

Eric P. Astor

Contact

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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.

Academic Appointments

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

Publications

In preparation:

Eric P. Astor, L. Bienvenu, D. Dzhafarov, L. Patey, P. Shafer, R. Solomon, and L.B. Westrick.
The weakness of typicality.

Submitted:

Eric P. Astor, D. Dzhafarov, A. Montalbán, R. Solomon, and L.B. Westrick,
The determined property of Baire in reverse math.

Published:

2019: Eric P. Astor, Denis R. Hirschfeldt, and Carl G. Jockusch, Jr..
The computational content of intrinsic density.
Computability, 8(2), pp. 155–177.
arXiv preprint: [arXiv:1811.07172](https://arxiv.org/abs/1811.07172)
2018: Eric P. Astor. The computational content of intrinsic density.
The Journal of Symbolic Logic, 83(2), pp. 817–828.
arXiv preprint: [arXiv:1708.04267](https://arxiv.org/abs/1708.04267)
2017: Eric P. Astor, Damir D. Dzhafarov, 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 (<https://rmzoo.math.uconn.edu>)
- 2010-2011: Student Health Advisory Board, University of Chicago.

Technical Experience

- 2018-present: Software Engineer III, Google LLC (Drive File Stream), New York, NY.
Designed & implemented cache efficiency upgrade, saving terabytes/day of bandwidth.
Proposed & led transition of product to modern standard build system (Bazel), improving
build consistency at ~2x speed and saving hours/week in maintenance.
Optimized testing process, reducing standard unit test cycle from 30 minutes to 10.
- 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.

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.