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ICSET Celebrates Their New Facility Grand Opening

The mission of the Institute for Combustion Science and Environmental Technology (ICSET) is to provide a dynamic research and learning environment for WKU students to use state-of-art instrumentation in course work and hands-on experiment. It will provide multidisciplinary approaches to professional growth of faculty by providing avenues for collaboration with other faculty at WKU, as well as state, federal, and industrial research institutions. Finally it provides professional contacts for WKU faculty in search of funding for research projects.

"There is amazing and very important work going on in this facility and it plays right into what we are trying to accomplish from a national standpoint," Bill Wehrum of the U.S. Environmental Protection Agency said Thursday, February 23, during the grand opening of ICSET's new facility at WKU's Center for Research and Development. Wehrum, who is responsible for the EPA's clean air programs, said ICSET's work on mercury emissions is helping coal-fired power plants meet clean air regulations, which will result in significant improvements in public health and help secure the nation's energy future by maintaining fuel diversity in power generation. More than 200 people attended the ceremony. Scott Raab, who represented Sen. McConnell at the event, said ICSET is a good example of what targeted federal funding has done for WKU by improving the quality of education, solving pressing problems that face communities, and driving the region's economy.

WKU President Gary Ransdell said the research by ICSET is a classic partnership of state government, federal government, WKU and the private sector. "This is an important moment for us to be able to dedicate this facility," he said. During the ceremony, Commerce Secretary George Ward announced a collaboration to advance the cause of clean coal research in Kentucky and presented $352,999 from the Kentucky Office of Energy Policy to Dr. Pan and representatives from East Kentucky Power Cooperative, Owensboro Municipal Utilities, Tennessee Valley Authority, Electric Power Research Institute and Electric Energy Inc. Ward said ICSET's research fits the three basic principles of Gov. Ernie Fletcher's state energy strategy to maintain Kentucky's low cost energy, responsibly develop Kentucky's energy resources and maintain Kentucky's commitment to environment quality. "East Kentucky Cooperative is pleased to join with others in helping to continue the important clean-coal research being performed at WKU," said Roy Palk, president and CEO of EKPC, "These new technologies are helping to assure that EKPC can continue to lower its emissions while also utilizing affordable Kentucky coal."

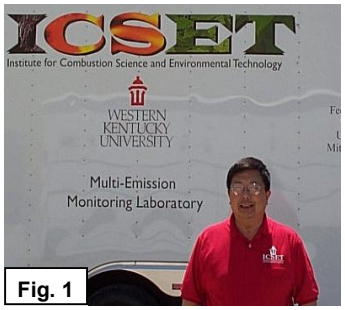


Fig. 1

Figure 1: Dr. Wei-Ping Pan, Director of Institute for Combustion Science and Environmental Technology (ICSET)

Figure 2: Dr. Gary Ransdell at the Grand Opening of the new ICSET Facility.

Fig. 2

Inside this issue:

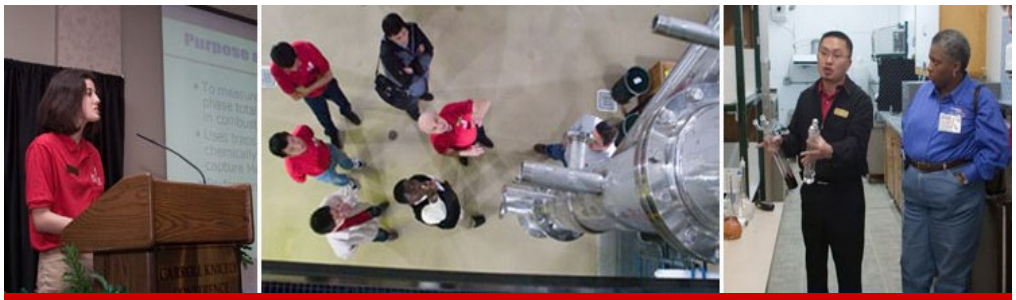
- *2006 Advisory Board Meeting, Thurs. May 18, 2006*
- *Summer Semester Begins Monday, May 15, 2006*

(Continued from Page 1--ICSET Grand Opening)

"Western Kentucky University is again leading the way in thinking about putting a gasification facility next to its combustion facility"

Don Bonk, who represented the U.S. Department of Energy, said he was pleased to hear that ICSET is adding the EKPC/WRECC Gasification Unit to its clean coal research. "Western Kentucky University is again leading the way in thinking about putting a gasification facility next to its combustion facility," Bonk said. For more grand opening news and pictures, please visit http://www.wku.edu/ICSET/grand opening.

Reference: ICSET Newsletter for February 2006
~Submitted by
Dr. Wei-Ping Pan
Director, Institute for Combustion Science and Environmental Technology



The Grand Opening of the Institute for Combustion Science and Environmental Technology was Held on February 23, 2006.

Above Photos: ICSET Grand Opening

ICSET Holds A Mercury Workshop Feb 22-23, 2006

A mercury workshop was held in Bowling Green with more than sixty participants. The workshop demonstrated three different mercury measurement methods and several mercury control technologies. The comments of a few participants are listed below:

- "Well done lab, great hands on demonstrations"
- "Staff very knowledgeable & accommodating"
- "Conduct another workshop next year with more data from test sites & Hg CEM updates"
- "One on one contact during tour"
- "Great facility with room to grow"
- "Modern equipment and excellent staff"
- "Knowledgeable staff"
- "Clean, up to date, organized, opportunity exists for good analysis"
- "Was impressed with overall knowledge of each person contacted. People were professional in trying to help"

Reference: ICSET Newsletter for February 2006

~Submitted by
Dr. Wei-Ping Pan
Director
Institute for Combustion Science and Environmental Technology

"Was impressed with overall knowledge of each person contacted. People were professional in trying to help"

Above Photos: ICSET Mercury Workshop Faculty and Participants

ICSET Receives Grant Awards From Kentucky office Of Energy Policy

"ICSET just received another award ($149,842) from the Kentucky Commerce Cabinet, Office of Energy Policy. This is in addition to the previous award ($345,999)."

A research proposal "The Impact of Multi-Pollution Control Devices on Mercury Chemistry and Transportation," was awarded by KOEP. This project will be a collaboration between East Kentucky Power Corporation (EKPC), Owensboro Municipal Utilities (OMU), Tennessee Valley Authority (TVA), Electric Power Research Institute (EPRI), Electric Energy, Inc., and Western Kentucky University. The Governor will make an announcement of this award. The total project is: $665,024 (KOEP: $352,999, EKPC: $59,724, OMU: $67,301, EPRI: $110,000, EI: $50,000 and TVA: $25,000)

The proposed research will help to understand the mercury chemistry and its transportation through APCDs. The experimental results and the model developed in this project will be used to guide future Hg control activities for utilities in Kentucky and the Nation. Furthermore, this project will help utilities to achieve greater improvements in environmental quality while reducing compliance costs using APCDs. According to a DOE report, the baseline cost estimate is $60,000/lb of mercury removed. It is anticipated that 25% or less of the baseline cost can be achieved using multi-pollutant control devices to control mercury removal. The success of this project will also help to preserve Kentucky's environmental quality, and it may also open new markets for Kentucky's coal. The control of Hg and other emissions from power plants is very much a regional problem of vital interest to the utility industry of Kentucky and the Ohio Valley. The proper training of students in emissions research is an important first step in keeping the most talented scientists and engineers in jobs in the state. Further, this project will educate and train undergraduate and graduate students in mercury abatement technologies. The next generation of graduates must have expertise in Hg control technologies, since this is a subject that will remain important for many decades to come.

ICSET just received another award ($149,842) from the Kentucky Commerce Cabinet, Office of Energy Policy. This is in addition to the previous award ($345,999). The project is entitled "Co-gasification of High Sulfur Coal with Coal-Bed Methane to Produce Synthesis Gas with Adjustable H_2/CO Contents for Synthesis of Valued-added Chemicals." As President Ransdell mentioned to Secretary Ward, Roy Palk; and Don Bonk (DOE) during the Grand Opening on Feb. 23rd, ICSET set up a state of the art gasification unit with a CFBC concept. The funds to set up the gasification unit will come from this new KOEP project, a USDA project; and the EKPC/WRECC fund.

According to U.S. Geological survey, Eastern Kentucky coal mines are a rich source of coal-bed methane (CBM), and its deposit is potentially capable of making Kentucky at least partially self-sufficient in natural gas supply. Additional economical benefits include the control of sulfur emission and production of potential mercury adsorbent. The preliminary test has verified the reality of process' concept. The proposed process will be continued to investigate several key reactions and their cooperation effects.

The Institute for Combustion Science and Environmental Technology at Western Kentucky University is establishing a laboratory scale gasification system through professional funding from East Kentucky Power Cooperative /WRECC to develop an advanced gasification technologies by using Eastern Kentucky coal. A series of fundamental mechanism investigations will be carried out in this available gasification facility after modification for further successful demonstration of the overall process. This proposed project will be completed within 12 months.

~Submitted by
Dr. Wei-Ping Pan
Director, Institute for Combustion Science and Environmental Technology

IASS Students Attend American Astronomical Society Meeting

Four students from the Institute for Astrophysics and Space Science (Department of Physics and Astronomy) attended the 207th American Astronomical Society (AAS) Meeting in Washington, D.C.

The four-day conference began Jan. 7 and engaged astronomers and students from around the world in research discussions and the presentation of research papers. The conference is one way AAS provides education and professional support to students and practicing astronomers.

IASS students attending the conference were Jeremy Maune of Taylorsville, Charles Poteet of Bowling Green, Shelly Smith of Princeton, and Richard Walters of Lexington. Four IASS faculty and staff mentors accompanied the students on the trip: Dr. Michael Carini, Dr. Richard Gelderman, Dr. David Barnaby and Dr. Charles McGruder.

Charles Poteet, a senior said the meeting was a wonderful experience. "I gained new insight and ideas regarding my research," Poteet said. "It was my first time attending as a prospective graduate student, so the professionalism and network opportunities were great exposure."

The meeting was the largest in AAS history. More than 3500 researchers attended the event.

The meeting was the first astronomy conference for Jeremy Maune. "I'd given presentations on my research before, but only to faculty and students here at WKU," Maune said. "It was a good way to get used to that overwhelming sense of intellectual inferiority when an astronomer walks up to you and asks you to explain what you've been doing with your life."

Dr. Michael Carini, associate professor and director of the Institute for Astrophysics and Space Science, coordinated the trip. The Institute and Department will make it an annual trip for students and will continue to provide the trip as long as funding is available, he said. "There is nothing more stimulating and valuable to both the research and the teaching process than to interact with colleagues from different parts of the nation and world, and share different ideas on teaching, research, and student engagement," Dr. Carini said.

The trip is a valuable experience for students because it allows the submission and publication of research. Three of the four students who attended the conference had their research published.

"Though my primary purpose on the trip was to present my research on active galaxies," senior Richard Walters said, "the most enlightening part was meeting with faculty members from the graduate schools I have interest in attending."

But submitting research is only one of several benefits students received through AAS. Shelly Smith, another senior, said that her motives for attending the meeting were geared more toward the networking opportunities for industry-related astronomy. "I have an interest in working for NASA, and by hearing about the future of NASA from the Administrator, Michael Griffin, I was able to really see what opportunities were out there," Smith said.

The sessions held throughout the conference covered topics ranging from *Modeling the Universe* to *History of Space Science*. The meeting also included a three hour career workshop for undergraduate students and professionals.

"Accompanying our undergraduates to meetings is an inspirational event," Dr. Richard Gelderman, associate professor pf physics and astronomy said, "The discussions, questions, and conflicts that take place at national meetings are where science really takes place."

Travel funds were provided by the Kentucky Space Grant Consortium, Kentucky NASA EPSCoR Program and the ARTP Institute for Astrophysics and Space Science program. The names and research papers published at AAS are listed below:

Charles Poteet: "A Chandra Study of Herbig-Haro Objects: HH184 & HH300."

Richard Walters: "Analysis of Multi-Color Microvariability in S5 0716+714."

Jeremy Maune: "The Long Term Multiwavelength Behavior of TeV Blazars."

~Submitted by
Dara Hardin for
Mike Carini, Director
Institute for Astrophysics
and Space Science

"Accompanying our undergraduates to meetings is an inspirational event," Dr. Richard Gelderman, associate professor pf physics and astronomy said."

ES: Engineering Students Going Fishing in Concrete Boats…

"WKU Civil Engineering students participate in the American Society of Civil Engineers concrete canoe competition, a battle of brains, brawn, and buoyancy."

With the partial support of ARTP funds, WKU Civil and Mechanical Engineering students compete annually in national student design competitions. WKU Civil Engineering students participate in the American Society of Civil Engineers concrete canoe competition, a battle of brains, brawn, and buoyancy. These students must design, construct, and race a canoe made principally of concrete, which can be made to float. It is less dense than the steel used to make ocean liners.

At the April regional competition, teams compete in five races with the canoe – the men's sprint, men's endurance, women's sprint, women's endurance, and the final race with all four paddlers in the canoe. Besides the races, teams are judged on adherence to canoe specifications, on quality and aesthetics of the canoe, and on a team presentation.

WKU Civil Engineering has won the regional competition ten years in a row, against schools such as Kentucky, Louisville, Cincinnati, Carnegie-Mellon, Pittsburgh and Ohio State. Last year, WKU placed 12th nationally and has placed as high as 4th.

As a part of the design process, this year's WKU Canoe Team went to Lost River Cave to measure drag or resistance forces on the canoe. Less drag means a faster boat, and testing boat shapes may allow Western to improve canoes for future competitions. Water flow speeds in the Lost River Rise vary depending on the width and depth of the channel; by placing the canoe in the water with paddlers (Figure 1) at several locations, drag measurements were obtained for different velocities.

Every year in a comparable competition, the WKU Mechanical Engineering Junior Design class competes in the American Society of Mechanical Engineers Student Design Competition. This competition changes each year ranging from building a remotely controlled landmine removal robot to a human-powered potable water still. The 2006 competition required teams to design and build a remotely controlled fishing device capable of accurate casting and controlled reeling in of a "fish" using controls that would allow quadriplegics to fish. This challenging project combined the sophisticated dynamics of the fishing motion with the constraint of limited device size, power and control options.

Thirty schools, including Purdue, Wisconsin, Iowa, Nebraska, Rose-Hulman, Southern Illinois, and Kentucky, attended the March 4th ASME District C conference and design competition. Each team had to accurately cast their fishing device five times and then reel in a simulated fish in a specified time. Besides device performance, teams were also judged on a report that would allow someone to build their device.

The Mechanical Engineering Junior students started the project in late January, while many of their competitors began during the fall semester. Teams were provided with a limited budget, which they could supplement with their own money. Seven WKU teams totaling 22 students participated in the competition (Figure 2), with the WKU team of Brian Hellinger (Bowling Green) and Nathan Plemons (Alvaton) winning the competition and advancing to the national competition in Chicago in November. WKU teams also placed 2nd and 3rd at the competition and, for the past three years, have now won the event. Last year, WKU placed 4th at the national competition.

Construction of concrete canoes and automatic fishing systems may seem like strange activities for future engineers; however, these time-consuming competitions provide many valuable experiences for the teams. The competitions are governed by rigorous specifications provided by ASCE and ASME. The design process is comparable to

Figure 1. The WKU Concrete Canoe Team measuring drag on the canoe at Lost River.

what engineers follow in projects encountered in professional practice. Students must use sound program planning principles for resource allocation, budgeting, and managing personnel. Quality must be maintained during the construction process, and the end product must be thoroughly tested and proven to function and conform to specifications. Additionally, students gain actual construction experience ranging from the use of computer-controlled machines to old-fashioned elbow grease.

Each year, WKU engineering students work over school break and through the night to construct the devices they will use in the competition. Why work this hard? They compete for recognition, for some modest scholarships or monetary prizes and because after designing and building a concrete canoe or an automated fishing pole, students have a pretty good idea of what it means to be an engineer.

~ Submitted by
Kevin Schmaltz
Director, Engineering Services Center
~Written by
Warren Campbell and Kevin Schmaltz

Figure 2. The WKU Junior Design teams and devices at the ASME District Competition in Rolla, MO.

"Each year WKU engineering students work over school breaks and through the night to construct the devices they will use in the competition."

MCC: Announces New Director Starting in August

Dr. Ronald L. Hoffmann will be joining the Materials Characterization Center (MCC) as Director starting August 15, 2006. Dr. Hoffmann graduated from WKU with both a BS and MS degree in Chemistry. He then obtained his Ph.D. in physical chemistry from Memphis State University. Dr. Hoffmann brings to the MCC a wealth of experience and research ideas. He will be leaving his current position as Director of Special Technology Countermeasures at the Naval Surface Warfare Center in Dahlgren. Other prestigious research chemist positions Dr. Hoffmann has held include those at the Naval Air Warfare Center at China Lake, CA and the Pentagon. In addition, from June 1991 to July 1994, Dr. Hoffmann served as the Science Advisor to the Commander of the US Second Fleet which is assigned to the Northern Atlantic. Because of his dedicated service, he was presented the Navy Meritorious Civil Service Award upon completion of this position.

Dr. Hoffmann looks forward to building collaborations with all interested faculty at WKU.

~Submitted by
Eric Conte, Director
Materials Characterization Center

Dr. Ronald L. Hoffmann will become the new Director of MCC starting August 15, 2006

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