

Jason Gross

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CONTACT

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RESEARCH INTERESTS

Programming Languages, Formal Verification, Cryptography, Performance Engineering

EDUCATION

Massachusetts Institute of Technology 2013–2021
PhD in Computer Science Cambridge, MA
Advisor: Adam Chlipala
Thesis: Performance Engineering of Proof-Based Software Systems at Scale
SM Thesis: An Extensible Framework for Synthesizing Efficient, Verified Parsers

Massachusetts Institute of Technology 2009–2013
BS in Mathematics and Physics Cambridge, MA
GPA: 4.6/5

EXPERIENCE

Coq Development Team, INRIA June 2021–Present
Core Team Member Nantes, France (remote)

- Stress Testing, Bug Reporting, Bug Minimizer, Compatibility Assurance
- Engineering and maintaining a bug minimizer for automatically producing minimized stand-alone test-cases from buggy code
- Researching performance issues that impact scalability of automated verification
- Have reported the plurality of all-time bugs in Coq (since 2012)

Machine Intelligence Research Institute February 2021–Present
Research Staff Berkeley, CA (remote)

- Performing self-directed research into topics in fundamental programming language theory and mathematics

MIT CSAIL September 2013–February 2021
PhD Researcher Cambridge, MA

- Main Research Project: Fiat Cryptography (github.com/mit-plv/fiat-crypto)
- Collaboratively implemented proven-correct cryptographic code now used by Google Chrome, and in the majority of secure connects from web browsers
- Led development of one of the world's first algorithm-level-optimizing compilers
- Wrote backends to C, Go, Java, and JSON; managed development of backends to Rust and Zig

INTERNSHIPS

Machine Intelligence Research Institute June 2019–August 2019
Type Theory Intern Berkeley, CA

- Worked on formalizing type theories and on proving things within proof assistants

Google June 2018–August 2018
Software Engineering Intern Cambridge, MA

- Worked with BoringSSL on integration of proven-correct low-level ECC primitives into Chrome

Google June 2016–September 2016
Software Engineering Intern Mountain View, CA

- Formalized low-level ECC primitives with proofs of correctness

Microsoft Research June 2014–August 2014
Intern Cambridge, United Kingdom

- Collaboratively created a language for specifying input/output behavior of x86 assembly programs; Verified the I/O behavior of a number of simple programs
- Improved automation of the x86proved library

MIT CSAIL April 2012–June 2014
Researcher Cambridge, MA

- Entered a significant amount of category theory into the automated proof assistant Coq (<https://github.com/HoTT/HoTT/tree/master/theories/Categories>)
- Made progress towards an interface for databases and database migration on top of category theory in Coq

MIT CSAIL November 2009–September 2011
Researcher Cambridge, MA

- Designed from scratch a data collection webpage, collected data for, and helped with research on categorical and transfer learning

Commack High School Fall 2006–Summer 2009
Independent Researcher Commack, NY

- Independently researched circuits over sets of natural numbers for three years.
- Won fourth place award in mathematics in ISEF (Intel International Science and Engineering Fair) in 2009, third place award in ISEF 2008.

PROGRAMMING LANGUAGES

- Proficient: Coq, Mathematica, git, Python, JavaScript, BASIC
- Working knowledge: C, C++, Agda, OCaml, Haskell, Scheme, HTML, CSS, Perl, Java
- Basic knowledge: Matlab, Lean, Idris, Ruby, Go, Ur/Web, x86 Assembly

TEACHING

- Instructor at Monsoon Math Camp: category theory, linear logic, Löb's theorem
- TA for 6.172 (Performance Engineering): Led recitations, analyzed and explained assembly output of `gcc -O3` to teach vectorization
- TA for 8.012 (Physics I) and 8.022 (Physics II) in Experimental Study Group
- Teacher at MIT ESP Programs: \LaTeX , philosophy, linear algebra, quantum mechanics

OTHER ACTIVITIES

- Co-maintainer of the Fiat Cryptography project (`mit-plv/fiat-crypto` on GitHub)
- Co-maintainer of the homotopy type theory Coq repository (`HoTT/HoTT` on GitHub)
- Program Committee Member of CoqPL 2022
- Committer to the SIPB BarnOwl project (<https://barnowl.mit.edu>)
- SIPB (Student Information and Processing Board) Member
- President of Tech Squares, MIT's Square Dancing Club (May 2013–October 2014)
- Canada/USA Mathcamp (Summers 2006–2009)

SELECTED PRESENTATIONS AND PUBLICATIONS