It Takes a Village to Advance Women (& Men) in STEMM

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American Society for Cell Biology

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DiverseBrains 18 December 2018
• The Problem
• The Mayor
• The Village
• Village Resources
Advancement in Academic Biomedicine

- Science/Clinical Contributions
- Funding
- Communication
- Plus ______
And for some of you, there may be an additional problem
Women Post-doc -----> Full Professor

A very “leaky pipeline”

% Women

- Biology
- Chemistry
- Math/Stats
- Astronomy
- Physics

Science 2005 309: 1190-1191
Women Professors Are Underrepresented in Medical School Faculty
Why aren’t there more women at the top?
Gender Stereotypes

Pantene
Gender Stereotypes

duration 0:45  Pantene
GENDER SCHEMAS:

A set of implicit, or nonconscious, hypotheses held by both men & women about sex differences play a central role in shaping women and men’s professional lives.

The most important consequence of gender schemas for professional life is that men are consistently over-rated, while women are under-rated.

From “Why So Slow? The Advancement of Women.” Virginia Valian
GENDER SCHEMAS: a set of implicit, or nonconscious, hypotheses (held by both men & women) about sex differences plays a central role in shaping women and men’s professional lives. The most important consequence for professional life is that men are consistently over rated, while women are under rated.

ACCUMULATION OF ADVANTAGE & DISADVANTAGE

Whatever emphasizes a man’s gender gives him a small advantage, a plus, whereas whatever emphasizes a woman’s gender results in a small loss for her, a minus.

Very small differences add up and result in large disparities in salary, promotion and prestige.

“Why So Slow? The Advancement of Women.” Virginia Valian
“Outliers: The Story of Success” Malcolm Gladwell
Some Reflections on the Dearth of Women in Science, Ben A. Barres
A talk at Harvard University, 2013 (then Professor of Neurobiology, Stanford University)
Personal Encounters with Discrimination

1. As a woman:
   - High school guidance counselor
   - MIT
   - Finding a research lab at MIT
   - During medical training
   - Postdoc fellowship competition
   - NIH R01 funding as an Assistant Professor

2. Overt discrimination as a transsexual:
   - Health insurance

3. Awareness of discrimination since sex change:
   - Awareness of the many closeted LGBT academics
   - Awareness of how women and men are treated differently

Does Gender Matter? B.A. Barres, NATURE 442: 133-136; 13 July 2006
The Autobiography of a Transgender Scientist, Ben Barres, MIT Press, 2018
Personal Encounters with Discrimination

Shortly after he changed sex, a faculty member was heard to say

“Ben Barres gave a great seminar today, but then his work is much better than his sister’s work“.

“his sister” was Ben, when he was Barbara

Does Gender Matter? B.A. Barres, NATURE 442: 133-136; 13 July 2006
We all hold these implicit biases

“Gender stereotypes about intellectual ability emerge early and influence children’s interests”
by 6 years, girls avoid games for really ‘smart kids’

“Sex Differences in Doctoral Student Publication Rates”
Male STEM students submitted and therefore published more papers (acceptance rate was same)
Lubienski, Miller, and Saclarides, Sage, Educational Researcher, Nov 2017

“Publishing while female: Gender differences in peer review scrutiny”
6 months longer for female authored papers to be accepted for publication in Economics journals
Erin Hengel, Economics, University of Liverpool
“You miss 100% of the shots you don’t take”.
Wayne Gretsky – Hockey Hall of Famer
It Takes a Village: Advancement in Academic Biomedicine

- The Problem
- The Mayor
Committed Leaders (Mayors)

Leaders have a disproportionate impact on organizations because of their status as authorities

1) establish and publicize policies to increase fairness,

2) articulate, legitimize and support the leadership of both women & men.

Impact of Leaders

Robert Birgeneau – Dean of Science, MIT
Nancy Hopkins – Professor, MIT
Number of Women Faculty MIT School of Science (1960-1995)

Title IX, 1972

"No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any educational program or activity receiving Federal financial assistance."

Nancy Hopkins, MIT
MIT’s Problems (1996)

- Unequal resources/rewards to senior women faculty (*Nancy Hopkins measuring tape*)
- Family-work conflict for junior women faculty
- Small number of women faculty
- No women faculty in academic administration
- Undervaluation of equal accomplishment
- Marginalization of women faculty as they rise

Nancy Hopkins, MIT
Number of Women Faculty MIT School of Science (1960-2010)

Title IX
1971

Birgeneau – Science Dean
1996

Nancy Hopkins, MIT
MIT (2010)

- **Women in leadership**: MIT President, 3 of 5 Deans, 2 of 6 department chairs in science and 1 in engineering.
- **Women faculty in science and engineering**: numbers have more than doubled.
- Having **children** is discussed openly, and women have actually taken **maternity leaves and gotten tenure** – for the first time in MIT's history.
- **New day care center** in one of the most prominent and heavily trafficked places at MIT. (A second new day care center opened in 2013.)
- **MIT is not alone**: other universities have achieved similar results, in some cases these changes were initiated through NSF ADVANCE grants.
Women in Leadership Positions

2010

Department Chairs  0
Institute Directors  0
Academic Deans      0
Endowed Chairs      14%
**Impact of a Leader**

Dean Dennis Charney  
Icahn School of Medicine at Mount Sinai

**Women in Leadership Positions**

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<thead>
<tr>
<th>Position</th>
<th>2010</th>
<th>2017</th>
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<tr>
<td>Department Chairs</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Institute Directors</td>
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<td>6</td>
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<td>Academic Deans</td>
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<td>4</td>
</tr>
<tr>
<td>Endowed Chairs</td>
<td>14%</td>
<td>36%</td>
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Department Chairs
Why focus on them?

- Individuals experience climate in their immediate workplace – the department
- Chairs' perspectives of climate may differ from those of other faculty, especially women faculty
- Chairs significantly influence faculty's experiences in their departments

Study of Faculty Worklife at the University of Wisconsin-Madison, 2003
Impact of a Leader

Chairman of Medicine, John Stobo, MD
Johns Hopkins Medical School - 1990 (Emma Stokes, consultant)

• Women faculty earned less than men and advanced more slowly.

• Appointed a committee to evaluate situation and develop ways to deal with gender-based problems.

Stobo’s Committee found

• Women were coming up for promotion later than men because evaluators failed to identify qualified women. e.g., junior men faculty were asked to chair confs 6X more frequently than junior women faculty.

• Women didn’t know the criteria for promotion.

Stobo’s initiatives included:
• Annual faculty evaluations with explicit info re progress.
• Monthly meetings with concrete mentoring for moving up in career.
• Senior faculty were given explicit info on how to mentor.
• Important meetings moved from outside normal hrs to standard working hrs.
• *These initiatives positively impacted all the faculty.*

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• Monthly meetings with concrete mentoring for moving up in career.
• Senior faculty were given explicit info on how to mentor.
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Impact on the women in the Dept of Medicine

• 1990 there were 6 women Assoc Profs

• 1995 there were 26 women Assoc Profs.

• The Problem
• The Mayor
• The Village

Increasing Dominance of Teams and Importance of Diversity
Number of Papers Authored by Teams and Size of Teams: Increasing Over Time

Team-Authored Work More Highly Cited Than Solo-Authored Work

Science & Engineering

Social Sciences

Teams receive more citations

Solo authors receive more citations

The Power of Diversity
In Teams

Scott Page, Professor of Complex Systems, Political Science and Economics, University of Michigan

Uses mathematical modeling and case studies (from business) to show how a variety in staffing produces organizational strength
The Power of Diversity

• Breakthroughs emerge by looking at complex problems from diverse perspectives.

• Inclusive enterprises with a diverse work force that recognize and value unique individual contributions tend to be more successful than more homogeneous ones – lessons from business.

• As the complexity of scientific problems increases, the need to build and to work within inter- and multi-disciplinary teams increases.
Evidence for a Collective Intelligence Factor in the Performance of Human Groups

Anita W Wooley, Christopher F Chabris, Alex Pentland, Nada Hashmi, Thomas W Malone
Collective Intelligence - measure of the performance of a group in a wide variety of cognitive tasks (similar to “general intelligence” of a single person)

Two studies of 699 people in groups of 2 to 5

Found converging evidence of a general collective intelligence factor, C, that explains a group’s performance on a wide variety of tasks.
Group’s Collective Intelligence

1. Moderately correlated with average intelligence of individual group members and the intelligence of the highest-scoring team member.

2. Not correlated with group cohesion, motivation, and satisfaction.

Woolley et al, Science 330, 2010
3. **Significant correlation** with the **average social sensitivity** of group members.

Groups where a more equal distribution of **conversational turn-taking** scored more collectively intelligent than those in which a few people dominated the conversation.

4. Collective intelligence was **positively and significantly correlated with the proportion of women in the group**. They scored better on the social sensitivity measure than men (taking turns).

_A surrogate for “C” was the number of women on the team_
Peer-reviewed publications with gender heterogeneous authorship teams received 34% more citations than publications produced by gender-uniform authorship teams.
Women can raise the collective intelligence by their ideas/skills and their ability for conversational turn-taking.
Having the woman’s voice heard

Women who “sat at the table” in the Obama administration adopted a strategy of “amplification”:

When a woman made a key point, other women would repeat it, giving credit to its author.

This forced the men in the room to recognize the contribution — and denied them the chance to claim the idea as their own.
Your Village

Find, join and build diverse teams where your perspective and skills
• increase the impact of your work
• can increase your scholarly output
Sharing how they coped with the sudden, unexpected loss of their husbands and their resultant single parenthood:

EA: “One of the things that came into sharp focus for me is that we need to live in villages.”

SS: “Making villages is an important part of surviving this.”

Alexander - poet, essayist, Columbia U professor and Ford Foundation Director of Creativity and Free Expression
Sandberg – Chief Operating Officer, Facebook
• The Problem
• The Mayor
• The Village

• Village Resources
  Level Playing Field
  Career Flexibility & Critical Period Support
  Celebration of Success
• The Problem

• The Mayor

• The Village

• Village Resources
  A level playing field
Recruitment Package
The Playing Field is Not Level

• 2 New England biomedical research programs
• 219 applicants - 127 men and 92 women
• Early career research awards
  (within candidate’s 2 or 5 yrs of initial appointment at universities, hospitals, nonprofit research institutions)

“Sex Differences in Institutional Support for Junior Biomedical Researchers.” Sege et al JAMA September 15, 2015 Volume 314, Number 11: 1175-1177
Recruitment Package

The Playing Field is Not Level

- 2 New England biomedical research programs
- 219 applicants - 127 men and 92 women
- Early career research awards
  (within candidate’s 2 or 5 yrs of initial appointment at universities, hospitals, nonprofit research institutions)
- $889,000 = start-up package median for MEN
- $350,000 = start-up package median for WOMEN ($P < .001$
- 51 men (40%) and 11 women (12%) reported support of more than $1 million ($P < .001$

“Sex Differences in Institutional Support for Junior Biomedical Researchers.”
Sege et al JAMA September 15, 2015 Volume 314, Number 11: 1175-1177
The Playing Field is Not Level
Recruitment Package

• Men had higher support regardless of degree
• Start-up difference was **significant** for basic scientists not clinical scientists
• **Significant** for PhDs not MDs
• Not explained by degree, years of experience, or institutional characteristics
• Nor by stratum of NIH funding to the institution

Sex Differences in Institutional Support for Junior Biomedical Researchers. Sege et al JAMA September 15, 2015 Volume 314, Number 11: 1175-1177
Level Your Playing Field

• Learn to negotiate – work within/around gender stereotypes

• Get data from your peers/coworkers, especially men

• Use data bases

“Moving Past Gender Barriers to Negotiate a Raise”
Tara Siegel Bernard, NY Times March 24, 2014
Salary Information

Prepare: Get data from AAMC* & AAUP (members) & Glass Door

*https://www.aamc.org/ in reference section of our library

- Institution can make data available for salaries by rank, years in rank, degrees, and department from the chair, department administrative assistant or the human resources office.

- Adjust your expectations higher or lower to account for the cost of living in the new location


And negotiate
• The Problem
• The Mayor
• The Village

• Village Resources
  Level Playing Field
  Career Flexibility & Critical Period Support
“OK, now --- on three, I’m going to throw a grant deadline in there!”

*Modified from a cartoon in the New Yorker Magazine*
Career Flexibility: Critical Period Support

• Claflin Fellowship - Helping Hands
  MGH, U Pittsburgh, U Mass, Weill-Cornell (post-docs)

• Emergency Backup Care

• ABCC – Stanford
Claflin Distinguished Scholar Awards

• Advancement of junior women scientists to senior faculty positions was far less frequent than that of their male counterparts at MGH

• Significant obstacle to career advancement is the difficulty of maintaining research productivity during the child-rearing years

• Provide bridge funding for junior faculty to sustain research productivity during the child-rearing years

• Funds may be used for support of a technician, postdoctoral fellow or graduate student and supplies.

http://www2.massgeneral.org/facultydevelopment/owc/claflin.html
• Three-page basic or clinical research plan
• MD, PhD, within 7 years of first full-time faculty appointment
• Primary appointment and conducting their research at MGH
• Salary support from a grant or other funding source
• Applicant is clearly the PI, whose academic progress would benefit from such funding support
• Evidence of strong research training, productivity, and a well-defined focus in either basic or clinical research
• Responsible for care of children
• $50,000/yr X2 in 2014 in direct costs, plus 15% indirect costs per year.
1997-2004 Claflin Awards

Retention 90% of awardees

Investment by MGH
35 awards $2,100,000

Awardee’s grants as PI $51,401,314

ROI = 24.5 fold

2007-2014 Junior Scholar* Awards
University of Pittsburgh Medical School

Dept of Medicine
19 awardees $1,060,000

Awardee’s grants as PI $23,000,000

ROI = 21.7 fold

* Women and men
Personal communication, Professor Ora Weiss, Vice-Chair for Mentoring
Department of Medicine, University of Pittsburgh Medical School
New York-Presbyterian
New Paid Family Leave Policy
(May 4, 2017)

• new parents get two to six weeks of paid time off

• extended leave for six months and continuation of benefits for new parents at no cost to employees during any unpaid period of leave

• plus flex time currently available for new parents.

• Emergency back-up child and elder care for its employees, providing employees with up to 15 days per year of quality in-home or center-based care.

“Our employees are the lifeblood of our organization. This new policy represents an investment in them and their families, but more than that, it's simply the right thing to do.” Dr. Steven J. Corwin, president and CEO of New York-Presbyterian Hospital.
• Village Resources:
  Level Playing Field
  Critical Period Support
  Career Flexibility
Our Family
Thanksgiving
Men and women are equally affected by policies that support career flexibility
Two major sources of conflict for faculty:

- **work-life conflict**, caused by juggling demands of career and home, and
- **work-work conflict**, caused by competing priorities of the tripartite research, teaching, and clinical mission of an academic medical center combined with service and administrative tasks.
Stanford University
Academic Biomedical Career Customization (ABCC) model

Hannah Valantine MD, MRCP
Professor of Medicine, Division of Cardiovascular Medicine and Director of Heart Transplantation Research, Stanford U.
Senior Investigator, NHLBI and the first NIH Chief Officer of Scientific Workforce Diversity.

ABCC pilot was supported by grant from the Sloan Foundation
Reframe flexibility as career-enhancing, not career pausing

“We had a child, we had no money, my wife worked… I had to stay home. There was no telecommuting in those days, but… my colleagues were amazing and supported my telecommuting. I would be in the lab 3 hours in the morning when we had a babysitter, typed punched cards furiously, and then would go home. And they got used to it, because I would show up the next day having done something.”

- Prof. Michael Levitt, Nobel Prize Laureate, Oct 9, 2013
**ABCC model**

- Desire for “work-life balance” is 1 of 2 top reasons to leave academic medicine
- Work-Life (flexibility) policies often misalign with professional culture of academic medicine
- Noted extensive use of the Emergency Back-up Care program
- Human-centered design research principles*
  - Stanford’s Design Thinking team (Jump Associates) & Deloitte

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*creating solutions for problems and opportunities through a focus on the needs, contexts, behaviors, and emotions of the people that the solutions will serve.

Fassiotto et al. Acad Med Jan 2, 2018 (epub)
ABCC two-part model

- Coaching to create a customized and integrated Career-Life Plan
- Needs assessment, in-depth interviews
- Division chief training
- Self-reflection guide
- Career planning discussion with ABCC Assoc. Director
- Structured career planning discussion with division chief
- Access to professional life coach

H. Valantine (Fassiotto et al AcadMed 2018)
ABCC two-part model

• Coaching to create a customized and integrated Career-Life Plan

• A banking system to recognize behaviors that support flexibility:
  - incentivizes faculty behavior that creates flexibility for their colleagues
  - serves to buy back faculty time
  - concrete recognition/support to faculty who take on more shared team responsibilities (not adequately recognized)
Banking System for Recognizing Faculty Service

Not just WORK-LIFE conflict ... also WORK-WORK conflict

H. Valantine (Fassiotto et al AcadMed 2018)
Support Services Redeemed

Basic Science Faculty

- Female: 52% Work Support, 48% Home Support
- Male: 94% Work Support, 6% Home Support

Clinical Faculty

- Female: 17% Work Support, 83% Home Support
- Male: 16% Work Support, 84% Home Support

H. Valantine (Fassiotto et al AcadMed 2018)
• **Research productivity**: ABCC program participants received 1.3 more awards, compared to a matched set of nonparticipants, $1.1M/person increase in funding

• **By decreasing turnover**, Stanford would save ~ $1M/person (the cost of replacing a single clinical faculty)
• Village Resources

  Level Playing Field

  Career Flexibility & Critical Period Support

  Celebration of Success
Celebrate/Share Success

- Legends & Legacies
- Cell Metabolism profiles
- Just Desserts
- Speaker Data Bases
• 26 accomplished women faculty - physicians and scientists

• Diverse ages, background and cultures

• Overcame hardships, biases, and their own self-doubts to pursue their passion for research and helping others.

• Passion, perseverance and success of women “balancing” work and family.

“Legends and Legacies: Personal Journeys of Women Physicians and Scientists at MD Anderson Cancer Center” Edited by Elizabeth L. Travis, PhD 2009
The Rosie Project
Cell Metabolism Vol 21 (5), 5 May 2015, p649

- Goal: “Women in Metabolism” to recognize that creativity and accomplishments...need not be at the expense of work-life balance and responsibilities

12 talented women in the field share their insights,

- finding a good mentor and having family support
- asking the right questions, etc

“...being open-minded and flexible and creating the right environment for progress are essential components of our collective mission of advancing science and bettering lives.”
Just Desserts Program
Icahn School of Medicine at Mount Sinai

• Goal: Platform for highly successful women physicians & scientists as role models for women trainees and faculty
• Monthly meeting in informal setting
• Features the story of unique path of a highly successful woman scientist and/or physician
• Candid sharing information about success in juggling competing responsibilities of career, family, and outside interests, overcoming bias
• Chocolate and fruit are served
The subject of tonight's discussion is:
Why are there no women on this panel?

New Yorker Magazine
The subject of tonight’s discussion is:
Why are there no women on this MANEL?

Modified from the New Yorker Magazine
Women Speaker Data Bases

- WICB Speakers List Women Cell Biologists, etc
  www.ascb.org/wicb-committee
- Anne’s List Women Neuroscientists
  anneslist.net; BiasWatchNeuro.com
- 500 Women Scientists
  500womenscientists.org
- Synberc Synthetic Biology; Women Engineering Biology
  https://www.ebrc.org/diversity-speaker-suggestions
- American Physical Society women physicists
  https://www.aps.org/programs/women/speakers/index.cfm
- American Chemical Society Diversity & Inclusion
  http://www.chemdiversity.org/resources/speakers-directory/
Women Speaker Data Bases

- Your list of 2-3 outstanding women in your field – when you can’t say “Yes”

• Seek a role on organizing committees where you can suggest excellent women and underrepresented scientists/speakers

Self Promotion

• You can contact meeting organizers and offer to give a talk
• Where appropriate, submit your CV and ask to be included on lists such as Anne’s List, APS, ACS.
• Get a sponsor – network up
• Offer to give a seminar when you plan to visit colleagues in another town or country
Career and Family Metaphors

Life as a jar:
Put in the big rocks first, then the small pebbles. Sand particles can fill the interstices later.

Career and Family Metaphors

Life as a jar:
Put in the big rocks first, then the small pebbles. Sand particles can fill the interstices later.

Juggling Career and Family:
You will have several balls in the air at the same time. Some balls are very resilient and will bounce. Other balls are fragile and will break if you drop them.

Helping Women and Men Succeed in Academia

• High impact work is now done by teams. Women scientists and physicians are an essential part of the team.

• Chairs can provide support at recruitment and other critical times.

• Celebrate success and create alternative pathways.

• Use resources both in and outside your village.
How to Produce Highly Visible Research
Useful tips for researchers (Elsevier Researchers Academy Webinar)

How to
• Make the most of collaborations.
• Approach multidisciplinary and collaborative work.
• Make it contribute to an individual’s research impact (especially in terms of citations).

The multidisciplinary background and internal and external collaborations affects an individual’s citation impact. Early-career and established researchers should conduct research with different awareness in order to attract more citations.

Emergency Backup Care

**In-home** sick, emergency or backup care by vetted caregivers for dependents (kids) and adults (partners, parents)
- at a reduced cost
  
  e.g. 10 calendar days @ $6/hr to benefit-eligible employees, annually

**Online database** network of caregivers and businesses
  
  child care,
  adult and senior care,
  pet care, housekeeping, and tutoring.
- free access and unlimited use
  
  e.g. Care@Work at Care.com
Credits Earned

Basic Science Faculty

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Clinical Faculty

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H. Valantine (Fassiotto et al AcadMed 2018)
Banking System Preliminary Results: Support Services

- **84%**: support mechanisms improved work-life fit.
- Proportion of faculty reporting postponing/avoiding taking vacation due to lack of time in the past 12 months: **64% → 39%**.
- Across clinical teams, proportion of faculty volunteering to fill a clinical service on short notice to help a colleague: **44% → 83%**.
- Across basic science teams, proportion of faculty reporting adequate time to discuss science with colleagues: **9% → 55%**.
- Among female faculty, proportion who agree with the statement “Stanford School of medicine supports my career development”: **29% → 57%**.