

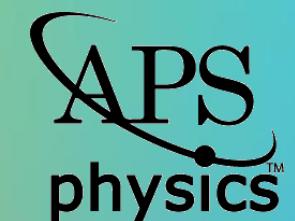
STUDYING PEOPLE IS DIFFICULT

What I learned while doing diversity statistics at APS

Madison Swirtz

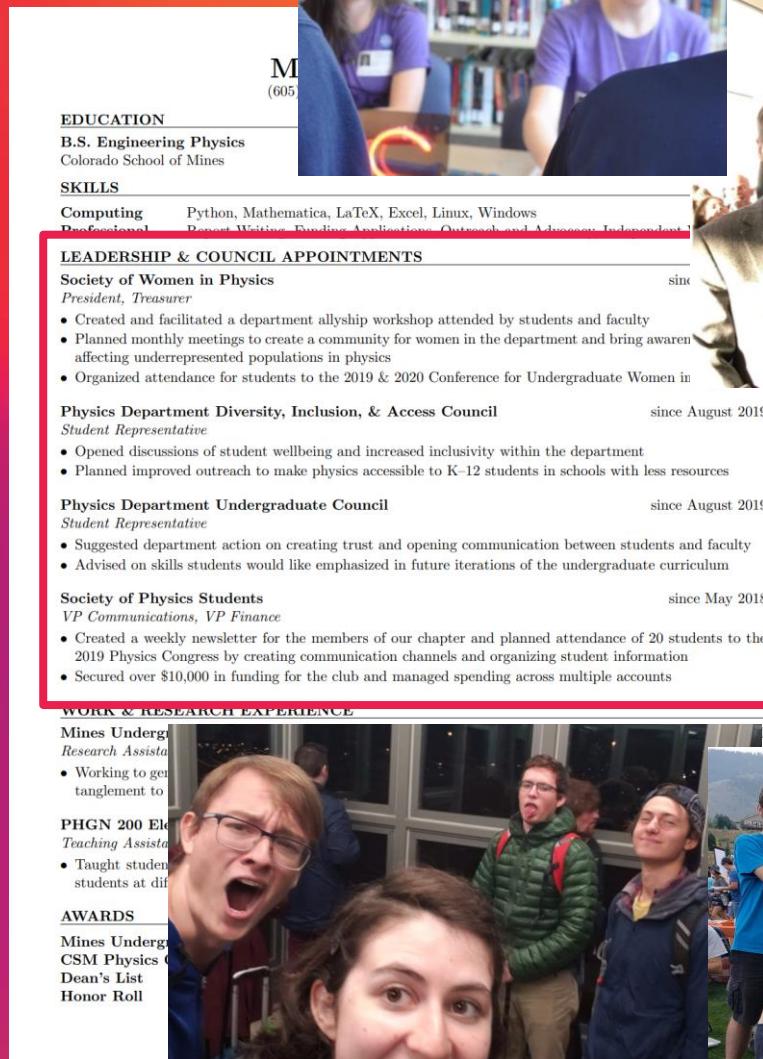
Colorado School of Mines

American Physical Society Education & Diversity Intern | Spring 2020



About Me

- ❖ Someone who cares a lot about physics community
- ❖ A musician
- ❖ A physicist
- ❖ Queer
- ❖ A woman



LinkedIn profile screenshot showing education, skills, leadership, and work experience.

EDUCATION
B.S. Engineering Physics
Colorado School of Mines

SKILLS
Computing Professional Python, Mathematica, LaTeX, Excel, Linux, Windows, Remote Working, Funding Applications, Outreach, and Advocacy, Independent Research

LEADERSHIP & COUNCIL APPOINTMENTS

- Society of Women in Physics President, Treasurer** since 2019
 - Created and facilitated a department allyship workshop attended by students and faculty
 - Planned monthly meetings to create a community for women in the department and bring awareness to underrepresented populations in physics
 - Organized attendance for students to the 2019 & 2020 Conference for Undergraduate Women in Physics
- Physics Department Diversity, Inclusion, & Access Council Student Representative** since August 2019
 - Opened discussions of student wellbeing and increased inclusivity within the department
 - Planned improved outreach to make physics accessible to K-12 students in schools with less resources
- Physics Department Undergraduate Council Student Representative** since August 2019
 - Suggested department action on creating trust and opening communication between students and faculty
 - Advised on skills students would like emphasized in future iterations of the undergraduate curriculum
- Society of Physics Students VP Communications, VP Finance** since May 2018
 - Created a weekly newsletter for the members of our chapter and planned attendance of 20 students to the 2019 Physics Congress by creating communication channels and organizing student information
 - Secured over \$10,000 in funding for the club and managed spending across multiple accounts

WORK & RESEARCH EXPERIENCE

- Mines Undergraduate Research Assistant** PHGN 200 ECE 200 Teaching Assistant
 - Working to get the department involved in the community
 - Taught students how to use the lab equipment

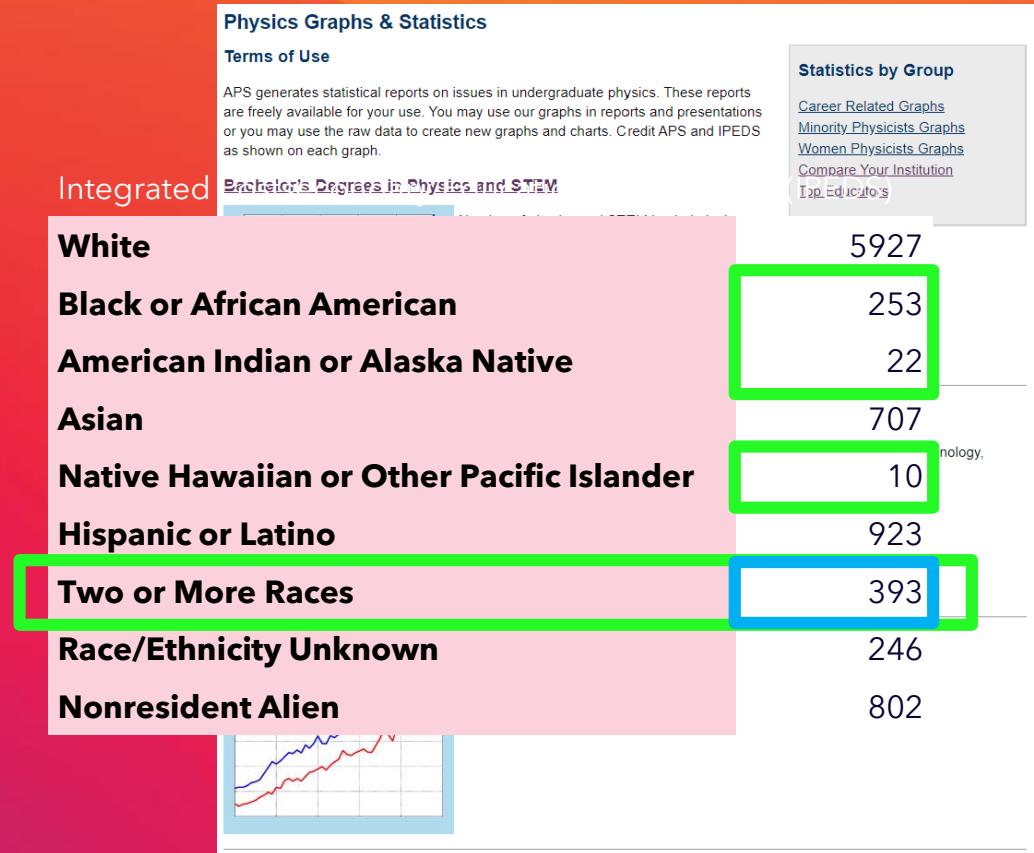
AWARDS

- Mines Undergraduate CSM Physics Department Dean's List Honor Roll**



My initial job seemed pretty straightforward:

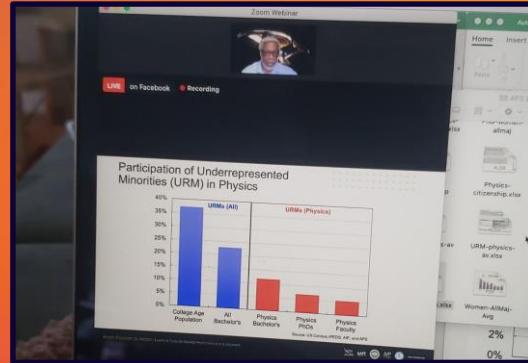
- ❖ Updating APS Physics Graphs and Statistics, top educators lists
- ❖ I assumed this was going to just be plugging numbers into excel, it was not
- ❖ Not only did this feel unethical, it was leading to bad data
- ❖ There wasn't much I could do about it, since our data comes from national databases which are out of our control.



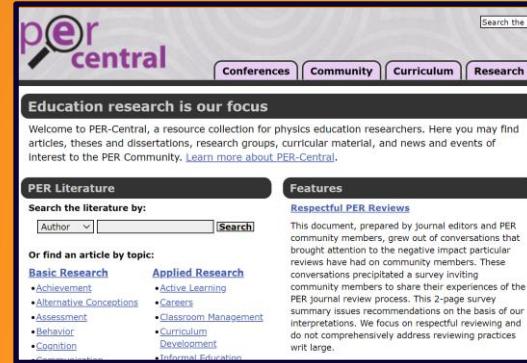
That was just the start of my summer



BLM Protests



From Passion to Action Webinar



Lit Review and doing PER



Mildred Boveda

AAPT and PERC

What I learned

“Sometimes attaining the deepest familiarity with a question is our best substitute for actually having the answer.”

— Brian Greene, [The Elegant Universe](#)

- How to analyze the framework and the question, not just the results
- The PER community has done a ton of incredible work that more physicists should see
- Physicists have the skillsets to do this learning

Thank you! Questions?

Special thanks to Simone Hyater-Adams, Claudia Fracchiolla, the American Physical Society, and the Society of Physics Students for this opportunity!

What was my job this summer?

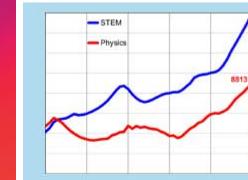
- ❖ APS Physics Graphs and Statistics
- ❖ APS Top Educators Lists
- ❖ PhysTEC Data Validation
- ❖ PhysicsQuest scriptwriting
- ❖ Qualitative data analysis for APS mini-grants survey
- ❖ Applied for an APS mini-grant!

Physics Graphs & Statistics

Terms of Use

APS generates statistical reports on issues in undergraduate physics. These reports are freely available for your use. You may use our graphs in reports and presentations or you may use the raw data to create new graphs and charts. Credit APS and IPEDS as shown on each graph.

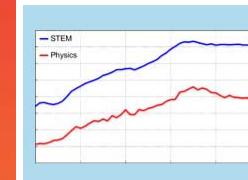
Bachelor's Degrees in Physics and STEM



Number of physics and STEM bachelor's degrees conferred as the first or second major at U.S. institutions

► [Larger Graph and Raw Data](#)

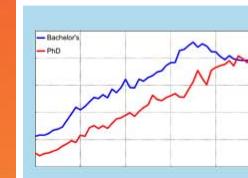
Bachelor's Degrees in Physics and STEM Earned by Women



Bachelor's Degrees in Physics and STEM Earned by Women (Science, Technology, Engineering, & Mathematics)

► [Larger Graph and Raw Data](#)

Physics Degrees Earned by Women



Percentage of physics bachelor's and doctoral degrees earned by women

► [Larger Graph and Raw Data](#)

Statistics by Group

[Career Related Graphs](#)
[Minority Physicists Graphs](#)
[Women Physicists Graphs](#)
[Compare Your Institution](#)
[Top Educators](#)

I had problems pretty much immediately

- It turned out that my job was a lot harder than I anticipated because the ways we choose to categorize people are inconsistent and ill-conceived
- This led to bad data and potentially incorrect graphs

Integrated Postsecondary Education Data System (IPEDS)

White	5927
Black or African American	253
American Indian or Alaska Native	22
Asian	707
Native Hawaiian or Other Pacific Islander	10
Hispanic or Latino	923
Two or More Races	393
Race/Ethnicity Unknown	246
Nonresident Alien	802

U.S. Census

	Hispanic	Not Hispanic
White	5,961,914	16,295,126
Black or African American	336,894	4,336,704
American Indian and Alaska Native	199,280	257,472
Asian	67,829	1,743,253
Native Hawaiian and Other Pacific Islander	23,525	60,463
Two or More Races	230,758	943,684