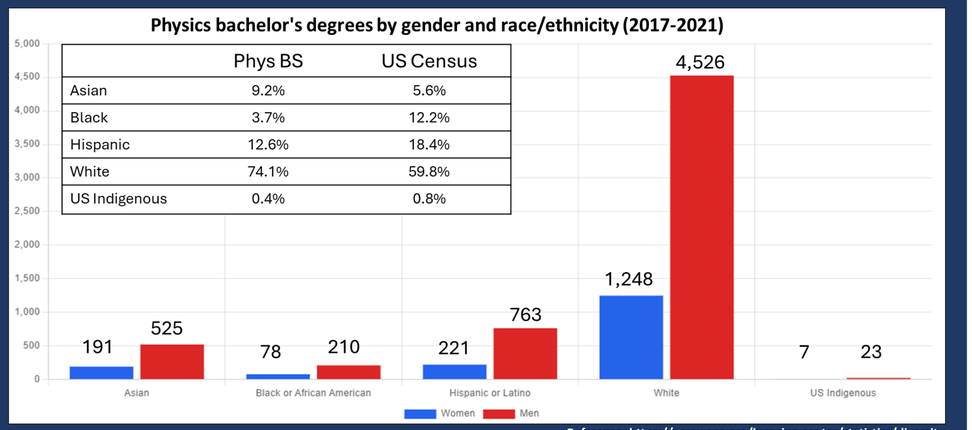
Identifying Barriers to STEM in Underrepresented Groups

Imagine a world where the brightest minds from every race and culture come together to solve our greatest challenges.

Physics bachelor's degrees by gender and race/ethnicity (2017-2021)

	Phys BS	US Census
Asian	9.2%	5.6%
Black	3.7%	12.2%
Hispanic	12.6%	18.4%
White	74.1%	59.8%
US Indigenous	0.4%	0.8%



Reference: https://www.aps.org/learning-center/statistics/diversity

Breaking barriers to boost diversity in Physics and STEM.

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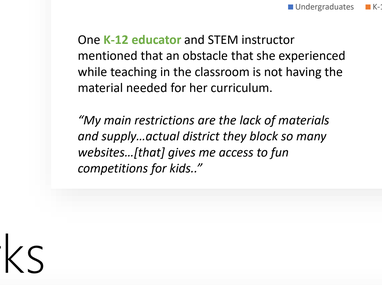
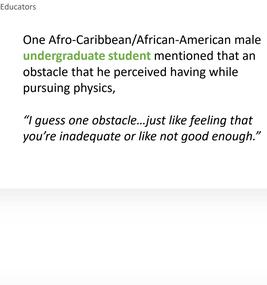
Method

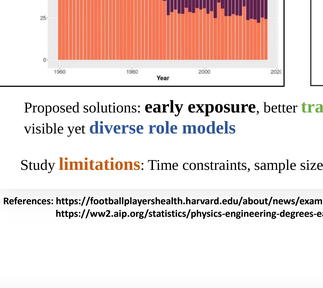
Semi-structured interviews:

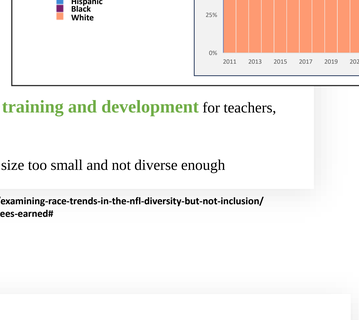
Undergraduate physics majors at Georgia Institute of Technology





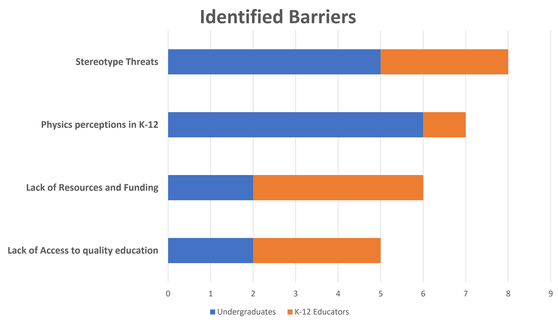
K-8 educators at a nearby Atlanta metro school district





Results

My research showed that **stereotype threats** are still a **prominent barrier.**



One **K-12 educator** and STEM instructor mentioned that an obstacle that she experienced while teaching in the classroom is not having the material needed for her curriculum.

"My main restrictions are the lack of materials and supply…actual district they block so many websites…[that] gives me access to fun competitions for kids.."

One Afro-Caribbean/African-American male **undergraduate student** mentioned that an obstacle that he perceived having while pursuing physics,

"I guess one obstacle…just like feeling that you're inadequate or like not good enough."

Discussion

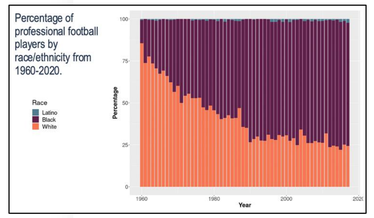
An examination through the lens of **Critical Race Theory** (CRT) in education.

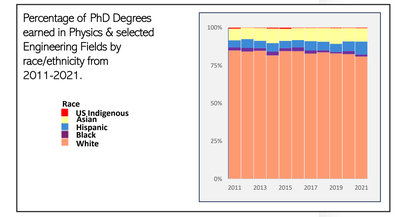
Highlighted **CRT** tenets: **colorblindness**, interest convergence, and **whiteness property**

A Caucasian educator participant indicated that teaching methods may not be changed to accommodate demographic groups and that ways of learning have no bearing on race.

Analyze the systemic inequities within educational institutions that hinder the participation of underrepresented groups in physics and other STEM disciplines

A different **outlook:** diversity in the NFL vs. Physics





Proposed solutions: **early exposure**, better **training and development** for teachers, visible yet **diverse role models**

Study **limitations**: Time constraints, sample size too small and not diverse enough

References: https://footballplayershealth.harvard.edu/about/news/examining-race-trends-in-the-nfl-diversity-but-not-inclusion/
https://ww2.aip.org/statistics/physics-engineering-degrees-earned#

Future Works

Expanding interviews to include parents with K-12 age children, a wider pool of educators from different districts that represent the full socioeconomic ladder within the community, school boards, and minority high schoolers with opportunities to take physics dual enrollment courses with colleges and universities

Deeper comprehension for understanding the barriers and appropriately implementing solutions that not only build a more diverse future for STEM but propel changes across multiple domains, such as societal equity, economic prosperity, scientific innovation, educational equity and policy and practices

ANIKA K JONES