Seminar Title: *Predicting Drug Sensitivity and Synergy From Genomics Data: a Wisdom of Crowds Study*

**Time:** 3:00-4:00 PM, Friday, Oct 3, 2014  
**Location:** ECE 101 Lankford Lab

**Speaker:**  
Gustavo Stolovitzky  
Thomas J. Watson Research Center, IBM

**Abstract:**

The pace at which biomedical datasets of unprecedented size and complexity are created outstrips the capabilities of the traditional peer-review system and requires new paradigms that more quickly produce verified methods and data-driven findings. To help benchmarking emerging algorithms we created the DREAM Challenges initiative, a crowdsourcing-based approach designed to critically assess complex analytic workflows using the wisdom of crowds, while accelerating the pace of scientific discovery and fostering the creation of communities around pressing biomedical problems. We will present the results of two recently run challenges in the area of systems pharmacology of cancer. In the NCI-DREAM Drug Sensitivity Prediction Challenge we analyzed the predictive ability of 44 drug sensitivity prediction algorithms. Gene expression microarrays consistently provided the best predictive power of the individual profiling data sets. The NCI-DREAM Drug Synergy Prediction Challenge we assessed 32 methods of which only four performed significantly better than random guessing. We will discuss the innovations underlying the top-performing methodologies in both Challenges. Although the accuracy of predictions was not optimal, we find that computational prediction of drug sensitivity and compound-pair activity is possible. Community challenges has proven a useful way to advance the field of *in-silico drug sensitivity prediction* and drug-pair activity prediction.

**Speaker Bio:**

Dr. Gustavo Stolovitzky is a Distinguished Research Staff Member at IBM Research, the Director of the IBM Translational Systems Biology and Nano-biotechnology Program, and an adjunct Professor at Columbia University and at the Icahn School of Medicine at Mount Sinai. Dr. Stolovitzky joined IBM Research in 1998. Previously he was a postdoctoral researcher at the Center for Studies in Physics and Biology at The Rockefeller University. He received his PhD in Mechanical Engineering from Yale University (1994) and his M.Sc. in Physics, from the University of Buenos Aires (1987). Dr Stolovitzky has received Yale University’s Henry Prentiss Becton Prize award (1994), the HENAAC’s Pioneer Award for Great Minds in STEM (2013), the World Technology Awards (2013), and was distinguished as a Master Inventor in IBM Research (2013). Dr. Stolovitzky has been elected Fellow of the NY Academy of Sciences, Fellow of the World Technology Network, Fellow of the American Physical Society and Fellow of the American Association for the Advancement of Sciences. Dr Stolovitzky has published over 120 papers and patented over 20 inventions on high-throughput biological-data analysis, reverse engineering biological circuits, the mathematical modeling of biological processes and nano-biotechnology.