Diversity Equity and Inclusion in Nuclear Physics Collaborations

Rosi Reed
Lehigh University
Hot/Cold QCD Town Hall

DEI in the LRP Charge

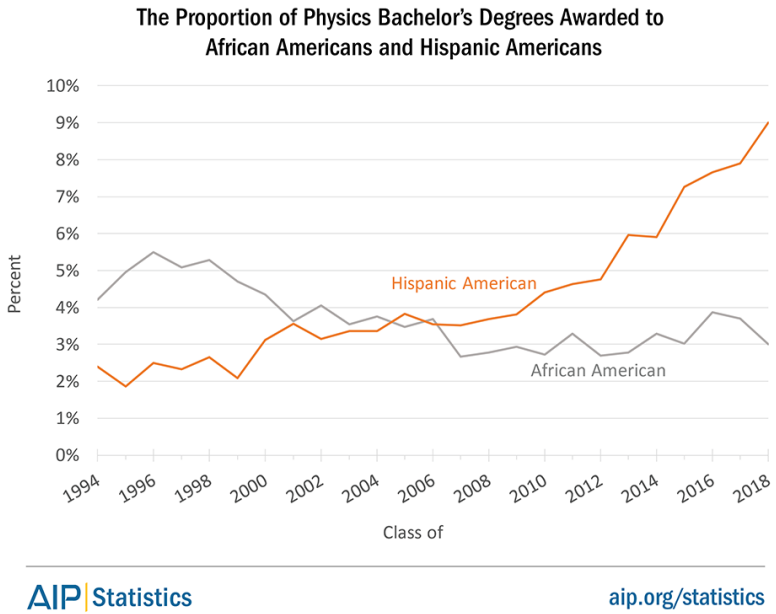
"The document should also articulate how efforts to **promote** and **sustain** a **diverse, equitable, and inclusive** nuclear science **workforce** will be fully integrated into every aspect of the vision for the future of U.S. nuclear science."

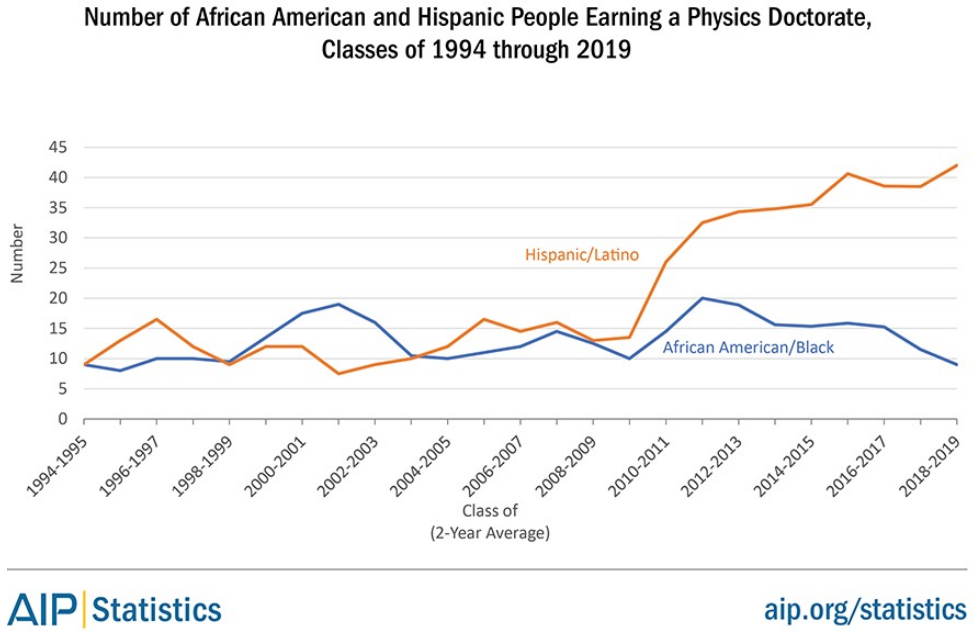
- Not just a footnote but will also be a **key component** of the 2023 LRP for Nuclear Physics
- DEI has been a part of many policy statements for years
  - How do we go from **policy** to **action**?

Outline/Introduction

- A brief summary of the DEI status in (nuclear) physics
  - Demographics
  - Climate
- DEI Goals
- Select programs from the community that promote and/or sustain DEI
- Recommendations for the LRP

US Physics Demographics (1/2)





Race and Ethnicity of Physics Faculty

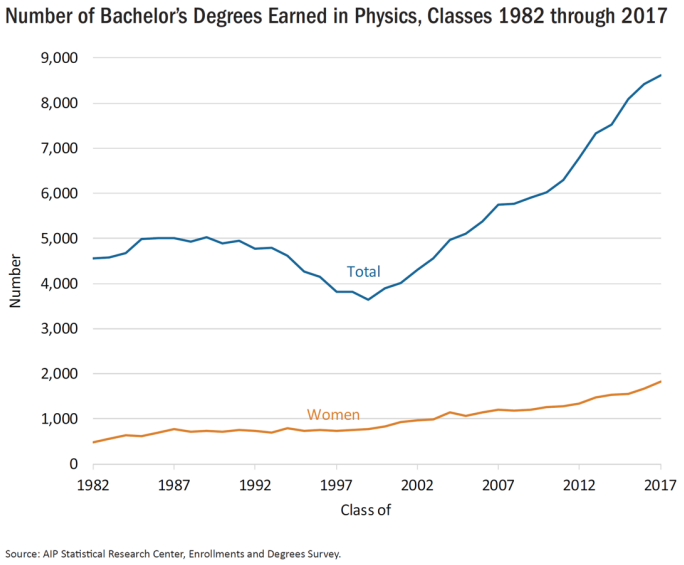
	Physics			All Disciplines*
	2004 (%)	2008 (%)	2012 (%)	2009 (%)
African-American	2.0	2.2	2.1	6.6
Asian	10.6	13.2	14.3	6.0
Hispanic	2.7	3.1	3.2	4.0
White	82.2	80.0	79.2	74.9
Other	2.2	1.5	1.2	0.5

* Data for all disciplines (which includes non-science disciplines) found at http://nces.ed.gov/fastfacts/display.asp?id=61

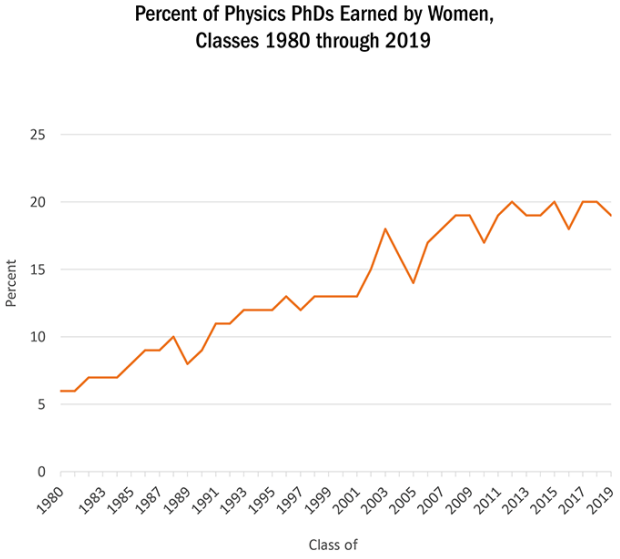
www.aip.org/statistics

- Racial demographics of faculty, awarded Doctorates, awarded Bachelor's degrees has been largely static
- Can Nuclear Physics do better?
- Clearly the physics community still has work to do

US Physics Demographics (2/2)



AIP | Statistics aip.org/statistics



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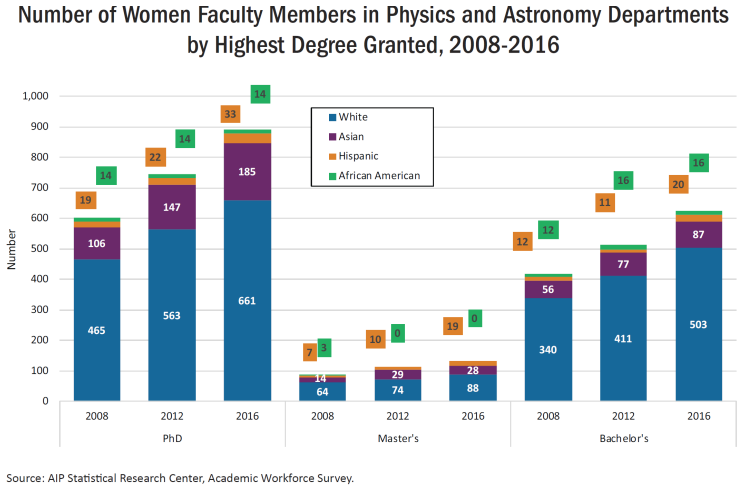

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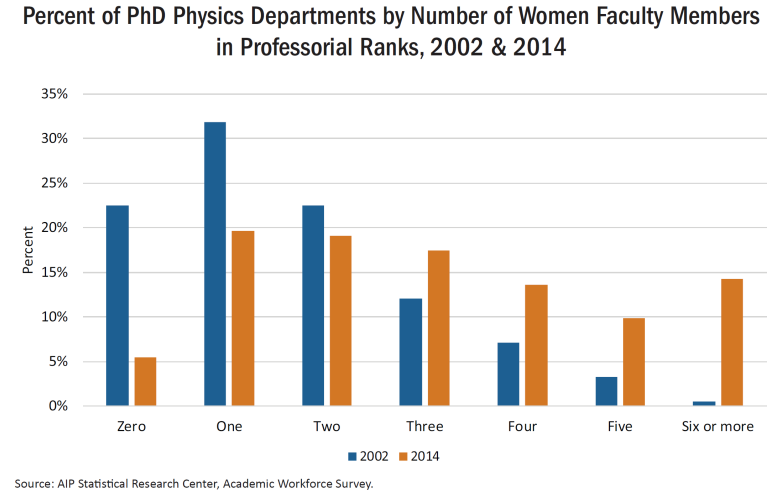
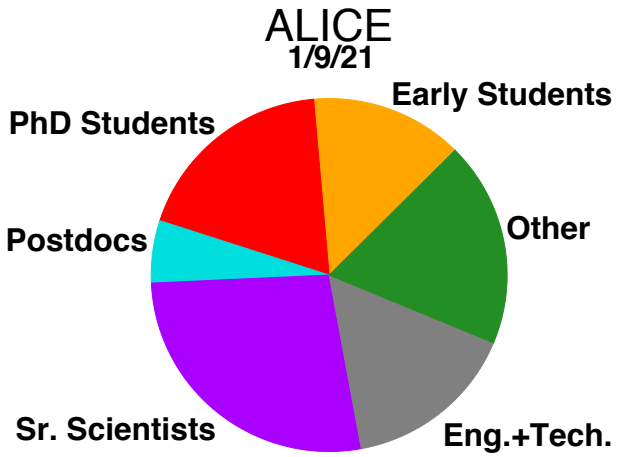
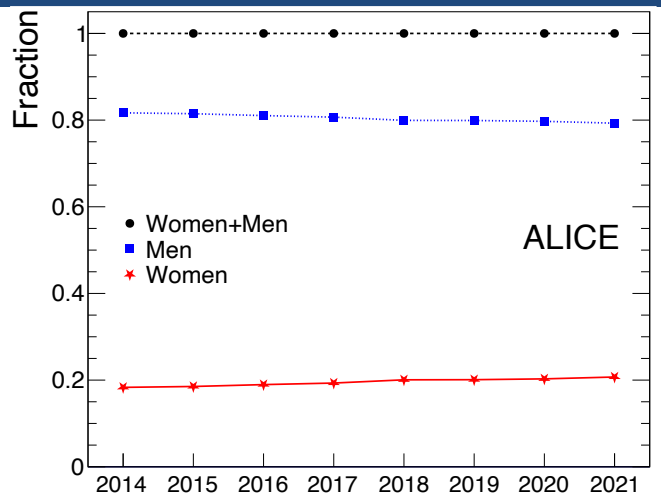


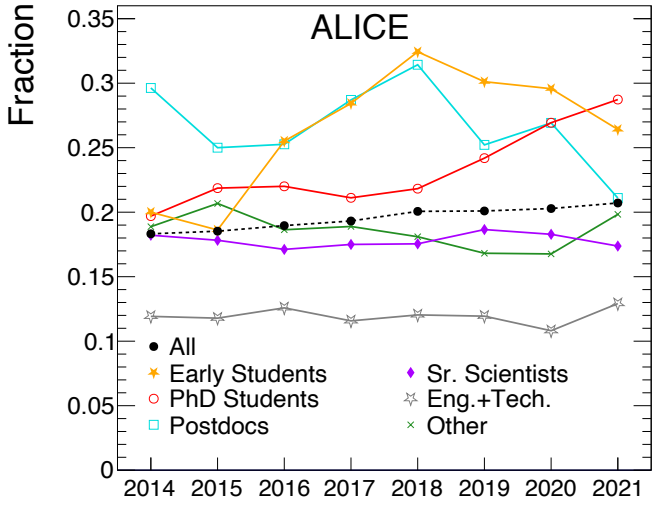
AIP | Statistics aip.org/statistics

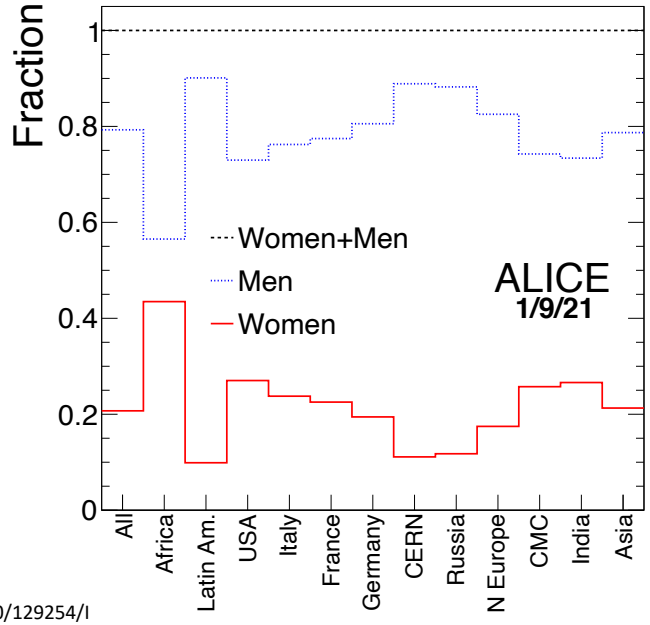
- There has been improvement over the decades of percent of women gaining
  - Bachelor's Degrees
  - PhDs
  - Faculty postions
- However this highlights the issue of racial diversity
  - The number of PhDs to people in historical marginalized groups is largely unchanged
- Can Nuclear Physics do better?

ALICE Demographics









https://agenda.infn.it/event/28874/contributions/169239/attachments/94450/129254/ICHEP_2022_ADO_FAF.pdf

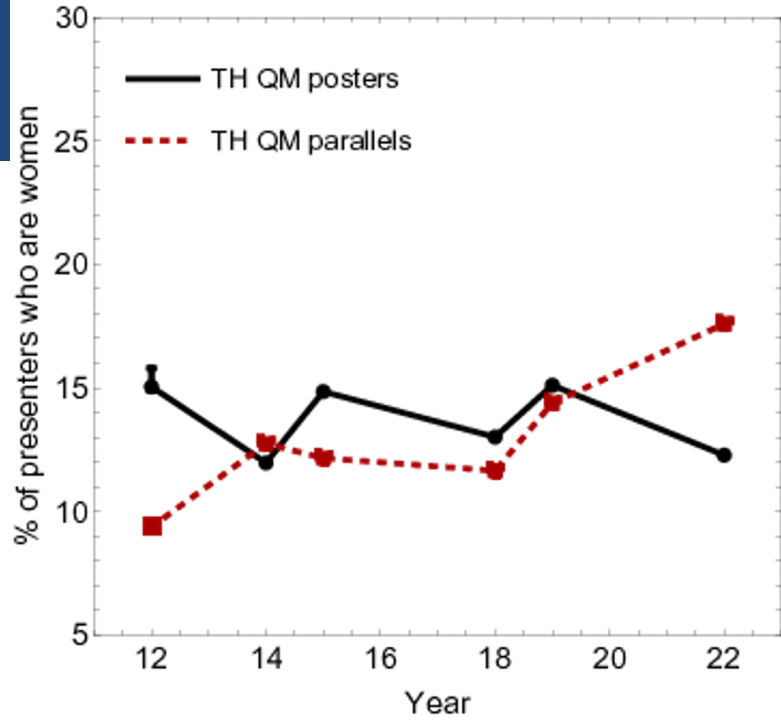
Sept 2021 Data Set
1907 active members

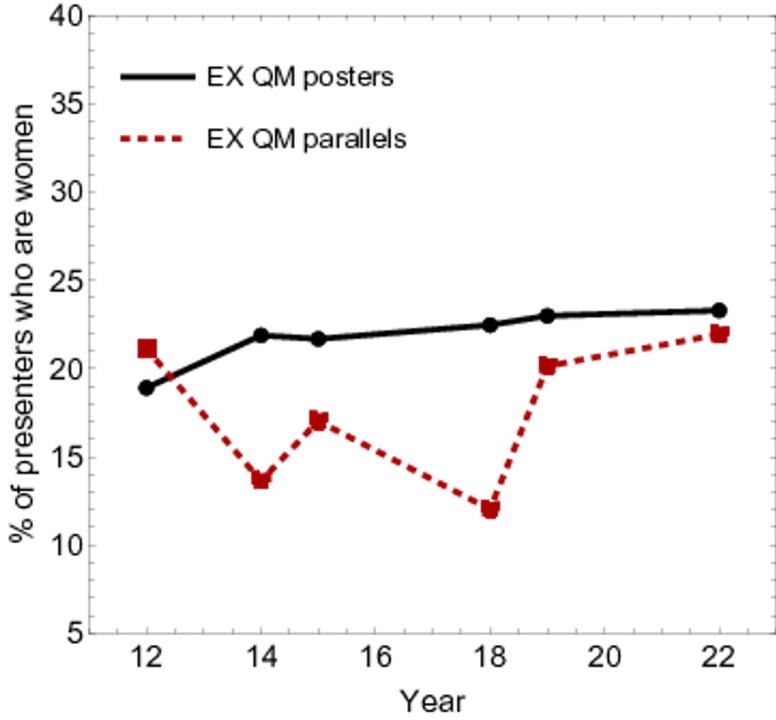
- ALICE is the largest hot QCD experiment
- ~20% women
- Significant regional variation
  - DEI is complicated due to the intersection of an individual's many identities
- Climate survey similar to the EICUG would be interesting
  - Career demographics are very different than EICUG
- Increase in Female PhD students not (yet?) reflected in an increase in Postdocs

Analysis of conference talks by gender

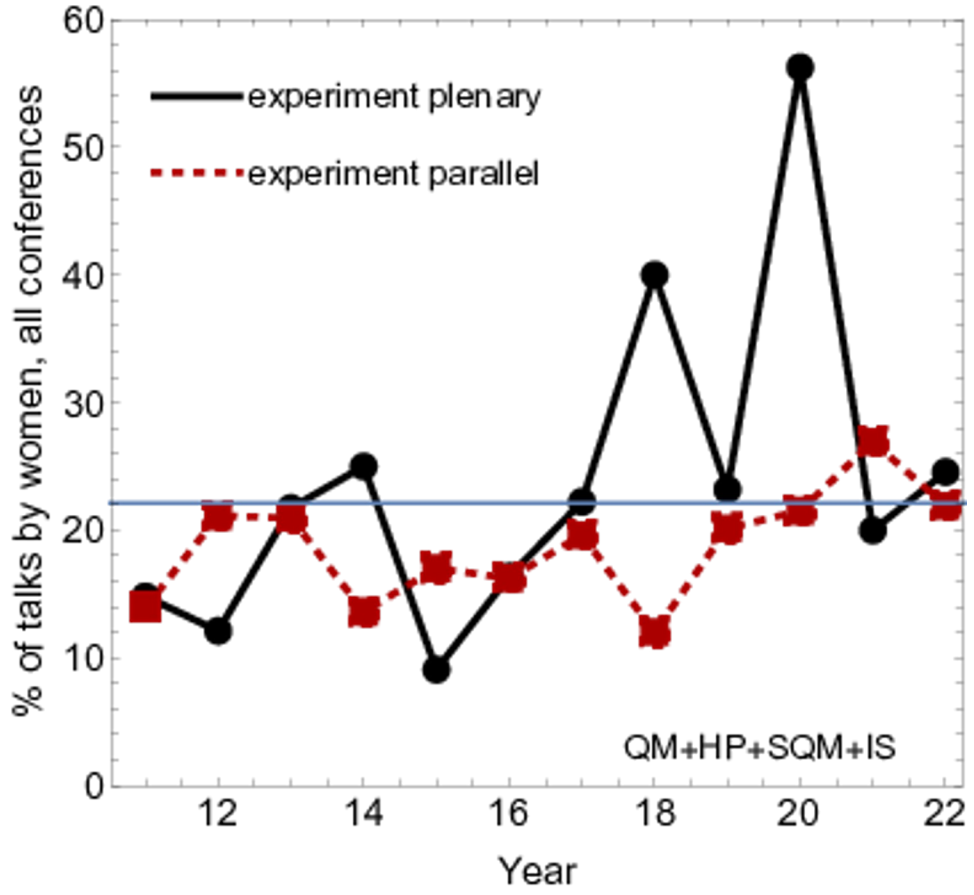
[See Nattrass WWND2022 for details]

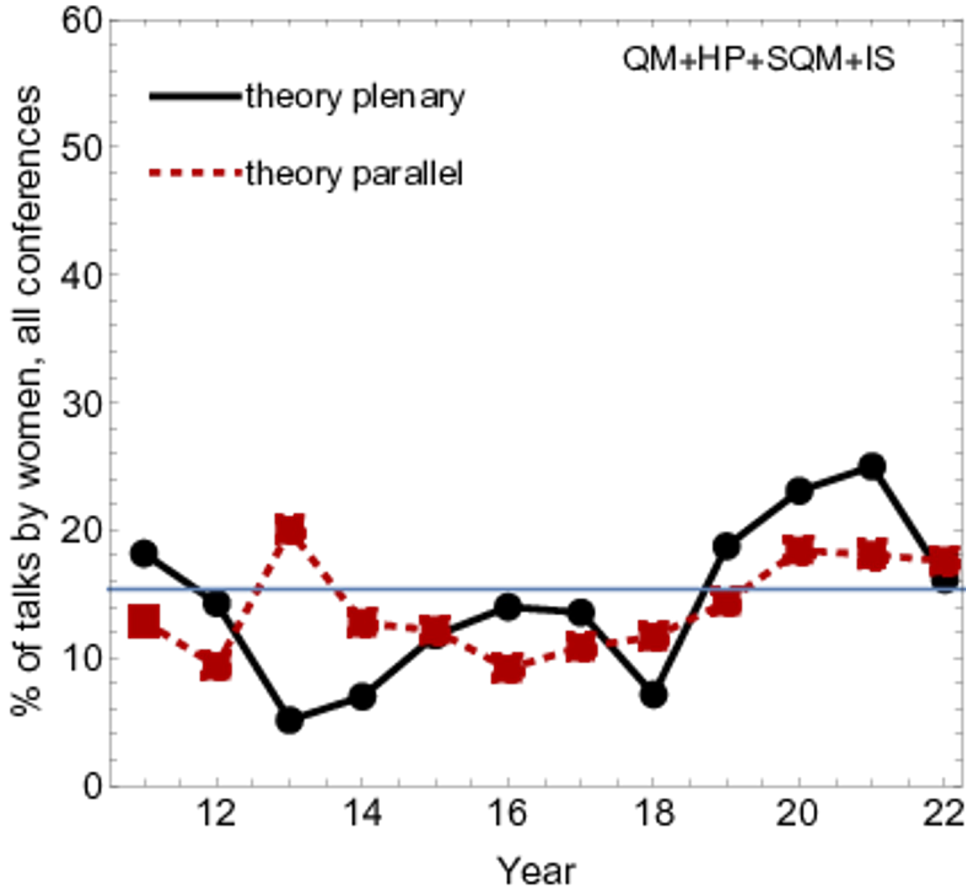
- Analysis
  - **Quark Matter**, Initial Stages, Strangeness in Quark Matter, Hard Probes from 2011-2022
  - Download presenters' names, separate plenary and poster presenters and manually identify presenters' gender
- Key findings
  - Female theorists generally underrepresented among plenary speakers
  - Female experimentalists systematically underrepresented among parallel speakers
  - Women more likely to get a poster than a parallel talk at QM
  - A woman has **never** given the Quark Matter overview talk





Analysis of conference talks by gender





- Gender was studied as easier to identify, but it is assumed other biases follow general trend
- Other trends are interesting such as repeat speakers, institutional representation, etc.

EICUG DEI Survey (2021)

Survey done by EICUG Diversity & Inclusion ad hoc Committee

2021 committee: Taya Chetry, Wouter Deconinck, Paul Gueye, Narbe Kalantarians, Astrid Morreale, Sanghwa Park

Total of 33 questions:

- Demographic questions
- Satisfaction/dissatisfaction with **EIC climate** over past year
- Agreement/disagreement with statements on **EIC research community**
- Experiences of discriminatory or exclusionary behavior
- Open responses

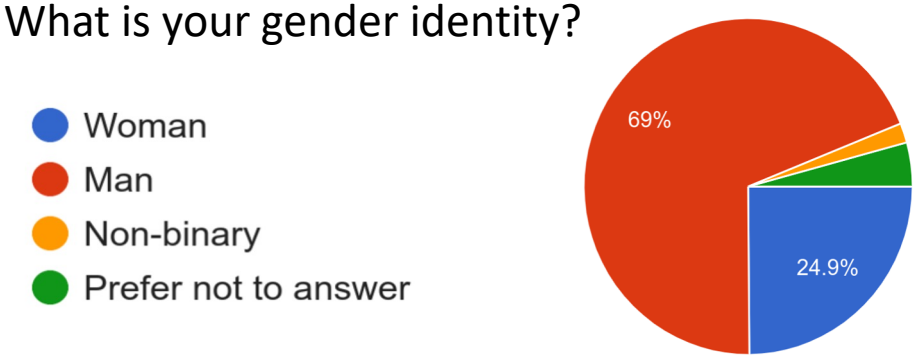
For more details, see: https://indico.bnl.gov/event/11463/contributions/52054/

Repeated in 2022 with similar questions in order to track changes within the community

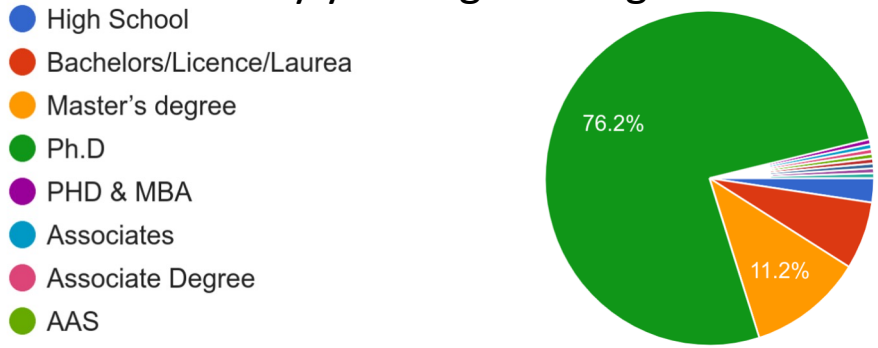
- Stay tuned for the results!
- Changed to use both Google forms and Tencent in order to collect responses from China

EICUG Survey Demographic Overview

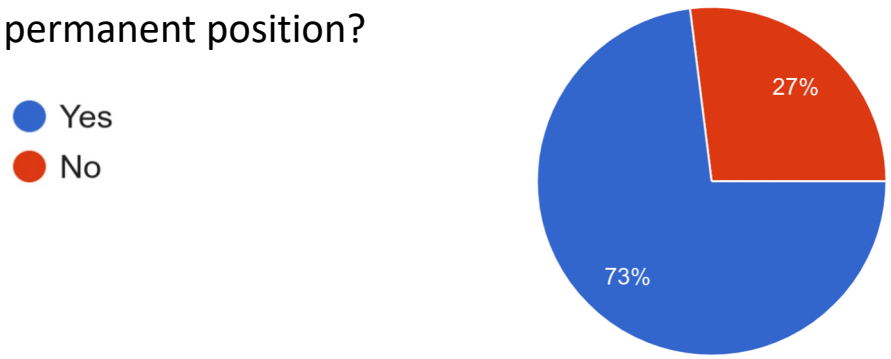
What is your gender identity?



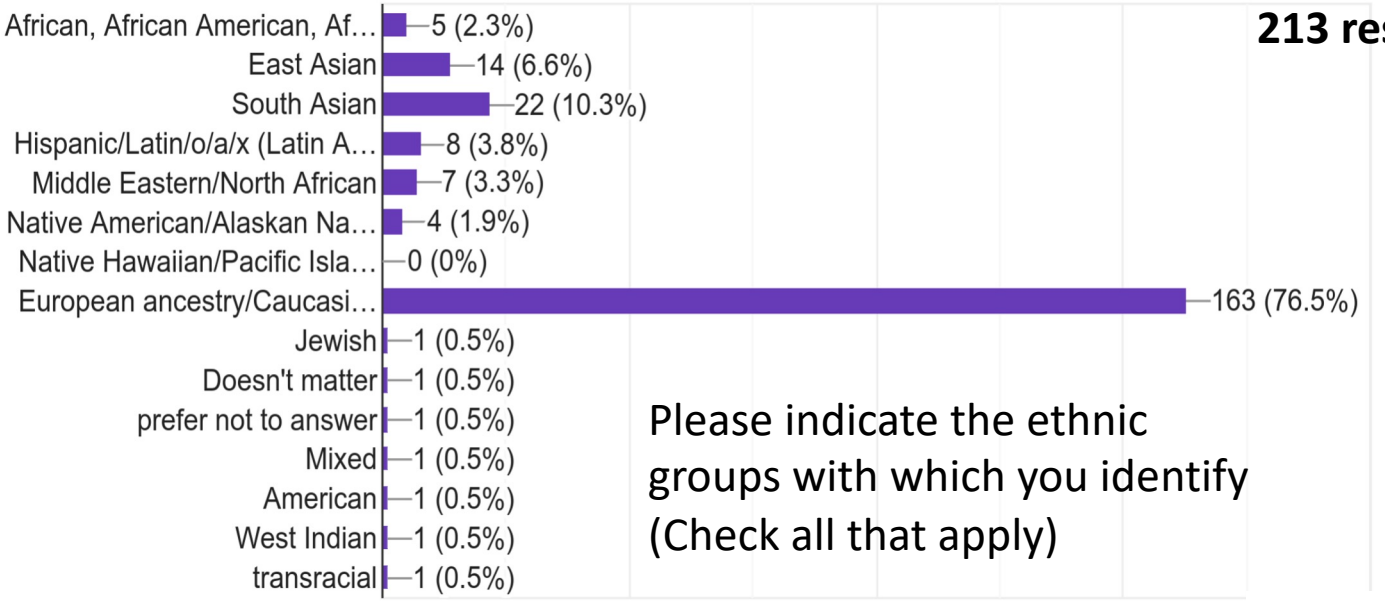
What is currently your highest degree?



Are you currently in a permanent/potentially permanent position?

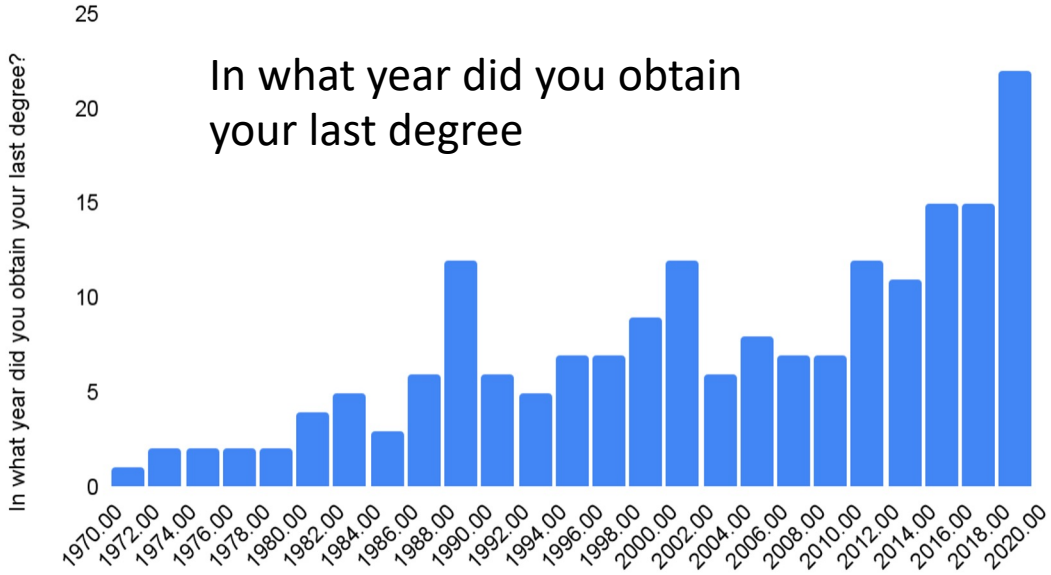


213 responses



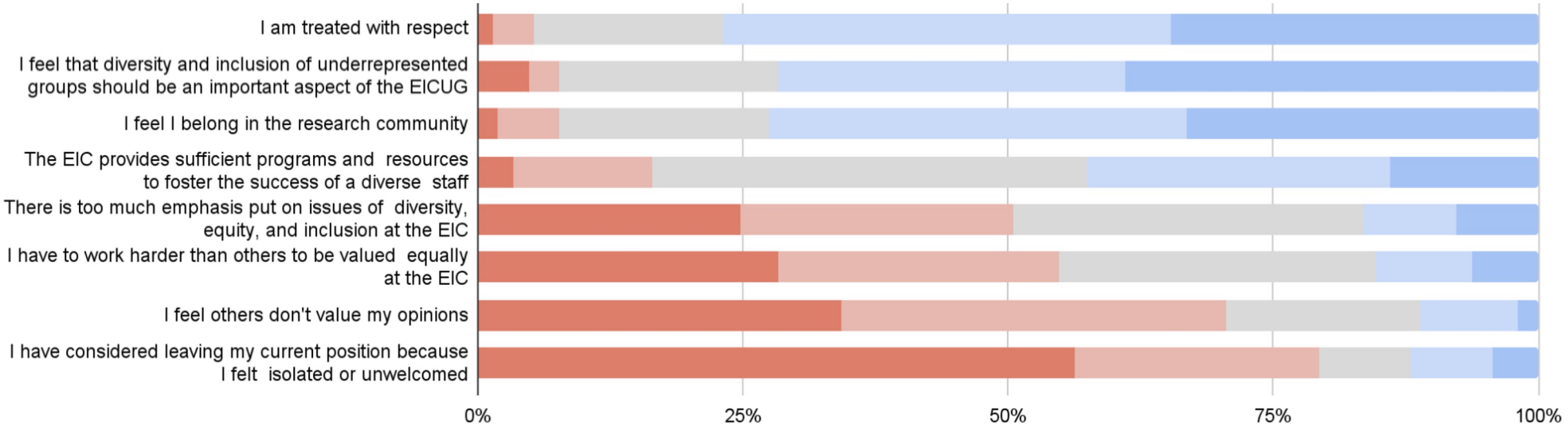
Please indicate the ethnic groups with which you identify (Check all that apply)

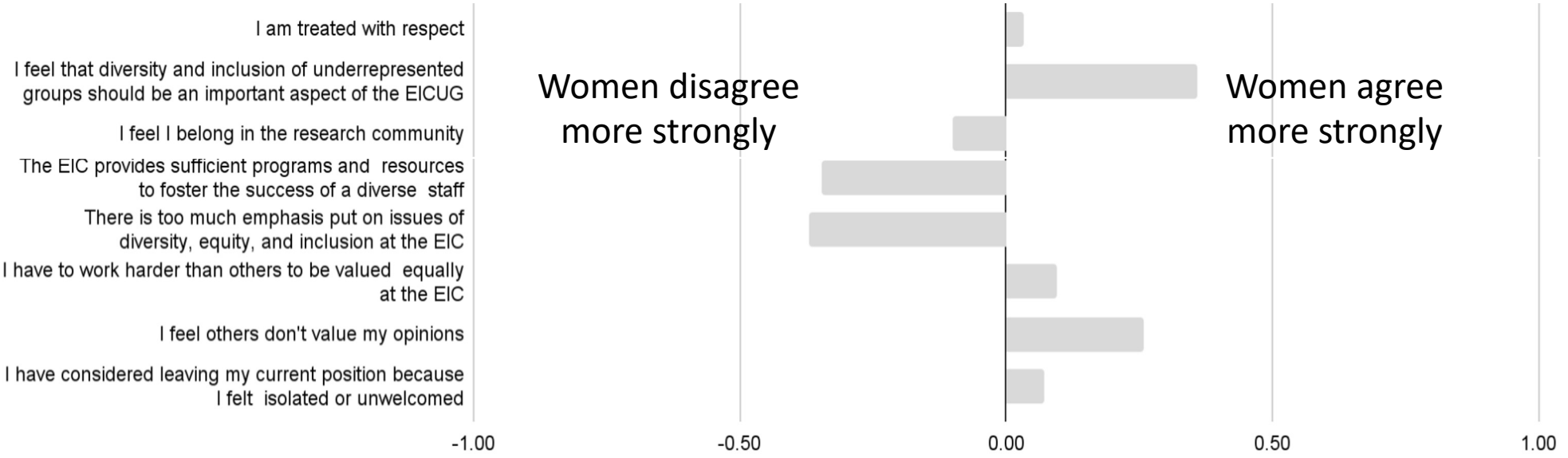
In what year did you obtain your last degree



2021 EICUG Survey – Selected Results

Indicate your level of agreement considering your experiences over the last year





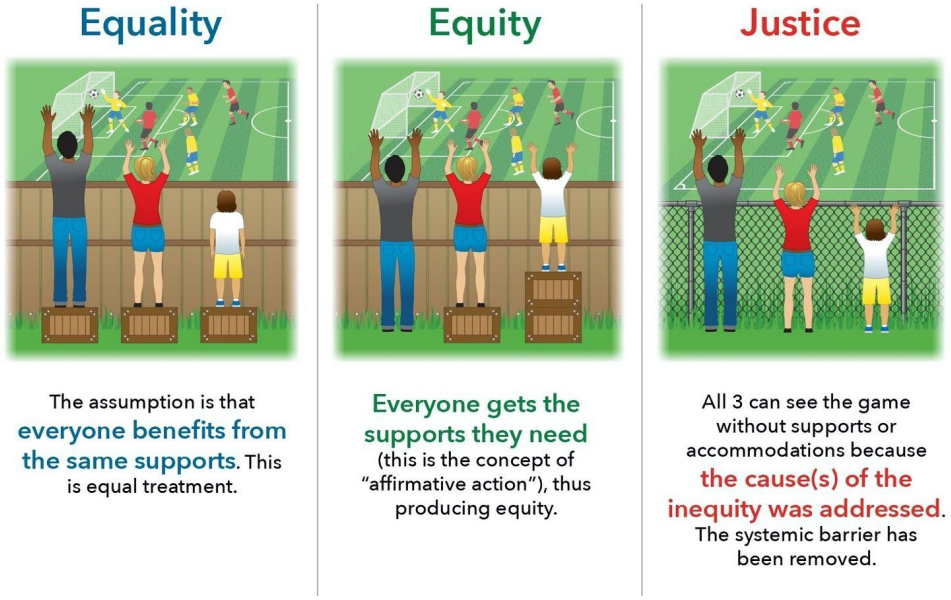
2021 EICUG Survey – My interpretations

- **Women see the need for DEI initiatives** much more strongly, tend to feel more isolated and not valued
- However the statistics indicating belonging and being treated with respect are encouraging → **Retention requires Inclusion**
- Caveat – survey results were dominated by US participants and skewed largely to people with permanent or potentially permanent positions
- Efforts to **gather data (yearly)** are important for mapping progress or problem areas!
  - Data collection on demographics/climate is a general issue!

DEI Goals

- Nuclear Physics is funded by all and should reflect the population
- Lack of diversity is a loss of talent
- DEI is more than % of women
  - It's not just about numbers/quotas, or physical presence, but also allowing different models of what a physicist is

https://www.mobilizegreen.org/blog/2018/9/30/environmental-equity-vs-environmental-justice-whats-the-difference



- Climate is incredibly important, people do not go where they are not invited, and do not stay where they do not feel like they belong
  - Code of Conducts (CoC) to decrease bullying/harassment/etc are very important (See Community Agreements by C. Nattrass)

Promoting DEI

- How do we promote a **diverse, equitable, and inclusive** NP **workforce?**
  - Re-evaluating policies/structures for improvements
    - What **causes for inequity** can be addressed?
    - **Accessibility** can further inclusion
    - Childcare and other issues play a role
  - Need an environment that works for everyone
  - Institutionalize needed changes
- Hiring diverse candidates is neither the first or last step
  - Need to work on increasing # of candidates → Development!
    - We need to be proactive and identify and support talent
    - Recruitment must start early → Graduate school is too late

Promoting DEI

- How do we promote a **diverse, equitable, and inclusive** nuclear science **workforce?**
  - Engagement with minority serving institutions ←→ Partnerships with Labs/Research Universities to develop talent + provide opportunities
  - Bridge Programs
  - Partnerships w/Community Colleges+Undergraduate Only Universities
- Partnerships need to be sustained, evaluating progress and impact
- NP commitment → contribution cannot rely on only few people, but must come from the entire community
- Some **examples from the community** follow - there are **many more!**

NuSTEAM

Nuclear Science in Texas to Enhance and Advance Minorities

A program funded by DOE through TBD-NP
(Research Traineeships to Broaden and Diversify the Nuclear Physics community).
NuSTEAM Classes of 2021/2022: Cohort of 18 undergraduate minority students
(14 Hispanic, 4 African American) from four Texas institutions

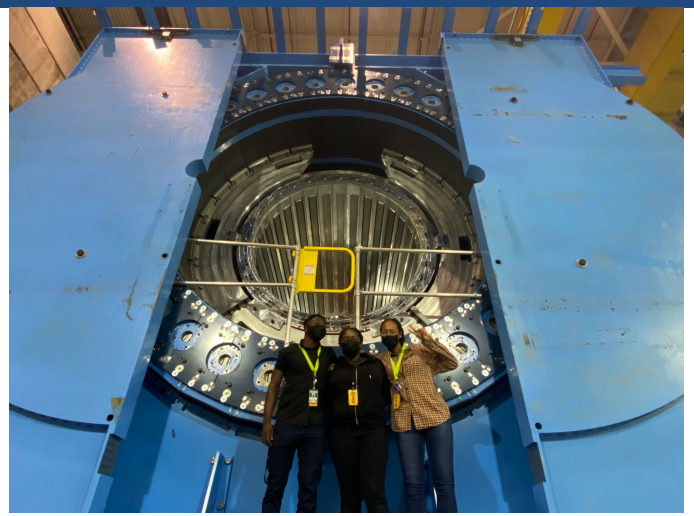
8-week summer program (UH/BNL) followed by two research semesters at home institution.
Student stipends & travel support throughout all three semesters provided by program

Class of 2021

SUMMER	UH Summer Training • Physics of RHIC & LHC • Experimental Techniques • Theoretical modeling • Low-energy applications • Hands-on computing • Professional skill training		
	BNL Traineeship		
FALL+SPRING	Research projects at home institutions		
	UH Mentors	Matter in strong fields (1) Phenomenological modeling of heavy-ion data (1+1)	UTRGV
		Machine learning (1) Detector testing and operation (1)	UTEP
		Radiation Measurements (2)	PVAMU
		Fluid Dynamics (1) Neutrino Physics (1)	UH

Class of 2022

BNL-MSI PREP-NPT Program



- 2 year pilot program started in June ’21 with an initial cohort of 10 fellows, to address perpetual short-falls in minority participation in NP
- Student research fellows are paired with BNL scientist and MSI University Mentor for 1 to 2 years
- Work on a cutting-edge NP research project and learn the tools and skills of a scientist while being supported by mentors
- 5 fellows have graduated from program this past summer and are attending graduate school currently

BNL NPT Fellow	Graduate Program	BNL Mentor
Brynna Moran	Stony Brook MS Physics	Abhay Deshpande
Allen Pierre-Louis	Stony Brook MS Physics	Abhay Deshpande
Ambar Rodriguez	Michigan St PhD Physics	Luca Cultrera
Rosemary Cortes	Univ of Puerto Rico MS Physics	Luis Betancourt
Marcus McLaurin	Morgan St MS Math	Matteo Vorabbi

- 7 fellows in program currently (6 seniors and 1 junior)

DOE Trainee Program at GSU

- Summer 2022
  - Jorge and Damian, GSU undergrads spent 6 weeks at BNL working with GSU Post Doc Virginia Bailey
  - Participated in assembly work at BNL
    - Jorge previously tested Hcal tiles at GSU
  - Conducted important simulation studies related to jet performance and calibration plans for sPHENIX
- Fall 2022
  - Jorge +Damian will present talks in CEU session at DNP
  - Recruiting another URM undergrad for paid position during academic year

More than a dozen undergrads were trained with sPHENIX Hcal tile testing at GSU

Engaging indigenous women into gluon saturation search in nucleus

NEW MEXICO NEWS

Program aims to help Indigenous women get into the world of physics

by: Jessica Garate, KRQE Staff
Posted: Dec 2, 2021 / 10:22 PM MST / Updated: Dec 2, 2021 / 10:22 PM MST

LOS ALAMOS, N.M. (KRQE) – Indigenous women are the most underrepresented group in physics. Los Alamos National Laboratory is trying to change that with a new program aiming to help women and break down stereotypes. The lab is teaming up with Fort Lewis College in Durango to change that.

THE Durango HERALD

DH News Local News Nation & World New Mexico Education

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FLC partners with Los Alamos National Laboratory to promote Indigenous women in physics

Two students selected for an internship with nuclear and particle physicists

By Nicholas A. Johnson Herald Staff Writer
Friday, Dec 3, 2021 5:01 Updated Monday, Dec. 6, 2021 6:01

Two students from Fort Lewis College were chosen to be the first participants in an internship program developed by the college and Los Alamos National Labratory to promote Indigenous women in physics. (Courtesy of Fort Lewis College)

Los Alamos National Laboratory has partnered with Fort Lewis College to provide an internship program for undergraduate Indigenous women interested in a career in physics.

New LANL program aims to get more Indigenous women in physics

Colton Shone
Updated: December 06, 2021 05:27 PM
Created: December 06, 2021 01:52 PM

LOS ALAMOS, N.M. – A new program at Los Alamos National Lab has the goal of getting more Indigenous women in physics.

SPORTS ENTERTAINMENT BUSINESS LEGISLATURE

LANL launches Indigenous women in physics program

BY ANDY STINY / JOURNAL STAFF WRITER
PUBLISHED: MONDAY, DECEMBER 13TH, 2021 AT 9:02PM
UPDATED: TUESDAY, DECEMBER 14TH, 2021 AT 12:02AM

- **Massive local news outlet coverage to the diversity FOA awarded by LANL**
- QCD and gluon saturation introduction
- Particle detectors for high-energy nuclear physics
- Help assemble a prototype for the magnet station tracker for LHCb
- Visit CERN to take data acquisition shifts for LHCb + socialize
- Introduction to data analysis

Julie Nelson
Cheyenne River Sioux Tribe

Arielle Platero
Navajo Nation

Sustaining DEI

- How do we **sustain** a **diverse, equitable, and inclusive** nuclear science **workforce?**
- **Climate** is incredibly important
  - Inclusion - Providing a welcoming space to any individual → People need to feel like they belong
  - Codes of Conduct (CoC) at conferences, collaborations play a role
- **Mentorship** is a crucial component of sustaining a diverse workforce
- **Reduce DEI-Focused Work and Cognitive Load on URMs**
  - This needs to be a community effort
- Some community examples to follow

sPHENIX DEI Training

sPHENIX has DEI training that is required for authorship. Some important features:

- **Defining terms and expectations**, since we're working in a multicultural environment
- Multiple **contemporary examples** from the field → Thought provoking case studies so people know how to respond
- Expectation of **bystander intervention** with a framework for real time intervention
- People in leadership positions are expected to intervene (faculty are de facto leaders)

Training addresses the following types of misconduct:

- Bullying (No "equal opportunity jerk" defense)
- Conflicts of interest, particularly romantic relationships

Additional “good citizen” training such as helping with misunderstandings/mistranslations

Training is coupled with bylaws which provide a framework with the following features:

- Flexible enough to **respond to unexpected/unpredictable misconduct**
- A procedure for **adjudicating conflicts**
- Able to respond to smaller issues and interpersonal conflicts
- Capable of implementing responses which are **restorative to the target**, not just punitive

Theory Collaborations and Focusing on DEI

Statistics:

- All members of the MUSES executive committee are either women and/or underrepresented minorities
- 46% of senior personnel are women/URMs
- 45% of students/postdocs developing MUSES modules are women/URMs

Approach to DEI issues:

- Ensure a diverse speaker list for journal clubs
- Outreach will be done in Spanish and Portuguese
- Specifically sought out partnerships in South America
- Focus on bringing in REU students
- Code of conduct for the collaboration meetings
  - Collaboration ethics discussed on the first day of the meeting
  - Code of conduct discussed on the first day of the collaboration meeting
- Many members new to large scale collaboration environment, learning new tools to provide open discussions

NSF ADVANCE

- https://provost.gsu.edu/advance/
- $1 million ADVANCE adaptation grant from the NSF
- Goal: adapt and implement practices at the university aimed at increasing the number of women, particularly women from underrepresented minority (URM) backgrounds, who are recruited, promoted, and retained in STEM tenure track positions and in GSU Leadership
  - Aim 1: Recruitment: STRIDE[1]
  - Aim 2: Bystander Leadership Program[1]
  - Aim 3: Faculty Mentoring: Launch Committees[1]
  - Aim 4: Policy Review for DEI Best Practices
- ADVANCE grants have strong records of recruitment and retention through increased opportunities, support and outreach

[1] *Collaborating with FIU to adapt proven programs*

Recommendation for the LRP

- Support and sustain partnerships between National Labs/Research Universities and MSIs/Community Colleges/non-PhD granting Universities
  - Encourage programs so undergraduates (and younger) can participate in research
- Invest in NP educational programs AND NP infrastructure at undergraduate+ graduate levels at MSIs, community colleges, non-PhD granting universities
- Require Conferences funded by DOE/NSF to have CoC and a procedure for applying it → Strongly urge Collaborations to do so
- Mechanisms need to address inter-institutional harassment + bullying
- DEI needs to be a component in grant proposals → Not just part of the NSF Broader Impacts