

JOINT BIOENGINEERING SEMINAR SERIES



“Precision Medicine and the Future of Genetics and Complex Disease”

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Dec. 15, 2017, 12:00-12:50pm UWM EMS E295

Abstract:

Essential to a future of preventive and predictive medicine is the use and application of modern technologies and computational approaches in the implementation of precision medicine. A sweeping array of bioinformatics tools, approaches and analysis will impact everything from the integration of whole genome technologies into clinical and health practice to the identification and refinement of pharmacogenetic algorithms designed to vastly improve clinical outcomes. We present examples of the development of precision medicine, improved outcomes including the use of whole genome sequencing and analysis in rare disease and breast cancer care to create a post-genome paradigm shift in health, disease prevention, and clinical care. We also demonstrate the use of bioinformatics in the accurate dosing of drugs whose metabolism is impacted by the genetics of the individual patient. These and parallel efforts though difficult, will catalyze the adoption and widespread implementation of precision medicine resulting in dramatically improved patient outcomes.

Bio:

Peter J. Tonellato earned his PhD in applied mathematics from the University of Arizona following study at both the University of Oxford and Hiroshima University. Past positions include Founding Director, Bioinformatics Research Center, Medical College of Wisconsin and Founder and CEO, of Pointone Systems, LLC, the first personalized medicine software company that provided genetic enabled ‘best practice’ clinical decision support systems to hospitals and health care facilities. Previous work includes the creation of the Rat Genome Database (rgd.mcw.edu), the first disease-centric repository of phenotype and genetic data and the Program in Genomic Applications (pga.mcw.edu) data mining system for a heterogeneous collection of phenotypes, microarray expression and genotypes.



Currently, Professor Tonellato has joint appointment with Harvard Medical School as Director of the Laboratory for Personalized Medicine (LPM) in the Department of Biomedical Informatics (lpm.hms.harvard.edu) and the Zilber School of Public Health, University of Wisconsin, Milwaukee, Professor of Bioinformatics and Director where he directs the Laboratory for Public Health Informatics and Genomics (lphig.zsph.uwm.edu) and Professor of Computer Science in the College of Engineering and Applied Science and of Health Informatics in the College of Health Sciences. Dr. Tonellato and his labs develop strategies, methods, bioinformatic tools, and analyses to study and test the accuracy and clinical efficacy of genetic discoveries and accelerate their translation to practical clinical use. LPM and LPHIG design and execute insilico experiments to explore and solve barriers to translation from discovery to clinical use across a broad collection of public health problems.