Talk Descriptions (approx. 10 minutes each)

Combining Outcomes Research with Big Data Analytics and with System Dynamics to Create Learning Health Care Organizations (Chohreh Partovian, IBM Research)

Patients, employers, payers, and policy makers are demanding a higher value health care: better clinical outcomes at lower cost. Big Data analytics will allow us to "phenotype" healthcare organizations on multiple dimensions both at baseline and over time. Data mining and visualization will allow us to identify the patterns of behavior and/or structure that are associated with higher value of care delivery, better organizational performance, organizational readiness for change, as well as learning capacity. System Dynamics is uniquely qualified to initiate and guide change by focusing on dynamic complexity which arises from the interactions among agents over time.

Linking Open Source Health Data to a dynamic model of Diabetes Control and Progression in New York State. (Mingzhe Tao, UAlbany)

We show the results of an experiment to integrate publically available hospital admissions data with a disease progression model. This work in progress includes a demonstration of the work to date, as well as an outline of findings and open issues regarding data access, privacy, transformations, visualizations, and our first cut at an integration architecture.

Collecting Data in a Jar (James Houghton, MIT)

In this lightning talk, I'll demonstrate a way to estimate the number of pennies in circulation from the population of pennies in a penny jar. We'll infer parameters for a simple aging chain that models the life cycle of a penny using optimization and Markov Chain Monte Carlo. Most importantly, we'll apply our optimization not to the output of any single model, but to the distribution of outputs from a suite of parallel simulations.

A Tool for Enhanced Causal Discovery and Understanding: System Dynamics Modeling – Causal Miner (SDM-CMiner) (Ignacio Martinez-Moyano, Argonne National Laboratory)

The System Dynamics Modeling – Causal Miner (SDM-CMiner) is a prototype software tool designed for exploring causal relationships in system dynamics models using data mining processes and techniques. Using a causal model or map, a set of discovery rules, and a corpus of documents, the SDM-CMiner tool attempts to uncover evidence (or the lack thereof) for the causal relationships present in the model or map that can be found in the corpus of documents provided.

Big Data, Small Models, (Robert Jeffers, Sandia National Laboratories)

It has been notoriously difficult to build confidence in human behavior models because of the tremendous amounts of noise in dynamic behavioral data sets. As our ability to analyze extremely large data sets improves, however, the signal of large-scale behavioral phenomena can finally be separated from this noise by applying multiple structural hypotheses grounded in theory and using very powerful computers. This talk will present the difficulties with, and discuss potential solutions for, calibration and testing of multiple structural hypotheses of social unrest using system dynamics models populated by twitter data over a three-year window.