Western Kentucky University

the leading edge

Issue 13 February-March 2007

EXHIBITS

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OGDEN COLLEGE	Booth #2
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BISC—Page 7	Booth #13
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CWRS—Page 9	Booth #9
ESC—Page 10	Booth #7
HERI—Page 11	Booth #11
IASS—Page 12	Booth #8
ICSET—Page 13	Booth #3
KCC—Page 14	Booth #14
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SPECIAL EDITION

Western Kentucky University
Applied Research & Technology Program
Ogden College of Science & Engineering

TECHNOLOGY IN ACTION EXPO

March 1, 2007 4pm-6pm
At the ICC
(Center for Research & Development)

Center Demonstrations
Booths, Activities, Door Prizes, Refreshments
Center Tours, Prizes, Giveaways
& Promotions
~ REGISTRATION At the Door ~

Agriculture Research and Education Complex

Department of Agriculture

100 Years of Excellence!

•Environmentally Sustainable Waste Management

- ***•Novel Uses for Poultry Litter in the Southeastern United States with National Implications***

Protecting Human and Dairy Herd Health and Environmental Quality

- ***• Maintaining Milk Production and Herd Safety with Proper Waste Management, Implications for Herd Management throughout United States***

Director: Nevil Speer
Department Head: Dr. Jack Rudolph
Office: 270-745-3151
Dairy Waste: Jenks Britt, DVM
Sustainable Poultry Litter Management::
Becky Gilfillen, Ph.D. and Todd Willian, Ph.D.
Compost Heated Greenhouse:
Jack Rudolph, Ph.D.

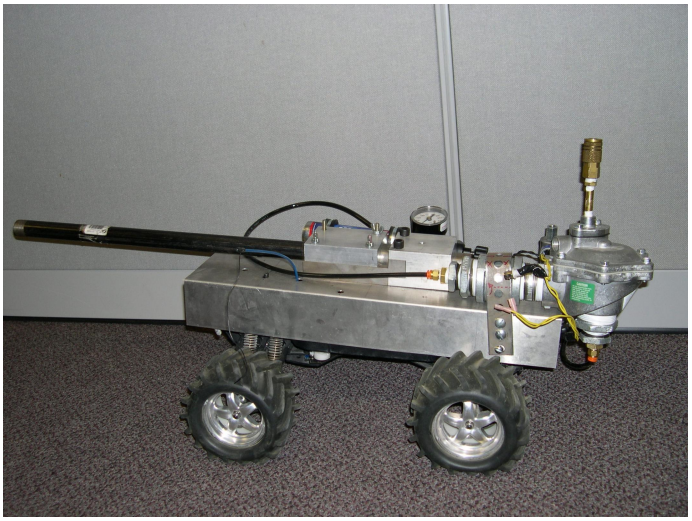
Applied Physics Institute

Department of Physics and Astronomy

Visit our booth to see:

Radiation Detection Systems

Electric Meter of the future



Bomb Disrupting Robots

Director: Phillip Womble
Office: 270-781-3859
Fax: 270-781-1104
www.wku.edu/API

Architectural and Manufacturing Sciences Institute

AMSI INSTITUTE
Western Kentucky University

... strengthening student experience
through real-life projects
and community interaction...

HABITAT FOR HUMANITY

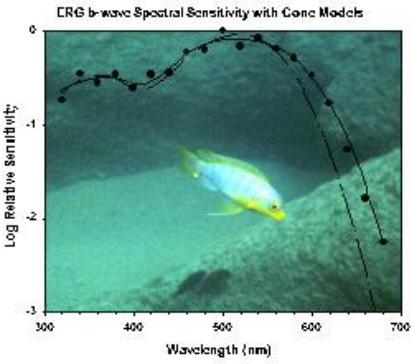
MANUFACTURING

ARCHITECTURE

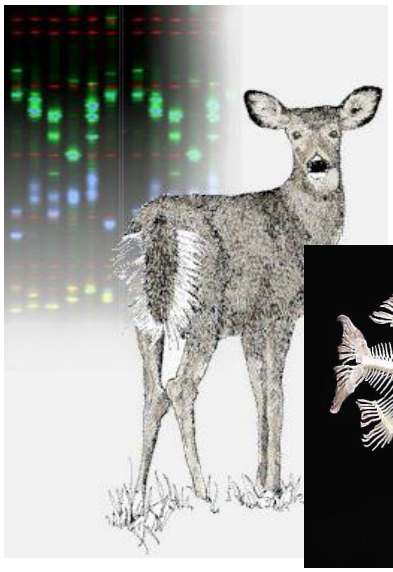
Director: Neal E. Downing, AIA
Student Manager: Tyler LeMarinel
Student Intern: Daniel Whitley
Office: 270-745-6302
Lab: 270-745-4759
amsi@wku.edu

Center for Biodiversity Studies

Department of Biology

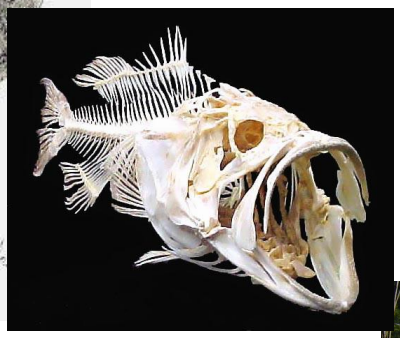


Visit our booth to discuss:



Molecular Species Identification

System Modeling and Statistical Analyses



Aquatic and Terrestrial Biotic Surveys

Educational opportunities at the WKU Green River Biopreserve

Contact: Philip Lienesch
(270) 745-6006
Philip.Lienesch@WKU.edu

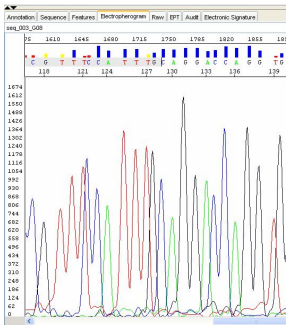
The Biotechnology Center

Department of Biology

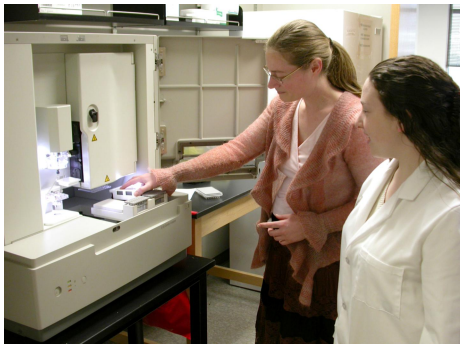
Learn what biotechnology is

Discover instruments that can
- determine the sequence of DNA
- grow animal and plant cells outside the organism
- measure the extent of gene expression
- introduce foreign DNA into a cell

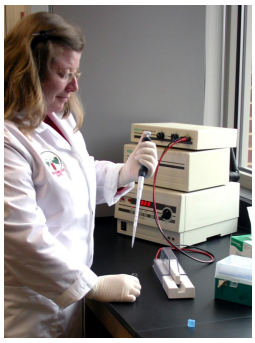
Sterile Hoods



DNA Sequence Data



DNA Sequencer



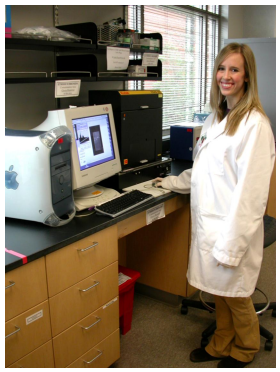
Electroporator

Learn about ongoing research in

- regeneration of sensory hair cells in fish
- genes important in color pattern of butterflies
- control of gene expression by viruses
- immunology of host-parasite interactions
- molecular basis of the circadian clock

Real-Time PCR

HPLC



DNA Gel Analysis

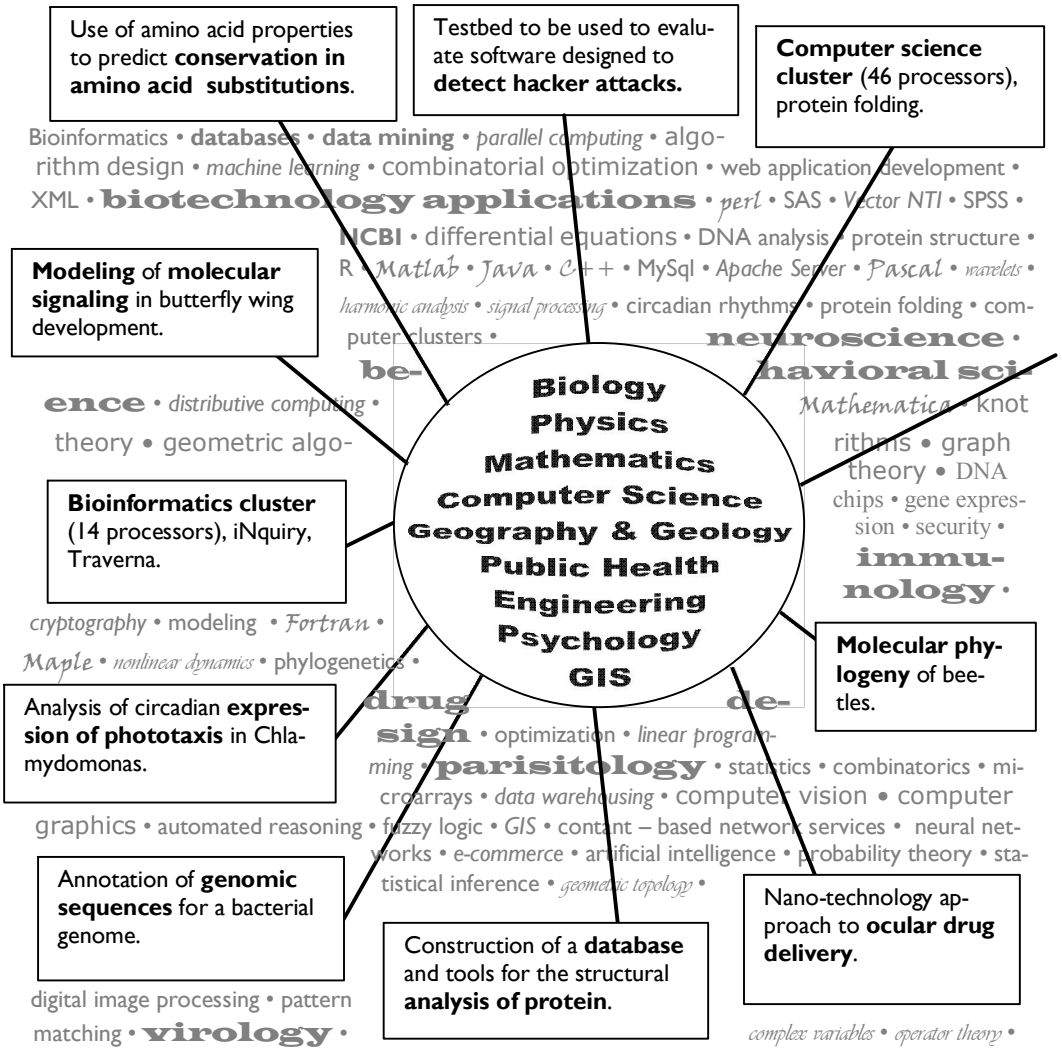
Nano Drop

Director:
Sigrid Jacobshagen
Co-director: Rodney King
Core Facility Coordinator: Xinnan Niu
Phone 270-745-6931
http://biotech.wku.edu

Bioinformatics and Information Science Center

http://bioweb.wku.edu/asp/bisc/

The mission of BISC is to build and maintain an interdisciplinary community that will solve problems in bioinformatics and information science. To support this mission BISC sponsors **seminars & workshops**, develops **curriculum**, and **engages students** in hands-on experiences and research.



BISC has 46 members from eight WKU departments. With such a large membership, BISC is able to draw on a broad diversity of skills to answer most bioinformatic questions in a collaborative research environment.

Director
Claire Rinehart
270-745-5997
claire.rinehart@wku.edu
Department of Biology

Co-director:
Uta Ziegler
270-745-2911
uta.ziegler@wku.edu
Computer Science Department

Center for Cave and Karst Studies

Department of Geography and Geology
Crawford Hydrology Laboratory
Geophysical Subsurface Investigations

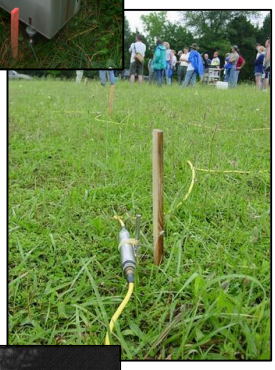
Visit our booth to see:

Dye tracing,
including a video of a dye injection

-Micrograv ity and
Electrical Resistivity

-Cave Radio

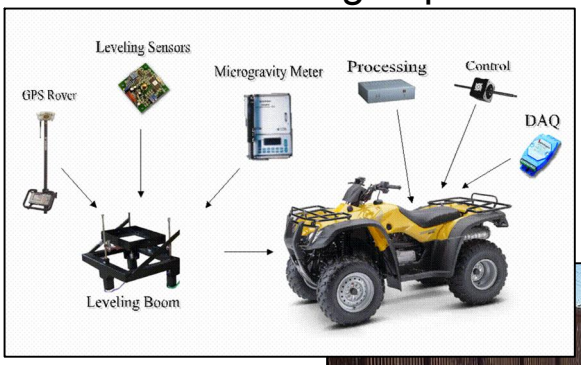
-Cave Mapping



-the Void Detection Robot

-the 2007 Karst Field Studies Program

-Sign up for a free tour of Lost River Cave



Director: Nicholas C. Crawford
Assistant Director: Leigh Ann Croft
Laboratory Manager: Adam Coffman
Office Coordinator: Lisa Haynes
Office: 270-745-3252
Lab: 270-745-9224
www.caveandkarst.wku.edu

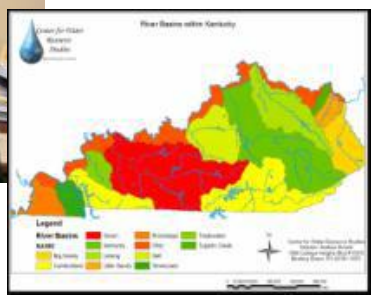
Center for Water Resource Studies

ENVIRONMENTAL INFORMATICS

- Web Hosting and Design
- Customized Software Tools
- Customized Maps
- Data Analysis
- Data Storage
- Media Guide
- Water Loss Calculator
- Expert System Development
- Database Management

TRAINING

- Water Utility Management
- Pipeline/Manhole Assessment
- Certification Program (PAXP/MACP)
- Laboratory Procedure Training
- Sample Collection and Transport Training
- Computer Technology Training
- Database Management



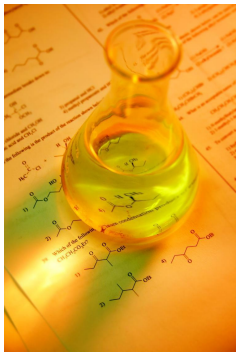
FIELD OPERATIONS

- Small Water Systems
- Circuit Rider Program
- Water Quality Monitoring
- Sample Collection
- Flow Monitoring
- GPS Data Collection/GIS Mapping
- Certified Pipeline/Manhole Assessments

WATERS Laboratory

- Certified Drinking Water Analysis
- DMR Preparation
- LT2/Cryptosporidium
- DNA Analysis
- Troubleshooting/Investigation

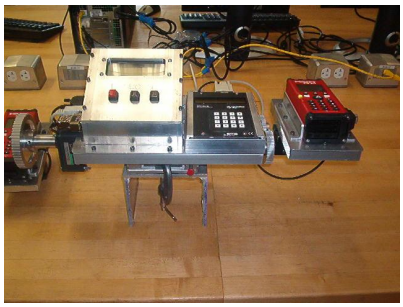
Director: Andrew Ernest
Associate Director: Jana Fattic
Center for Water Resource Studies
1906 College Hts. Blvd. #11075
Bowling Green, KY 42101
Phone 270-745-8895 Fax 270-745-4244
andrew.ernest@wku.edu



Center for Engineering Services

Department of Engineering

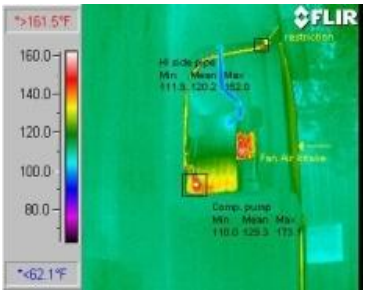
Electrical Engineering Services
Mechanical Engineering Services
Scott Center for Civil Engineering



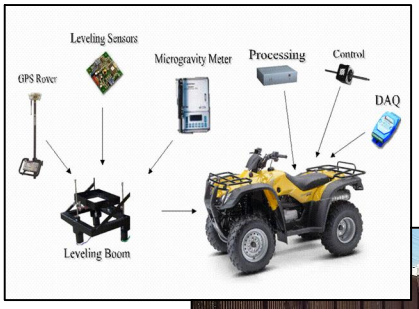
Visit our booth for additional information about:

Civil Engineering:
construction quality, inspection, design and testing, surveying

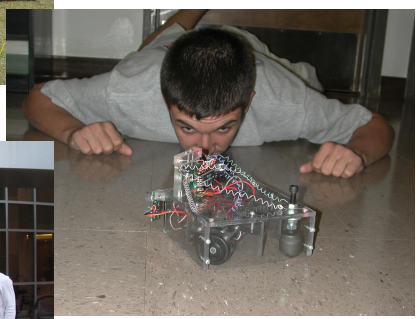
Electrical Engineering:
hardware/software design, system control microgravity measurement system



Mechanical Engineering:
rapid prototyping and product realization, materials characterization, machine integration, design simulation



Student Design Competitions



Director: Kevin Schmaltz
Office: 270-745-8859
Civil Engineering Contact: Matt Dettman
Electrical Engineering Contact: Stacy Wilson

Hoffman Environmental Research Institute

Department of Geography & Geology

The Hoffman Institute logo symbolizes our mission with the Chinese characters dì, tiān, shuǐ, and rén: earth, sky, water, and people

The mission of Hoffman Environmental Research Institute is to be a leader in basic and applied research that aims to better understand landscape/atmosphere/water/human interactions. The Institute involves post-doctoral, graduate, and undergraduate students in all aspects of this work to increase their critical thinking skills and technical expertise in the environmental discipline, and in combination with extensive international ties, to prepare these students for success in a global society.

Natural Resources and Protection Strategies

Institute scientists work to understand natural resources and how to protect them. Current research/training efforts include studies of water quality in Mammoth Cave National Park, atmosphere/landscape CO_2 interactions in California's Sequoia National Park and interactions between water and both forest and aquatic ecology in Tongass National Forest, Alaska. A specialized graduate study program caters to federal natural resource specialists

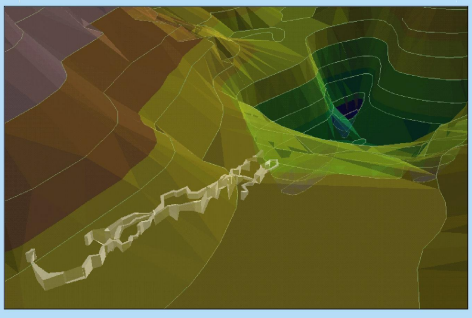
International Programs

The Institute maintains numerous international relationships. Two major programs underway include leadership of the US Agency for International Development supported *China Environmental Health Project* and the United Nations program *Global Study of Karst Aquifers and Water Resources.* In recent years Institute students have participated in research and conferences in China, Greece, Switzerland, Spain, Malaysia, and the Caribbean region.

Geographic Information Systems

Geographic Information Systems (GIS) technologies consist of computer resources for analysis of spatial data. All Hoffman Institute students gain familiarity with GIS. Standard GIS tools support our research projects, and we are developing specialized tools for particular analysis or visualization tasks. The Institute is increasing GIS infrastructure at Southwest University in Chongqing, China through training and lab development there.

GIS Analysis and Modeling



GIS analysis and modeling functions to solve problems within fields such as urban planning, natural resource management, and economic development.

Institute for Astrophysics and Space Science

Department of Physics and Astronomy

Stop by our booth to learn about:

- Outreach to the local K-12 education community
- Our international network of robotic telescopes
- Faculty research activities
- Undergraduate student engagement in research

Service activities within the state and the nation

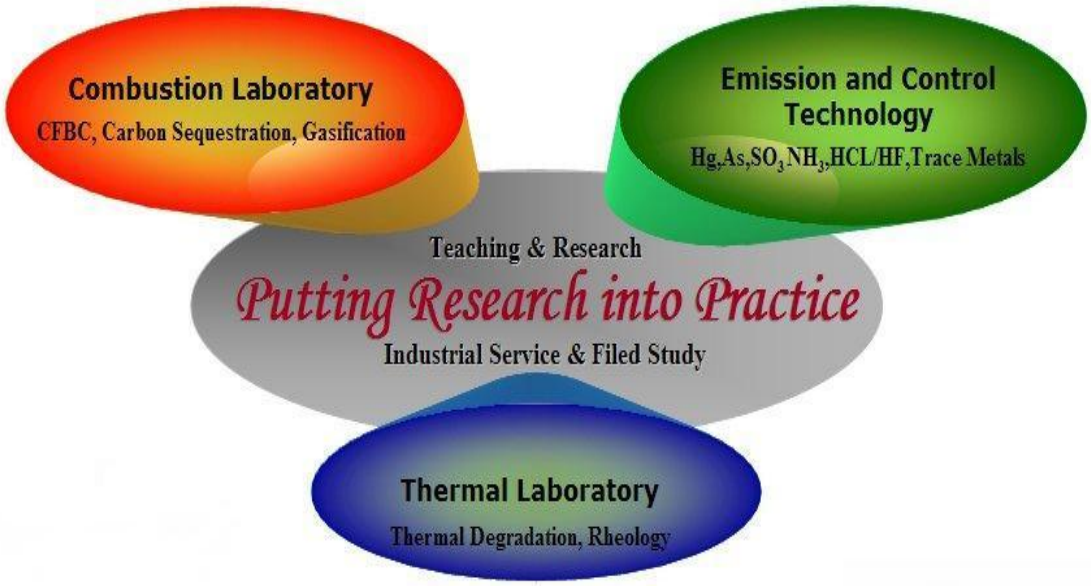
Director: Michael Carini
Office: 270-745-6198
Fax: 270-745-2294
mike.carini@wku.edu
astro.wku.edu/observatory

applied research and technology program
A program of distinction
Western Kentucky University

Kentucky NASA EPSCoR Program

ICSET

Institute for Combustion Science & Environmental Technology



Development of ICSET

1986: The Thermal Analysis Laboratory was established.

1993: The Combustion Laboratory was established.

2000: Moved into new Materials Characterization Center facilities.

2001: The Emission Control Laboratory was established.

2004: Name changed to the Institute for Combustion Science and Environmental Technology.

2005: Moved into new ICSET facilities (Combustion Laboratory)

2005: Started hosting North American Thermal Analysis Society

2006: Move into new ICSET facilities (Thermal and Emission Control Laboratory)

Missions of ICSET

- Providing a dynamic research and learning environment for WKU students, including opportunities to use state-of-the-art instrumentation in course work and hands-on experiments
- Providing multidisciplinary approaches to research projects and in solving industrial problems
- Promoting professional growth of faculty by providing avenues for collaboration with other faculty at WKU and other institutions and with professionals in state and federal research institutions, as well as, industry
- Providing professional contacts for WKU faculty in search of funding for research projects

KENTUCKY CLIMATE CENTER

DR. STUART FOSTER
DIRECTOR/STATE CLIMATOLOGIST

DR. REZAUL MAHMOOD
ASSOCIATE DIRECTOR

Visit our booth to learn about:

- Seasonal Climate Outlooks for Kentucky and the United States
- Natural Hazards Related to Weather and Climate
- Fun Facts: Discover what the weather was on your birthday
- Learn about the Kentucky Mesonet and the Benefits of Real-Time Weather Data
  - Instrumentation and Data Collection
  - Applications of Mesonet Data
  - Site Selection
  - How You Can Be Involved

KENTUCKY MESONET

The Kentucky Mesonet is a network of automated environmental monitoring stations currently being developed across the commonwealth. Funding for the Mesonet was secured by U.S. Senator Mitch McConnell through an earmark to the Kentucky Climate Center.

For more information on the Kentucky Mesonet please call (270) 745-4567.

Kentucky Climate Center
Department of Geography & Geology
http://kyclim.wku.edu
Phone: (270) 745-5983

Materials
Characterization
Chemical Analysis

Materials Characterization Center

What we do!

The Materials Characterization Center offers a trained professional staff, state-of-the-art instrumentation, and use of the latest technology to provide you with quick and accurate analysis and solutions to meet your specific needs. Materials Analysis Services provided include:

Polymer analysis and testing

Coal and fuel analysis and testing

Elemental analysis

Drinking and waste water analysis

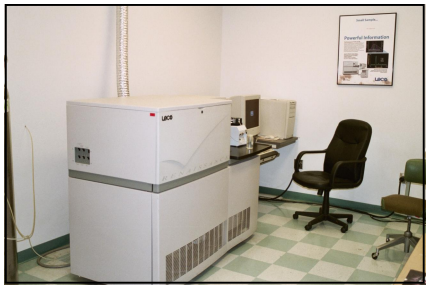
Materials identification

Manufacturing problem solving

Product development research

Emissions analysis & control

Alloy & coating analysis



Elemental Analysis Capabilities
(ASTM Standards)

- **Total sulfur *(D 4239)***
- **Carbon, hydrogen & nitrogen *(D 5373)***
- **Chlorine *(D 4208)***
- **Fluorine *(D 3761)***
- **Anions (F^-, Cl^-, Br^-, NO_3^-, NO_2^-, PO_4^{3-} & SO_4^{2-}) by ion chromatography**
- **Carbon forms: carbonate, organic, and total *(D 6316)***
- **Sulfur forms: sulfate, pyritic, and total *(D 2492)***
- **Mercury analysis (CVAAS) *(D 6414)***
- **Major/minor element analysis (SiO_2, Al_2O_3, Fe_2O_3, CaO, MgO, Na_2O, K_2O, TiO_2, P_2O_5, & SO_3)**
- **by ICP/MS analysis *(D 6349)***
- **by wavelength dispersive XRF *(D 4326)***
- **Trace element analysis by ICPMS *(D 6357)***
- **Surface analysis, depth-profiling, and bulk elemental analysis by glow discharge atomic emission spectroscopy *(GD-AES)***
- **SEM/EDX analysis**

Materials Characterization Center
Western Kentucky University
2355 Nashville Road
Bowling Green, KY 42101

ARTP Office
Ogden College of Science and Engineering

MATERIALS CHARACTERIZATION CENTER
DR. RONALD HOFFMANN, DIRECTOR
MR. DONG LI, LAB. MANAGER

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Leading Edge Editor:
Lisa Lynn Haynes
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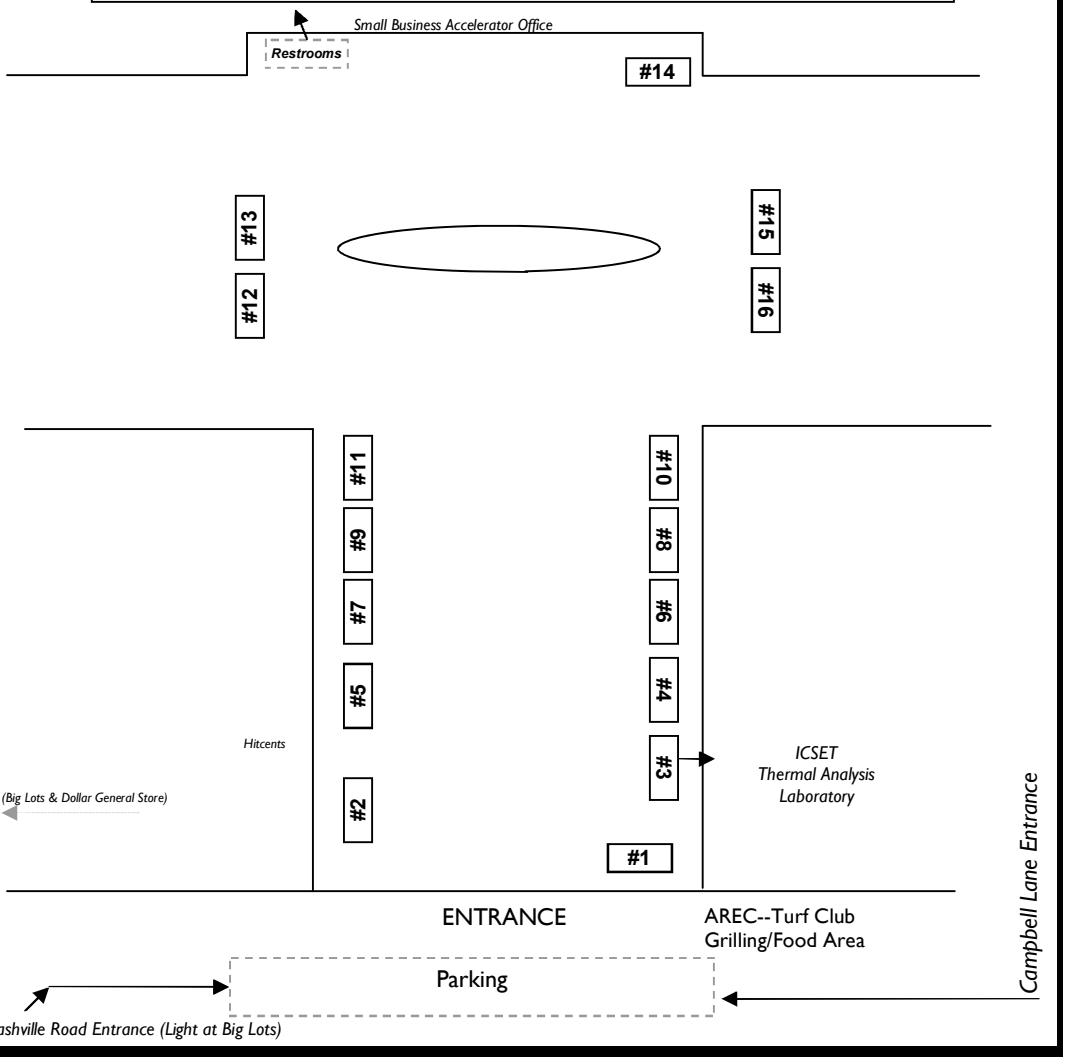
TECHNOLOGY IN ACTION EXPO

Map of ICC Booths

Center for Research and Development
2413 Nashville Rd, Bowling Green, KY 42101

Booth #1	ARTP Registration
Booth #2	Ogden College of Science and Engineering
Booth #3	ICSET--Institute for Combustion Science and Environmental Technology (Inside Thermal Analysis Laboratory)
Booth #4	AREC--Agriculture Research and Education Complex
Booth #5	CCKS--Center for Cave and Karst Studies
Booth #6	AMSI--Architectural and Manufacturing Science Institute
Booth #7	ESC--Engineering Services Center
Booth #8	IASS--Institute for Astrophysics and Space Science
Booth #9	CWRS--Center for Water Resource Studies
Booth #10	BIOTECH--Biotechnology Center
Booth #11	HERI--Hoffman Environmental Research Institute
Booth #12	BIOD--Center for Biodiversity Center
Booth #13	BISC--Bioinformatics and Information Science Center
Booth #14	KCC--Kentucky Climate Center
Booth #15	MCC--Materials Characterization Center
Booth #16	API--Applied Physics Institute



Visit us on the web: http:/artp.wku.edu