

Burke Wins DoD Instrument Grant



June 15, 2015 -- Electrical and computer engineering professor Peter Burke is the recipient of a highly competitive instrumentation award from the Department of Defense. The \$329,000 Defense University Research Instrumentation Program (DURIP) grant will fund a scanning microwave microscope, which will allow for nanoscale-resolution imaging of microwave conductivity

in nanostructures.

Burke says the new microscope will open the door to research on electromagnetic properties of novel nanomaterials and nanoelectronics. He's specifically interested in nanoantennas for nanoradios, which have the potential to extend the emerging Internet of Things from the physical world to the biological world by integrating radios and sensors into cells. "Our work would be some of the first to apply the technique of scanning microwave microscopy in water, which is a new and novel capability of this instrument," adds Burke, who was granted a related patent last fall for an in-vivo RFID chip the size of single cell – less than 100 microns.

As electronic devices continue shrinking, their wavelengths get smaller and smaller too, creating higher radio-frequency bands. Millimeter wave-level frequencies are the highest radio-frequency bands in practical use today, but eventually even higher terahertz-wave levels will become commonplace. Burke and his students plan to explore this pioneering avenue of communications research, which would eventually enable his long-term goal of a radio that fits inside a single cell.

"This funding is important because it allows us to measure how atomic scale devices behave as antennas in an environment that mimics the interior of the human body," he says.

The DURIP supports the purchase of state-of-the-art equipment that buoys cutting-edge defense research. Nearly 700 proposals were submitted for this year's DURIP funding, with 225 university researchers from 111 institutions receiving awards. The competition was sponsored by three DoD

research offices: the Army Research Office, Office of Naval Research, and Air Force Office of Scientific Research.

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-- Anna Lynn Spitzer

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