A career in Physics

My path in STEM

Joe Osborn

University of Michigan

August 31, 2018

Overview of my talk

1. Who am I?

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2. What was my career path? How did I get to where I am today?

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1. Who am I?
2. What was my career path? How did I get to where I am today?
3. Where else could a degree in physics (or STEM) have taken me?

Who am I?

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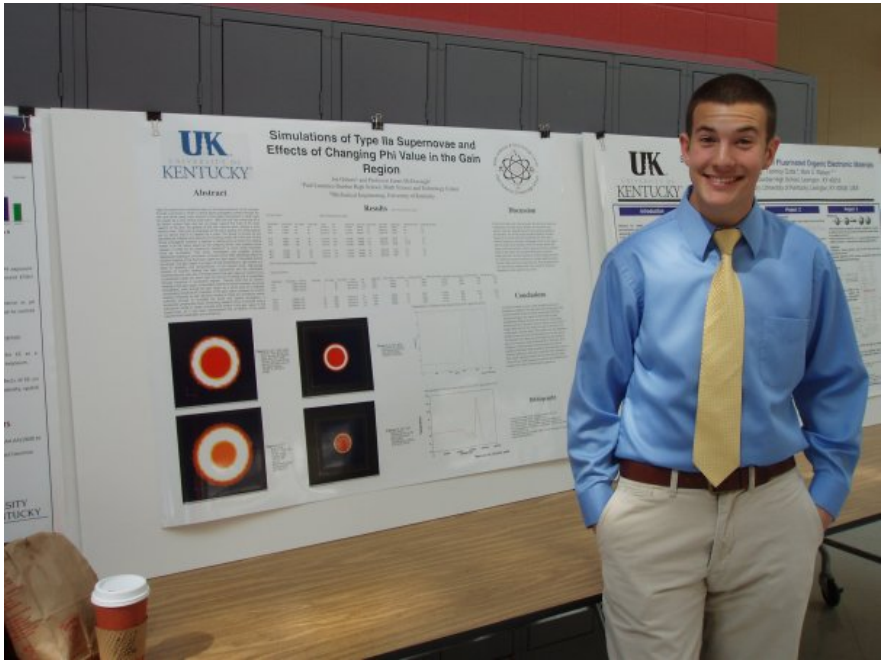
- Joe Osborn
  - Postdoctoral Research Fellow
  - University of Michigan
- Class of 2009, MSTC



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- Class of 2009, MSTC
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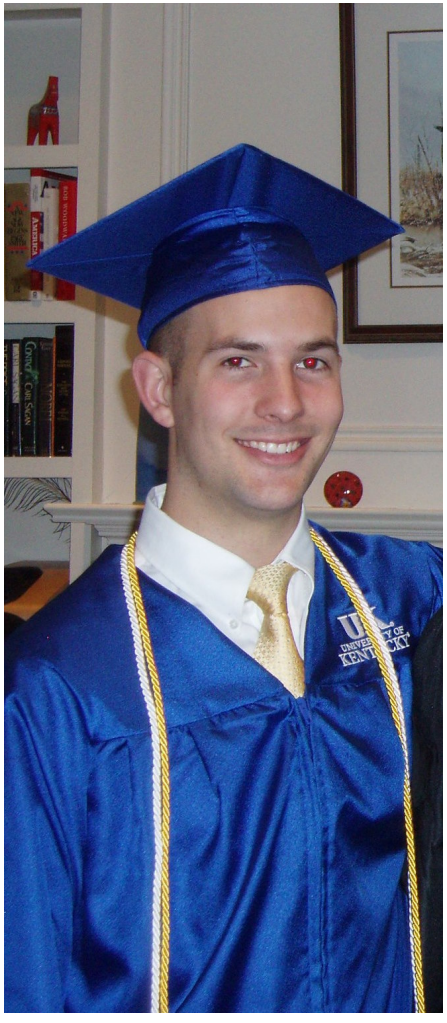

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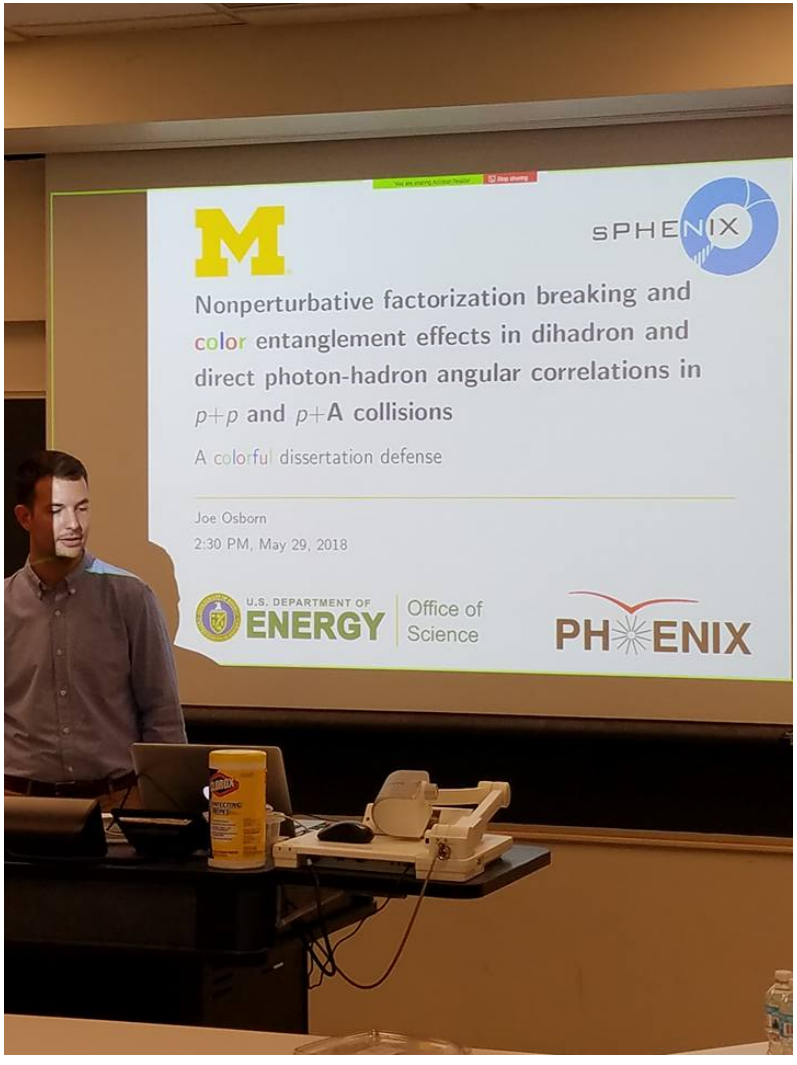
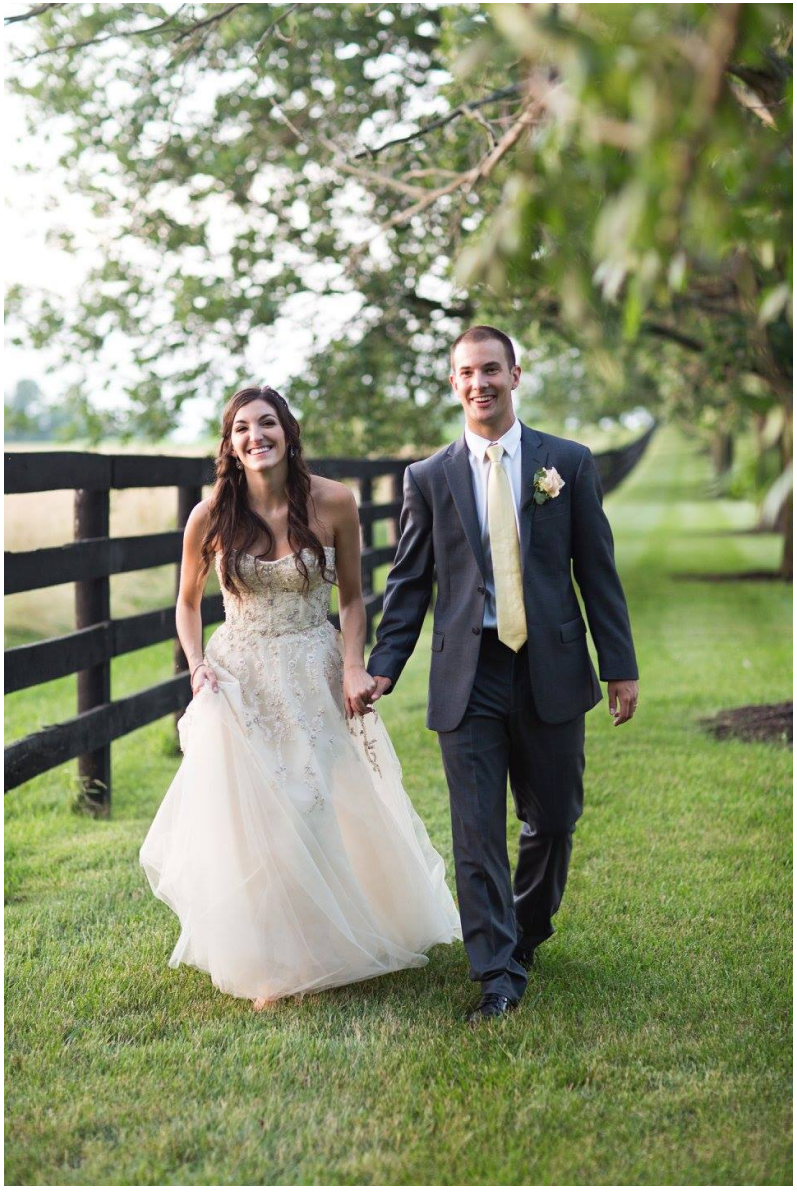


Who am I?

- Joe Osborn
  - Postdoctoral Research Fellow
  - University of Michigan
- Husband



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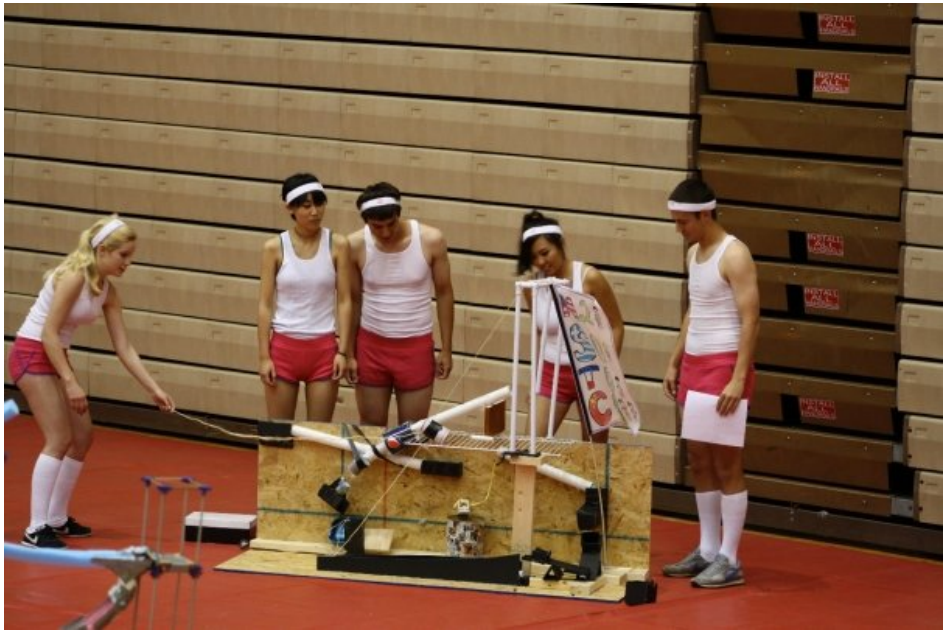
- Dunbar soccer alumnus
- ...

Where am I now?

- I am now a research scientist at the University of Michigan
- My physics research is on the structure of the proton
  - I work with thousands of collaborators from across the world studying the smallest particles of nature

My career path

MSTC Class of '09



- Graduated from Dunbar in 2009
- Mrs. Young for physics, Mr. Swango for chemistry, Mrs. Patterson for calculus
- Played varsity soccer for 3 years
- MSTC senior Rube Goldberg project a success

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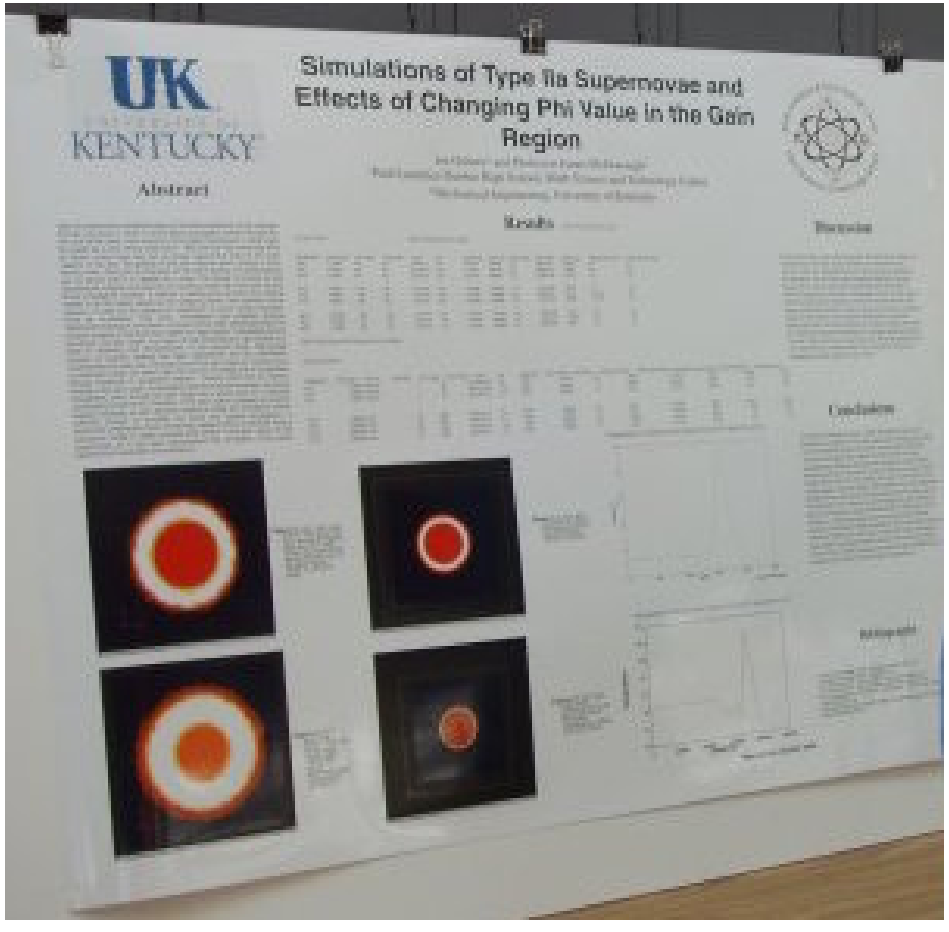
- MSTC senior Rube Goldberg project a success
- Not the actual machine, just the costumes

MSTC Research Project

- My senior research project focused on simulations of supernovae
- Understanding fluid dynamics and supernovae propagation
- Led me to be interested in observational astronomy in college
- Accepted to University of Rochester in Spring 2009



University of Rochester

- Decided to major in physics as a path to astronomy
- Played soccer on varsity team at Rochester
- Due to some personal struggles, decided to transfer to University of Kentucky in January 2011

University of Kentucky

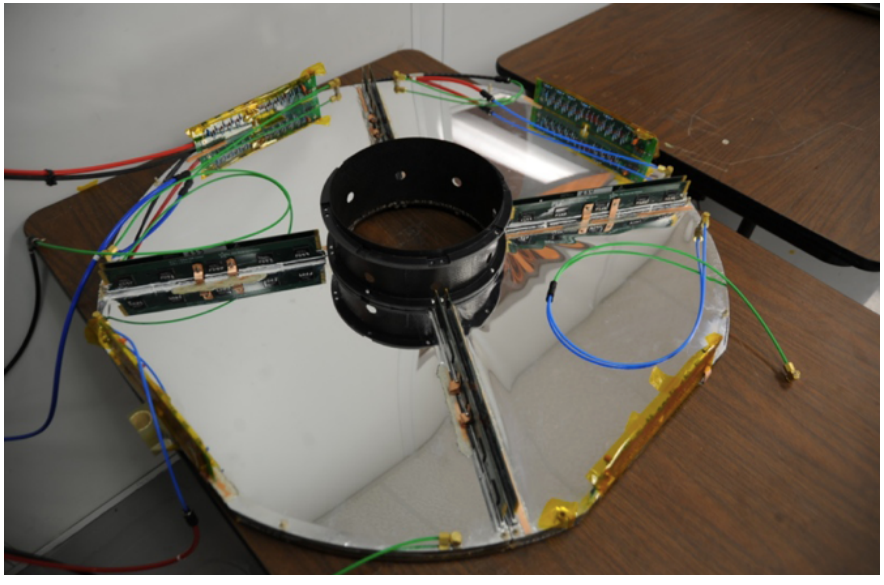
- Worked in an astronomy laboratory in summer of 2011
- Project: Analyzing spectra of stars to determine their chemical composition, looking for particular signals of blue giant stars

University of Kentucky

- Worked in an astronomy laboratory in summer of 2011
- Project: Analyzing spectra of stars to determine their chemical composition, looking for particular signals of blue giant stars
- Potentially my most important research project!
- I learned I really didn't enjoy astronomy after all ...

University of Kentucky

- Summer of 2012 I worked in a particle physics laboratory
- Spent summer at MIT testing and developing foils to detect electrons
- The rest of the year performed an efficiency analysis of detector with real data



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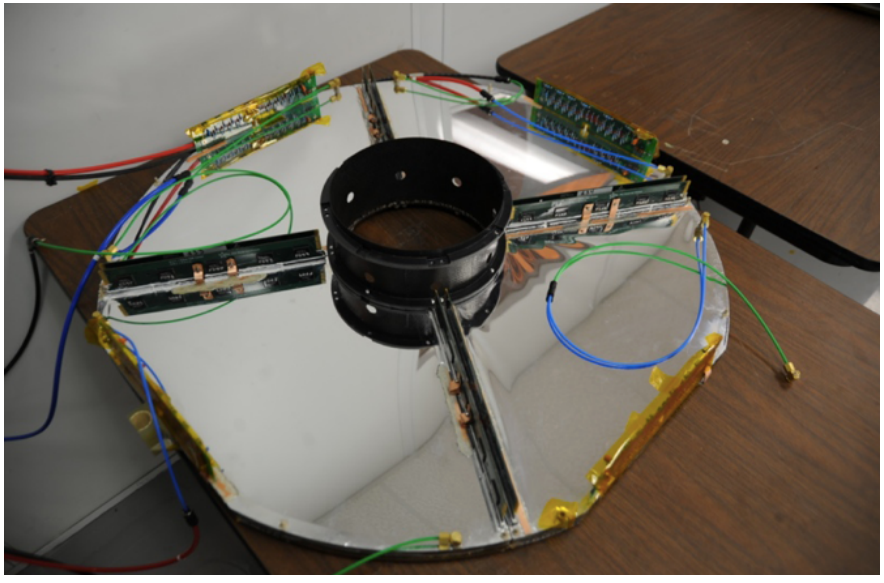
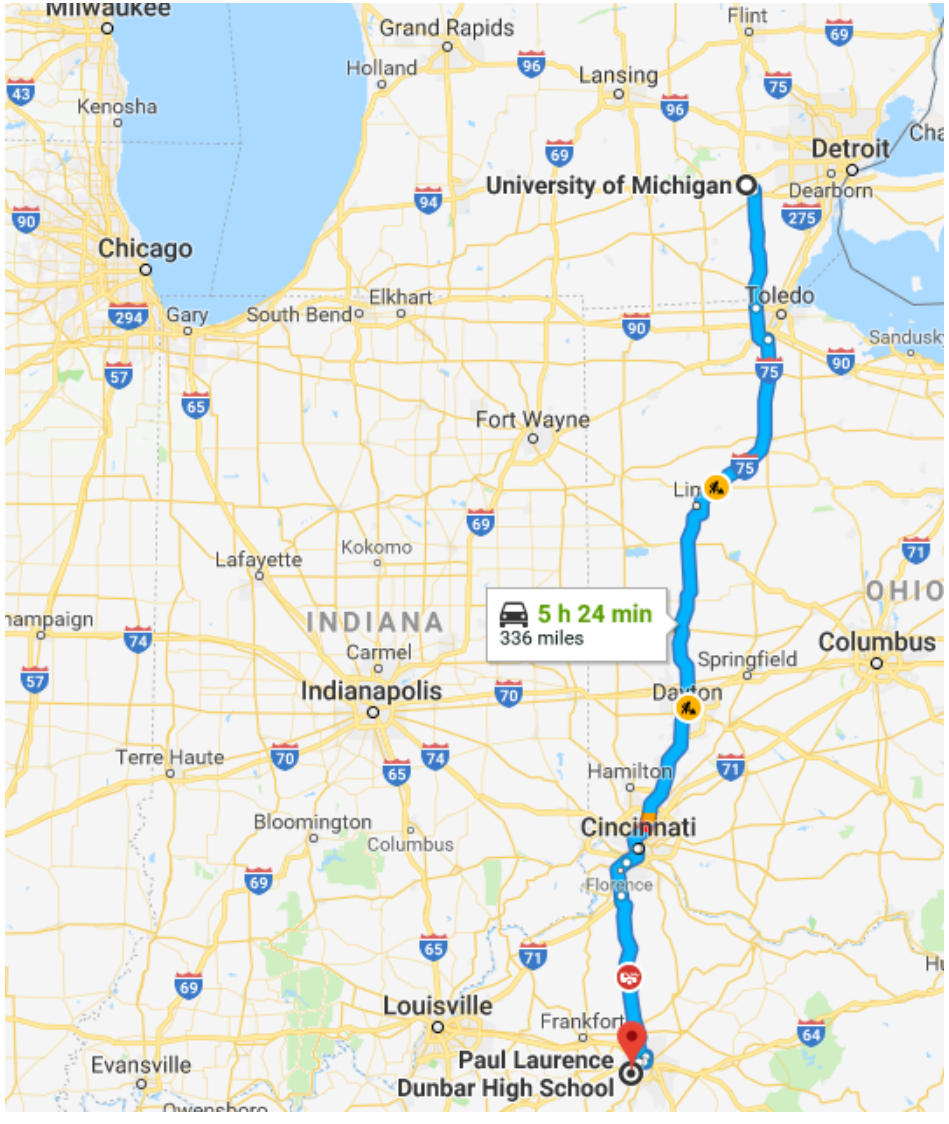


- I found what I wanted to do - study the smallest structures of nature!

University of Kentucky

- I love doing research and exploring the unexplored, so I decided to go to graduate school
- Accepted offer from University of Michigan physics department in Spring 2013



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PLD Stadium - holds $\sim$1000 people

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The Big House - holds 115,000 people

University of Michigan

- Graduate school at UM
  - Take physics classes
  - Teach introductory physics classes
  - Research physics

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  - Take physics classes
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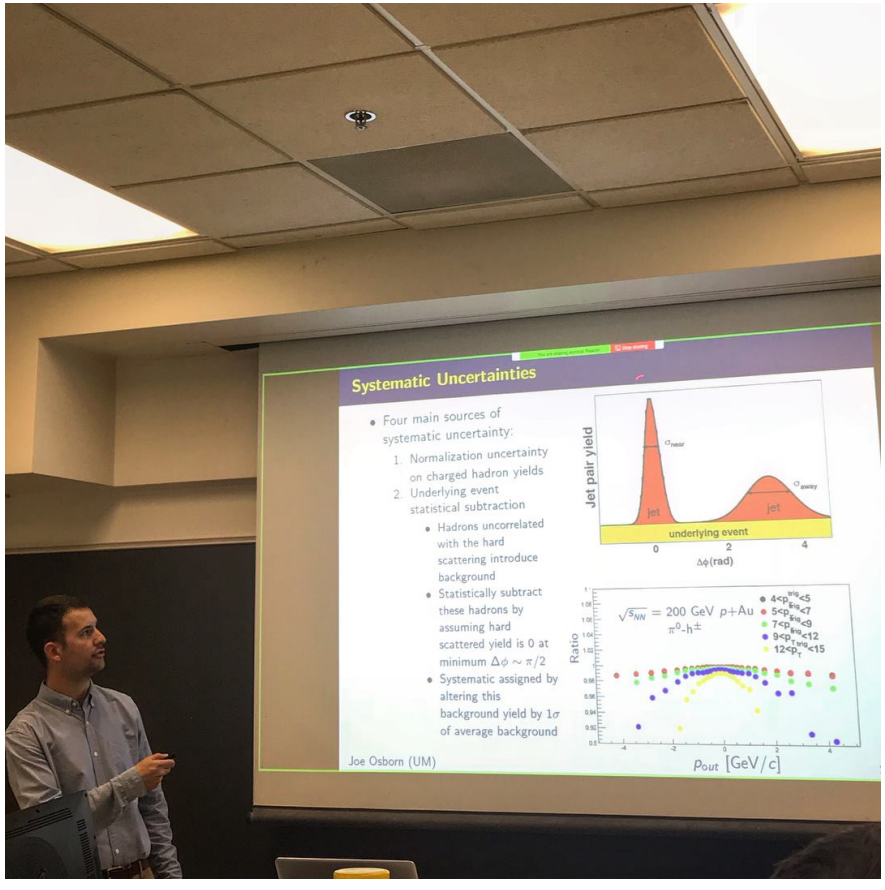
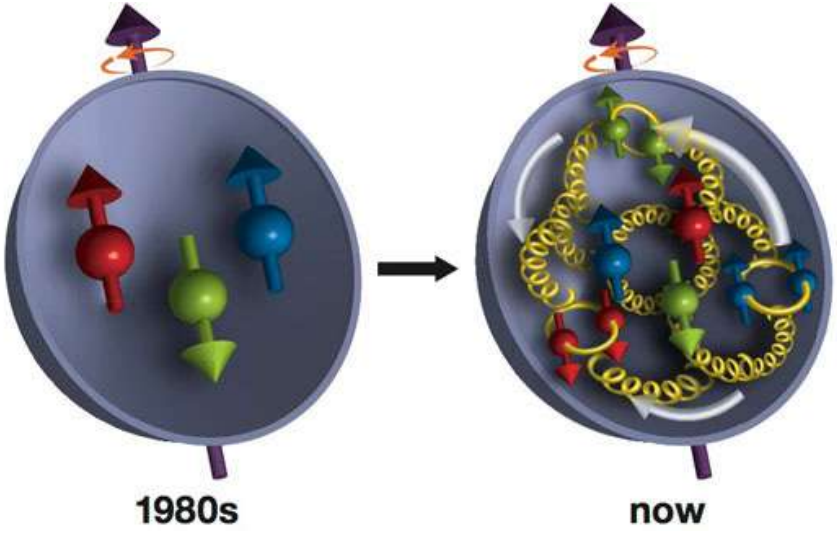
  - Research physics
- I got to travel to conferences to present my research
- Write thesis and defend dissertation

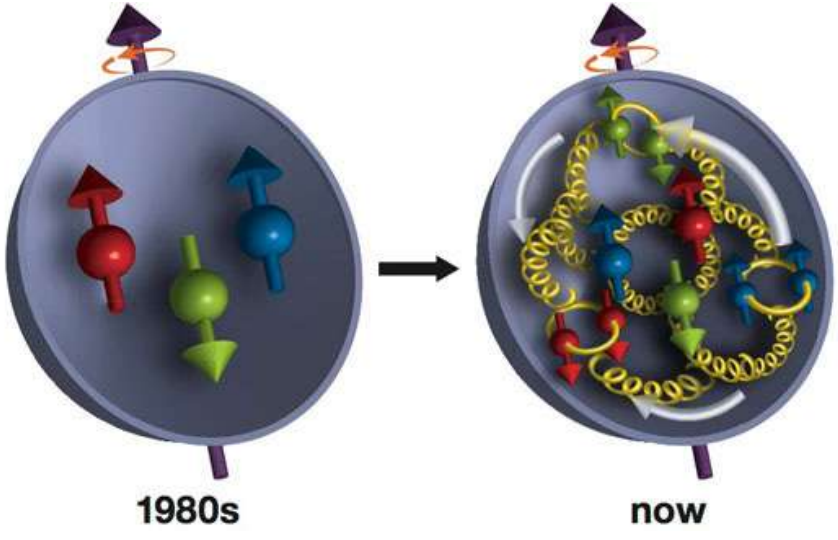


My Research



- In Mr. Swango's chemistry class you learn that proton and neutrons are the fundamental particles of atoms
- There are actually smaller particles that make up protons and neutrons!
- Particles called quarks and gluons form the proton, and there are a lot of them

My Research



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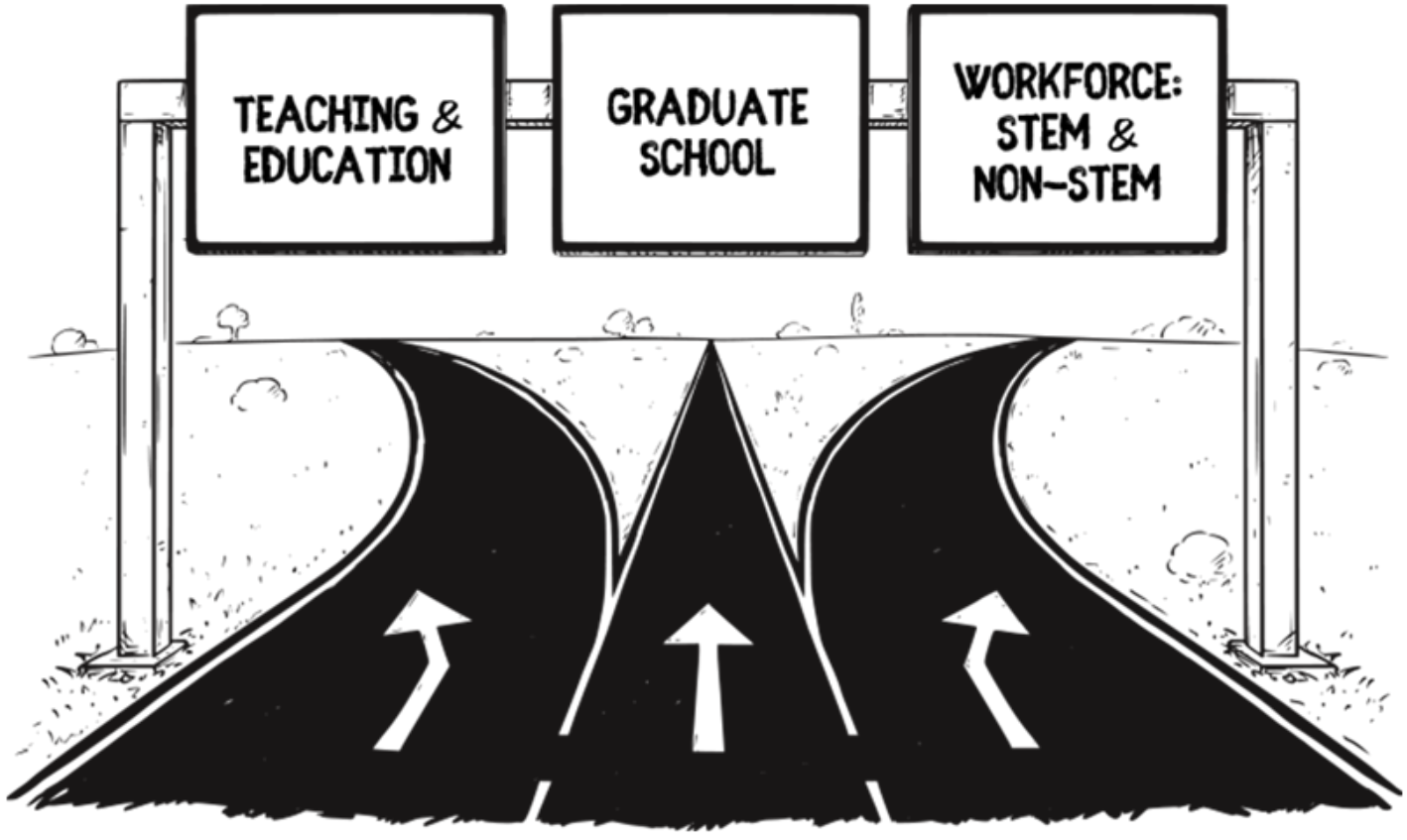
- How do the quarks and gluons combine to form the proton, one of the most basic building blocks of matter?

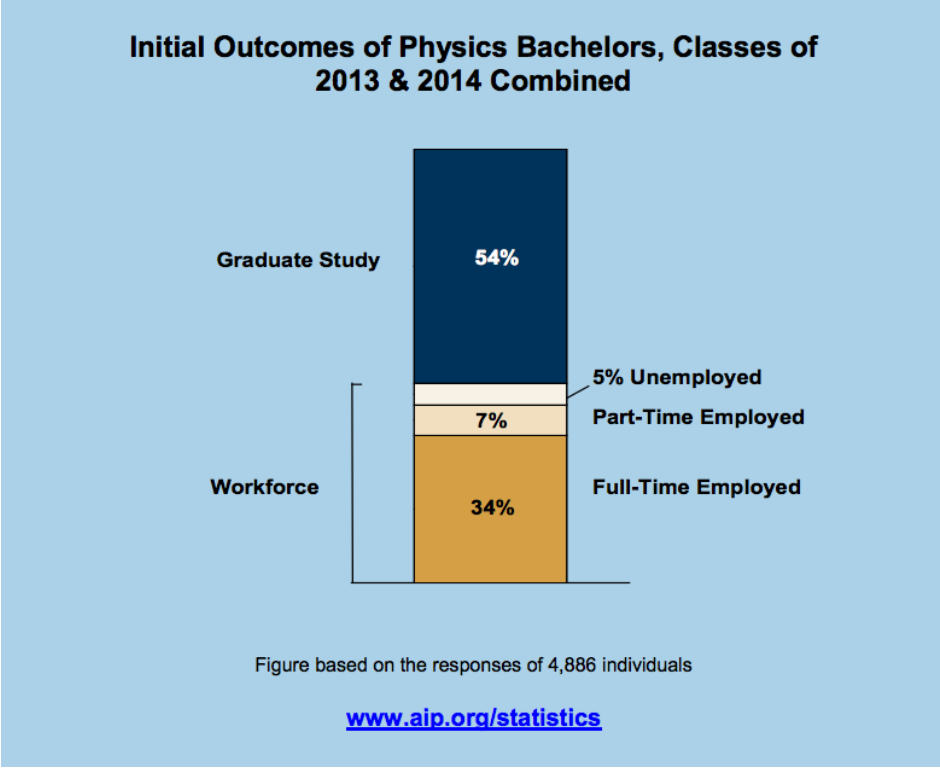
Common misconceptions about where STEM can take you

If I go into STEM, I have to become an academic researcher. I don't want to do research or go to graduate school



www.spsnational.org/careerstoolbox

Options with a STEM (Physics) degree



Options with a STEM (Physics) degree

Initial Outcomes of Physics Bachelors, Classes of 2013 & 2014 Combined

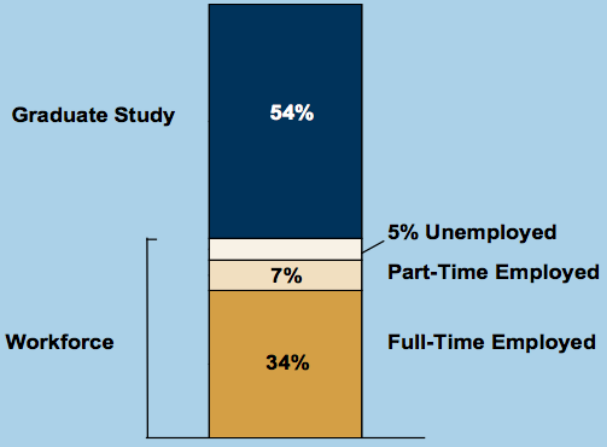
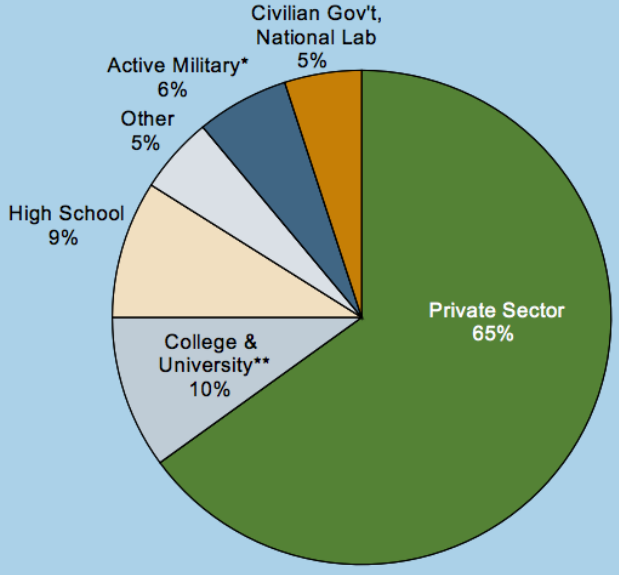


Figure based on the responses of 4,886 individuals

www.aip.org/statistics

Initial Employment Sectors of Physics Bachelors, Classes of 2013 & 2014 Combined



*Data do not include degree recipients from the three military academies (US Naval Academy, US Military Academy, US Air Force Academy).

** Data include two- and four-year colleges, universities, and university affiliated research institutes.

Figure based on the responses of 1,657 individuals

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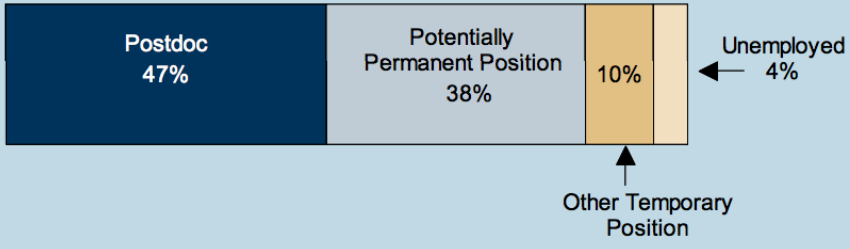
If I go to graduate school, I have to be an academic researcher

Options with a STEM (physics) Ph.D

Employment Type for Physics PhDs One Year After Degree, Classes of 2013 & 2014 Combined



Note: Data only include US-educated physics PhDs who remained in the US after earning their degrees. Figure is based on the responses of 1,450 individuals.

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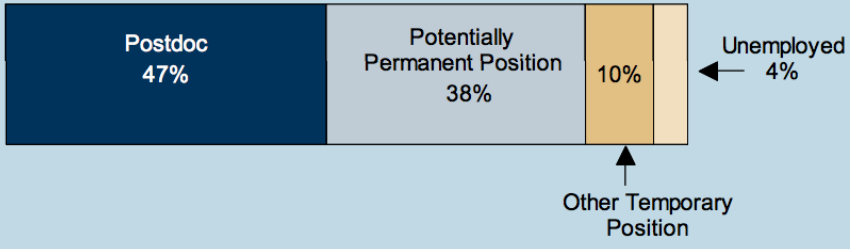

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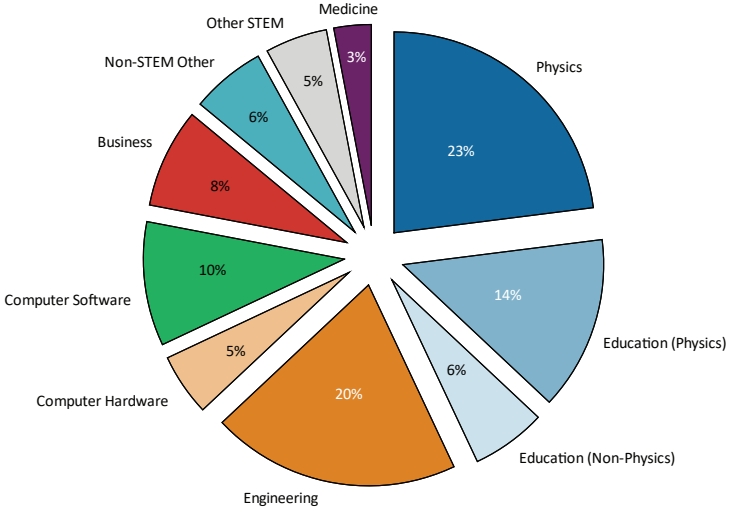
Employment Fields for New Physics PhD Recipients in Potentially Permanent Positions, Classes of 2009 through 2014



Source: AIP Statistical Research Center, Initial Employment Survey, classes 2009 through 2014.

AIP | Statistics aip.org/statistics

Example Paths after Physics Bachelor

Workforce

- Data analyst
- Health physicist
- Analyst for health, social, environmental policy firm
- Financial analyst
- Data science and strategy manager
- System software developer
- Many different types of engineer (software, mechanical, environmental, civil, . . .)
- Research associate

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Advanced study

- Graduate school
  - Mechanical engineering
  - Physics
  - Public policy
  - Environmental engineering
  - Atmospheric and space science
  - Physical geography
  - Medical physics
  - Earth and planetary sciences
  - Genetics
  - Mathematics
- Medical school
- Law school
- Secondary education

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- You can always send me questions and I will help the best I can!
  - jdosbo@umich.edu