A NATIONAL UNIVERSITY TRANSPORTATION CENTER
AT MISSOURI UNIVERSITY OF SCIENCE AND TECHNOLOGY

CENTER FOR TRANSPORTATION INFRASTRUCTURE AND SAFETY

ADVANCED MATERIALS, TRANSITION-STATE FUELS AND NON-DESTRUCTIVE TESTING TECHNOLOGIES

Fourth Year Annual Report
July 1, 2009 – June 30, 2010

PART A: CORPORATE STYLE ANNUAL REPORT

Submitted by
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Interim Center Director

AUGUST 31, 2010

Fourth Year Annual Report
Part A: Corporate Style Annual Report

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OVERVIEW: CENTER FOR TRANSPORTATION INFRASTRUCTURE AND SAFETY

Introduction

Throughout four years of operation as a National University Transportation Center (NUTC), the Center for Transportation Infrastructure and Safety (CTIS) has become a Center of Excellence on the theme areas of advanced materials, transition-state fuel vehicle infrastructure and non-destructive testing technologies.

CTIS has provided the faculty, staff and students at Missouri University of Science and Technology (Missouri S&T) with the means for establishing key relationships with transportation-oriented state and federal agencies and industry partners. With NUTC leverage, the research and development (R&D) projects carried out at Missouri S&T have created the critical mass and the track record necessary to establish a Center of Excellence.

In addition to contributing to successful and relevant R&D projects, with the development of significant educational resources and by facilitating the transfer of advanced technology developed within the Center's theme areas, CTIS has impacted the quality of available education for engineers and transportation professionals, equipping engineers with interdisciplinary skills and experiences. As a result of CTIS activities, new academic programs for educating better-prepared engineers have been created at Missouri S&T and the University has become, and continues to be, the provider of the Local Technical Assistance Program (LTAP) for the state of Missouri.

Since its inception, CTIS has performed work in accordance with its strategic plan to accomplish projected goals in the areas of education, research and technology transfer. CTIS has put forth significant efforts to become highly visible and credible with the aim to recruit and retain quality students, faculty and professionals and to make significant contributions to transportation-related fields.

Future

The future activities of CTIS will continue to draw on the capabilities and campus expertise in the areas of advanced materials, transition-state fuel vehicle infrastructure and non-destructive testing. Partnerships with industry professionals and organizations will be continuously sought out and developed.

In particular, CTIS aims to become the point of reference and preferred partner of industry organizations that have not traditionally been involved with transportation-related applications and activities. The intention is to improve the quality and lifespan of existing transportation infrastructure using the broadest-based technology possible and to stimulate the economic viability of U.S. corporations.

Mission and Theme

Mission: The mission of the Center for Transportation Infrastructure and Safety (CTIS) at Missouri S&T is to advance U.S. technology and expertise in the many disciplines comprising transportation through the mechanisms of education, research and technology transfer at university-based centers of excellence.

Theme: To address national needs in the areas of transportation infrastructure and safety, focusing on the following topical areas:

- **Advanced materials** including constructed facilities security, which will involve several tasks:
    - The development, manufacture and application of modern construction materials
    - Installation processes and engineering design
    - Standardization and code approval of products and design protocols
- **Transition-state fuel vehicle infrastructure** leading to a hydrogen economy, which will require two critical tasks:
    - Development of safety codes, standards and regulations
    - Infrastructure development and deployment
- **Non-destructive evaluation (NDE) technologies and methods** including monitoring and evaluation of new and repaired structures and system components.

Advanced materials developed for use in transportation infrastructure offer superior mechanical properties, long-term durability and design flexibility. R&D in advanced materials address the growing needs for strengthening/rehabilitation of aging structures and for the design/construction of new structures to more stringent requirements and for extended service life. These materials apply to all modes of surface transportation.

Alternative fuel vehicles face the same implementation challenges as that of hydrogen vehicles. Research, development, demonstration and deployment activities of alternative fuel (including hydrogen) vehicles and supporting infrastructure across all modes of transportation address the growing need for a successful transition to a hydrogen economy.

Recent advances in sensor technologies and NDE techniques offer new methods of non-intrusive, in-situ monitoring of the health, geometric, environmental and structural characterization of civil structures and their supporting systems. NDE sensor technologies and methods enable more accurate, sensitive, cost-effective, rapid and straightforward evaluations. Integration of NDE technology to existing and future infrastructure systems will improve network evaluation and enhance the safety of the transportation infrastructure.

The choice of the Center theme comes from an analysis of state and national needs/opportunities, as well as the strengths/potential of Missouri S&T. We are walking the bridge that connects the transportation infrastructure of the second millennium to that of the third millennium. Existing

infrastructure was conceived to support vehicular traffic powered by fossil fuel and has dramatic shortcomings in terms of durability and congestion. But the future will be an intelligent infrastructure incorporating advances in information technology and supporting a new generation of alternative fuels up to an ending point, which is conceivably hydrogen, with all the associated challenges in terms of safety, deployment and market acceptance.

Missouri S&T determined that it is of critical importance to its own mission and future, as well as the economical success of the state of Missouri, to focus on advanced materials in order to: a) help with the upgrade and maintenance (including security hardening) of existent infrastructure; and b) contribute to the development of new infrastructure. Similarly, NDE methods and techniques are a core area of expertise at Missouri S&T and their development and deployment continues to help with health monitoring of existing infrastructure and is becoming an integral part of new infrastructure to ensure both acceptance and safety. Finally, the Center takes a systematic approach to tackle the challenge of alternative fuels (including hydrogen) as the only viable methodology for the safe deployment of a new form of transportation.

MANAGEMENT STRUCTURE

This section presents an overview of the Center's management structure and staff, those individuals who actively contribute to the functioning of Center activities, as well as information about the composition and purpose of the Research Advisory Board.

Center Staff

In addition to the Interim Director, the following individuals actively contribute to the management/operation of the Center: one associate director, four office staff persons and three laboratory staff persons. The Research Scholar position is currently open.

Name	Title	Address/Phone/Fax/E-mail	Responsibilities
Myers, J. J.	Interim Director	325 Butler-Carlton Hall, Rolla MO 65409 573-341-6618/6215 jmyers@mst.edu	Center management
Sheffield, J.	Associate Director	331 Toomey Hall, Rolla MO 65409 573-341-6073/4607 sheffld@mst.edu	Research activities
Spitzmiller, G.	Admin. Assistant	221 ERL, Rolla MO 65409 573-341-7170/6215 spitz@mst.edu	Administration and accounting
Sherman, A.	Senior Secretary	222 ERL, Rolla MO 65409 573-341-7884/6215 abigayle@mst.edu	Clerical support/ student appointments
Geisler, C.	Secretary	223 ERL, Rolla MO 65409 573-341-4497/6215 geislerc@mst.edu	Clerical support
Dafni, J.	Technical Editor	220 ERL, Rolla MO 65409 573-341-7848/6215 dafnij@mst.edu	Publications/website
Open Position	Research Scholar	218 ERL, Rolla MO 65409 573-341-6223/6215	Research activities/mentoring
Cox, J.	Sr. Research Specialist	G-8 ERL, Rolla MO 65409 573-341-6742/6215 coxjn@mst.edu	Laboratory and field testing/coordination
Bullock, J.	Lab/Research Technician	G-8 ERL, Rolla MO 65409 573-341-7895/6215 bullockjr@mst.edu	Laboratory testing/ equip. maintenance

OVERVIEW OF EDUCATION, RESEARCH, AND TECHNOLOGY TRANSFER PROGRAMS

This section presents a summary and overview of all projects awarded during Year IV (2009-2010).

Research Projects

R261—Ground Penetrating Radar (GPR) for Pavement Evaluation
[Anderson, N., PI – Missouri S&T, new in this reporting period]

The objective of this project is to investigate the cost-effectiveness of new GPR technologies for providing accurate pavement layer thickness data for use with the Falling Weight Deflectometer (FWD) to provide pavement structural capacity and remaining service life for use in the Pavement Management database; to determine specifications and requirements for acquiring a GPR sub-system and data interpretation software; and to deliver a working GPR system that will allow the Arkansas State Highway and Transportation Department (AHTD) to collect, analyze and distribute pavement thickness information.

The deployment of a GPR system for network level pavement survey will provide AHTD substantial capability in its effort to determine pavement layer thickness and fulfill needs for statewide pavement management, the implementation of the Mechanistic and Empirical Pavement Design Guide (MEPDG) and meet the Federal Highway Administration (FHWA) Highway Performance Monitoring System (HPMS) requirement of pavement layer information. The anticipated results are that FWD data and GPR generated pavement layer information will become an essential component of pavement structural evaluation data sets that are part of this new database engine.

R260—Alternative Energy Sources for MoDOT
[Grasman, S., PI – Missouri S&T, new in this reporting period]

The objective of this project is to investigate environmentally friendly alternative energy sources that could be used by Missouri Department of Transportation (MoDOT) and to develop applicable and sustainable strategies to implement those energy sources.

MoDOT has long been committed to engaging in environmentally friendly innovative technologies and practices and therefore aims to develop applicable strategies to implement alternative energy in various areas. Not only will these applications be environmentally friendly but, in some cases, technically and economically superior to traditional strategies. Specifically, the project will conduct a thorough investigation of potential alternative energy sources that could be used by MoDOT, identify the various application areas in which the alternative energy may be appropriate, develop detailed and applicable strategies that will instruct the implementation of the selected energy sources based on appropriate technology feasibility analysis, as well as address technological issues and risk mitigation, perform appropriate cost-effectiveness and financial feasibility analysis as a function of electric utility rates and potential rate increases, as well as analyze various financing mechanisms such as public-private partnerships.

R257—Evaluation of the Orientation of 90° and 180° Reinforcing Bar Hooks in Wide Members
[Sneed, L., PI – Missouri S&T, new in this reporting period]

The objective of this project is to study the influence of tilt angle on the development of ACI standard reinforcing bar hooks. Specific objectives include: evaluate 90° and 180° ACI standard reinforcing bar hooks to determine the influence of hook tilt angle (from vertical) on the development of the reinforcing bar; study the influence of confinement and transverse reinforcement on the development of tilted, hooked reinforcing; and develop design recommendations for limits of tilt of hooked reinforcing bars.

Longitudinal reinforcing steel in concrete flexural elements is often developed at the end of a concrete member by a 90° or 180° standard hook that is usually oriented such that the hook is in the vertical direction. In some instances, such as the case of a shallow member that is heavily-reinforced with reinforcing bars of large diameter, the standard hook height in plus concrete cover above and below the bar may exceed the thickness of the concrete member. To address this issue, sometimes it is suggested that the hook may be tilted from vertical to maintain the required clear cover. Design recommendations developed as part of this study will provide clarification to engineers and building code officials regarding limits of tilt of hooked reinforcing bars so that the original intent of hooked bar development is met.

R256—Mapping of Previously Mined Ground for Infrastructure Citing Purposes
[Anderson, N., PI – Missouri S&T, new in this reporting period]

The objective of this project is to collect high-resolution reflection seismic data along multiple traverses at the Knight Hawk Coal Company PEUG Site in an effort to determine if/where the area has been previously mined. This information is required for infrastructure planning and construction purposes because previously-mined ground is susceptible to gradual-to-catastrophic subsidence which can cause structural damage to overlying infrastructure, including roadways and utilities.

The reflection seismic data will be interpreted (using borehole control as an interpretational constraint) with a view to determining if the seismic tool is useful for mapping shallow (~100 ft) previously-mined ground (room and pillar mining). Missouri S&T researchers will also focus on the degree of resolution provided by the seismic data. They are interested in determining whether individual rooms and pillars can be resolved and if the magnitude of post-mining collapse can be quantified. The collected data will be analyzed so that optimum data acquisition and processing parameters can be determined for application to future scenarios with consideration to cost-effectiveness.

Research Equipment Projects

RE254—Missouri S&T Hydrogen Transportation Test Bed Equipment & Construction
[Sheffield, J., PI – Missouri S&T, new in this reporting period]

The objective of this project is focused on one of the Missouri S&T NUTC's theme areas: Transition-state fuel vehicle infrastructure leading to a hydrogen economy. Two identified tasks associated with this theme are the following: 1) development of safety codes, standards and regulations, and 2) infrastructure development and deployment. The overarching goals of this research are to collect and evaluate the real-world performance and utility of hydrogen-powered vehicles and to benchmark issues related to the safety, operation and maintenance of hydrogen-powered vehicles with other alternative fuel-powered vehicles.

NUTC funds, along with specific project matches, have allowed Missouri S&T to accomplish Phase I of the "E^3 Commons." Tackling Phase II requires complementary capabilities for these three areas of the Commons: EcoCAR Garage, Hydrogen Fueling Station and Renewable Energy Transit Depot. Upgrading the Missouri S&T E^3 Commons provides a unique transportation test bed for both current and future university transportation research projects focused on the transition-state fuel vehicle infrastructure leading to the vehicular use of hydrogen as a fuel in both internal combustion engines and fuel cell plug-in hybrid electric vehicles at Missouri S&T.

Education and Technology Transfer Projects

ETT259—2010 Missouri Local Technical Assistance Program (LTAP) at Missouri S&T
[Pickerill, H., PI - Missouri S&T, new in this reporting period]

The objective of this project is to manage the Missouri LTAP program for the Missouri Department of Transportation (MoDOT). The LTAP program was established by the Federal Highway Administration (FHWA) in 1982 and operates in each state to provide community leadership through advocacy and implementation of education and training.

The Missouri LTAP program will provide a resource center and technology transfer activities for local officials, counties, parishes, townships, cities and towns throughout the state of Missouri in the form of: workforce development services; resources to enhance safety and security; solutions to environmental concerns, congestion, capacity and other issues; technical publications; and training materials and videos.

ETT258—Women in Science & Engineering and Minority Engineering Scholarships: Year 4
[Elmore, C., PI - Missouri S&T, new in this reporting period]

The objective of this project is to make scholarships available to minority and women students interested in engineering and science in order to significantly increase the number of minority and female students recruited to Missouri S&T science and engineering programs. Recipients of scholarships will also be exposed to career opportunities in transportation.

Women in Science and Engineering (WISE) scholarships are awarded to support female Missouri S&T students studying science and engineering. Missouri S&T's WISE program provides a campus focal point for increasing the number of women in science, engineering, math and technology fields through outreach, recruitment and retention efforts from middle school age through undergraduate levels. WISE provides support programs such as mentoring, advising,

professional/technical workshops and social activities, with the goal of providing a rich academic and social experience for young women at Missouri S&T.

Minority Engineering and Science Program (MEP) scholarships provide critical financial support for under-represented students majoring in engineering and science programs at Missouri S&T. MEP scholarship students receive professional and academic support through the close-knit MEP network of friends, mentors and Missouri S&T staff. MEP has a rich 30-year tradition of sponsoring events, activities and organizations that ensure its students are prepared for personal and professional success.

DOT PRODUCTS

Because the Center's theme areas focus around safety in transportation infrastructure as well as new technologies in fuel and infrastructure monitoring, many of the awarded research projects are tied to the U.S. and state Departments of Transportation, particularly Missouri Department of Transportation (MoDOT).

Below are brief explanations of a few research projects meant to serve as examples of how work and research at CTIS serves the transportation and infrastructure needs of our state and nation.

Missouri S&T Hydrogen Transportation Test Bed Equipment & Construction – RE254
The hydrogen transportation test bed serves as a focal point for CTIS, focusing on the overarching goals of collecting and evaluating the real-world performance and utility of hydrogen-powered vehicles and benchmarking issues related to the safety, operation and maintenance of hydrogen-powered vehicles with other alternative fuel-powered vehicles. The project objectives include the development of safety codes, standards and regulations alternative fuel technologies and infrastructure development and deployment of those technologies.

2009 Summer Transportation Institute – ETT249
The purpose of the STI is to provide an educational experience for rising 11th and 12th grade high school students, which explores all aspects of the transportation industry and its role in our society. The STI is a 2-week intensive learning experience held during the summer targeted primarily toward minorities, but not limited to them. The project objectives include allowing secondary school students to participate in a series of academic and practical experiences designed to motivate them toward professions in the transportation industry and to provide secondary school students with mathematics, science and technological enrichment to enable them to pursue a career in the transportation industry, thereby increasing the number of students entering the transportation profession.

MTI/MoDOT Transportation Geotechnical Research Program - R247-R242
The Geotechnical Research Program will lead to substantial cost savings by avoiding excessive conservatism in cases where it is not warranted and by avoiding excessive maintenance and rehabilitation costs in cases where performance is unacceptable. The execution and completion of this program will address many of MoDOT's most pressing research needs while making notable improvements to the state of the art and practice of geotechnical engineering at a national and international level. The objective, as a whole, is to achieve significant and recurring cost savings for Missouri Department of Transportation (MoDOT) by developing improved, technically sound design specifications. The new specifications will be based on LRFD concepts which produce consistent and appropriate performance/risk factors for the local conditions and consequences involved.

MTI/MoDOT Structural Collaborative Research Program - R241-R233
The Structural Collaborative Research Program will effectively address Missouri Department of Transportation's (MoDOT) and the nation's needs in developing better, faster and cheaper solutions for transportation structures with superior long-term performance, innovative construction technologies and effective maintenance and preservation strategies. For MoDOT,

emphases will be placed on critical needs, reducing costs of inspection, maintenance and repair, ensuring bridge safety and providing durable solutions.

SUCCESS STORIES

This section lists a sampling of "success stories" for Year IV, including notable Center events; NUTC News articles of interest; faculty and student awards; and media articles about the Center, faculty or campus. Articles, awards and events with corresponding clips are available in the Appendix.

Featured Articles in the NUTC News

- "Summer Transportation Institute 2009." Volume 4, Issue 4.
- "Innovative Concrete Systems for Pedestrian Bridges." Volume 4, Issue 4.
- "Missouri S&T Hydrogen Transportation Test Bed Equipment and Development: Phase II." Volume 5, Issue 1.
- "First Annual MOVITE/University Showcase." Volume 5, Issue 2.
- "WISE Programs at Missouri S&T." Volume 5, Issue 3.

Awards

- Kurt Bloch, a civil, architectural and environmental engineering Ph.D. student, was named Missouri S&T's 2009 UTC Outstanding Student of the Year.
- Missouri S&T's student Hydrogen Design Team took first place in the Hydrogen Student Design Contest sponsored by the Hydrogen Education Foundation.
- Cecilia Elmore, director of Missouri S&T's Women's Leadership Institute, was named co-winner of the Missouri S&T Alumna of the Year Award.
- Missouri S&T's student chapter of the American Concrete Institute (ACI) placed first in the American Concrete Institute Pervious Concrete Design Competition.
- Dr. Reza Zoughi, professor of electrical and computer engineering, received a 2008-2009 Outstanding Teaching Award from Missouri S&T.
- Mathew Thomas, a graduate student in engineering management and systems engineering, was selected for a $1,000 Euro Cash Award for submitting the best paper in hydrogen systems applications and was invited to present at the World Congress of Young Scientists on Hydrogen Energy Systems in Torino, Italy.
- Dr. Genda Chen, professor of civil, architectural and environmental engineering, won a 2009 Research Achievement Award and a $1,000 stipend.

- Dr. Fatih Dogan, professor of materials science and engineering, won a 2009 Research Achievement Award and a $1,000 stipend.

- Dr. Sanjay Madria, associate professor of computer science, won a 2009 Research Achievement Award and a $1,000 stipend.

- Dr. Harvest Collier, vice provost for undergraduate studies at Missouri University of Science and Technology, was one of 10 educators in the United States selected for Outstanding First-Year Student Advocates by National Resource Center for the First-Year Experience and Students in Transition.

- Dr. Richard Brow, Curator's Professor of materials science and engineering, won the Presidential Award for Research and Creativity.

- Dr. Roger LaBoube, Distinguished Teaching Professor of civil engineering, received the 2010 Market Development Industry Award from the American Iron and Steel Institute.

- Dr. Abdeldjelil "DJ" Belarbi, former Curator's Teaching Professor of civil, architectural and environmental engineering, received a Global Learning 2010 Outstanding Teaching Commendation Award.

- Dr. Ronaldo Luna, associate professor of civil, architectural and environmental engineering, received a Global Learning 2010 Outstanding Teaching Commendation Award.

- Dr. John Myers, associate professor of civil and architectural engineering, was awarded the 2010 American Concrete Institute (ACI) – Committee Member of the Year in 2009 Award from ACI-EAC.

- Dr. John Myers, associate professor of civil and architectural engineering, was awarded the 2010 Society of American Military Engineers (SAME) – Engineering Award.

- Dr. John Myers, associate professor of civil and architectural engineering, was elected 2009 Tau Beta Pi (TBΠ) Emanate Engineer Representing Missouri Beta Chapter.

Missouri S&T in the News

External Media Sources

- "The rubber is hitting the road at Missouri S&T." Rolla Daily News. July 21, 2009.

- "At S&T, future engineers are embracing transformational changes." Rolla Daily News. September 4, 2009.

- “S&T’s house of the future to be on display in D.C.” Rolla Daily News. September 22, 2009.

- “S&T researcher thinks "inside the box" to create self-contained wastewater system for soldiers, small towns.” Rolla Daily News. September 25, 2009.

- “S&T researchers to develop renewable energy technologies for military installations.” Rolla Daily News. October 6, 2009.

- “Engineers Without Borders to leave S&T on Feb. 24.” Rolla Daily News. February 26, 2010.

- “Missouri S&T to receive $2.5 million in funding to be energy hub.” Rolla Daily News. March 23, 2010.

- “Bridge expert from S&T does post-earthquake reconnaissance in Chile.” Rolla Daily News. April 19, 2010.

- “S&T student plans to market hydrogen generator.” Rolla Daily News. April 20, 2010.

- “Egyptian university signs agreement with S&T.” Rolla Daily News. May 11, 2010.

Internal Media Sources

- “Luna invited to international conference in Egypt.” Missouri S&T Public Relations. September 28, 2009.

- “S&T team to unveil EcoCAR during GM Day in Rolla.” Missouri S&T Public Relations. October 1, 2009.

- “S&T researchers to develop renewable energy technologies for military installations.” Missouri S&T Public Relations. October 6, 2009.

- “NASA astronaut Sandra Magnus to speak at S&T.” Missouri S&T Public Relations. October 13, 2009.

- “Long carbon fibers could improve blast resistance of concrete structures, say S&T researchers.” Missouri S&T Public Relations. October 19, 2009.

- “Missouri S&T EWB chapter receives $100,000 gift.” Missouri S&T Public Relations. January 22, 2010.

- “Spring enrollment up more than 8 percent.” Missouri S&T Public Relations. February 9, 2010.

- “$1.25 million donation moves design center forward.” Missouri S&T Public Relations. February 16, 2010.

- “S&T reps to participate in energy forum Friday evening.” Missouri S&T Public Relations. February 16, 2010.

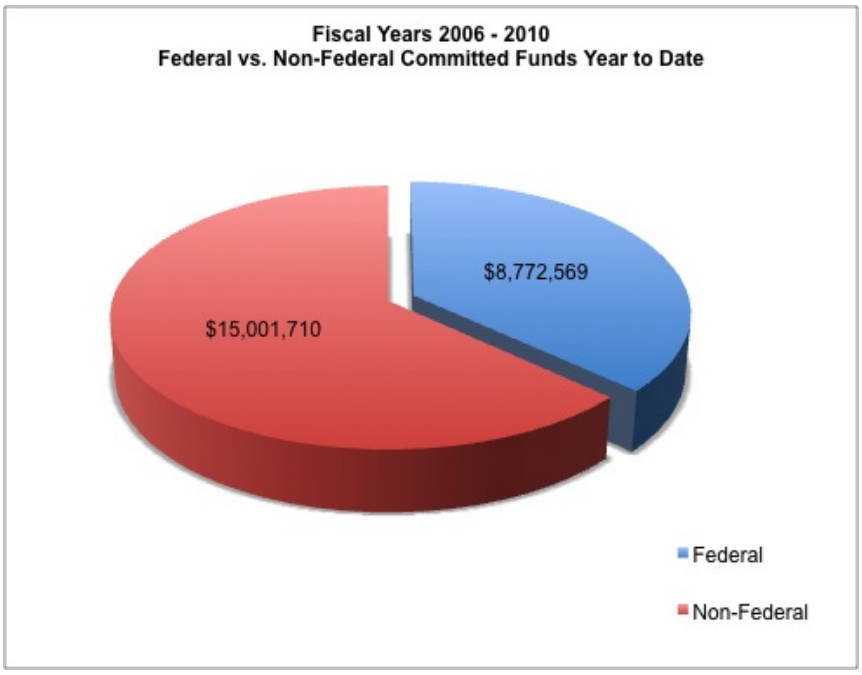
- “Robot provides 3-D images of dangerous locations.” Missouri S&T Public Relations. February 19, 2010.

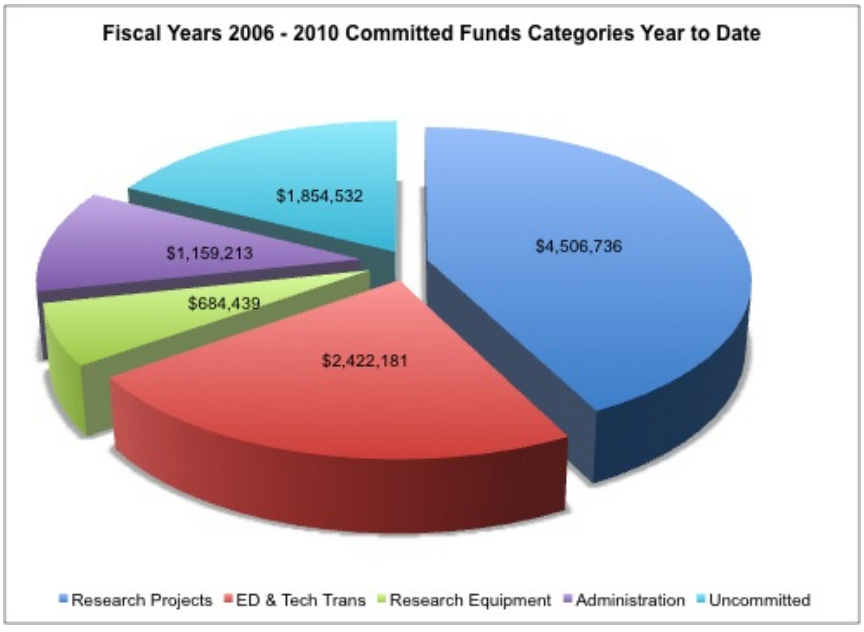
- “S&T students to share research results with state lawmakers.” Missouri S&T Public Relations. April 7, 2010.

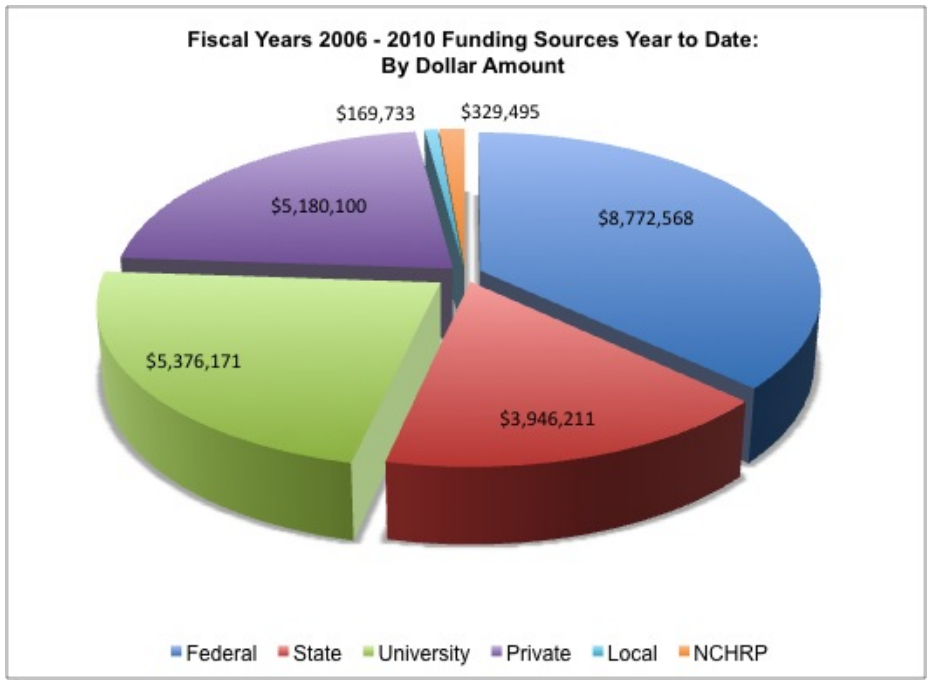
- “S&T receives $3.2 million for transportation center.” Missouri S&T Public Relations. June 22, 2010.

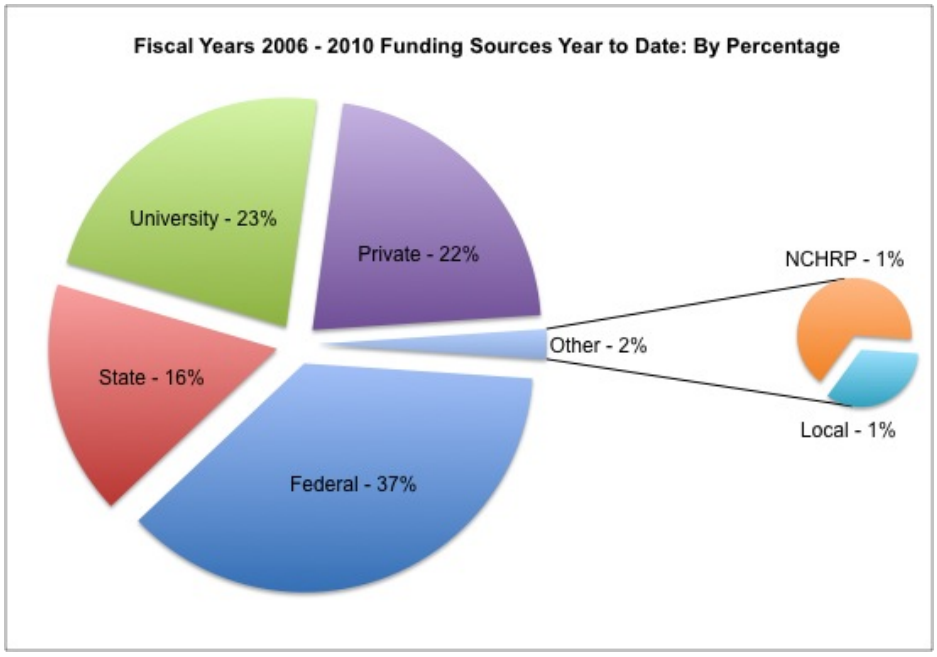
FUNDING SOURCES AND EXPENDITURES

This section provides information on Funding Sources and Expenditures for Years I-IV of the NUTC grant. The following funding charts and tables show committed revenues; expenditure categories; match funding sources; pending project allocations; and funding sources and expenditures for both awarded and pending projects.






Fiscal Years 2006 - 2010 Funding Sources Year to Date:
By Dollar Amount
$169,733
$329,495
$5,180,100
$8,772,568
$5,376,171
$3,946,211
Federal
State
University
Private
Local
NCHRP


Fiscal Years 2006 - 2010 Funding Sources Year to Date: By Percentage
University - 23%
Private - 22%
NCHRP - 1%
Other - 2%
State - 16%
Local - 1%
Federal - 37%

Funding Sources and Expenditures

Amounts and Sources of Funding: July 1, 2006–June 30, 2010

Seq. No.	Non-Federal * Source	Amount	UTC	Total
R195	NCHRP-NYSDOT-MS&T CE	$ 157,873	$ 78,936	$ 236,809
ETT196	Industry	$ 394,450	$ 187,500	$ 581,950
R197	NCHRP-MS&T CE	$ 120,000	$ 60,000	$ 180,000
R198	MoDOT-UMC CE	$ 269,381	$ 100,087	$ 369,468
ETT199	MoDOT	$ 200,054	$ 99,537	$ 299,591
R200	General Motors	$ 26,902	$ 13,776	$ 40,678
R201	EPRI	$ 68,980	$ 42,985	$ 111,965
R202	MS&T GS&E	$ 230,000	$ 115,000	$ 345,000
R203	MS&T Depts.	$ 500,000	$ 250,000	$ 750,000
R204	GTI	$ 600,000	$ 250,000	$ 850,000
ETT205	MS&T DCE	$ 20,000	$ 10,000	$ 30,000
RE206	LGA	$ 133,880	$ 66,939	$ 200,819
R207	CDOT	$ 21,960	$ 9,286	$ 31,246
R208	Roesch, Inc	$ 10,000	$ 5,000	$ 15,000
R209	Coreslab Structures	$ 7,746	$ 3,873	$ 11,619
R210	Transystems, Inc.	$ 21,200	$ 10,599	$ 31,799
R211	USB	$ 50,000	$ 24,944	$ 74,944
ETT212	Industry	$ 23,400	$ 7,525	$ 30,925
R213	Ameren	$ 25,000	$ 12,500	$ 37,500
R214	EPRI	$ 58,660	$ 29,330	$ 87,990
ETT215	MS&T VPR	$ 19,115	$ 19,115	$ 38,230
ETT216	Industry	$ 415,750	$ 187,500	$ 603,250
ETT217	Retired	$ -	$ -	$ -
R218	MoDOT	$ 44,813	$ 23,877	$ 68,690
R219	MoDOT	$ 59,997	$ 34,161	$ 94,158
ETT220	MoDOT	$ 211,885	$ 211,885	$ 423,770
R221	SCI Engineering	$ 23,431	$ 11,715	$ 35,146
R222	HNTB Corp.	$ 10,387	$ 5,116	$ 15,503
R223	Lake Sherwood Estates	$ 4,500	$ 2,250	$ 6,750
ETT224	MS&T-VPR	$ 26,102	$ 26,102	$ 52,204
R225	MS&T Departments	$ 1,800,000	$ 900,000	$ 2,700,000
ETT226	Industry	$ 77,125	$ 20,769	$ 97,894
R227	Egyptian Concrete	$ 28,172	$ 14,087	$ 42,259

R228	Ameren	$	25,000	$	12,500	$	37,500
ETT229	MoDOT	$	35,358	$	17,679	$	53,037
R230	NYSERDA	$	50,000	$	50,000	$	100,000
R231	MS&T Departments	$	500,000	$	250,000	$	750,000
R232	ASNT	$	15,000	$	7,475	$	22,475
R233	MoDOT MS&T-CE	$	121,555	$	75,972	$	197,527
R234	MoDOT MS&T-CE	$	194,612	$	121,633	$	316,245
R235	MoDOT MS&T-CE	$	78,192	$	48,870	$	127,062
R236	MoDOT Missouri S&T-CE	$	363,590	$	152,981	$	516,571
R237	MoDOT Missouri S&T-CE	$	76,923	$	48,077	$	125,000
R238	MoDOT UMC-CE	$	80,033	$	37,750	$	117,783
R239	MoDOT UMC-CE	$	109,309	$	50,178	$	159,487
R240	MoDOT UMC-CE	$	111,382	$	53,928	$	165,310
R241	MoDOT UMKC-CE	$	124,225	$	35,612	$	159,837
R242	MoDOT / UMC CE	$	151,296	$	35,965	$	187,261
R243	MoDOT / Missouri S$T CE	$	141,116	$	97,406	$	238,522
R244	MoDOT / Missouri S$T CE	$	64,472	$	55,928	$	120,400
R245	MoDOT / UMC CE	$	89,047	$	50,863	$	139,910
R246	MoDOT / Missouri S&T CE	$	132,890	$	91,620	$	224,510
R247	MoDOT / UMC CE	$	915,596	$	43,218	$	958,814
ETT248	MoDOT	$	343,261	$	218,261	$	561,522
ETT249	MoDOT	$	30,506	$	11,438	$	41,944
R250	City of Rolla	$	169,733	$	165,000	$	334,733
ETT251	Industry	$	367,250	$	187,500	$	554,750
RE252	Spirit Aerosystems	$	25,000	$	12,500	$	37,500
R253	NCHRP/MAPA/MS&T CE	$	190,910	$	95,449	$	286,359
R254	Industry	$	1,197,195	$	605,000	$	1,802,195
R255	USB	$	50,000	$	25,000	$	75,000
R256	KH	$	7,000	$	3,500	$	10,500
R257	CRSI	$	30,000	$	15,000	$	45,000
ETT58	Industry	$	375,000	$	187,500	$	562,500
ETT59	MoDOT	$	218,289	$	218,289	$	436,578
R260	MoDOT	$	99,978	$	49,966	$	149,944
R261	University of Arkansas	$	4,993	$	2,496	$	7,489
P	University of Arkansas	$	45,000	$	22,500	$	67,500
P	Unviersity of Nevada-Reno	$	65,854	$	32,927	$	98,781
P	GEI	$	4,800	$	2,400	$	7,200

P	USB	$ 50,000	$ 25,000	$ 75,000
P	MS&T Depts.	$ 1,000,000	$ 500,000	$ 1,500,000
P	Industry	$ 750,002	$ 375,001	$ 1,125,003
P	MoDOT	$ 436,578	$ 436,579	$ 873,157
P	MS&T Depts.	$ 500,000	$ 250,000	$ 750,000
	Facilities & Admin. Indirect Costs		$ 1,159,213	$ 1,159,213
	TOTAL	**$ 15,001,707**	**$ 8,772,568**	**$ 23,774,276**

Legend:
CDOT=California Department of Transporation
CRSI= Concrete Reinforcing Steel Institute
EPRI=Electrical Power Research Institute
FMSME=Fuller, Mossberger, Scott & May Engineering
GEI=GeoEngineers Inc.
GTI=Gas Technology Institute
KH=Knight Hawk
LGA=Leica Geosystems Advantage
MODOT = Missouri Department of Transporation
MS&T DCE = Missouri Uniersity of Science & Technology Distance & Cont. Education
MS&T GS&E = Missouri Uniersity of Science & Technology Geological Science & Engineering
MS&T-CE= Missouri University of Science and Technology-Civil Engineering
MS&T-VPR= Missouri University of Science and Technology-Vice Provost of Research
NCHRP=National Cooperative Highway Research Program
NYSDOT=New York State Depart. of Transporation
NYSERDA= New York State Energy Research and Development Authority
UMC-CE =University of Missouri-Columbia Civil Engineering
UMKC-CE=University of Missouri Kansas City-Civil Engineering
UNR=University of Nevada-Reno
USB=United Soybean Board

APPENDIX: SUCCESS STORIES CLIPS

Featured Articles in the NUTC News

SUMMER TRANSPORTATION INSTITUTE 2009

Thirty-one rising high school sophomores, juniors and seniors interested in the transportation industry attended the two-week Summer Transportation Institute (STI) hosted by Missouri Local Technical Assistance Program (LTAP) July 12-24, 2009.

Week one was spent at the campus of Missouri University of Science and Technology (Missouri S&T) in Rolla and week two at Linn State Technical College in Linn, MO. Students had the opportunity to participate in leadership development and teambuilding activities while learning about a variety of aspects of the transportation industry and getting a taste of university life.

The curriculum included seminars on career opportunities in transportation; hands-on laboratories in which students designed software, mixed and tested concrete samples and learned about the components of asphalt; field trips to Kansas City, Universal Challenge Center in Rolla, St. Louis Transportation Museum and St. Louis' Metrolink; truck driver simulations and a tour of the Black Hawk Helicopter facility at Fort Leonard Wood; and recreational activities such as a ropes course, indoor and outdoor group games, pool parties and picnics.

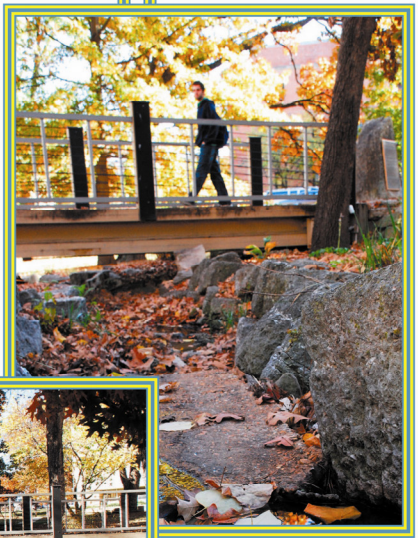
Participants were selected based on their academic achievement, expression of interest in transportation as a possible career choice and a written recommendation from the student's high school counselor and/or instructors. Selected students were awarded a scholarship covering room and board as well as any travel expenses associated with program activities and field trips.

STI is sponsored by the U.S. Department of Transportation, Missouri Department of Transportation, Missouri LTAP and the Center for Transportation Infrastructure and Safety and has been offered annually since 1999.

For more information about STI, visit http://dce.mst.edu/noncredit/precollege/sti.html. For more about Missouri LTAP, visit http://131.151.35.63/index.html.

Innovative Concrete Systems for Pedestrian Bridges

Using pedestrian bridges to research and monitor innovative concrete systems has the potential to solve problems on both local and national levels. Implementing small-scale structures in a local setting allows researchers to examine the long-term behavior of new concrete systems while making a valuable contribution to the community. At the same time, testing and developing new materials will aid in the repair of the ailing transportation infrastructure system in the United States.



With support from CTIS, Dr. John J. Myers and his research team will utilize innovative advanced concrete to fabricate, instrument and monitor two new pedestrian bridges in the City of Rolla, MO. One bridge will be constructed with high-strength concrete (HSC) as a baseline structure, while the second bridge will be constructed with high-strength, self-consolidating concrete (HS-SCC).

Because of its beneficial economical and material properties, the use of high-strength concrete (HSC) has become ordinary in the transportation infrastructure industry. The implementation of HSC in bridge construction reduces total material requirements and total costs by permitting longer girder spans and allowing for increased spacing between girders.

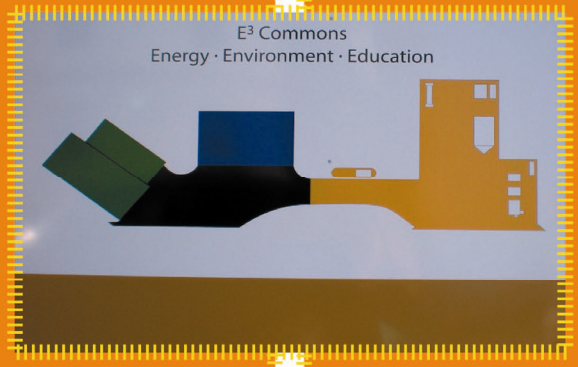
Over the past few years, acceptance and use of self-consolidating concrete (SCC) in bridge construction has increased in the U.S. due to a reduced potential for segregation, voids and surface defects. Due to the availability of new admixtures and fewer required steps in the curing process, the fabrication time and labor costs associated with SCC are less than that of other concretes. With these advantages, and numerous recent research studies investigating the material and mechanical properties of its use in precast members, SCC is becoming the material of choice for the precast industry.

Combining the performance characteristics of SCC with the engineering properties of HSC into one material will produce a cost-effective choice for the construction industry. The Pedestrian Bridges research effort involves the implementation of HS-SCC as an integrated precast system for pedestrian bridges which can be monitored and evaluated for future use in the transportation industry.

This research study will advance the state-of-knowledge on the transfer and development length, prestress losses, serviceability behavior and load distribution of HS-SCC precast elements and panels. Additionally, the system holds promise to provide a cost-effective, durable alternative for rapid construction of bridge systems in general.

Missouri S&T Hydrogen Transportation Test Bed Equipment and Development: Phase II

With support from the Center for Transportation Infrastructure and Safety, development of a hydrogen transportation test bed at Missouri S&T, coined E³ Commons, is underway to develop, demonstrate and deploy hydrogen vehicles and supporting infrastructure, including hydrogen production from renewable energy sources. Phase 1 of this project was completed in 2008, consisting of the development of a Hydrogen Fueling Station, the EcoCAR Garage and a Renewable Energy Transit Depot.



Focusing on the overarching goals of collecting and evaluating the real-world performance and utility of hydrogen-powered vehicles and benchmarking issues related to the safety, operation and maintenance of hydrogen-powered vehicles with other alternative fuel-powered vehicles, CTIS will provide support in tackling Phase II of the project, which will upgrade equipment and complete development at the E³ Commons.

EcoCAR Garage

The EcoCAR Garage is home to the Missouri S&T EcoCAR design team. The EcoCAR Competition challenges engineering students from universities across North America to re-engineer a light-duty vehicle, minimizing energy consumption, emissions and greenhouse gases while maintaining the vehicle's utility, safety and performance. Phase II will upgrade the EcoCAR Garage with a hydrogen gas leak detection system using catalytic beads with alarms/monitors/security cams and with an automatic fire sprinkler system.

Hydrogen Fueling Station

Phase II will upgrade the Missouri S&T Hydrogen Fueling Station from a temporary facility to a permanent facility by purchasing the currently leased GTI mobile hydrogen fueling unit. When finished, the Hydrogen Fueling Station will consist of several leading technologies including an on-site steam methane reformer and an electrolyzer for generation of high purity hydrogen; steel and carbon composite storage tanks for high pressure storage of hydrogen gas; a 350 bar hydrogen dispenser for both internal combustion engine and fuel cell vehicles; and a stationary polymer electrolyte membrane (PEM) fuel cell.

Story continues on page 8....

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Renewable Energy Transit Depot

The Missouri S&T Renewable Energy Transit Depot is a new "green-building" fabricated from four recycled shipping containers. The overall design emphasizes state-of-the-art strategies for sustainable site development, water savings, energy efficiency, material and resource selection and indoor environmental quality. This transit depot is a multifunctional building acting as the terminus of the hydrogen shuttle bus service from Rolla to Fort Leonard Wood, Missouri, home of the Missouri S&T EcoCAR team offices and training space, architectural wind turbines and a solar photovoltaic canopy. Phase II involves the erection of the four recycled shipping containers and the installation of the solar PV panels, architectural wind turbines and the hydrogen electrolyzer with chiller.

E³ Commons

Phase II involves the installation of a 330 kVA buck transformer to ensure a more secure 480 volt service to the E³ Commons as a whole.

Upgrading the Missouri S&T E³ Commons provides a unique transportation testbed for both current and future university transportation research projects focused on transition-state fuel vehicle infrastructure leading to the vehicular use of hydrogen as a fuel in both internal combustion engines and fuel cell plug-in hybrid electric vehicles at Missouri S&T.

FIRST ANNUAL MOVITE/UNIVERSITY SHOWCASE

MISSOURI UNIVERSITY OF SCIENCE AND TECHNOLOGY

The Center for Transportation Infrastructure and Safety (CTIS) and the Missouri Valley Chapter of the Institute of Transportation Engineers (MOVITE) hosted the First Annual MOVITE/University Showcase at the Havener Center at Missouri University of Science and Technology (Missouri S&T) on December 3, 2009.

The mission of the MOVITE/University Showcase was twofold: 1) Showcase noteworthy transportation research, innovative solutions, faculty and students at Missouri's universities and 2) Provide an opportunity to develop and foster relationships between transportation practitioners and academia.

More than 50 students, industry professionals, engineers and educators took advantage of the opportunity to network within the transportation community and to learn more about the wide variety of transportation research at Missouri S&T.

The day's events included presentations on the research needs of the Missouri Department of Transportation (MoDOT) as well as research presentations from MoDOT, CTIS Graduate Research Assistants and industry partners. A poster session during lunch provided time for networking and the event concluded with tours of the Missouri S&T campus, including the Hydrogen Fueling Station and Structures Laboratory.

Due to the generous sponsorship of both CTIS and MOVITE, the University Showcase was a free event.

WISE Programs at Missouri S&T

For the past 5 years, the Center for Transportation Infrastructure and Safety has been a supporter of the Women in Science and Engineering (WISE) program at Missouri S&T. The WISE program provides a campus focal point for increasing the number of women in science, engineering, math and technology fields through outreach, recruitment and retention efforts from middle school age through undergraduate levels. WISE also provides support programs for young women at Missouri S&T.

The following is a sampling of activities offered/planned from July 2009 through June 2010:

Society of Women Engineers (SWE) National Conference - October 2009

Missouri S&T SWE students participated in both National and Regional conferences. Each year, the National conference attracts nearly 5,000 engineering professionals, students and corporate representatives.

7th "Expanding Your Horizons (EYH)...in Math and Science" - November 4, 2009

EYH is an invitation for 7th & 8th grade girls to visit the Missouri S&T campus and attend a keynote presentation by a successful woman engineer or scientist, participate in hands-on math/science activities and to interact with female students, faculty and practicing engineers and scientists who serve as positive role models. Over 500 girls participated in 2009.

Girls "Lock-In" Conferences - October 2-3, 2009 and February 12-13, 2010

Eleventh and 12th grade girls were given the opportunity to camp out in a residence hall, learn more about studying math, science and engineering at Missouri S&T, to meet other perspective and current students, learn tips for financial aid and admission and participate in team projects. A total of 53 students participated in the two conferences and 62 percent of attendees later enrolled at Missouri S&T.

Summer Solutions Camp - June 21-25, 2010

Summer Solutions Camp is designed to interest freshman and sophomore high school girls in engineering and science. The one-week program enables female students to obtain a clear picture of engineering and science as a profession. Several hands on projects are planned to help the students learn more about career options and work in the field. The 2010 program expects close to 30 participants.

Awards

KURT E. BLOCH

2009 OUTSTANDING MISSOURI S&T UTC STUDENT OF THE YEAR

Kurt E. Bloch has been named Outstanding Missouri S&T UTC Student of the Year. The award was made based on his excellent academic performance, the technical merit of his research topic and his service to both Missouri S&T and the surrounding community.

Bloch earned B.S. in Civil Engineering with Summa Cum Laude honors from Missouri University of Science and Technology (formerly University of Missouri-Rolla) in May 2008. During his undergraduate career, Bloch was a member of the Missouri S&T chapters of the American Society of Civil Engineers (ASCE), Chi Epsilon (the National Civil Engineering Honor Society) where he served as Service Chair and Vice President, Order of Omega (Greek Honor Society) where he served as Secretary, Delta Tau Delta Fraternity where he served as Philanthropy Chair, Stewart, Director of Risk Management, and Vice President External and Phi Kappa Phi (National Honor Society). Bloch was awarded the Academy of Civil Engineers Outstanding Senior Award in May 2008. He is also highly involved in his church where he is the organist and a choir member. As a graduate student, Bloch was involved with the Missouri S&T PCI Big Beam Competition Team.

Advised by Dr. John J. Myers during his graduate career, Bloch has studied and made technical contributions to the understanding of High-Strength Concrete (HSC) and High-Strength Self-Consolidating Concrete (IIS-SCC) for accelerated construction, including: the design, instrumentation and erection of two innovative precast prestressed HSC and HS-SCC bridges located in Rolla, Missouri. Sponsored by the City of Rolla and the CTIS-NUTC at Missouri S&T, his work furthers the current knowledge base on these advanced materials, including knowledge of mechanical and material behavior under field conditions.

The field of civil engineering appealed to Bloch "because it was an engineering field that would produce a tangible result." He chose Missouri S&T because of the program, faculty and research environment available to students, believing it would provide "the exact education... needed to succeed in the engineering world." Of his research on HSC and HS-SCC, Bloch says: "HS-SCC has the potential to create high strength durable structures rapidly and with less labor." These advances could result in more sustainable structures with longer service lives.

Bloch anticipates graduating from the Missouri S&T with his M.S. in Civil Engineering in May 2010 and plans to work in industry as a structural engineer, "getting the necessary experience in civil engineering that can only be obtained in the work world."

Missouri S&T Wins Grand Prize in Hydrogen Design Contest

Left to Right: Jeffrey Serfass (National Hydrogen Association President), Stephen Schrock, Mathew Thomas, Aanchal Shah, Vijay Shah, Yaqin Lin, Amber Gomaz, Matthew Rankins, James Haworth and Dr. John W. Sheffield (Team Advisor)

A design for a hydrogen-powered community in California by students from Missouri University of Science and Technology captured the grand prize in the national Hydrogen Student Design Contest sponsored by the Hydrogen Education Foundation.

Missouri S&T was announced as the grand prize winner Tuesday, May 4, 2010 at the National Hydrogen Association's Hydrogen Conference and Expo in Long Beach, CA. This marks the second time in three years that a Missouri S&T team has won the contest.

For this year's competition, the Missouri S&T team designed a scalable hydrogen fueling station for the community of Santa Monica, CA and identified renewable hydrogen sources in the community as well as customers for early-market hydrogen applications.

The team's eight students designed a station capable of dispensing at least 200 kilograms of hydrogen per day. To better inform the public about the benefits of hydrogen power, team members also designed a public education facility to be constructed from a recycled shipping container.

The work was based on criteria outlined in the California Fuel Cell Partnership's Action Plan 1, a 2009 strategy for developing early hydrogen communities in California over the next eight years.

The Hydrogen Design Contest is an annual event that challenges teams of university-level students from around the world to develop and design hydrogen applications for real-world use. Established in 2004 by the Hydrogen Education Foundation, the contest showcases the talents of students in many disciplines, including engineering, architecture, marketing and entrepreneurship. Students from colleges, universities and vocational schools worldwide are eligible to participate. More than 30 teams from all over the world signed up for the 2009-2010 competition.

As the grand prize winner, the Missouri S&T team was invited to present its design at the Hydrogen Conference and Expo and at the World Hydrogen Energy Conference to be held May 16-19 in Essen, Germany.

In 2008, a Missouri S&T team won the grand prize by designing systems to address air and water quality,

continued on page 8...

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noise pollution, energy efficiency, safety and security issues at the Columbia Metropolitan Airport in Columbia, SC.

Members of this year's team are:

•Mathew Thomas, Team Leader, of Rolla, MO
Ph.D. student in Engineering Management

•Stephen Schrock of Omaha, NA
senior in Architectural Engineering

•James Haworth of Kansas City, MO
senior in Architectural Engineering

•Amber Gomaz of Rolla, MO
senior in Architectural Engineering

•Matthew Rankins of Eureka, MO
senior in Architectural Engineering

•Aanchal Shah of Rolla, MO
graduate student in Mechanical Engineering

•Vijay Mohan of Malleswaram, Bangalore, India
graduate student in Mechanical Engineering

•Yaqin Lin of Rolla, MO
graduate student in Engineering Management

Team advisers include Dr. Paul D Hirtz, Interim Director of Missouri S&T's Student Design Center; Dr. Stuart W. Baur, Assistant Professor of Civil, Architectural and Environmental Engineering; Heath Pickerill, Lecturer of Civil, Architectural and Environmental Engineering and Director of the Missouri Local Transportation Assistance Program; Scott E. Grasman, Associate Professor of Engineering Management and Systems Engineering; Kevin B. Martin, Assistant Research Professor of Mechanical and Aerospace Engineering; Angela Rolufs, Director of the Missouri Transportation Institute and the S&T Center for Environmental Excellence; Dr. John Sheffield, Professor of Mechanical and Aerospace Engineering; and Timothy Montgomery, Owner and Principal Architect of TMA Architects of St. Louis and a 1971 Mechanical Engineering graduate of Missouri S&T (then known as the University of Missouri-Rolla).

This article was adapted from a May 4, 2010 Missouri S&T Public Relations news release.

Women's award winners announced

December 3, 2009 9:39 AM | Permalink

Cecilia Elmore and **Paula Lutz** were named co-winners of the Missouri S&T Alumna of the Year Award. The Missouri S&T Alumna and Women Student of the Year Awards endowment was created by three Missouri S&T professors: Dr. Mariesa Crow, F. Finley Distinguished Professor of Electrical Engineering; Dr. Dee Haemmerlie Montgomery, Curator's Teaching Professor of Psychology; and Dr. Ann Miller, Cynthia Tang Missouri Distinguished Professor of Computer Science.

Elmore, director of S&T's Women's Leadership Institute, earned her bachelor's degree in engineering management from S&T in 1986, where she was also a varsity athlete in basketball and softball. Her professional achievements include being honored as a Chi Omega Outstanding Student Instructor, receiving the Society of Hispanic Engineers Gold Support Award and winning the UMR/MSM Outstanding Varsity Athlete Alumni Achievement Award. Elmore has served as an instructor for Women as Global Leaders, including Guatemala service and outreach experiences, as interim director of student diversity programs and as director of pre-college outreach summer camps for girls. Her service contributions include staff advisor for Delta Omicron Lambda women's service organization, mentoring female engineering students through MentorNet, and counselor for the Society of Women Engineers student chapter. Elmore is a member of the Women in Engineering Programs Advocates Network and the Women in Science and Engineering Advisory
Board.

Lutz is presently dean of the College of Letters and Science at Montana State University. She earned her bachelor's degree in chemistry with life science preference from S&T in 1976, then went on to earn her Ph.D. in microbiology and immunology in 1981 from Duke University. Achievements in her professional field include her service as dean of the college of arts and sciences (the first female dean in S&T's history), department chair of biological sciences at S&T, and recognition as UMR Woman of the Year in 1999. During her tenure at S&T, Lutz received seven Faculty Excellence Awards and six Outstanding Teaching Awards. Lutz helped develop the Women's Leadership Institute and the Expanding Your Horizons Program. She serves on the Advisory Board for a National Science Foundation ADVANCE grant at Montana State to promote the careers of women faculty in STEM fields.

The Missouri S&T Alumna Silver Award winner for 2009 is **Jean Holley**, senior vice president and CIO of Tellabs. Holley earned her bachelor's degree in computer science from S&T in 1981 and a master's degree in computer science and engineering in 1986 from the Illinois Institute of Technology. Achievements in her professional field include the Association of IT Professionals CIO of the Year

S&T students take first in concrete competition

December 7, 2009 10:00 AM | Permalink | Comments (0) | SHARE

A team of students from Missouri University of Science and Technology recently placed first among nine university teams in the American Concrete Institute Pervious Concrete Design competition at the University of Missouri-Kansas City.

The goal was to develop a concrete mix design that would drain water from the surface, yet still be durable and maintain its strength. This competition is new to the ACI lineup, and was the first of its kind for the S&T team.

"When we compete, we have to become real engineers," says Dane Shaw, S&T student and vice president for the American Concrete Institute chapter on campus. "We modify theories and ideas taught to us and use them in real life applications."

The team won $600 in travel funds that will allow them to attend the annual spring ACI convention to be held March 21-25, 2010, in Chicago.

The spring competition, called "Xtreme Concrete," is a national event involving two separate tests; a version of the pervious concrete challenge and the construction of a hollow, perfectly spherical fiber-reinforced concrete bowling ball.

The S&T team includes Shaw, a junior in civil engineering from Warrenton, Mo.; Tony Neer, a senior in civil engineering and physics from Higginsville, Mo.; Derek Aholt, a senior in architectural engineering from Washington, Mo.; and Sihem Belarbi, a senior in architectural engineering from Rolla. The team's advisor is Dr. D.J. Belarbi, professor of civil, architectural and environmental engineering.

Belarbi, who is leaving the Missouri S&T faculty soon to return to his alma mater, the University of Houston, was the founding advisor for the S&T ACI chapter in 1993.

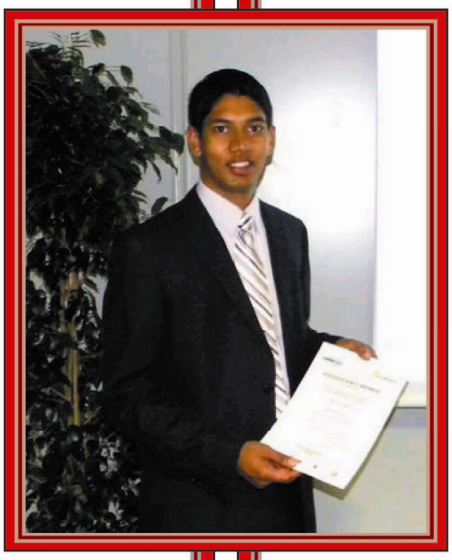
"We would like to express our thanks for his years of service to the campus and the ACI organization," says Shaw. "Without his support and expertise, we could never have gotten where we are today."

In addition to winning first place in the Pervious Concrete Design competition, the team competed in the ACI International competition held in New Orleans Nov. 7-9. In this competition, teams designed a two-inch-square cube with specific criteria for weight, strength and sizing. S&T placed 17th among 40 teams from around the world, including teams from Mexico, Canada and Peru.

S&T Graduate Student's Paper Wins Award at International Conference on Hydrogen Systems

S&T grad students and a young faculty member presented six papers at the World Congress of Young Scientists on Hydrogen Energy Systems held October 7-9, 2009 in Torino, Italy.

Mathew Thomas' research paper was selected for the $1,000 Euro Cash Award for the best paper in Hydrogen Systems Applications. In addition, Thomas received a $250 Euro Grant from the event's organizers. Thomas's paper, "Design Layout of Hydrogen Research and Development Garage," will be published in a special issue of the International Journal of Hydrogen Energy.



Thomas is a member of Missouri S&T's EcoCAR team which is developing a hydrogen fuel cell plug-in hybrid electric vehicle (FC PHEV). The team is one of 17 university groups from the United States and Canada participating in a three-year competition to design a more eco-friendly vehicle. EcoCAR: The NeXt Challenge tests students' abilities to re-engineer a Saturn VUE. The ultimate goal is to improve fuel economy and reduce greenhouse gas emissions while retaining a vehicle's performance and commercial appeal.

During the three-year competition, General Motors is providing production vehicles, vehicle components, seed money, technical mentoring and organizational support. The Department of Energy and the Argonne National Laboratory are also providing support.

Thomas is studying engineering management and systems engineering at Missouri S&T. He is the first author of "Design Layout of Hydrogen Research and Development Garage." Other co-authors from Missouri S&T are Dr. Kevin Martin, Assistant Research Professor of Mechanical and Aerospace Engineering; Dr. Scott Grasman, Associate Professor of Engineering Management and Systems Engineering; Dr. John Sheffield, Professor of Mechanical and Aerospace Engineering; and Edward Anculle, a graduate student in Mechanical and Aerospace Engineering.

Joining Mathew Thomas on the European trip were S&T grad students Edward A. Anculle Arauco, Joseph A. Ishaku, Andrew L. Meintz, Clint Alex Cottrell and faculty members Drs. Kevin B. Martin and John W. Sheffield.

A version of this article, written by Lance Feyh, was first published by Missouri S&T Public Relations in September 2009.

S&T students win national leadership training award

January 27, 2010 10:56 AM | Permalink | Comments (1) | SHARE

A group of students at Missouri University of Science and Technology have won the national Student Award for Leadership Training (SALT) for their training/teaching module titled "Making Leaders by Making Friends." The SALT award recognizes outstanding leadership training programs developed and executed by students, for students.

The students are members of Missouri S&T's Shamrock Chapter of the National Residence Hall Honorary (NRHH). They won the regional title in October 2009.

Representatives from both the National Association of College and University Residence Halls (NACURH), the largest student-run not-for-profit organization in the United States, and the American College Personnel Association (ACPA), a comprehensive student affairs association, read bids from around the country to determine the national winner. This year, 11 bids were submitted from seven regions. Missouri S&T's NRHH chapter was notified they had earned the award on Jan. 20. The bid's authors, **Matt Hume**, a senior in engineering management from St. Peters, Mo., and **Rob Sager**, a senior in metallurgical engineering from Hazelwood, Mo., will select members of the team to present the group's module at two national conferences. The ACPA conference is scheduled from March 20-24, in Boston, and the NACURH 2010 conference is scheduled from June 21-24, at the University of California, San Diego. The Shamrock Chapter's advisor is **Kristi Schulte**, associate director of residential life at Missouri S&T.

26 faculty to receive awards

December 21, 2009 8:28 AM | Permalink | Comments (0) | SHARE

Twenty-six faculty members at Missouri S&T will receive awards for their achievements, research, service or teaching for 2009 during an awards ceremony on Monday, Feb. 1, 2010.

The awards are given annually to recognize outstanding faculty. Each winner receives a $1,000 stipend funded by industry and alumni contributions.

Receiving the 2009 Achievement Awards are:

- **Dr. Petra DeWitt**, lecturer of history and political science
- **Stephanie Fitch**, instructor of business and information technology
- **Dr. Scott Miller**, associate teaching professor of materials science and engineering
- **Clayton Price**, instructor of computer science
- **Dr. W. Eric Showalter**, associate teaching professor of civil, architectural and environmental engineering.

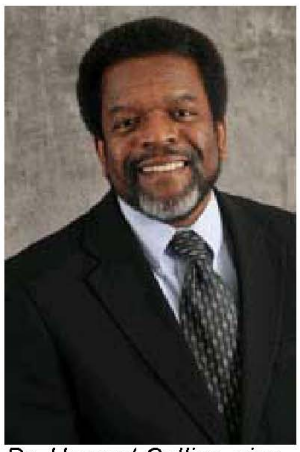
Receiving the 2009 Research Awards are:

- **Dr. S.N. Balakrishnan**, professor of mechanical and aerospace engineering
- **Dr. Genda Chen**, professor of civil, architectural and environmental engineering
- **Dr. Fatih Dogan**, professor of materials science and engineering
- **Dr. Shannon Fogg**, assistant professor of history and political science
- **Dr. Sanjay Madria**, associate professor of computer science
- **Dr. Julia Medvedeva**, assistant professor of physics
- **Dr. Matthew O'Keefe**, professor of materials science and engineering

S&T's Harvest Collier receives student advocate award

February 3, 2010 10:31 AM | Permalink | Comments (8) | SHARE

Dr. Harvest Collier, vice provost for undergraduate studies at Missouri University of Science and Technology, is one of 10 educators in the United States to be selected as Outstanding First-Year Student Advocates by a national organization based at the University of South Carolina.



Dr. Harvest Collier, vice provost of undergraduate studies

Collier will receive the award in February from the **National Resource Center for the First-Year Experience and Students in Transition**. The award will be presented during the center's 29th Annual Conference on the First-Year Experience Feb. 12-16 in Denver.

Collier and the other recipients are being recognized for their efforts to improve the experiences of first-year college students.

As vice provost of **undergraduate studies** and a chemistry professor at Missouri S&T, Collier has initiated and led several programs designed to improve student learning, particularly in the areas of science, technology, engineering and mathematics. An advocate of collaborative learning and the use of technology in the classroom, Collier has also been instrumental in developing programs such as "Hit the Ground Running" to help incoming freshmen make the transition from high school to college.

Collier also serves as director of Missouri S&T's Center for Educational Research and Teaching Innovation, a position he has held since 2003. The center promotes faculty development in areas of collaborative and experiential learning, technology-enhanced learning, and educational research.

Collier joined the Missouri S&T faculty in 1982 as an assistant professor of chemistry. He was promoted to associate professor in 1988 and professor in 1994. From 1996-1999, he served as chair the chemistry department, and from 1999-2002, he was associate dean for the College of Arts and Sciences. He was named vice provost for undergraduate and graduate studies in 2001 and in 2007 became vice provost for undergraduate studies.

Collier holds bachelor's, master's and Ph.D. degrees in inorganic chemistry from Mississippi State University.

S&T faculty and students receive University of Missouri System awards

June 11, 2010 11:44 AM | Permalink | Comments (0) | SHARE

Four of six awards presented by the **University of Missouri System** during its annual awards ceremony were presented to faculty and students from Missouri University of Science and Technology.

The ceremony, held June 10 at the Reynolds Alumni Center in Columbia, Mo., was hosted by University of Missouri Board of Curators and UM System President Gary Forsee and his wife, Sherry.

Missouri S&T's awards include:

Presidential Award for Research and Creativity, presented to **Dr. Richard K. Brow, Curators' Professor of materials science and engineering at Missouri S&T**. The award recognizes a faculty member with a sustained record of national and international quality research or creativity.
For more than 20 years, Brow has been one of the leading glass scientists in the world, particularly in phosphate glass, which is useful for nuclear waste disposal, laser glasses and sealants. He has produced numerous publications on this topic and has more than $3.8 million in research expenditures to his credit through 2009.

The first American recipient of the Gottardi Prize from the International Commission on Glass, Brow also received an award from R&D Magazine for the development of a sealing glass that was named one of the 100 most technologically significant new products of 1996.

Said one nominator: "One of the best things about Professor Brow is that he doesn't wear his many achievements on his sleeve. He is a humble person who quietly goes about doing world-class research, enabling the success of many students, visiting professors and faculty. Through his efforts, our university is known the world over for excellence in glass science and engineering."

LaBoube receives AISI leadership award

May 3, 2010 8:30 AM | Permalink | Comments (0) | SHARE

Dr. Roger A. LaBoube, Distinguished Teaching Professor of civil engineering at Missouri University of Science and Technology, has received the 2010 Market Development Industry Leadership Award from the American Iron and Steel Institute.

The award recognizes LaBoube's contributions to promoting the use of steel in the construction industry.

LaBoube is also director of the **Wei-Wen Yu Center for Cold-Formed Steel Structures** at Missouri S&T. He was cited by the **AISI** for his research contributions, his involvement on two AISI committees (on specifications and on framing standards), and his "enthusiastic promotion of the use of cold-formed steel construction through technical service, engineering education, research and professional activity."

He will receive the award from AISI Chairman Daniel DiMicco, chairman, president and CEO of Nucor Corp., during the AISI 2010 General Meeting May 4 in Boca Raton, Fla. A member of the S&T civil engineering faculty since 1989, LaBoube was named Distinguished Teaching Professor in 1998 in recognition of his teaching excellence. He received his bachelor's, master's and Ph.D. degrees in civil engineering from Missouri S&T (then known as the University of Missouri-Rolla) in 1970, 1973 and 1977, respectively.

LaBoube has received several Outstanding Teaching Awards and Faculty Excellence Awards from campus during his career.

S&T to recognize outstanding teaching

By Staff reports
The Rolla Daily News
Posted Apr 28, 2010 @ 02:05 PM

Rolla, Mo. — Dr. Henry Wiebe, vice provost of global learning at Missouri University of Science and Technology, will present outstanding teaching awards to Missouri S&T faculty members engaged in distance education during a campus ceremony on Friday, April 30.

Global Learning 2010 Outstanding Teaching Award of Excellence recipients:

-- Dr. Elizabeth Cudney, assistant professor of engineering management and systems engineering
-- Dr. Lokesh Dharani, Curators' Professor of mechanical and aerospace engineering and senior research investigator at S&T's Materials Research Center
-- Dr. Roger LaBoube, Curators' Teaching Professor of civil, architectural and environmental engineering
-- Dr. Robert Landers, associate professor of mechanical and aerospace engineering
-- Dr. David Rogers, associate professor and the Hasselman Chair of Geological Engineering
-- Dr. Paul Worsey, professor of mining engineering and senior research investigator at S&T's Rock Mechanics and Explosives Research Center.

Global Learning 2010 Outstanding Teaching Commendation Award recipients:

-- Dr. Abdeldjelil (D.J.) Belarbi, former Curators' Teaching Professor of civil, architectural and environmental engineering
-- Dr. Victor Birman, professor of mechanical engineering and director of S&T's Engineering Education Center at the Universit of Missouri-St. Louis
-- Dr. William Daughton, professor and chair of engineering management and systems engineering
-- Dr. Cihan Dagli, professor of engineering management and systems engineering

-- Dr. Bih-Ru Lea, associate professor of business and information technology
-- Dr. Ronaldo Luna, associate professor of civil, architectural and environmental engineering
-- Dr. Ann Miller, the Cynthia Tang Missouri Distinguished Professor of electrical and computer engineering
-- Dr. Robert Montgomery, professor of psychological sciences.

Missouri S&T in the News

External Media Sources

The rubber is hitting the road at Missouri S&T

By Staff reports
The Rolla Daily News
Posted Jul 21, 2009 @ 01:36 PM

Rolla, Mo. — Researchers at Missouri University of Science and Technology are investigating ways to use rubber and resin from the guayule plant to help pave roads.

The researchers from Missouri S&T are trying to determine if guayule can be used as a source of renewable and environmentall friendly material in the production of flexible pavement mixtures.

Flexible pavement, or asphalt, is used to pave about 93 percent of the roads in the United States. That means 5.3 million miles o roads in the U.S. are paved with asphalt.

"The prospect of developing a new and better product for highway construction makes this research both exciting and important," says Dr. David Richardson, associate professor of civil, architectural and environmental engineering at Missouri S&T. "The project will evaluate new ways to reduce our need for crude oil products in future road construction."

Richardson and Mike Lusher, senior research specialist at S&T, are leading the university's efforts. They are working with representatives from Yulex Corp., which develops natural rubber materials from the guayule shrub for use in medical products and green energy production.

According to the researchers, guayule has the potential to replace petroleum-based products that are currently used for highway construction. They say it could help decrease dependency on foreign oil and lower costs.

The two-year study is funded in part by a national cooperative highway research program called Innovations Deserving

Exploratory Analysis. Other partners include the National University Transportation Center in Rolla and the Missouri Department of Transportation.

At S&T, future engineers are embracing transformational changes

By Staff reports
The Rolla Daily News
Posted Sep 04, 2009 @ 07:09 PM

Rolla, Mo. — Missouri University of Science and Technology has been awarded $149,838 by the National Science Foundation (NSF) to help future engineers navigate business climates that are undergoing transformational changes.

The official title of the Missouri S&T project funded by the NSF is "Collaborative Research: Sustainability in Supply Chain Management and Facility Logistics Curriculum." Dr. Suzanna Long, assistant professor of engineering management at S&T, is the principal investigator.

According to Long, the goal is to give students a comfort zone and the ability to handle rapidly changing situations. "The NSF is concerned about the loss of competitive advantage," she says. "They want to address the skills that engineers aren't getting."

Long cites the automotive industry as an example of how transformational changes can impact engineers and the general publi

"A change from gas-powered vehicles to electric cars, for instance, means the engineering has to totally change," Long says. "Th mechanic at the shop has to change. The public mindset has to change."

A key part of these transformations, according to Long, is embracing sustainability issues and global ideas.

Long teaches a class on business logistics at Missouri S&T. Thanks to the NSF award, she is able to put her students in teams with students from other universities and other countries. "They work together in virtual supply chains," Long says.

Last year, Andrew Ronchetto was one of the S&T students in the class. Ronchetto chose to work on a research project involving

alternative transportation fuels. He was placed in a group with five S&T students, two students from Missouri Southern State University and three from Universite de Savoie-Chambery in France.

Early on, the group ran into problems. A spam filter at the French university was blocking transmissions and there was an eight-hour time zone difference between Missouri and France, making conference calls difficult. Of course, the group also had t work out a way to deal with languages difficulties.

"The project gave me a flavor of what it is like to be on an international team in a safe environment," says Ronchetto, who graduated with a degree in engineering management last year and is now a business transformation consultant at IBM in Houston. "I wish more of my class projects in college had an international component."

This year, Long's students will collaborate with students from the University of Puerto Rico-Mayaguez, Universidad Publica de Navarra in Spain, and Colorado State University-Pueblo.

"We need to take new approaches to learning," Long says. "Organizations in the real world are not bound by walls."

The students in Long's business logistics classes produce detailed reports with measurable outcomes and recommendations. Teams also give oral presentations about their findings.

Some of the information Long gathers from the student groups is incorporated in her academic research on supply chains and sustainability issues. Long's research partners at Missouri S&T include Dr. Abhijit Gosavi, assistant professor of engineering management, and Dr. Scott Grasman, associate professor of engineering management.

The funding for the collaborative curriculum in business logistics at S&T is part of the American Recovery and Reinvestment Act, which involves support from partners like NSF.

S&T's house of the future to be on display in D.C.

By Staff reports
The Rolla Daily News
Posted Sep 22, 2009 @ 10:34 PM

Rolla, Mo. — Missouri University of Science and Technology is one of 20 universities that will be participating in the 2009 Sola Decathlon this October in Washington, D.C. Members of Missouri S&T's Solar House Team are currently building a new home on campus for the competition.

The Missouri S&T team has been designing and building the new house for more than a year. In late September, the house will be shipped to Washington. It will be displayed on the National Mall along with the other teams' homes from Oct 8-18.

During the competition, the solar houses are judged in 10 categories, including architecture, engineering and energy balance. This year, the Missouri S&T house is equipped with a home automation system that monitors energy efficiency.

"Our home automation system is completely custom and we are actually in the process of obtaining a patent for it," says team member Lucas Sudkamp, a senior in civil and architectural engineering from St. Louis.

The S&T house has about 650 square feet of living space. The house cost approximately $350,000 to build. The team is subsidized through fundraising efforts and by a $100,000 grant from the Department of Energy.

The 2009 house is the fourth solar home designed and built by S&T students. Missouri S&T and the Universidad de Puerto Rico are the only universities that have been involved with all four Solar Decathlons, which are typically held every-other-year in Washington.

Houses built for previous competitions are currently situated on foundations in Missouri S&T's Solar Village. The homes are

available for rent to students. After the 2009 competition, the new house will be trucked backed to Rolla and become part of the village.

The houses are highly efficient. In the summer, the Solar Village generates extra energy that Missouri S&T sells to a utility company.

Eleven students on the S&T team will be going to Washington this October to participate in the Solar Decathlon. A group of architecture students from the University of Missouri-Columbia is collaborating with the S&T team on this year's house.

S&T researchers to develop renewable energy technologies for military installations

By Staff reports
The Rolla Daily News
Posted Oct 06, 2009 @ 07:39 PM

Rolla, Mo. — Researchers at Missouri University of Science and Technology have received a $3.45 million grant from the Air Force Research Laboratory (AFRL) to develop renewable energy technologies for advanced military installations.

The research focuses on ways to diversify fuel sources in order to reduce the dependence of air bases on fossil fuels and diesel generation. The investigators will look for ways to improve the efficiency of fuel cells and hydrogen production, decrease the siz of fuel cells for mobility, and integrate wind and solar generation as part of a sustainable base microgrid.

"We are developing ways for the military to incorporate smart, renewable energy systems in order to efficiently power their efforts in the field," says Dr. Mariesa Crow, the Fred W. Finley Distinguished Professor of Electrical and Computer Engineering at Missouri S&T and director of the university's Energy Research and Development Center.

Missouri S&T faculty members involved include Crow; Dr. Fatih Dogan, professor of materials science and engineering; Dr. Frank Liou, professor of mechanical and aerospace engineering; and Dr. K.B. Lee, professor of chemical and biological engineering.

Research on the projects sponsored by the AFRL is expected to be ongoing at Missouri S&T through July of 2012.

Engineers Without Borders to leave S&T on Feb. 24

By Staff reports
The Rolla Daily News
Posted Feb 26, 2010 @ 09:27 AM

Rolla, Mo. — Three students from the student chapter of Engineers Without Borders at Missouri University of Science and Technology will leave Feb. 24 to continue their partnership with the community of Los Eucaliptos, a rural subdivision located ir Erquis Sud, Bolivia.

Since 2008, the student-led organization has been helping the community develop its infrastructure, including developing and coordinating a sustainable water supply and distribution system, electricity, and waste collection and treatment system. Farms surround the 100-lot subdivision, which is being built by Habitat for Humanity.

This assessment trip to southern Bolivia will focus on negotiating with members of the community and local officials to determine the best water source.

"After getting to know the community members throughout several trips, it is so important to me to see a clean, reliable water source established," says Emily Pasch, a senior in mechanical engineering from Lake Zurich, Ill.

In 2009, Pasch led a dozen S&T students on a two-week trip to where they built a water-holding tank. "The options for the wate sources are a deep water well or an infiltration gallery, which would collect subsurface flow of water from a nearby river," she says. "We are hoping to take significant steps to provide a clean water source that is consistently available throughout the Bolivian dry season. The result of our efforts should significantly improve health among community members, particularly children."

During the Bolivian dry season, the residents of Erquis Sud have no nearby water sources and must purchase the water they need to survive. During the rainy season, the nearby river is infested with bacteria from animal waste and chemicals from farmers' pesticides that causes health problems for community members.

"Many of the families, generally four to five people, are supported by single mothers," says Pasch, the project's leader. "The water source is especially important to them because once it's established, the population of the community will have room to expand and the surrounding municipalities will be able to justify a nearby public transportation route.

"The public transport will be invaluable to these women, who currently must walk to work to earn the money that supports her family, often with several children in tow."

In the future, the EWB team plans to develop a more in-depth water distribution system as well as a sewage system.

"Once residents have water, they'll need a sewage collection and treatment system too because of the dense concentration of homes on small lots," says Pasch. "Some lots have two homes constructed on them and there's the potential for contamination of the groundwater source for the well."

Students traveling to Erquis Sud, Bolivia, include:

-- Andrea Clements of St. Louis, a junior in architectural engineering
-- Emily Pasch of Lake Zurich, Ill., a senior in mechanical engineering
-- Anna Zor of St. Louis, Mo., a sophomore who has not yet declared a major

Dr. Rick Stephenson, professor of civil, architectural and environmental engineering at Missouri S&T, and David Hoffman, associate research engineer in civil, architectural and environmental engineering at Missouri S&T, will accompany the students on this trip. Stephenson's son Zachary, president of Black Jack Roofing in Rolla, will also make the journey.

Missouri S&T to receive $2.5 million in funding to be energy hub

Announcement made Friday at Small Business and Entrepreneurial Development Summit

By Staff reports
The Rolla Daily News
Posted Mar 23, 2010 @ 03:45 PM

Rolla, Mo. — "If you don't compete, you can't win," said Jason Hall, executive director of the Missouri Technology Corp. (MTC), explaining why the MTC's board voted just this week to approve $2.5 million in support of Missouri S&T's bid to become the nation's alternative energy hub.

The announcement was made Friday evening during the Small Business and Entrepreneurial Development Summit hosted at Missouri S&T by Sen. Frank Barnitz on Friday night, an event the District 16 senator described as "one-stop shopping" for small business owners and entrepreneurs.

The S&T project, headed by Dr. Sunggya "KB" Lee, is competing with other states for the chance to be the base for the development of solar power to produce energy. The decision, said Hall and Dr. Lee, will be announced in September, and is expected to generate close to $100 million during the next five years.

"We wanted to make a statement that the state of Missouri supports this community and this university, and will partner with this team of scientists," said Hall. "Missouri needs to encourage innovation, and wants to bring home a major research center like this."

The idea is to have one team under one roof, said Dr. Lee, to find a solution to solve the country's energy problems. Including the use of solar power to create a liquid fuel.

"We would form a team of very high level scientists and engineers working to deliver a solution. I expect within five years to have something very revolutionary."

The MTC was created by an act of the General Assembly in 1994 and is a private, not-for-profit corporation led by a 15 member Board of Directors, 11 of whom are appointed by the governor.

The MTC is charged by law with being a focal point for creating better ways Missouri businesses can interface with universities in order to solve technical and productivity issues.

Bridge expert from S&T does post-earthquake reconnaissance in Chile

By Staff reports
The Rolla Daily News
Posted Apr 19, 2010 @ 01:37 PM

Rolla, Mo. — Dr. Genda Chen, professor of civil engineering at Missouri University of Science and Technology, was part of a seven-member Transportation Infrastructure Reconnaissance Team that traveled to Chile earlier this month to document the performance of bridges, tunnels and retaining walls in the wake of February's Chilean earthquake.

Chen's group visited more than 40 bridge sites in the heavily affected areas of Santiago and Concepcion, Chile.

Chen says Chile's infrastructure held up quite well, despite the intensity of the quake. There are approximately 12,000 bridges i Chile; 100 or so were damaged and only 20 collapsed. Most retaining walls performed satisfactorily and no significant damage was reported to tunnels.

The reconnaissance team was selected by the U.S. Federal Highway Administration, which dispatched the group to Chile and financed the trip.

S&T student plans to market hydrogen generator

By Staff reports
The Rolla Daily News
Posted Apr 20, 2010 @ 09:45 AM

Rolla, Mo. — Everything Adam Knollmeyer needs to build a hydrogen generator can be found at his family's hardware store in Linn, Mo.

When added to an internal combustion engine, a hydrogen generator produces supplemental energy for the engine to use. Whe electricity passes from the vehicle through water in the generator, hydrogen and oxygen (HHO) are released.

Using materials from the hardware store, Knollmeyer has already built prototype generators that are serving as his senior desig project at Missouri S&T. As part of his course requirements, he's also developing a business plan for the product.

Knollmeyer, who is from Linn, has already received interest from local transportation companies about installing units on their trucks. If the trucks get better gas mileage as a result, the Missouri S&T senior will be in business (literally) after he graduates.

Electrolysis of water is a technology that is more than 200 years old. Knollmeyer says there are many flawed designs of hydrogen generators on the Internet. According to the Missouri S&T senior, his product is unique because of its safety features, including a thoroughly tested flame arrester. Knollmeyer's generators also have the ability to freeze and thaw without damagin the system.

Egyptian university signs agreement with S&T

By Staff reports
The Rolla Daily News
Posted May 11, 2010 @ 03:59 PM

Rolla, Mo. — Representatives from Egypt's Alexandria University recently visited the campus of Missouri University of Science and Technology to sign a Memorandum of Academic Cooperation. Alexandria University is one of Africa's leading institutions, with strong programs in science and engineering.

The collaboration was conceived by Dr. Francisca Oboh-Ikuenobe, professor and program head of Missouri S&T's geology and geophysics department. Oboh-Ikuenobe visited Alexandria University last year when she conducted field work with undergraduate students in Egypt's Western Desert. The work was part of a United States-Egypt Cooperative Research program funded by the National Science Foundation. The program is aimed at promoting cooperation in teaching and research, facilitating the international exchange of ideas and enhancing the scholarly activities of Missouri S&T and Alexandria University

The memorandum paves the way for collaboration in the areas of:

-- Student exchange in science and engineering
-- Faculty exchange
-- Joint research activities
-- Joint organization of seminars and academic meetings
-- Exchange of academic materials
-- Joint organization of special academic and non-academic programs
-- Publication of the results of collaborative research projects.

In 2009, Dr. Mohamed Ismail Ibrahim, vice dean for community development and environmental affairs and a member of Alexandria's science faculty, Dr. Suzan Kholeif, head of the scientific documentation and media unit at the National Institute of

Oceanography and Fisheries in Alexandria, and Oboh-Ikuenobe organized a workshop in the geology subspecialty of palynology the study of microscopic fossils found in sediments and soils that are rich in organic material. The workshop brought together more than 40 participants from universities and petroleum companies. The trio plans to host another workshop next year.

Internal Media Sources

Luna invited to international conference in Egypt

September 28, 2009 3:47 PM | Permalink | Comments (0) | SHARE

Dr. Ronaldo Luna, associate professor of civil engineering at Missouri University of Science and Technology, is traveling all the way to Egypt this fall to present research findings that come partly from Poplar Bluff, Mo.

Luna has been invited to share his work at the 17th International Conference on Soil Mechanics and Geotechnical Engineering, which will feature top experts from around the world. The conference will be held Oct. 3-9 in Alexandria, Egypt.

At the conference, Luna will discuss the use of geographic information systems (GIS) as a modern tool to help agencies and engineers assess structures in earthquake-prone areas. Some of the information Luna will present was collected in lowland areas around Poplar Bluff, which is located in the New Madrid Seismic Zone.

"Poplar Bluff is situated at a divide between uplands and lowlands," Luna says. "The lowlands shake like Jello in an earthquake, and the uplands shake like a stiff board."

Luna studies the soils and geology in seismic zones to better understand how earthquakes impact structures. Some of this research focuses on liquefaction -- the tendency of sediments to momentarily liquefy during a large earthquake.

If the sediments in lowland areas of Missouri or riverbanks near the Mississippi River were to liquefy during an earthquake, bridges and other structures would fail.

Luna advocates the use GIS equipment to help agencies and engineers understand the dangers better. "We want planners to use GIS to assess hazards for bridges," he says. "These modern tools can provide red flags for bridges in danger."

The GIS tools, according to Luna, are like screening instruments for the Earth and its structures. He likens the bridges to medical patients. By using GIS, he says, "we can identify which bridges are really sick."

In addition to presenting a scholarly paper he co-authored, Luna has also been invited to conduct a workshop on geo-engineering data while in Alexandria. The conference will be held at the New Bibliotheca of Alexandria, which contains millions of books, four museums, a planetarium, and four art galleries.

S&T team to unveil EcoCAR during GM Day in Rolla

October 1, 2009 8:47 AM | Permalink | Comments (0) | SHARE

Missouri University of Science and Technology and Fairground Auto Plaza are hosting GM Day Saturday, Oct. 3, in Rolla as part of National Energy Awareness Month. During the event, a team of students from Missouri S&T will unveil a 2009 Saturn VUE that has been donated by GM for use in a new collegiate advanced vehicle technology competition.

The general public is invited to the event, which will be held from 11:30 a.m. to 1:30 p.m. at Missouri S&T's E3 Commons facility, located on Collegiate Station Blvd.

Seventeen universities across the United States and Canada, including Missouri S&T, have been invited to re-engineer a 2009 Saturn VUE to further minimize fuel consumption and reduce emissions while retaining the car's performance and consumer appeal. Organizers of the three-year competition, EcoCar: The NeXt Challenge, hope to inspire the next generation of automotive leaders by giving them the tools and experience necessary to secure a more energy-efficient future.

GM provides vehicles, vehicle components, seed money, technical mentoring and operational support. The Department of Energy and its research and development facility, Argonne National Laboratory, provide competition management, team evaluation, technical and logistical support.

The Missouri S&T team is building an advanced vehicle powered by hydrogen fuel cell and lithium ion batteries from their Saturn VUE. The team has already designed a virtual model of their plug-in hybrid electric vehicle using advanced software and computer modeling tools. Now the students will begin to work under the hood in order to turn their designs into reality.

"The EcoCAR competition gives students hands-on design and engineering experience," says Dr. John W. Sheffield, professor of mechanical and aerospace engineering at Missouri S&T. "Our students have worked hard this past year, and they are excited for the opportunity to integrate their design into the hydrogen fuel cell plug-in hybrid electric vehicle."

Fairground is participating in GM Day in order to educate the public about the future of the automobile industry and GM's current energy efficient models. Several 2009 and 2010 vehicles will be on display at the E3 Commons, which houses Missouri S&T's hydrogen refueling station and other facilities.

S&T researchers to develop renewable energy technologies for military installations

October 6, 2009 10:35 AM | Permalink | Comments (0) | SHARE

Researchers at Missouri University of Science and Technology have received a $3.45 million grant from the Air Force Research Laboratory (AFRL) to develop renewable energy technologies for advanced military installations.

The research focuses on ways to diversify fuel sources in order to reduce the dependence of air bases on fossil fuels and diesel generation. The investigators will look for ways to improve the efficiency of fuel cells and hydrogen production, decrease the size of fuel cells for mobility, and integrate wind and solar generation as part of a sustainable base microgrid.

"We are developing ways for the military to incorporate smart, renewable energy systems in order to efficiently power their efforts in the field," says Dr. Mariesa Crow, the Fred W. Finley Distinguished Professor of Electrical and Computer Engineering at Missouri S&T and director of the university's Energy Research and Development Center.

Missouri S&T faculty members involved include Crow; Dr. Fatih Dogan, professor of materials science and engineering; Dr. Frank Liou, professor of mechanical and aerospace engineering; and Dr. K.B. Lee, professor of chemical and biological engineering.

Research on the projects sponsored by the AFRL is expected to be ongoing at Missouri S&T through July of 2012.

NASA astronaut Sandra Magnus to speak at S&T

October 13, 2009 12:24 PM | Permalink | Comments (1) | SHARE

Early in 2009, NASA astronaut Sandra Magnus concluded a four-month stay aboard the **International Space Station**. This month the Missouri University of Science and Technology graduate will return to her alma mater to deliver a keynote speech during Missouri S&T's **Homecoming** festivities.

Magnus, who earned a bachelor of science degree in physics in 1986 and a master of science degree in electrical engineering in 1990, both from Missouri S&T, will speak about life aboard the space station at 8 p.m. Friday, Oct. 23, in Leach Theatre of Castleman Hall, 10th and Main streets in Rolla.

The lecture is free and open to the public, but tickets are required. Tickets will be made available to the public beginning at 9 a.m. Monday, Oct. 19, at the **Leach Theatre Box Office**. Tickets are limited to two per person. The Miner Alumni Association will provide tickets to all Missouri S&T Alumni who register for the Silver and Gold Feaste and Merriment by Friday, Oct. 16.

Ticketholders must be seated by 7:45 p.m. At that time, any vacant seats will be released to individuals waiting at the door.

In November 2008, Magnus launched into orbit aboard the **Space Shuttle Endeavour** to begin a four-month stay aboard the International Space Station. While there, Magnus and other crew members installed equipment needed to support a six-person crew aboard the space station. It was previously equipped for three crew members.

During her months in outer space, Magnus answered questions and reported on her stay on the Missouri S&T blog, **http://spacebook.mst.edu**. Elementary school students and teachers from around the state submitted questions like "What is it like to sleep in zero gravity?" and "How do you go to the bathroom in space?" which Magnus answered on the blog.

Magnus is a native of Belleville, Ill. She earned a doctorate from Georgia Institute of Technology in 1996.

Magnus joined **NASA** in 1996. She spent **11 days in space** in 2002. During that trip to the International Space Station, she operated Space Shuttle Atlantis' robotic arm.

Magnus is one of three Missouri S&T graduates to have launched careers as NASA astronauts. The others are Tom Akers, who holds bachelor's and master's degrees in mathematics from S&T, and Janet (Sellers) Kavandi, who earned a master's degree in chemistry from S&T.

Long carbon fibers could improve blast resistance of concrete structures, say S&T researchers

October 19, 2009 2:35 PM | Permalink | Comments (1) | SHARE

Dr. Jeffery Volz, assistant professor of civil, architectural and environmental engineering at Missouri University of Science and Technology, and his team have received $567,000 to explore how adding carbon fibers could improve the blast and impact resistance of conventional reinforced concrete. The research is funded by the through a cooperative agreement with the Leonard Wood Institute.

Reinforcing concrete with fibers isn't a new idea, Volz says. The Roman Empire used hair and straw in their concrete structures and Egyptians mixed straw in clay to make harder bricks. Today short carbon fibers - measuring no more than 1.5 inches - are found in buildings, bridges and slabs to limit the size of cracks. But in the future, Volz says the carbon fibers could be up to 6 inches in length, significantly improving a structure's ability to withstand blasts, hurricanes and other natural disasters.

Dr. Jeffrey Volz says long, coated carbon fibers, like those pictured in his left hand, could significantly improving a structure's ability to withstand blasts, hurricanes and other natural disasters. In his right hand are short, uncoated fibers, which resemble clumps of human hair.

"The long fibers will absorb more energy as they pull-out during the pressure wave or impact, cutting down on the potential for failure during an explosion or earthquake," Volz explains. "The fibers will also significantly diminish secondary fragmentation, reducing one of the leading causes of damage to surrounding personnel and materials. First responders will be able to get to the scene faster because they won't have to clear chunks of concrete out of their way."

Previous efforts by other researchers to incorporate longer carbon fibers have failed for two reasons. First, longer carbon fibers are more likely to ball up as the concrete is mixed. Second, it's difficult to disperse the carbon fibers throughout the concrete.

Coating the fibers can reduce the fibers tendency to form into a ball. The team plans to study a variety of formulas to find a coating that balances between flexibility and rigidity. "A delicate balancing act is required between allowing the fibers to flow easily

during mixing yet bond sufficiently with the concrete matrix in the hardened state," Volz says.

In addition, the team plans to study how a negative electric charge, applied to a polymer coating, could force the fibers to disperse more uniformly during mixing.

Missouri S&T EWB chapter receives $100,000 gift

January 22, 2010 3:26 PM | Permalink | Comments (0) | SHARE

Raymond and Susan Bucy, together with a matching gift from the GE Foundation, have donated $100,000 to Missouri University of Science and Technology to establish an endowment for the university's chapter of Engineers Without Borders.

Formed on campus in 2004, the Missouri S&T EWB chapter was the first of its kind in Missouri. Since then, the organization has made more than 20 trips, helping to provide sanitation and access to clean water for communities in four different developing countries.

Raymond Bucy says he had never traveled more than few hours away from his small hometown in northwest Missouri until he came to college in Rolla. Since then, he's visited nearly a dozen countries and worked on everything from the Apollo program to energy-efficient engines, opportunities he credits to having a Missouri S&T degree.

When the Bucys returned to campus for his 50-year reunion, they were impressed by the work the EWB students were doing and decided to fund an endowment.

"The Missouri S&T EWB chapter provides good training for young engineering students by giving them the opportunity to test their skills in an unstructured program," Bucy says.

"Plus it's helpful to the communities they serve and is a great tool for building relationships between the United States and other countries. But most importantly, it gives them a background and a knowledge of the world that I don't think they could get other way."

Dr. Rick Stephenson, the chapter's advisor and a professor of civil engineering at Missouri S&T, says the gift is the first step toward making the program sustainable. He would like to see the endowment eventually grow to $2 million, which would help the chapter pay for the materials and transportation used in their projects.

"EWB is clearly a life-changing experience for our students because they learn to use their skills and talents to save lives," Stephenson says. "Students become both skilled technically and able to make decisions on the fly through EWB. They have to figure out how to complete tasks in a country thousands of miles away, in a culture they're

not familiar with and in a language they don't speak.

"You can't get that from a lecture in a classroom."

Bucy earned his bachelor's degree in mechanical engineering from Missouri S&T, then known as Missouri School of Mines, in 1958. He spent 35 years with GE Aircraft Engines, retiring in 1994 as general manager of the company's Military Product Engines.

Spring enrollment up more than 8 percent

February 9, 2010 3:16 PM | Permalink | Comments (0) | SHARE

The official fourth-week enrollment figures at Missouri University of Science and Technology show a total enrollment of 6,496 students. This represents an on-campus enrollment increase of 8.6 percent over last spring's fourth-week enrollment, says registrar Laura Stoll.

The spring semester at Missouri S&T began Monday, Jan. 11.

The spring 2010 enrollment census - officially recorded at the end of the semester's fourth week - is up 578 students from the official spring 2009 figure.

$1.25 million donation moves design center forward

February 16, 2010 1:28 PM | Permalink | Comments (1) | SHARE

Work is expected to begin this spring on a new facility to house Missouri University of Science and Technology's 10 student design teams.

An artist's conception of the Kummer Student Design Center at Missouri S&T. The new center will house the university's award-winning design teams.

At 23,000 square feet, the new Missouri S&T student design center will give students more room to build concrete canoes, radio-controlled aircraft, solar-powered cars and other engineering projects. The facility will provide more space than the current metal building that houses the internationally competitive teams.

The university will renovate the Miner Recreation Building to house the design center. The building is located on the northwest corner of 10th Street and Bishop Avenue,

across from Missouri S&T's Gale Bullman Multi-Purpose Building.

Private funds will finance the project. The university had already raised $1.5 million of the $2.75 million needed to complete construction when Fred and June Kummer of Huntleigh Village, Mo., contributed $1.25 million for the center, which will be called the Kummer Student Design Center.

Missouri S&T Chancellor John F. Carney III announced the gift today (Feb. 16, 2010). The Kummers' gift ensures that work will begin in May with completion by March 2011.

Fred Kummer, the chief executive officer of St. Louis-based HBE Corp., is a 1955 civil engineering graduate of the university, which was then known as the University of Missouri School of Mines and Metallurgy.

The original design center idea was spearheaded by three other civil engineers: Richard Arnoldy, a 1969 civil engineering graduate of Missouri S&T and the retired CEO of ARCO Construction Co. Inc. in St. Louis; Robert Brinkmann, a 1971 civil engineering graduate and founder and president of R.G. Brinkmann Construction Co., based in Chesterfield, Mo.; and Barry Koenemann, a 1970 civil engineering graduate and CEO of United Construction Ent. Co. of St. Louis. Other recent major donors to the project include Michael Bytnar, a 1968 mechanical engineering graduate and the retired president of Nooter Corp. of St. Louis; and the Sunderland Foundation of Ashgrove Cement Co., Overland Park, Kan.

"Throughout the years, the Kummer family's generosity has provided support for Missouri S&T's most important initiatives in education and research," says Carney. "As Fred himself knows, the kind of practical, team-based experience our students gain from participating in student design teams better prepares them for the technological work force, and this gift will help Missouri S&T build on a solid foundation as a leader in preparing students for the future."

"Missouri S&T's student design teams have an incredible record of success, and our students deserve to work and conduct business in a facility that provides the best laboratory and work space possible," says Kummer. "June and I are very pleased to be able to provide this support for such a world-class student operation."

Missouri S&T has built a strong reputation among technological research universities for its student design team success. S&T's solar car team has won two North American solar races - Sunrayce'99 and the 2003 North American Solar Challenge - and its human-powered vehicle team has won several East Coast and West Coast championships in recent years. Last year, Missouri S&T's Advanced Aero Vehicle

Group was the top U.S. team in an international competition among student-designed and -built radio-controlled aircraft.

A major concern in renovating the Miner Recreation Building was relocating the indoor practice facilities it houses for intercollegiate teams. To address that challenge, a group of alumni and their spouses partnered to fully fund an indoor practice facility to be located south of the Gale Bullman Multi-Purpose Building.

Donors to the indoor practice facility are Keith and Pat Bailey, John W. and Kristie Gibson, and Steve and Gwen Malcolm, all of Tulsa, Okla. Keith Bailey is a 1964 mechanical engineering graduate of Missouri S&T and retired president and CEO of The Williams Companies Inc. of Tulsa, Okla. John Gibson and Kristie Gibson are both 1974 engineering management graduates of S&T and John is the president and CEO of ONEOK Inc. Steve Malcolm is a 1970 civil engineering graduate of S&T and is president and CEO of The Williams Companies Inc.

S&T reps to participate in energy forum Friday evening

February 16, 2010 9:25 AM | Permalink

Two representatives from S&T will be among the participants in the "Forum on Energy Efficiency," scheduled from 7-9 p.m. Friday, Feb. 19, in the Multi-Purpose Room of the Phelps County Courthouse, 502 W. 2nd St., in Rolla.

Dr. Mariesa Crow, professor of electrical and computer engineering S&T, will discuss advances in smart grid technologies.

Angela Rolufs, director of the Missouri Transportation Institute and the Institute for Environmental Excellence at S&T, will present on an EPA grant to assist communities in Missouri in identifying and implementing energy saving projects relating to water and waste water treatment technologies.

The forum will be hosted by the Jeffersonian Democratic Club of Phelps County and is free and open to the public. For more information, contact Janet McKean at 573-364-7809 (home) or 573-465-0405 (cell).

Robot provides 3-D images of dangerous locations

February 19, 2010 10:26 AM | Permalink | Comments (5) | SHARE

Soldiers and first responders may soon have a better way to evaluate the interior of dangerous structures, thanks to a joint project between Missouri University of Science and Technology and the University of Missouri-Columbia.

As part of the project, which began in 2008, students at Missouri S&T have built a remote-controlled robot that is equipped with an infrared camera and LIDAR (light detection and ranging) technology. Like radar, LIDAR sends out signals, in this case millions of laser points, to bounce off objects and provide feedback. The LIDAR-equipped robot then wirelessly relays detailed images to a laptop computer.

"We can get a 3-D map of rooms by sending the robot inside or having it look through a window," says Dr. Norbert Maerz, associate professor of geological engineering at Missouri S&T. "Even when you can't see through windows, you can still scan through them with LIDAR. Using this information, soldiers or first responders could evaluate safety issues and determine strategies."

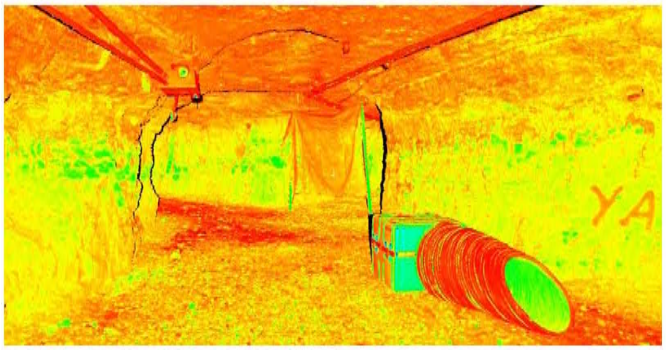
Maerz and Dr. Ye Duan, an associate professor of computer science at MU, are the primary investigators on the research project, which was funded at a total cost of

$400,000 by the Leonard Wood Institute.

Maerz and his students have used their prototype to map the inside of houses, businesses, Missouri S&T buildings, chambers in S&T's Experimental Mine and cave passages in the Mark Twain National Forest.

"In theory, you could deploy this technology inside caves where terrorists might be hiding," Maerz says.

Maerz sends sample images to Duan in Columbia for advanced data analysis and 3-D reconstruction. The technology is capable of revealing detailed information regarding floorplans, for instance, but it can also "see" people and objects inside a space. "Once you have the images, you can zoom in on objects and look at things from different angles," Maerz says. "You can make precise measurements of any object and assess



S&T students to share research results with state lawmakers

April 7, 2010 9:45 AM | Permalink | Comments (0) | SHARE

On April 29, 11 undergraduates from Missouri University of Science and Technology will travel to Jefferson City, Mo., to share research results with state lawmakers. Among the topics to be discussed are the behavior of bridge piers during earthquakes, the conversion of wet biomaterials to fuel, and methods to fix supply roads in Iraq and Afghanistan.

Selected students from all four campuses in the University of Missouri system participate in Undergraduate Research Day at the Capitol, which is an annual event. The undergraduates have been working individually or in groups on research that is directed by faculty mentors. The purpose of Undergraduate Research Day at the Capitol is to inform lawmakers about research that is occurring at Missouri universities.

The following Missouri S&T students are going to Jefferson City:

Ashley Banaszek, a senior in information science and technology from Imperial, Mo. --

"Comprehensive Education, Training and Outreach in Advanced Electric Drive Vehicles," directed by Dr. Richard Hall, professor of business and information technology at S&T.

Nathaniel Carter, a senior in chemistry from St. Louis -- "Hydrothermal Chemistry as a Pathway to Convert Cellulosic Biomass to Fuel," directed by Dr. Klaus Woelk, associate professor of chemistry at S&T.

Jingwen (Wendy) Chen, a junior in computer science from Rolla -- "Structural Health Monitoring with the SmartBrick Platform," directed by Dr. Sahra Sedigh, assistant professor of electrical and computer engineering from S&T.

Corey Grace, a senior in civil engineering from Columbia, Mo. -- "Seismic Behavior of Bridge Piers under Combined Loading," directed by Dr. Lesley Sneed, assistant professor of civil, architectural and environmental engineering at S&T.

Travis Hemsath, a senior in civil and architectural engineering from St. Charles, Mo. -- "IED Crater Repair for Enduring Route Remediation," directed by Dr. John J. Myers, associate professor of civil, architectural and environmental engineering at S&T.

Justin Higginbotham, a junior in mining engineering from Potosi, Mo. -- "Comparing Impact and Compression Crushers for Product Finishing in Missouri Limestone Quarries," directed by Dr. Kwame Awuah-Offei, assistant professor of mining engineering.

Kyle Holman, a senior in architectural engineering from Rolla -- "Learning Tools for Structural Analysis," directed by Dr. John J. Myers and Dr. Lesley Sneed of the civil, architectural and environmental engineering department at S&T.

David Lecko, a sophomore in computer engineering from St. Louis -- "Structural Health Monitoring with the SmartBrick Platform," directed by Dr. Sahra Sedigh, assistant professor of civil, architectural and environmental engineering at S&T.

Megan Oldroyd, a senior in chemistry and applied mathematics from St. Louis -- "Hydrothermal Chemistry as a Pathway to Convert Cellulosic Biomass to Fuel," directed by Dr. Klaus Woelk, associate professor of chemistry at S&T.

Matthew Struemph, a senior in civil engineering from Rolla -- "IED Crater Repair for Enduring Route Remediation," directed by Dr. John J. Myers, associate professor of civil, architectural and environmental engineering at S&T.

Jordan Tripp, a senior in architectural engineering from Springfield, Mo. -- "Learning Tools for Structural Analysis," directed by Dr. John J. Myers and Dr. Lesley Sneed of the civil, architectural and environmental engineering department at S&T.

Missouri S&T places an emphasis on providing research opportunities to undergraduate students. For more information, call 341-7585.

S&T receives $3.2 million for transportation center

June 22, 2010 3:06 PM | Permalink | Comments (0) | SHARE

Missouri University of Science and Technology's National University Transportation Center - one of only 10 in the nation - will receive an additional $3.2 million in federal funds for its research program, U.S. Sen. Kit Bond announced.

Missouri S&T's High-Bay Structures Lab is part of the campus's National University Transportation Center, one of only 10 in the nation.

"The work being done at the Missouri S&T National University Transportation Center is essential to the modernization of our nation's infrastructure," said U.S. Sen. Kit Bond, ranking member on the Senate Appropriations subcommittee that funds the nation's transportation programs. "I am pleased to have worked with University officials to secure these funds and am proud Missouri S&T is leading the way in developing solutions to America's transportation challenges."

"For more than a decade, the National University Transportation Center at Missouri S&T has addressed critical transportation infrastructure issues through this program, and we're very thankful to Sen. Bond for his continuing support of this important work," says Missouri S&T Chancellor John F. Carney III. "We also very much appreciate Sen. Bond's ongoing efforts to provide support for improving the nation's transportation infrastructure."

"The additional funding provides critical support necessary for our faculty and students to advance the state-of-the-art of the technology to not only repair and rehabilitate our nation's aging transportation infrastructure, but also for new construction of transportation structures that have better performance, safety and lower life cycle cost," says Dr. K. Krishnamurthy, Missouri S&T vice provost for research and sponsored programs.

Missouri S&T is one of 10 universities to receive a designated National University

Transportation Center (UTC) in the 2005 federal highway bill, which Bond authored as then-chairman of the Senate Environment and Public Works' Transportation and Infrastructure Subcommittee.

The UTC program was created in 1988 to meet the nation's need for the safe, efficient and environmentally sound movement of people and goods through research, education and technology transfer. Participating universities are involved in a variety of advanced and applied research ranging from intelligent transportation systems and fuel-efficient vehicle deployment to innovations that will improve passenger safety and reduce traffic and freight congestion. National UTCs are expected to provide national leadership in advancing research and technology solutions to America's transportation challenges.