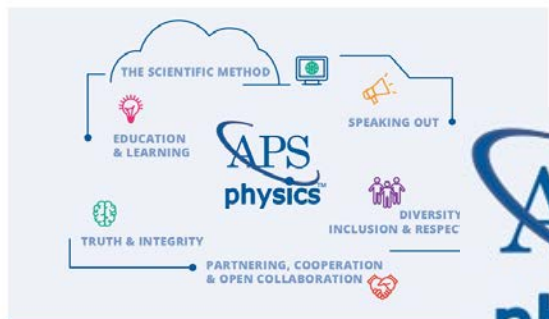


Finding Gaps and Inequities in Higher Education

Lucy Corthell (she/they), Education and Diversity Statistics Intern
Christine O'Donnell, Education Program Manager
American Physical Society (APS)



APS CORE VALUES



THE SCIENTIFIC METHOD
 We use the best available data to guide timely, thoughtful decision
 We solve problems by building on success and learning from failure
 We embrace forward thinking that fosters innovation.

EDUCATION AND LEARNING
 We promote personal and professional growth.
 We embrace change and seek continuous improvement.
 We learn from each other to succeed together.

TRUTH AND INTEGRITY
 We communicate respectfully and honestly while considering others
 We perform our jobs with excellence, integrity, and accountability.
 We hold ourselves to the highest ethical standards.

PARTNERING, COOPERATION, AND OPEN COLLABORATION
 We listen and respond to each other and to our communities.
 We collaborate and act with good intent.
 We celebrate successes and acknowledge everyone's contributions.

DIVERSITY, INCLUSION, AND RESPECT
 We respect each other's differences and value everyone's time and talents.
 We commit to creating an inclusive and accepting working environment.
 We seek diverse perspectives and ensure that all voices are heard.

SPEAKING OUT
 We seek and provide respectful feedback from each other.
 We talk through issues and propose solutions to address conflict.
 We address situations that are inconsistent with our values.



DIVERSITY, INCLUSION, AND RESPECT
 We respect each other's differences and value everyone's time and talents.
 We commit to creating an inclusive and accepting working environment.
 We seek diverse perspectives and ensure that all voices are heard.



Home

About

- Join SPS
- SPS Store
- Connect with SPS
- Society News
- Sigma Pi Sigma
- Society Partnerships
- National Office
- Governance
- Contact us
- Support SPS

SPS and ΣΠΣ Diversity, Inclusion, Responsibility

Share This:   

Feb 22 2020

Council action

On January 25, 2020, the Society of Physics Students (SPS) and Sigma Pi Sigma (ΣΠΣ) have approved the following statement. This statement was approved on January 25, 2020. The 2016 SPS Statement on Diversity and Inclusion and the 2019 SPS Statement on Diversity and Inclusion are also available.

"The Society of Physics Students with a passion for physics but not limited to race, ethnicity, gender identity, presentation, gender identity, family and socio-economic

"The Society of Physics Students (SPS) welcomes all students with a passion for physics independent of identities including but not limited to race, ethnic origin, religious beliefs, gender presentation, gender identity, sexual orientation, ability, age, family and socio-economic status, or cultural background. Many groups are under-represented in physics and SPS and Sigma Pi Sigma (ΣΠΣ) have not always been welcoming to diverse groups. Today all of our events are subject to our Code of Conduct, and SPS and ΣΠΣ are committed to working to correct this exclusion and will continue to update our policies and best practices in pursuit of promoting diversity, inclusion, and equity."

Comments:

The inclusion of everyone takes many forms and must be an active process that SPS leaders and members adopt. It is encouraged that an SPS chapters and members reach out to all students who might have an interest in physics.

This should include majors, minors, and those who might not realize their interest in physics yet. Some students may have limited availability but are still welcome at events. The SPS National Office encourages chapters to announce events and meetings well in advance, through several modes of communication, and make accommodations for anyone that wants to participate. While traditions and commitment to an SPS is important, so too is being inclusive of the wide variety of people within a department. Be kind and caring to all members. We are stronger together and the SPS National Office can help chapters achieve this goal. Please email sps@aip.org for assistance.

(Society of Physics Students, Sigma Pi Sigma)



My role: updating statistics on the APS website on the degrees granted across demographics at colleges and universities in the US

- Demographics for my project consisted mainly of race and gender.
- Visual representation of the data is a good way to encourage discussion and show obvious trends and disparities.

Who is using the data?

- Schools
- Grant proposals
- You and me
- Students and professors

Current Trends in Physics Enrollment

Samina Masood
 Department of Physical and Applied Sciences
 University of Houston-Clear Lake

Abstract

We analyze the current trends in higher education and discuss its impact on physics enrollment in US institutions. The pandemic, lockdowns, unemployment, and healthcare problems have led to unique social and economic conditions. These conditions have modified the latest trends in education. COVID-19 has had great impact on the academic culture due to online teaching and learning methods. We identify some of the key factors including economic problems, changes in job market, modifications in family obligations, physical and mental health conditions, and overall insecurity and uncertainty in life. These key factors are causing a shift in educational preferences. A few recommendations are made to get out of the current dilemma. We use all the data collected by the American Physical Society statistics department [1].

Identification of the Problem

Physics has never been a very popular subject and has been almost accepted as a low enrollment discipline. Physics departments are relatively small departments and physics programs are smaller programs and have to be continuously watched and special recruitment tools are used

(Masood, 2022)



Methods used to collect the most recent data and update the website

- IPEDS (Integrated Postsecondary Education Data System) is a system of interrelated surveys conducted annually by the U.S. Department of Education's National Center for Education Statistics (NCES).
- Selected data in IPEDS and put it into excel sheets



NCES National Center for Education Statistics

IPEDS Integrated Postsecondary Education Data System

Compare Institutions

1. Select Institutions 2. Select Variables 3. Output

My Comparison Institution - None Selected

Select Institutions - You have selected 6440 institution(s)

Select Variables - You have selected 30 variable(s), 30 can be used in this report.

How would you like to select variables to include in your data file/report?

[Browse/Search Variables](#) [Choose from My Variables](#) [Create Derived Variables](#) [Upload Variables](#)

Select the variable(s) you would like to include in your data file/report.

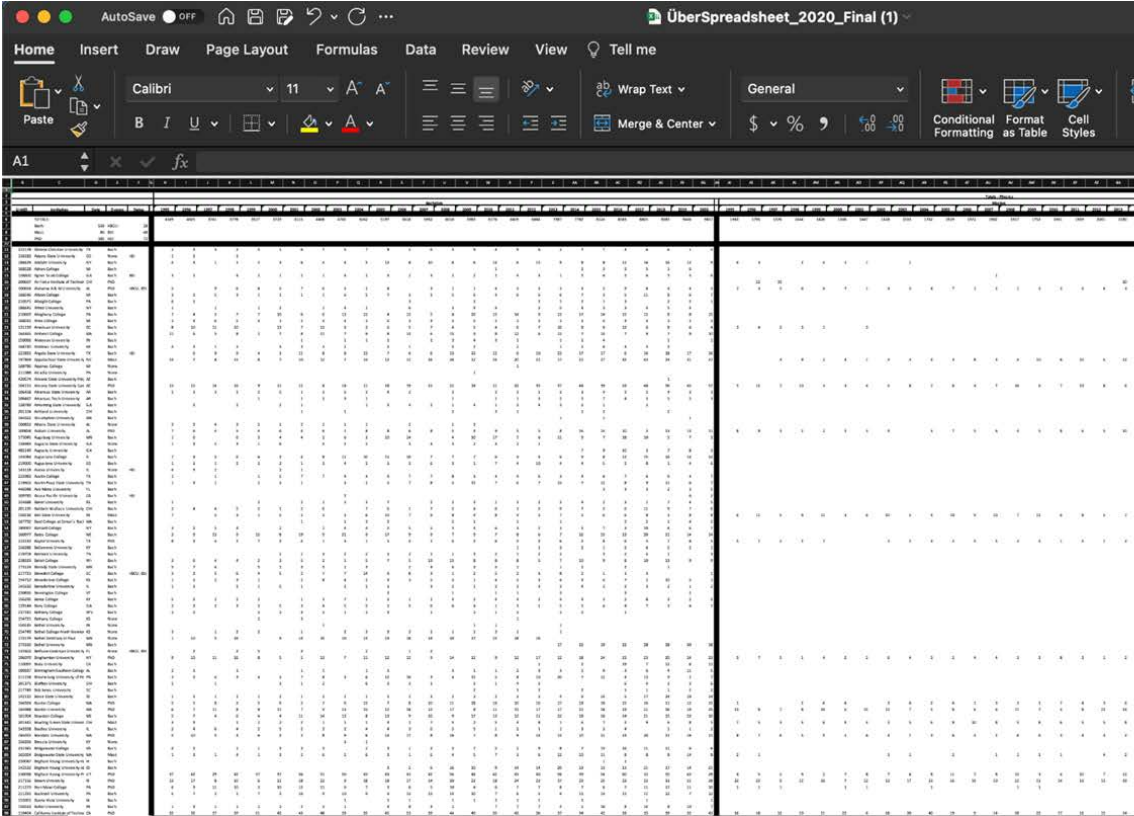
Continue

My Variables [Edit Years](#) [Delete Variable](#) [Modify years for all variables in a file](#) [DELETE ALL](#)

Derived Variables	Select all	Unselect all
<input checked="" type="checkbox"/> Grand Total - Engineering, Bachelor - 1st + 2nd (2019)	DETAIL	D
<input checked="" type="checkbox"/> Grand Total men - Engineering, Bachelor - 1st + 2nd (2019)	DETAIL	D
<input checked="" type="checkbox"/> Grand Total women - Engineering, Bachelor - 1st + 2nd (2019)	DETAIL	D
<input checked="" type="checkbox"/> American Indian or Alaska Native total - Engineering, Bachelor - 1st + 2nd (2019)	DETAIL	D
<input checked="" type="checkbox"/> American Indian or Alaska Native men - Engineering, Bachelor - 1st + 2nd (2019)	DETAIL	D
<input checked="" type="checkbox"/> American Indian or Alaska Native women - Engineering, Bachelor - 1st + 2nd (2019)	DETAIL	D
<input checked="" type="checkbox"/> Asian total - Engineering, Bachelor - 1st + 2nd (2019)	DETAIL	D
<input checked="" type="checkbox"/> Asian men - Engineering, Bachelor - 1st + 2nd (2019)	DETAIL	D
<input checked="" type="checkbox"/> Asian women - Engineering, Bachelor - 1st + 2nd (2019)	DETAIL	D
<input checked="" type="checkbox"/> Black or African American total - Engineering, Bachelor - 1st + 2nd (2019)	DETAIL	D
<input checked="" type="checkbox"/> Black or African American men - Engineering, Bachelor - 1st + 2nd (2019)	DETAIL	D
<input checked="" type="checkbox"/> Black or African American women - Engineering, Bachelor - 1st + 2nd (2019)	DETAIL	D
<input checked="" type="checkbox"/> Hispanic or Latino total - Engineering, Bachelor - 1st + 2nd (2019)	DETAIL	D



Updating the Überspreadsheet with 2020 data



```
# coding: utf-8
...
Last updated by Lucy Cortthell in 2022.

Import all the necessary libraries to execute the entire program. Define three functions that are
used to print statements during execution and return the time taken to perform each operation named.
...

from datetime import datetime
from sys import exit
import openpyxl
import pandas as pd
import os
import numpy as np

# Start the clock for the entire runtime
Final_start_time = datetime.now()

# These functions are called and prevent the next line from being printed
# below the given string.

def reading():
    print("Reading files...", end="", flush=True)

def combining():
    print("Combining data...", end="", flush=True)

def exporting():
    print("Exporting file...", end="", flush=True)

#####
...
This function runs the code and connects each of the functions together to
produce the final product. To run the code, call this function (see last lines
in the code).
...

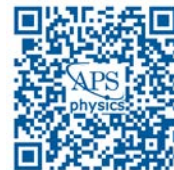
def functionRunner():
    # Call the function that reads the necessary files and extracts the data.
    # The extract function takes the raw data and returns it in usable lists
    # that represent each institution. It also returns the Unit ID
    # list which is only really needed for a few of the files.
    newYearsBachIdList, newYearsBachRows, newYearsMastIdList, newYearsMastRows, newYearsPh
    AllBachIdList, AllBachDataRows, AllMastIdList, AllMastDataRows, AllPhdIdList, AllPhdDataRows, yearToBeAdd
    allRowsInstList, BsIHSIdList, BsIHSIRawRows, HbcuIdList, HbcuRawRows, uberIdList, uberRawRows = readingF

    # Start the clock for combining the code. This includes converting institution dicts
    # into lists, adding states, degrees, status, and all new data from the files given.
    start_time = datetime.now()
    combining()

    # Call the function that returns the list of new Unit IDs that were not
    # previously on the uber spreadsheet.
    addedUnitIDs = addNewRows(newYearsBachRows, newYearsMastRows,
                             newYearsPhRows, uberIdList)

    #print('addedUnitIDs: ', np.size(addedUnitIDs))

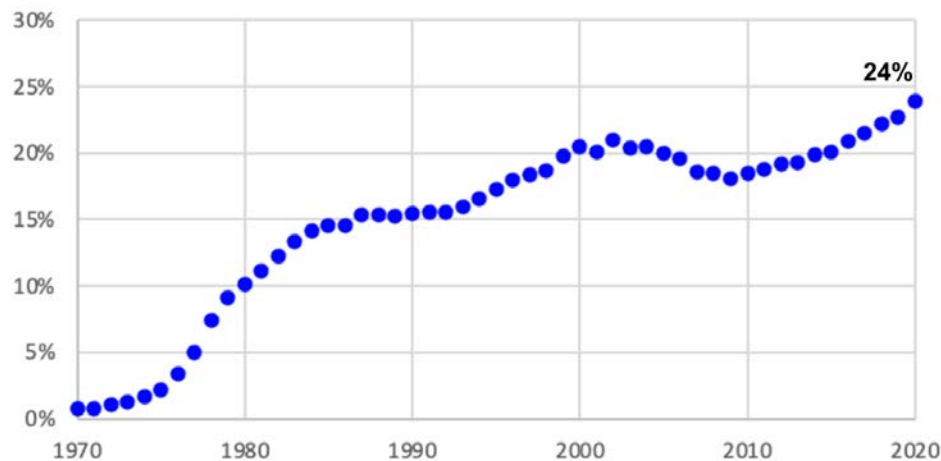
    # Call the function that combines the original uber file with the 6 files
    U:===== 2022_Überspreadsheet_Code.py Top L62 Python E1Doc
    Write /Volumes/GoogleDrive-110480323558713506825/My Drive/Education & Diversity - Lucy/IPEDS/IPEDS_Data/2022_
```



Results: I generated 18 plots

- There continues to be disparities between demographic groups in higher education

Percentage Engineering Bachelor Degrees Earned by Women



Education Diversity and Inclusion (EDI) papers

A comparative examination of research on why women are more underrepresented in some STEM disciplines compared to others, with a particular focus on computer science, engineering, physics, mathematics, medicine, chemistry, and biology

"I Could Hear You If You Would Just Calm Down": Challenging Eurocentric Classroom Norms through Passionate Discussions of Racial Oppression

Author(s): Eileen O'Brien

Vol. 273. Identifying Race and Transforming Whiteness in

Summary

In this paper, I explore the experience of women in science or "climates" as disabled women are getting worse while some intersectional women in science are getting worse of gender representation to understand the

Introduction



International Journal of Qualitative Studies in Education



ISSN: 0951-8398 (Print) 1366-5898 (Online) Journal homepage: <http://www.tandfonline.com/loi/tqse20>

Just what is critical race theory and what's it doing in a nice field like education?

Gloria Ladson-Billings

To cite this article: Gloria Ladson-Billings (1998) Just what is doing in a nice field like education?, International Journal of Qualitative Studies in Education, 7-24, DOI: 10.1080/0951839982368863

To link to this article: <https://doi.org/10.1080/0951839982368863>

Chanda Prescod-Weinstein

Making Black Women Scientists under White Empiricism: The Racialization of Epistemology in Physics

Cultural Studies of Science Education (2019) 14:265–281
<https://doi.org/10.1007/s11422-019-09938-7>

ORIGINAL PAPER



Expanding and enacting transformative meanings of equity, diversity and social justice in science education

Alberto J. Rodriguez¹ · Deb Morrison²

Received: 26 November 2017 / Accepted: 1 February 2019 / Published online: 17 May 2019

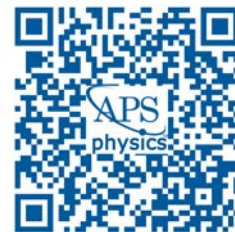
essentially
 specificity
 of the
 empiricism
 phenomenon



Call to action

- The first step: check out the website!
- The second step in changing culture and the systemic issues we are facing is acknowledging that there is an issue.
- A third step is letting others know about the information.





Step three continued: letting others know about the information

- Implementing ways of welcoming marginalized groups in Physics and STEM and amplifying and listening to marginalized groups.

- There are free resources for the physics community such as:



EDI Section from the Effective Practices for Physics Programs (EP3) Guide (American Physical Society, American Association of Physics Teachers et al.).



IDEA: Inclusion, Diversity, and Equity Alliance (APS)



References

- American Physical Society. "APS Core Values." American Physical Society, <https://drive.google.com/file/d/1FqPbils9Q-cEfuRdYxt9L9xdXn2QX9Na/view>. Accessed 20 July 2022.
- American Physical Society. "APS Inclusion, Diversity, and Equity Alliance." *American Physical Society*, <https://www.aps.org/programs/innovation/fund/idea.cfm>. Accessed 2 August 2022.
- American Physical Society. "Tips for Writing a Title and Abstract." *American Physical Society*, <https://www.aps.org/meetings/policies/abstract-tips.cfm>. Accessed 22 July 2022.
- American Physical Society, American Association of Physics Teachers, et al. "Equity, Diversity, and Inclusion." *Effective Practices for Physics Programs*, 2021, <https://ep3guide.org/guide-overview/equity-diversity-and-inclusion>. Accessed July 2022.
- Chenthittayil, Sherli, and Nikeetha Dsouza. "The Access and Equity for Students with Disabilities (SWD) in STEM Higher Education." Center on Disability Studies, University of Hawaii at Mānoa, 2020, https://www.researchgate.net/publication/343135838_The_Access_and_Equity_for_Students_with_Disabilities_SWD_in_STEM_Higher_Education. Accessed 27 July 2022.
- Jenson, Ronda Jean. "Effective Inclusion Practices for Neurodiverse Children and Adolescents in Informal STEM Learning: A Systematic Review Protocol." *Cambridge Dictionary | English Dictionary, Translations & Thesaurus*, Creative Commons Attribution 4.0 International License., 07 June 2022, <https://assets.researchsquare.com/files/rs-1061784/v1/07d8ed8e-34dc-4a85-a3a0-047477067b2a.pdf?c=1654619742>. Accessed 27 July 2022.
- Masood, Samina. "Current Trends in Physics Enrollment." *arXiv*, 28 June 2022, <https://arxiv.org/abs/2206.14143>. Accessed 22 July 2022.
- National Center for Science and Engineering Statistics. "Women, Minorities, and Persons with Disabilities in Science and Engineering: 2021." *Women, Minorities, and Persons with Disabilities in Science and Engineering: 2021 | NSF - National Science Foundation*, 29 April 2021, <https://nces.nsf.gov/pubs/nsf21321/report/field-of-degree-minorities#persons-with-disability>. Accessed 27 July 2022.
- Policy and Standards Division of the Library of Congress. "Library of Congress to Cancel the Subject Heading "Illegal Aliens."" *Library of Congress*, 22 March 2016, <https://www.loc.gov/catdir/cpso/illegal-aliens-decision.pdf>. Accessed 1 August 2022.
- The Rutgers Center for Minority Serving Institutions. "Rutgers GSE CMSI - What are MSIs?" *The Rutgers Center for Minority Serving Institutions*, Rutgers University, 2022, <https://cmsi.gse.rutgers.edu/content/what-are-msis>. Accessed 20 July 2022.
- Society of Physics Students, Sigma Pi Sigma. "SPS and $\Sigma\Pi\Sigma$ Statement on Diversity, Inclusion, Ethics, and Responsibility." *Society of Physics Students*, 22 February 2020, <https://www.spsnational.org/about/governance/statements/sps-and-%CF%83%CF%80%CF%83-statement-diversity-inclusion-ethics-and-responsibility>. Accessed 29 July 2022.
- United States Census Bureau. *data.census.gov*, 2020, <https://data.census.gov/cedsci/table?q=black%20age&tid=ACSDT5Y2020.B01001B>. Accessed 28 July 2022.
- United States Department of Education. "The Integrated Postsecondary Education Data System." *National Center for Education Statistics*, 2022, <https://nces.ed.gov/ipeds/use-the-data>. Accessed 20 July 2022.
- University of California, Los Angeles. "Native American and Indigenous Peoples FAQs." *UCLA Equity, Diversity & Inclusion*, 14 April 2020, <https://equity.ucla.edu/know/resources-on-native-american-and-indigenous-affairs/native-american-and-indigenous-peoples-faqs/#term>. Accessed 3 August 2022.
- Williams, Tiffani L. "Underrepresented Minority/ Considered Harmful, Racist Language | blog@CACM." *Communications of the ACM*, George Washington University, 19 June 2020, <https://cacm.acm.org/blogs/blog-cacm/245710-underrepresented-minority-considered-harmful-racist-language/fulltext>. Accessed 20 July 2022.



Thank you!



Christine O'Donnell, I am so grateful for your guidance, support, and time! (special appreciation to Misty the cat for intermittently showing up on zoom).



Society of Physics Students, Kayla Stephens, Mikayla Cleaver, Brad Conrad, and Andrew Zeidell for this opportunity and all the work you've done to organize educational, networking, bonding, and other events!



American Physical Society, Michael Wittmann, Kathryne Sparks Woodle, and everyone else for their knowledge and advice on my projects.



APS IT, Milton Villatoro and Nathan Walton for the monitor and other IT help!



All the SPS interns! Thank you for being the best community and chosen family, it has been a pleasure to live on the 9th of Amsterdam Hall with you all!

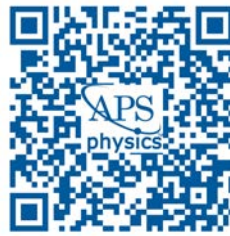


Questions? Contact me

Email: Corthle20@Juniata.edu

LinkedIn: www.linkedin.com/in/lucy-corthell

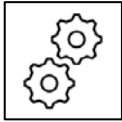




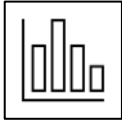
Summary slide



Background: APS, SPS, and other STEM organizations value diversity and inclusion.



Methods: making excel sheets and coding in Python to update the website.



Results: There continues to be disparities; the use of EDI papers to fill gaps.



Call to action: Identify disparities, share information, and implement EDI actions.