

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

Paul Gueye, Hampton University

Jack Hehn, American Institute of Physics

Charles Henderson, Western Michigan University

Robert Hilborn, American Association of Physics Teachers

Theodore Hodapp, American Physical Society

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Kevin Marvel, American Astronomical Society

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**American Physical Society**



**National Science Foundation**

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# Workshop Leaders

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**Daniel Arenas**

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Breakout Session II

**Hamza Balci**

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Breakout Session III

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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

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**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

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## 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

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- 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

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- 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.)

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- 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  
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## 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](http://www.aas.org).

Kevin Marvel  
*Executive Officer*

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## **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](http://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](http://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](http://www.aps.org).

Kate Kirby  
*Executive Officer*

Theodore Hodapp  
*Director of Education and Diversity*

American Physical Society  
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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