Emerging Inventor of the Year

The Emerging Inventor of the Year Award is given to younger researchers whose work has shown promise or results in the furtherance of healthcare improvements.

2010 – Yoky Matsuoka, PhD

Yoky Matsuoka, PhD., is a Torode Family Endowed Career Development Professor in the Department of Computer Science and Engineering. Dr. Matsuoka completed her Ph.D. in Electrical Engineering and Computer Science at MIT in 1998, working in the fields of artificial intelligence and computational neuroscience. She was the recipient of a prestigious MacArthur Fellowship in 2007 and is now Director of the Center for Sensorimotor Neural Engineering.

Dr. Matsuoka pursues a broad range of activity that, in the ultimate application, would lead to the development of artificial devices that augment human capabilities under neural control. In a very important step along this path, she is developing an anatomically correct robotic hand to investigate the neural control of human hand movements. The goal of this work is a prosthetic hand capable of executing detailed hand movements autonomously or with natural neural signals. Her work is highly interdisciplinary, including the development of chronically implantable neural interfaces, as well as the mechanical, electrical, and computer systems needed to operate and control such devices. Along her path she has also developed a hand exoskeleton to restore the ability of patients with upper spinal cord injuries to pinch, point and grasp, as well as a robotic manipulator that can improve hand movement rehabilitation for victims of stroke. Dr. Mastuoka has helped to improve the lives of many patients and shows tremendous promise to develop additional tools that will further improve healthcare.

2008 – Tueng Shen & Babak Parviz

To honor both the work of two brilliant researchers and the collaborative nature of their work, this year's award was jointly presented to Tueng Shen, M.D., Ph.D. and Babak Parviz, Ph.D.

"Many groundbreaking ideas are the results of fruitful collaborations between physicians and engineers. I am definitely excited to build bridges between those fields to benefit our patients." – Tueng Shen, M.D., Ph.D.

Tueng Shen, M.D., Ph.D., is an Assistant Professor in Opthalmology, Adjunct Assistant Professor of Bioengineering, and Director of the Refractive Surgery Center. She earned her M.D. from Harvard and her Ph.D. in Bioengineering from MIT. She joined the UW faculty in 2003.

Tueng Shen, drawing on her background in medicine and bioengineering, has teamed up with Babak Parviz to develop an active contact lens that can wirelessly communicate important information about the health of the eye and the whole patient. For example, currently patients having their retinal function tested must wear contact lenses connected to wires to measure retinal responses to light flashes. The lens under development will be equipped with a wireless transmitter and lights powered by combination of radio frequency and solar cells and will collect data for the clinician or researcher. For longer-term use data will be continuously acquired by a small computer worn on the patient's belt or wrist giving clinicians information on the health of the eyes in normal settings. The lens could also collect information on medication effectiveness or blood sugar levels in tears. Dr. Shen is hoping that the lenses as functional Microsystems will eventually be used to improve vision.

Babak Parviz, Ph.D. is an Assistant Professor of Electrical Engineering and Associate Director of the Micro-scale Life Science Center. He earned his PH.D. from the University of Michigan and worked for Nanovation Technologies Inc., as a device designer in integrated photonics. He works on bionanotechnology, self-assembly, nanofabrication, MEMS. He
joined the UW faculty in 2003.

Babak Parviz has developed a technique of engineered self-assembly that combines the lens material and the circuitry to create the new active contact lens. Dr. Parviz manufactured micrometer sized silicon parts and designed a plastic substrate with binding sites whose shapes complemented those of the silicon components. He then immersed the plastic substrate in a fluid containing the silicon parts. The parts quickly attached themselves to the binding sites on the substrate. Metal intconnections embedded in the plastic completed the circuitry. The results was the lens that will soon be placed in a human eye for clinical trials.
Dr. Parviz's methodology for creating the flexible displays would be useful for other biosensor applications and non-medical projects like low-cost solar panels and navigation devices, and include tiny sensors, motors and power sources. Augmented reality applications could include projecting images onto the contact lenses for gaming, training and manufacturing.

Dr. Parviz, Assistant Professor of Electrical Engineering – Bionanotechnology, Self-Assembly, Nanofabrication, MEMS and Associate Director of the Micro-scale Life Sciences Center earned his Ph.D. from the University of Michigan and worked for Nanovation Technologies Inc., as a devise designer in integrated photonics. He joined the UW faculty in 2003.