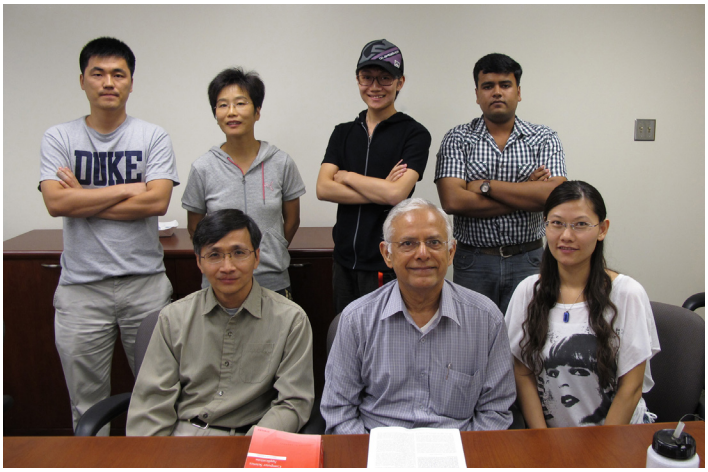
THE NEW ORU

ENGINEERING NEWSLETTER

Volume 2, Issue 3

GENIUS IS 1% INSPIRATION AND 99% PERSPIRATION - THOMAS EDISON

ORU ENGINEERING PROFESSOR RECEIVES $194,146 GRANT TO FURTHER GROUNDBREAKING VEHICLE SAFETY RESEARCH



Dr. Xiaomin Ma visited Duke University for a seminar about the NSF grant, where he met with Professor Kishor Trivedi (Co-PI of the NSF grant) and his students.

Oral Roberts University (ORU) has been awarded a National Science Foundation grant to carry out collaborative research with Duke University focused on vehicular ad-hoc networks to improve vehicle safety for the future. This grant provides $194,146 to further the research of Dr. Xiaomin Ma, ORU Associate Professor of Engineering on this vehicle safety project. Dr. Xiaomin Ma's pursuit of this NSF opportunity should be applauded for his brilliant research. This is the first NSF grant that ORU has received since the medical school days.

Transportation systems are designed to help get people from one destination to the next as safely and efficiently as possible. Unfortunately, many accidents and fatalities occur on the road every day. Nearly 6.2 million police-reported motor vehicle crashes occurred in 2005 in the United States –one every five seconds. AAA reports that in 2008 vehicle accidents cost $162.4 billion, which comes to $1,051 per person.

The basic idea of the project is to build sensors to be aware of surrounding cars or road conditions, and to measure the distance between your car and another car, and the relative speed. In an emergency situation, your car sends a signal through wireless communication to warn the other driver of danger or an adverse driving situation. Statistics show that many auto accidents are caused by a one-second reaction delay. With this early warning signal, a driver can brake or steer away when he or she is a mere second away from the danger of a collision.

ORU will partner with Duke University for this research, as the two universities will be working as a team to complete this highly complex project. Dr. Kishor Trivedi, professor of Electrical and Computer Engineering at Duke will focus on analytic modeling of the network service. ORU's Ma will focus on the investigation and modeling of the network communication environment and leading the research among other aspects.

The proposed research tackles an important problem that has great impact on people's lives and environments. The results of this project will contribute to paving the way for practical vehicular wireless ad hoc networks to be deployed on the road which will greatly improve road safety and urban traffic efficiency. The success of this project will not only improve the traveling experience of millions of people but also contribute tremendously to improving urban environments. ■

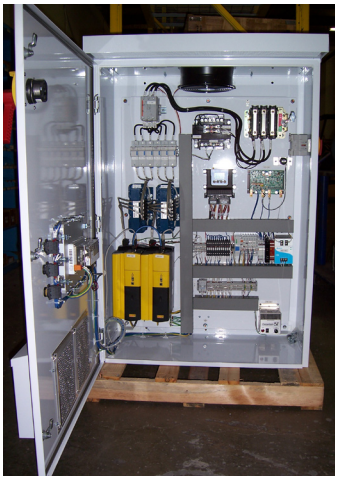
DR. SOPHIE LIU INVOLVES HER STUDENTS IN RESEARCH

The project was also selected for inclusion in the 2010 Tulsa Engineering Challenge. Shown in the picture above (from right to left): Jacob Garner, Sharayah Vermette, Dr. Sophie Liu, Venkatesh Kesanapalli and Justin Mitchell.

Providing engineering students with an exciting learning environment is a challenge to all engineering professors. To do so, I am trying to get students involved in my research. In the summer of 2009, I received an honors program grant from Oral Roberts University. With the grant, I involved Jacob Garner and Sharayah Vermette, two honor students in my research project titled Video Based Soccer Ball Tracking and Detection. The purpose of this project is to design a system that is capable of locating and tracking a soccer ball during a normal soccer game. The necessary algorithms for this system accurately distinguish between stationary and moving objects in a stream of video frames and are able to consistently detect which of these moving objects is the soccer ball. The system is aware of the position of the soccer ball at all times. The resulting data can then be used to control a camera that will cover the action of the game, or to analyze the game afterwards. After making significant progress towards the project goal, the students chose to continue deeply and broadly on this project as their senior project. The project of Video Based Soccer Ball Tracking and Detection was awarded the department outstanding senior project in 2010. The project resulted in a paper presented at the 2010 IEEE Southwest Symposium on Image Analysis and Interpretation on May 2010 at Austin, TX. Two students, Jacob Garner and Sharayah Vermette are co-authors of the paper with me. By Sophie Liu ■

Alumni News From Shawn Lay

Graduating from ORU in 2003, I joined Eaton Corporation's Electrical Products Group. After a period of product training, I was assigned to their Dallas/Ft. Worth district office. As a Sales Engineer, I was responsible for the sale of power distribution and industrial control products. Over the next 5 years, I worked on a wide array of projects with many of the largest companies in and around the Dallas/Ft. Worth area. In 2008, I left to become a partner in Layco Electric Innovations, headquartered in Tulsa. While with LEI, I have been privileged to work on a number of



electrical design/build projects for customers in the petrochemical, industrial and nuclear market throughout the U.S. The technical education I received while attending ORU has proven invaluable throughout my career, allowing me to effectively articulate ideas and concepts to both technical and non technical customers. Thank you ORU... ■

Alumni News from Mike Noack

I am Mike Noack, Mechanical Engineer, graduating class of '88. God started the beginning of the next phase of my life by placing me in the energy industry in Houston, Texas, through an interview with Shell Oil Company just before Christmas of my senior year. Now, I thought I was becoming a mechanical engineer to do something related to the manufacturing business, but God had a whole different plan. Never be afraid to pursue God's call to the unknown. I had never seen an oil/gas well in my life and for the next eight years, Shell taught me the upstream oil and gas industry, through experiences in Texas, Michigan and Louisiana in various roles of engineering and operations. Upon completion of a field assignment in Louisiana, God called me to make a career change from Shell Oil to a small oil and gas company, Jordan Oil Company, located in South Louisiana. Over the next twelve years, while with Jordan Oil Company, I served as Vice President and learned the entire spectrum of the oil and gas business in the Gulf Coast region. In 2005, an opportunity through a partnership opened up to move to North Texas and be involved with the midstream business with Cimmarron Gathering Company. The midstream business takes the gas production from

the wells via pipeline, processes the gas and delivers it to the large pipelines for distribution around the United States. After being with Cimmarron Gathering for 14 months, we sold the company and that began the mechanism for me to go into business for myself. In 2007, I started Tristate Midstream LLC with Glen Harrod. We are currently focused on the midstream business with assets in Louisiana and are working on expanding into other sectors of the energy industry. Tristate Midstream's office is located in Denton, Texas.

My career has taken me from ORU, to Houston, Texas where I met my wife, Sonein, and had our first son, Aaron. To Sulphur, Louisiana, where God blessed us with twins, Gavin and Machala, to ending up in Krum, Texas. Along the way we have served in various ministry positions and levels of involvement with the local church. We currently feel God shifting our focus to reaching the next generation both locally and abroad. Always be sensitive to the voice of God and never get comfortable with where you're at. God will continually advance you if you will allow Him to! ■

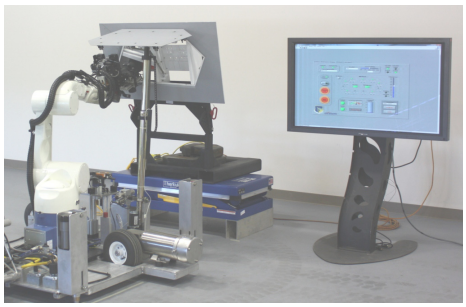
Alumni News from Dr. Mike Sawyer

Dr. Mike Sawyer earned his bachelor's degree in engineering from ORU. He earned his master's degree and doctoral degree in mechanical engineering from Georgia Institute of Technology in Atlanta, GA. For several years, he worked for the polymers engineering division of AlliedSignal, Inc. (now Honeywell). In this capacity, he first worked as a process engineer in a carpet fiber factory. Later, he was a lead engineer for the design and construction of the Evergreen Nylon Recycling facility in Augusta, GA.

Trailer-mounted furnace for Transportable Waste-to-Energy System

For the past nearly eleven years, he has been employed by Applied Research Associates, Inc. at the Air Force Research Laboratory (AFRL) in Florida. Work at the AFRL has included development of minichannel heat exchangers, a fuel reformer, and combustion systems. Currently, Dr. Sawyer is the principal investigator for two projects. In the first, his research team is developing and testing furnace technology for disposal of waste and conversion to useful energy. This renewable energy system has potential for application at domestic military bases and at deployed military bases around the world.

He is also the principal investigator for Automated Aircraft Ground Refueling (AAGR). In this second project, the team has developed a prototype robot for refueling military aircraft on the ground. It has potential for future use on all aircraft including unmanned aerial vehicles (UAVs). The prototype robot opens and closes a mock-up fuel panel door and attaches a fuel nozzle to the single-point refueling (SPR) adapter inside the panel.



Automated Aircraft Ground Refueling prototype robot attached to fuel adapter inside the mock-up aircraft refueling panel

The system will provide a feasible alternative to manual refueling, reducing the number of people needed near each aircraft during 'hot-pit refueling,' improving safety and efficiency. In hot-pit refueling one or more of the engines are operating.

A crew chief will marshal the aircraft and oversee the refueling operation, but an operator at an Operational Control Unit will run the actual refueling and may be several hundred feet away from the aircraft. Video and data links will guide the robot and its operator. In the future, the system may be adapted to allow crews to operate in a closed environment while protected from possible chemical/biological risks, without Mission-Oriented Protective Posture gear.

While aircraft ground refueling equipment has improved, this is still a manual process that involves personnel handling the fuel supply hose or pantograph, attaching, and then detaching it. A fueling pantograph is a movable pipeline with rotating elbows. Some are mounted on wheels.

A portion of this article was taken from:
Sawyer, M. (primary source/author), "AFRL Successfully Tests Robot Refueler," US Air Force News website, http://www.wpafb.af.mil/news/story.asp?storyID=123218057, Wright-Patterson AFB, OH, Aug 17, 2010. ■

Alumni News from Abigail Wendt

Abigail Wendt works at Magellan Midstream Partners in Tulsa as a project manager. Magellan transports fuel via pipelines to terminals mostly in the Midwest where a truck then picks up shipments to transport the product to the local gas stations. The job involves managing projects through design, contractor selection, and construction. Abigail has been involved in a variety of projects ranging from installation of additive systems throughout the system to construction of a mile long pipeline loop in Texas. ■

Math and Science Summer Academy Summary

ORU hosted the Math and Science Summer Academy on June 7 – 11. The academy is a program providing opportunities for 48 students in the 8th and 9th grade levels to develop skills to learn mathematics and science. Mathematical activities include code breaking cryptology and fractal pattern recognition. Science experiences include field trips, real-world technologies, rocketry and laboratory work where students seek to understand the natural world. ■

Alumnus Gives Engineering Grant for Racecar Project

A $10,000 grant was recently given for the Formula SAE racecar project, sponsored by Oral Roberts University's Engineering Department, from alums Mike and Sue Noack. So far, this is the largest individual grant given toward the Formula SAE project.

Formula SAE is a premier and global student design competition organized by the International Society of Automotive Engineers. Teams are exclusively comprised of students who must design, build and race their formula-style racecar.

Aside from racing, Formula SAE teams recruit students to help with marketing, sponsor relations, management skills and students with engineering skills to be involved with racing. ■

Grant Received for Swirling Pipe Flow Lab

Oral Roberts University Engineering Department was recently awarded a $5,000 grant for a Swirling Pipe Flow Laboratory from The American Society of Heating, Refrigerating and Air-Conditioning Engineers. This laboratory will be used by freshman to senior engineering majors to build and test a swirling pipe flow system.

Students working on this project will design a combined air and water pipe flow device with various pieces. They will design this device using SolidWorks software and will measure turbulence levels of the flow in the pipe.

Toward the end of the project students will test the flow quality of the pipe flow and perform velocity measurements in the pipe. This will be followed by a lab report about the entire project. ■