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Jerrie Fiala, Editor: jerrie.fiala@wmich.edu**“Smart” technology a key component of three CS research projects**

Three professors in the Department of Computer Science (CS) are exploring various facets of smart technology to improve automotive safety, business computing, and battlefield logistics.

Drs. Ala Al-Fuqaha and **Dionysios Kountanis**, CEAS professors who direct the CS Telecommunications Research Lab (TRL), have recently been awarded a two-year grant from the Michigan Department of Transportation (MDOT) to pursue a research and development effort that aims to increase the safety and efficiency of transportation networks.

The project includes working closely with MDOT, the University of Michigan, the University of Arizona, HNTB Inc. and Motorola to develop test facilities that involve state-of-the-art vehicle infrastructure integration (VII) technologies and concepts and that work to grow the overall national and international VII programs.

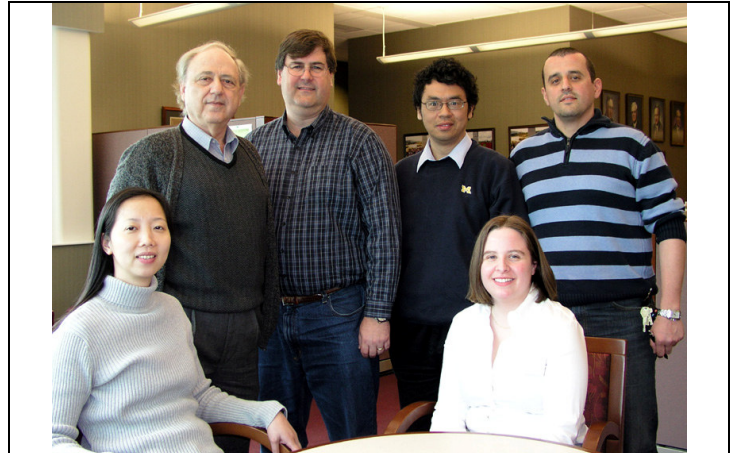
Five WMU student vehicles will be outfitted with MOTO-MESH, a Motorola network from that enables communication between cars. Vehicles will be equipped with sensors so data can be collected from the vehicles through their CANbus systems. “Vehicles will be able to talk to other vehicles,” Al-Fuqaha said. “For example if one car slows down, the other cars will be informed.”

The project will include a regional and ultimately a national VII roll-out through a series of demonstrations that will be showcased to local and national leaders. “The end result of this is that we will be avoiding accidents and saving lives,” Al-Fuqaha said.

Al-Fuqaha and Kountanis have also been awarded a one-year grant extension from Cisco Systems to design a prototype that aims “to predict information technology (IT) infrastructure failures and performance degradations and control network elements accordingly.” A year ago, with the first Cisco grant, the professors and their team developed an intelligent system to predict infrastructure failures in business systems.

“Essentially this means that businesses today – which are highly dependent on information infrastructure, networks, and computers – can predict when some of this equipment is going to fail,” Al-Fuqaha said. “We have an intelligent system that can reconfigure this equipment automatically to avoid failure and that will increase the business productivity in general.”

In addition to the Cisco grants, they have also earned the Technology Development Award (TDA) from the office of the vice president for research (OVPR) to pursue patent and commercialization efforts of related ideas. “The TDA essentially carries the work we are doing with Cisco to the next level so we can apply for patents,” Al-Fuqaha said.



Members of the Boeing team include (seated) **Jing Zhang** (left) and **Stephany Coffman-Wolph**, and (standing, L-R) **Dr. Dionysios Kountanis**, **Steven Cooke**, **Dr. Wuwei Shen**, and **Dr. Ala Al-Fuqaha**

Al-Fuqaha said that even though the research is being done with Cisco, the approach could be applied to products and processes of different companies. “We are essentially designing and building automated intelligent software that monitors a network and reacts without human involvement,” he said.

Kountanis, Al-Fuqaha, and **Dr. Wuwei Shen**, CS associate professor, were also recently awarded a research grant from The Boeing Company “to develop prototypes and tools that employ artificial intelligence and optimization techniques to perform intelligent planning on battlefield environments,” Al-Fuqaha said. Two other team members are Ph.D. students **Stephany Coffman-Wolph** and **Jing Zhang**.

The research is part of a multi-year WMU collaboration with The Boeing Company. Over the last five years, these efforts have totaled more than one million dollars.

The CEAS group is working with CS alumnus **Steven Cooke** (MS '86), the lead engineer of research and development at the virtual warfare center at Boeing. “We do analysis of tactical systems for next-generation operations,” Cooke said.

Cooke’s master’s work was in inference systems, and Kountanis served as his adviser. “The problem we’re working on is an inference problem,” Cooke said. “Because I knew of his [Kountanis’] expertise in this area, we specifically came here to WMU for the research.”

Fifteen students at different degree levels (Ph.D., MS and BS) are involved in the research and development efforts. “Students come up with fresh out-of-the-box ideas,” Kountanis said.