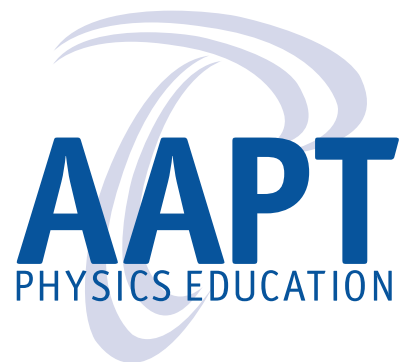




chicago
2009 AAPT
WINTER MEETING 

Winter Meeting Preview
February 12-16, 2009
Chicago, IL



AAPT Goes to Chicago!

Welcome to Chicago! Beyond the standard committee meetings, exhibits, and ceremonial sessions, the Chicago AAPT meeting offers a rich spectrum of invited and contributed sessions, posters, workshops, crackerbarrels, and plenaries on disciplinary and interdisciplinary topics ranging from exciting new areas of contemporary research through the substance of what we teach at all levels to the history of physics, uses of technology, and recent research in physics education. We are meeting in conjunction with AAAS, whose symposia and special events span all sciences, and those who register with either organization will be welcome at a large fraction of the events arranged by the other.

While a single theme would be difficult to identify for any AAPT meeting, we have, at this meeting, taken particular pains to highlight the contributions of Chicagoans to physics research and teaching. To that end, we have arranged a workshop at the Chicago Museum of Science and Industry (W08), field trips to Fermilab, invited talks by several Fermilab researchers (DA and NA), a session on the Manhattan project (LJ), a panel on the Illinois State Physics Project (LG), a panel on physics first (KA), several posters highlighting projects by Chicago-area high school students (PST1), a session (OG) in which Chicago-area high school teachers provide take-home demonstrations, a session (OH) in which you can view prize-winning demonstrations developed by students at Glenbrook South High School, a Share-A-Thon arranged largely by teachers in Chicago schools, and a demo show featuring, particularly, Chicago-area teachers. There is also a session (OC) on the International Year of Astronomy and designed to whet your appetite for the fuller recognition that will be part of the 2009 summer meeting.

In an effort to respond to those who have expressed concerns over the attention given to posters at past meetings, each poster in sessions PST1 and PST2 will be on display for a full day, and at least 1.5 hours of unopposed time for posters has been distributed throughout each day. So that some presenters may visit with other presenters, those with odd-numbered posters will be at their posters during half of the unopposed time, and those with even-numbered posters will be at their posters during the other half of that time.

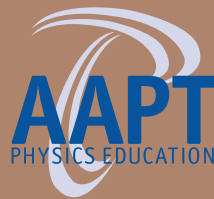
In the past six months, I have been made acutely aware that putting together the schedule of an AAPT national meeting provides a challenge not unlike that posed by a Jackson Pollock puzzle, and complete elimination of conflicts is almost certainly impossible. The program sorters (Shannon Mandel, Michelle Strand, Charles Henderson, and Gordon Ramsey), AAPT staff people in the Meetings and Programs Department (Tiffany Hayes, Cerena Cantrell, Janet Lane, Natasha Randall, and Annette Coleman), and I regret any conflicts that remain. At the same time, those who worked with me on this monumental task deserve deep appreciation for their diligence and creativity in solving the scheduling puzzle as fully as they have. The AAPT area chairs and committee members and all the presenters and presidors also deserve sincere thanks for their contributions to assuring a varied, full, and valuable meeting.

Enjoy the meeting and—time permitting—Chicago! I am confident your challenge will be much less in finding interesting things to do than in deciding which of several compelling but conflicting events will be of greatest value to you.

David M. Cook
Vice-President and Program Chair
Lawrence University
Appleton, Wisconsin

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www.aapt.org

Register now!

Program note: *This special section features a preliminary list of workshops and events. Speakers and workshop descriptions are currently being confirmed. Visit www.aapt.org frequently to find up-to-date information.*

location

Chicago – The Windy City

The 2009 Winter Meeting will be held in conjunction with the American Association Advancement of Science Annual Meeting in Chicago, Illinois. Join us in the windy city for a variety of attractions. Highlights include visiting the Sears Tower Skydeck, Navy Pier, Millennium Park, the Art Institute of Chicago, the Magnificent Mile, and Shedd Aquarium.

Educational Institutions

There are 680 public schools, 394 private schools, 83 colleges, and 88 libraries in Chicago proper. Since the 1890s, Chicago has been a world center in higher education and research. There are three universities in or immediately adjoining the city, Northwestern University, DePaul University, and the University of Chicago, are among the top echelon of doctorate-granting research universities. Prominent Catholic universities in Chicago include Loyola University and DePaul University. The city also has a large community college system known as the City Colleges of Chicago.

Population

Current estimates put Chicago's population at approximately 3,000,000. More than half the population of the state of Illinois lives in the Chicago metropolitan area.

For more information visit: www.choosechicago.com



Now functionally obsolete, the Chicago Water Tower now houses a visitor information center and has become one of the major tourist attractions in Chicago.

Traveling to Chicago

By Air

AAPT Conference attendees may take advantage of a 5% discount on American Airlines, American Eagle and AmericanConnections. You must reference the promotion code A3429AN. Book your flight now.

Midway Airport is located 10 miles from downtown Chicago. During rush-hour travel times can take up to 45 minutes. The cost of taking a taxi between Midway and downtown is approximately \$28-\$32.

O'Hare International Airport is located 13 miles from downtown Chicago. During rush-hour travel times can take approximately one hour. The cost of taking a taxi between O'Hare and downtown varies from \$30-\$50, depending on travel time.

By Train

Amtrak offers long distance services to and from Chicago's Union Station via New York, Seattle, New Orleans, San Francisco, Los Angeles, and Washington, D.C. Amtrak also provides a number of short-haul services throughout Illinois and toward nearby Milwaukee, Indianapolis and Detroit. Phone: (800) 872-7245

By Bus

Greyhound Lines, Inc., is the largest provider of intercity bus transportation, serving more than 2,300 destinations with 13,000 daily departures across North America. Phone: (800) 231-2222

Rental Car Information

With great discounts and the highest levels of service, there has never been a better reason to rent with Avis! For an AAPT discount on a car rental, visit the Avis Car Rental Site.

Ground Transportation

Go Airport Express: (888) 284-3826 or visit: www.airportexpress.com/shuttles/shuttle-faq.html

Public Transit

The Chicago Transit Authority (CTA) offers direct train service from both airports to downtown. The CTA is also an effective way to move around the city. A one-way ticket is \$2.00. Daily and weekend passes are available. For route, fare, and schedule information, call 312-836-7000 every day from 5:00 a.m. to 1:00 a.m. (CT) or go to: <http://www.transitchicago.com>

Lodging

Lodging Information

Hyatt Regency Chicago
151 East Wacker Drive
Chicago, IL 60601
Telephone: (312) 565-1234
Fax: (312) 239-4414
Group Rate: \$183 single, \$208 double
Parking: Overnight - \$48

The Fairmont Chicago
200 North Columbus Drive
Chicago, IL 60601
Telephone: (312) 565-8000
Fax: (312) 856-1032
Group Rate: \$175 single/double
Parking: Overnight - \$49



Hyatt Regency Chicago



The Fairmont Chicago

Once you are registered for the meeting you will receive instructions on how to make your hotel reservation. Therefore, you must register for the meeting prior to reserving your hotel room. **You will not receive the group rate if you contact either hotel directly.**

You must contact the AAAS/AAPT Travel desk to make your hotel reservation at either the Hyatt Regency Chicago or the Fairmont Chicago. Scheduled meetings and events will take place in both hotels, which are located approximately one block apart.

Room Sharing

If you are interested in sharing a hotel room at the Chicago meeting, complete the Room Share List form at: <http://www.aapt.org/Events/rslform.cfm>

Things to do in Chicago

Adler Planetarium & Astronomy Museum

1300 S. Lake Shore Drive
Chicago, IL, 60605 • (312) 922-STAR

The Art Institute of Chicago

111 S. Michigan Avenue
Chicago, IL, 60603 • (312) 443-3600

Field Museum

1400 S. Lake Shore Drive
Chicago, IL 60605 • (312) 665-7600

Frank Lloyd Wright Home and Studio

951 Chicago Avenue
Oak Park, IL 60302 • (708) 848-1976

Frank Lloyd Wright's Frederick C. Robie House

5757 S. Woodlawn Avenue
Chicago, IL 60637 • (773) 834-1847

John Hancock Observatory

875 N. Michigan Avenue, 94th Floor
Chicago, IL 60611 • (312) 751-3680

Museum of Contemporary Art

220 E. Chicago Avenue
Chicago, IL 60611 • (312) 397-3836

Museum of Science and Industry

57th Street and Lake Shore Drive
Chicago, IL 60637 • (773) 753 6853

Sears Tower Skydeck

233 S. Wacker Drive (Jackson Entrance)
Chicago, IL 60606 • (312) 875-9696

Shedd Aquarium

1200 S. Lake Shore Drive
Chicago, IL 60605 • (312) 939-2438

DISCOUNT PASSES

City Pass Chicago: www.citypass.com/city/chicago.html

Go Chicago Card: www.gochicagocard.com/

TOUR COMPANIES

Chicago Trolley and Double Decker Company
(773) 648-5000

Chicago Gray Line Tours
(312) 251-3107

meeting

Registration Fees

	(thru 01/05)	(01/06-onsite)
AAPT Member – full meeting	\$305	\$358
AAPT Member – one day	\$155	\$180
AAPT Member – retired or emeritus	\$200	\$225
Non-member – full meeting (includes membership)	\$385	\$438
Non-member – one day	\$235	\$260
Undergraduate and Graduate Students	\$25	\$35
High School Student	FREE	FREE

Participants outside of North America (North America includes, the U.S., Canada, Mexico and U.S. Territories) will receive a 50% reduction in registration for the Full Meeting only.

See AAPT website for additional special registration offers. <http://www.aapt.org/Events/WM2009/meetinfo.cfm>

Special Events and Workshops

Thursday and Friday, February 12-13

Field Trip to Fermilab • 9:00 a.m.-5:00 p.m. • \$20
Fermi National Accelerator Laboratory (Fermilab) is the nation's premier particle physics laboratory. Participants in this field trip will enjoy a guided tour of some parts of the laboratory and see firsthand the facilities in which several important discoveries in particle physics have been made.

Friday, February 13

Chicago Museum of Science and Industry Workshop • 9:00 a.m. - 12:00 p.m. • \$85 (\$110 nonmembers)
Gain inspiration and strategies for teaching physics and developing outreach activities at this workshop at the Museum of Science and Industry, the largest science museum in the western hemisphere. Take a tour of iconic exhibits like the U-505 Submarine and Coal Mine.

Saturday, February 14

First Timer's Gathering • 7:00-8:00 a.m. • No Fee
The best time to learn about AAPT and the Winter Meeting and to meet fellow attendees and AAPT leadership.

Retirees' Breakfast • 7:00-8:00 a.m. • \$20
Meet with long-time AAPT members and leadership.

Spouses' Gathering • 10:00-11:00 a.m. • No Fee
An opportunity to learn about Chicago-area activities, shops, and recommended sight-seeing.

Young Physicists Meet and Greet • 12:00-1:30 a.m. • No Fee
The place for Generation-X attendees to mix and mingle.

AAPT Plenary/AAAS Symposium

Exciting Research at Fermilab

Speakers: Niki Saoulidou on Neutrino Physics; Rob Roser on collider physics; Michael Crisler on WIMPs

AAPT Oersted Medal Plenary

The History and Fate of the Universe

George Smoot III, Lawrence Berkeley Laboratory and University of California, Berkeley

AAPT Richtmyer Memorial Award Plenary

Rotating Galaxies and Dark Matter

Vera Rubin, Carnegie Institution of Washington

Sunday, February 15

Breakfast for Two-Year College Faculty • 7:00-8:00 a.m. • \$20
Meet with AAPT members representing Two-Year Colleges.

Multicultural Luncheon • 12:00-1:30 p.m. • \$35
Gather for lunch with AAPT members representing international and cultural diversity.

AAPT Plenary

Early High School Physics: Building a Foundation for Understanding the Sciences

Panel Moderator: Leon Lederman

Monday, February 16th

AAPT Plenary

Dark Matter in the Laboratory

Joseph Lykken, Fermilab

Distinguished Service Citations

Presidential Transfer – Passing of the gavel from Lila Adair to Alex Dickison

awards

Hans Christian Oersted Medal

George F. Smoot III, Lawrence Berkeley Laboratory
and University of California, Berkeley

The History and Fate of the Universe

Saturday, February 14, 8:00 - 9:00 p.m.; Hyatt Regency Grand Ballroom D

George Smoot has done forefront work in cosmology using microwave radiation detectors in airplanes, high-altitude balloons, and satellites. He is best known for his analysis of data gathered by the COBE satellite. His differential microwave radiometer enabled him to detect temperature differences as small as 0.001 K. His work provided the first evidence of structure in the early Universe and smaller ripples in the temperature of the cosmic background radiation, consistent with Big Bang theory. For his major findings, George Smoot shared, with John Mather, the 2006 Nobel Prize in Physics. His *Wrinkles in Time: Witness to the Birth of the Universe*, co-authored with Keay Davidson, provides many details about his scientific journey.



Floyd K. Richtmyer Memorial Award

Vera Rubin, Carnegie Institution of Washington

Rotating Galaxies and Dark Matter

Saturday, February 14, 9:00 - 10:00 a.m.; Fairmont Chicago - Imperial Ballroom

Vera Rubin's pioneering work in astronomy on rotation rates of dozens of galaxies has shown that this velocity does not decrease at large distances from the galactic center. A decrease would be expected if the center-seeking force were due to the gravitational pull of the galaxy's luminous matter. This led to the conclusion that the Universe contains copious amounts of "dark matter" that was heretofore undetected. In 1993 Vera Rubin received the National Medal of Science, the USA's highest scientific award, for her pioneering research... which demonstrated that much of the matter in the universe is dark. In 1996, Vera Rubin authored the book *Bright Galaxies Dark Matters* (Masters of Modern Physics).



Distinguished Service Citations

Monday, February 16, 2:30 - 4:00 p.m.; Hyatt Regency Grand Ballroom EF

Paul Hickman has had a distinguished career as an optical engineer, a high school physics teacher and associate professor of education. His long years of service to AAPT include leadership in PTRA, PhysTEC, the Teacher Preparation Committee, and being the first recipient of AAPT's Excellence in Pre-College Physics Education award.



Charles Holbrow, Dana Professor of Physics Emeritus at Colgate University and Adjunct Professor at MIT, has had a distinguished career as a physics teacher, textbook author, nuclear physics researcher, and physics historian. He served as Associate Editor of *Physics Today*, AAPT President, AAPT Senior Staff Physicist and AAPT Interim Executive Officer.



plenaries

Saturday, February 14, 1:30 - 3:00 p.m.

Imperial Ballroom

AAPT Plenary/AAAS Symposium

Exciting Research at Fermilab

David Cook presiding and co-organized by Gordon Ramsey

Speakers

Niki Saoulidou of the Particle Physics Division/Neutrino Department at Fermilab will speak about Neutrino Physics
Rob M. Roser of the Particle Physics Division/CDF/Physics at Fermilab will speak on collider physics
Michael B. Crisler of the PPD/Experimental Physics Projects/Astrophysics at Fermilab will speak about WIMPs

Sunday, February 15, 1:30 - 3:30 p.m.; Fairmont Chicago,

Imperial Ballroom

AAPT Plenary

Early High School Physics: Building a Foundation for Understanding the Sciences

Panel Moderator **Leon Lederman** has worked tirelessly to raise awareness for what he calls a potential revolution in science education. He wants Physics First efforts that preserve the integrity of the three core disciplines while connecting them to form a coherent high school science sequence.

Panelists

Paul Hickman, a longtime physics teacher and Physics First advocate, will set the stage for the discussions with an overview of this movement to reorder the traditional high school science sequence.

Marsha Rosner studies how biochemical signals promote the growth, differentiation or death of cells. She will share her thoughts about how physics can support understanding in high school biology and chemistry.

Ron Kahn, a former award winning physics teacher, will speak to the statewide efforts initiated by Rhode Island's Governor Donald Carcieri. The project seeks to implement an improved science sequence in the State's high schools.

Gabriel de la Paz, an active high school physics teacher will speak to the A-TIME for Physics First statewide partnership effort in Missouri. He serves as a peer teacher for their professional development efforts.

Corinne Williams, who is now an Assistant Superintendent at a local area school system, will share some data, observations and thoughts from her doctoral work on Physics First.

John Hubisz, who just completed a review of textbooks appropriate for Physics First, will speak to the instructional materials available to support early high school physics courses.

Monday, February 16, 11:30 a.m. - 12:30 p.m.; Hyatt Regency Grand Ballroom EF

AAPT Plenary

Dark Matter in the Laboratory

Joseph Lykken, Fermilab

Presidential Transfer – Passing of the gavel from Lila Adair to Alex Dickison

Distinguished Service Citations continued

Bob Shurtz has been a distinguished physics teacher at the Hawken School for many years, and served as Academic Director of the US Physics Olympiad Team. Other service to AAPT includes PTRA work, being Ohio Section President, and chairing the High School Committee. His many awards include the Tandy Prize.



Gary White is Director of the Society of Physics Students and Sigma Pi Sigma, and Assistant Director of the Education Division of the American Institute of Physics. Prior to his post at AIP, he taught at Northwestern State University, where he was voted Outstanding Teacher of the Year in 1996.



Courtney Willis teaches at the University of Northern Colorado, after a distinguished career as a high school teacher. He served as AAPT Examinations Director, Chair of the High School Committee, presented at AAPT workshops, contributed frequently to The Physics Teacher, and served as President and Secretary-Treasurer of the Colorado-Wyoming Section.



workshops

T01: Computational Physics Examples for Physics Courses

Thursday, February 12, 9:00 a.m. - 12:00 p.m.

Although physics faculty are incorporating computers to enhance physics education, computation is often viewed as a “black box” whose inner workings need not be understood. We propose to open up the computational black box by providing Computational Physics (CP) curricula materials based on a problem-solving paradigm that can be incorporated into existing physics classes, or used in stand-alone CP classes. The curricula materials assume a computational science point of view, where understanding of the applied math and the CS is also important, and usually involve a compiled language in order for the students to get closer to the algorithms. The materials are based on published textbooks that scan the entire undergraduate curriculum, and include programs, applets, visualizations, and video-based lectures (for one semester so far). A data DVD with all materials will be distributed.

Rubin H. Landau

Committee on Educational Technologies

T02: Seeing the Invisible (NASA)

Thursday, February 12, 9:00 a.m. - 12:00 p.m.

What’s out there in our universe? Participants will engage in a captivating hands-on activity, observing different wavelengths of “light” or electromagnetic energy and what can be used to “block” it. Most wavelengths can’t be seen with the eyes, so how scientists detect it and how that information is being used will be the focus of the session. Examine ultraviolet, infrared, radio, and find out about the most exciting of all gamma rays and the distant universe! The activities can be done in a middle or high school classroom.

Mandy P. Frantti

Committee on Space Science and Astronomy

T03: Providing Feedback To Improve Science Instruction: A Taste of RTOP

Thursday, February 12, 10:00 a.m. - 12:00 p.m.

How do we break the cycle of teaching as we were taught? Can we really quantify science teachers’ practice? Will formative feedback accelerate teachers’ professional growth? Recent education scholarship asks that teachers include active-learning, inquiry-based, and problem-solving strategies in their science instruction (Beichner, 2004). These reform strategies have been proven to spark student interest in science, help students, especially women and underrepresented minorities, learn more and get better grades, and lead students to enroll in advanced science courses (Handelsman, 2004). This tutorial will provide the rationale for studying teaching using

classroom video and the Reformed Teaching Observation Protocol. We will engage participants in the exploratory use of the tool through selected video clips.

Paul Hickman, Kathleen Falconer
Committee on Teacher Preparation

T04: Civic Engagement and Service Learning: The SENCER Project

Friday, February 13, 10:00 a.m. - 12:00 p.m.

This tutorial is aimed at those interested in improving physics education within the context of civic engagement (including service learning). During the tutorial we will describe the national dissemination program SENCER, which connects science and civic engagement by teaching “through” complex, capacious, and unresolved public issues and ways to participate in its activities. We will also discuss ways to include service learning in the physics curriculum using examples from across the country, and engage in group activities that will provide a springboard for making curricular changes that will make civic engagement an integral part of the physics curriculum.

Theo Koupelis

Committee on Professional Concerns

Committee on Physics in Two-Year Colleges

T05: Mining the Hidden Web

Friday, February 13, 10:00 a.m. - 12:00 p.m.

The Internet and the World Wide Web are growing at an amazing rate. This tutorial is designed to give participants skills for fast, efficient searching of the Internet. In this digital age, skill in evaluating the information one finds on the Internet is essential. This tutorial will also offer some guidelines for evaluating information.

Pat T. Viele

Committee on Professional Concerns

T06: ComPADRE

Friday, February 13, 10:00 a.m. - 12:00 p.m.

ComPADRE is a network of web-based resource collections for teaching physics and astronomy. Each collection focuses on a particular audience, such as high-school teachers, introductory astronomy, or physics students. This tutorial will introduce the collections, explore the available resources, and give experience with the personalization tools. Specific topics covered will depend on the interests of the tutorial participants. Attendees are encouraged to bring their own computers to make the tutorial a hands-on experience. ComPADRE is funded by the National Science Foundation and is part of the National Science Digital Library.

Bruce Mason

Committee on Educational Technologies

T07: A New Model of Instruction for the Urban Physics Classroom

Friday, February 13, 9:00 a.m. - 12:00 p.m.

Many PER-based materials are designed for institutions that serve largely traditional student populations in fairly rigid learning environments. The introductory physics course at the urban institution is often small, with students remaining in a single room for all components of the course (lecture, laboratory, problem-solving sessions, etc.). Chicago State University (CSU) and the City Colleges of Chicago are capitalizing on these features to create a learning environment where students continuously move back and forth between course components. To aid in the implementation of this environment, CSU is creating an Interactive Physics Workbook that provides a clear structure for this type of course. The workbook contains lecture notes, discussion questions, TIPERS, problem-solving tasks, and laboratories that are often broken up. Much of the material in this workbook comes from a diverse group of collaborators. In this workshop, participants will be placed in this learning environment and will get a sense of how the various components cohere into one unit.

Mel S. Sabella, Samuel Bowen, Kim Coble, Thomas Kuhn, Anthony Escudro, Jamie Millan, Daniel Russ, David Zoller
Committee on Research in Physics Education
Committee on Physics in Undergraduate Education

W01: An Introduction To Improving Student Learning

Friday, February 13, 8:00 a.m. - 12:00 p.m.

This participatory workshop for college and university astronomy and physics faculty provides an overview and introduction to the motivations, strategies, methodologies, and publication routes for conducting science education research in their own classrooms in order to improve astronomy education. Participants will evaluate the value of various education research questions, identify strengths and weaknesses of several research design methodologies, learn how to obtain Institutional Review Board approval to conduct education research on human subjects, and become more aware of how education research articles are created for publication in journals such as the Astronomy Education Review.

Janelle M. Bailey, Timothy F. Slater, Stephanie J. Slater
Committee on Space Science and Astronomy

W02: InterActions in Physical Science

Thursday, February 12, 8:00 a.m. - 12:00 p.m.

InterActions in Physical Science is an NSF-supported, standards-based, guided inquiry physical science curriculum that was built using the research on the teaching and learning of science. In this workshop, participants will be introduced to the InterActions curriculum, experience several activities,

watch and analyze video from InterActions classrooms, and work through part of the professional development materials that support teachers and help students do inquiry at the middle-school level. Emphasis will be placed on how these materials can be used to help students understand the nature of scientific inquiry and how scientists make and support their claims. Time will also be scheduled to discuss strategies of how to engage pre-high school students in interactive learning environments.

Robert H. Poel

Committee on Physics in Pre-High School Education

W03: Teaching Physics for the First Time

Thursday, February 12, 8:00 a.m. - 5:00 p.m.

With the decline in the number of physics graduates who enter the teaching profession, many teachers are assigned to teach physics and physical science with little or no formal preparation. "Teaching Physics for the First Time" is designed to provide the novice and experienced instructor who has been assigned physics or physical science with a standards and benchmark-correlated learning cycle curriculum. Examples of lesson plans, lab activities, demonstrations, and sample assessments for core topics kinematics to magnetism will be presented.

Jan Mader, Mary Winn

Committee on Physics in High Schools

W04: NTIPERS: Research-Based Conceptual Reasoning Tasks for Introductory Mechanics

Thursday, February 12, 1:00 p.m. - 5:00 p.m.

This workshop will deal with various alternative task formats that can be used to make instructional materials that impact and improve student learning and understanding of physics concepts in mechanics. These exercises are based, in part, on efforts in Physics Education Research and thus are called TIPERs (Tasks Inspired by Physics Education Research). Such tasks support active learning approaches and can be easily incorporated into instruction in small pieces. This workshop will feature new TIPERs in the area of mechanics but the techniques can be deployed in all areas of physics. The first part of the workshop will explore various formats, their characteristics, and how they can be used. Participants will work in groups to develop a set of TIPERs that address a concept, principle, or relationship in mechanics. These TIPERs sets will be shared with and critiqued by the group. This workshop will also include new nTIPER "clickers." This work is supported in part by a CCLI grant #0632963 from the Division of Undergraduate Education of the National Science Foundation.

David P. Maloney, Curtis Hieggelke, Steve Kanim

Committee on Research in Physics Education

Committee on Physics in Two-Year Colleges

**W05: How To Implement a Pedagogy Course for Undergraduate and Graduate Learning Assistants
Thursday, February 12, 1:00 p.m. - 5:00 p.m.**

Participants in this workshop will learn how to implement a pedagogy course for undergraduate and graduate learning assistants (or teaching assistants). Workshop participants will explore learning assistants' prior knowledge of teaching and learning and will investigate some of our goals (implicit and explicit) to help learning assistants move toward an understanding of research-based teaching. We will provide participants with materials and guides for implementing pedagogy lessons in their own institutions. We will also spend some time trouble-shooting issues that may have come up in participants' early attempts to implement such a course.

Valerie K. Otero and Steve Iona
Committee on Teacher Preparation
Committee on Research in Physics Education

**W06: Inquiry Based Learning for High School Teachers
Thursday, February 12, 1:00 p.m. - 5:00 p.m.**

This is a hands-on workshop designed for teachers interested in using materials in their physics classes that will engage their students in inquiry-based active learning. Participants will work with activities from kinematics, dynamics, energy and optics from the updated Activity-Based Physics High School CD (ABP HSCD). These student-centered curricular modules are based on the outcomes of physics education research and are linked to the national standards. They make extensive use of computers for data collection and analysis. The outcome of this approach is that students learn physics by doing physics. The curricula on the ABP HSCD include: RealTime Physics, Tools for Scientific Thinking, Workshop Physics and Interactive Lecture Demonstrations. All of the equipment and software used in this workshop are compatible with both Mac and Windows computers and use interface equipment from both Vernier Software and Pasco.

Maxine C. Willis, Priscilla Laws and Marty Bamberger
Committee on Physics in High Schools

**W07: Using Digital Cameras and Tablet PC's to Analyze Motion of Objects
Thursday, February 12, 1:00 p.m. - 5:00 p.m.**

This is a hands-on workshop where participants will record videos of moving objects using a digital camera. Graphs of the motion will be created using video analysis software. The participants will then annotate the graphs using the tablet functionality of a Tablet PC. Participants will have the ability to complete activities from a variety of topics, including kinematics, momentum, energy, rotational motion, and simple harmonic motion.

Paul M. Waechtler, Mary Beth Barrett, John Miller and Ryan Dunn
Committee on Educational Technologies

**W08: Chicago Museum of Science and Industry
Friday, February 13, 9:00 a.m. - 12:00 p.m.**

Gain inspiration and strategies for teaching physics and developing outreach activities at this half-day workshop at the Museum of Science and Industry, the largest science museum in the western hemisphere. You'll hear about the museum's innovative education programs, get a sneak peak at new exhibitions of awe-inspiring size and scale, and take a tour of iconic exhibits like the U-505 Submarine and Coal Mine. Participants are invited to spend the rest of the day exploring the museum's 14 acres of exhibit space.

Stanley J. Micklavzina and Richard Flarend
Committee on Science Education for the Public

**W09: Cantilevers and Nanotech
Thursday, February 12, 8:00 a.m. - 5:00 p.m.**

The simple cantilever is not only a commonly observed system in our every-day life, but also a key component in many Micro- and Nano-based sensor and actuator systems. These applications range from the atomic force microscope and nano-enabled micro cantilever sensing arrays to physical memory storage devices able to store terabytes of data on a square inch platform. The experiment presented in this workshop is intended to provide a means of cross-linking many STEM disciplines in a hands-on learning environment. Students discover how to acquire time-dependant position data, calibrate, graph, and analyze to determine the natural frequency of a system as mass is added. From this experience, students then discover how to engineer the system resonance frequency by adjusting the material and geometric specifications. Once these concepts are understood, the students can extrapolate down to the micro and nano scale and review current micro/nano-technology applications.

Matthias Pleil
Committee on Physics in Two-Year Colleges
Committee on Physics in High Schools

**W10: Physics: Understanding By Design
Thursday, February 12, 8:00 a.m. - 5:00 p.m.**

The most recent wave of science education reforms aim at changing science learning from memorization of facts to the doing of science. To successfully do science in the classroom requires careful planning for conceptual understanding, not only doing activities. This workshop (appropriate for all educators, K-college) is based on "Understanding by Design" by Wiggins and McTighe, and will focus on designing physics/physical science instruction leading to student understanding of concepts as well learning basic knowledge and skills. This model of planning is especially relevant in today's classrooms where student academic diversity is the norm and standards are foundational. Participants should bring their own curricular materials to work with, and each will develop a unit plan useful for their

own teaching, no matter what grade level and content. This workshop will be based on individual needs of participants, who will also each receive a copy of *Understanding by Design*, 2nd ed.

Julia Olsen

Committee on Physics in Pre-High School Education

W11: Research-Based Alternatives To Problem-Solving in General Physics

Thursday, February 12, 8:00 a.m. - 5:00 p.m.

Accumulating research on problem solving in physics clearly indicates that traditional, end-of-chapter exercises in physics texts are not useful and may actually hinder students' learning of important physics concepts. The research also raises questions about the efficacy of such tasks for helping students develop "problem solving skills." In light of these results the question is: What alternative tasks can we use to help students develop problem solving skills and a conceptual understanding? This workshop will review the research and then provide examples of several alternative tasks and their use. Participants will also get practice writing alternative problems for use in their own classrooms.

Kathleen Harper, Thomas M. Foster and David P. Maloney
Committee on Physics in Undergraduate Education

W12: Developing Physics Teachers Knowledge

Thursday, February 12, 9:00 a.m. - 5:00 p.m.

Lee Shulman identified pedagogical content knowledge (PCK) as a necessary component of teacher knowledge—a blend of content and pedagogy that distinguishes the understanding of a content specialist from that of the pedagogue. PCK involves knowing students' original ideas and potential difficulties, alternative ways to represent those ideas, assessment strategies, and effective instructional methods within a particular discipline. What constitutes physics PCK and how can prospective and practicing physics teachers construct and improve theirs? What is the difference between PCK of a college instructor and a high school physics teacher? What elements of a teacher preparation program and what specific activities help physics teachers develop their PCK? In this interactive workshop participants will tackle the above questions and develop some strategies for the improving their own PCK, incorporating the building of teacher PCK into their physics courses, methods courses, and teacher preparation programs.

Eugenia Etkina

Committee on Teacher Preparation

Committee on Apparatus

W13: Modeling Mechanics: From Free Fall To Chaos

Friday, February 13, 8:00 a.m. - 12:00 p.m.

Easy Java Simulations, Ejs, is a free and open source tool for

creating Java simulations. Unlike other software programs designed to make programming easier for programmers, the structure of the Ejs environment allows users to focus on the process of building simulations, and therefore the underlying physics, as opposed to the technical aspects of building simulations. In this workshop participants will learn how to use Ejs to create simple and advanced simulations for mechanics. We will distribute on a CD the Ejs programming environment and several completed curricular units. The workshop will be based on templates that can be easily adapted to simulate other, more advanced, physical phenomena. Participants are encouraged to bring their own laptops with a CD drive and the latest version of Java installed.

Mario Belloni, Wolfgang Christian and Anne J. Cox

Committee on Educational Technologies

Committee on Physics in Undergraduate Education

W14: Physics By Inquiry

Friday, February 13, 8:00 a.m. - 12:00 p.m.

This workshop focuses on how college and university physics faculty can contribute to the professional development of pre-college (K-12) teachers. Participants will have an opportunity to gain hands-on experience with Physics by Inquiry (1), instructional materials designed to provide teachers with the background needed to teach physics and physical science as a process of inquiry. Excerpts from a video produced by WGBH will be used to illustrate interactions between teachers and instructors during a course based on these instructional materials.(2) Participants will also gain an understanding of how physics education research has guided the design of the curriculum. In addition, there will be a discussion of various intellectual and practical issues. Volumes I and II will be provided to participants. (1) L.C. McDermott and the Physics Education Group at the University of Washington, *Physics by Inquiry: An Introduction to Physics and Physical Science*, Volumes I and II (Wiley, New York, 1996). Development was supported, in part, by the National Science Foundation. (2) *Physics by Inquiry: A Video Resource* (WGBH, Boston, 2000).

Lillian McDermott

Committee on Teacher Preparation

Committee on Research in Physics Education

W15: Using Experimental Tracks in Intermediate/Advanced Physics Laboratories to Foster Physical Insight and Independence

Friday, February 13, 8:00 a.m. - 12:00 p.m.

In intermediate/advanced physics laboratories, students are often exposed to many different investigations. Unfortunately, this usually leads to very little depth in the student's understanding. This workshop presents the participants with an alternative approach to intermediate undergraduate

laboratories in which the students complete a series of conceptually linked investigations (tracks) that vary from simple mechanical to modern physics investigations. For reporting laboratory results we advocate poster sessions. Participants in this workshop will be engaged in discussion about the nature of laboratory investigation and “tracks.” Apparatus will be set up so that the participants can experience a “tracked” series of investigations. We will role play a poster session so that attendees can get an idea of how one can probe student-understanding using this method. At the end of the session, groups will brainstorm new experimental tracks.

Mark F. Masters and Timothy T. Grove
Committee on Physics in Undergraduate Education

W16: Nature of Science

Friday, February 13, 8:00 a.m. - 12:00 p.m.

We will work in small groups as research teams to open up a new area of knowledge using a web-based simulation system. We will observe, design and conduct experiments, generate and demolish hypotheses, and build up a common understanding and body of research. We will communicate through journals and symposia, and even worry about funding. Supported by NSF. Great fun, and you can use it at home.

Timothy Erickson
Committee on Educational Technologies

W18: Designing a Diagnostic Learning Environment: A Workshop for Teacher Educators

Friday, February 13, 1:00 p.m. - 5:00 p.m.

While many teachers engage in frequent assessment, typically this means that they identify whether the student has the “right” idea, and if not, the instruction presents more of the right idea. A diagnostic learning environment is one in which assessments are used for formative purposes, i.e., to identify the fine structure of students’ understanding and reasoning, and to help a teacher decide which aspects of student thinking might be troublesome so that she/he may address specific student ideas with targeted instruction. To employ formative assessment effectively, teachers need deep subject matter knowledge and robust pedagogical content knowledge. Participants will experience a diagnostic learning environment and learn about issues that arise in setting up teacher professional preparation programs that are focused on formative assessment. Participants will learn about the Diagnoser Project’s free instructional tools to help diagnose pre-college student thinking and guide instructional decisions. Participants are encouraged to bring a laptop.

Stamatis Vokos and Pamela A. Kraus
Committee on Teacher Preparation
Committee on Research in Physics Education

W19: PET & PSET

Friday, February 13, 1:00 p.m. - 5:00 p.m.

Physics and Everyday Thinking (PET) and Physical Science and Everyday Thinking (PSET) are each one-semester courses that can serve the needs of both prospective and practicing elementary teachers and as a general education science course. Both PET and PSET engage students in four types of activities: (1) standards-based physics or physical science content, (2) nature of science, (3) learning about one’s own learning, and (4) learning about the learning of elementary students. PET and PSET use a similar course pedagogy and activity sequence that is guided by research on student learning of physical science. The PET course content focuses on the themes of interactions, energy, forces and fields. PSET focuses on interactions, energy, forces and atomic-molecular theory. During much of the workshop participants will view and discuss video from college PET and PSET classrooms, and from elementary classrooms.

Valerie Otero and Fred Goldberg
Committee on Teacher Preparation
Committee on Physics in Pre-High School Education

W20: Exploring Beyond the Solar System

Friday, February 13, 1:00 p.m. - 5:00 p.m.

Explore the biggest questions about our place in space and time. Many new astronomy learners, students and adults alike, are unfamiliar with the universe beyond the solar system. This workshop provides an opportunity to deepen content knowledge and to practice strategies for teaching and learning about current scientific models and evidence for the origin and evolution of our universe of galaxies. The “Beyond the Solar System” project investigated student misconceptions and exemplary classroom strategies. Each participant will receive the project final product, a DVD produced for NASA Universe Education Forum at the Harvard-Smithsonian Center for Astrophysics. Key concepts, evidence, researchers, student ideas, and classrooms and resources will be presented from the DVD. Modeling the Universe, Exploring with Telescopes, Measuring Galaxies with Telescopes, and Cosmic Timeline inquiry-based lesson plans will be featured.

Janelle M. Bailey, Lindsay Bartolone, Pamela Greyer, Pamela Harman and Erika Reinfeld
Committee on Space Science and Astronomy
Committee on Teacher Preparation

W21: Three-Color Astronomy Images By High School Students

Friday, February 13, 1:00 p.m. - 5:00 p.m.

Probe the universe. Find new features in many celestial objects. Study Young Stars. Learn how to make those beautiful colored images of astronomy objects. We will construct three-color images from narrow-band filter images. These images can be found at sources such as IR from Spitzer Space Telescope, visual from the STScI Digitized Sky

Survey and others. Using computer programs like Adobe Photoshop (with FITS Liberator plug-in), and free software such as ds9, Spot, and Leopard, participants will gain hands-on experience constructing the three-color images. Programs and data files will be available on laptops for AAPT participants to practice the process during presentation. Then their students can learn the process as well, and be engaged in active inquiry and work on authentic astronomy research, and create their own three-color images. Handouts will be provided and if participants bring USB thumbdrives, they can take copies of all files with them.

David W. McDonald and Joy-Lyn McDonald
Committee on Physics in High Schools

W22: Tutorials in Introductory Physics
Friday, February 13, 1:00 p.m. - 5:00 p.m.

Tutorials in Introductory Physics (1) is a set of instructional materials intended to supplement the lecture, textbook, and laboratory of a standard calculus-based or algebra-based introductory course. The tutorials are designed to address specific conceptual and reasoning difficulties that have been identified through research. In addition to providing hands-on experience with the curriculum, the workshop will include discussions of instructional strategies and results from assessments of student learning. Important aspects related to implementation of the tutorials will be covered, including preparation of graduate teaching assistants, undergraduate peer instructors, and post-docs. Copies of Tutorials in Introductory Physics will be provided to participants. (1) L.C. McDermott, P.S. Shaffer, and the Physics Education Group at the University of Washington, Tutorials in Introductory Physics, First Ed. (Prentice Hall, 2002).

Lillian C. McDermott
Committee on Research in Physics Education

W23: Model Building Investigations of Field Creation and Transformer Operation
Friday, February 13, 1:00 p.m. - 5:00 p.m.

Participants will use simple experiments from the recently completed CASTLE curriculum to generate image-based electromagnetic field concepts (which conventional instruction introduces mathematically) and make dynamic electromagnetic phenomena visualizable. A portable radio detects electric field radiated by accelerating charge whenever a battery-and-wire circuit is closed or opened. The magnetic field around the final current suggests formation by electromagnetic radiation, and the effect of wire shape on radio reception shows this magnetic field is given energy that radiation carries to the radio after the circuit is opened. Detecting current in a coil through which a magnet is moving reveals a charge-pushing agent in the coil, suggesting curly electric field in proportion to rate of change of magnetic

field (Faraday's Law). A small transformer, introduced via its bulb-lighting ability as an "AC battery," drives a coaxial-coils transformer which causes predictable bulb brightness changes when coil overlap and iron core insertion are varied.

Melvin S. Steinberg
Committee on Physics in High Schools

W24: Ben Franklin As My Lab Partner
Friday, February 13, 1:00 p.m. - 5:00 p.m.

Benjamin Franklin's experiments and observations on electricity established not only his reputation as a scientist, but also our electrical conventions and vocabulary, and the principle of charge conservation. In his letters, Franklin builds, test, and defends his model with skill and eloquence, arguing from experiment and sharing both his wisdom and doubts, while clearly conveying his fascination with electricity. As Franklin was not formally schooled in mathematics, his theory was qualitative, and is an approachable example of hands-on and minds-on construction of a conceptual model with significant explanatory power. In this workshop, developed by the author at the Wright Center for Science Teaching at Tufts University, working with Franklin's descriptions, we will recreate many of his experiments using modern, inexpensive equipment. Participants will receive take home equipment and a CD-ROM containing the workshop manual, a collection of Franklin's letters relating to electricity, and movie clips illustrating the experiments.

Robert A. Morse
Committee on History & Philosophy of Physics

W25: Reaching, Teaching and Keeping Underrepresented Groups in Physics (College Level)
Friday, February 13, 1:00 p.m. - 5:00 p.m.

The purpose of this introductory workshop is to increase the effectiveness of teachers (K-12) and college faculty in constructing inclusive learning environments in their classrooms and beyond. Workshop participants, using guided discussions and collaborative exercises will explore pedagogical philosophies, outreach paradigms, and assessment strategies that can be adapted to individual uses. Participants will also investigate the factors that can help (or hinder) widespread, permanent change. Though focused particularly on under-represented groups, the workshop is actually geared to making the learning of physics more effective for all students. The pedagogical exercises are built on physics at the senior high school and introductory college level, but teachers in the K-20 educational enterprise may find the workshop useful.

Juan R. Burciaga
Committee on Minorities in Physics

W26: Open-Source Tutorials: PER-Based Instructional Materials with Resources to Facilitate Modification and Implementation

Friday, February 13, 1:00 p.m. - 5:00 p.m.

Instructors inevitably need to adapt even the best reform materials to suit their local circumstances. We offer a package of research-based, open-source, epistemologically-focused mechanics tutorials, along with the detailed information instructors need to make effective modifications and provide professional development for TAs. In particular, our tutorials are embedded with comments from the developers, advice from experienced instructors, and video clips of students working on the materials.

Rachel E. Scherr and Andrew Elby

Committee on Research in Physics Education

W27: Math, Science and Teacher Ed Faculty Collaboration: An Interdisciplinary Approach to Preservice Teacher Education in Math and Science

Friday, February 13, 1:00 p.m. - 5:00 p.m.

The Math and Science Concepts Minor program, a consortium based at Northeastern Illinois University, Harry S. Truman College, and Wilbur Wright College, differs from previous math and/or science concentrations in that it is an interdisciplinary minor that provides appropriate content material, an intentional focus on metacognitive processes and content specific pedagogy. It is, in essence, an applied mathematics concentration focused in scope for diverse city college and university students preparing to be educators, and primarily to become educators who teach middle school (6th through 9th grades). We will briefly introduce the program, and then break into smaller groups, so that faculty who teach several of the course pairs, along with students who have completed that course pair, can facilitate sample activities from their courses. Participants will be able to rotate among the several activities. These activities will be selected so as to engage participants in the sample learning activities.

Paul J. Dolan, Jr., Heather Patay, Tanya Cofer, Wayne Landerholm, George Pryjma, Isidor Ruderfer, Emma Turian, Vinay Duggal, Panagos Papageorgiu, Richard Kampwirth and Sheila McNicholas

Committee on Physics in Pre-High School Education

W28: Physics Front: Capabilities and Possibilities

Friday, February 13, 1:00 p.m. - 5:00 p.m.

The Physics Front offers K-12 teachers a place online to find and share high-quality physics teaching resources including lesson plans, labs, simulations, and reference materials. All these materials are organized by subject, grade level, and course type. This website also gives teachers the tools to collaborate and share expertise. Topics covered in this workshop will include: collecting, organizing, and sharing

resources from the collection; submitting new resources; navigating and building Physics Front topical units; and Physics Front discussions, comments, and reviews. Participants wishing to actively engage, hands-on, in the workshop should bring their own laptop computers; we hope to have enough participants with computers so that they can work online in pairs. Wireless internet connections will be provided.

Cathy Ezrailson and Caroline Hall

Committee on Physics in High Schools

W29: Haunted Physics Lab: Organize and Construct a Kid Magnet On-Campus Outreach Event

Friday, February 13, 8:00 a.m. - 5:00 p.m.

How do we get 1100 children and adults to visit the Department of Physics on a single Saturday afternoon in rural Illinois? We invite them to a Haunted Physics Laboratory! Mixing a bit of Halloween fun with some good solid physics in the form of interactive displays has lead to a series of very successful outreach events. Come investigate 70 of our displays, make some of your own, and learn how to publicize and carry out a Haunted Physics Laboratory of your own, starting with equipment you have on hand or purchase at your local discount store. Haunted labs can be effective outreach events for universities, community colleges, high schools and even middle schools. The morning session will concentrate on activities in our “dark room” and the afternoon session will focus on activities done in a lighted room or hallway.

Patricia A. Sievert and Richard Flarend

Committee on Science Education for the Public
Committee on Apparatus

W30: Using Research-Based Curricula and Tools to Revitalize Your Introductory Course

Friday, February 13, 8:00 a.m. - 5:00 p.m.

This hands-on workshop is designed for those who want to introduce active learning and computer tools into their introductory courses. We will introduce new approaches to teaching based on physics education research (PER) in lectures, labs, and recitations as well as studio and workshop environments. Among the approaches presented will be Interactive Lecture Demonstration (ILDs), Web-Based ILDs, RealTime Physics Labs, Activity Based Tutorials, Collaborative Problem-Solving Tutorials, Live Photo Assignments and Workshop Physics, as well as analytic modeling and video analysis tools. The computer tools used are available for both Macintosh and Windows computers. Results of studies on the effectiveness of these teaching strategies will also be presented. Current versions of the curricula, along with the book Teaching Physics with the Physics Suite by E.F. Redish will be distributed. Partially supported by the National Science Foundation.

David R. Sokoloff and Ronald Thornton

Committee on Research in Physics Education
Committee on Educational Technologies

W31: Teaching Astronomy With Technology Friday, February 13, 8:00 a.m. - 5:00 p.m.

This workshop will survey a variety of educational technologies useful for engaging students in both high school and introductory college classrooms. Special emphasis will be placed on simulation usage and peer instruction. Participants will work on computers gaining familiarity with the astrophysical simulations of the Nebraska Astronomy Applet Project (NAAP) and its web-based assessment capabilities. Participants will also design peer instruction sequences to be used in the classroom using the computer-based modules of the ClassAction Project. A lighter emphasis will be placed on using computerized ranking tasks and on comparing available options for online homework, astronomy laboratories, and desktop planetariums. All participants will receive NAAP, ClassAction, and computerized ranking task materials on CD.

Kevin M. Lee

Committee on Educational Technologies

sessions

Friday, February 13, 2009

FRI SPS Undergraduate Research and Outreach (posters)
Gary White 6:00 - 8:00 p.m.

Saturday, February 14, 2009

PST1 Poster Session I 8:00 a.m. - 6:00 p.m.
AA AAPT Plenary I - Richtmyer Award
Lila Adair, Harvey Leff 9:00 a.m. - 10:00 a.m.
BA Nuclear and Particle Physics
in the Upper-Level Curriculum
Juan R. Burciaga 10:00 a.m. - 12:00 p.m.
BB Frontiers in Space Science and Astronomy
Daniel M. Smith, Jr. 10:00 a.m. - 12:00 p.m.
BC Physics Education Research in High Schools
John Lewis 10:00 a.m. - 11:20 a.m.
BE Interdisciplinary Nature of Teacher Preparation
Dan MacIsaac 10:00 a.m. - 12:10 p.m.
BF Reforming STEM Instruction:
An Examination of Four Core Change Strategies
Noah Finkelstein 10:00 a.m. - 12:00 p.m.
BG Advancing Women in Physics Internationally
Luz Martinez 10:30 a.m. - 12:00 p.m.
BD Physics and Society Education
Jane Flood 11:20 a.m. - 12:00 p.m.
CA Professional Concerns of PER Faculty
Thomas Foster 12:00 p.m. - 1:30 p.m.
CB Professional Concerns of Graduate Students
Mary Kustusch 12:00 p.m. - 1:30 p.m.
CC TYC Crackerbarrel
Karim Diff 12:00 p.m. - 1:30 p.m.

DA AAPT Plenary II - Exciting Research at Fermilab
David Cook 1:30 p.m. - 3:00 p.m.
EA SPS Undergraduate Research and Outreach
Gary White 5:45 p.m. - 7:15 p.m.
EB Best Practices in Recruiting and Retaining Women
and Minorities in Physics
Kathleen Falconer 5:45 p.m. - 7:25 p.m.
EC Capstone Experiences and Required
Upper-Level Projects
Ernest Behringer 5:45 p.m. - 7:15 p.m.
ED Computation in Undergraduate Physics:
New Developments
Norman Chonacky 5:45 p.m. - 7:15 p.m.
EE Best Practices for Teaching with Technology
Michelle Strand 5:45 p.m. - 7:25 p.m.
EF Unconventional Labs
Kathleen Falconer 5:45 p.m. - 7:15 p.m.
EG Innovations in Biophysics
Juan R. Burciaga 5:45 p.m. - 7:15 p.m.
EH Simulating the Universe on Your Computer
Kevin Lee 5:45 p.m. - 7:15 p.m.
EI Current Directions in Materials Research:
Graduate Students Talk to Teachers
Melissa Eblen-Zayas 5:45 p.m. - 7:15 p.m.
EJ Astronomy Labs and Projects
Jordan Raddick 5:45 p.m. - 7:15 p.m.
FA AAPT Plenary III - Oersted Award
Harvey Leff 8:00 p.m. - 9:00 p.m.

Sunday, February 15, 2009

PST2 Poster Session II 8:00 a.m. - 6:00 p.m.
HB Discipline-Based Science Education Research
Carl Wieman 8:30 a.m. - 11:30 a.m.
IA Teaching Physics Around the World
Genaro Zavala 8:30 a.m. - 10:30 a.m.
IB New Results in Astronomy Education Research
Janelle M. Bailey 8:30 a.m. - 10:30 a.m.
IH Physics Education Research Around the World
Paula Heron 8:30 a.m. - 10:30 a.m.
II How Educational Technologies Can Reach New and
Cross-Over Teachers Who Also Teach Physics
Cathy Ezrailson 8:30 a.m. - 9:30 a.m.
IE Particle Physics in the High School
Jeffrey Rylander 9:00 a.m. - 11:30 a.m.
IF Role of Community Colleges in
Pre-High School Teacher Preparation
Tom Foster 9:00 a.m. - 10:10 a.m.
IG Mentoring and Support for Novice
High School Physics Teachers
Paul Hickman 9:00 a.m. - 11:00 a.m.
IJ Interactive Lecture Demonstrations—Physics
Suite Materials that Enhance Learning in Lecture
David Sokoloff 10:00 a.m. - 11:15 a.m.

Monday, February 16, 2009

ID	What is the Curriculum for the Advanced Lab? David Abbott 10:15 a.m. - 11:15 a.m.	MA	PER: Student Understanding and Scientific Reasoning Valerie Otero 9:15 a.m. - 11:15 a.m.
HA	Professional Concerns of PER Solo Faculty Paula Engelhardt 12:00 p.m. - 1:30 p.m.	MB	New Ideas for High School Physics Laura Nickerson 9:15 a.m. - 11:15 a.m.
JA	Physics and Society Education Jane Flood 12:00 p.m. - 1:30 p.m.	MC	Use of Tablet PCs in the Undergraduate Curriculum Lili Cui 9:15 a.m. - 11:15 a.m.
JB	International Issues Genaro Zavala 12:00 p.m. - 1:30 p.m.	MD	Assessment of Teacher Preparation Eugenia Etkina 9:15 a.m. - 11:15 a.m.
KA	AAPT Plenary IV - Early High School Physics: Building a Foundation for Understanding the Sciences Leon Lederman 1:30 p.m. - 3:30 p.m.	ME	Researching the Use of Clickers in Physics Lecture Neville W. Reay 9:15 a.m. - 11:15 a.m.
LA	Project-Based Physics Thomas O'Kuma 6:00 p.m. - 8:00 p.m.	MF	Making the Transition from Introductory to Upper-Level Courses Joseph Kozminski 9:15 a.m. - 11:25 a.m.
LB	Rethinking the Upper-Level Curriculum Ernest Behringer 6:00 p.m. - 7:00 p.m.	NA	AAPT Plenary V - Dark Matter in the Laboratory David Cook 11:30 a.m. - 12:30 p.m.
LD	College Labs and Curriculum Lili Cui, Joseph Kozminski 6:00 p.m. - 8:40 p.m.	OA	PER: Implementing Reforms Jeffrey Marx 12:30 p.m. - 2:30 p.m.
LF	Good Teaching Ideas Shannon Mandel, Diane Riendeau 6:00 p.m. - 9:10 p.m.	OB	Implementing Modeling Instruction in the Physics Classroom Carl J. Wenning 12:30 p.m. - 2:30 p.m.
LG	Celebrating the Beginning and Impact of the Illinois State Physics Project James Hicks 6:00 p.m. - 8:00 p.m.	OC	Highlights of the International Year of Astronomy 2009 Janelle M. Bailey 12:30 p.m. - 2:30 p.m.
LH	High School Pedagogies Based on Physics Education Research Daniel M. Crowe 6:00 p.m. - 8:00 p.m.	OD	Educational Technology Demonstrations Vern Lindberg 12:30 p.m. - 2:30 p.m.
LC	Energy and the Environment Todd R. Leif 7:15 p.m. - 10:00 p.m.	OF	Post-deadline Paper Session 12:30 p.m. - 2:30 p.m.
LI	Using Research to Guide Science Teacher Professional Preparation Stamatis Vokos 8:00 p.m. - 10:00 p.m.	OG	Make and Take Physics Equipment Tom Senior 12:30 p.m. - 2:30 p.m.
LJ	Women and Men of the Manhattan Project: The Legacy of Wartime Physics in Chicago Jill Marshall 8:00 p.m. - 10:00 p.m.	OH	Demonstration Exhibits Created by Students 12:30 p.m. - 2:30 p.m.
LK	PER: Problem Solving in Lecture and Lab Paula Engelhardt 8:00 p.m. - 10:00 p.m.	PA	AAPT Plenary VI - Awards Ceremony/Presidential Transfer Harvey Leff 2:30 p.m. - 4:00 p.m.
LE	Assessment of Effectiveness of Educational Technologies in Instruction Michelle Strand 9:00 p.m. - 10:00 p.m.		