**Project Ideas**

Apply Machine Learning to estimate treatment effects:

* Unconfoundedness, selection on observables, conditional independence assumption
* Person specific gain from treatment
* Supervised machine learning, classifiers
* Previous application in medical research to find optimal treatment according to very flexible cut-offs in observable characteristics

Panel data on networks:

* identify which agents influence others through the network when the network is unobserved:
  + a panel provides information as to when correlations in the characteristics of two agents lead to correlation in outcomes and, provided there is enough sparsity in the system, one can sort through the potential links and identify which are present using LASSO approaches.
* Second stage equation which relates outcomes to neighbors’ outcomes as well as a first-stage equation that considers network formation
  + unobserved heterogeneity can make it so that certain agents are likely to interact and form a link.
  + the unobserved heterogeneity may directly influence outcomes, but by virtue of being unobserved, may bias the researcher’s estimate of a peer effect
* when a researcher has access to four periods of network data, by looking at how the network transitions, one can identify various parameters of network formation despite the unobserved heterogeneity