Sowing the Seeds of Diversity in Engineering

Jennifer Sinclair Curtis
WEPAN Webinar
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UC Davis

• Most comprehensive university on west coast
• 39,000 students; $941M research expenditures
• #5 Public University (WSJ, Times Higher Ed)
• #1 Sustainable University in US (GreenMetric)

• 42% undergraduates are first generation students
• #2 Transfer Students in top US universities
• #3 “Doing the Most for the American Dream” (NY Times)
## The Academic Pipeline

### In Engineering

<table>
<thead>
<tr>
<th>Category</th>
<th>2019 Percentage</th>
<th>Change since 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women Faculty</td>
<td>17%</td>
<td>+5%</td>
</tr>
<tr>
<td>Women Graduate Students</td>
<td>23%</td>
<td>+6%</td>
</tr>
<tr>
<td>Women Undergraduate Students</td>
<td>23%</td>
<td>+5%</td>
</tr>
<tr>
<td>URM Faculty</td>
<td>8%</td>
<td>No change</td>
</tr>
<tr>
<td>URM Graduate Students</td>
<td>10%</td>
<td>+2%</td>
</tr>
<tr>
<td>URM Undergraduate Students</td>
<td>17%</td>
<td>+2%</td>
</tr>
</tbody>
</table>

*Engineering by the Numbers (ASEE, 2019)*
15% of early high school girls - interest in pursuing STEM (40% boys)

- We all can help girls and other underserved groups explore STEM as possible career and support/encourage them in their education

Only 30% of women who earn bachelor’s degrees in engineering are still working in engineering 20 years later

In the workforce, only 13% of engineers are women
“UC Davis has shown dramatic changes at all levels. These outcomes arise from creating an environment that is welcoming ....... coupled with an unwavering dedication to student success and diversity.”

Diversity at UC Davis

Sowing the Seeds of Diversity in Engineering

#1 for Women in STEM (Forbes)

By Jennifer Sinclair Curtis on December 8, 2017
Faculty Recruitment and Support
Mission

Institutional transformation to increase recruitment, retention and advancement of female STEM faculty, with emphasis on Hispanic Women/Latinas

- Programs to enhance the recruitment, promotion and retention of women faculty in STEM with best practices impacting all faculty
- Led by Chancellor Emerita Linda Katehi (PI) and Prof. Karen McDonald (Faculty Director and Chemical Engineer!)
- Best practices are now institutionalized and permanently supported
Faculty Hiring and Advancement

- Contributions to diversity are required of all applicants
- Central oversight of process
- Contributions to diversity in all promotion reviews
- Superior contributions to diversity are recognized and rewarded
- College-wide searches, instead of narrow disciplinary expertise
Strength Through Equity and Diversity Committee

Faculty committee of volunteers

Train peers on recruitment practices and implicit bias

Mandatory training for all search committees
LAUNCH Mentoring Committee

Goal: Facilitate development and success of early-career faculty members

Mentoring Committee: ~4 faculty members, some outside of department/college

Quarterly meetings of mentoring committee with faculty mentee

“The LAUNCH committee gave me a unique opportunity to connect at the time I needed it the most. I really appreciated the fact that the committee involved professors from my department as well as from other departments. I always received advice from different points of view, which I found particularly invaluable. I remain in touch with most members, and they have become my long-term mentors.”

- Associate Prof. Cindy Rubio Gonzalez (Computer Science)
Goal: Integration of new staff and faculty and their partners to UC Davis and the community

Facilitates...

- Temporary housing
- Positions for partner in region, including UC Davis’ Partner Opportunity Program
- Introduction to community services and activities
Faculty Hiring In Engineering

BUILDING A DIVERSE COMMUNITY OF FACULTY and ROLE MODELS

#1 for Percent Female Engineering Faculty
Student Recruitment
Avenue to Engineering (Avenue-E)
An Innovative Student Transfer Pathway Program

- ~70% of students in CA Community Colleges from underserved groups
- Huge opportunity to accelerate diversification of STEM industries
- UC Davis has transfer admission guarantee program with community colleges

- Avenue-E provides a support network and seamless transition for students
  - Engages students during their community college experience
  - Eliminates barriers associated with timely degree completion at UC Davis

New Generation of Promising Engineering Talent & Leadership
Avenue-E
Interventions and Programming

• Professional Learning Communities
  • 90 faculty and staff from UC Davis and 4 community college partners

• Aggie Transfer Scholars Weekend – One year before transfer to UCD

• Summer Transfer Bridge Program – Two weeks prior to their first quarter at UCD

• Weekly Connection Meetings facilitated by a college engineering advisor

• Industry Engagement through mentoring and career development workshops

• Free Tutoring services

• Student Scholar Awards $4000/year
Avenue-E
Outcomes to Date (into our 4th year)

• Yearly Cohorts of 30 students
• 81% URMs, 69% first-generation students

• All students but one remain enrolled/graduated in engineering or CS
• Students report highly positive experiences, emphasizing community

http://avenuee.ucdavis.edu/
Undergraduate Education
UC Davis Engineering Student Diversity

Leadership in Engineering Advancement Diversity and Retention Program (LEADR)

- Quarterly advising for first and second years
- Student study center
- Summer Bridge Program
- Living-Learning Community
- Leadership and Career Development Seminars

Diversity at Undergraduate Level

- 30% female (23% national average)
- 24% URM (17% average)
- 35% first-generation college students
A First-Year Career Development Course: Securing and Succeeding in an Engineering Job

- Seminar course for first-year students taught by practicing engineers and the Dean
- Many students do not have access to individuals to assist them in their job search
- Large student enrollment in the course, particularly from at-risk students

Course topics:

- What I Wish I Knew as a First-year Student
- Building a Great Resume
- Improving your Interview Performance
- Optimizing LinkedIn Profile
- How to use Networking to Find a Job
- Characteristics of a Successful New Hire
- Creating a Positive Professional Image
- Effective Business Communications
- Developing Leadership Skills
- Skills Necessary to be a Entre/Intrapreneur
First Year Engineering Design

Design Projects

• Serving a client - UCD Student Farm
• Students work in teams to design and create prototypes and solutions
• 2/3 of our students are involved
First Year Engineering Design

- Intro to computer programming, circuits and prototyping
- Oral & written communication assignments
- Final project presentation

UG retention has increased 20%
What We’ve Learned

- Culture is changing through proactive actions
- Mentoring and support at all levels
- Peer-to-peer for faculty
- Women and underrepresented minorities in leadership roles
- Early exposure to the impact and excitement of engineering increases recruitment and retention
What We Can All Do

- Encourage
- Advocate
- Speak up
- Be a mentor
Grateful for My Mentors

Nicholas Peppas  
UT Austin  
UG Research Advisor at Purdue University

Roy Jackson  
Princeton University  
PhD Advisor

John Anderson  
IIT-NAE  
ChE Department Chair at CMU
Thank You!

Encourage, Advocate, Speak Up and Be a Mentor