

## Joint IACT/ISAAPT Meeting Program Overview

<b>FRIDAY, October 10, 2008</b>				
8 a.m. - 5 p.m.	<b>Bowling &amp; Billiards Ctr. (BBC) Activity Room</b> Check in and on-site registration along with light breakfast items before lunch.			
8:30 - 8:50 a.m.	<b>Bowling &amp; Billiards Ctr. (BBC) Activity Room</b> Overview and welcoming remarks by Tom Holbrook, IACT President; ISAAPT President Debby Lojkutz; Chemistry & Physics Dept. chairs Clifford E. Dykstra & Richard F. Martin			
Time \ Location	<b>Bone Student Ctr. (BSC) Founders Suite</b>	<b>Bone Student Ctr. (BSC) Circus Room</b>	<b>Bowling &amp; Billiards Ctr. Activity Room</b>	<b>Bone Student Ctr. (BSC) Spotlight Room</b>
9:00 - 9:50 a.m.	<b>W1.</b> Willy Hunter & Ken Wester, <i>Future Teachers</i>	<b>W3.</b> Anthony Nelson, <i>GE and Alternative Energy Sources</i>	<b>W4.</b> Barbara Gottmoller, <i>Modeling Chemistry</i>	<b>W2.</b> Sara McCubbins & Angie Codron, <i>Inquiry &amp; Student-centered Learning in Chemistry</i>
10:00 - 10:50 a.m.	<b>W6.</b> Beth Chamberlain, <i>Engineering is Fun – Producing a Science Camp for Your Community</i>	<b>W5.</b> Don Reid, <i>A Collection of Energy Demonstrations and Activities</i>		<b>W7.</b> Anthony Nelson, <i>The Scientific Method</i>
11:00 - 11:50 a.m.	<b>W8.</b> Lynn Otterson, <i>Reading Strategies in the Science Classroom</i>	<b>W10.</b> Lenore Horner, S. Miller, H. Lynch, T. Duncan, & A. Martin, <i>Wii Remote in Physics Labs</i>	<b>W11.</b> Tom Foster, <i>Matter and Interactions</i>	<b>W9.</b> Zach Metzger, <i>Bicycle Energy</i>
11:00 - 11:50 a.m.	<b>PL.</b> Tom Willmitch, <i>Timothy Ferris's Galaxies</i> , <b>ISU Planetarium</b> (College & School Streets)			
12:00 - 1:30 p.m.	Lunch, <b>BBC Activity Room</b> (including 30-min. business meeting for IACT and informal time for ISAAPT working groups)			
1:30 - 2:30 p.m.	Albert D. Grauer, <i>Remote Access Telescope</i> <b>BBC Activity Room</b>			
2:30 - 3:45 p.m.	Paper Session A, <b>BBC Activity Room</b>		Paper Session B, <b>BSC Circus Room</b>	
3:45 - 4:00 p.m.	Break, <b>BBC Activity Room</b>			
4:00 - 5:00 p.m.	John Fulton, <i>Wind Energy</i> <b>BBC Activity Room</b>			
5:00 - 6:00 p.m.	Free Time or optional wind farm visit for those not staying for the banquet			
6:00 - 6:30 p.m.	Cash Bar, <b>BSC Old Main Room</b>			
6:30 - 7:30 p.m.	Banquet, <b>BSC Old Main Room</b>			
7:30 - 9:00 p.m.	Gregg Swackhamer, <i>Energy and the Structure of Matter: Common Threads from Physics to Chemistry</i> <b>BSC Old Main Room</b>			
<b>SATURDAY, October 11, 2008</b>				
7:00 - 8:15 a.m.	ISAAPT Council Meeting, <b>309 Moulton Hall</b>			
8:00 - 8:30 a.m.	Check in and on-site registration along with light breakfast items, <b>217 Moulton Hall</b>			
8:30 - 9:30 a.m.	Paper Session C <b>214 Moulton Hall</b>			
9:30 - 10:30 a.m.	Daniel Holland, <i>The ISU Solar Car Team</i> , and David Marx, <i>Photovoltaics for Today and Tomorrow</i> <b>214 Moulton Hall</b>			
10:30 - 10:50 a.m.	Break, <b>217 Moulton Hall</b>			
10:50 - 12:00 p.m.	Paper Session D <b>214 Moulton Hall</b>			
12:00 - 1:00 p.m.	Conclusion and ISAAPT Business Meeting over Lunch <b>214 Moulton Hall</b>			

## **“Energy”**

### **Fall Meeting of the Illinois Section of the AAPT and IACT**

October 10-11, 2008

**Illinois State University, Normal, Illinois**

Friday, October 10, 2008

**8:00 - 5:00 Registration.** Check in and on-site registration along with light breakfast items before lunch. Please make checks payable to “ISAAPT”. **Bowling and Billiards Center**

**Please Recycle.** When you leave the meeting to return home, please place your plastic nametag holder in the designated box. These holders will be used at the next meeting. Thanks.

**8:30 - 8:50 Welcome.** Welcoming remarks by Tom Holbrook, IACT President; ISAAPT President Debby Lojkutz; Chemistry & Physics Department chairs Clifford E. Dykstra and Richard F. Martin. **Orientation.** Willy Hunter, ISU Chemistry Department. **Bowling and Billiards Center**

<b>Workshops, Planetarium Program, and Wind Farm</b>			
W1.	9:00-9:50	“Future Teachers”, Willy Hunter and Ken Wester	BSC Founders Suite
W2.	9:00-9:50	“Inquiry and Student-Centered Learning in Chemistry”, Sara McCubbins and Angie Codron	BSC Spotlight Room
W3.	9:00-9:50	“GE and Alternative Energy Sources”, Anthony Nelson	BSC Circus Room
W4.	9:00-10:50	“Modeling Chemistry”, Barbara Gottemoller	BBC Activity Room
W5.	10:00-10:50	“A Collection of Energy Demos and Activities”, Don Reid	BSC Circus Room
W6.	10:00-10:50	“Engineering is Fun! - Producing a Science Camp for Your Community”, Beth Chamberlain	BSC Founders Suite
W7.	10:00-10:50	“The Scientific Method”, Anthony Nelson	BSC Spotlight Room
W8.	11:00-11:50	“Reading Strategies in the Science Classroom”, Lynn Otter-son	BSC Founders Suite
W9.	11:00-11:50	“Bicycle Energy”, Zach Metzger	BSC Spotlight Room
W10.	11:00-11:50	“Wii Remote in Physics Labs”, Lenore Horner, Scott Miller, Heather Lynch, Thomas Duncan, and Andrew Martin	BSC Circus Room
W11.	11:00-11:50	“Matter and Interactions”, Tom Foster	BBC Activity Room
PL.	11:00-11:50	“Timothy Ferris’ Galaxies” - Planetarium Program, Tom Willmitch	ISU Planetarium @ College & School St
WF.		Twin Grove Wind Farm. This will be a self-guided tour that will take from 2-3 hours. Tentative starting times are at 5:00 p.m. on Friday (immediately following John’s talk) and at 1:00 p.m. on Saturday. <i>You will need to provide your own transportation.</i> Details are provided in your registration packet.	East of Bloomington

**12:00 – 1:00 Buffet Lunch and Door Prizes** – Lunch ticket required. *Lunch must have been ordered with Registration.* **BBC Activity Room**

1:00 - 1:30 IACT Business Meeting, informal ISAAPT working groups, free time. **BBC Activity Room**

1:30 - 2:30	<p style="text-align: center;"><b>“Remote Access Telescope”</b></p> <p style="text-align: center;"><b>Albert Grauer</b> Lunar and Planetary Laboratory, University of Arizona <b>BBC Activity Room</b></p> <p>The NFO WebScope is a web-based observatory that has been in use since December 2004. The telescope is an 0.6-m Group 128 Cassegrain reflector with a new drive and control system. By optical modifications and appropriate image treatment, we have been able to reach a differential photometric accuracy of about 0.005 magnitude per observation in work on eclipsing binary stars. In addition, middle school, high school, college, graduate students, and public school teachers use this telescope to conduct their astronomical research projects under a NASA IDEAS grant. Collaborators include A. W. Neely and C.H.S. Lacy.</p>
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2:30 - 3:45 **Session A (concurrent with Session B) - BBC Activity Room - Chair: TBA**

2:30 - 2:45 - A1 - Other

**Promoting STEM Careers to Underrepresented Group.** Grace Foote Johns, Illinois State University Physics Department, Normal, IL 61790-4560. The discussion about improving the recruitment and retention of women in physics is joined by more Educators today than it had twenty years ago. And that is a welcome and long awaited outcome. Our society needs all of its citizens encouraged to reach their potential if the United States is to regain its competitive technological edge. With the pool of college bound seniors is shrinking, Educators/Advisors need to get serious about identifying new sources of potential physics majors. Tapping into “grow your own” philosophies are one way to increase that pool while also helping to retain the students we have. Educators and Advisors sharing their successes and strategies for increasing the number of women (and minorities) in STEM will help all of us to increase our potential recruitment pools. My talk will discuss ISU Physics’ successful recruitment and retention efforts and ask others to share their efforts.

2:45 - 3:00 - A2 - Other

**Who Did This?** George Bart, Truman College, Chicago, IL 60640. A brief multiple-choice questionnaire will sample the audience’s collective knowledge of a number of introductory physics related examples and events. They have interesting historical origins that are not noted in typical physics texts. Thus, physics instructors commonly do not credit the creators and principals of key aspects of their discipline. Isaac Newton wrote to Robert Hooke that: “If I have seen further it is by standing on ye shoulders of Giants.” But today, beginning physics courses often neglect the individuals who laid the foundations of our science. This gives an inaccurate picture of how physics progresses. Identifying the giants can provide colorful and inspirational personal stories to humanize physics and enrich the classroom experience. The examples and events considered have a surprisingly common thread. Come and learn what it is.

3:00 - 3:15 - A3 - Other

**You Too Can Be a Presidential Award Winner.** Tom Holbrook, University High School, Normal, IL 61790. A brief account of Tom Holbrook’s experience as the 2007 Winner of the Presidential Award for Excellence in Mathematics and Science Teaching will be presented along with advice on how you can apply, or nominate a colleague, to be the 2009 Illinois Science PAEMST award winner.

**3:15 - 3:45 - Take Fives - BCC Activity Room** 1. Ken Mellendorf, "TIPER Quizzes" 2. Dave Sykes, "Cell Phones and Popcorn" 3. Stephanie Persson, "Percy Julian" 4. Frank Cange, "The 14 Bottle Problem and Air Rocket Projectile" 5. Rebecca Wenning-Vieyra, "Mathematics of Music"

**2:30 - 3:45 Session B (concurrent with Session A) - BSC Circus Room - Chair: TBA**

**2:30 - 2:45 - B1 - Active Learning**

**"Shocking" Optics with Disposable Cameras.** Rebecca Wenning-Vieyra, Cary-Grove High School, Cary, IL 60013. A simple laboratory activity will be presented that includes the use of free, already-used disposable cameras available at nearly any Walgreens or Wal-Mart. A demonstration will be given of how the cameras can be used to teach about refraction, concave and convex lenses, and pinholes. Safe-handling instructions and a demonstration of how to carefully discharge a capacitor will be shared. A hand-out detailing the lab activity will be provided.

**2:45 - 3:00 - B2 – Demonstrations**

**The Color of Shadows.** Don Reid, Lincolnwood High School, Raymond, IL 62560. Most physics test include color photos of different colors of light shining on different colored objects producing, for some, unexpected results. A few also include photos of shadows cast when two or more colors of light are combined. This presentation will demonstrate the colors of shadows using an inexpensive and easy to use system.

**3:00 - 3:15 - B3 - Active Learning**

**The Art of Estimation.** Dave Sykes, Lincoln Land Community College, Springfield, IL 62794-9256. A new Math Course (Math 105) is being developed at Lincoln Land Community College that is a terminal transfer course that consists of two hours of traditional lecture and two hours of activities (lab) per week. Many of the activities will deal with the mathematical descriptions of natural and social phenomena while one of the beginning activities will deal with having students make estimates of common everyday quantities. In this talk a list of proposed activities for Math 105 and a description of the estimation activity will be presented along with an opportunity for attendees to attempt some estimates for themselves.

**3:15 - 3:30 - B4 - Active Learning**

**Wind Turbine Physics.** Christopher LaRoche, Sherrard High School, Sherrard, IL 61281. Sherrard High School has had the construction of a 600 kW wind turbine in the works for over two years. The time has finally come when the high school will no longer be dependent on company bought electricity. Physics students have been buzzing with excitement and cannot wait to begin data collection and analysis. This presentation will give a brief history of Sherrard's wind turbine experience to date and some examples of student designed projects that are in the works.

**3:30 - 3:45 - B5 - Active Learning**

**Energy and Hot Wheels.** Deborah Lojcutz, Joliet West High School, Joliet, IL 60435. I will present some lab activities using hot wheels cars and track that help students develop their understanding of the various types of energy, transformations between types of energy and the law of conservation of energy.

**3:45 - 4:00 - Break - BSC Spotlight Room**

<b>4:00 - 5:00</b>	<p><b>“Wind Energy”</b></p> <p><b>John Fulton</b> Horizon Wind Energy, Bloomington, Illinois <b>BBC Activity Room</b></p> <p>A brief introduction to wind, history of wind energy use, how a wind turbine is used to make electricity, and wind energy and the environment.</p>
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**5:00 - 6:00 Free Time**

**6:00 - 6:30 Cash Bar - BSC Old Main Room**

**6:30 - 7:30 Banquet - BSC Old Main Room.** Meal ticket required. *Banquet meal must have been ordered with Registration. After dinner talk open to all conference registrants.* Presentation of the *Distinguished Service Citation.*

<b>7:30 - 9:00</b>	<p><b>“Energy and the Structure of Matter: Common Threads from Physics to Chemistry”</b></p> <p><b>Gregg Swackhamer</b> Glenbrook North High School, Northbrook, Illinois <b>BSC Old Main Room</b></p> <p>Students generally have difficulty explaining how particles and energy account for the behavior of matter as we observe it with our senses. Phenomena such as diffusion, phase changes, chemical changes, and so on, are often problematic for students even after we have done our best as teachers. In addition, physics and chemistry books sometimes contradict one another in their treatment of energy and bonding, whether physical, chemical, or nuclear. Because particle models and energy are common to physics and chemistry, our science department decided to attempt to address these learning issues by designing a physics course to serve in part as an introduction to chemistry and a chemistry course designed to use models from physics explicitly, weaving structure-of-matter and energy “threads” through these courses. This presentation describes the rationale for our work and our progress so far.</p>
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*Saturday, October 11, 2008*

**7:00 - 8:15 ISAAP Council meeting** - Presiding: Deborah Lojkutz, President. 309 Moulton Hall

**8:00 - 8:30 Registration.** Check-in and on-site registration with light breakfast items. Please make checks payable to "ISAAP". 217 Moulton Hall

**8:30 - 9:30 Session C - 214 Moulton Hall** - Chair: TBA

**8:30 - 8:45 - C1** - Research

**Earth’s Deadliest Neighbors in Space.** *Al Grauer*, University of Arizona, Silver City, NM 88062. Near

Earth Objects [NEOs] are asteroids, comets, and meteorite precursors which pass near the Earth. The impact of a large NEO represents a small, but significant, threat to the global biosphere. The Catalina Sky Survey uses telescopes in Arizona and Australia and discovered more than 450 NEOs in 2007. Collaborators include E. C. Beshore and S. M. Larson.

**8:45 - 9:00 - C2 - Active Learning**

**Covering Newton's Laws of Motion.** *Bill Hogan*, Joliet Junior College, Joliet, IL 60431. All introductory physics courses spend significant time covering Newton's Laws of Motion. Over the years, I've stolen some ideas that have helped my students understand this material. I will present what I have found helpful to my students in the hope that this presentation will prompt audience members to suggest even more good ideas that I can steal.

**9:00 - 9:15 - C3 - Active Learning**

**Do Clickers work? For Everyone?.** *Tom Carter*, College of DuPage, Glen Ellyn, IL 60137. Do clickers and the associated Peer Instruction method work for all students? I will review some data from the College of DuPage and Chicago State University that seem to indicate that there may be some problems with this method at least for some students.

**9:15 - 9:30 - C4 - Active Learning**

**Volume of Everyday Items.** *Don Reid*, Lincolnwood High School, Raymond, IL 62560. Most students are familiar with standard measures of volume such as a gallon of milk or 1/2 a gallon of OJ. But few are familiar with metric (except for the 2 L soda bottle). Participants will guess and then measure the volumes of several household items packaged in metric volumes.

<p><b>9:30 - 10:00</b></p>	<p style="text-align: center;"><b><i>"ISU Solar Car Team"</i></b></p> <p style="text-align: center;">Daniel Holland Illinois State University <b>214 Moulton Hall</b></p> <p>In 2005 the ISU Solar Car team successfully completed the North American Solar Challenge, a 2,500-mile "rayce" from Austin, Texas to Calgary, Alberta. This year the team updated and improved essentially all of the components of the car in preparation for the 2008 Solar Challenge. Even though the team was forced to withdraw due to a motor malfunction, the project was still a big success from the perspective of student learning and gaining experience. We are currently working to resolve the motor problem in preparation for a track rayce in May of 2009 and to long distance road rayces in 2010.</p>
<p><b>10:00 - 10:30</b></p>	<p style="text-align: center;"><b><i>"Photovoltaics for Today and Tomorrow"</i></b></p> <p style="text-align: center;">David Marx Illinois State University <b>214 Moulton Hall</b></p> <p>In the United States, renewable energy sources currently provide around 7 % of our energy needs. Around 85 % is provided by fossil fuels, which are in increasing demand, largely imported, increasingly expensive, and a primary source of carbon emissions. Although Germany and Japan are the world's leaders in the use of solar energy, the United States hopes to catch up with both utility- sized projects and distributed systems on homes and businesses. This presentation will focus on past and present efforts to make high efficiency, low cost solar cells to provide a greater percentage of tomorrow's energy needs.</p>

**10:30 - 10:50 Morning Break - 217 Moulton Hall**

**10:50 - 12:00 Session D - 214 Moulton Hall - Chair: TBA**

**10:50 -11:05 - D1 - Teaching Methods**

**Using iClickers.** *Ken Mellendorf*, Illinois Central College, East Peoria, IL 61635. Here are the reasons why I like using the iClicker student response system in class.

**11:05 -11:20 - D2 - Teaching Methods**

**Mössbauer Day in the Modern Physics Course.** *Chuck Schulz*, Knox College, Galesburg, IL 61401. The standard Modern Physics course covers both relativity and introduces wave mechanics. These topics present a range of non-intuitive phenomena that challenge the students' notions of how the world behaves, particularly in the lack of direct connection to student experience: time dilation, gravitational red shift, the uncertainty principle, emission and absorption spectra, Doppler shift, and the quantization of various energies of a quantum system. I have found that introducing the Mössbauer effect one day late in my Modern Physics course is a neat way to both review these topics done earlier in the course and to show real-world examples of the physical phenomena. This talk will show in a condensed form how this works.

**11:20 -11:35 - D3 - Teaching Methods**

**Use of Mathematica in Intermediate Quantum Mechanics.** *Narendra K. Jaggi and John Meuser*, Illinois Wesleyan University, Bloomington, IL 61702. We will share some recent, pleasant experiences with the use of Mathematica 6.0 in our junior level course in Quantum Mechanics at IWU. During the first four weeks of the current semester, students in this class have written, as homework, Mathematica programs that do an outstanding job of visualizing the solutions of a number of fundamental problems in non-relativistic quantum mechanics. In particular, we will present the manner in which dynamically displaying the stationary energy eigenstates of the harmonic oscillator in the large quantum number limit, watching the evolution of the exact wave-packet solutions of the harmonic oscillator for variable "amplitude", and contrasting these with the wave-packet solutions for the free particle case is a good example of the significant value of integrating symbolic and numerical computation in the undergraduate physics curriculum.

**11:35 -11:50 - D4 - Active Learning**

**Old Technology for New Purposes.** *Christopher LaRoche*, Sherrard High School, Sherrard, IL 61281. Students in Sherrard High School's physics class are required to complete a project called "Catalog Creation". Students are asked to choose a device, found in catalogs, that interest them then begin the experimental process of making their own piece of equipment. The goal is to spend little to no money on a device that will function equally well as a catalog bought device.

**11:50 - 12:00 Take Fives** *Tom Foster*, "The International Year of Astronomy Promotional Video"

**12:00 - 1:00 Lunch** – Ticket required. *It must have been ordered with Registration.* **ISAAPT Business Meeting** – Election of Council Members and Officers, Constitution and Bylaw Amendments.