Atlantic Causal Inference Conference Program
University of North Carolina
23 – 25 May 2017

Locations: [Koury Oral Health Sciences Building](#) and [Michael Hooker Research Center](#)

Tuesday May 23

730a	Breakfast	KOURY LOBBY

8a – noon	**Workshop: New Matching Methods for Causal Inference**	KOURY G601

Jose Zubizarreta, University of Pennsylvania
In observational studies of causal effects, matching methods are often used to approximate the ideal study that would be conducted if it were possible to do it by controlled experimentation. In this workshop, Jose Zubizarreta will discuss new advancements in matching methods that allow the investigator to overcome three limitations of standard matching approaches by: (i) directly obtaining flexible forms of covariate balance; (ii) producing self-weighting matched samples that are representative by design; and (iii) handling multiple treatment doses without resorting to a generalization of the propensity score and instead balancing the original covariates. He will also discuss extensions to matching with instrumental variables and in discontinuity designs, and for matching before randomization in experiments. These methods will be illustrated with the statistical software package 'designmatch' for R.

8a – 5p	**Short Course: Precision Medicine Through Optimal Treatment Regimes**	KOURY G411

Marie Davidian, Butch Tsiatis, Shannon Holloway, North Carolina State University
The vision for precision medicine is a healthcare system that adapts to the uniquely evolving health status of each individual patient, so that treatment decisions made at milestones in the disease or disorder process are tailored to the characteristics of the patient. Treatment regimes operationalize precision medicine as a sequence of decision rules, each rule corresponding to a key decision, that map up-to-date patient information to a recommended treatment. An optimal treatment regime maximizes the mean of some cumulative clinical outcome if used to select treatments in a population of interest. In this course, we provide a rigorous but accessible introduction to estimation of optimal treatment regimes using data from observational or randomized studies. Topics covered include: formalizing an optimal treatment regime using potential outcomes; estimators for an optimal treatment regime, including methods based on regression modeling and inverse probability weighting, including Q-learning, policy search, and outcome weighted learning; design and analysis of sequential multiple assignment randomized trials (SMARTs), the gold standard data source for estimation of optimal treatment regimes; and R software for constructing and evaluating estimated optimal treatment regimes. No prior exposure to treatment regimes is assumed. Participants should have a good working knowledge of standard statistical methods, including regression analysis.

10a	Break	KOURY LOBBY

3p	Break	KOURY LOBBY

| 1p – 5p | **Causal Inference and Machine Learning/High Dimensional Data** | KOURY G601 |
| | **NISS Workshop** | |

1p – 210p   **Machine Learning, Computation, and Causal Inference**
Organizer: Cynthia Rudin, Duke University

Causal Inference with High-Dimensional Controls and Parameters of Interest
Alex Belloni, Duke University

Causal Analysis for Big Data using Techniques from Databases
Sudeepa Roy, Duke University

Estimating Optimal Intervention Strategies Against an Intelligent and Adaptive Adversary with Application to Real-Time Disruption of Human Trafficking in the United States
Eric Laber, North Carolina State University

Hypothesis tests that are robust to subjective choices in matching
Cynthia Rudin, Duke University

230p – 330p   **High-Dimensional Causal Inference**
Organizer: Avi Feller, UC Berkeley

Approximate Residual Balancing: De-Biased Inference of Average Treatment Effects in High Dimensions
Stefan Wager, Stanford University

Overlap and Deconfounding Scores in High Dimensions
Alex D'Amour, UC Berkeley

Selecting Subpopulations for Causal Inference in High Dimensional Settings
Alessandra Mattei, University of Florence

350p – 5p   **Estimating Causal Networks in High-Dimension Observational Data**
Organizer: Donglin Zeng, University of North Carolina

Inference in Gaussian DAGs with Known Partial Ordering
Syed Rahman, University of Florida

Estimating Latent Causal Network through Sparse Mixed Effects Directed Acyclic Graphs
Yuanjia Wang, Columbia University

Estimating the Skeleton of High Dimensional Directed Acyclic Graphs
Jichun Xie, Duke University

Estimation of Sparse Directed Acyclic Graphs through a Lasso Framework and its Applications
Hua Zhong, New York University

| 630p – 830p | **Junior Researcher Mixer** | The Strowd |

Wednesday May 24

8a-830a	Breakfast	KOURY LOBBY

830a – 930a **Keynote:** Susan Athey, Stanford   KOURY G601
Discussant: Eric Laber, North Carolina State University

930a – 1045a **Machine Learning and Causal Inference**   KOURY G601
Organizers: Jennifer Hill and Uri Shalit, New York University

Automated versus Do-It-Yourself Methods for Causal Inference: Lessons Learned from a Data Analysis Competition
Uri Shalit, New York University

Combining Observational and Experimental Data to Find Heterogeneous Treatment Effects
Alex Peysakhovich, Facebook

Bayesian Causal Forests
Richard Hahn, University of Chicago

Counterfactual Prediction using Deep Instrumental Variables Networks
Greg Lewis, Microsoft

1045a   Break   KOURY LOBBY

11a – 1215p **Causal Inference for Randomized Trials**   KOURY G601
Organizer: Ashley Naimi, University of Pittsburg
Moderator: Enrique Schisterman, NICHD

Estimating The Effect of Continued Breastfeeding on Infant Hospitalizations in a Cluster Randomized Encouragement Trial
Mireille Schnitzer, University of Montreal

Generalizing the Adjusted Per-protocol Treatment Effect using Inverse Probability Weights
Haidong Lu, University of North Carolina

G Computation for Compliance Adjustment in Randomized Trials: An Example using the Effects of Aspirin on Gestation and Reproduction Trial
Ashley Naimi, University of Pittsburgh

Discussant: Robert Platt, McGill University

11a – 1215p **Survey Sampling and Causal Inference**   KOURY G411
Organizer: Peng Ding, UC Berkeley

Balancing Covariates via Propensity Score Weighting
Fan Li, Duke University

Using Standard Tools from Finite Population Sampling to Improve Causal Inference for Complex Experiments
Tirthankar Dasgupta, Rutgers University

Efficient Estimation of Sample Average Treatment Effects
Yotam Shem-Tov, UC Berkeley

General Forms of Finite Population Central Limit Theorems with Applications to Causal Inference
Peng Ding, UC Berkeley

1215p	Lunch	KOURY LOBBY

130p – 245p **New Methods for Digital Experimentation** KOURY G601
Organizer: Jas Sekhon, UC Berkeley

Optimizing Treatment Regimes via Sequential Experimentation and Bayesian Optimization
Konstantin Kashin, Facebook

Trustworthy Analysis of Online A/B Tests: Pitfalls, Challenges and Solutions
Alex Deng, Microsoft

Empirical Bayes Estimators for Online Experiments
Drew Dimmery, Facebook

Discussant: Erin Hartman, UCLA

130p – 245p **Lightning Talks** KOURY G411

250p – 405p **Generalizing Treatment Effects from One or a Collection of Randomized** KOURY G601
Trials to a Target Population in the Presence of Treatment Effect
Heterogeneity: Identification, Estimation and Sensitivity Analysis
Organizer: Elizabeth Stuart, Johns Hopkins
Chair: Hwanhee Hong, Johns Hopkins

Generalizing Study Results: A Potential Outcomes Perspective
Catherine Lesko, Johns Hopkins

Sensitivity Analyses for Partially or Fully Unobserved Effect Modifiers when Calibrating the Effect
from a Randomized Trial to a Target Population
Trang Quynh Nguyen, Johns Hopkins

Transporting the Results of Multiple Randomized Controlled Trials to a Target Population:
Towards Causally Interpretable Meta-Analysis
Issa J. Dahabreh, Brown University

Discussant: Robert Platt, McGill University

250p – 405p **Innovations in discovering effect modification** KOURY G411
Organizer: Ashkan Ertefaie, University of Rochester

Causal Interaction in Factorial Experiments: Application to Conjoint Analysis
Kosuke Imai, Princeton University

Optimal Policy Learning

Stefan Wager, Stanford University

Post-Selection Inference for the Effect Modifiers Selection
Qingyuan Zhao, University of Pennsylvania

Discussant: Susan Athey, Stanford University

405p	Break	KOURY LOBBY

420p – 535p **Modern Advances in Instrumental Variable Methods**   KOURY G601
Organizers: Luke Keele, Georgetown University;
Edward Kenedy, Carnegie Mellon University

Survivor-Complier Causal Effects in a Study of Prompt ICU Admission with Selection on Treatment
Luke Keele, Georgetown University

Generalizing local effects with sharp instruments
Edward Kennedy, Carnegie Mellon University

TMLE for Marginal Structural Models Based on an Instrument
Boriska Toth, UC Berkeley

Testing Endogeneity with Possibly Invalid Instruments and High Dimensional Covariates
Hyunseung Kang, University of Wisconsin, Madison

Discussant: Elizabeth Ogburn, Hopkins

420p – 535p	**Lightning Talks**	KOURY G411
6p – 8p	**Tom Ten Have Poster Session & Data Analysis Challenge Winners**	HOOKER ATRIUM
8p --10p	**Reception featuring The Imposteriors**	HOOKER ATRIUM

Thursday May 25

745a	Breakfast	KOURY LOBBY

815a	**Tom Ten Have Talk**	KOURY G601
	Constructed Second Control Groups and Attenuation of Unmeasured Biases	
	Sam Pimentel, University of Pennsylvania	
	* 2016 Tom Ten Have Winner *	

845a – 945a	**Keynote:**	KOURY G601
	Model and Variable Selection in Causal Inference	
	James Robins, Harvard	
	Discussant: Michael R. Kosorok, University of North Carolina	

945a – 11a	**Causal Inference in Air Pollution Epidemiology**	KOURY G601
	Organizer: Richard Smith, University of North Carolina	

The Effects of Policy-Driven Air Quality Improvements on Children's Respiratory Health
Kiros Berhane, University of Southern California

Efforts to quantify the causal effect of fine particulate matter on mortality
Zhulin He, Iowa State University

Progress in Automated Inference and Estimation of Causal Concentration-Response Functions in Air Pollution Epidemiology
Tony Cox, University of Colorado

Discussant: Richard Smith, University of North Carolina

11a	Break	KOURY LOBBY

1115a – 1230p	**Different Modes of Inference under Interference**	KOURY G601
	Organizer: Laura Forastiere, University of Florence	

Randomization Inference in Networks
Dean Eckles, MIT

A Folk Theorem on Interference in Experiments
Fredrik Savje, UC Berkeley

Estimation and Testing in Two-Stage Randomized Designs with Interference
Avi Feller, UC Berkeley

Exploring encouragement, spillover and attendance effects in a field experiment on museums attendance of high school teens using principal stratification
Fabrizia Mealli, University of Florence

1115a – 1230p	**Balance at Baseline in Experiments and Observational Studies: New Measures, New Implications**	KOURY G411
	Organizer: Ben Hansen, University of Michigan	

The Classification Permutation Test: A Nonparametric Test for Equality of Multivariate Distributions
Johann Gagnon-Bartsch, University of Michigan
* 2016 Tom Ten Have Winner *

New multivariate tests for assessing covariate balance in matched observational studies
Hao Chen, University of California, Davis

Balancing Basu's elephants: Limiting bias of subgroup effect estimates, particularly in stratified cluster randomized trials
Mark Fredrickson, University of Illinois, Urbana-Champaign

Appraising Covariate Balance as Part of Experimental Design
Kari Lock Morgan, Pennsylvania State University

1230p	Lunch	KOURY LOBBY

130p – 245p   **Causal Inference with Unobserved Confounders**   KOURY G601
Organizer: Eric Tchetgen Tchetgen, Harvard and Wang Miao, Beijing University

Bounded, Efficient and Triply Robust Estimation of Average Treatment Effects using Instrumental Variables
Linbo Wang, Harvard

Optimal Criteria to Exclude the Surrogate Paradox and Sensitivity Analysis
Lan Liu, University of Minnesota

Testing Causative Hypotheses in the Presence of Unmeasured Confounding
Wang Miao, Beijing University

Discussant: James Robins, Harvard

245p – 4p   **Interference and Social Networks**   KOURY G601
Organizer: Lan Liu, University of Minnesota

Modeling Interference Via Symmetric Treatment Decomposition
Ilya Shpitser, Johns Hopkins

Estimation of Monotone Treatment Effects under Interference
David Choi, Carnegie Mellon University

Simulation-Based Sensitivity Analysis for Interference in Observational Studies with Unmeasured Links
Laura Forastiere, University of Florence

Discussant: Alex Volfovsky, Duke University