

workshop for
**new physics and
astronomy faculty**



November 17-20, 2011
American Center for Physics
College Park, MD

New Faculty Advisory Committee

Beth Cunningham, American Association of Physics Teachers

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Jack Hehn, American Institute of Physics

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of Physics Teachers**



American Astronomical Society



American Physical Society



National Science Foundation

Duncan McBride, Division of Undergraduate Education, dmcbride@nsf.gov

Kathleen McCloud, Division of Physics, kmcloud@nsf.gov

Scott Fisher, Division of Astronomical Sciences, sfisher@nsf.gov

Dick Peterson, Division of Undergraduate Education, rpeterso@nsf.gov

Research Corporation

Richard Wiener, Program Officer, rwiener@rescorp.org

Workshop Leaders

Robert Hilborn

Workshop Chair

American Association of Physics Teachers

College Park, MD 20740

rhilborn@aapt.org

Richard Berg

University of Maryland

College Park, MD

reberg@physics.umd.edu

Gina Brissenden

University of Arizona

Tucson, AZ

gbrissenden@as.arizona.edu

Wolfgang Christian

Davidson College

Davidson, NC

wochristian@davidson.edu

Noah Finkelstein

University of Colorado

Boulder, CO

noah.finkelstein@colorado.edu

Andrew Gavrin

IUPUI: Indiana University-Purdue

University-Indianapolis

Indianapolis, IN

agavrin@iupui.edu

Kenneth Heller

University of Minnesota

Minneapolis, MN

heller@physics.umn.edu

Eric Hooper

University of Wisconsin-Madison

Madison, WI

chooper@astro.wisc.edu

Ken Krane

Oregon State University

Corvallis, OR

kranek@science.oregonstate.edu

Nathaniel Lasry

John Abbott College

Hampstead, Quebec, Canada

nlasry@me.com

Corinne Manogue

Oregon State University

Corvallis, OR

corinne@physics.oregonstate.edu

Bruce Mason

University of Oklahoma

Norman, OK

bmason@ou.edu

Eric Mazur

Harvard University

Cambridge, MA

mazur@physics.harvard.edu

Lillian McDermott

University of Washington

Seattle, WA

lcmcd@phys.washington.edu

Katherine Perkins

University of Colorado-Boulder

Boulder, CO

katherine.perkins@colorado.edu

Ed Prather

University of Arizona

Tucson, AZ

eprather@as.arizona.edu

Peter Shaffer

University of Washington

Seattle, WA

shaffer@phys.washington.edu

Tim Slater

University of Wyoming

Laramie, WY

timslateryo@gmail.com

David Sokoloff

University of Oregon

Eugene, OR

sokoloff@uoregon.edu

Ronald Thornton

Tufts University-CSMT

Medford, MA

csmt@tufts.edu

Steve Turley

Brigham Young University

Provo, UT

turley@byu.edu

Workshop Participants

Daniel Arenas

University of North Florida
Breakout Session II

Hamza Balci

Kent State University
Breakout Session III

James Battat

Bryn Mawr College
Breakout Session I

Misty Bentz

Georgia State University
Breakout Session II

David Bernat

Manhattan College
Breakout Session III

Mishkatul Bhattacharya

Rochester Institute of Technology
Breakout Session I

Grace Brannigan

Rutgers University-Camden
Breakout Session II

Jeremy Carlo

Villanova University
Breakout Session III

Ke Chen

Temple University
Breakout Session I

Hunter Close

Texas State University-San Marcos
Breakout Session III

Jodi Cooley

Southern Methodist University
Breakout Session I

Nathaniel Cunningham

Nebraska Wesleyan University
Breakout Session II

Tabbatha Dobbins

Rowan University
Breakout Session III

Jennifer Docktor

University of Wisconsin-La Crosse
Breakout Session I

Gerardo Dominguez

California State University-San Marcos
Breakout Session II

Jack Dostal

Wake Forest University
Breakout Session III

Hardin Dunham

Angelo State University
Breakout Session I

Wade Fisher

Michigan State University
Breakout Session II

Daniel Fologea

Boise State University
Breakout Session III

Elizabeth Freeland

Benedictine University
Breakout Session I

Silvina Gatica

Howard University
Breakout Session II

Elvis Geneston

La Sierra University
Breakout Session III

Parviz Ghavamian

Towson University
Breakout Session I

Vayujeet Gokhale

Truman State University
Breakout Session II

Dragoslav Grbovic

Naval Postgraduate School
Breakout Session III

Sheikh Haque

Colorado State University-Pueblo
Breakout Session I

Eyo Ita

U.S. Naval Academy
Breakout Session III

Maxim Khodas

University of Iowa
Breakout Session I

Workshop Participants

Joanna Kiryluk

Stony Brook University
Breakout Session II

Andriy Kovalsky

Austin Peay State University
Breakout Session III

Jakobus Le Roux

University of Alabama in Huntsville
Breakout Session I

Roman Makarevich

University of Alaska-Fairbanks
Breakout Session II

Carrie Menke

University of California, Merced
Breakout Session III

Rebecca Metzler

Colgate University
Breakout Session I

Kendrah Murphy

Skidmore College
Breakout Session II

Nikolas Podraza

University of Toledo
Breakout Session III

Chandrasekar Ramanathan

Dartmouth College
Breakout Session I

Luis Reyes

California Polytechnic State University
Breakout Session II

Aaron Santos

Oberlin College
Breakout Session III

Eleanor Sayre

Kansas State University
Breakout Session I

Asli Sezen

Towson University
Breakout Session II

Mitchell Soderberg

Syracuse University
Breakout Session III

Patricia Soto

Creighton University
Breakout Session I

Tudor Stanescu

West Virginia University
Breakout Session II

Diyar Talbayev

Tulane University
Breakout Session III

Chenggang Tao

Virginia Polytechnic Institute
Breakout Session I

Dmitri Tsybychev

Stony Brook University
Breakout Session II

Matthew Vannette

Saginaw Valley State University
Breakout Session III

Aaron Wade

University of West Florida
Breakout Session I

Qi Wen

Worcester Polytechnic Institute
Breakout Session II

Jia-An Yan

Towson University
Breakout Session III

Hui Zhang

University of Alaska-Fairbanks
Breakout Session I

Erhai Zhao

George Mason University
Breakout Session II

Workshop Schedule

Thursday, November 17

- 10:00 a.m.–4:00 p.m. **Workshop Registration – Hilton Garden Inn, Greenbelt**
Azalea Ballroom Foyer
- 11:45 a.m.–12:45 p.m. **Lunch - Azalea Ballroom, Hilton Garden Inn**
- 1:30–3:00 p.m. **Optional Workshop: Grant Opportunities at Research Corporation**
Richard Wiener, Research Corporation
Dogwood Ballroom
- 3:00–4:30 p.m. **Optional Workshop: Grant Opportunities NSF Program Officers**
Scott Fisher, Astronomical Sciences
Duncan McBride, Undergraduate Education
Kathleen McCloud, Physics
Dick Peterson, Undergraduate Education
Dogwood Ballroom
- 4:30–5:00 p.m. **Break – Azalea Ballroom Foyer**
- 5:00–5:15 p.m. **Welcome and Opening Remarks**
Robert Hilborn, Associate Executive Officer, AAPT
Chair, New Physics and Astronomy Faculty Workshop
Beth Cunningham, Executive Officer, AAPT
Monica Plisch, Assistant Director of Education, APS
Kevin Marvel, Executive Officer, AAS
Fred Dylla, Executive Director, AIP
Duncan McBride, National Science Foundation
- 5:15–6:15 p.m. **Large Group Session I**
“Introduction to Peer Instruction”
Eric Mazur, Harvard University
- 6:15–7:30 p.m. **Dinner – Azalea Ballroom**
- 7:30–8:30 p.m. *“Peer Instruction Practical Details”*
Eric Mazur, Harvard University
Nathaniel Lasry, John Abbott College

Friday, November 18

- 6:30–7:30 a.m. **Breakfast – Hilton Garden Inn, Great American Grill**
- 8:00 a.m. **Shuttle bus leaves for American Center for Physics**
- 8:30–9:30 a.m. **Large Group Session II – Conference Room A**
“Learner-Centered Teaching in Physics and Astronomy”
Edward Prather, University of Arizona
- 9:30–10:30 a.m. **Large Group Session III – Conference Room A**
“How to Get Your Students to Prepare for Every Class”
Andrew Gavrin, IUPUI
- 10:30–10:45 a.m. **Refreshment Break – ACP Rotunda**
- 10:45–11:30 a.m. **Small Group Sessions**
- *PhET (I)* – Conference Room A
Katherine Perkins, University of Colorado-Boulder
 - *Digital Libraries (II)* – Conference Room B
Bruce Mason, University of Oklahoma
 - *Lecture Tutorials (III)* – Conference Room C
Edward Prather, Gina Brissenden, University of Arizona
- 11:30–12:15 p.m. **Small Group Sessions**
- *PhET (II)* – Conference Room A
 - *Digital Libraries (III)* – Conference Room B
 - *Lecture Tutorials (I)* – Conference Room C
- 12:15–1:30 p.m. **Group Photo and Lunch – ACP Cafeteria**
- 1:30–2:15 p.m. **Small Group Sessions**
- *PhET (III)* – Conference Room A
 - *Digital Libraries (I)* – Conference Room B
 - *Lecture Tutorials (II)* – Conference Room C
- 2:30–3:30 p.m. **Small Group Discussion – Conference Rooms A, B, and C**
Various Topics
(presider TBD)
- 3:30–4:00 p.m. **Refreshment Break – ACP Rotunda**
- 4:00–5:00 p.m. **Large Group Session IV – Conference Room A**
“Evaluation and Assessment”
Noah Finkelstein, University of Colorado
- 5:00–6:00 p.m. **Small Group Sessions**
Primarily Undergraduate Institutions – Conference Room C
M.S. and Ph.D. Granting Institutions – Conference Room A
- 6:00–7:00 p.m. **Dinner – ACP Cafeteria**
- 7:00–8:00 p.m. **Large Group Session V – Conference Room A**
“The Physics IQ Test”
Richard Berg, University of Maryland

Saturday, November 19

- 6:30–7:30 a.m. **Breakfast – Hilton Garden Inn, Great American Grill**
- 7:45 a.m. **Shuttle bus leaves for American Center for Physics**
- 8:15–9:15 a.m. **Large Group Session VI – Conference Room A**
“Active Learning with Interactive Lecture Demonstrations (ILD)”
David Sokoloff, University of Oregon
Ronald Thornton, Tufts University
- 9:15–10:00 a.m. **Small Group Sessions**
- *Upper-level Physics (III)* – Conference Room A
Corinne Manogue, Oregon State University
 - *ILD/ Real Time Physics (II)* – Conference Room B
David Sokoloff and Ron Thornton
 - *Introductory Physics (I)* – Conference Room C
Ted Hodapp, APS
- 10:00–10:30 a.m. **Break – ACP Rotunda**
- 10:30–11:15 a.m. **Small Group Sessions**
- *Upper-level Physics (II)* – Conference Room A
 - *ILD/ Real Time Physics (I)* – Conference Room B
 - *Introductory Physics (III)* – Conference Room C
- 11:15–12:00 p.m. **Small Group Sessions**
- *Upper-level Physics (I)* – Conference Room A
 - *ILD/ Real Time Physics (III)* – Conference Room B
 - *Introductory Physics (II)* – Conference Room C
- 12:00–1:00 p.m. **Lunch – ACP Cafeteria**
- 1:00–2:00 p.m. **Large Group Session VII – Conference Room A**
“Help Your Students Develop Expertise in Problem Solving”
Ken Heller, University of Minnesota
- 2:00–2:45 p.m. **Small Group Sessions**
- *Physlets, Easy Java Simulations, and Open Source Physics (I)*
Conference Room A
Wolfgang Christian, Davidson College
 - *Tenure Matters (II)* – Conference Room B
Robert Hilborn, AAPT
 - *Problem Solving (III)* – Conference Room C
Ken Heller, University of Minnesota
- 2:45–3:30 p.m. **Small Group Sessions**
- *Physlets, Easy Java Simulations, and Open Source Physics (II)*
Conference Room A
 - *Tenure Matters (III)* – Conference Room B
 - *Problem Solving (I)* – Conference Room C

Saturday, November 19 (cont.)

- 3:30–4:00 p.m. Refreshment Break – ACP Rotunda
- 4:00–4:45 p.m. Small Group Sessions
- *Physlets, Easy Java Simulations, and Open Source Physics (III)*
Conference Room A
 - *Tenure Matters (I)* – Conference Room B
 - *Problem Solving (II)* – Conference Room C
- 4:45–6:15 p.m. Large Group Session VIII
“Research in Physics Education: A resource for improving student learning” – Conference Room A
Lillian McDermott and Peter Shaffer,
University of Washington
- 6:15 p.m. Bus to Hilton Garden Inn
- 6:30–7:00 p.m. Reception – Azalea Ballroom
- 7:00–8:00 p.m. Dinner – Azalea Ballroom

Sunday, November 20

- 6:30–7:30 a.m. Breakfast – Hilton Garden Inn, Azalea Ballroom
Hotel Check-Out
- 8:15–9:00 a.m. Large Group Session IX
“Case Studies, Discussion of Student Behavior”
Dogwood Ballroom, Hilton Garden Inn
Tim Slater, University of Wyoming
- 9:00–10:00 a.m. Large Group Session X
“Mentoring” – Dogwood Ballroom
Eric Hooper, University of Wisconsin-Madison
- 10:00–10:15 a.m. Break – Azalea Ballroom Foyer
- 10:15–11:00 a.m. Large Group Session XI
“Time Management” – Dogwood Ballroom
Tim Slater
- 11:00–11:30 a.m. Final Summary, Evaluations and Adjournment



AAPT American Association of Physics Teachers

Founded in 1930, The American Association of Physics Teachers (AAPT) is dedicated to enhancing the understanding of physics through teaching. For our 10,000+ members who serve physics students across the spectrum of schools, colleges, and universities, AAPT is a professional home that helps bring together knowledgeable and innovative colleagues who care deeply about physics teaching and education, and that offers valuable resources and benefits.

We serve our members through programs, publications, and networking, 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 nation and beyond to promote a better understanding of physics at all levels. The association supports physics educators at all levels through our two publications, the *American Journal of Physics* and *The Physics Teacher*; NSF-funded programs including the Physics Teaching Resource Agents institutes; the digital physics library, ComPADRE (with APS and AIP); the Physics Teacher Education Coalition, PhysTEC (with APS and AIP); the Workshops for New Physics and Astronomy Faculty (with APS and AAS); our two national annual meetings; and the student programs and scholarships that we administer, including the Lotze Scholarship for Future Teachers, the High School Physics Teacher Grant, the Physics Bowl, and the U.S. Physics Olympiad.

Beth Cunningham
Executive Officer

American Association of Physics Teachers
One Physics Ellipse, College Park, MD 20740-0845; 301-209-3333; www.aapt.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.

Kevin Marvel
Executive Officer

American Astronomical Society
2000 Florida Ave. NW, Suite 400, Washington, DC 20009-1231; 202-328-2010; www.aas.org



American Physical Society

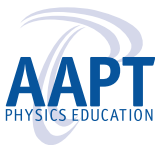
With more than 47,000 members worldwide, the American Physical Society works to advance and disseminate the knowledge of physics. Since its formation in 1899, it has been dedicated to providing its members and the international physics community with the latest research results through meetings and the 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*), and *Reviews of Modern Physics*. 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 educational programs to improve undergraduate education and to improve the education 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, the ComPADRE digital library of educational resources, and conferences and workshops on education at various levels. For many years APS has worked to increase the number of female and minority physicists, and has several significant programs that advance these goals. Information about these and other APS programs can be found at www.aps.org.

Kate Kirby
Executive Officer

Theodore Hodapp
Director of Education and Diversity

American Physical Society
One Physics Ellipse, College Park, MD 20740-3844; 301-209-3200; www.aps.org



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American Association of Physics Teachers

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On the Cover: Disappearing Act

This swirling landscape of stars is known as the North America Nebula. In visible light, the region resembles North America, but in this new infrared view from NASA's Spitzer Space Telescope, the continent disappears.

Where did the continent go? The reason you don't see it in Spitzer's view is due, in part, to the fact that infrared light can penetrate dust whereas visible light cannot. Dusty, dark clouds in the visible image become transparent in Spitzer's view. In addition, Spitzer's infrared detectors pick up the glow of dusty cocoons enveloping baby stars.

Clusters of young stars (about one million years old) can be found throughout the image. Slightly older but still very young stars (about 3-5 million years) are also liberally scattered across the complex. Some areas of this nebula are still very thick with dust and appear dark even in Spitzer's view and are likely to be the youngest stars in the complex (less than a million years old).

Image Credit: NASA/JPL-Caltech