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NIH Awards New National Center of Excellence for Mobile Sensor Data-to-Knowledge

Computer science, engineering, statistical and biomedical researchers from 11 universities will spend the next four years developing innovative tools to make it easier to gather, analyze and interpret health data generated by mobile and wearable sensors. The Mobile Sensor Data-to-Knowledge (MD2K) team, led by University of Memphis computer scientist Santosh Kumar, will receive \$10.8 million from the National Institutes of Health (NIH) to develop novel big-data solutions for reliably quantifying physical, biological, behavioral, social, and environmental factors that contribute to health and disease risk.

Turning the wealth of mobile sensor data available through new and rapidly evolving wearable sensors into reliable and actionable health information is one of the next critical frontiers in realizing the vision of predictive, preventive, personalized, participatory, and precision (P5) medicine. MD2K's team is comprised of leading scientists from Cornell Tech, Georgia Tech, Northwestern, Ohio State, Rice, UCLA, UC San Diego, UC San Francisco, the University of Massachusetts Amherst, the University of Memphis, the University of Michigan, and Open mHealth (a non-profit organization). Together, they aim to accelerate progress towards the P5 vision by producing and making widely available open-source, extensible, and standards-compliant big data analytics software for extracting information and actionable knowledge from mobile sensor data.



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The team will directly target two complex health conditions with high mortality risk – reducing hospital readmission in congestive heart failure (CHF) patients and preventing relapse in abstinent smokers. The approach and product of MD2K will

be applicable to other complex diseases as well, such as asthma, substance abuse and obesity. The Center will make the MD2K tools, software, and training materials widely available and organize workshops and seminars to encourage their use by researchers and clinicians.

According to MD2K Center Director Kumar, “Mobile sensors offer tremendous opportunities for accelerating biomedical discovery and optimizing care delivery. By resolving significant technological and scientific challenges related to the complexities of mobile sensor data, our team aims to lay the scientific foundations for realizing the vision of P5 Medicine with mobile sensors, and usher in the next generation of healthcare.”

UC San Diego researchers Kevin Patrick, Jacqueline Kerr and their Center for Wireless and Population Health Systems (CWPHS) in Calit2’s Qualcomm Institute are engaged in this project because of the pioneering work that they have done in the use of data from Global Positioning System (GPS) devices to monitor and improve health behaviors. Funded through the NIH Gene-Environment initiative, their Personal Activity Location Measurement system, which fuses GPS data with accelerometer data to measure such things as intensity of physical activity, has now been used by over 100 researchers in the U.S. and abroad.

“Continuing to advance the methods by which location-based data are used in health research will be essential if we are to uncover many of the unknown causes of premature death and disability,” said Patrick, who is also a professor of family and preventive medicine in the UC San Diego School of Medicine. “We know that environmental influences are important to health and illness, but to date, precise measurement of these has been very difficult.”

The Mobile Sensor Data-to-Knowledge Center is part of the National Institutes of Health (NIH) Big Data to Knowledge (BD2K) initiative, designed to support advances in research, policy, and training that are needed for the effective use of big data in biomedical research. As part of this initiative, NIH has funded 12 National Centers of Excellence, each representing a multi-investigator, interdisciplinary team working to develop innovative approaches to address a major challenge to the effective use of big data. Together, these centers form a national infrastructure to develop and deploy cutting edge approaches, methods, software, tools, and other resources that will enable biomedical researchers to use big data to advance human health.

MEDIA CONTACT

Tiffany Fox, 858-246-0353, tfox@ucsd.edu

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