



Centre for Biosystems Science and Engineering

SEMINAR

at 4:00 PM on November 3, 2015
Faculty Hall

The Emerging Discipline of Computational Medicine

Prof. Raimond Winslow

Raj and Neera Singh Professor, The Johns Hopkins University
School of Medicine

Because of the inherent complexity of biological systems, the development of computational models is necessary to achieve a quantitative understanding of their structure and function in health and disease. Computational Medicine is a discipline in which mechanistic models of disease are developed, personalized using data from individual patients, and then applied to deliver improved health care. In computational molecular medicine, statistical learning is applied to high--dimensional biomolecular data to create models that describe relationships between molecules and networks in health and disease. In computational physiological medicine, multi-scale modeling links networks to cells, organs, and organ systems. In computational anatomy, mathematical approaches are used to analyze medical imagery to characterize anatomic shape and its variations in health and disease. In computational healthcare, statistical models of electronic health record data are developed. In each case, models are personalized using patient data, and then applied to improve disease diagnosis and to guide therapy. This talk will present success stories in each of these areas of computational medicine, with specific examples in the fields of cancer, diabetes, cardiology, and neurology. Challenges that must be confronted to translate these computational methods to the clinic will be discussed.

About the speaker:

Dr. Raimond L. Winslow is a professor of biomedical engineering at the Johns Hopkins University School of Medicine. He holds an additional appointment in the Whiting School of Engineering at Johns Hopkins, through which he serves as Director of the Institute for Computational Medicine and Director of the Center for Cardiovascular Bioinformatics and Modeling.

Dr. Winslow holds a B.S. in electrical engineering from Worcester Polytechnic Institute and a Ph.D. in biomedical engineering from the Johns Hopkins University. He concluded his training at the Institute for Biomedical Computing and Department of Neurology within Washington University in St. Louis. He joined the faculty of Johns Hopkins in 1991 as an assistant professor, became an associate professor in 1994 and a full professor in 2000.

Dr. Winslow is a fellow of the Biomedical Engineering Society, American Heart Association and American Institute for Medical and Biological Engineering. He serves as Specialty Editor in Chief for the journal *Frontiers in Computational Physiology and Medicine*, and as a member of the editorial boards of *Circulation Research*, *The Journal of Molecular and Cellular Cardiology*, *IET Systems Biology* and the *International Journal of Computational Medicine and Healthcare*. He has authored or co-authored over 130 peer-reviewed articles and 12 book chapters, received numerous grants and awards and holds one patent.