“How Successful Have Initiatives Aimed at Increasing Gender Equity in the STEM Disciplines Been in The United States?”

Shobha K. Bhatia
National Science Foundation (NSF) ADVANCE Institutional transformation Grants

- Many Private and Public Universities received ADVANCE Institutional Transformation (IT) Awards, Started in 2001

- Multi Institutional ADVANCE Award
  - Women in Engineering Leadership Initiative (WELI), Effort started in 2000, First leadership meeting started in 2002
NSF ADVANCE Institutional Transformation Grants

Goals

• Innovative, *systemic* organizational approaches to transform institutions of higher education in ways that will increase the participation and advancement of women in STEM academic careers
• Comprehensive programs for institution-wide change
• Started in 2001

Most grants between $3 million and $5 million (with various institutional matching funds)

Initiatives to Increase Women in STEM

Women in Engineering Leadership Initiative (WELI)

- Established following Leadership Conference held in Winter Park, CO in 2000.
- Awarded an ADVANCE Institutional Transformation Award to offer similar conferences and workshops to engineering faculty.
- WELI has offered six leadership workshops attended by over 200 engineering faculty.

Source: WELI http://www.weli.eng.iastate.edu/about_weli.htm
WELI Goals

• Increase the number of women in academic leadership positions.

• Accelerate and enhance the success of women in academic leadership positions.

• Establish and maintain a support network for women engineering faculty leaders.
### TABLE 4. Female Science and Engineering Faculty by Rank (FY2002)

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Assistant Professor</th>
<th>Associate Professor</th>
<th>&quot;Full&quot; Professor</th>
<th>All Ranks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry (FY2003)</td>
<td>4.1%</td>
<td>3.0%</td>
<td>5.1%</td>
<td>12.1%</td>
</tr>
<tr>
<td>Math</td>
<td>2.8%</td>
<td>2.4%</td>
<td>3.1%</td>
<td>8.3%</td>
</tr>
<tr>
<td>Computer Science</td>
<td>2.8%</td>
<td>3.8%</td>
<td>4.0%</td>
<td>10.6%</td>
</tr>
<tr>
<td>Astronomy (FY2004)</td>
<td>3.4%</td>
<td>2.6%</td>
<td>6.5%</td>
<td>12.6%</td>
</tr>
<tr>
<td>Physics</td>
<td>1.5%</td>
<td>1.4%</td>
<td>3.8%</td>
<td>6.6%</td>
</tr>
<tr>
<td>Chemical Engineering</td>
<td>3.8%</td>
<td>4.0%</td>
<td>2.7%</td>
<td>10.5%</td>
</tr>
<tr>
<td>Civil Engineering</td>
<td>4.8%</td>
<td>3.2%</td>
<td>1.8%</td>
<td>9.8%</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>1.8%</td>
<td>2.5%</td>
<td>2.2%</td>
<td>6.5%</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>2.5%</td>
<td>2.3%</td>
<td>1.8%</td>
<td>6.7%</td>
</tr>
<tr>
<td>Economics</td>
<td>4.3%</td>
<td>3.0%</td>
<td>4.2%</td>
<td>11.5%</td>
</tr>
<tr>
<td>Political Science</td>
<td>8.6%</td>
<td>8.2%</td>
<td>6.7%</td>
<td>23.5%</td>
</tr>
<tr>
<td>Sociology</td>
<td>12.6%</td>
<td>11.0%</td>
<td>12.2%</td>
<td>35.8%</td>
</tr>
<tr>
<td>Psychology</td>
<td>9.6%</td>
<td>8.4%</td>
<td>15.4%</td>
<td>33.5%</td>
</tr>
<tr>
<td>Biological Sciences</td>
<td>6.3%</td>
<td>5.4%</td>
<td>8.5%</td>
<td>20.2%</td>
</tr>
</tbody>
</table>
Effectiveness: NSF Advance

ADVANCE Institutional Transformation Awards:

Cohort 1 (2001)
- CUNY Hunter College
- University of Colorado at Boulder
- Georgia Tech
- University of Michigan (Ann Arbor)
- New Mexico State University
- University of Puerta Rico at Humacao
- UC Irvine
- University of Washington
- University of Wisconsin-Madison

Cohort 2 (2003)
- Case Western Reserve University
- University of Montana
- Columbia University
- University of Rhode Island
- University of Alabama at Birmingham
- University of Texas-El Paso
- Kansas State
- Utah State University
- University of Maryland, Baltimore County
- Virginia Tech
NSF ADVANCE: CUNY Hunter

- Size: 15,566 Undergraduates, 5,743 Graduate Students, 544 Full time Faculty
- NSF funding used to fund creation of Gender Equity Project
GEP Initiatives

- Reviewing policy and changing procedures that disadvantage women.
- Educating faculty and administrators about how gender affects careers.
- Uncovering and correcting hidden and subtle biases.
- Measuring and reporting gender equity benchmarks.
- Sponsoring talented beginning and mid-level women scientists.
- Increasing recognition and leadership of outstanding women scientists.
Current GEP Initiatives

- Grant writing assistance program
- Workshop for junior faculty
- Make awards to women scientists.
- Identify/invite sponsors.
- Develop colloquia on women in science.
- Assess and evaluate program.
- Educate science departments & administration about gender schemas, subtle biases, and departmental gender disparities.
- Develop a training manual.
- Assess and evaluate training.

http://www.hunter.cuny.edu/genderequity/
GEP Analysis

• Survey salaries, start-up packages, time in rank, grant support, and office/lab space for gender disparities.
• Publish annual report of benchmarks.
• Review recruitment, retention, and promotion policies.
• Establish/modify policies to ensure gender equity.
• Develop measures via interviews and surveys.
• Correct imbalances via new procedures.

http://www.hunter.cuny.edu/genderequity/
Faculty Flux* at Hunter
Female science faculty 2002-2007

Source: http://www.hunter.cuny.edu/genderequity/benchmarks.html
NSF ADVANCE: New Mexico State

- Size: 14,698 Undergraduate, 3,799 Graduate, 1,219 Faculty

- Between 2002 and 2008, the strategies used doubled the number of female scientists hired into faculty positions at NMSU from 17% to 34%

- In 2006, New Mexico State University established ADVANCE as a permanent program at the Teaching Academy.
  - This ongoing program has a broader focus, serving all faculty members, especially underrepresented faculty
**NSF ADVANCE: New Mexico State University**

*All Data Provided by the Office of Institutional Research, Planning, and Outcomes Assessment (IRPOA) unless otherwise noted*

### Table 1: New Mexico State University Faculty by Category, Fall 2008

<table>
<thead>
<tr>
<th>Faculty Category</th>
<th>All NMSU</th>
<th>% Female</th>
<th>STEM and SBS Departments</th>
<th>Social and Behavioral Science Departments</th>
<th>ADVANCE (STEM) Departments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Female</td>
<td>All</td>
<td>Female</td>
<td>All</td>
</tr>
<tr>
<td><strong>Tenured/Tenure Track</strong></td>
<td>582</td>
<td>198</td>
<td>34.0%</td>
<td>290</td>
<td>73</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>25.2%</td>
<td>46</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>43.5%</td>
<td>244</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>53</td>
</tr>
<tr>
<td><strong>Temporary/Non-Tenure Track</strong></td>
<td>141</td>
<td>92</td>
<td>65.2%</td>
<td>51</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>56.9%</td>
<td>13</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>61.5%</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>21</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>723</td>
<td>290</td>
<td>40.1%</td>
<td>341</td>
<td>102</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>29.9%</td>
<td>59</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>47.5%</td>
<td>282</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>74</td>
</tr>
</tbody>
</table>

1For a complete list of Social and Behavioral Science Departments and ADVANCE (STEM) Departments, see Table 3.
NSF ADVANCE: UC Irvine

- **Size:** 22,122 Undergrad, 5,509 Graduate, 2,685 Faculty

- **Goals:** Promoting a Faculty Culture of Inclusion through Gender Equity and Diversity in
  - Recruitment
  - Retention and Advancement
  - Leadership Opportunities
NSF ADVANCE: UC Irvine

- **Equity Advisor Model Implemented in All Eleven Schools and Department of Education**
  - Faculty Assistant to the Dean
  - 3-year term w/ stipend Participate in recruitment process
  - Coordinate mentoring programs Proactively investigate inequities

- **Gender Equity Indicators**
  - Survey of Faculty and Chairs Equity Advisor Annual Reports
  - Start-up Packages in Selected STEM Schools
  - Selection of Final Candidates in Selected STEM Schools

- **Best Practices, Career Tools, Family Friendly Resources**
  - Search Committee Workshops Mentoring:
  - Instructional DVD for Gender
  - Equity Sponsored Lecturers and Events: Hastings College of Law
  - Professor Joan Williams, University of Michigan CRLT Players
NSF ADVANCE: UC Irvine

Initiatives:

- Implement recommendations of the UC President's Task Force for Faculty Diversity
- Coordinate campus Scholarship on Diversity FTE Call and Program
- Develop $16m ADVANCE fundraising priorities for the campus comprehensive campaign
- Promote UC President's Postdoctoral Fellowship
- Hiring Incentive Program - eight fellows hired since 2003

Source: http://advance.uci.edu/
NSF ADVANCE: University of Washington

- Size: 42,907 Undergrad, 30,790 Graduate, 5,803 Faculty
- Grant used for creation of Creation of Center for Institutional Change (CIC).
  - The CIC focuses on the implementation of programs designed to eliminate existing barriers and to precipitate cultural change at both the departmental and the institutional level.
NSF ADVANCE: University of Washington

- The Center for Institutional Change focus on:
  - Leadership development for current chairs, deans, provost, and president
  - SEM department cultural change
  - Examination of UW policies for equity and policy transformation
  - Mentoring women in SEM for leadership
  - Transitional support for women faculty in SEM

http://www.engr.washington.edu/advance/
NSF ADVANCE: University of Washington

• 28.3% increase in the number of tenured or tenure-track women faculty (60 to 77) (Fall 2001 to Fall 2006)
• 17.8% increase in number of women full professors (28 to 33) (Fall 2001 – Fall 2006).
• Through AY04-05, more than 37% of the women in the faculty interview pool were offered positions, resulting in 16 new women faculty through Fall 2004.
• ADVANCE CIC staff has met with over 25 women faculty candidates
• *Quarterly Leadership Workshops for UW Department Chairs and Emerging Leaders*

Source:
http://www.engr.washington.edu/advance/resources/UW_ADVANCE_results_overview.pdf
NSF ADVANCE: Case Western Reserve University

- Size: 4,356 Undergraduates, 5,458 Postgraduates, 2,400 Faculty
- First private university to be awarded the NSF-ADVANCE Institutional Transformation Grant
- Grant used to create Academic Careers in Engineering & Science (ACES) program
  - enhanced transparency in faculty recruitment, advancement, development, and retention policies and improved accountability and effectiveness at the school/college and departmental level.

http://www.case.edu/admin/aces/
• ACES Initiatives

  • NSF-ACES Executive Coaching Initiative
  • Advance Opportunity Grants
    • provide small amounts of supplemental support of current or proposed projects and activities
  • Hotline Coaching
  • Provost Leadership Retreat
  • Undergraduate summer research program

http://www.case.edu/admin/aces/
Figure 1: Tenure-Stream Positions by Gender for the Case School of Engineering, AY 1998-99 to AY 2007-08

Source: http://www.case.edu/admin/aces/final.htm
Of the 7 departments in the Case School of Engineering, the number of female department chairs increased from 0 in 2003 to 2 in 2008. In 2008, the female department chairs were from the Mechanical and Aerospace Engineering department and the Electrical Engineering and Computer Science department.

Source: http://www.case.edu/admin/aces/final.htm
NSF ADVANCE: Columbia University

• Size:
  • 7,169 Undergraduate
  • 17,065 Postgraduate
  • 3,566 Faculty

• Grant created ADVANCE Program within the Earth Institute at Columbia University
  • Constituents include faculty and research scientists in the departments and centers affiliated with the Earth Institute and the Lamont-Doherty Earth Observatory, the Fu Foundation School of Engineering and Applied Science, and the Natural Sciences at Columbia.
  • The program works closely with the Vice Provost for Diversity Initiatives to expand successful ADVANCE initiatives to other parts of the University.

Source:
Initiatives:

• Workshops for department chairs and search committees on best practices for recruiting women scholars

• Departmental transformation awards to increase the number of women who are visiting scientists and to support recruitment and retention efforts

• Marie Tharp Visiting Fellowship for distinguished women scientists

• Institutional climate survey
NSF ADVANCE: Columbia University

• Initiatives

  • Targeted support for women scholars in the form of workshop leadership awards and research productivity grants
  • Faculty development programs
  • Symposium on the Science of Diversity
  • Lecture series on the Science of Diversity at the Lamont campus
  • Presidential lectures with eminent scientists who have had an impact on diversity at other institutions
The ADVANCE grant was awarded to the Earth Institute in June 2004. Since that time:

- The proportion of women among new hires has increased from 17% to 38% in the School of Engineering and 17% to 25% in the Natural Sciences.
- The proportion of women on the junior research staff at the Lamont campus has increased from 14% to 20%.
• Size: 18,778 Undergraduate, 4,366 Postgraduate
  • 1,305 Faculty
• Designed to increase the participation, retention, and advancement of women in academic science, technology, engineering and math careers by changing institutional culture and practices
Programs

• Distinguished lecture series
• Work-life resources website
  • http://www.k-state.edu/worklife/
• Mentoring program:
  • Career Milestones for Academic Personal Success (Career MAPS)
  • http://advance.ksu.edu/projects/32/career-milestones-for-academic-personal-success
Full-Time Tenure-Line Women SEM Faculty 1997-2008

Year 1997 2003 2004 2005 2006 2007 2008

Full
N=52
- 3 Retired
- 2 Left
- 1 Denied Tenure

Associate
N=66
- 1 Left
- 1 Admin
- 1 Promoted

Assistant
N=64
- 3 Left
- 1 Promoted

Assistant
N=71
- 3 Left
- 1 Promoted

Assistant
N=77
- 1 Promoted

Assistant
N=80
- 1 New Hire
- 1 Promoted

Assistant
N=85
- 1 New Hire
- 2 Promoted

Source: http://advance.ksu.edu/publications/
Six Participating institutions:
- Iowa State University, University of Utah, University of Connecticut, Syracuse University, Louisiana State University, University of Central Florida.

Activities:
- Advanced Leadership Workshop: examining transformative leadership
  - Syracuse, Oct, 2004 (30 participants,)
- Leadership Summit: Broad national strategies for advocacy for women engineers in the workplace
  - Storrs, Connecticut, May 2004 (70 participants, different organizations)
  - The conference and Summit involved faculty members and administrators from 96 institutions representing 38 states, Puerto Rico and Canada.
- Electronic Networking Community
Which Door to Open?
Conclusions

• Nationally funded programs are changing institutional climate.

• Women are successful in taking activist roles in creating change in their institutions.

• Activism needs to translate into broad leadership in institutions.
ADVANCE it- SU: The Inclusive Connective Corridor (ICC)