

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

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

Publications

Load Balancing Guardrails: Keeping Your Heavy Traffic on the Road to Low Response Times

I. Grosz, Z. Scully, and M. Harchol-Balter (2019).

Proceedings of the ACM on Measurement and Analysis of Computing Systems, 3(2), 42.

SHORT VERSION: *Abstracts of the 2019 ACM International Conference on Measurement and Modeling of Computer Systems* (SIGMETRICS 2019). June 2019, Phoenix, AZ, USA.

The Markovian Price of Information

A. Gupta, H. Jiang, Z. Scully, and S. Singla (2019). In *International Conference on Integer Programming and Combinatorial Optimization* (IPCO 2019). May 2019, Ann Arbor, MI, USA.

SRPT for Multiserver Systems

I. Grosz, 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.

AWARD: PERFORMANCE 2018 Best Student Paper.

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

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.

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.
AWARD: INFORMS Applied Probability Society Best Student Paper Prize Finalist.
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. Bletloch, 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

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

Invited Visits

University of Amsterdam

Host: Jan-Pieter Dorsman.

Amsterdam, The Netherlands, *December 2018*

Eindhoven University of Technology

Host: Onno Boxma.

Eindhoven, The Netherlands, *December 2018*

California Institute of Technology

Host: Adam Wierman.

Pasadena, CA, *June 2018*

Other Activities

MIT Educational Studies Program, Program Director, Teacher

Cambridge, MA, *2012–2017*

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.