

# RYAN ROGERS

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## RESEARCH INTERESTS

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

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## SKILLS

Python, TensorFlow, R, Spark, Matlab, Mathematica, Excel.

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## EDUCATION

### University of Pennsylvania

*Ph.D. in Applied Mathematics and Computational Science*

Philadelphia, PA

*August 2012 - May 2017*

- Advisors: Michael Kearns, 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.

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## WORK EXPERIENCE

### Apple

*Senior Research Engineer with the ML Privacy/Differential Privacy Team*

Cupertino, CA

*April 2017 - Present*

- Contributor on the machine learning blog post here <https://machinelearning.apple.com> entitled *Learning with Privacy at Scale*.
- Communicated differential privacy and privacy preserving technologies to various teams.
- Collaborated with academia to design practical, privacy preserving machine learning algorithms.

### 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)**

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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*. To appear in AISTATS 2019.

M. Kearns, M. Pai, R. Rogers, A. Roth, J. Ullman. *Robust Mediators in Large Games*. In submission.

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

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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

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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*

## LEADERSHIP/SERVICE

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**President and Co-Founder of SIAM Student Chapter** Philadelphia, PA  
*University of Pennsylvania* *2013-2016*

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

**Sports Officer - Graduate Student Body** Cambridge, UK  
*University of Cambridge* *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

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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.