Eric P. Astor

Jersey City, NJ – New York Metro Area

✉ eric.astor@gmail.com   ●   🌐 www.ericastor.info

I work to understand the root of the problem, and produce clean, reusable, documented solutions.

Software engineer, mathematician with post-doctoral experience, & teacher. Software-development background includes client-side applications, machine learning, and open-source leadership. Mathematical research includes usually-correct algorithms and verifying assumptions needed for formal argument; published in three top journals, presented by invitation at five leading international conferences. Interdisciplinary communicator; respected coach/mentor/team player; dedicated & proactive problem-solver.

Experience

Google LLC (Drive File Stream)   **New York, NY**
Software Engineer III   *2018–ongoing*
First-party streaming file system backed by Google Drive.
Achievements:
- Designed & implemented cache efficiency upgrade, saving terabytes/day of outgoing bandwidth;
- Improved company-wide infrastructure for cross-platform builds, creating standard extension for targeting Windows;
- Proposed & led transition of product to modern standard build system (Bazel), improving build consistency at $\sim$2x speed and saving hours/week in maintenance;
- Optimized Drive File Stream testing & release process, reducing standard unit test cycle from 30 minutes to 10.

Open Source

The Reverse-Mathematics Zoo   **rmzoo.math.uconn.edu**
Lead Developer & Maintainer   *2016–ongoing*
Expert system and authoritative bibliography for reverse mathematics.
Achievements:
- Re-architected the Zoo for improved maintainability, portability, and performance;
- Implemented a new inference engine, increasing capability, extensibility, and performance (8x speed);
- Expanded & cleaned underlying bibliography for the field (4x previous size, verified and detailed referencing).

Anathema   **anathema.github.com**
Developer   *2010–2014*
Specialized data-management system, enforcing complex rules in an intuitive interface designed for mass appeal.
Achievements:
- Organized the revival of this previously-abandoned project;
- Optimized & simplified codebase, with focus on readability and extensibility;
- Coordinated design & implementation of a new reporting interface.

One Laptop Per Child (Google Summer of Code)   **Cambridge, MA**
Developer   *2006*
Achievements:
- Designed and implemented, in Python & Cython, a self-organizing cluster implementation of a graph-theoretic network centrality algorithm, running against a large MediaWiki database (i.e., Wikipedia);
- Collaboratively designed CrossMark, a document markup standard intended for use on the OLPC XO laptop;
- Began development on the reference CrossMark parser for the XO laptop, using ANTLR 3.0.

Mathematics...

University of Connecticut   **Storrs, CT**
Assistant Research Professor   *2015–2018*
50% research in reverse mathematics, analyzing which assumptions are required to prove a given theorem;
50% teaching and educational work.
Detailed achievements:

- Designed & taught assorted undergraduate and graduate courses, receiving consistently strong student evaluations for accessibility, clarity, and general recommendation, as well as a University commendation for merit in teaching;
- Developed new line of inquiry in international collaboration, involving bounds on the strength of large families of assumptions — first application found limits on the power of computation with access to random numbers;
- Refined analysis of strengths of closely-related systems, applying tools from another field with new methods;
- Presented at major conferences, both national (e.g., North American Annual Meeting of the ASL) & international (e.g., Symposia on the Foundations of Mathematics [interdisciplinary]);
- Published in leading journals (including: Annals of Pure and Applied Logic, the Journal of Symbolic Logic).

University of Chicago   **Chicago, IL**
Ph.D. candidate & Lecturer   *2011–2015*
75% research and training in mathematical logic (specifically computability theory); 25% teaching.
Detailed achievements:

- Designed & taught assorted undergraduate courses, receiving consistently strong student evaluations for accessibility, clarity, and general recommendation;
- Strengthened & refined analyses of asymptotic computation, algorithms that work for "almost all" inputs;
- Recovered desired & standard results not present in prior work, permitting the generalization of classic results;
- Presented in invited talks at major international conferences, including the Workshop on Computability Theory in Bucharest and the Annual Meeting of the Canadian Mathematical Society;
- Published in leading journals (including the Journal of Symbolic Logic).

AMALTHEA (University of Central Florida and Florida Tech)   **Orlando, FL**
Machine Learning REU Participant   *2008*
Studied numerical optimization algorithms, esp. simplex variants, for support vector machine (SVM) training.
Integrated a conjugate residual solver into Rusin's revised simplex method for quadratic programming, producing a hybrid algorithm with promising applications to SVM training.

Computer skills

Languages: C/C++, Python, Java, C#/.NET
Other: Mathematica, MATLAB, SQL, ANTLR

Education

University of Chicago   **Chicago, IL**
Ph.D., Mathematical Logic   *2009–2015*
M.S., Mathematics   *2009–2011*
Swarthmore College   **Swarthmore, PA**
B.A., Mathematics and Physics, with High Honors   *2005–2009*

Doctoral thesis

title: *Asymptotic density and effective negligibility*

supervisors: Denis R. Hirschfeldt and Robert I. Soare

description: Introduced new analyses for asymptotic computation, a framework for algorithms that work for "almost all" inputs; proved the halting problem not asymptotically computable.