Causal Discovery with Biomedical Data
June 8-11, 2015

Center for Causal Discovery Summer Short Course
Carnegie Mellon University, Pittsburgh, PA
Course Director: Richard Scheines, PhD
http://www.ccd.pitt.edu/training/summer-short-course-2015/

This 4-day short course is appropriate for both biomedical and data scientists at the level of graduate students or higher who are seeking training in causal discovery and graphical modeling using large, complex biomedical data. Attendees are expected to have knowledge of basic statistical principles, but no prior graphical modeling experience is needed. Attendees will be taught by and receive individualized assistance from researchers from Carnegie Mellon University and the University of Pittsburgh in the Center for Causal Discovery, a BD2K Center of Excellence.

Potential attendees can review presentations from the 2013 CMU Workshop, Case Studies of Causal Discovery with Model Search, to better understand the material to be presented at the Short Course.

Attendees are expected to bring laptops, as each session will have hands-on training on the use of Tetrad with practice data. Attendees may bring their own large biomedical datasets to use; advance discussion with Dr. Joseph Ramsey is advised to ensure the data are of the proper type and format.

There is no charge to attend the course, which includes a poster session-dinner and beverage/snack breaks. Attendees must pay for other meals, travel expenses, and housing, which includes low-cost CMU dormitory rooms or reduced-rate hotel rooms at the Wyndham Pittsburgh University Center. Please use the CMU Directions page for information on traveling to the venue site.

Please see the Online Registration for details and to register (75 person capacity, registration closes Friday, May 15, 2015). Please direct any logistics questions to Toni Porterfield.

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June 8 - Causal Graphical Models

Morning
• Introduction (Overview of causal graphical models and causal discovery)
• Building Statistical Causal Models

Afternoon
• Estimation/Inference in Causal Models
• Hands-on Real-Data Examples

Welcome Reception followed by dinner on your own

June 9 - Search

Morning
• D-Separation
• Model Equivalence

Afternoon
• Model Search
• Hands-on Real-Data Examples

Break early for Poster Session with Dinner

June 10 - Biomedical Causal Discovery Overview

Morning
• Survey of Biomedical Research
  o fMRI (brain functional connectome)
  o Cancer genomic drivers
  o Lung disease pathways (susceptibility & progression)
  o Genetic regulatory network examples

Afternoon
• Data Issues
• Dimensionality Reduction
• Displaying/Reporting Results

June 11 - Biomedical Causal Discovery Case Studies

Morning
Breakout Sessions: Attendee’s Choice (pick one)
• fMRI (brain functional connectome)
• Cancer genomic drivers
• Lung disease pathways (susceptibility & progression)
• Genetic regulatory network examples

Afternoon
• Attendee Presentations (for those who volunteer to do so): data and research questions
• General Discussion and Q&A

We look forward to continuing the conversation after the Course concludes!