EVAN STORMS

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Department of Economics,
Stanford University
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EDUCATION

Ph.D. in Economics (expected), Stanford University, 2015-2021
B.A. in Economics/Mathematics, Stanford University, 2009-2013

DISSERTATION COMMITTEE

Prof. Matthew Jackson (primary)
Economics Department, Stanford University
(650) 723-3544
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Prof. Paul Milgrom
Economics Department, Stanford University
(650) 723-3397
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Prof. Gabriel Carroll
Economics Department, Stanford University
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RESEARCH AND TEACHING FIELDS

Primary: Microeconomic theory

Secondary: Networks, Econometrics

WORKING PAPERS

Modeling Statistically Robust Learners in High-Dimensional Environments

(**Job Market Paper**)
Economic models generally assume agents learn according to the classical Bayesian paradigm, or else view departures from that paradigm as the result of behavioral biases or cognitive limitations. Yet when researchers in economics and statistics are themselves learning how to model something -- in particular, when they are trying to learn potentially high-dimensional models -- their approach is increasingly guided by not by a Bayesian prior but the objective of statistically robust performance: guarantees that their learning rule will select an approximately best-performing model in some class no matter the true data-generating process. This paper develops a framework for modeling statistically robust learners. First, we formalize a general notion of statistical robustness that applies to learning from potentially indirect and heterogeneous sources of information, and then extend the classical Vapnik–Chervonenkis learnability results to this setting to give a sharp characterization of when robust learning is possible. Second, we show that robust learning is fundamentally different from Bayesian learning in complex learning problems with

misspecification by proving an upper bound on the robustness guarantees of Bayesian learning for any prior. Third, we apply these results to define statistically robust learning equilibrium in games, which replaces the best-fit condition of Berk-Nash equilibrium with optimal robust learning conditions. An application to an asset trading game illustrates that statistically robust equilibrium can provide more intuitively appealing predictions than modeling agents as misspecified Bayesian learners.

On the Probability of the Existence of Pairwise Stable Networks

Since its introduction in Jackson and Wolinsky (1996), pairwise stability has been the preponderant equilibrium notion for network formation games in both the theoretical and applied networks literatures. Yet pairwise stable networks do not exist in some network formation settings, and the known conditions which ensure existence with deterministic preferences are too restrictive to cover all but a highly specialized set of cases. In this paper, we analyze the probability of the existence of pairwise stable networks in network formation settings with random utilities. Our results show that, in a broad range of settings that includes many standard empirical specifications, pairwise stable networks exist with high probability in network formation settings with many agents.

Behavioral Communities and the Atomic Structure of Networks
(with Matt Jackson)

We develop a method of detecting the 'behavioral communities' of a social network based on how people act when they choose their behaviors in coordination with their friends' behaviors. There can be multiple different 'conventions' (equilibria) in which people in some parts of the network adopt a behavior while people in other parts of the network do not. We define atoms/communities to be groups of people who behave the same as each other in every convention. This provides a microfoundation for a method of detecting communities in social and economic networks. We characterize such behavioral communities in some random graphs as a function of how strongly the benefits of adopting the behavior depend on others' behaviors. We also discuss applications including: optimally seeding the diffusion of behaviors involving peer influence, detecting which demographics or nodal characteristics define a society's communities, estimating the strength of peer influence on behavior, as well as identifying missing network data by observing a series of conventions.

Myopica Equilibria in Network Formation via Expander Graphs

We study when myopic behavior constitutes an approximate equilibrium in a decentralized, cumulative offer trading network formation game. We show that when firms' preferences satisfy full substitutability, the formation game implements a stable outcome of the related cooperative game, and so an epsilon-Bayes Nash Equilibrium in myopic strategies exists if and only if there is a stable mechanism which is epsilon-Bayesian incentive compatible. A sufficient condition for the existence of an epsilon-Bayesian incentive compatible stable mechanism is that influence graphs, which track how manipulations propagate through the network, belong to the class of vertex-expander graphs.

TEACHI NG EXPERIENCE

2017- 2020	Teaching Assistant for Prof. Matt Jackson, Stanford University Econ 202, Core Microeconomics III
2018	Teaching Assistant for Prof. Ilya Segal, Stanford University Econ 181, Honors Game Theory
2017	Teaching Assistant for Professor Paul Milgrom, Stanford University Econ 136, Introduction to Market Design

RELEVANT POSITIONS

2015-16	Research Assistant for Prof. Matt Jackson Stanford University
2013-2014	Research Assistant (Pre-Doc) for Profs. Raj Chetty and Nathan Hendren, Harvard
2012-13	Research Assistant to Prof. Paul Milgrom, Stanford University

PROFESSIONA L ACTIVITI ES

Referee for *Econometrica*, *Quarterly Journal of Economics*, *Review of Economics Studies*

CODING LANGUAGES

Expert: Python, C++, Cuda, with focus on network modeling, machine learning, and graphical analysis
Proficient: Fortran, C#, Java, SAS, Stata, R
Tried once and swore never to use again: COBOL

CITIZENSHIP

United States