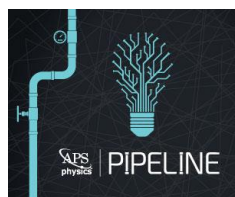


Dream Jobs and Desired Career Paths of Physics Majors

AAPT, Summer 2020

My Dining Room (Virtual), North Carolina

Anne Leak, Krystina Williamson, and Benjamin Zwickl
Stout School of Education, High Point University



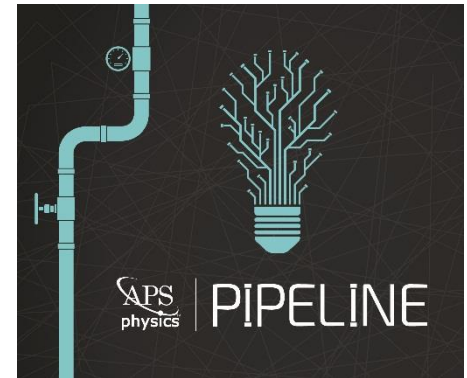
HIGH POINT UNIVERSITY

Stout School of Education



APS PIPELINE Network

- Six member institutions: Loyola University Maryland, Rochester Institute of Technology, Wright State, UC Denver, and George Washington University.
- Advised by experts from established physics entrepreneurship programs (e.g. Carthage College, Case Western, Kettering University)
- Goals are:
 - to **deliver tested PIE curriculum** to a wider cohort of practitioners.
 - to **assess of effects of PIE implementation** on student and faculty attitudes towards innovation and entrepreneurship, and **examine barriers** to PIE implementation
 - to **build a community** of expert practitioners who can mentor other institutions.
- Activities are varied in scope and resources needed; institutions varied in culture and resources available.

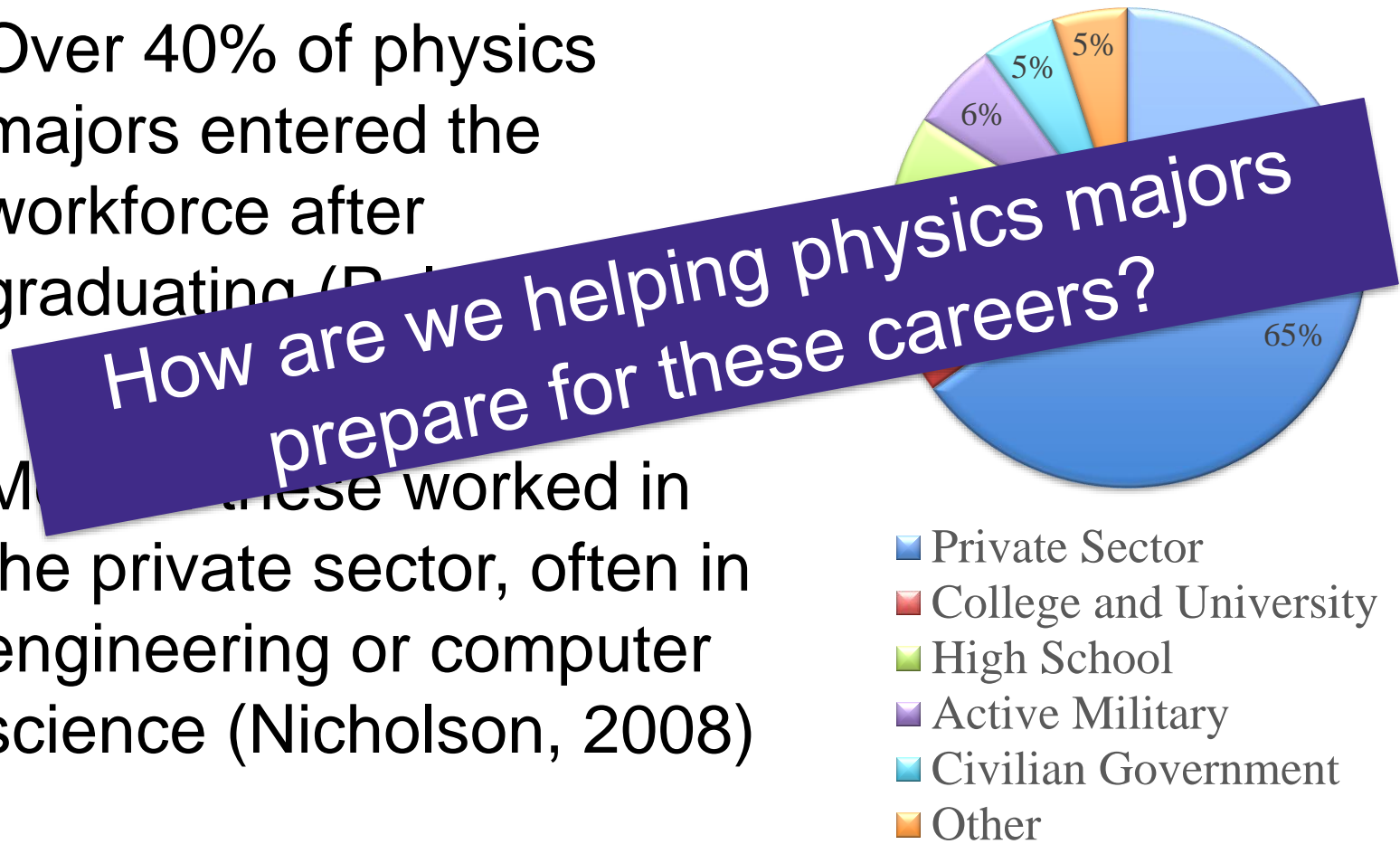


www.aps.org/programs/education/innovation/index.cfm



Diverse Physics Career Paths Taken

- Over 40% of physics majors entered the workforce after graduating (Pold, 2015)
- More than half of these worked in the private sector, often in engineering or computer science (Nicholson, 2008)



*Adapted from Mulvey and Pold (2015)

The PIPELINE Student Survey



Q5 If you were to describe being a physics major to a senior in high school who was considering majoring in physics,

what would you tell them about being a physics major to help with their decisions? (approx. 3-5 sentences)

Q7 Which of the following field(s) are you interested in pursuing after you graduate? Please select all that apply.

- Astronomy/ Astrophysics (1)
- Business/ Entrepreneurship (2)
- Computer/ Information systems (3)
- Data analysis (4)
- Engineering (5)
- Medicine (6)
- Physics (7)
- Teaching/ Education (8)
- Other (9) _____
- I do not know what field(s) I am interested in (10)

Q8 9. Which of the following sector(s) are you interested in after you graduate (post-BS)? Please select all that apply.

- Graduate school (please describe a specific field/program you are interested in if you have one) (1) _____
- Private sector/ Industry STEM (2)
- Private sector/ Industry non-STEM (3)
- Civilian Government/National lab (4)
- College/ University (permanent employment, not including graduate school) (5)
- K-12 Education/ Teaching (6)
- Military (7)
- Other (8) _____
- I do not know what sector(s) I am interested in (9)

*

Q9 11. Describe your dream job. Where would you be working? What would you be doing there? Who would you be working with? (if you do not have a specific dream job, describe your dream plans in general terms) (approx. 3-5 sentences)

Participants (so far)

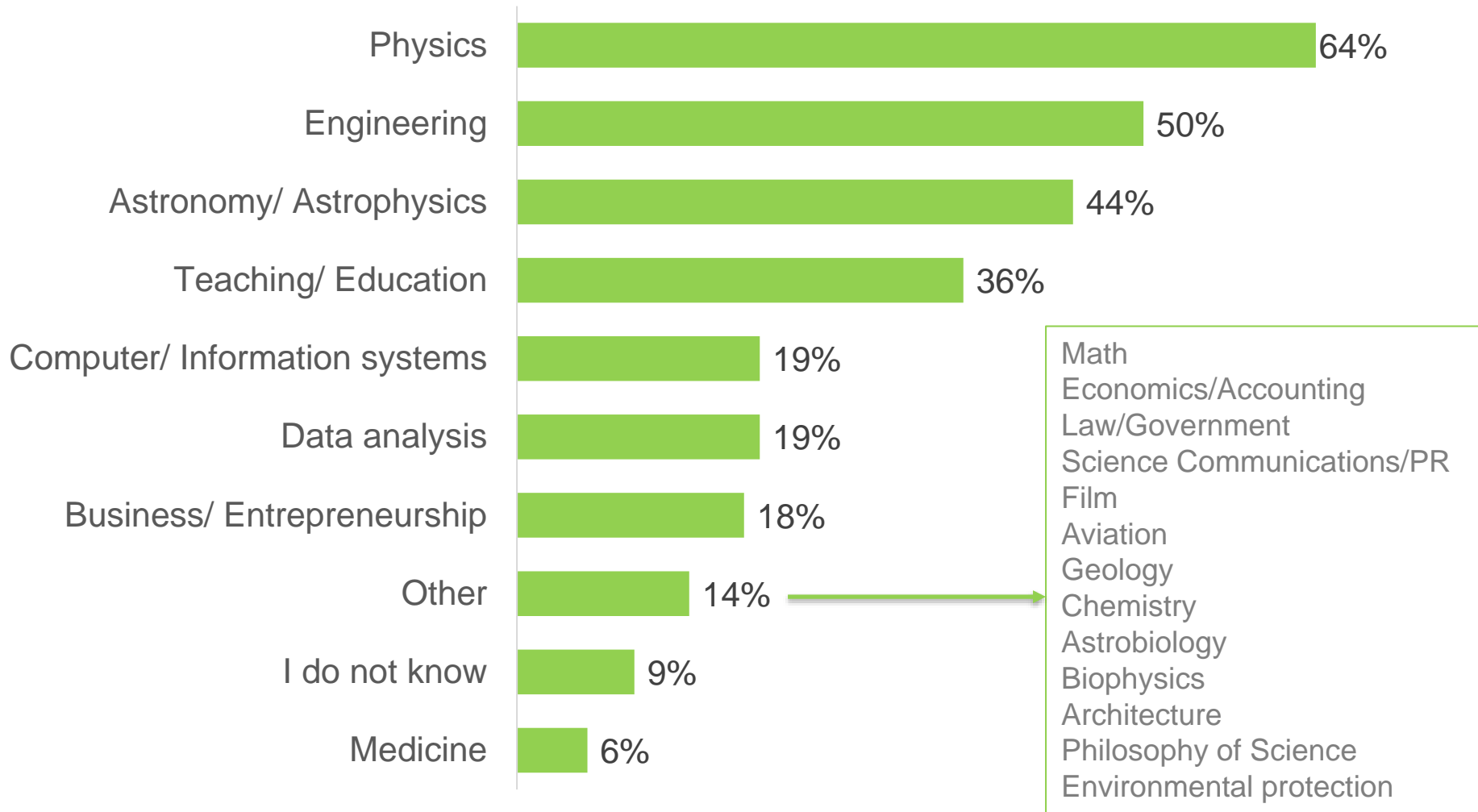
- 160 student participants who responded to career questions on the PIPELINE survey
- from 12 colleges and universities
- in the Northeast, Midwest, South, and Southeast regions of the U.S.

Research to Identify Career Plans

- What fields are physics majors interested in pursuing?
- In what sectors?
- What are physics majors' dream jobs?
- How can we better support physics majors in reaching their career goals?

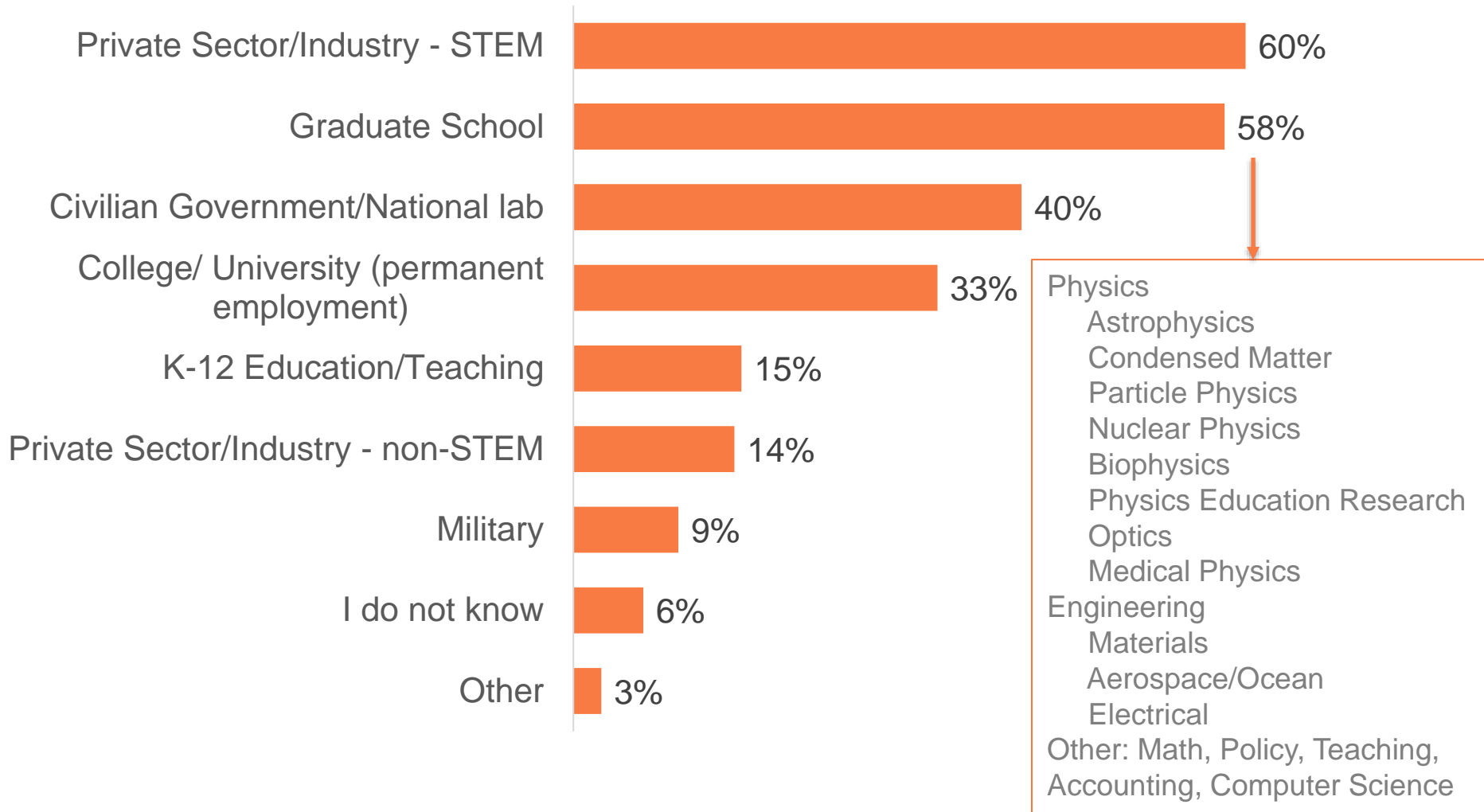
Fields Physics Majors are Interested in Pursuing

Percentage of Students Interested in Field (N=160)



Sectors Physics Majors are Interested in

Percentage of Students Interested in Sector (N=160)



Dream Jobs

Physics majors describe dream jobs based on:

- Ideal location/ sector
- Social/culture requirements
- Hands-on, application-focus
- Specific job or research interests (especially research and space exploration!)
- Variety of problems to solve that have a strong impact
- Time and Money considerations

Dream Jobs – Supportive Collaborative Culture

Contributions - “I would be working in a place where my contributions are seen as such and where I am respected for being me, not for being a copy of all others before me.”

Collaboration - “I would be working with peers at the top of their field and we would collaborate and get along well.”

Teamwork - “It would ideally be team oriented and involve creative projects.”

Leadership - “I'd love to someday lead a research team on physics or astrophysics-related projects.”

Dream Jobs – Emphasis on Research

*Approximately 70 physics majors emphasized research as part of their dream jobs

“I would really like the freedom to explore **my own research interests**, whether in a university or in a government funded lab.”

“**Research** and development: being given a project start and ending point and asked to bridge the start and end in whatever way.”

“I enjoy working with **data and doing research**, but I also love teaching and would love a way to **combine** the two if possible. Working with my hands is also a plus.”

Dream Jobs – Problem Solving with Impact

“My dream job would be leading a small group of people in solving a particular problem, generally more of a **long-term problem...**”

“I would like to work in a lab but not be researching the same project for years, **changing projects** now and again so I can stay interested in my work.”

“Ideally, I would apply my physics degree to a medical environment or, generally, **a place where I can help others.**”

“I know I want to do something involving physics as well as **helping people in some way.**”

Career Support for Physics Majors

- Physics majors are interested in applying their major to a variety of fields
- Many students are interested in the private sector
- Dream jobs are often social, hands-on, applied, and involve a variety of interesting problems to solve
- Traditional physics courses are not enough to prepare students for their future careers

What can we do to help our majors pursue their dream jobs?

ATTENTION PHYSICS STUDENTS:

You Have Options

Q: What can you do with a physics degree?
A: Get a PhD and become a physics professor OR ...

What comes after the "or" is not widely known in many physics departments, even though data show that only about a third of physics bachelor's degree



~36% attend graduate school in physics or astronomy.⁵

• About 80% enroll in a PhD program; the remainder choose a master's degree

supported by teaching research assistantships, or

start graduate physics or astronomy...

enter the workforce.⁹

include:

to enter the workforce sector. In the private sector, the majority engineering, and math

EM positions are well compensated with starting salary of

positions in these positions at the institution they graduated from or IT.

sector includes national laboratories. These positions are in defense or energy.

cross all branches of the armed forces or nuclear power.



The Statistical Research Center does not formally follow the career paths of these individuals, but we hear that they go on to successful careers in engineering, management, education, law, medicine, business, and a variety of other areas.



Add to the mix:

Foreign citizens coming to the United States for a graduate degree, students who earned bachelor's degrees in another field but want a graduate degree in physics and students who earned a physics bachelor's degree in previous academic years.



~1 out of 3 exiting

Exiting master's degree department upon receiving an en route master's degree.

• About two-thirds do so with a specific plan
• A master's degree

For US citizens master's degree



~2/3 enter workforce

• About half work in the private sector, overwhelmingly in STEM fields.
• The largest portion of exiting master's working in the private sector are employed in the field of engineering.
• Other common employment sectors for exiting master's include colleges and universities, high schools, civilian government, and the military.

Some transfer to other institutions to earn a physics PhD
• Many others transfer to programs in related fields such as medical physics, atmospheric science, and materials science.

~1 out of 6 US physics
~2/3 accept a temporary position (e.g. a postdoc), primarily at a university or

...helps educators provide better support toward these goals!



Learn more at the Careers Toolbox website:
www.spsnational.org/careerstoobox

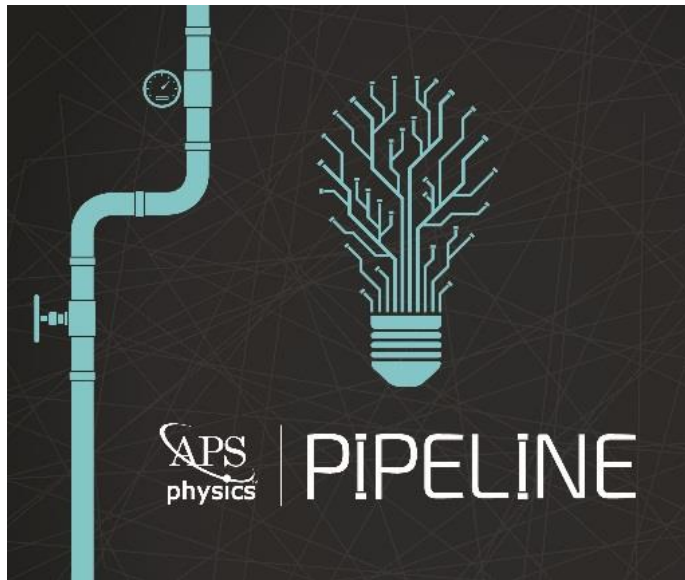


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*Estimate provided by the AIP Statistical Research Center, Summer 2014.

Have your students take the PIPELINE Survey!

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