

ALEX PEYSAKHOVICH, PH.D.

New York, NY | alex.peys@gmail.com | <http://alexpeys.github.io>

Summary

I do basic and applied research in AI, data science, and behavioral economics. At Facebook I led or was a major contributor to projects including advanced experimentation systems, large scale embedding systems, personalization of Facebook News Feed, applications of deep learning, and bad actor detection. My research has been published in top journals/conferences (examples: *Nature*, *ICLR*, *WWW*). My popular writing has been published in the *New York Times* and *WIRED*. Way back in the day I was profiled in *Pacific Standard*.

Work Experience

FACEBOOK | ARTIFICIAL INTELLIGENCE RESEARCH (NEW YORK, NY) | 09/2016-CURRENT

Senior research scientist doing both basic and applied research in machine learning, reinforcement learning, algorithmic economics, and graph embeddings.

FACEBOOK | CORE DATA SCIENCE / NEWS FEED (MENLO PARK, CA) | 05/2014-09/2016

Research scientist working on applied research in experimentation, personalization, and surveys. Responsible for setting projects and goals as technical lead of News Feed data science team.

Applied Machine Learning / Data Science Projects

- **Led team** that built **advanced experimentation tools** for Facebook News Feed. These tools are used by engineers across the company to understand the impact of changes they make. Some of these tools required novel methods and were later published in a top computer science conference (*WWW*). Multiple shorter papers from our group on this topic were accepted to MIT's annual Conference for Digital Experimentation over the years, they are available upon request.
- Helped build tools to **interpret black box machine learning models**
- Major contributor to **large scale graph embedding system** that creates vector representations of users/pages/groups/domains using entire Facebook interaction graph (trillions of edges, billions of entities). The system is used across the company for personalization, data science, and site integrity tasks. A research paper describing this system is currently under peer review.
- Helped **integrate survey data into evaluation of News Feed** ranking as well as ad delivery. Among other applications, these surveys were used to evaluate changes to ranking algorithms at Facebook. Key parts of this project are described in the *New York Times* and *Slate*.
- Architected AI system for **detection of clickbait** on Facebook News Feed. The system is described in a public facing Facebook blog post. It remains deployed in production. This was a big change to Facebook that was covered by outlets including *The New York Times*, *Forbes*, and *The Wall Street Journal*.
- Built key systems to **apply computer vision and natural language processing to the evaluation of ad creative**
- I **enjoy mentoring** interns, junior scientists and engineers. My Facebook mentees that have gone on to do awesome things both in industry and academia (though I cannot claim credit for their successes).

Basic Research / Representative Publications

See my website or academic CV for full list of research papers/publications

- Advanced Experimentation – I have worked on using machine learning as a tool for improving experimentation in both industry and behavioral/social science.
 - Using methods from machine learning to evaluate behavioral models of choice under risk and ambiguity *Journal of Economic Behavior and Organizations* 2017 (with Jeff Naecker)
 - Learning causal effects from many randomized experiments using regularized instrumental variables *WWW* 2018 (with Dean Eckles)
- Reinforcement Learning & Game Theory – Some of my work focuses on using modern deep reinforcement learning to construct artificial agents that can cooperate, communicate, coordinate, and adapt to the norms of other agents (e.g. people).
 - Learning Existing Social Conventions in Markov Games *under review* (with Adam Lerer)
 - Prosocial learning agents solve generalized Stag Hunts better than selfish ones *AAMAS* 2018 (with Adam Lerer)
 - Multi-agent cooperation and the emergence of (natural) language *ICLR* 2017 (with Angeliki Lazaridou, Marco Baroni)
- Behavioral Economics – My older work focuses on basic science questions of understanding human cooperation and building mechanisms that can achieve more cooperative groups.
 - Cooperating with the Future *Nature* 2014 (with Oliver Hauser, David Rand, Martin Nowak)
 - Social heuristics shape intuitive cooperation *Nature Communications* 2014 (with David Rand, Gordon Kraft-Todd, George Newman, Owen Wurzbacher, Martin Nowak, Joshua Greene)
 - Habits of virtue: creating norms of cooperation and defection in the laboratory *Management Science* 2015 (with David Rand)

Skills & Programming Languages

- Machine learning, statistics, deep learning, economics, game theory, psychology, experimental design, econometrics, network analysis, data science, R, Python, PyTorch, SQL/HQL

Education

POST DOC | 04/2013-05/2014 | HARVARD UNIVERSITY

- Joint appointment between Program for Evolutionary Dynamics and Yale's Human Cooperation Lab
- PI: Prof. Martin Nowak and Prof. David Rand

PHD IN ECONOMICS | 09/2009-03/2013 | HARVARD UNIVERSITY

- Committee: Alvin E. Roth & Drew Fudenberg (co-advisers), David Laibson, Uma Karmarkar

BS | 05/2009 | NEW YORK UNIVERSITY

- Double Major in Math and Economics
- Undergraduate Adviser: Adam Brandenburger

Information about grants/awards/honors received, presentations given, patents held, classes taught, program committee membership, etc... available upon request.