

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: *Causal inference in complex systems; networks; randomization tests; stochastic approximation/gradient methods*

EDUCATION **Harvard University**, Cambridge, MA, USA
Ph.D. in Statistics, 05/2016; M.S. in Statistics, 05/2013;
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, 05/2011
Advisor: *David C. Parkes*

Aristotle University, Thessaloniki, Greece
B.S. in Electrical and Computer Engineering, 2006
Thesis: *Mertacor, A Successful Autonomous Trading Agent*

WORKING PAPERS **Randomization tests in observational studies with time-varying adoption of treatment**
2018 (in preparation) — with A Shaikh (U Chicago, Economics).

Screening with tournaments
2018 (submitted) — with DC Parkes (Harvard, CS).

Propensity score methodology under network entanglement between treatments
2017 (submitted) — with A Volfovsky (Duke, Stat.), EM Airoldi (Temple U, Fox).

Causal inference under partially revealed interference
2018 (in preparation) — with EM Airoldi, DB Rubin.

A stable stochastic approximation method via implicit updates
2018 (submitted) — with T Horel (Harvard, CS), EM Airoldi.

Scalable estimation of large-scale dynamic discrete choice models
2018 (in preparation) — with L Junhyung, S Misra (Chicago, Booth).

Dynamical systems theory for causal inference with application to synthetic controls
2018 (submitted) — with D Yi (U Chicago, CS).

JOURNAL
PUBLICATIONS

Conditional randomization tests of causal effects with interference between units
Biometrika, 2018, *forthcoming* — with G Basse, A Feller.

Stochastic gradient methods for estimation with large datasets
Journal of Statistical Software, 2018, *forthcoming* — with D Tran, E Airoldi.

Asymptotic and finite-sample properties of estimators based on stochastic gradients
Annals of Statistics, 2017, Volume 45, Number 4, 1694-1727 — with EM Airoldi.

A useful pivotal quantity
American Statistician, 2017

Scalable estimation with stochastic approximations: Classical results and new insights
Statistics and Computing, 2015 — with EM Airoldi.

Design and analysis of multi-hospital kidney exchanges using random graphs
Games and Economic Behavior, 2015 — with DC Parkes.

CONFERENCE
PAPERS

Convergence diagnostics for stochastic gradient descent
AI and Statistics, 2018 (AISTATS'18, *oral*) — with J Chee.

Long-term causal effects via behavioral game theory
Neural Information Processing Systems, 2016 (NIPS'16) — with DC Parkes.

Towards stability and optimality in stochastic gradient descent
AI and Statistics, 2016 (AISTATS' 16) — with D Tran, EM Airoldi.

Incentive-compatible experimental design
Economics and Computation, 2015 (EC'15) — with DC Parkes, E Pfeffer, J Zou.

Statistical analysis of stochastic gradient methods for generalized linear models
Int'l Conference of Machine Learning, 2014 (ICML'14, *oral*) — with J Rennie, EM Airoldi.

Estimation of Causal Peer Influence Effects
International Conference of Machine Learning, 2013 (ICML'13, *oral*) — with E Kao.

A Random Graph Model of Kidney Exchanges
Economics and Computation, 2011 (EC'11, *oral*) — with DC Parkes.

Synergies between online social networking, face recognition, and interactive robotics
International Conference on Computational Aspects of Social Networks, 2009 (CASoN'09)
— with N Mavridis, W Kazmi, C Ben-AbdelKader.

Mertacor, a successful trading agent
Int'l Conference on Autonomous Agents and Multi-Agent Systems, 2006 (AAMAS'06) —
with D Kehagias, P Mitkas.

BOOK CHAPTERS

Stochastic gradient methods for principled estimation with large datasets
Handbook of Big Data, 2016 — with E Airoidi.

Friends with Faces: How Social Networks Enhance Face Recognition and Vice Versa
Computational Social Network Analysis, 2009 — with N Mavridis, W Kazmi.

INVITED TALKS

10/2018 *forthcoming*, Advances on Field Experiments

Randomization tests for causal inference with spillovers and interactions between units
<https://economics.uchicago.edu/content/advances-field-experiments-2018>

09/2018, Temple University, Data Science Seminar

Long-term Causal Effects via Behavioral Game Theory

08/2018, DIMACS/MOPTA

Statistical properties of stochastic gradient descent
<http://coral.ie.lehigh.edu/~mopta/program>

07/2018, Joint Statistical Meetings (JSM'18)

Exact Conditional Randomization Tests for Causal Effects Under Interference

<https://ww2.amstat.org/meetings/jsm/2018/onlineprogram/AbstractDetails.cfm?abstractid=326538>

05/2018, Atlantic Causal Inference Conference (ACIC'18)

Randomization tests under interference with conditioning mechanisms
<https://www.cmu.edu/acic2018/schedule/index.html>

11/2017, Department of Statistics and Data Sciences (UT, Austin)

Randomization tests for causal inference with interference via conditioning mechanisms

11/2017, IBM Thomas J. Watson Research Center

Convergence diagnostics for stochastic gradient descent with constant step size

07/2017, Political Methodology Conference (PolMeth, 2017, *with discussion*)

Exact tests for causal effects in two-stage randomization in the presence of interference
<https://polmeth.polisci.wisc.edu/program.php>

05/2017, Working Group in Econometrics (U Chicago, Economics)

Exact tests for causal effects in two-stage randomization in the presence of interference

04/2017, ForecastNY conference (Microsoft Tech Center, NY, USA)

Implicit methods in stochastic gradient descent for robust estimation with massive data

03/2017, Toyota Technology Institute (TTI)

Statistical inference with stochastic gradient descent

02/2017, Duke University

Asymptotic and finite-sample properties of estimators based on stochastic gradients

01/2017, American Economic Association meeting (Chicago, USA)

Comment on paper by S. Athey et. al.

12/2016, What-If Causality Workshop at NIPS 2016 (Barcelona, Spain)

Long-term causal effects via behavioral game theory

<https://sites.google.com/site/whatif2016nips/schedule>

11/2016, Athens University of Economics and Business

Fundamental concepts in statistical causal inference

05/2016, Atlantic Causal Inference Conference (ACIC'16)

Computational and Methodological Challenges of Causal Inference in Networks

06/2015, Workshop on Algorithmic Game Theory and Data Science (EC'13)

Long-term Causal Effects of Interventions in Multiagent Economic Mechanisms

<https://sites.google.com/site/agtanddatascienceworkshop2015/schedule>

10/2015, Conference on Digital Experimentation (CODE@MIT, 2015)

Long-term causal effects in multiagent economies

10/2014, Conference on Digital Experimentation (Cambridge, USA)

Incentive-compatible experimental design

06/2014, International Conference in Machine Learning (ICML'14)

Statistical analysis of stochastic gradient methods for generalized linear models

06/2013, International Conference in Machine Learning (ICML'13)

Causal inference of peer influence effects

08/2013, Machine Learning Seminar, Google Inc.

Online prediction of user travel intent

ORGANIZATION

7th Causal Inference Workshop, 2018

International Conference on Uncertainty in Artificial Intelligence (UAI'18, Monterey, California) — with A Volfovsky, B Chen (IBM).

<https://sites.google.com/view/causaluai2018/home>

Workshop on Network Causal Inference and Design of Experiments, 2018

Satellite workshop of Int'l Conference on Network Science, 2018 (NetSci 2018, Paris, France) — with A Volfovsky, D Sussman (BU), E Ogburn (John Hopkins).

<https://sites.google.com/view/causal-netsci2018/home>

Workshop on Causal Inference and Machine Learning, 2017

Neural Information and Processing Systems, 2017 (NIPS'17, Long Beach, CA) — with A Volfovsky, A Swaminathan (Microsoft), N Kallus (Cornell), R Silva (UCL), J Shawe-Taylor (UCL), T Joachims (Cornell), L Li (Microsoft).

<https://sites.google.com/view/causalnips2017>

Workshop on Networks in the Social and Information Sciences, 2015

Neural Information and Processing Systems, 2015 (NIPS'15, Montreal, Canada) — with E Airoldi, D Choi (CMU), A Clauset (U Colorado), J Ugander (Stanford).

<https://nips.cc/Conferences/2015/Schedule?showEvent=4929>

PRIOR WORK
EXPERIENCE

Software Engineering Intern – Google Inc., Cambridge, USA, 05-08/2012, and 05-08/2013
Analyst – Obama for America, Chicago, USA, 10-11/2012
Research assistant – Interactive Robotics and Media Laboratory, Abu Dhabi, UAE, 2009
Software engineer – CERTH, VTrip Ltd, Thessaloniki, Greece, 2006-2009

HONORS AND
AWARDS

2017 **John E. Jeuck Faculty Fellow**
— *University of Chicago, Booth School of Business*

2015 **Winner of Economic Graph Challenge, LinkedIn Corp**
— *with Alexander Volfovsky and Edoardo Airoidi*
<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”.*
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.*
<http://bokcenter.harvard.edu/files/bokcenter/files/qdistnamef14.pdf>

2013 **Ten Have Award (with Ed Kao), Atlantic Causal Inference Conference**
— *Awarded “for exceptionally creative or skillful research on causal inference”.*
<http://bit.ly/2omxn30>

2012 **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”.*
http://research.google.com/university/relations/fellowship_recipients_usca.html

2011 **Commencement Marshall, Harvard University’s 360th Commencement**

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.*

OTHER
INFORMATION

- Extensive Programming Experience: Perl, R, Python, Java, C/C++, C#, Javascript.
- 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. US immigration status: green card.