

# Ziv Scully

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## *Education*

**Carnegie Mellon University**, *PhD, Computer Science* Pittsburgh, PA, 2016–present

THESIS ADVISORS: Mor Harchol-Balter and Guy Blelloch.

Research in queueing theory, resource allocation, and scheduling. Received NSF Graduate Research Fellowship and ARCS Foundation scholarship.

SELECTED COURSES: advanced stochastic processes, advanced algorithms, computer architecture, types and programming languages.

**Massachusetts Institute of Technology**, *BS, Math with Computer Science* Cambridge, MA, 2012–2016

SELECTED MATH COURSES: abstract algebra, real analysis, point-set topology, algebraic topology, logic and set theory, combinatorial optimization, algebraic combinatorics, theory of computation.

SELECTED COMPUTER SCIENCE COURSES: algorithm design, program analysis, large-scale symbolic systems, constructive computer architecture, microcomputer project lab, randomized algorithms, computational classical mechanics.

**Brookline High School** Brookline, MA, 2008–2012

Siemens Competition Regional Semifinalist, Intel Science Talent Search Semifinalist, National Merit Scholarship Finalist.

## *Research Experience*

**Carnegie Mellon University**, *Graduate Research Assistant* Pittsburgh, PA, 2016–Present

ADVISORS: Mor Harchol-Balter and Guy Blelloch.

Research in queueing theory, resource allocation, and scheduling. Interests include scheduling algorithms for complex jobs with multiple tasks and performance analysis of complex scheduling policies.

**Harvard Medical School**, *Research Intern* Boston, MA, Summer 2016

ADVISOR: Walter Fontana.

Researched dynamic connectivity algorithms for KaSim, a simulator for protein interaction networks.

**MIT CSAIL**, *Undergraduate Researcher* Cambridge, MA, 2014–2016

ADVISOR: Adam Chlipala.

Worked on Ur/Web, a pure functional programming language for web applications. Built a compiler optimization that automatically finds opportunities for caching SQL-query-backed output and implements both caching and corresponding cache invalidation.

**MIT PRIMES**, *Math Research Student* Cambridge, MA, 2011–2012

Researched a discrete nonlinear dynamical system (2011) and matrix determinant algorithms for computer algebra (2012) in MIT PRIMES, a program to introduce high school students to math and science research.

## *Teaching Experience*

**Carnegie Mellon University**, *Teaching Assistant* Pittsburgh, PA, Fall 2016

Led recitations and designed new course material for CMU 15-857, Analytical Performance Modeling.

**MIT Educational Studies Program, AP Physics C Teacher** Cambridge, MA, 2014–2015  
Together with a coteacher, taught weekly classes to local high school students in preparation for the Physics C Advanced Placement exam.

## *Industry Experience*

**Intentional Software Corporation, Software Developer Intern** Bellevue, WA, Summer 2015  
Became proficient with Intentional’s unique application platform and wrote product code using it, both individually and as part of a six-person team.

**Bridgewater Associates, Technology Associate Intern** Westport, CT, Summer 2014  
Completed a project in the trading department on a team with two other interns. Gained experience with machine learning and Hadoop.

**TripAdvisor, Software Engineering Intern** Newton, MA, Summer 2013  
Built customer-facing web pages, developed internal tools for customer service, and fixed a myriad of bugs as part of the Vacation Rentals team.

## **Programming Language Skills**

PROFICIENT: Haskell, Standard ML, C, Java, C#, Python, Ur/Web.

FAMILIAR: MIT Scheme, OCaml, JavaScript, 8051 assembly, Bluespec SystemVerilog, and others.

## *Awards*

<b>INFORMS Applied Probability Society Student Paper Award, Finalist</b>	November 2018
<b>National Science Foundation Graduate Fellowship Program, Awardee</b>	2016–2019
<b>ARCS Foundation Scholarship, Recipient</b>	2016–2019
<b>PLDI 2016 Student Research Competition, Third Place</b>	June 2016
<b>Intel Science Talent Search, Semifinalist</b>	January 2012
<b>Siemens Competition, Regional Semifinalist</b>	October 2011

## *Publications*

### **Optimal Scheduling and Exact Response Time Analysis for Multistage Jobs**

Z. Scully, M. Harchol-Balter, and A. Scheller-Wolf (2018).

arXiv:1805.06865 [cs.PF]. In submission.

### **SRPT for Multiserver Systems**

I. Groszof, Z. Scully, and M. Harchol-Balter (2018).

In *Proceedings of the 35th International Symposium on Computer Performance, Modeling, Measurements and Evaluation* (PERFORMANCE 2018). December 2018, Toulouse, France.

SHORT VERSION: In *Proceedings of the ACM Workshop on Mathematical Performance Modeling and Analysis* (MAMA 2018). June 2018, Irvine, CA, USA.

### **SOAP Bubbles: Robust Scheduling under Adversarial Noise**

Z. Scully, M. Harchol-Balter (2018).

In *Proceedings of the 56th Allerton Conference on Communications, Control and Computing* (Allerton Conference 2018). October 2018, Monticello, IL, USA.

### **SOAP: One Clean Analysis of All Age-Based Scheduling Policies**

Z. Scully, M. Harchol-Balter, and A. Scheller-Wolf (2018).

*Proceedings of the ACM on Measurement and Analysis of Computing Systems*, 2(1), 16.

SHORT VERSION: *Abstracts of the 2018 ACM International Conference on Measurement and Modeling of Computer Systems* (SIGMETRICS 2018). June 2018, Irvine, CA, USA.

### **Optimally Scheduling Jobs with Multiple Tasks**

Z. Scully, G. Blelloch, M. Harchol-Balter, and A. Scheller-Wolf (2017).

In *Proceedings of the ACM Workshop on Mathematical Performance Modeling and Analysis* (MAMA 2017).

June 2017, Urbana, IL, USA.

### **A Program Optimization for Automatic Database Result Caching**

Z. Scully and A. Chlipala (2017).

In *Proceedings of the 44th ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages* (POPL 2017). January 2017, Paris, France.

### **Motors and Impossible Firing Patterns in the Parallel Chip-Firing Game**

T.-Y. Jiang, Z. Scully, and Y. X. Zhang (2015).

*SIAM Journal on Discrete Mathematics*, 29(1), pp. 615–630.

SHORT VERSION: *DMTCS Proceedings*, vol. AT, pp. 537–548.

### **Efficient Calculation of Determinants of Symbolic Matrices with Many Variables**

T. Khovanova and Z. Scully (2013).

arXiv:1304.4691 [cs.SC].

## *Presentations and Posters*

<b>Young European Queueing Theorists 2018</b> , <i>Invited talk</i>	<i>December 2018</i>
<b>2018 INFORMS Annual Meeting</b> , <i>Two invited talks</i>	<i>November 2018</i>
<b>SIGMETRICS 2018</b> , <i>Paper, talk, and poster</i>	<i>June 2018</i>
<b>IMACCS 2018</b> , <i>Poster</i>	<i>June 2018</i>
<b>2017 INFORMS Annual Meeting</b> , <i>Invited talk</i>	<i>October 2017</i>
<b>2017 INFORMS APS Conference</b> , <i>Invited talk</i>	<i>July 2017</i>
<b>MAMA 2017</b> , <i>Extended abstract and talk</i>	<i>June 2017</i>
<b>POPL 2017</b> , <i>Paper and talk</i>	<i>January 2017</i>
<b>PLDI 2016 Student Research Competition</b> , <i>Talk and poster</i>	<i>June 2016</i>
<b>2012 MIT PRIMES Conference</b> , <i>Talk</i>	<i>May 2012</i>
<b>2012 MAA Undergraduate Student Poster Session</b> , <i>Poster</i>	<i>January 2012</i>
<b>2011 MIT PRIMES Conference</b> , <i>Talk</i>	<i>May 2011</i>

## *Invited Visits*

<b>University of Amsterdam</b> Host: Jan-Pieter Dorsman.	Amsterdam, The Netherlands, <i>December 2018</i>
<b>Eindhoven University of Technology</b> Host: Onno Boxma.	Eindhoven, The Netherlands, <i>December 2018</i>
<b>California Institute of Technology</b> Host: Adam Wierman.	Pasadena, CA, <i>June 2018</i>

## *Other Activities*

**MIT Educational Studies Program**, *Program Director, Teacher* Cambridge, MA, 2012–present

Codirected two educational programs for middle- and high-school students, Spring HSSP 2013 and ProveIt 2013–2014, and taught numerous classes to middle- and high-school students on a variety of math and programming topics (including aforementioned employment teaching AP Physics C).

**MIT Asymptones**, *President, Singer, Arranger* Cambridge, MA, 2012–2016

Sang bass and arranged music for the Asymptones a cappella group. Served as group president in 2015.

**MIT Alpha Epsilon Pi Philanthropy**, *Logistics Lead, Committee Member* Cambridge, MA, 2013–2014

Designed and ran AEPI's 2014 philanthropy campaign, which raised \$30,000 for Save a Child's Heart.