Alice Agogino, Professor of Mechanical Engineering
Education Director, Blum Center for Developing Economies
Chair, Graduate Group in Development Engineering
Research Synergies & Funding Opportunities

- Funding opportunities can catalyze faculty, staff and students.
- Must be driven by shared strategic goals: time invested is worthwhile even if not successful in extramural support.
- Works best if tied to sustainable institutional support.
An interdisciplinary research field that integrates:

- Engineering, physical sciences, energy, and resource development
- Economics, business, and social sciences

Students learn to cycle through a full process of design.

Aimed at scaling technologies to benefit people living in underserved areas.
STEM Training for Actionable Research and Global Impact

Alice M. Agogino, PI
Yael Perez, Coordinator

$3M over 5 years
INF)W FACULTY

Alice Agogino, Mech Eng
Dan Kammen, Energy Resources
Kara Nelson, Environ Eng
Matthew Potts, Energy, Social Science, Policy

David Levine, Business
Isha Ray, Energy Resources
Jack Colford, Public Health
Clair Brown, Econ
David Zilberman, Agricultural Econ
UC Berkeley InFEWS NRT

actionable interdisciplinary research that address grand challenges in the design, implementation, and coordination of food, energy and water systems within spatial and temporal constraints.
UC Berkeley InFEWS NRT

InFEWS/DevEng Enrollment Trends

- New students enrolled
- Total enrolled students
- Female
- Male
- URM
- URM%
- Departments represented

Color codes:
- Blue: 2017-18
- Red: 2018-19
- Orange: 2019-20
- Green: 2020-21
Our Broader Mission: Interdisciplinary Learning & Problem Solving for Global Social Impact

- Interdisciplinary learning
- Problem solving
- Human-centered design
- Co-design with communities
Indige-FEWSS


Inter-cultural awareness

Develop Diverse Workforce

FEWS expertise

Water & Ag Tech

FEW Security

Training Tribal College Students in FEWSS

12 trainees (9 PhDs, 3 MS)
42% Native American
58% Minorities
50% Male & Female

https://energy.arizona.edu/indigefewss

MAJOR RESEARCH EFFORTS

Production of Drinking Water from Brackish Groundwater

Brine Management

Controlled Environment Agriculture
Indigenous Co-Innovation of Food, Energy & Water Systems

Training students to co-design with Indigenous communities using systems thinking

$200K workshop grant
Co-InFEWS NRT Partners

- Alice Agogino, UC Berkeley InFEWS Faculty
- Maya Trotz and Rebecca Zarger, USF InFEWS Faculty
- Karletta Chief, U Arizona InFEWS Faculty
- Don Robinson, Diné College INFEW Faculty
Holistic Ecological Perspective

- Implicit in this indigenous thinking is the perception that all things are naturally interconnected, meaning everything works as a whole and undivided.

- Furthermore, it is systemic, organic, and ecological.

- Within this undivided ecological wholeness everything is considered living and with this understanding those things considered not alive by western standard, are alive and through its interconnectivity with those living.
Topics to consider in the process of Indigenous innovation

How sustainability should be considered in the design of FEWS with Indigenous communities?

Action Items: How can YOU put this into action?

1. Sustainable food energy and water systems
2. Health and wellbeing
3. Resiliency (to COVID-19 and other pandemics or potential disasters)
4. FEWS Sovereignty & Environmental Justice
5. Multi-generation perspectives; FEWS across generations
6. STEAM (Science, Technology, Art, and Mathematics) Education: Broadening participation
7. Language and cultural brokers
8. Digital Transformations in Access and Development
9. What else?
Launch of the Native FEWS Alliance

Broadening Career Pathways in Food, Energy, and Water Systems (FEWS) with and within Native American Communities

<table>
<thead>
<tr>
<th>University of California, Berkeley</th>
<th>University of Arizona</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PI</strong> Alice Agogino</td>
<td>Karletta Chief</td>
</tr>
<tr>
<td><strong>Co-PI</strong> Elizabeth Hoover</td>
<td>Greg Barron-Gafford</td>
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<tr>
<td><strong>Co-PI</strong> Matthew Potts</td>
<td>Kelly Simmons-Potter</td>
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<tr>
<td><strong>Co-PI</strong> Carrie Billy (AIHEC)</td>
<td>Valerie Shirley</td>
</tr>
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<td>Diana Dalbotten (U of Minnesota)</td>
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</tbody>
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$10 million over 5 years
Change Strategy

- **Native FEWS**
- **Address urgent FEWS challenges in Indigenous communities**
- **Use curricula and interventions to recruit, retain and graduate Indigenous students**
- **Co-develop integrated, Indigenous, place-based FEWS curricula, mentoring and practice experiences**
- **Transform institutional STEM fields to be relevant and accessible to Indigenous communities**
Project Goals:
Native FEWS Pathways through the Native FEWS Alliance Institutions
Organization Structure and Launch Breakout Group Leaders

Tribal FEWS Advisory Board

Alliance Council (All Personnel)

Indigenous Research Ethics Advisors

Backbone
Billy AIHEC

Ext Evaluator
Valdez & Stein Native Pathways

NSF INCLUDES National Network

Pls
Agogino & Chief

Alliance Program Leads

Pre-College Shirley
TCUs Kuslikis
Undergraduate Watts
Graduate Agogino & Chief
Certif/Prof Roane
Postdoctoral Patt
Faculty Plenty Sweetgrass-She Kills
Community-based Dalbotten
Networked Improvement Community (NIC) Framework
Research Synergies & Funding Opportunities

- Funding opportunities can catalyze faculty, staff and students
- Must be driven by shared strategic goals
- Works best if tied to sustainable institutional support
  - DevEng Faculty Position
  - PhD Minor – Designated Emphasis
  - Master of Development Engineering
  - Support for Graduate Student Research
  - Research Experiences for Undergraduates
  - Follow on Grants – Digital Transformations in Development