August 1, 2016

Dear members of the Hajim School community:

Congratulations to several of our faculty and students whose grants and papers reflect the diverse and exciting research that is taking place at the Hajim School.

**Stephen McAleavey**, associate professor of biomedical engineering, has received a $408,368 R21 grant from the National Institutes of Health for his project, "Quantification of Shear Wave Strain Dependence in Breast Tissues." Many women presently undergo breast biopsy due to lesions detected with x-ray and ultrasound imaging. The great majority of these biopsies are negative, resulting in needless expense and worry. The goal of this project is to improve the power of ultrasound imaging to predict if a breast lesion is benign or malignant, by using a novel, high-resolution technique to non-invasively map the non-linear mechanical properties of breast tissue. These properties are determined by the microstructure of the tissue and show marked differences between benign and malignant tissues. Stephen’s co-investigators on this interdisciplinary project are **Marvin Doyley**, associate professor of electrical and computer engineering; **Linda M. Schiffhauer**, associate professor of pathology and laboratory medicine, and **Avice O’Connell**, professor of imaging sciences.

**Anne Luebke**, associate professor of biomedical engineering, is coauthor with **Loisa Bennetto**, associate professor of psychology, of a study that identifies a simple, safe, and non-invasive method to screen young children for hearing deficits that are associated with autism. The technique uses miniature speaker/microphone earplugs that can detect minute sound emissions made by inner ear outer hair cells in response to certain tones or clicking sounds. When emissions are not detected it is an indication that inner ear function is impaired. Because the test is non-invasive, inexpensive, and does not require the subject to respond verbally, it could be adapted to screen infants, an approach that the team is currently exploring. Read more [here](#).

**Qiang Lin**, assistant professor of electrical and computer engineering, and optics PhD student **Wei Jiang**, in collaboration with researchers at the University of Victoria, have demonstrated for the first time how the so-called optical spring effect produced when light circulates in a miniaturized microresonator can be used to detect single molecules and particles. The new technology, described in a study published last week in *Nature Communications*, has many potential applications, including medical diagnostics, drug development, security screening, and environmental science. Read more [here](#).

A collaboration between students and faculty in electrical and computer engineering and computer science, combining hardware support and program analysis, resulted in a best paper award at the recent ACM SIGPLAN International Symposium on Memory Management in Santa Barbara, CA. In their paper, "Hardware Support for Protective and Collaborative Cache Sharing," **Raj Parihar** 16 (PhD) of electrical and computer engineering, now a performance engineer at Imagination Technologies; **Michael Huang**, associate professor of electrical and computer engineering; and PhD student **Jacob Brock** and Professor **Chen Ding** of computer science, present a new cache management technique for shared environments and compute clouds. It allows conservative sharing to protect the cache occupancy for individual programs, yet enable full cache utilization whenever there is an opportunity to do so.
Have a great week!

Your dean,
Wendi Heinzelman