



CAM MESA

Overheard

A computer guy's take on personalized medicine

Shyam Visweswaran, an MD/PhD, began his career in neurology. But after completing graduate work in biomedical informatics at Pitt, he's more focused on the computer brain than the human one. Perhaps you're aware that the biomedical science community has an eye toward customizing care for each patient. That effort (or dream), called personalized medicine, hopes to get the right therapy to the right patient at the right time. Add "via the right model," to that line, Visweswaran, an assistant professor of biomedical informatics at Pitt, might say. He believes we should also personalize the computer model for each patient.

What that means— modeling for each patient

"Currently, for most risk assessments and other prediction models in medicine, a single model is developed, and that model is applied to everybody. This approach involves building a prediction model that will perform well for the average patient, but not necessarily for the current patient that the physician is seeing. What I am working on is patient-specific (or personalized) modeling, where computer programs build a prediction model for the current patient that is tailored to that patient's information, such as age, gender, blood pressure, cholesterol level, and, in the future, DNA sequence. These computer programs will, on the fly, figure out what are the important factors that should go into the model to achieve the best prediction for the current patient."

Predicting outcomes

"Within 10 years, I anticipate, we will see a patient's DNA sequence become part of the electronic medical record. We are going to need computer programs that combine DNA sequence information with traditional clinical data to help predict well-outcomes that are of interest to the physician, such as, *Is my patient at high risk of developing Alzheimer's? What is the precise DNA sequence abnormality that is causing pancreatitis in my patient? Will my patient respond to this therapy?*"

Another kind of physician assistant

"The current generation of clinical-decision support systems assists the physician with simple tasks such as alerting when a vaccination needs to be done or if two medications that interact are prescribed to the same patient. We want, and hope, to build far more intelligent support systems that will assist physicians in all tasks they do, day in and day out, including better risk assessment, more precise diagnosis, more accurate evaluation of prognosis, and better selection of therapy."

—Interview by Joe Miksch

Faculty Snapshots

The University of Pittsburgh School of Medicine's Bruce Freeman and Valerian Kagan have been named fellows of the American Association for the Advancement of Science (AAAS). Freeman, PhD professor and chair of pharmacology and chemical biology, who holds the UPMC/Irwin Fridovich Chair, was honored for his career-long research into free radicals and their roles in inflammation and cell function. Kagan, professor of radiation oncology in the School of Medicine (whose primary appointment is in the Graduate School of Public Health, where he is vice chair for environmental and occupational health), was also added to the AAAS rolls. Kagan has a distinguished background in free radical biology and programmed cell death research.



Freeman



Kagan

The American Society of Neural Therapy and Repair named Pitt associate professor of radiology **Michel Modo**, a PhD, winner of the 2013 Bernard Sanberg Memorial Award for Brain Repair. Modo was recognized for his efforts in neurorestorative biology for TBI patients, including better use of noninvasive neuroimaging techniques to identify brain damage and developing strategies for repair. His imaging work focuses on finding ways to best monitor live cells moving through the body.



Modo

A Pitt team received one of the Clinical Research Forum's Top 10 Clinical Research Achievement Awards for work with brain-computer interfaces. The interfaces and the science behind the technology came out of the lab of Andrew Schwartz, a PhD professor of neurobiology. (Early clinical studies were done with support from Pitt's Clinical and Translational Science Institute.) The group's most recent triumph involved using the technology to allow a woman with quadriplegia to manipulate a robotic arm with her mind. She was able to feed herself chocolate. Jennifer Collinger, a PhD assistant professor of physical medicine and rehabilitation, was the lead author of the paper, which was published in *Lancet*.



Schwartz



Collinger

Robert Arnold has long researched ways to improve communication between doctors and patients in cases where patients face life-threatening illnesses. And now the MD has received the Lifetime Achievement Award from the American Academy of Hospice and Palliative Medicine. Arnold is the Leo H. Crip Professor of Patient Care and the medical director of the UPMC Palliative and Supportive Institute. —JM



Arnold