

Panagiotis (Panos) Toulis

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code: <https://github.com/ptoulis>
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ACADEMICS **University of Chicago**, Booth School of Business, Chicago, IL, USA
Assistant Professor of Econometrics and Statistics (2016-present)
John E. Jeuck Faculty Fellow
Interests: Causality in networks; large-scale estimation.

EDUCATION **Harvard University**, Cambridge, MA, USA
M.S. in Statistics, May 2013; Ph.D. in Statistics, March 2016 (expected)
Advisors: Edoardo M. Airoldi, David C. Parkes, Donald B. Rubin
Topics: Causality in complex systems; scalable estimation with stochastic approximations.

Harvard University, Cambridge, MA, USA
M.S. in Computer Science, May 2011
Advisor: David C. Parkes

Aristotle University, Thessaloniki, Greece
B.S. in Electrical and Computer Engineering, November 2005
Thesis: Mertacor, A Successful Autonomous Trading Agent

HONORS AND AWARDS 2015 Winner of Economic Graph Challenge, LinkedIn Corp.
–*with Alexander Volfovsky and Edoardo Airoldi.*
url: <http://economicgraphchallenge.linkedin.com>

2015 Arthur P. Dempster Prize, Department of Statistics, Harvard University.
–*Awarded for “significant contributions to theoretical or foundational research in statistics”.*
url: http://www.stat.harvard.edu/Site_Content/Dempster_Award.pdf

2014 Teaching Excellence for STAT 221-Statistical Computing, Harvard University.
–*Awarded to teaching fellows who receive student evaluation scores > 4.5 out of 5.*
url: <http://bokcenter.harvard.edu/files/bokcenter/files/qdistnamef14.pdf>

2013 Ten Have Award (with Ed Kao), Atlantic Causal Inference Conference (*ACIC*, 2013).
–*Awarded “for exceptionally creative or skillful research on causal inference”.*
url: <http://tinyurl.com/ph6gzbk>

2012 Google Fellowship in Statistics, 2012 Google US/Canada PhD Fellowship Program.
–*Awarded annually to one graduate student in US/Canada “doing exceptional work in computer science, related disciplines, or promising research areas”.*
url: http://research.google.com/university/relations/fellowship_recipients_usca.html

2011 Commencement Marshall, Harvard University’s 360th Commencement, May 26, 2011.

2010 Hellenic Harvard Foundation Scholarship.

2006 Undergraduate Excellence, Greek Ministry of Education.

–*Awarded for the diploma thesis resulting in the 1st position in TAC international competition.*

2005 1st prize in Int'l Trading Agent Competition, (*IJCAI, 2005*), Edinburgh, Scotland.

–*TAC competition runs annually among leading teams in multiagent systems/AI research.*

TEACHING
EXPERIENCE

Harvard University, Cambridge, MA, USA

Class	Description	Instructor	Year
STAT 232	Topics in Missing Data	Donald B. Rubin	2014
STAT 221	Statistical Computing	Edoardo M. Airoldi	2014
STAT 171	Stochastic Processes	Natesh Pillai	2014
CS 186	Economics and Computation	David C. Parkes	2013
STAT 100	Statistics for Social Sciences	Luke Miratrix	2012
STAT 104	Quantitative Methods in Economics	Michael Parzen	2012
CS 181	Intelligent Machines: Perception, Learning & Uncertainty	David C. Parkes	2011
CS 182	Intelligent Agents: Reasoning, Actions & Plans	Radhika Nagpal	2010

WORKING PAPERS P Toulis, A Volfovsky, EM Airoldi, “Causal inference under treatment entanglement”

P Toulis, EM Airoldi, DB Rubin, “Causal inference under partially revealed interference”

P Toulis, EM Airoldi, “Implicit stochastic approximations” (2015; arxiv preprint: <http://arxiv.org/abs/1510.00967>)

D Tran, P Toulis, EM Airoldi, “Stochastic gradient descent methods for estimation with large data sets” (2015, minor revision accept; Journal of Statistical Software; arxiv preprint: <http://arxiv.org/abs/1509.06459>)

JOURNAL PAPERS P Toulis, EM Airoldi, “Asymptotic and finite-sample properties of estimators based on stochastic gradients”, *Annals of Statistics*, Volume 45, Number 4 (2017), 1694-1727.

P Toulis, “A useful pivotal quantity” (2017, *American Statistician*, forthcoming)

P Toulis, EM Airoldi, “Scalable estimation strategies based on stochastic approximations: Classical results and new insights”, *Statistics and Computing*, 2015.

P Toulis, DC Parkes, “Design and analysis of multi-hospital kidney exchanges using random graphs”, *Games and Economic Behavior* (GEB, 2014)

CONFERENCE PAPERS P Toulis, David Parkes, ”Long-term causal effects via behavioral game theory”, *Neural Information Processing Systems*, 2016, Barcelona, Spain, (NIPS’16)

P Toulis, Dustin Tran, Edoardo M. Airoldi, ”Towards stability and optimality in stochastic gradient descent”, *AI and Statistics*, 2016, Cadiz, Spain (AISTATS’ 16)

P Toulis, David Parkes, Elery Pfeffer, James Zou, "Incentive-compatible experimental design", Economics and Computation, 2015, Portland, Oregon (EC'15)

P Toulis, Jason Rennie, Edoardo Airoldi, "Statistical analysis of stochastic gradient methods for generalized linear models", International Conference of Machine Learning, 2014, Beijing, China (ICML' 14)

P Toulis, Edward Kao, "Estimation of Causal Peer Influence Effects", International Conference of Machine Learning, 2013, Atlanta, Georgia (ICML'13)

P Toulis, David Parkes, "A Random Graph Model of Kidney Exchanges: Efficiency, Individual-Rationality and Incentives", Economics and Computation, 2011, San Jose, California (EC'11)

Nikolaos Mavridis, Wajahat Kazmi, P Toulis, C. Ben-AbdelKader, "On the synergies between online social networking, Face Recognition, and Interactive Robotics", International Conference on Computational Aspects of Social Networks, 2009, Fontainebleau, France (CASoN'09)

P Toulis, Dionisis Kehagias, Pericles Mitkas, "Mertacor, a successful trading agent", Autonomous Agents and Multi-Agent Systems, 2006, Hakodate, Japan (AAMAS'06)

Dionisis Kehagias, P Toulis, Pericles Mitkas, "A Long-Term Profit Seeking Strategy for Continuous Double Auctions in a Trading Agent Competition", Fourth Hellenic Conference on Artificial Intelligence, 2006, Heraklion, Crete

INVITED TALKS

Mar. 2017, Toyota Technology Institute (TTI)
"Statistical inference with stochastic gradient descent"

Feb. 2017, Duke University
"Asymptotic and finite-sample properties of estimators based on stochastic gradients."

Jan. 2017, American Economic Association meeting (Chicago, USA)
Comment on paper by S. Athey et. al.

Dec. 2016, What-If Causality Workshop at NIPS 2016 (Barcelona, Spain)
"Long-term causal effects via behavioral game theory."

Nov. 2016, Athens University of Economics and Business
"Fundamental concepts in statistical causal inference"

May, 2016, Atlantic Causal Inference Conference (New York, USA)
"Computational and Methodological Challenges of Causal Inference in Networks."

June, 2015, Workshop on Algorithmic Game Theory and Data Science (EC'13)
"Long-term Causal Effects of Interventions in Multiagent Economic Mechanisms"

Oct. 2015, Conference on Digital Experimentation (CODE@MIT, 2015)
“Long-term causal effects in multiagent economies”

Oct. 2014, Conference on Digital Experimentation (Cambridge, USA)
“Incentive-compatible experimental design.”

Jun. 2014, International Conference in Machine Learning (Beijing, China)
“Statistical analysis of stochastic gradient methods for GLMs”

Aug. 2013, Machine Learning Seminar, Google Inc.
“Online prediction of user travel intent”

PROFESSIONAL
EXPERIENCE

Google Inc., Cambridge, MA, USA

Software Engineering Intern **May 2012-August 2012, May 2013-August 2013**

My goal was to improve online learning of flight search and booking demand in a large-scale Poisson regression model. My procedure, termed implicit stochastic gradient descent, resolved the stability issues of the procedure that was previously in place. The results of this project were disseminated through an Invention Disclosure Form within Google, and one research paper. In my second internship, I designed and developed an online learning algorithm to predict travel intent from recent web searches, which was later integrated into Google’s production system.

Obama for America, Chicago, IL, USA

Analytics team **October-November, 2012**

I worked with the Analytics team of Obama For America’12 during the last weeks of the elections. I designed and executed three large-scale experiments on targeted sharing of campaign material within Facebook app users. Specific questions were the effect of peer influence on link clickback and voter turnout, and the effect of interactions between Facebook users in the absence of complete information about the network.

Interactive Robotics and Media Laboratory (IRML), Abu Dhabi, UAE

Research Assistant **September 2008-August 2009**

I worked on utilizing social information and interactions to enhance intelligent systems. I was responsible to program the “Ibn Sina” humanoid robot with an array of machine learning modules: speech recognition/synthesis, gestures, face recognition/expressions, and automated conversations. In collaboration with Nikolaos Mavridis and Wajahat Kazmi, I investigated how social information can boost the performance of face recognition. We showed an increase in recognition accuracy that ranged, on average, from twofold to sixfold. Our project received funding from Microsoft External Research (\$50,000) and attracted worldwide media attention (BBC¹ and others).

CERTH, Singular Logic SA, VTrip Ltd, Thessaloniki, Greece

Software Engineer **June 2006- June 2008**

I worked on several software development projects for the private sector, and on integrated research projects funded by the European Union. These projects involved machine learning

¹<http://news.bbc.co.uk/2/hi/technology/8034190.stm>

models for dynamic pricing in large retailer shops, mobile applications for geo-location services, and programming of multiagent systems.

OTHER
INFORMATION

- Extensive Programming Experience: Perl, R, Python, Java, C/C++, C#, Javascript. Currently developing with R and Perl.
- R package: **sgd** (<https://cran.r-project.org/web/packages/sgd/index.html>)
- Languages: Greek (native), English (CPE from Cambridge University), French (Sorbonne II from University of Sorbonne)
- Citizenship: Greek. Current US visa status: H1B.