

Sowing the Seeds of Diversity in Engineering

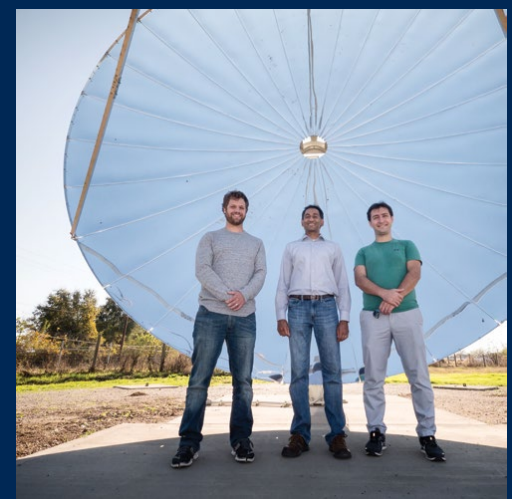


Jennifer Sinclair Curtis

WEPAN Webinar
March 18, 2021

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

Change since 2009

• Women Faculty	17%	+5%
• Women Graduate Students	23%	+6%
• Women Undergraduate Students	23%	+5%
• URM Faculty	8%	No change
• URM Graduate Students	10%	+2%
• URM Undergraduate Students	17%	+2%

Engineering Pipeline and Workforce

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

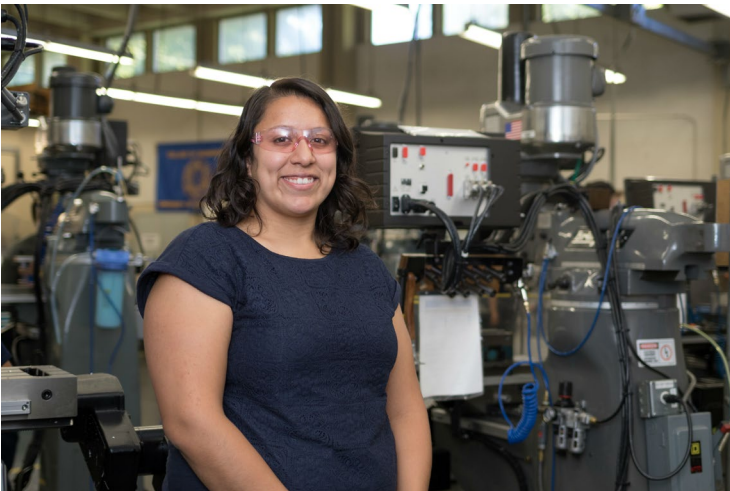


Only 30% of women who earn bachelor's degrees in engineering are still working in engineering 20 years later

In the workforce, only 13% of engineers are women

Diversity at UC Davis

“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.**”



SCIENTIFIC
AMERICAN.



Sowing the Seeds of Diversity in Engineering

By Jennifer Sinclair Curtis on December 8, 2017

#1 for Women in STEM (Forbes)

Faculty Recruitment and Support

ADVANCE Grant funded by the National Science Foundation (2012-2017)

Mission

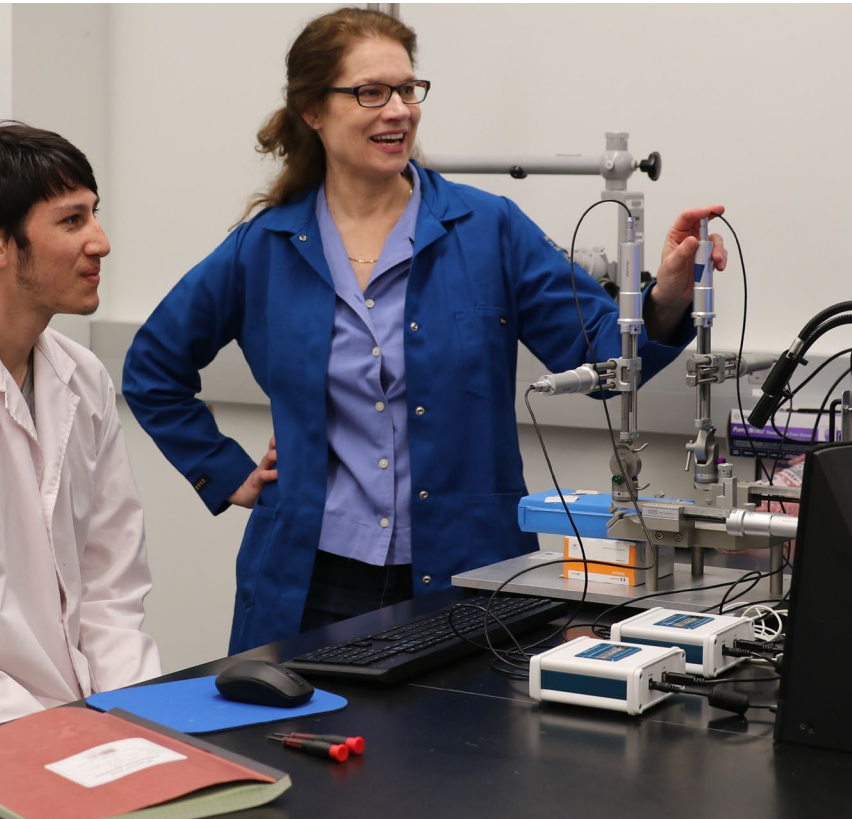
Institutional transformation to increase recruitment, retention and advancement of female STEM faculty, with emphasis on Hispanic Women/Latinas



- 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)



Capital Resource Network

- **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**



Jamal Lewis
Assistant Professor, Biomedical Engineering
Ph.D., University of Florida (2010)



Karen Mason
Professor, Biomedical Engineering
Ph.D., University of Colorado (1996)



Alyssa Paritch
Edward Taylor Endowed Chair and Professor,
Department of Mechanical Engineering
Ph.D., University of Michigan/Ann Arbor (2002)



Coleman Kronawitter
Assistant Professor, Chemical Engineering
Ph.D., UC Berkeley (2010)



Priya Shah
Assistant Professor, Chemical Engineering
Ph.D., UC Berkeley (2015)



Jason White
Assistant Professor, Chemical Engineering
Ph.D., University of Connecticut (2016)



Heather Bischof
Assistant Professor, Civil
and Environmental Engineering
Ph.D., Stanford University (2016)



Colleen Bronner
Assistant Professor, Civil and Environmental Engineering
Ph.D., State University of New York, Buffalo (2016)



Alexander Forrest
Assistant Professor, Civil
and Environmental Engineering
Ph.D., Cornell University (2016)



Jonathan Herman
Assistant Professor, Civil
and Environmental Engineering
Ph.D., University of South Florida (2016)



Maureen Kinyua
Assistant Professor, Civil
and Environmental Engineering
Ph.D., University of South Florida (2016)



Alejandro Martinez
Assistant Professor, Civil
and Environmental Engineering
Ph.D., Stanford University (2016)



Sabbie Miller
Assistant Professor, Civil
and Environmental Engineering
Ph.D., Stanford University (2016)



Veronica Morales
Assistant Professor, Civil
and Environmental Engineering
Ph.D., Cornell University (2016)



Holly Oldroyd
Assistant Professor, Electrical and Computer
Engineering, Ph.D., Ecole Polytechnique
Universite de Lorraine (2016)



Katerina Ziotopoulou
Assistant Professor, Electrical and Computer
Engineering, Ph.D., UC Santa Barbara (2016)



Srabanti Chowdhury
Assistant Professor, Electrical and Computer
Engineering, Ph.D., UC Santa Barbara (2016)



Shuguang (Robert) Cui
Assistant Professor, Electrical and Computer
Engineering, Ph.D., Stanford University (2016)



J. Sebastian Gomez-Diaz
Assistant Professor, Electrical and Computer
Engineering, Ph.D., Technical University of Catalonia, Spain (2016)



Lifeng Lai
Assistant Professor, Electrical and Computer
Engineering, Ph.D., Ohio State University (2016)



Heoman Rashtian
Assistant Professor, Electrical and Computer
Engineering, Ph.D., University of British Columbia (2016)



David Doty
Assistant Professor, Computer Science
Ph.D., Iowa State University (2016)



Kurt Eiselt
Assistant Professor, Computer Science
Ph.D., University of California, Davis (2016)



Cho-Jui Hsieh
Assistant Professor, Electrical and Computer
Engineering, Ph.D., Stanford University (2016)



Susan Gentry
Lecturer, PSC, Materials Science and Engineering
Ph.D., University of Michigan, Ann Arbor (2010)



Roopali Kukreja
Assistant Professor, Materials Science and Engineering
Ph.D., Stanford University (2016)



Seongkyu Lee
Assistant Professor, Mechanical and Aerospace Engineering
Ph.D., Pennsylvania State University (2016)



Xinfan Lin
Assistant Professor, Mechanical and Aerospace Engineering
Ph.D., University of Michigan (2016)



Jason Moore
Lecturer, PSC, Mechanical and Aerospace Engineering
Ph.D., University of California, Davis (2016)



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/>



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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

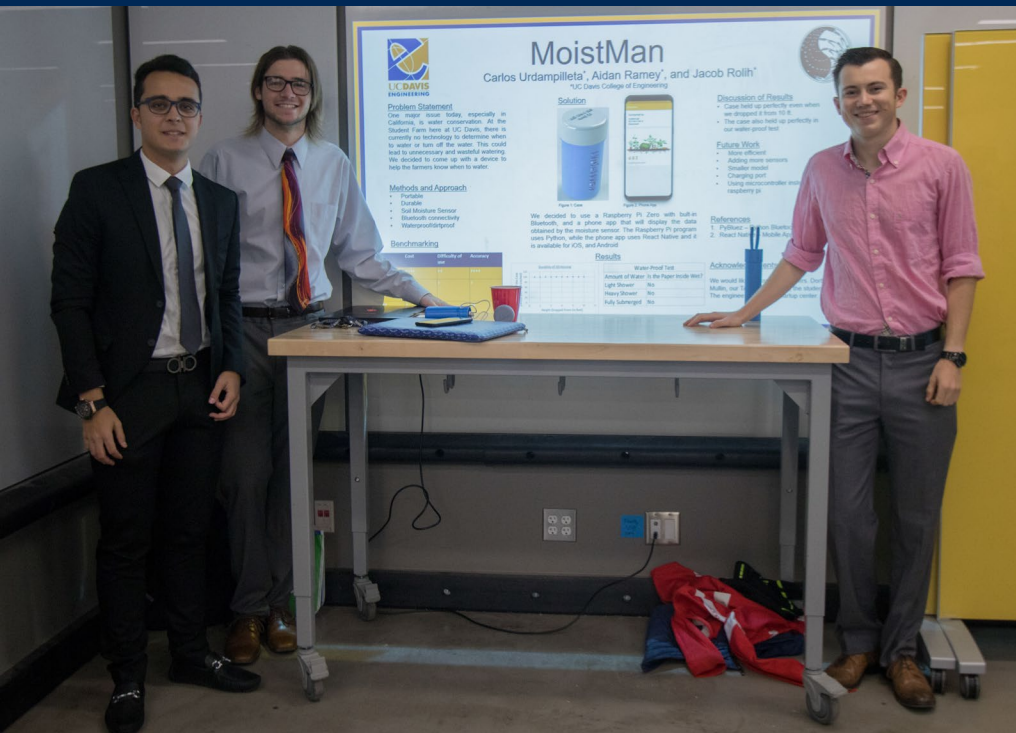
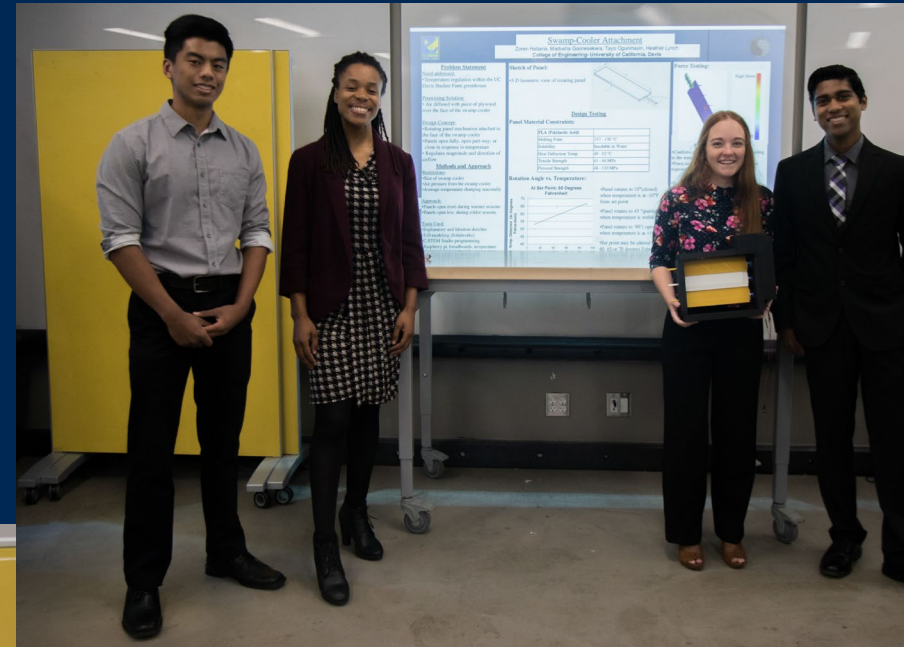
Design Projects

- 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

