
• Five reviewers (male & female) score each applicant on:
  • Scientific competence
  • Relevance of research
  • Quality of methodology

Career challenges & Gender: Gender schema

Assessment & Granting success

• Women = lower ratings across all categories
• Fellowships granted:
  • 8% of female applicants
  • 24% of male applicants

• Largest gender differential on ‘scientific competence’
• Did women publish fewer, or lower impact papers?

“...a female applicant had to be **2.5 times more productive** than the average male applicant to receive the same competence score ...”
Unconscious bias

Comparable data on gender bias (by both male & female assessors):

• Assessment of competence & salary (Moss-Racusin et al. 2012)

• Assessment of leadership ability (Geis et al. 2006)

• Letters of recommendation (Trix & Psenka, 2003)

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Unconscious bias

‘Damning with faint praise’

e.g., letters of recommendation, performance evaluations (from men and from women)

• Men are more often described with:
  • superlatives
  • references to ability
  • references to meeting/exceeding performance objectives

• Women are more often described:
  • as ‘working hard’
  • with negative language: “..despite...”

• Schmader et al. (2008), Trix & Psenka (2003)

*modified from T De Mello
Unconscious bias

Examples of Gendered Evaluations

1. Using first names for women or minority faculty and titles for men
   • “Joan was an asset to our department.”
   • –vs.– “Dr. Smith was an asset to our department.”

2. Gendered adjectives
   • “Dr. Sarah Gray is a caring, compassionate physician”
   • –vs.– Dr. Joel Gray has been very successful with his patients”

3. Doubt raisers or negative language
   • “...although her publications are not numerous”
   • or “while not the best student I have had, she...”
Unconscious bias

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- Assessment of competence & salary (Moss-Racusin et al. 2012)
- Assessment of leadership ability (Geis et al 2006)
- Letters of recommendation (Trix & Psenka, 2003)
- Who becomes a PI (van Dijk et al 2014)
- Differences in paper acceptance rates by gender of first author (Tregenza 2002)
- Tenure review* (Spelke & Grace 2007) 70 vs 45%
- Student evaluations of instructors (Basow 1998; McPherson et al 2009; Reid, 2010)
Unconscious bias & student evaluations

Data: 7 consecutive semesters
11 major departments in Engineering
3938 courses, 137,431 students

• Male instructors received higher student evaluations on average
• \( p = 0.01 \)

• Gender differential was significant in lower level, but not upper-level courses.

• Student evaluations higher in smaller classes (not analyzed by gender)

*Texas A & M*

Johnson et al. 2013. J. Engineering Education
Career challenges & schema: Imposter syndrome/phenomenon

- Success is attributed to luck, not ability
- Convinced of own incompetence

Moving forward?

- Credit where it is due
- Education about bias
- Transparency
- Mentorship

Policy & Behaviour

Tools
Endorsement of competence & talent can shift biased evaluations by an audience

• Geis et al 2006. J. Appl. Social Psych

• Best practice for introducing job candidates?
• Departmental acknowledgement of significant contributions? (internal & external)
• Acknowledgement of origin of departmental initiatives (verbal & in final documents)
Moving forward: *self* education

- Does the imposter phenomenon affect you?
  - [http://paulinerooseclance.com/impostor_phenomenon.html](http://paulinerooseclance.com/impostor_phenomenon.html)
Moving forward: **education**

Recognition of an unconscious bias can lead to behavioural compensation.

Green et al 2007. J GIM

Recognize unconscious biases: Implicit Association Tests?

https://implicit.harvard.edu/implicit/
Moving forward: transparency

Consider Departmental policies:

- Clear, systematic processes for evaluation & feedback
- Clear guidelines on discipline-specific standards for promotion
- Written guidance following formal promotion committee meetings
- Published service/committee membership
- Rotating membership on PTR committees
Moving forward: mentorship

If in doubt: ask

- Update your understanding
- You are *entitled* to information
- Collegial norms
- Pathways to resource / space acquisition

Be strategic (e.g., service)

- Consider your own goals
- Consider fair workloads

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