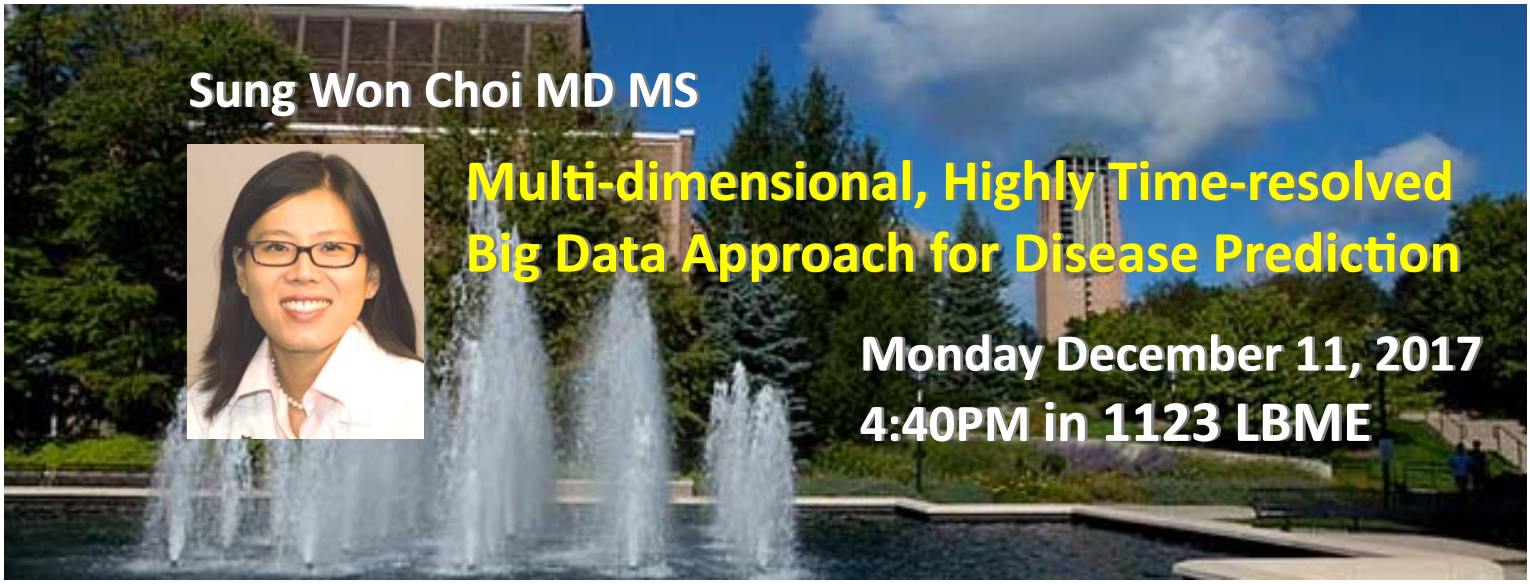

Individualized prediction of disease (and disease-related events) is a major unmet challenge, yet is essential for realizing the full potential of personalized medicine. Underlying the prediction problem is the fact that disease processes, and the human hosts in which they occur, represent complex dynamical systems comprised of large numbers of components that interact in non-linear ways over time. A key insight from complexity science is that accurate long-term prediction in such systems is usually not feasible, but short-term predictions can be successful if multi-parameter, highly time-resolved data can be collected and integrated using computational methods. Complex science indicates that prediction of disease needs to be done on an ongoing basis, in near "real-time", because complex dynamical processes tend to proceed non-linearly. There are "windows of opportunity" when signal begins to exceed background noise and the disease process is early enough for intervention to be successful. Please join Dr. Choi as she discusses how she and her collaborators, including Dr. Wiens (Computer Science/Machine Learning), Dr. Tewari (Medical Oncology), Dr. Kurabayashi (Mechanical Engineering), and Dr. Li (Computational Biology) are using the blood and marrow transplantation setting as an ideal model system to prototype such an approach for disease prediction that is consistent with the highly complex nature of human disease.

Sung Won Choi MD MS trained as a pediatric resident at New York University and later as a fellow in pediatric hematology-oncology at the University of Michigan. Through an NIH K23 award, Sung received additional training in Clinical Research Design and Statistical Analysis through the University of Michigan School of Public Health. She is currently an Associate Professor in the Department of Pediatrics, and in 2017, she was named the inaugural Edith S. Briskin / Shirley K Schlafer Research Professor of Pediatrics. Sung specializes in the field of blood and marrow transplantation (BMT) and is recognized for her work in translating the use of histone deacetylase inhibition in BMT patients for prevention of a devastating complication known as graft-versus-host disease (GVHD). She enjoys translational research initiatives that include the use of novel, non-steroidal therapeutics both in the prevention and treatment of GVHD. Her research efforts focus on: 1) providing an improved understanding of clinical BMT through translation of experimental studies 2) exploring clinical outcomes in BMT patients alongside laboratory correlates; and 3) leveraging novel tools, such as information technology, to support patient- and caregiver-centered care in her clinical and translational research efforts in BMT.

The seminar series “Providing Better Healthcare through Systems Engineering” is presented by the U-M Center for Healthcare Engineering and Patient Safety (CHEPS): Our mission is to improve the safety and quality of healthcare delivery through a multi-disciplinary, systems-engineering approach.

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