

RYAN ROGERS

Webpage: <http://www.math.upenn.edu/~ryrogers/>

RESEARCH INTERESTS

Differential Privacy, Machine Learning, Statistics, Adaptive Data Analysis, Algorithmic Game Theory.

SKILLS

Python, TensorFlow, R, Spark, Java (some familiarity).

EDUCATION

University of Pennsylvania

Ph.D. in Applied Mathematics and Computational Science

Philadelphia, PA

August 2012 - May 2017

- Advisors: Michael Kearns and Aaron Roth.
- Dissertation: *Leveraging Privacy in Data Analysis*.
- Committee: Rakesh Vohra (chair), Salil Vadhan (external), Michael Kearns, Aaron Roth.
- G.P.A. 3.98/4.0

University of Cambridge - Clare Hall

Part III - Masters of Advanced Study in Applied Mathematics

Cambridge, UK

October 2010 - July 2011

- Advisor: Richard Weber.
- Thesis: *Algorithmic Game Theory*.
- Graduated with Distinction (top grade).

Stetson University

B.S. in Mathematics and B.A. in Religious Studies

DeLand, FL

August 2005 - May 2009

- Advisor: Thomas Vogel.
- Thesis: *Using Hamilton's Principle to Approximate Soliton Solutions to Nonlinear PDEs*.
- G.P.A. 3.93 / 4.0.

University of Oxford - Magdalen College

Study Abroad - Visiting Student

Oxford, UK

October 2007 - December 2007

- G.P.A. 4.0/4.0.

WORK EXPERIENCE

LinkedIn

Senior Software Engineer in Data Science Applied Research

Sunnyvale, CA

February 2019 - Present

- Tech lead for differential privacy

Simons Institute for the Theory of Computing

Visiting Scholar

UC Berkeley, CA

February 2019 - May 2019

- Invited participant to the workshop on Data Privacy: From Foundations to Applications.

Apple

Senior Research Engineer with the ML Privacy/Differential Privacy Team April 2017 - February 2019

Cupertino, CA

- Communicated differential privacy and privacy preserving technologies to various teams at Apple.
- Collaborated with academia to design practical, privacy preserving machine learning algorithms.
- Coauthor on the blog post *Learning with Privacy at Scale* on the Apple Machine Learning Journal: <https://machinelearning.apple.com/2017/12/06/learning-with-privacy-at-scale.html>.
- Tech lead on the private federated learning project, which incorporates local and central differential privacy with federated learning for distributed machine learning, resulting in this publication (see below): *Protection Against Reconstruction and Its Applications in Private Federated Learning*.

- Private federated learning project announced during WWDC 2019 “Designing for Privacy” session 708: <https://developer.apple.com/videos/play/wwdc2019/708>
- Use cases announced using private federated learning: QuickType Keyboard and Vocal Classifier for personalized *Hey Siri*.

Microsoft Research
Research Intern

New York, NY
Summer 2016

- Collaborated with Miro Dudik, Jenn Wortman Vaughan and Sébastien Lahaie on prediction markets.
- Research resulted in a publication at ICML’17.

Harvard University - Privacy Tools Project
Research Assistant - worked with Prof. Salil Vadhan

Cambridge, MA
Summer 2015, 2016

- Mentored interns to conduct private statistical hypothesis tests on medical data.
- Implemented a new private statistical test based on the Chi-Squared test for independence.
- Created new tools in R for privately releasing contingency tables from sensitive datasets.

Milliman - Denver Health
Actuary Intern

Denver, CO
May 2012 - August 2012

- Managed large data files using SAS and Excel macros to conduct statistical analysis.
- Presented a regression technique to fill missing entries in medical databases.

United Space Alliance (USA)
Computer Scientist for the Space Station Training Facility (SSTF)

Johnson Space Center, TX
December 2009 - October 2010

- Worked onsite at NASA’s Johnson Space Center.
- Tested and corrected the thermal model of the onboard computer system for the SSTF.
- Analyzed and validated NASA anomaly reports that were reported to USA.
- Developed software that facilitated program checks for SSTF testing sessions.

NASA
USRP Intern

Kennedy Space Center, FL
May 2007 - August 2007

- Constructed a white light Michelson Interferometer to measure small defects in the Shuttle’s windows.
- Compiled a deliverable for USRP focusing on the White Light Interferometer.

PUBLICATIONS (AUTHOR NAMES IN ALPHABETICAL ORDER)

- D. Durfee and R. Rogers. *Practical Differentially Private Top-k Selection with Pay-what-you-get Composition*. To appear as a Spotlight presentation at NeurIPS 2019. .
- R. Rogers, A. Roth, A. Smith, N. Srebro, O. Thakkar, B. Woodworth. *Guaranteed Validity for Empirical Approaches to Adaptive Data Analysis*. In submission.
- J. Duchi and R. Rogers. *Lower Bounds for Locally Private Estimation via Communication Complexity*. COLT 2019.
- A. Bhowmick, J. Duchi, J. Freudiger, G. Kapoor, R. Rogers. *Protection Against Reconstruction and Its Applications in Private Federated Learning*. <https://arxiv.org/abs/1812.00984>. In submission.
- M. Gaboardi, R. Rogers, and O. Sheffet. *Locally Private Mean Estimation: Z-test and Tight Confidence Intervals*. AISTATS 2019.
- M. Gaboardi and R. Rogers. *Local Private Hypothesis Testing: Chi-Square Tests*. ICML 2018.
- M. Dudik, S. Lahaie, R. Rogers, J. W. Vaughan. *A Decomposition of Forecast Error in Prediction Markets*. NIPS 2017.
- D. Kifer and R. Rogers. *A New Class of Private Chi-Square Tests*. AISTATS 2017.

- R. Rogers. *Leveraging Privacy in Data Analysis*. Ph.D. Dissertation 2017.
- R. Rogers, A. Roth, J. Ullman, S. Vadhan. *Privacy Odometers and Filters: Pay-as-you-Go Composition*. To appear in NIPS 2016.
- R. Rogers, A. Roth, A. Smith, O. Thakkar. *Max-Information, Differential Privacy, and Post-Selection Hypothesis Testing*. To appear in FOCS 2016.
- M. Gaboardi, H. Lim, R. Rogers, S. Vadhan. *Differentially Private Chi-Squared Hypothesis Testing*. ICML 2016.
- J. Morgenstern, J. Hsu, R. Rogers, A. Roth, R. Vohra. *Do Prices Coordinate Markets?* STOC 2016.
- S. Jabbari, R. Rogers, A. Roth, and Z. S. Wu. *Learning from Rational Behavior: Predicting Solutions to Unknown Linear Programs*. NIPS 2016.
- R. Rogers, A. Roth, J. Ullman, and Z. S. Wu. *Inducing Approximately Optimal Flow using Truthful Mediators*. EC 2015.
- S. Kannan, J. Morgenstern, R. Rogers, and A. Roth. *Private Pareto Optimal Exchange*. EC 2015.
- R. Rogers and A. Roth. *Asymptotically Truthful Equilibrium Selection in Large Congestion Games*. EC 2014.
- R. Rogers and T. Vogel. *Identification of Localized Structure in a Nonlinear Damped Harmonic Oscillator using Hamilton's Principle*. *Involve - A Journal of Mathematics*, 2010.

TEACHING EXPERIENCE

- University of Pennsylvania - Teacher's Assistant *Fall 2013 - Fall 2014*
 TA for Differential Equations - Linear Algebra, Advanced Calculus II, and Networked Life.
- University of Colorado at Boulder - Teacher's Assistant *Fall 2012 - Spring 2013*
 TA for Calculus II and Multivariable Calculus.

AWARDS AND HONORS

- Best Poster Award sponsored by HP Labs at SIAM CSE 2015 conference *2015*
- Benjamin Franklin Doctoral Fellowship - University of Pennsylvania *2012-2014*
- Gene W. Medlin Award for outstanding senior research in Mathematics - Stetson *2009*
- Presented at the Mathematical Association of America (MAA) Conference in Fort Myers, FL *2009*
- Florida Bright Futures Scholarship *2005-2009*

SERVICE AND LEADERSHIP

- Reviewer for *Annals of Statistics*, *Transactions on Information Forensics and Security*, *Journal of the Royal Statistical Society*, *Transactions on Economics and Computation*, *Transactions on Emerging Telecommunication Technologies*, VLDB, JMLR, NIPS2016, WINE2016, SODA2017, FOCS2017, ACSAC2017, SODA2018, ICML2019, ICALP2019, KDD2019, UAI2019, NeurIPS2019, PC for AAAI2020.
- Panelist on Differential Privacy Deployment for CS208** Cambridge, MA
Harvard University *April 2019*
- Invited to share my experience with deploying differential privacy in practice to the Applied Privacy for Data Science course.

President and Co-Founder of SIAM Student Chapter
University of Pennsylvania

Philadelphia, PA
2013-2016

- Secured grant for the student chapter from SIAM and created the SIAM Student Conference at Penn.

Sports Officer - Graduate Student Body
University of Cambridge

Cambridge, UK
2010-2011

- Allocated sport funds to different college teams and published a sports report in the college bulletin.

Rowing

2007-2016

- Coach for Wharton Crew from 2014-2016.
- Rowed competitively with Oxford, Stetson, Cambridge, Wharton Crew, and Fairmount Rowing Assoc.

GRADUATE COURSEWORK

Numerical Solutions of Differential Equations, Operations Research, Stochastic Networks, Biostatistics, Applied Bayesian Statistics, Quantum Computation, Numerical Analysis, Time Series, Applied Analysis, Functional Analysis, Complex Analysis, Probability, Stochastic Processes, Algebra, Representation Theory and Numerical Linear Algebra, No-Regret Algorithms, Discrete Convexity and Submodularity, Algorithms, Computational Complexity Theory, Bayesian Analysis.