

the leading edge

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Dates To Remember:

- Spring 2007 Semester ends May 11, 2007
- Spring Commencement May 12, 2007
- Summer Semester Begins May 14, 2007

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ARTP's TECHNOLOGY IN ACTION EXPO is a Big Success

The Technology in Action Expo held March 1 sponsored by the Applied Research and Technology Program (ARTP) was a great success. All Centers were well represented by faculty and students. In addition, SIFE (Students Involved in Free Enterprise), the Science Alliance, and the South Central Region Innovation and Commercialization Center (ICC) also participated. There were approximately 300 people in attendance with one-third from outside Western. Dr. Gary Ransdell, President of WKU, and Buddy Steen, the director of the ICC, both made comments regarding the partnerships among the ARTP, the ICC, government (local, state and federal), industry and the Chamber of Commerce and the impact of their coordinated efforts toward improving the quality of life for the citizens of Kentucky through economic development and environmental stewardship.

The Expo highlighted the impact that ARTP activities have had on the education of students through engagement in applied research and technology projects under the mentorship of faculty members. At the same time these efforts have had a positive impact on economic development and environmental quality of the region and state. Middle

and high school leaders were invited to witness the potential for intellectual development for their students and the availability of high-pay, high-tech jobs now available in Kentucky and the potential to create more through innovation. It was the intention of the Expo to have these school leaders take this message back to their respective schools in order encourage more students to pursue science, technology, engineering and mathematics careers and to think entrepreneurially.

I would like to thank the many people who worked so hard to prepare for this event.

Special thanks go to Dr. Shiven-dra Sahi, Associate Director of the ARTP, Lisa Lynn Haynes, the rest of the ARTP staff, and the Center directors. I also thank the Turf Management Club for the great pork chop dinner. Thanks go to President Ransdell and Buddy Steen for their support of the ARTP.

~Written by
Dr. Blaine Ferrell,
Director,
Applied Research and
Technology Program
Dean,
Ogden College of
Science
and Engineering

Top Photo taken by
ARTP Staff.
Bottom Photo provided
by John Andersland.



Photos From the "Technology in Action Expo". **Figure 1:** President Dr. Gary Ransdell speaking with Dr. Richard Bowker (Interim Graduate Dean/ Dept Head of Biology) and Dr. Michael Smith (Assistant Professor-Biology) at the Expo. **Figure 2:** The Volcano from the Science Alliance by Margaret Crowder and Dr. Andrew Wulff. (More photos from the Expo on Page 6 and 7)

Engineering Services and Center Projects with the National Parks Service: Portable Devices for On-Site Distance Measurement and Instrumentation Elevation

"WKU Engineering staff and students have designed, built and tested two different integrated instrumentation systems."

WKU Engineering is working with Johnathan Jernigan, a Physical Scientist at the Mammoth Caves National Park to support NPS research into the cave environment and ecosystems. WKU Engineering staff and students have designed, built and tested two different integrated instrumentation systems. The systems had to be lightweight and rugged so that they can be transported considerable distances into the cave by NPS personnel, and provide accurate measurements for extended periods of time. The two projects are described below.

Laser Range Measurement System

The scope of project was to construct two tripod-mounted distance measurement systems that could be transported into

distant cave locations. The device measures the spherical coordinates (distance and two angles) from a known location and the results are stored to an existing NPS data-recording device. (Figure 1)

NPS scientists are using the system to gather accurate locations of cave populations such as crickets. Currently it takes two researchers to measure these distances, and the method is less accurate. The new system will make it easier, quicker and more accurate to gather this ecosystem information.

Device details include the following:

- Distance is determined using a shock-resistant, moisture-proof HILTI laser measuring device with accuracy of ± 3 mm.
- Horizontal direction is determined using an Ac-

roname electronic compass with one degree accuracy.

- Azimuth elevation is determined using a calibrated gearing system, potentiometer and rotating platform designed for one degree accuracy.

- The three devices are integrated onto a single platform that is mounted to a standard heavy-duty tripod. The system data is automatically sent to an NPS data-recording device. The overall system is moisture resistant and designed to withstand the transport in duffle bags to a measurement location.

Instrumentation Lift System

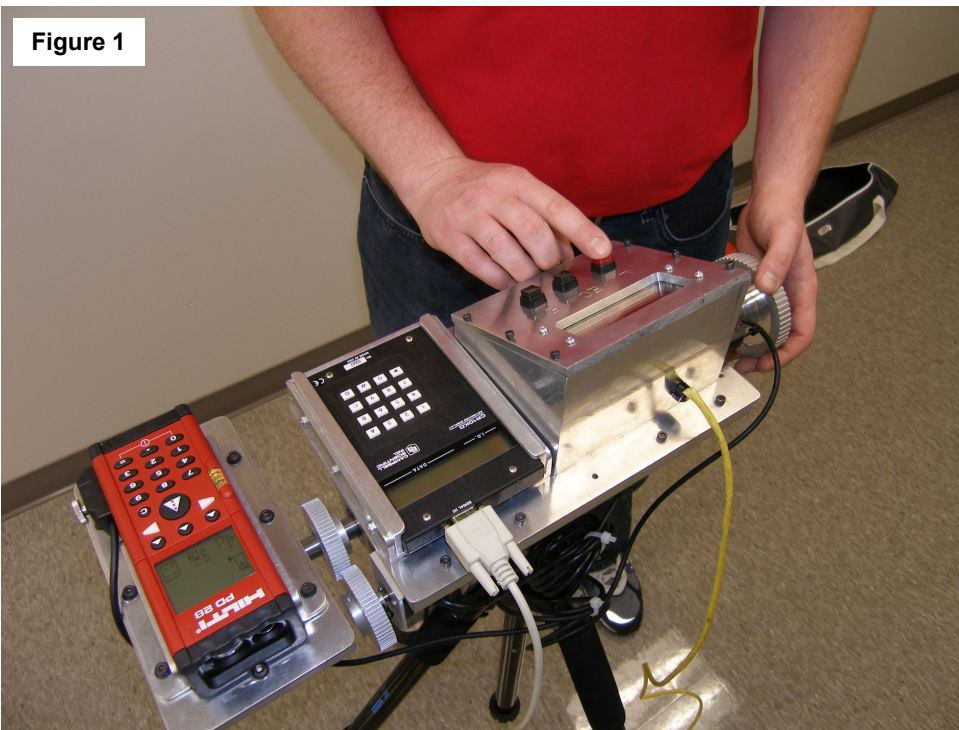
The 2nd portion of the project was to construct two transportable instrumentation lift systems. The tower has a stationary top instrumentation platform, and a second platform capable of moving up and down the tower continuously for extended periods while unattended, pausing to collect data. NPS instrumentation is mounted to the platforms to collect temperature, humidity and air velocity data, with results stored to an existing NPS data-recording device.

NPS scientists will use the system to gather accurate data on the quality and movement of air within the cave networks, and use the data to create a model of the environment. The new system will allow measurements up to 30 feet, and will make it feasible to collect long-term data over the cross sections of passages.

Device details include the following:

Figure 1: Assembled, tripod-mounted range finding system (red laser range finder to left, system control panel to right)

Figure 1



(Continued from Page 2)

- A six feet tall 4-legged aluminum base structure supports and stabilizes the tower. The base can be disassembled and transported while in a duffle bag.
- Ten 3 feet sections of PVC pipe that can be screwed together to build a 10-meter tall tower. A gripping mechanism at the center of the base holds the partially completed tower during raising or lowering (Figure 2a).
- A top one-foot square platform houses instrumentation is mounted to the top PVC pipe. Data will be sent to a data-recording device located at the tower base.
- A motor/pulley system will raise and lower the moving platform between the top of the tower and the base. Data will be sent to a data-recording device located on the moving platform. The location of the moving platform is also measured.
- Four tension cable systems

run from the base to the tower to increase the stability of the tower at full height (Figure 2b). Each tensioner attaches to the tower at the top and at a mid-tower location.

The lift platform has been designed and is currently being built and tested to assure that it is user friendly and reliable (Figure 3). Tower stability, ease of tower construction, accuracy of platform movement, and required battery life are ongoing issues. The overall system will be moisture resistant and designed to withstand the transport in duffle bags to a measurement location.

Work on these projects was performed by WKU Engineering Students: Josh McCombs, Jason Kondracki, Josh DeArmond, Rusty Welborn, Russell Wimsatt, Jason Birkhead and Seth O'Dell. Primary guidance and input for these projects was provided by WKU Staff

Figure 2a

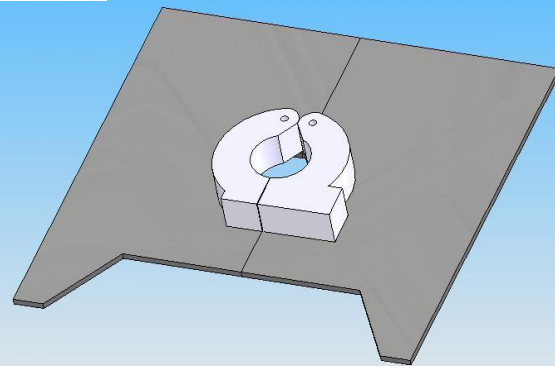


Figure 2b

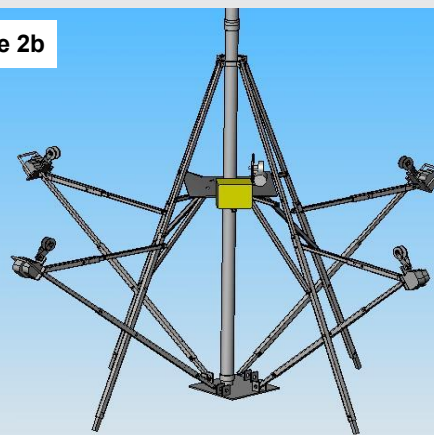


Figure 3



Engineers Ron Rizzo and Chris Moore. Funding was provided by a grant from NPS. This project demonstrates the kind of opportunities for continuing interactions between Engineering Services and other ARTP centers. In addition to these NPS projects, Engineering Services has also constructed integrated instrumentation systems for the WKU WATERS lab, as well as a variety of external customers. Other ARTP centers may be interested in considering Engineering Services as a resource to investigate the design and construction of a prototype instrumentation system.

Figures 2a and b: (a) Gripping system to hold tower during installation; (b) tensioner system mounted to tower base to support tower

Figure 3: (At Left) Josh McCombs, Josh DeArmond and Chris Moore performing testing on completed tower.

~Submitted by
Kevin Schmaltz,
Director
Engineering
Services Center

Figure 1: Magon Kirby and LeAndra Chandler holding concrete Frisbees.

Figure 2: (Back Row) Dr. Shane Palmquist (Advisor), Ben Matthews, Brian Ferguson, Parker Sloan, Magon Kirby, Seth Warren, Brandon Bagby, Devon Moore, Sean O'bryan, Josh Melson, Jon Whitaker, Jessica Acosta, LeAndra Chandler and David Coomes. (Front Row) Stuart Payton, Kal Vencil, Catie Holmes, Sarah Barker, Kelly Stolt and Bryan Phillips

Figure 3: Tony Kelly

WKU Engineering Students Win Regional Competitions

Bowling Green, Ky. - Western Kentucky University civil engineering students brought home top honors at the annual Ohio Valley Regional Student Conference.

WKU students won the concrete canoe competition for the 12th straight year and added first-place finishes in concrete Frisbee and technical paper competitions along with second place in the surveying competition and third in the steel bridge competition.

The Ohio Valley Regional Student Conference was held March 29-31 at Ohio State University in Columbus. Other participating schools included Kentucky, Louisville, Carnegie Mellon, Cincinnati, Cincinnati State, Cleveland State, Dayton, Geneva, Ohio, Pittsburgh, Stark State College of Technology, Ohio State and Youngstown State.

In the concrete canoe competition, WKU

won the best oral presentation, best final product, men's slalom/endurance race, women's slalom/endurance race, men's sprint race and women's sprint race and took second in best design paper. The concrete canoe team advanced to the national competition June 14-16 in Seattle. WKU has finished in the top 10 nationally in six of the past seven years.

Concrete canoe team members include Brandon Bagby of Greensburg, Sarah Barker of Frankfort, Brian Ferguson of Greensburg, Joshua Melson of Campbellsville, Devon Moore of Bowling Green, Stuart Payton of Bowling Green, Bryan Phillips of Glasgow, Parker Sloan of Shawnee Mission, Kan., Seth Warren of Antioch, Calif., Jon Whitaker of Rockfield, David Coomes of Philpot, Sean O'Bryan of Whitesville, Catie Gay of Evansville, Ind., Kelly Stolt of Nashville, Tenn., Kal Vencil of Richmond, Sarah Bertke of Reynolds Station, Erica Rigney of Mount Washington, Chris Simpson of Bowling Green, and LeAndra Chandler of Livermore.

In the steel bridge competition, WKU finished third overall. Team members

include Chad Doughty of Woodbury, Adam Evans of Monticello, Joseph Kelly of Brandenburg, Sarah Kohler of Bowling Green, Justin Young of Morgantown, Austin Shields of Lexington, Matt White of Mount Juliet, Tenn., Brad Hall of Russellville, David Morse of Kingwood, Texas, JP Tilley of Paducah, Kurt Smith of New Haven, and Brad Dobina of Louisville.

In the concrete Frisbee competition, WKU won best overall and had first-place finishers in men's distance (Parker Sloan of Shawnee Mission, Kan.) and women's distance (Magon Kirby of Auburn). Other team members included Brad Hall of Russellville, Sean O'Bryan of Whitesville and David Coomes of Philpot.



Figure 1



Figure 2

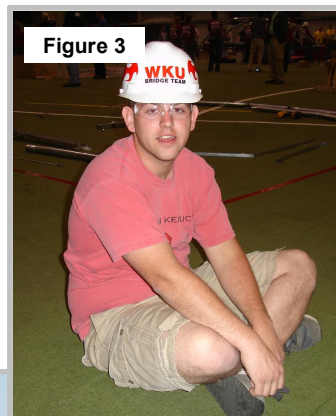


Figure 3

(Continued from Page 4)

In the technical paper competition, WKU's David Hurd of Bowling Green won best overall.

In the surveying competition, the team of Sean O'Bryan of Whitesville, Clint Ervin of Greensburg and David Coomes of Philpot placed second overall.

~Original article

WKU News & Events

April 5, 2007

Written by

Tommy Newton

Submitted by

Shane Palmquist

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Competition Results:

CONCRETE CANOE

COMPETITION:

Students:

- Brandon Bagby
- Sarah Barker
- Brian Ferguson
- Joshua Melson
- Devon Moore
- Stuart Payton
- Bryan Phillips
- Parker Sloan
- Seth Warren
- Jon Whitaker
- David Coomes
- Sean O'Bryan
- Catie Gay
- Kelly Stolt
- Kal Vencill
- Sarah Bertke
- Erica Rigney
- Chris Simpson
- LeAndra Chandler

Best Overall: 1st place

Best Design Paper: 2nd place

Best Oral Presentation: 1st place

Best Final Product: 1st place

Men's Slalom/

Endurance Race: 1st place

Women's Slalom/Endurance Race: 1st place

Men's Sprint Race: 1st place

Women's Sprint Race: 1st place

STEEL BRIDGE
COMPETITION:

Students:

- Chad Doughty
 - Adam Evans
 - Joseph Kelly
 - Sarah Kohler
 - Justin Young
 - Austin Shields
 - Matt White
 - Brad Hall
 - David Morse
 - JP Tilley
 - Curt Smith
 - Brad Dobina
- Overall Performance:
3rd place

CONCRETE
FRISBEE
COMPETITION:

Students:

- Brad Hall
 - Sean O'Bryan
 - David Coomes
 - Parker Sloan
- Best Overall: 1st place

Men's Distance: 1st place
(Parker Sloan)

Women's Distance: 1st place
(Magon Kirby)

TECHNICAL PAPER
COMPETITION:

Student:

- David Hurd
- Best Overall: 1st place

SURVEYING
COMPETITION:

Students:

- Sean O'Bryan
 - Clint Ervin
 - David Coomes
- Best Overall: 2nd place

Figure 4: (Playing the guitar) Parker Sloan



Figure 4

Figure 5



Figure 6



Figure 5: (Steel Bridge Team) (Back Row) Brad Dobina, Sarah Kohler, Matt White, David Morse, Dr. Shane Palmquist (Advisor), Chad Doughty, Tony Kelly, Curt Smith, Justin Young, Brad Hall and JP Tilley

Figure 6: (From Left to Right) Sarah Barker, Kal Vencil, Kelly Stolt, and Bryan Phillips.

Graduate Student from Ghana Visits Biotechnology Center

Figure 1



Left: Karen Bell, Biotechnology Center member.
Right: Lily Paemka, from Ghana, working in the Biotechnology laboratory of Dr. Keith Philips conducting projects on insect diversity Ghana.

A graduate student from the University of Ghana, Lily Paemka, (Figure 1) is currently working in the laboratory of Dr. Keith Philips conducting projects on insect diversity in Ghana, West Africa. One study is on the phylogeography of a genus of dung beetle using mitochondrial DNA sequence data to elucidate the relationships of populations in Ghana.

This will determine unique populations that deserve protection and will assist the government in making conservation decisions.

The second analysis

is an investigation into the ecosystem health of several preserves to better understand the effects of human disturbances such as logging and bushmeat hunting on the mammal fauna via the study of dung beetle species diversity. In addition to supporting the efforts to protect the Upper Guinean Forest biodiversity global hotspot (one of 25 in the world), this project has resulted in baseline data on species presence that will be used in future monitoring efforts of these ecosystems.

Lily will return to the University of Ghana in early June to present her research and defend her thesis.

~Written by
Keith Philips
Biotechnology Center
~Submitted by
Sigrid Jacobshagen
Director,
Biotechnology Center

Pictures From the "Technology in Action Expo"

(Continued from Page 1)





Photos taken at the 2007 Technology in Action Expo provided by the ARTP Staff and John Andersland.



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