

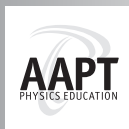


workshop for
**new physics and
astronomy faculty**

NOVEMBER 19-22, 2015

AMERICAN CENTER FOR PHYSICS
COLLEGE PARK, MD

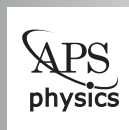
THE WORKSHOP FOR
NEW PHYSICS AND
ASTRONOMY FACULTY
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AMERICAN ASTRONOMICAL SOCIETY



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AMERICAN INSTITUTE OF PHYSICS



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BREAKOUT I

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BREAKOUT II

Lawrence Armendarez
Kentucky Wesleyan College

BREAKOUT III

Swagato Banerjee
University of Louisville

BREAKOUT I

Brian Batell
University of Pittsburgh

BREAKOUT II

Jessica Bickel
Cleveland St. University

BREAKOUT III

Erin Bonning
Emory University

BREAKOUT I

Katherine Brown
Hamilton College

BREAKOUT II

Eric Bumbalough
Kettering University

BREAKOUT III

Enson Chang
Azusa Pacific University

BREAKOUT I

Ashwith Chilvery
Xavier University of Louisiana

BREAKOUT II

Jacquelyn Chini
University of Central Florida

BREAKOUT III

Jongmin Cho
Oklahoma State University

BREAKOUT I

Charlotte Christensen
Grinnell College

BREAKOUT II

Kendal Clark
Central Methodist University

BREAKOUT III

Theodore Corcovilos
Duquesne University

BREAKOUT I

Luke Corwin
South Dakota School of Mines
and Technology

BREAKOUT II

Carl Dahl
Northwestern University

BREAKOUT III

Chamaree De Silva
Mercer University

BREAKOUT I

Adolfo Del Campo
University of Massachusetts -
Boston

BREAKOUT II

Pratibha Dev
Howard University

BREAKOUT III

Timothy Dolch
Hillsdale College

BREAKOUT I

Maxim Durach
Georgia Southern University

BREAKOUT II

Alfredo Estrade
Central Michigan University

BREAKOUT III

Cassandra Fallscheer
Central Washington University

BREAKOUT I

William Graves
Arizona State University

BREAKOUT II

Josefa Guerrero Millan
Augusta State University

BREAKOUT III

Hayk Harutyunyan
Emory University

BREAKOUT I

Michael Hatridge
University of Pittsburgh

BREAKOUT II

Chen-Lung Hung
Purdue University -
West Lafayette

BREAKOUT III

Savan Kharel
Davidson College

BREAKOUT I

Praveena Kommidi
Miles College

BREAKOUT II

Chryssa Kouveliotou
The George Washington
University

BREAKOUT III

Andrei Kryjevski
North Dakota State University

BREAKOUT I

Nathan Kuwada
Central Washington University

BREAKOUT II

John Laiho
Syracuse University

BREAKOUT III

Mary Lanzerotti
Augsburg College

BREAKOUT I

Michael Lerner
Earlham College

BREAKOUT II

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San Marcos

BREAKOUT III

Yize Li
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Bakersfield

BREAKOUT I

Bjorn Lussem
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BREAKOUT II

Bing Lv
University of Texas at Dallas

BREAKOUT III

Matt Lykins
Coastal Carolina University

BREAKOUT I

Alexander McCormick
University of South Florida

BREAKOUT II

Sean McWilliams
West Virginia University

BREAKOUT III

Deepika Menon
Towson University

BREAKOUT I

WORKSHOP PARTICIPANTS

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Lynchburg College

BREAKOUT II

Anton Naumov
Texas Christian University

BREAKOUT III

Suman Neupane
Middle Tennessee State
University

BREAKOUT I

Akm Newaz
The College of New Jersey

BREAKOUT II

Tuan Nguyen
San Francisco State University

BREAKOUT III

Christopher Oakley
Spelman College

BREAKOUT I

Eli Owens
Presbyterian College

BREAKOUT II

Dirk Pandel
Grand Valley State University

BREAKOUT III

Vlad Pribiag
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Cities

BREAKOUT I

Elias Puchner
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Cities

BREAKOUT II

Weihong Qiu
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BREAKOUT III

Thomas Searles
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BREAKOUT I

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BREAKOUT I

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BREAKOUT II

Dmitry Solenov
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BREAKOUT III

Bo Sun
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BREAKOUT I

Jency Sundararajan
Missouri Southern State
University

BREAKOUT II

Ali Tabei
University of Northern Iowa

BREAKOUT III

Laurene Tetard
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BREAKOUT I

Grant Thompson
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BREAKOUT II

Kristen Thompson
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BREAKOUT III

Ghanim Ullah
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BREAKOUT I

Krithika Venkataramani
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BREAKOUT II

Jianwei Wang
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BREAKOUT III

Kebra Ward
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Arts

BREAKOUT I

Andre Wehner
Coastal Carolina University

BREAKOUT II

Benjamin White
Central Washington University

BREAKOUT III

Jessica Young
Arkansas Tech University

BREAKOUT I

Dongxue Zhao
Greenville College

BREAKOUT II

Kyle Zilic
Earlham College

BREAKOUT III

THURSDAY, NOVEMBER 19

11:00 A.M.–5:00 P.M.	WORKSHOP REGISTRATION Holiday Inn – College Park, MD	GRAND BALLROOM FOYER
1:30–3:00 P.M.	WORKSHOP Effective Grant Proposal Writing and Grant Opportunities with Research Corporation Richard Wiener, Program Officer, Research Corporation for Science Advancement, rwiener@rescorp.org	GRAND BALLROOM AB
3:00–4:30 P.M.	WORKSHOP Grant Opportunities at the National Science Foundation Corby Hovis, Division of Undergraduate Education, chovis@nsf.gov Kevin Lee, Division of Undergraduate Education, klee@nsf.gov Kathleen McCloud, Division of Physics, kmcloud@nsf.gov James Neff, Division of Astronomical Sciences, jneff@nsf.gov Leonard Spinu, Division of Materials Research, lspinu@nsf.gov	GRAND BALLROOM AB
4:30–5:00 P.M.	BREAK	GRAND BALLROOM FOYER
5:00–5:15 P.M.	OPENING REMARKS Welcome and Introductions Robert Hilborn, Associate Executive Officer, AAPT, Chair, Physics and Astronomy New Faculty Workshop Beth Cunningham, Executive Officer, AAPT Kate Kirby, Executive Officer, APS Kevin Marvel, Executive Officer, AAS Cathy O’Riordan, Chief Operating Officer, AIP	GRAND BALLROOM AB
5:15–6:15 P.M.	LARGE GROUP SESSION Peer Instruction Eric Mazur, Harvard University	GRAND BALLROOM AB
6:15–7:15 P.M.	DINNER	GRAND BALLROOM AB
7:15–8:15 P.M.	LARGE GROUP SESSION Teaching Physics: Conservation Laws First Eric Mazur, Harvard University	GRAND BALLROOM AB

FRIDAY, NOVEMBER 20

6:30–7:45 A.M.	BREAKFAST – Holiday Inn – College Park	MOOSE CREEK STEAK HOUSE
8:00 A.M.	SHUTTLE BUS LEAVES (ON TIME) FOR AMERICAN CENTER FOR PHYSICS	
8:20 A.M.	INTRODUCTIONS AND MARCHING ORDERS Robert Hilborn, AAPT	
8:30–9:30 A.M.	LARGE GROUP SESSION Learner-Centered Teaching in Physics and Astronomy Ed Prather, University of Arizona	CONFERENCE ROOM A

FRIDAY, NOVEMBER 20 (CONT.)

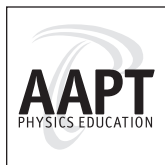
9:30–10:15 A.M.	SMALL GROUP SESSIONS	
	Peer Instruction/Think-Pair-Share (I) Ed Prather, University of Arizona	CONFERENCE ROOM A
	Mentoring (II) Arlene Modeste Knowles and Kathryne Woodle, APS	CONFERENCE ROOM B
	Lecture Tutorials (III) Gina Brissenden, University of Arizona	CONFERENCE ROOM C
10:15–10:45 A.M.	BREAK	ACP ROTUNDA
10:45 A.M.–12:00 P.M.	LARGE GROUP SESSION	
	Teaching for Retention and Diversity James Stith, American Institute of Physics (retired)	CONFERENCE ROOM A
12:00–1:00 P.M.	GROUP PHOTO AND LUNCH	ACP CAFETERIA
1:00–1:45 P.M.	SMALL GROUP SESSIONS	CONFERENCE ROOM A
	Peer Instruction/Think Pair Share (II)	CONFERENCE ROOM A
	Mentoring (III)	CONFERENCE ROOM B
	Lecture Tutorials (I)	CONFERENCE ROOM C
1:45–2:30 P.M.	SMALL GROUP SESSIONS	CONFERENCE ROOM A
	Peer Instruction/Think Pair Share (III)	CONFERENCE ROOM A
	Mentoring (I)	CONFERENCE ROOM B
	Lecture Tutorials (II)	CONFERENCE ROOM C
2:30–3:00 P.M.	BREAK	ACP ROTUNDA
3:00–4:00 P.M.	LARGE GROUP SESSION	CONFERENCE ROOM A
	Just-in-Time Teaching: How to Get Your Students to Prepare for Every Class Andy Gavrin, Indiana University-Purdue University-Indianapolis	
4:00–5:00 P.M.	LARGE GROUP SESSION	CONFERENCE ROOM A
	Tutorials in Introductory Physics Lillian C. McDermott and Peter Shaffer, University of Washington	
5:00–6:00 P.M.	SMALL GROUP SESSIONS	CONFERENCE ROOM A, B, AND C
	Designing Your Teaching Tidbit	
6:00 P.M.	SHUTTLE BUS LEAVES FOR HOLIDAY INN – COLLEGE PARK	
6:30–7:30 P.M.	DINNER – HOLIDAY INN – COLLEGE PARK	GRAND BALLROOM AB
7:30–8:30 P.M.		GRAND BALLROOM AB
	Faculty Online Learning Community Group meeting Andy Rundquist, Hamline University Gillian Ryan, Kettering University Adrienne Traxler, Wright State University	

SATURDAY, NOVEMBER 21

6:30–8:15 A.M.	BREAKFAST – Holiday Inn – College Park	MOOSE CREEK STEAK HOUSE
8:30 A.M.	SHUTTLE BUS LEAVES (ON TIME) FOR AMERICAN CENTER FOR PHYSICS	
9:00–10:00 A.M.	LARGE GROUP SESSION Collaborative Problem Solving Ken Heller, University of Minnesota	CONFERENCE ROOM A
10:00–10:30 A.M.	BREAK	ACP ROTUNDA
10:30–11:15 A.M.	SMALL GROUP SESSIONS (SIGN UP IN ADVANCE)	
	Digital Libraries Bruce Mason, University of Oklahoma	CONFERENCE ROOM A
	Physlets Mario Belloni, Davidson College	CONFERENCE ROOM B
	Tenure Matters Steve Turley, Brigham Young University	CONFERENCE ROOM C
	Introductory and Advanced Labs Bob Hilborn, AAPT	AAPT CONF. ROOM, 5TH FLOOR
11:15 A.M. – 12:00 P.M.	SMALL GROUP DISCUSSIONS (SIGN UP IN ADVANCE)	
	Digital Libraries	CONFERENCE ROOM A
	Physlets	CONFERENCE ROOM B
	Tenure Matters	CONFERENCE ROOM C
	Introductory and Advanced Labs	AAPT CONF. ROOM, 5TH FLOOR
12:00–1:00 P.M.	LUNCH	ACP CAFETERIA
1:00–2:00 P.M.	SMALL GROUP SESSIONS	
	Interactive Engagement in Upper-Level Courses (I) Corinne Manogue, Oregon State University	CONFERENCE ROOM A
	PhET Simulations (II) Mike Dubson, University of Colorado-Boulder	CONFERENCE ROOM B
	Problem Solving (III) Ken Heller, University of Minnesota	CONFERENCE ROOM C
2:00–3:00 P.M.	SMALL GROUP SESSIONS	
	Interactive Engagement in Upper-Level Courses (II)	CONFERENCE ROOM A
	PhET Simulations (III)	CONFERENCE ROOM B
	Problem Solving (I)	CONFERENCE ROOM C
3:00–3:30 P.M.	BREAK	ACP ROTUNDA
3:30–4:30 P.M.	SMALL GROUP SESSIONS	
	Interactive Engagement in Upper-Level Courses (III)	CONFERENCE ROOM A
	PhET Simulations (I)	CONFERENCE ROOM B
	Problem Solving (II)	CONFERENCE ROOM C
4:30–5:45 P.M.	SMALL GROUP SESSIONS Group Implementation of Teaching Tidbits	CONFERENCE ROOMS A, B, C, 5TH FLOOR CONFERENCE ROOM
5:45 P.M.	SHUTTLE BUS LEAVES FOR HOLIDAY INN – COLLEGE PARK	
6:15–7:15 P.M.	DINNER – Holiday Inn – College Park	GRAND BALLROOM AB

SUNDAY, NOVEMBER 22

6:30–8:15 A.M.	BREAKFAST – Holiday Inn – College Park Hotel Check-Out – before 12:00 noon	MOOSE CREEK STEAK HOUSE
8:30–9:15 A.M.	LARGE GROUP SESSION Infomercials – Resources for Effective Teaching	GRAND BALLROOM AB
9:15–10:00 A.M.	LARGE GROUP SESSION Overall Questions and Thinking About What You Will Do to Improve Your Teaching Corinne Manogue, Oregon State University	GRAND BALLROOM AB
10:00–10:15 A.M.	BREAK	GRAND BALLROOM FOYER
10:15–11:15 A.M.	LARGE GROUP SESSION What I Will Do When I Get Home – Developing Goals and Plans	GRAND BALLROOM AB
11:15–11:30 A.M.	LARGE GROUP SESSION Final Words, Evaluation Procedures, and Adjourn Bob Hilborn, AAPT	GRAND BALLROOM AB



BETH CUNNINGHAM
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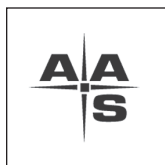
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AMERICAN ASSOCIATION OF PHYSICS TEACHERS

Founded in 1930, AAPT is the premier professional society established to advance the greater good through physics education. With the support of our members worldwide, AAPT is an action oriented organization designed to develop, improve, and promote best practices for physics education as part of the global need for qualified Science, Technology, Engineering, and Mathematics teachers who will inspire tomorrow's leaders and decision makers.

We serve our members through networking, publications, and programs, but also reach out to the larger community of physics and science teachers—current and future—and we look after issues of significance in science education. Our national office works closely with our dedicated volunteers around the world to promote a better understanding of physics at all levels.

AAPT provides networking opportunities through online discussion lists, social media, the Workshops for New Physics and Astronomy Faculty (with APS and AAS); Physics Department Chairs Conference (with APS), and our two national annual meetings. The association supports physics educators through our publications, the *American Journal of Physics* and *The Physics Teacher*; *Physical Review Special topics – Physics Education Research* (with APS and the APS Forum on Education) and the *eNNOUNCER*; NSF-funded programs including the PER User's Guide, the Physics Teacher Education Coalition, PhysTEC (with APS); Physics Teaching Resource Agents institutes; the digital physics library, ComPADRE (with APS and AIP); Physics Program Reviews, and the student programs and scholarships that we administer, including the Lotze Scholarship for Future Teachers.



KEVIN MARVEL
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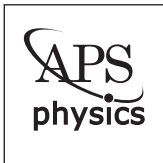
2000 FLORIDA AVE. NW,
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WWW.AAS.ORG

AMERICAN ASTRONOMICAL SOCIETY

The American Astronomical Society promotes the advancement of astronomy and closely related branches of science. It was founded in 1899. AAS members include professional researchers in the astronomical sciences, and also educators, students, and others interested in the advancement of astronomical research. The Society operates in five major areas: Publications, Meetings, Education, Public Policy and Employment in order to ensure that astronomy remains healthy and vital for the benefit of our profession and society at large. AAS publishes *The Astrophysical Journal* and *The Astronomical Journal*, which are among the most important scholarly journals in the field. The *Bulletin of the American Astronomical Society* reports the latest institutional developments and documents the content of AAS and its divisions' annual meetings. More information about the Society's activities and membership are available on the AAS website, www.aas.org.



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AMERICAN PHYSICAL SOCIETY

With 50,000 members worldwide, the American Physical Society works to advance and disseminate the knowledge of physics. Since its formation in 1899, it has been dedicated to providing its members and the international physics community with the latest research results through meetings and the most highly respected international journals in physics. These journals include *Physical Review Letters*, the *Physical Review* (with a Special Topics series including a journal on Physics Education Research), *Reviews of Modern Physics*, and its two newest journals, *Physical Review Applied* and *PRX*. The APS conducts more than 20 meetings per year, to connect physicists and disseminate physics knowledge and information relevant to the community. In addition, APS vigorously lobbies for funding for physics research and education, provides the physics community with timely information about government affairs, carries out studies of physics-based topics of importance to the country, and promotes the interests of the physics community through extensive public information efforts such as www.PhysicsCentral.com, a website for the public.

APS is actively involved in programs to improve undergraduate and graduate education and to improve the preparation of future physics and physical science teachers through its leadership in the Physics Teacher Education Coalition (www.PhysTEC.org). APS partners with AAPT in PhysTEC and on numerous other education programs, including the New Faculty Workshop, and conferences and workshops on education at various levels. For many years APS has worked to increase diversity in the physics community, and in 2012 launched the APS Bridge Program (www.apsbridgeprogram.org), a national effort to increase the number of underrepresented minorities that receive a PhD in Physics. In addition, APS recently began sponsorship of the Conferences for Undergraduate Women in Physics – regional conferences to encourage participation of women in the discipline.



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WWW.AIP.ORG

AMERICAN INSTITUTE OF PHYSICS

AIP's mission is to advance, promote and serve the physical sciences for the benefit of humanity.

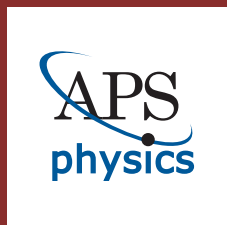
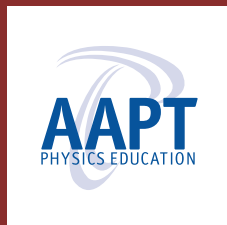
AIP offers authoritative information, services, and expertise in physics education and student programs, science communication, government relations, career services for science and engineering professionals, statistical research in physics employment and education, industrial outreach, and the history of physics and allied fields.

AIP Member Societies cover a broad range of fields in the physical sciences and collectively represent more than 120,000 scientists, engineers, educators and students in the global physical sciences community.



THIS PROJECT IS SUPPORTED IN PART BY THE NATIONAL SCIENCE FOUNDATION.

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