



INDIANA ACADEMY OF SCIENCE NEWSLETTER

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Musical Acoustics: “Science and Performance”

by Uwe Hansen

An evening with Ensembles and Soloists from the Department of Music of the University of Indianapolis and Dr. Uwe J. Hansen, Professor Emeritus of Physics, Indiana State University, was enjoyed by Participants in the annual IAS meeting, the UINDY community, and the Indianapolis public at large. Sponsored by The Indiana Academy of Science, the Acoustical Society of America, and the University of Indianapolis, the event represented a major effort on the part of the Academy to reach out to the community. The University of Indianapolis graciously made the Ruth Lilly Performance Hall of the Christel DeHaan Fine Arts Center available for the event. Dr. Kathleen Hacker, Chair of the Department of Music, and Dr. Richard Ratliff were largely responsible for making arrangements for the program of the evening.

Dr. Hansen began the evening by introducing science concepts associated with sound waves. This lead into the physics principles responsible for the music produced by bowed string instruments (see Fig 1). These string sounds were illustrated with a movement of a Schubert string quintet



Figure 1. Dr. Hansen recording the violin sound in preparation for presenting a violin spectrum. (All images by John Schutt.)

performed by UINDY music students. The missing even harmonics in a clarinet were illustrated with a clarinet spectrum which was followed by a Beethoven transcription performed by a clarinet trio (Fig. 2). Flute sounds were



Figure 2. UINDY students performing Beethoven in transcription.

beautifully demonstrated by the UINDY Flute Choir in a performance of a Medley by prominent Russian composers. The inharmonicity of upper harmonics in a piano sound were discussed by Dr. Hansen and subsequently demonstrated in a performance of a Poulenc Sonata for Piano – four hands (Fig. 3, next page). The evening was rounded out with comments about non-harmonic sounds of percussion instruments illustrated by the performance of two pieces by the UINDY Jazz Combo.(Fig. 4, next page).





Figure 3. Piano duet with Allegra Sorley and Richard Ratliff.



Figure 4. The Uindy Jazz Combo performs at the IAS Concert.

Successful BioBlitz at Hanover College

by Daryl R. Karns, Hanover College

A BioBlitz is a rapid assessment (usually over a 24 hour period) of the species found in a particular area. Scientists and volunteer naturalists work in teams to identify the local flora and fauna. BioBlitz events help connect people with the natural world and provide useful information on local biodiversity. The first public participation BioBlitz was held in 1996 outside Washington D.C.; since that time, BioBlitz events have become important tools for educational institutions and public agencies. To the best of our knowledge, there have been nine BioBlitz events in Indiana since 1991. As noted in the preceding announcement, the Rivers Institute at Hanover College and the Biodiversity and Natural Areas Committee of IAS plan to continue their BioBlitz collaboration.

On May 4 and 5, 2007 Hanover College hosted the first BioBlitz in southeastern Indiana. The Hanover BioBlitz was

organized by faculty members of the Hanover College Biology and Geology Departments; the event was sponsored by the Rivers Institute at Hanover College. A number of Indiana Academy of Science members and friends participated in the Hanover BioBlitz and the Rivers Institute collaborated with numerous institutions, agencies, and individuals in the execution of the BioBlitz.

At the Hanover College BioBlitz nine survey teams searched the campus and the adjacent Ohio River for species of fish, amphibians, reptiles, birds, mammals, insects and other arthropods, and vascular plants and fungi. In addition to these animal, plant, and fungus teams, the college also had a microbial team and a fossil team. A total of approximately 60 students and volunteers worked on the survey teams or helped with the public participation



The insect collecting team, organized by Bill Ruesink, Illinois Natural History Survey, at work during the Hanover BioBlitz.



Student herpetologists search for amphibians and reptiles in and around a small creek during the BioBlitz.



*Hanover College students, Cassie Morris (right) and Cara Dreher (left) holding two of the fish (Longnose Gar, *Lepisosteus osseus*) they caught during electrofishing cruises led by Chris Lorentz, Thomas More College.*

events. Faculty from the Hanover College Biology (Darrin Rubino, Daryl Karns, Walter Bruyninckx, J. Dan Webster, Dennis McDonald, and Mike Worrell) and Geology Departments (Ken Bevis, Pete Worcester) led most of the survey teams; in addition, the Hanover College BioBlitz was very fortunate in having some distinguished scientists join the survey. Dr. Bill Ruesink and Dr. Ed DeWalt (Illinois Natural History Survey) and Sara Sanders (Kentucky DNR) organized the arthropod team; Dr. Chris Lorentz (Thomas More College) brought their field station's electrofishing boat; Dr. Dale Sparks (Indiana State University) brought bat-netting and bat detection equipment; Jodie Sparks (ISU) joined the plant team; Dr. Joe Robb (Big Oaks Natural Wildlife Refuge) worked with the bat survey team; and Jason Lewis (Big Oaks) led one of the bird survey teams.

Mammal, fish, bird, and insect teams began their survey Friday night. The other teams did their survey work on Saturday. The science survey teams were working all over the campus and in the Ohio River. A total of 547 taxa were identified (233 plants, 146 insects, 79 birds, 23 fish, 21 miscellaneous invertebrates, 20 macrofungi, 12 mammals, 9 amphibians, and 4 reptiles). In addition, 24 fossils of Ordovician marine life were identified; bacteria and microfungi were collected, but not identified. No state or federally endangered species were found, but a number of new county records were recorded.

In addition to the scientific survey teams, three family-friendly public events allowed the campus community and visitors to interact with scientists. On Friday night, visitors could observe nocturnal insect-collecting using a black light, bat detection using a bat-trapping mesh net, solicitation of owl calls, and fluorescent dye-marking of small

mammals (a fluorescent powder is sprinkled on the fur of a small mammal, the mammal leaves a trail of powder that can be followed for several days using black light at night). On Saturday there was a day hike open to the public; participants were acquainted with the natural history of the Hanover campus by trail guides and visitors were able to see the survey teams in action.

The BioBlitz culminated in a public Biodiversity Festival on Saturday afternoon. The survey teams displayed some of the species found and identified species as visitors wandered among the display tables set up for the BioBlitz event in the Hanover College Science Center. An added bonus was the display of living birds of prey; Zach Walker, Indiana DNR, and Tami Davis brought birds from the Dwight D. Chamberlain Raptor Rehabilitation Center at the Hardy Lake State Recreation Area. On display were a screech owl, great horned owl, vulture and other spectacular birds. The Hanover BioBlitz team leaders plan to publish a short note in the Indiana Academy of Sciences and post the list on the Indiana Academy of Science website. Participants had a great time exploring the biological diversity, both past and present, of the Hanover College campus. In our frenetic, cell-phone society, many people, especially young people, suffer from what has been called nature-deficit disorder – the loss of connection with the natural world. BioBlitz events are one way to engage young people in the study of the natural world.



The botany team, led by Darrin Rubino, Hanover College, works in a forested ravine on the Hanover College campus.

A [Final] Note from the President

The Indiana Academy of Science truly is a wonderful organization. The deeper that my involvement has become involved with the group, the greater is my appreciation for the fine people who make this organization work. More on that later...

We had a WONDERFUL Fall Meeting: If you did not attend, then you really missed a great meeting. Friday night started out with an excellent presentation that blended science with musical performance. Dr. Uwe Hansen showed us the physics behind the timbre of different types of musical instruments. His talks were interspersed with performances by The University of Indianapolis String Quintet, Clarinet Trio, Flute Choir, pianists, and Jazz Combo. Friday morning started off with paper presentations. Our speaker of the year was Dr. Ann Cutler who gave a dynamite talk (with demonstrations) on fire and explosives. This was followed with four special presentations entitled, "Communicating Science with the Public," "Science as a way of Knowing: Teaching the Evidence for Evolution," "Freshwater Mussels of Indiana," and "Mag-gots from Murders!" In the last several years, I have appreciated the afternoon special sessions.

Do you attend the IAS annual meetings? I never leave an IAS annual meeting without becoming excited anew about science. Plan to attend next Fall's Meeting at the University of Evansville. And, if you only come to an IAS Fall Meeting to present a paper, then you are really missing out on other wonderful activities. Stick around! I promise you that you will be glad that you did.

The Natural Heritage of Indiana: At the 2006 IAS Fall Meeting, the Executive Committee and Council heard that film maker Sam Orr was working with WFYI to produce three videos based on Marion Jackson's book, *The Natural Heritage of Indiana*. At our December 2006 budget meeting, the IAS decided to help sponsor this production with a donation of \$20,000. (In addition to this being a worthy sponsorship in its own right, the IAS will also receive lots of name advertisement.) The video premier for the first episode was held Friday evening of our Fall Meeting. If you live in the WFYI viewing area, I hope that you saw this show in November. It will probably become available to other Indiana public television stations. If you live outside of the WFYI viewing area, then you may want to contact your local PBS station about showing this IAS sponsored program.



John Schutt, 2007 IAS President

Invite the Speaker of the Year Will Come to Your College or University: In addition to giving the key note talk at our annual meeting, the Speaker of the Year is available to come to your college or university. The IAS pays an honorarium to the Speaker for this purpose. Travel, lodging, and other related fees are paid by your school. If you are interested in hosting Anne Cutler, then contact Uwe Hansen at 812-234-0229 or at u-hansen@indystate.edu.

Thank you! Many people help to make the IAS a great organization. As president, I have worked closely with several people and I would like to express a public "Thank you" to:

- **Nelson Shaffer** for keeping the ship of the IAS on course. Presidents come and presidents go, but Nelson lasts forever. It seems that whenever I am around you, I hear you promoting the IAS. Thanks for your wonderful work on our behalf. Thanks also for organizing the talk on *Communicating Science with the Public*. The speakers were excellent.
- **Uwe Hansen** for organizing the Friday night "Musical Acoustics: Science and Performance" and for getting our Speaker of the Year. You really worked hard to make this fall meeting memorable.

- **Claire Chatot** for prepping me for my task as president this year.
- **Ed Frasier** for being an extraordinary treasurer, parliamentarian, and presidential advisor. I have truly appreciated your help and getting to know you.
- **John Langdon** and **Molly Schiel** for organizing the fall meeting.

Tell Someone About Our Great Organization: I shared this in my first Note, and I'd like to repeat it now... The best and easiest way to help the IAS grow is for each of us to tell someone else about the organization. Tell a colleague in the

hall or at a department meeting. Pass on a membership brochure. Have your departmental web site link to the IAS home page at www.indinaacademyofscience.org. Give someone a membership. Let's continue to grow this wonderful organization.

Thank you for allowing me to be your President: for the opportunity to serve you as president in 2007. It truly was a privilege.

With gratitude,
 -- **John Schutt**
 2007 IAS President

2008 IAS Meeting Dates

Meeting Site: - - - - - **University of Evansville**

Spring Meeting: - - - - - **April 18-19**

Fall Meeting: - - - - - **October 23-24**

-- **Daniell, David, Chair**
 Programs and Invitations Committee
 ddaniell@butler.edu

Indiana Academy of Science 2007 Winter Senior Grant Awards

(Recipient, Institution, Amount, Title of Project)

- Melody Bernot;** Ball State University; \$3,000.00.
 Nitrogen fixation rates in Indiana streams influenced by agricultural activity.
- Clare Chatot;** Ball State University; \$3,000.00. Regulation of expression of the glycolytic enzyme phosphofructokinase in preimplantation mouse embryos.
- Priya Hewavitharanage;** Ball State University; \$3,000.00. Synthesis of boron containing conjugated photochromic polymers.
- Priya Date;** Indiana State University; \$1,861.00. Chemical cue composition and effects of plasma hormone levels on chemical communication traits in *Sceloporus undulatus*.
- Gabriela Gonzalez-Olimon;** Indiana State University; \$655.00. Small mammal communities along highways: species composition and behavior.
- Richard Kjonaas;** Indiana State University; \$3,000.00. Minimization of coupling products in the preparation of

- substituted benzylic Grignard reagents.
- Winfried Peters;** Indiana University-Purdue University Fort Wayne; \$2,980.00. Characterizing gradients of elastic cell wall strain to quantify "cryptic growth" in plant organs
- Daragh Deegan;** Indiana University-Purdue University Fort Wayne; \$3,000.00. Endocrine disrupting effects of fish species exposed to agricultural contaminants in Cedar Creek watershed, northeast Indiana.
- James Beasley;** Purdue University; \$1,250.00. Ecological response of raccoons to agriculturally induced habitat fragmentation.
- Robert Brodman;** Saint Joseph's College; \$2,512.00. The ecological effects of aquatic herbicides on amphibians and aquatic invertebrates.
- Pamela Connerly;** Indiana University Southeast; \$2,795.00. Identification, purification and genetic analysis of *Acinetobacter* phages from Indiana soil.

Note from the Incoming President Nils I. Johansen, P.E.

I look forward to serving as president this next year. As many of my predecessors have said, we are building on a foundation established by outstanding Hoosier Scientists over the many years of the Academy.

This coming year I look forward to expanding our presence in the mind of Hoosiers in general. The Natural Heritage video, the presence in our secondary schools through the Junior Academy and our proceedings and publications should increase awareness of the scientific work in Indiana in its schools, universities and for the population as a whole. For example, the planned upcoming Bio-Blitzes are examples of what I consider the overall theme for the Academy, "Bringing Indiana Science to the people of Indiana."

-- Nils I. Johansen, P.E.
e-mail: johansen@usi.edu



Sixtieth Annual IAS Talent Search Report

The sixtieth annual Indiana Academy of Science Talent Search was held at Indiana University-Kokomo October 26-27, 2007. As co-chair of the Youth Activities Committee and a judge at this year's Talent Search, I was quite impressed with the caliber of students and the breadth of quality research they had performed. The competition consists of submitting a research paper describing the work and then, if selected for the finals, being interviewed by the panel of judges as a group and then individually in front of a poster presentation of the research. This year there were thirteen finalists representing five high schools from across the state. Their projects dealt with a variety of topics ranging from fuel cells to the ecological impacts of road salts. Our two first place winners each receive a

trip to the 2008 AAAS meeting in Boston and they were **Neeta P. Kamat** and **Joseph G. O'Rourke** both of John Adams High School. Neeta's research project was entitled "Ecotoxicological Effects of Ionic Liquids on Aquatic Life." "Developing Novel Methanol Crossover Management Techniques to Increase the Performance of the Direct Methanol Fuel Cell" was the title of Joseph's work. Our second place finisher was **Charles J. Hansen** of Northwestern High School who received a \$600 scholarship for his work "Cecropins as an Antitumor Agent." **Adam B. Kern** finished in third place receiving a \$300 scholarship for his project "Construction of a Prototype Enzymatic Fuel Cell for Purposes of Oxidizing and Generating Power from Wastewater."



Participants of the 2007 IAS Talent Search

Our other Talent Search Winners were **Nyssa C. Boyd**, **Jessica L. Jackson**, **Aaron W. Martinson**, **Emily A. Schubert**, and **Michael A. Tomchaney**. The remaining finalists were **Lauren N. Hodge**, **Stephen E. Hsieh**, **John R. McCormick**, and **Meelyn M. Pandit**. Each of these other finalists and winners received a \$50 cash award. At the luncheon following the competition it was so nice to see the level of support all of these talented young people receive from not only their sponsoring teacher but also their family. **Marcia Gillette**, director of the Talent Search, deserves much

praise for the amazing job she does in organizing, planning and executing this wonderful event. My fellow judges, **Mark Davis** of University of Evansville, **Howard McLean** and **Maarij Syed** both of Rose Hulman Institute of Technology, also deserve thanks for the dubious task of choosing the best projects out of all the excellent work received. The Indiana

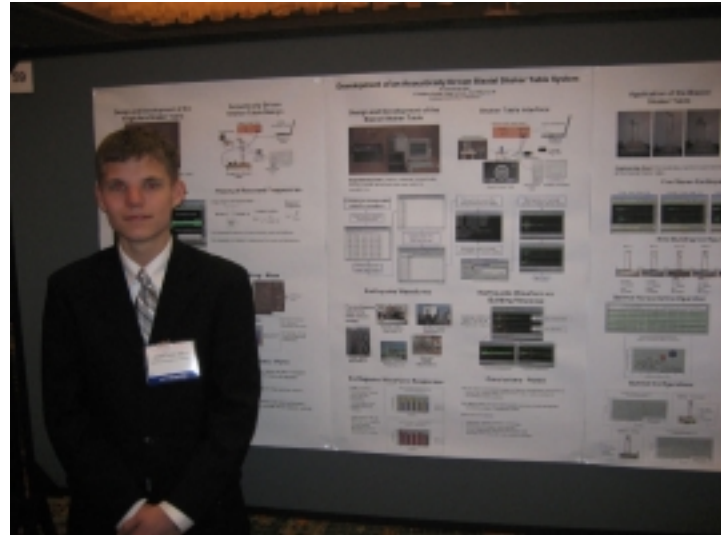
Academy of Science should be very proud of helping to nurture these future scientists and continue to foster their obvious love and excitement for the field we all have such a fondness for.

-- **Jennifer Metzler, Co-Chair**
Youth Activities Committee

Report from the AAAS/NAAS Representative

In February 2007 I attended the 2007 annual meeting of AAAS/NAAS in San Francisco, CA. As a part of my representation of the Indiana Academy of Science I attended the assembly of delegates for the National Association of Academies of Science (NAAS). Through this representation the Indiana Academy receives funding for two students from the state to attend and present their research at the annual meeting of the American Junior Academy of Science each year (held concurrently with the AAAS/NAAS meetings yearly).

At the 2007 annual meeting the two student state representatives from Indiana were **Ethan Sperry** and his sponsoring teacher/mentor Dr. **Rusty Gosner**, and **Jonathan Bell** with his father **Andrew Bell**. Each received paid trips to the AJAS/AAAS meeting in San Francisco. Our two representatives performed very well at the student research poster sessions. I observed both while they fielded questions from AAAS meeting attendees and they handled themselves with confidence and professionalism in their respective work. The Indiana Academy should be very proud of such outstanding young scholars representing



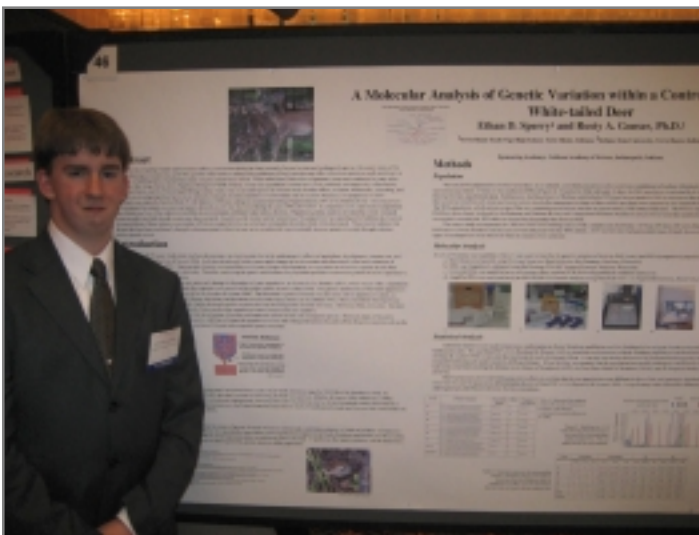
Jonathan B. Bell; *“Design, Development, and Application of a Computer Controlled Acoustically Driven Portable Biaxial Shake Table System”*; R. Nelson Snider High School, Fort Wayne; Sponsoring Teacher: Barbara Gabet

our state at the AJAS/AAAS meeting. Included in this article are pictures of Ethan and Jonathan with their presentations posters and information concerning their respective projects.

Other noteworthy items from the AAAS/NAAS annual meeting were that the NAAS is looking into ways to better serve state academies of science. Some ideas proposed (but not acted on formally) were: an increase in funding for student attendance and participation in the national AJAS meetings, providing students research funding or matching funding for research projects, and the possible establishment of a “Journal for Young Researchers” to publish research findings by young scholars. The NAAS is asking state academies of science for additional ideas about ways they can provide better service to the state academies.

If you have any questions, suggestions, ideas, or other issues you would like to discuss regarding the representation of Indiana Academy of Science with AAAS/NAAS please feel free to contact me:

-- **R. Brent Summers**
AAAS/NAAS Representative
bsummers@usi.edu
812.465.1636



Ethan D. Sperry; *“A Molecular Analysis of Variation within Microsatellite Loci of a Controlled Population of White-tailed Deer from Southern Maryland”*; Terre Haute South Vigo High School, Terre Haute; Sponsoring Teacher/Mentor: Dr. Rusty Gosner, Indiana State University.

(Photo Credits: Dr. R. Brent Summers, University of Southern Indiana)

Anika Williams

New IAS Librarian & Archivist

Anika Williams is excited to join the Indiana Academy of Science as the coordinator for the IAS Archive and the John S. Wright Memorial Library at the Indiana State Library.

Anika received her MLS from Indiana University in 2003 and has been a Librarian at the Indiana State Library since 2005. She has also worked at the Carmel Clay Public Library and conducted a special cataloging project for the Carmel Clay School Corporation. Before focusing on professional librarianship, Anika completed a B.A. in Anthropology as well as a B.A. in Art History -- both

from Purdue University.

Married for eight years, she is also “Mom” to three spoiled senior Pugs (Clio, Perseus, and Thalia), practices photography (her published work can be spotted in several well-known doll-related publications), and loves to garden (especially old-fashioned rose varieties).

Anika’s husband, Terry, was recently awarded his J.D. and admitted to the Indiana Bar. She is currently adjusting to having another human at home on a regular basis.

Series of Indiana BioBlitz Events Planned

In 2005, the Rivers Institute at Hanover College and the Biodiversity and Natural Areas Committee of the Indiana Academy of Science partnered to produce the Wabash River Symposium in conjunction with the 2005 annual meeting of IAS (see *Proceedings of the Indiana Academy of Sciences*, 2006: 115(2)). As part of the Symposium we conducted a BioBlitz (rapid assessment of the species found in a particular area over a short period of time) in and adjacent to Otter Creek, a tributary of the Wabash River. We recorded 370 species during one morning and afternoon period (Karns et al., 2006). Members of the IAS and friends conducted another BioBlitz on the Hanover College campus (see article in this issue) in May of 2007.

Based on these successful events, the Rivers Institute at Hanover College and the Biodiversity and Natural Areas Committee are planning to continue their BioBlitz collaboration. Over the next five to 10 years we plan to collaborate on a series of BioBlitz events around the state. Our next BioBlitz will take place in conjunction with the 2008 annual meeting in Evansville. We are still in the planning stages, but the general plan is for a 24-hour Blitz that would begin the Friday afternoon of the meeting, continue into Friday night and conclude with a BioDiversity Festival (a public event where local species are displayed) in the late morning on Saturday. We do not plan to have a BioBlitz associated with the annual meeting on a regular basis – we would like to consider a variety of sites and dates. In collaboration with other institutions, agencies and individuals around the state, we hope to develop a master plan and calendar for Indiana BioBlitz events. For example,

a spring BioBlitz is being planned by St. Patrick’s County Park in South Bend for May 17, 2008. This will be the second BioBlitz organized by St. Partick’s (their first was in September, 2006). In addition a mid-year 2008 (date to be determined) BioBlitz is being planned at the Limberlost Nature Preserve.

BioBlitz events have both scientific and educational value. We will plan to use the IAS website as a depository for the BioBlitz species lists generated by these events (thanks to Marcia Moore, the 2005 Otter Creek BioBlitz list is posted and the Hanover College list will be posted soon). In addition, we plan to publish a brief summary overview of each BioBlitz as part of the new “Short Communications” feature in the Proceedings. If you or your institution is interested in being involved in the developing BioBlitz consortium, please let both **Don Ruch**, Chair of the Biodiversity and Natural Areas Committee (druch@bsu.edu) and myself know (karns@hanover.edu).

-- **Daryl R. Karns**
Hanover College

Literature Cited

Karns, D.R., D.G. Ruch, R.D. Broadman, M.T. Jackson, P.E. Rothrock, P.E. Scott, T.P. Simon, and J.O. Whitaker, Jr. 2006. Results of a Short-term BioBlitz of the Aquatic and Terrestrial Habitats of Otter Creek, Vigo County, Indiana. *Proceedings of the Indiana Academy of Science* 115:82-88.

OBITUARIES

William R. Gommel, IAS Historian and Necrologist, reports the deaths of the following IAS members since the November 2006 annual meeting. Please take a moment to remember our fellow colleagues.

Charlotte M. Boener, President 1989

Robert F. Bozarth

Robert Brodman

Harry G. Day, President 1962

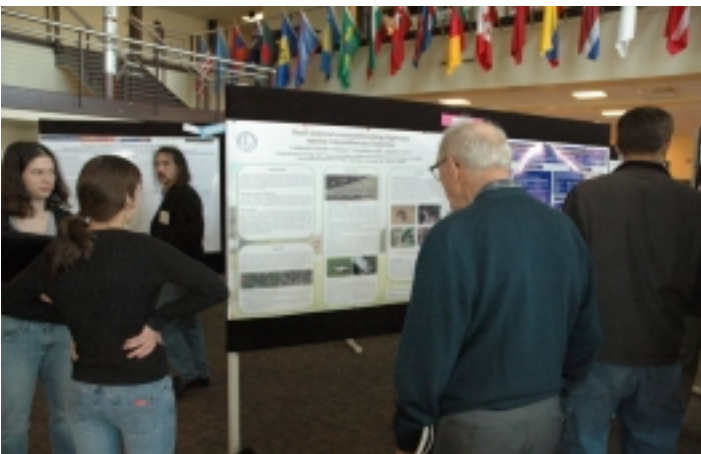
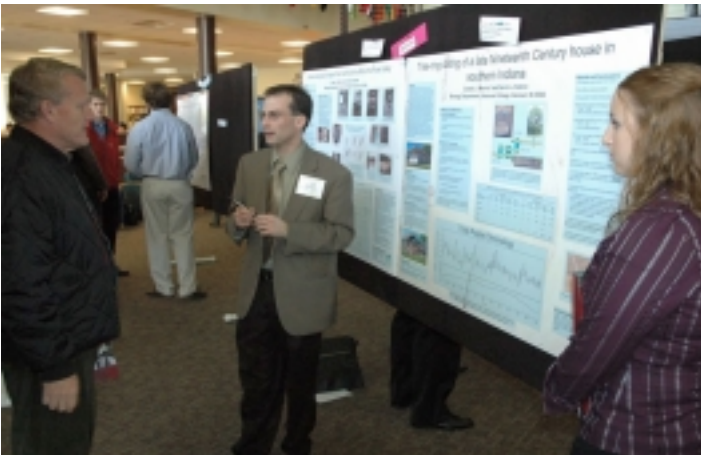
John A. Ricketts, Fellow 1967

Gerald J. Shea

Images from the 2008 Annual Meeting of the IAS University of Indianapolis



*Images provided by John R. Schutt,
Taylor University at Fort Wayne.*



2008 IAS Meeting Dates

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Deadline for submission of copy for the March issue of the IAS Newsletter is February 15, 2008.

Send copy to Donald G. Ruch at druch@bsu.edu

For IAS information, go to: www.indianaacademyofscience.org

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