

Eric P. Astor

Contact

Department of Mathematics

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Citizenship

U.S.A.

Research Interests

Mathematical Logic, Computability/Recursion Theory, Reverse Mathematics

Education

2015: Ph.D. in Mathematical Logic, University of Chicago.

Advisors: Robert I. Soare and Denis R. Hirschfeldt.

Thesis: Asymptotic Density and Effective Negligibility.

2011: M.S. in Mathematics, University of Chicago.

2009: B.A. with High Honors in Mathematics and Physics, Swarthmore College.

Professional Appointments

2015-2018: Assistant Research Professor, University of Connecticut.

Publications

In preparation:

Eric P. Astor, Denis R. Hirschfeldt, and Carl G. Jockusch, Jr.

Dense computability, upper cones, and minimal pairs.

Eric P. Astor, L. Bienvenu, D. Dzhabarov, L. Patey, P. Shafer, R. Solomon, and L.B. Westrick.

The weakness of typicality.

In press:

Eric P. Astor. The computational content of intrinsic density.

The Journal of Symbolic Logic, to appear.

arXiv preprint: [arXiv:1708.04267](https://arxiv.org/abs/1708.04267)

Published:

2017: Eric P. Astor, Damir D. Dzhabarov, Reed Solomon, and Jacob Suggs.

The uniform content of partial and linear orders.

Annals of Pure and Applied Logic, 168(6), pp. 1153–1171.

arXiv preprint: [arXiv:1605.06164](https://arxiv.org/abs/1605.06164)

2015: Eric P. Astor. Asymptotic density, immunity, and randomness.

Computability, 4(2), pp. 141–158.

arXiv preprint: [arXiv:1405.0022](https://arxiv.org/abs/1405.0022)

Invited or Selected Talks

2017: Divisions in the reverse math zoo, and the weakness of typicality, [interdisciplinary]
Symposia on the Foundations of Mathematics 4, LMU Munich, Oct. 10th.

2017: Robust computation modulo “small” sets,

South Eastern Logic Symposium (SEALS) 2017, University of Florida, Mar. 4th.

2016: Letting the natural numbers vote (or, upper cones for asymptotic computation),
Midwest Computability Seminar XVIII, University of Chicago, Oct. 23rd.

- 2016: The uniform content of ADS,
Computability Theory Session, ASL North American Annual Meeting, May 25th.
- 2016: Density and Computability,
New England Recursion and Definability Seminar 9.0, Apr. 2nd.
- 2015: Intrinsic density and computability, [interdisciplinary]
CUNY Logic Workshop, New York, Nov. 6th.
- 2015: "Almost Everywhere" in the Natural Numbers: Intrinsic Density and Effective
Negligibility, Workshop on Computability Theory, Bucharest, June 28th.
- 2014: Asymptotic Density, Immunity, and Randomness,
Computability Theory Session, CMS Winter Meeting in Hamilton, Ontario, Dec. 7th.
- 2014: Intrinsic Density and Effective Negligibility,
Computability Seminar, University of Notre Dame, Nov. 11th.
- 2014: Asymptotic Density, Immunity, and Randomness,
Midwest Computability Seminar XV, University of Chicago, Sept. 30th.

Notable Contributed and Internal Talks

- 2016: Density, Intrinsic Density, and "Usually Solvable" Problems, [interdisciplinary]
Logic Colloquium, University of Connecticut, Feb. 26th.
- 2012: A Computability-Theoretic Perspective on Asymptotic Density, and Vice-Versa,
Logic Seminar, University of Chicago, June 2012.
- 2010: The Tower of Hanoi – ASAP (As *Slow* As Possible),
Graduate Student Seminar, University of Chicago, April 2010.

Academic Service

- 2016-present: Maintainer, RM Zoo (<http://rmzoo.math.uconn.edu>)
- 2010-2011: Student Health Advisory Board, University of Chicago.

Technical Experience

- 2016-present: Lead Developer, RM Zoo open-source project.
Maintainer of an expert system for reverse mathematics, under the MIT license.
Re-architected the system for better portability, maintainability, and performance.
Implemented a new inference engine with increased reasoning capability & extensibility.
Compiled an authoritative bibliography for the field, as a revised knowledge base.
- 2010-2014: Developer, Anathema open-source project.
Organized the revival of an abandoned project built to enterprise standards in Java,
a specialized data-management system (in MVC architecture) enforcing business rules.
Improved readability & extensibility of the code base.
Designed & implemented a new reporting interface.
- 2006: Developer, One Laptop per Child (Google Summer of Code).
Designed & implemented, in Python & Cython, a distributed system to determine the most
central articles on Wikipedia, using a graph-theoretic measure of network centrality.
Collaborated on the design and reference parser for CrossMark, a document markup
standard intended for use on low-power machines with little storage capacity, using ANTLR.
- 2005: Developer, EnterpriseDB Corporation.
Applied & optimized static code analysis tools (Coverity Prevent) to identify bugs in
PostgreSQL; contributed patches, in C, for all relevant bugs to the open-source project.
- 2004: Intern Programmer, Fusion Technologies, Inc.
Directed small team of interns in design & implementation of a JSP/Servlet-based
authenticated internal invoicing system, integrating with Active Directory and Unanet.

Programming Languages

Python, Java, C#, C/C++, ANTLR, SQL, Mathematica, MATLAB.

Teaching Experience

2015-2018: University of Connecticut, Assistant Research Professor.

Honors Calculus 1-2 (Fall 2015 – Spring 2016, and Fall 2016).

Transition to Advanced Mathematics [introduction to proofs] (Fall 2016 – Fall 2017).

Combinatorics (Spring 2016).

Introduction to Mathematical Logic (Spring 2017).

Computability Theory [graduate course] (Fall 2017).

2011-2015: University of Chicago, Lecturer.

Honors Calculus 1-3 [axiomatic development of calculus] (Fall 2014 – Spring 2015)

Co-taught with Sarah Ziesler, in an Inquiry-Based Learning (IBL) framework.

Studies in Mathematics 1 [number-theory-based survey] (Fall 2012, Fall 2013).

Studies in Mathematics 2 [geometry-based survey] (Winter 2014).

Elementary Functions and Calculus 1-2 [calculus and precalculus] (Winter-Spring 2013).

Calculus 1-3 (Fall 2011 – Winter 2012).

Summers 2010 & 2011: University of Chicago, REU mentor.

Topics: Computability theory, reverse mathematics, model theory.

2010-2011: University of Chicago, College Fellow [TA, with some lectures].

Algebraic Number Theory (Spring 2011).

Mathematical Logic I (Fall 2010).

Point-Set Topology (Winter 2011).

Professional Memberships

American Mathematical Society, Association for Symbolic Logic, Sigma Xi.