Establishing Community: Research as a Broader Impact

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March 2022
Overarching Scientific Questions

How can we broaden participation in plasma physics?

What defines the identity of a physicist?

Who gets to establish values and norms?
Broader Scientific and Societal Context

U.S. labor force will grow ~0.2% annually from 2024 to 2031 (US CBO)
Broader Scientific and Societal Context

Physics annual phd production

In 2020, 2,241 degrees produced

- <21% were female
- 2 were American Indian/Alaskan Native
- 21 were Black or African American
Women make up ~25% of P&A undergrad students at UC

Women make up ~30% of P&A grad students at UC

Trends in Physics

Percent of Physics Bachelor’s Earned by Women, Classes of 1976 to 2020

Percent of Women among First-year Graduate Physics Students at PhD Granting Physics Departments, Fall of 1994 through 2017

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The pipeline

Women make up ~54% of all undergrad students

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Dry Creek Band of Pomo Indians
● The Morrill Act worked by turning land taken from tribal nations into seed money for higher education.

● Land-grant universities were built not just *on* Indigenous land, but *with* Indigenous land.

https://www.hcn.org/issues/52.4/indigenous-affairs-education-land-grab-universities

Database: https://www.landgrabu.org

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A different approach

• We discuss participation as if it is inherent that people should want to be here
  • Not viewing low participation as an indicator of lack of preparation or interest
• We neglect the history that has redefined being a physicist for the past few hundred years
  • Many cultures have strong cultural and societal ties to the study of the world with mathematics
  • Rather than defining physics as a new identity to replace your old one, we can reestablish it within these roots
Research as a source of community

• Begin with assumption that we are all here because we want to solve problems, to make the world a better place

• How to encourage open discussion and normalize tough conversations

• Remove inequitable barriers and increase growth mindset and wellness
3 Programs

• PACE
• CARE-NA
• AISES Ambassador Workshops
Institutional Alliances

>700 Minority serving institutions exist in US

Includes HBCU’s, Hispanic Serving Institutions, Tribal Colleges and Universities, and more
Research as a source of community

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PACE Peer Mentoring

• Recommendation derived from APS Report of the Site Visit 2017
• Grad student led workshops with small group discussions
• Mentors can receive training via Grad Division’s Mentoring Excellence Program
• TA Training meetings prior to workshop (workshop currently once a month in pizza seminar)
Program Impact

**Growth Mindset**
25%
Students believe in the possibility of change, self improvement, growth, creative problem solving

**Peer to Peer Support**
30%
Students feel a part of their cohort, and have a network of support among the grad community

**Building a Mentor Network**
30%
Students recognize the importance of building a mentor network, and can identify >1 faculty advisor as a mentor

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Top Sessions

- Time Management Tools
- Strategic Goal Planning
- Qual Exam Panel
- Defining Personal Health & Happiness w/ Dr. Phong Luong
- Planning for Summer Professional Development
Testimonials

“...This was a great and easy way to find out what you don't know. There were a lot of topics I did not realize I should question and that I have started questioning so that I can be a better grad student...”

“A place to build community and get to know each other.”

“It is a safe space to talk about anything you might be experiencing as a grad student in the department, and I found that a lot of other students were going through similar things as me but just didn’t vocalize it. This program was super helpful as it helped me to realize that I do deserve to be here no matter what my brain might be telling me.”

“...a place where you can grow as a scientist and as an individual. You'll gain experiences and knowledge that will help you navigate grad school as well as your own personal life...”

“...It helped me most by hearing that my experiences are normal and manageable.”

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CARE-NA

• Culturally-relevant Accelerator Research & Engineering for Native Americans (CARE-NA) Program

• Paid summer research opportunity
Workshops

Developing Culturally Relevant Research Proposals
Professor Franklin Dollar
Department of Physics & Astronomy
University of California, Irvine

NSF Review Criteria
1. What is the potential for the proposed activity to:
   a. advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
   b. benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?

Proposal 1
- Title: Mono Language Documentation Project
- PI: Dr. Kathryn Putative, University of California
- Abstract: The Mono language is a California Indigenous language which has fewer than 40 fluent speakers. It is currently listed as a critically endangered language by the United Nations and action is needed immediately. In this proposal, we will transcribe words and phrases from the mono language and tabulate them into a spreadsheet database. A graduate student researcher will be funded to perform the interviews and transcription process. An undergraduate researcher with ties to the local community will also be involved with the transcription. Both students will benefit from significant training from the PI, who is a world expert in the field. The students would also have the opportunity to share what they have learned with workshops for the tribe to promote language restoration efforts. Tribal members will have access to the results and we will work with tribal elders to determine what is appropriate for public release. Results will be published in academic journals and presented at national conferences.

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Open questions for the future

• How to establish meaningful partnerships that empower and respect others
• Having opportunities that leverage existing strengths
• Do we have a common set of objectives and goals
  • Do we treat those goals objectively