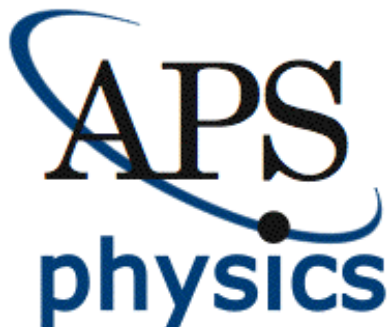


New Faculty Workshop

*27 June 2019
College Park, MD*

Resources for Solving Problems



Theodore Hodapp
American Physical Society
Director of Project Development
Senior Advisor: Education and Diversity

- Take out a piece of paper
- Thinking about 5 years from now: What is the one thing you would like to change in your department (but not time or money)?

Physics Teacher Education Coalition (PhysTEC)

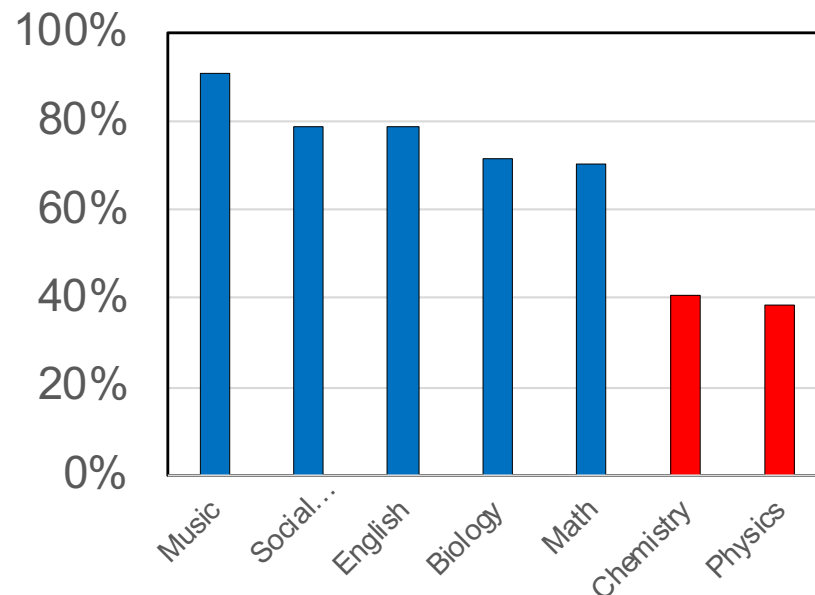
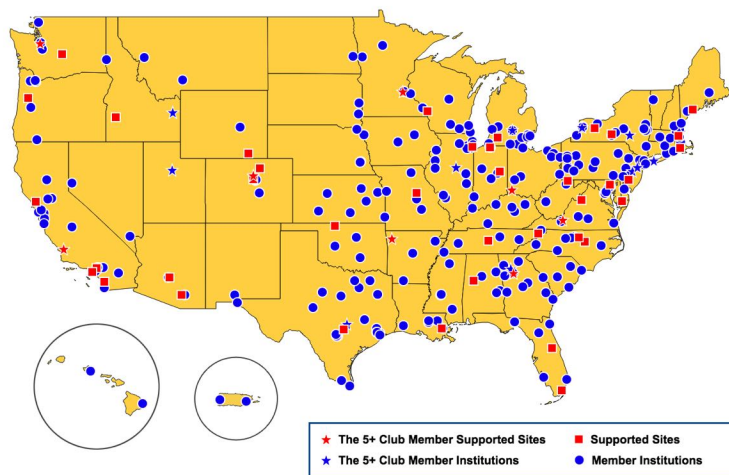
Goal: Increase the number of highly qualified high school physics teachers;
Build a national coalition of universities engaged in this work

Strategy: Encourage and support physics departments to work proactively to recruit and educate future teachers. Provide best-practices and advocate for successful strategies (national meeting: 28 Feb-1 Mar 2020)

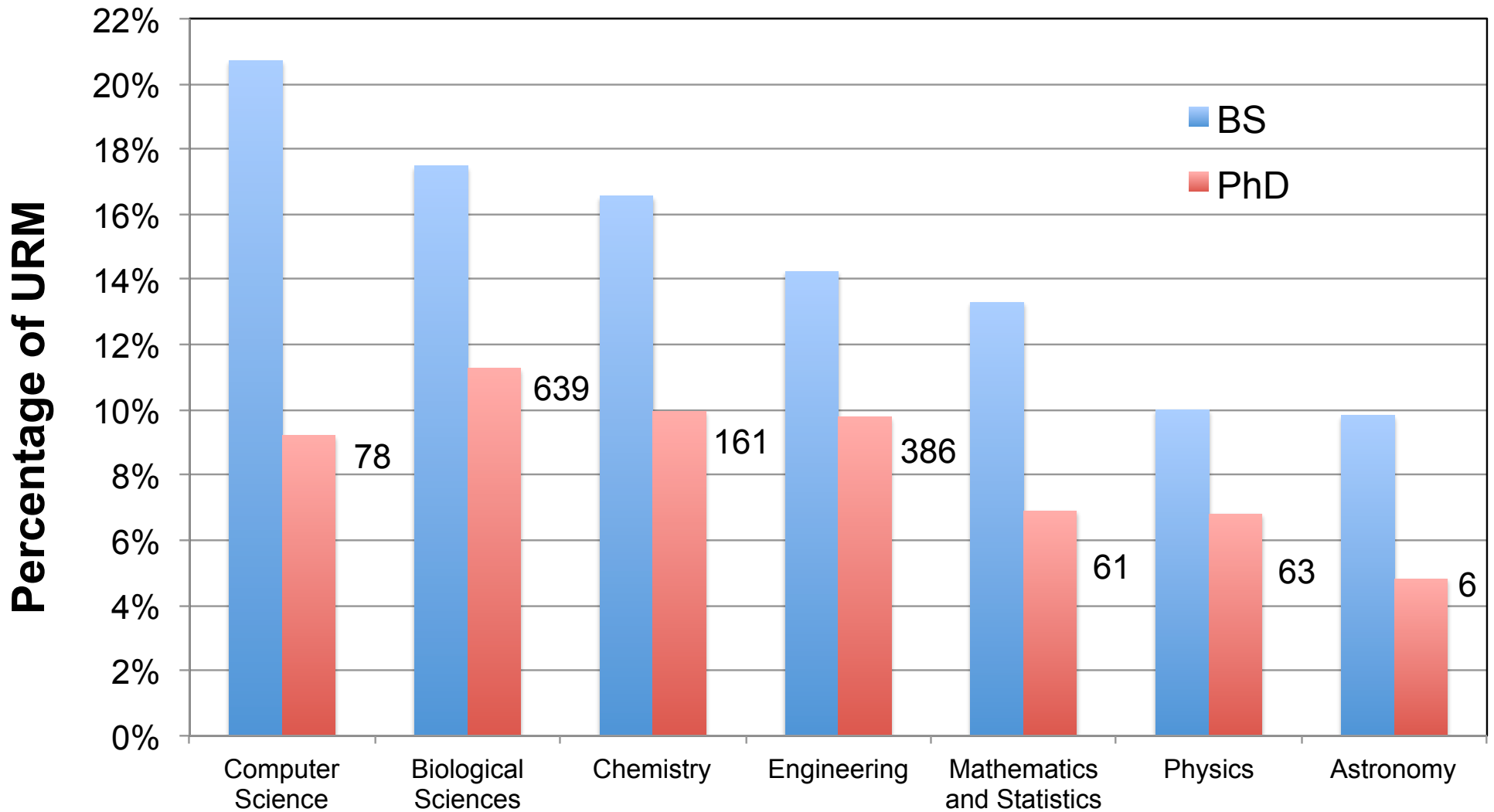
Contact: Monica Plisch, plisch@aps.org

Support: NSF-0108787, 0808790, 1646913, 1707990

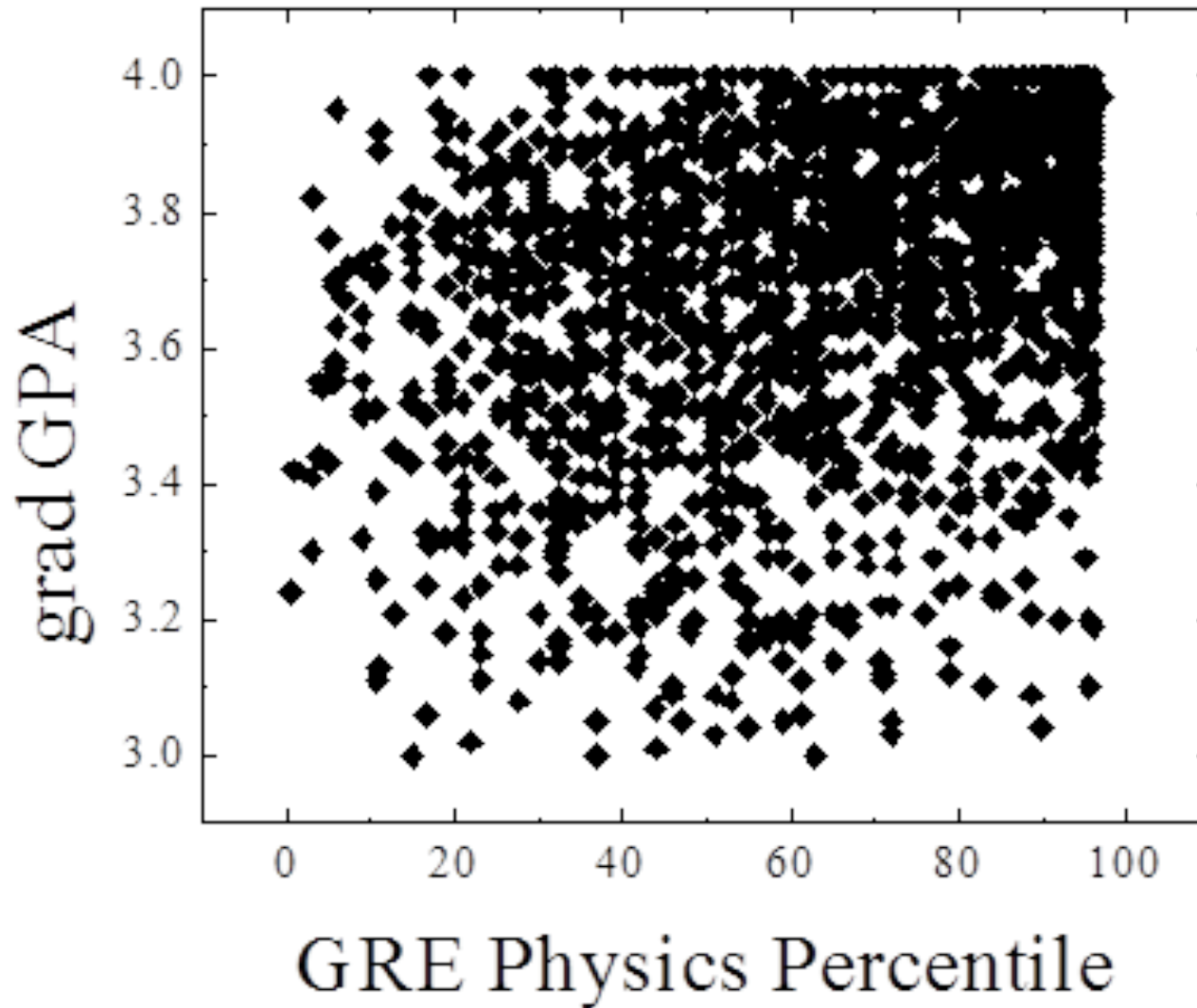
URL: phystec.org



URM Bachelor and PhD STEM Degrees



Physics GRE "Correlation" with Grad GPA



$r = 0.24$; $N = 1686$

"Weak" Correlation

APS Bridge Program

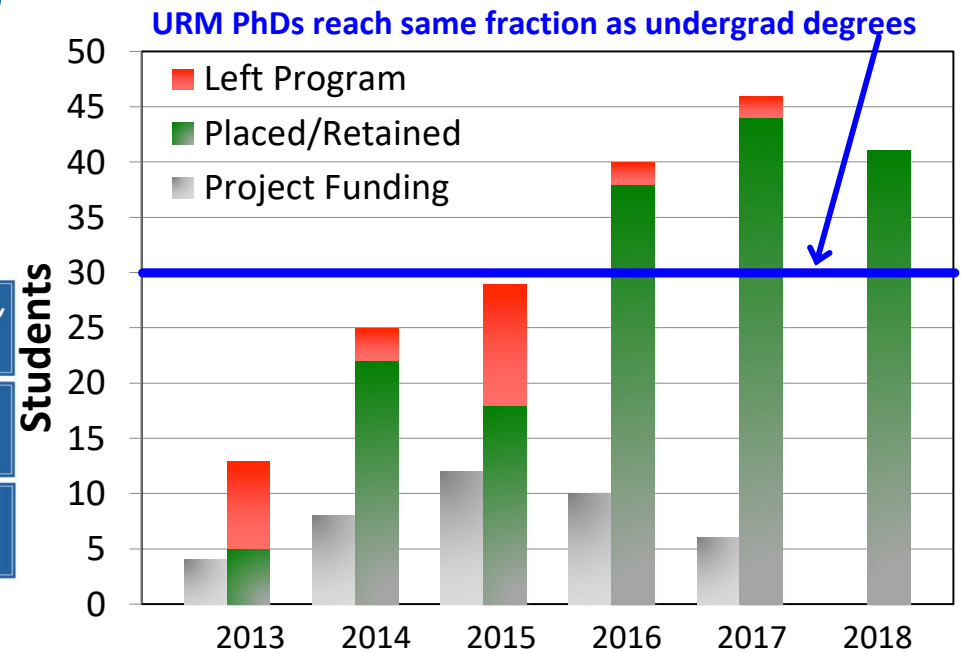
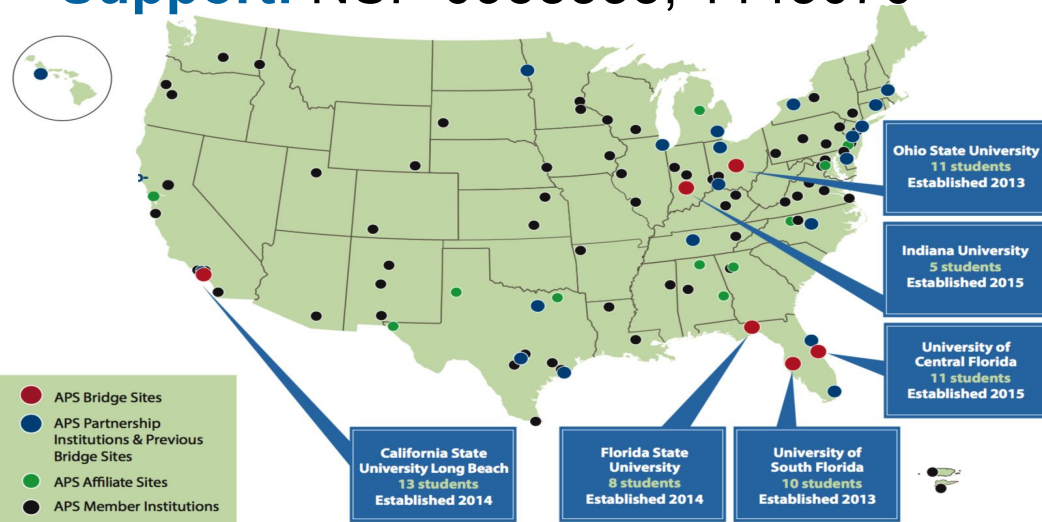
Goal: Increase the number of underrepresented (URM) students earning a PhD in physics or astrophysics

Strategy: Collect applications from URM students not admitted, and make available to departments. Provide best-practices in admissions, mentoring, retention and support (Meeting: Oct 2019, UCF, Orlando, FL)

Contact: Erika Brown, brown@aps.org

URL: apsbridgeprogram.org

Support: NSF-0958333, 1143070



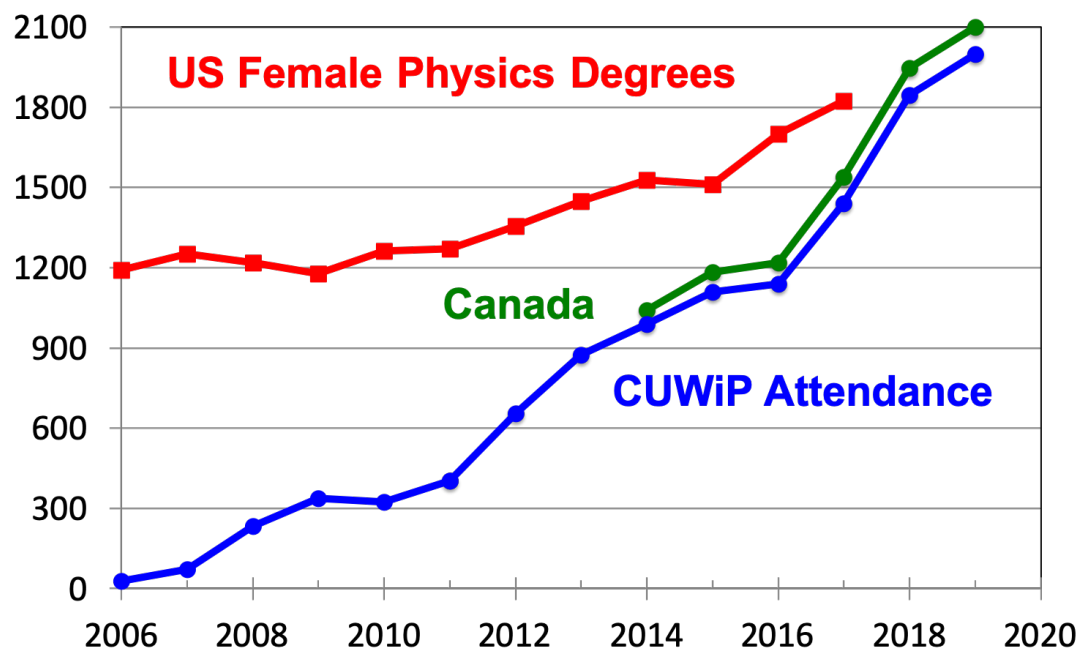
APS Conferences for Undergraduate Women in Physics (CUWiP)

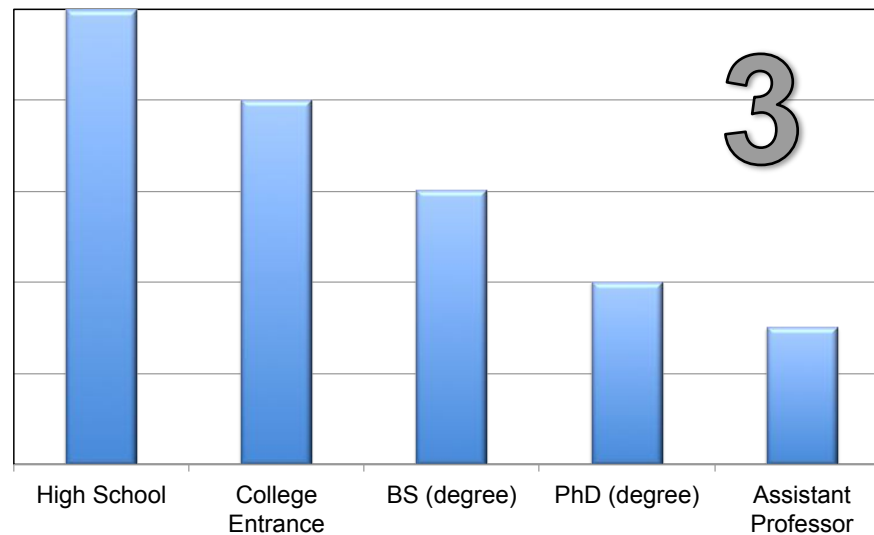
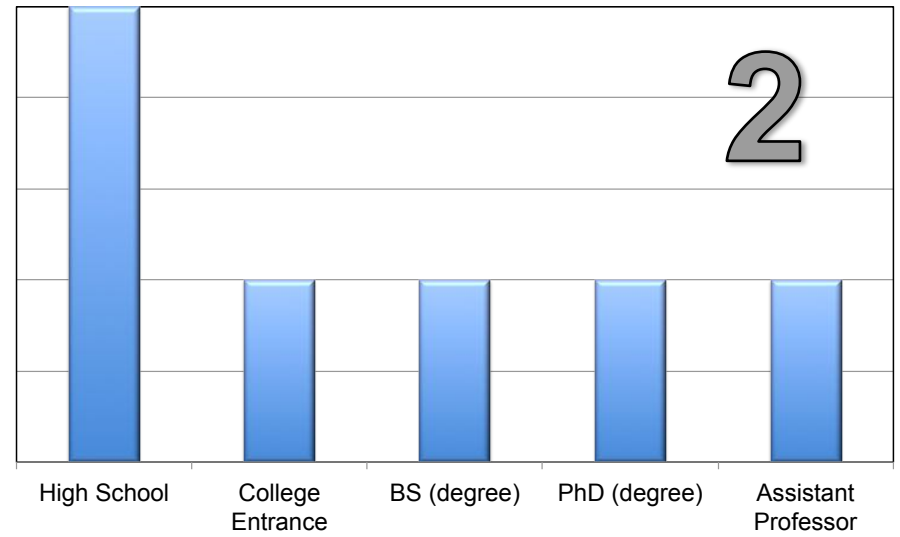
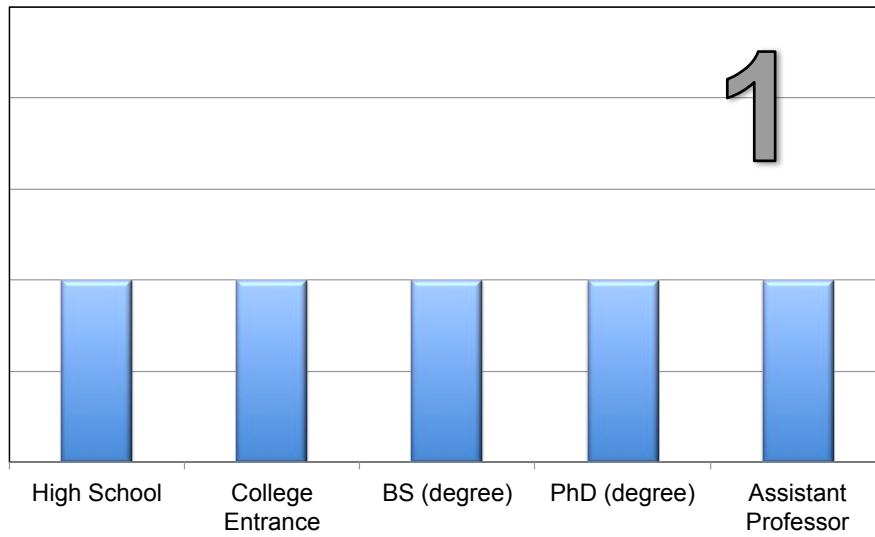
Goal: Three-day regional conferences for undergraduate physics majors, to help women continue in physics by providing them with information about graduate school, professional career advice, and networking opportunities with other women in physics (Next events: 17-19 Jan 2020)

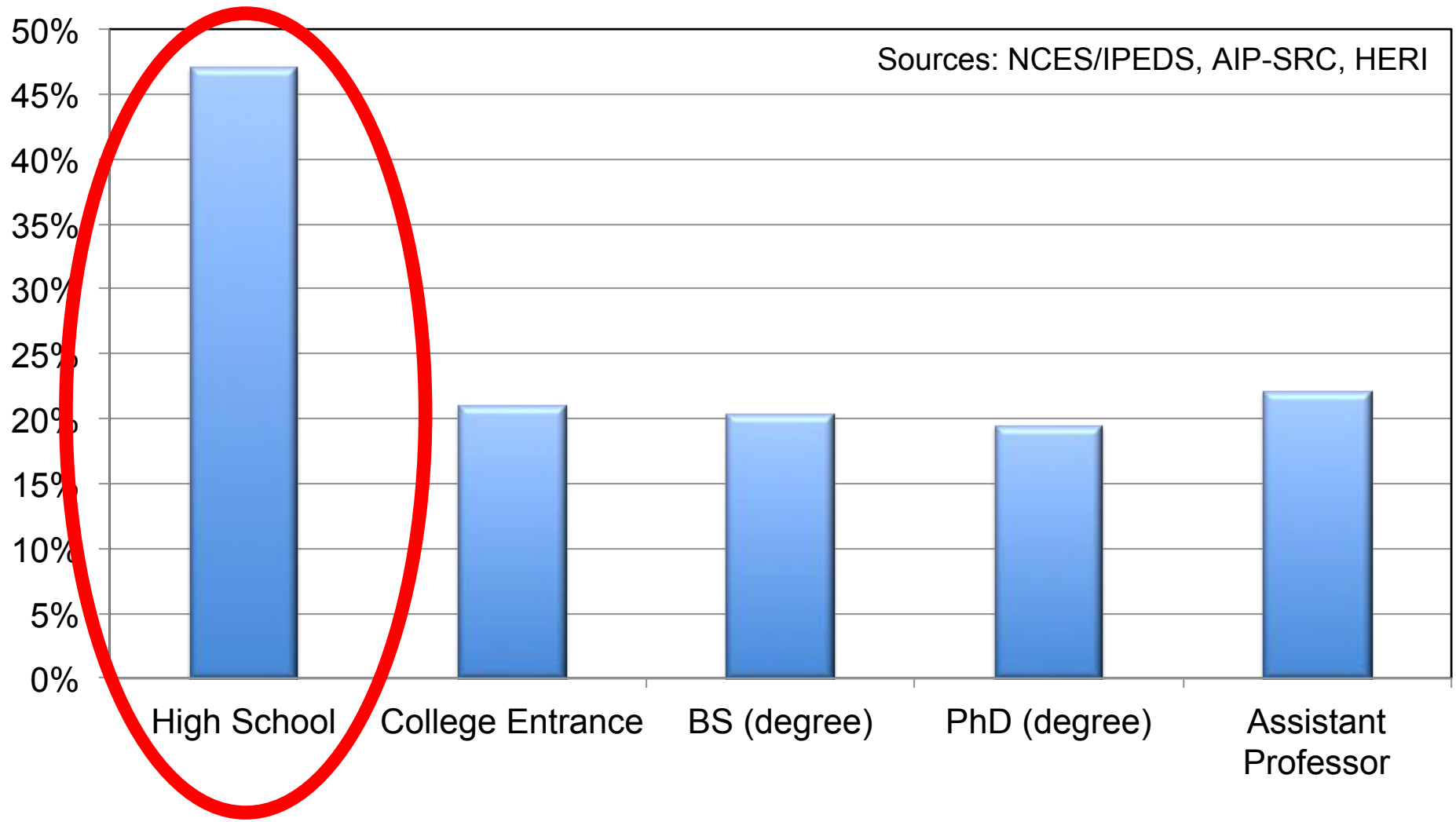
Contact: Kai Wright, women@aps.org

Support: NSF: 1346627, 1622510; DOE: DE-SC0011076

URL: aps.org/cuwip







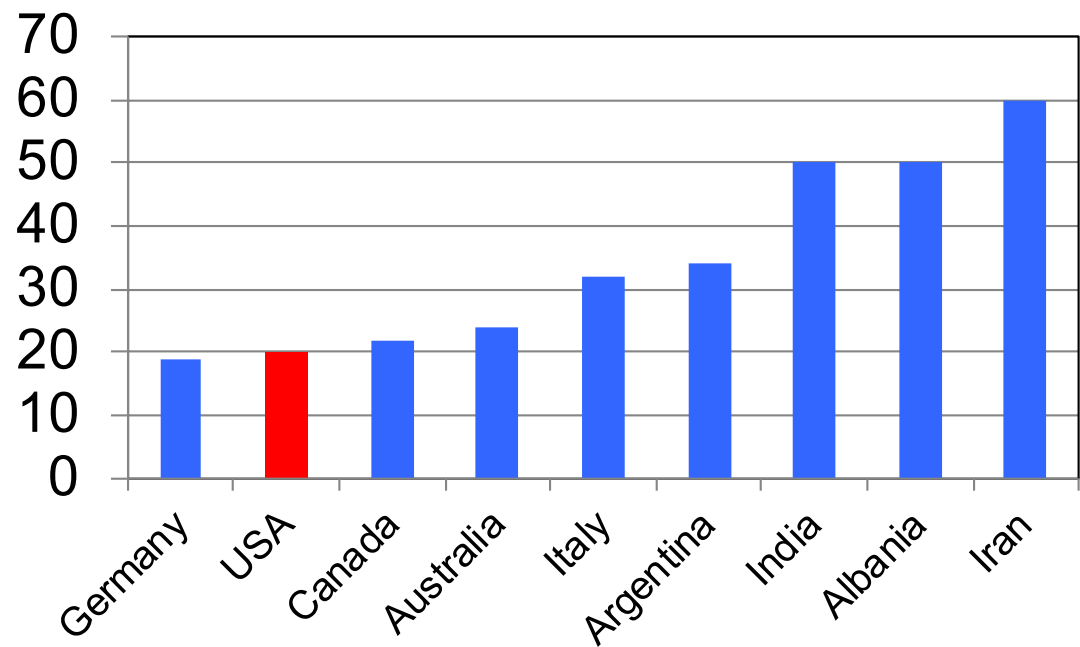
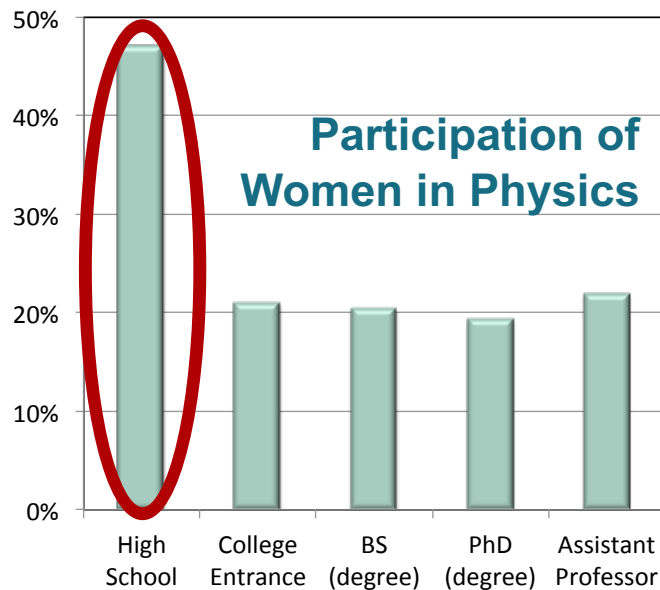
Goal: Close the gender gap in undergraduate physics degrees

Strategy: Enlist large numbers of high school physics teachers to directly recruit women to pursue a physics degree

Contact: Anne Kornahrens, kornahrens@aps.org

Support: NSF: 1720810, 1720869, 1720917, 1721021

URL: stepup4women.org



Society of Physics Students

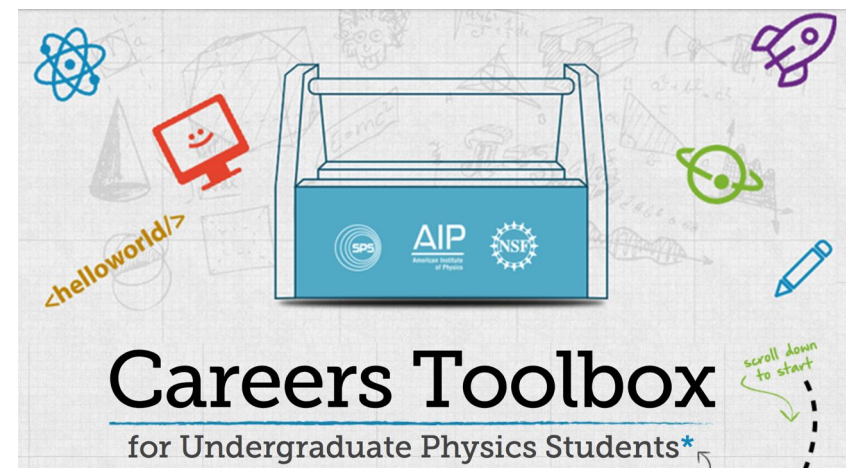
Goal: Support the professional development of undergraduate physics majors

Strategy: Sigma Pi Sigma – the physics honor society; leadership opportunities; department cohesion; scholarships; internships; outreach awards; undergrad research; conferences

Strategy: Careers Toolbox

Contact: Brad Conrad, bconrad@aip.org

URL: spsnational.org



SOCIETY OF PHYSICS STUDENTS



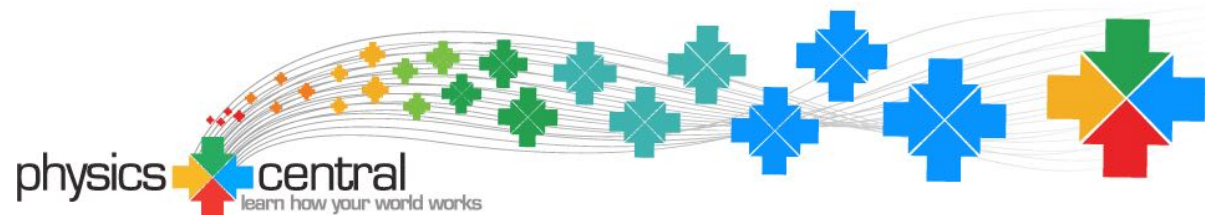
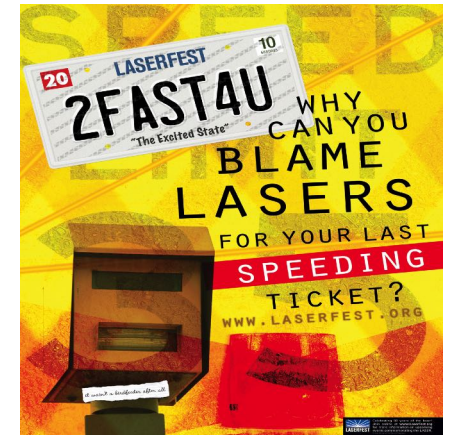
Goal: Build excitement in populations beyond the physics/astronomy community for physics and science

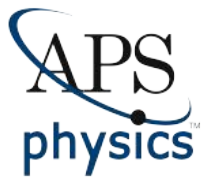
Strategy: Mini-grants for outreach (\$10,000); comic books, posters, and science kits for middle school classrooms (PhysicsQuest); blogs and social media posts on “cool” science

URL: physicscentral.org



www.aps.org





APS National Mentoring Community

Goal: Increase the number of African American, Hispanic American, and Native American undergraduates obtaining physics bachelor's degrees

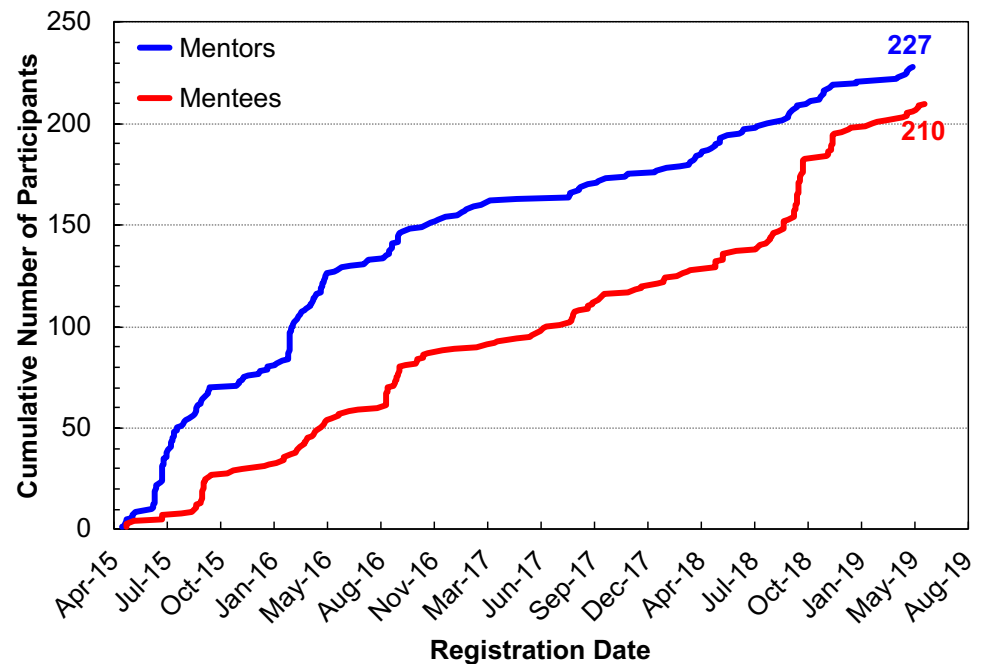
Strategy: Connect students with local faculty mentors and provide support and resources. Emergency financial aid fund to mentees (BEAM Fund). National recognition of mentoring service (coming).

Contact: Kathryne Woodle nmc@aps.org

URL: aps.org/nmc



NMC Mentor and Mentee Registration



Goal: Provide information on physics / astronomy graduate programs

Strategy: Online resource with data, and comparisons

Contact: Yolanda Matthews, y Matthews@aip.org

URL: gradschoolshopper.com



Find your
graduate
program in
the physical
sciences.

Search by school name, location, or specialty.

Find your school

Search

[Advanced search](#)

Goal: Provide a careers-oriented hallway slideshow for recruitment


Strategy: Slideshow comes out ~2x/semester and features profiles of physicists in industry, national labs, and other non-academic (mostly) careers; focus on individuals without PhDs (students already get information on academic careers); editable to include local information; hundreds of slides available

Contact: Crystal Bailey, bailey@aps.org

URL: aps.org/careers/insight

PHYSICIST PROFILE

Kate McAlpine (Physics BS)
 Science Writer and Physics Rapper
 CERN—Geneva, Switzerland




Why Physics?

Kate began her adventure with Physics at Michigan State, where she studied to be a science writer.

Since then, Kate has been at the Large Hadron Collider (LHC) doing outreach writing, and managing the news website for ATLAS (one of the experiments running on the LHC).

Kate is also responsible for the infamous "LHC Rap", which has gained worldwide notoriety through the internet!

"My goal is to explain scientific topics in a way that is relevant, interesting, and understandable," she says. "While accuracy is serious business, the science should still be fun."

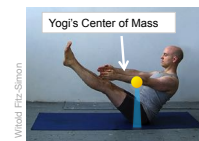


25 SECONDS OF PHYSICS

The Physics of Yoga

Many people associate physics with complex technologies and far-out discoveries—but did you know physics is also an essential principle in yoga?

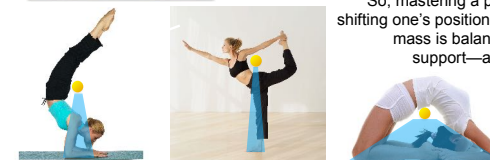
For every object, there is a point in space where you can imagine all of its mass is concentrated. This point is called the "center of mass" of the object.



In order for a yoga pose to be stable, the yogi's center of mass must sit directly above the yogi's point of contact with the ground—as though it was a heavy ball sitting on a support.

As a person moves, their center of mass shifts around in space.

So, mastering a pose involves carefully shifting one's position so that their center of mass is balanced over their point of support—and that takes physics!



Goal: Provide best-practice advice on topics relevant to improving and supporting physics departments

SPIN-UP: Increase number of majors – aps.org/programs/education/undergrad/faculty/spinup/spinup-report.cfm

T-TEP: Improve teacher education – phystec.org/webdocs/TaskForce.cfm

Phys21: Enhance career readiness of majors – compadre.org/Phys21

LGBT+: Improve climate for LGBT physicists – aps.org/programs/lgbt/

GradEd: Improve graduate education – aps.org/programs/education/graduate/conf2013/report.cfm

Goal: Advocate for physicists, and the broader community

Topics: Education

Ethics and Values

Human Rights

Internal Policy

National Policy

Statements being considered:

Physics GRE

Ethics

Sexual Harassment

Education Topics:

Undergraduate Research Statement

Ethics

K-12 Education Statement

Career Options for Physicists

Advocacy for Science Education

Improving Education for Professional Ethics, Standards and Practices

Assessment and Science

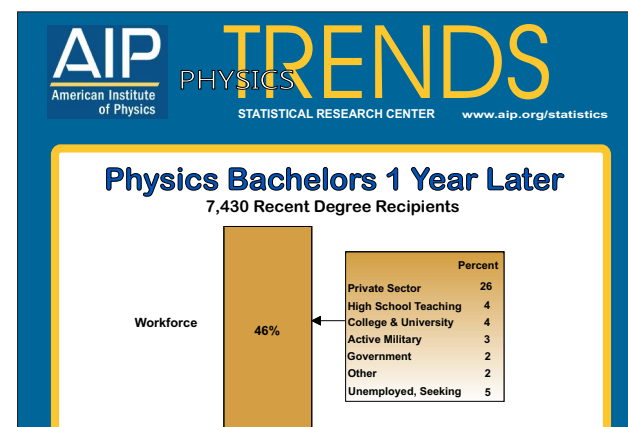
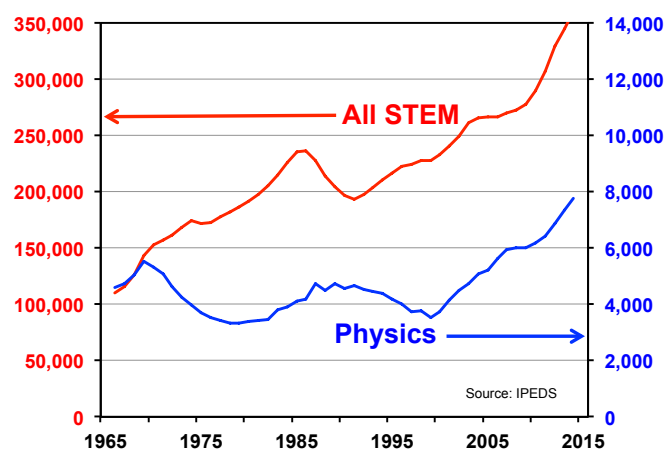
Research in Physics Education

URL: [aps.org/policy/statements](https://www.aps.org/policy/statements)

Goal: Provide data to help faculty and departments understand the national picture and make comparisons

AIP SRC: Comprehensive data on faculty, students, careers, and diversity – aip.org/statistics

APS: Graphics, data, and presentation-ready slides using national sources to inform departments on students, women, minorities, and trends; comparison tool to rank your department – aps.org/programs/education/statistics



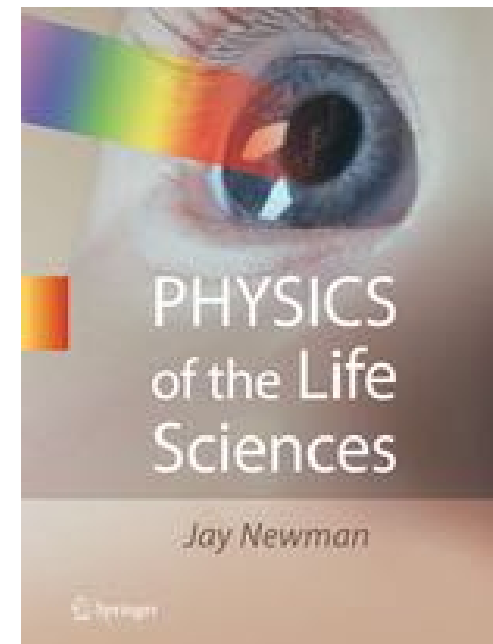
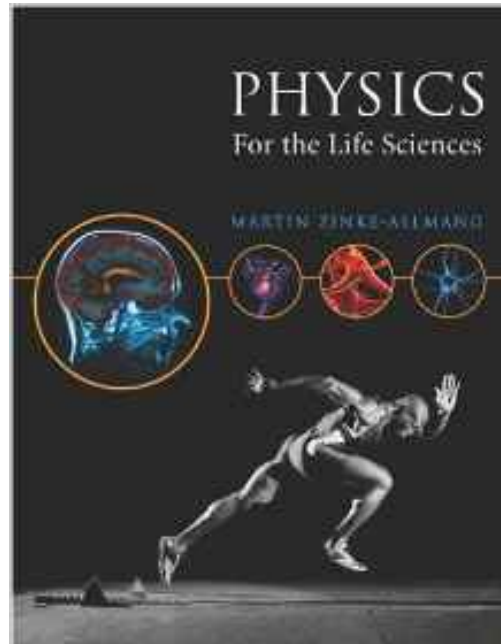
Portal: Introductory Physics for the Life Sciences

Goal: Transformative web site for sharing, testing, and disseminating materials for IPLS and related courses. Being developed by AAPT and eight colleges and universities. Up and running by mid-2019

Contact: Bob Hilborn, rhilborn@aapt.org

URL: compadre.org/ipls/

Support: NSF: 1624185



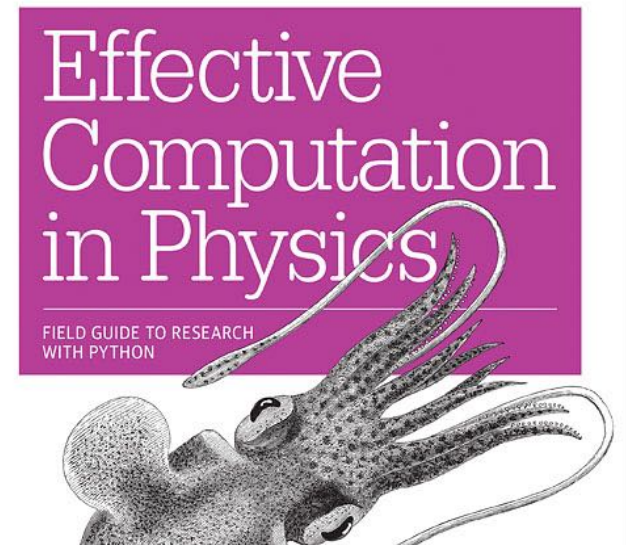
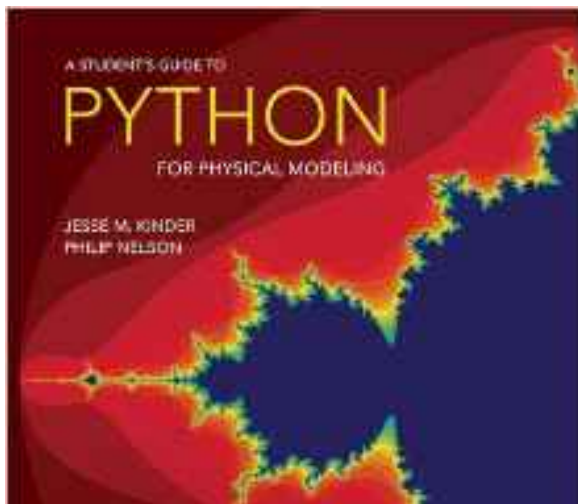
Partnership for Integrating Computation into UG Physics

Goal: Survey of the current usage of computational work in undergraduate physics programs. Annual Computational Physics Faculty Development Workshop. Computational Physics workshops at AAPT section meetings, and APS and AAPT national meetings

Contact: Bob Hilborn, rhilborn@aapt.org

URL: compadre.org/picup

Support: NSF: 1432363, 1524963, 1505278



Physics Research Mentor Training Seminar

Goal: Help research mentors improve their mentoring skills

Strategy: Provide a guidebook and materials to facilitate a 10-week seminar for physics researchers. Includes guidance on how to run workshops, directed readings, and strategy tips

Contact: Monica Plisch, plisch@aps.org

URL: aps.org/link/mentor-training



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Professional Skills Development Workshops

Goal: Improve the negotiation and communication skills for women

Strategy: 1-day workshop at national APS meetings; facilitation by nationally recognized leaders in negotiation and communication strategies

Contact: Kai Wright, women@aps.org

Support: NSF-0347210, 0752540, 1012585, 1419913

URL: womeninphysics.org



CSWP Site Visits to Improve the Climate for Women and Minorities

Goal: Improve the climate for underrepresented individuals in physics departments

Strategy: 1-2 day site visits resulting in a formal report to the chair; 1-year follow up; focus on Research Universities, National Laboratories, Scientific Collaborations; 79 visits over last 25 years; best-practices in hiring, retention, climate, etc. available on the website; led by the APS Committee on the Status of Women in Physics (CSWP) and APS Committee on Minorities (COM)

Contact: Kai Wright, women@aps.org

URL: womeninphysics.org



Women in Physics Groups

Goal: Improve recruitment and/or retention of women in physics (WiP)

Strategy: Provide mini-grants (up to \$1,000) to build, improve, or sustain WiP groups; collect and share ideas on activities

Examples: Workshops on careers, communication, negotiation, leadership, dealing with bias, other skills; high school or middle school classroom visits; lab tours or field trips; research expos; book club or journal club; group lunches, dinners, or social events

Contact: Kai Wright, women@aps.org

URL: womeninphysics.org



EP3: Effective Practices for Physics Programs

Goal: Develop a working document to guide departmental review, assessment, and improvement

Strategy: National task force to design, write, vet, and disseminate a collection of **effective practices** and guide for **self-assessment**, along with its inherent review structure to improve undergraduate physics. Although not accreditation at this time, it will form the basis of a document that could be used in this fashion; first sections likely to come out this fall with the full guide released in 2020.

Contact: Theodore Hodapp, hodapp@aps.org

Support: American Physical Society, NSF: 1738311, 1747563



Tentative Section List: 25 “Executive Summaries”

Students

- Recruiting
- Retention
- Mentoring / advising
- Internships
- Undergraduate research
- Career preparation

Curriculum

- Implementing research-based instructional practices in your program (overarching)
- Introductory courses for physical science and engineering majors
- Introductory courses for life sciences majors
- Upper-level physics courses
- Non-STEM major courses
- Communications skills
- Laboratory / experimental skills

- Computational skills
- Culminating integrative experiences (Capstone experiences)
- Online education

Programs

- Individuated degree tracks: engineering / applied physics
- Institutional partnerships: dual-degree physics / engineering programs
- High school physics teacher preparation
- Learning Assistant preparation
- Community engagement / outreach

Departmental

- Physical environment: encouraging collaboration and learning
- Departmental climate
- Equity, diversity, and inclusion
- Ethics

Hints for the Future

- Understand the problems of the people “up the chain” (chair, dean, provost, etc.), and solve their problems – this will allow you to gain resources to solve your problems
- Keep leadership informed about your progress relatively often – do not ask for resources when you do this; this develops a relationship and your credibility for the time when you do need resources.
- Don’t go “around” your leaders (chair, dean, etc.), but don’t let a negative response stop you – regroup, or be patient
- Involve your students – they have intrinsic knowledge of context
- Ask for help: mentors, chair, other faculty in or out of department