

This form is to be completed by EECS graduate students upon submission of a doctoral thesis to the department.  
**Please attach a CV or resume...thank you.**

STUDENT NAME:

CITIZENSHIP (circle) ☐ United States OTHER:

AREA (circle): ☐ EE or ☐ CS

DATE of THESIS SUBMISSION:

THESIS SUPERVISOR(S):

DATE of MIT DEGREE LIST:

Please notify us of your immediate future plans, by responding to the questions below:

1. Please check the type of job you are taking within the following broad categories:

Academic/faculty position

Academic/researcher

Academic/postdoc

Industry

Government

Medical

Financial

Management Consulting

Self-Employed

Other

Un-Employed

2.

If you can let us know specifically where you are going, that would be most helpful:

Institution:

Title:

Location of Employment:

3. Check the area within EECS that best describes your area of employment:

Communications

Systems, Decision and Control

Signal Processing

Bioelectrical/Medical Engineering

Circuit Design

Devices and Materials

Electromagnetics and Energy

Artificial Intelligence/Robotics

Hardware/ Architecture

Numerical Analysis/Scientific

Programming Language/Compilers

OS/Networks

Software Engineering

Theory/ Algorithms

Graphics/Human Interface

Database/Information Systems

Other:

**THANK YOU, and ALL GOOD WISHES!**



# Jason Gross

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## PRESENT ADDRESS

258 Prospect Street, Apt # 1L  
Cambridge, MA 02139

## PERMANENT ADDRESS

126 Hayrick Lane  
Commack, NY 11725

## EDUCATION

**Massachusetts Institute of Technology**, Cambridge, MA

Began Doctorate of Philosophy in Computer Science in September 2013

Research Interests: Homotopy Type Theory, Category Theory, Program Synthesis, Type Theory

Current G.P.A. 4.9/5.0

Bachelor of Science in Mathematics and Physics, June 2013

G.P.A. 4.6/5.0

### Coursework:

- Computer Science: Inference and Information, Computer Systems Security, Geometric Computing, Foundations of Program Analysis, Performance Engineering of Software Systems, Structure and Interpretation of Computer Programs
- Mathematics: Paradox and Infinity, Category Theory for Scientists, Algebraic Topology I, Seminar in Topology, Introduction to Topology, Real Analysis, Abstract Algebra I & II, Differential Equations, Calculus I & II, Linear Algebra
- Physics: Modern Astrophysics, General Relativity (Graduate), Statistical Physics I & II, Quantum Physics I, II, & III, Classical Mechanics II, Waves and Vibrations, Special Relativity and the Physics of Spacetime
- Other Sciences: Introductory Biology, Introductory Chemistry, Design a Concentrated Solar Power Water Heater (seminar)
- Other: The Art and Science of Happiness, Metaphysics, Introduction to Musical Composition, Capitalism and Its Critics, Moral Psychology, Philosophy of Quantum Mechanics, Moral Problems and the Good Life, Philosophy of Love, Kaufman Teaching Certificate Program

## EXPERIENCE

### MIT

September 2013–Present

#### *Researcher*

Cambridge, MA

- Researching program synthesis and verification with Adam Chlipala
- Collaboratively working on implementing one of the world's first algorithm-level-optimizing compilers
- Collaboratively implemented proven-correct crypto code now used by Google Chrome

### 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

### MIT

Fall 2009–Present

*Teacher* Cambridge, MA

- Taught classes on L<sup>A</sup>T<sub>E</sub>X, philosophy, linear algebra, and quantum mechanics for MIT Educational Studies Program's Splash, Spark, and Summer HSSP (High School Studies Program)
- Teaching Assistant for 8.012 (Physics I) and 8.022 (Physics II) in Experimental Study Group

**MIT** September 2015–December 2015  
*TA for 6.172 (Performance Engineering)* Cambridge, MA

- Created and led recitations, taught students, and helped run class
- Analyzed and explained assembly output of `gcc -O3` to teach vectorization

**MIRI** June 12–14, 2015  
*Decision Theory Workshop Attendee* Berkeley, CA

- Formalized various versions of Löb's theorem in Agda and Coq
- Learned about and worked on problems on the frontiers of decision theory

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

- Created a language for specifying input/output behavior of x86 assembly programs with Andrew Kennedy and Nick Benton; Verified the I/O behavior of a number of simple programs
- Improved automation of the x86proved library

**MIT** 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>)
- Working on building an interface for databases and database migration on top of category theory in Coq with David Spivak and Adam Chlipala
- Presented “Building Database Management on top of Category Theory in Coq”, January 25, 2013, POPL 2013: 40th ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages
- Presented “Experience Implementing a Performant Category-Theory Library in Coq”, July 14, 2014, Interactive Theorem Proving 2014 Conference

**MIT CSAIL** November 2009–September 2011  
*Researcher* Cambridge, MA

- Designed from scratch a data collection webpage, collected data for, and helped with research of Brenden Lake, Ruslan Salakhutdinov, and Josh Tenenbaum, on categorical and transfer learning (<http://jgross.scripts.mit.edu/alphabets/>).
- Co-author of “One shot learning of simple visual concepts” published in *Proceedings of the 33rd Annual Meeting of the Cognitive Science Society*.

**MIT OCW** May–August 2010  
 Cambridge, MA

- Evaluated and categorized videos of Walter Lewin solving physics problems for updating the 8.01 (Physics I) OpenCourseWare (OCW) website.

**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.

**Turnpike Total Appliance** Fall 2006–Summer 2009

- Designed and improved main company website, took initiative to make more improvements.

## COMPUTER SKILLS

- Proficient skills – Coq,  $\text{\TeX}$  macro language, Mathematica, git, Python, JavaScript, BASIC
- Working knowledge –  $\text{\LaTeX}$ , C, C++, Agda, Haskell, Scheme, HTML, CSS, Perl, Java
- Basic knowledge – Matlab, OCaml, Idris, Ruby, Ur/Web, x86 Assembly

## HONORS AND AWARDS

- Mathematics Honor Society (Commack High School)
- Collection of 12 original K’NEX synagogue models exhibited in various museums (2004–2008)
- Graduated Cum Laude from Commack High School (June 2009)

## EXTRACURRICULAR ACTIVITIES

- Co-maintainer of the homotopy type theory Coq repository (HoTT/HoTT on GitHub)
- Committer to the SIPB BarnOwl project (<http://barnowl.mit.edu>)
- SIPB (Student Information and Processing Board) Member
- Was project leader for MITeX, an online interface for composing  $\text{\LaTeX}$
- HMMT Solutions Editor (2010)
- Canada/USA Mathcamp (Summers 2006–2009)

## INTERESTS

- Philosophy
- Programming
- Dancing, especially tango, contra, and square dancing
- Psychology
- Hiking
- MIT Mystery Hunt, Participated on Manic Sages Team, January 2008–2012

## PRESENTATIONS AND PUBLICATIONS

- [1] Andres Erbsen, Jade Philipoom, Jason Gross, Robert Sloan, and Adam Chlipala. “Simple High-Level Code For Cryptographic Arithmetic – With Proofs, Without Compromises”. In: *Proceedings of the 40th IEEE Symposium on Security and Privacy (S&P’19)*. May 2019. URL: <https://people.csail.mit.edu/jgross/personal-website/papers/2019-fiat-crypto-ieee-sp.pdf>.
- [2] Jason Gross. *Presentation Proposal for Teaching Your Rooster to Crow in C*. Presented at The Coq Workshop 2018. July 2018. URL: <https://people.csail.mit.edu/jgross/personal-website/presentations/coq-workshop-2018/coq-workshop-proposal-notations.pdf>.
- [3] Jason Gross, Andres Erbsen, and Adam Chlipala. “Reification by Parametricity: Fast Setup for Proof by Reflection, in Two Lines of Ltac”. In: *Proceedings of the 9th International Conference on Interactive Theorem Proving (ITP’18)*. July 2018. URL: <https://people.csail.mit.edu/jgross/personal-website/papers/2018-reification-by-parametricity-itp-camera-ready.pdf>.

- [4] Andrej Bauer, Jason Gross, Peter LeFanu Lumsdaine, Michael Shulman, Matthieu Sozeau, and Bas Spitters. “The HoTT Library: A Formalization of Homotopy Type Theory in Coq”. In: *Proceedings of the 6th ACM SIGPLAN Conference on Certified Programs and Proofs*. CPP 2017. Paris, France: ACM, Jan. 2017, pp. 164–172. ISBN: 978-1-4503-4705-1. DOI: 10.1145/3018610.3018615. eprint: 1610.04591. URL: <https://people.csail.mit.edu/jgross/personal-website/papers/2017-HoTT-formalization.pdf>.
- [5] Jason Gross. *The HoTT/HoTT Library in Coq: Designing for Speed*. Presented at The 5th International Congress on Mathematical Software (ICMS 2016). July 2016. URL: <https://people.csail.mit.edu/jgross/personal-website/presentations/icms-2016/hott-hott-and-category-coq-experience.pdf>.
- [6] Jason Gross. “An Extensible Framework for Synthesizing Efficient, Verified Parsers”. MA thesis. Massachusetts Institute of Technology, Sept. 2015. URL: <https://people.csail.mit.edu/jgross/personal-website/papers/2015-jgross-thesis.pdf>.
- [7] Ben Delaware, Clément Pit-Claudel, Jason Gross, and Adam Chlipala. “Fiat: Deductive Synthesis of Abstract Data Types in a Proof Assistant”. In: *Proceedings of the 42nd ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL’15)*. Jan. 2015. URL: <https://people.csail.mit.edu/jgross/personal-website/papers/2015-adt-synthesis.pdf>.
- [8] Jason Gross. *Coq Bug Minimizer*. Presented at The First International Workshop on Coq for PL (CoqPL’15). Jan. 2015. URL: <https://people.csail.mit.edu/jgross/personal-website/papers/2015-coq-bug-minimizer.pdf>.
- [9] Tobias Tebbi and Jason Gross. *A Profiler for Ltac*. Presented at The First International Workshop on Coq for PL (CoqPL’15). Jan. 2015. URL: <https://people.csail.mit.edu/jgross/personal-website/papers/2015-ltac-profiler.pdf>.
- [10] Jason Gross. *Presentation: Input, Output, and Automation in x86 Proved*. Presented at Microsoft Research, Cambridge, UK. Aug. 2014. URL: <https://people.csail.mit.edu/jgross/personal-website/presentations/msr-2014-final-talk/input-output-and-automation-in-x86proved.pdf>.
- [11] Jason Gross, Adam Chlipala, and David I. Spivak. “Experience Implementing a Performant Category-Theory Library in Coq”. In: *Proceedings of the 5th International Conference on Interactive Theorem Proving (ITP’14)*. July 2014. eprint: 1401.7694. URL: <https://people.csail.mit.edu/jgross/personal-website/papers/category-coq-experience-ityp-submission-final.pdf>.
- [12] Jason Gross. *Presentation Proposal for Three Neat Tricks in Coq 8.5*. Presented at the 6th Coq Workshop. Apr. 2014. URL: <https://people.csail.mit.edu/jgross/personal-website/presentations/coq-workshop-2014/coq-workshop-proposal-tactics-in-terms.pdf>.
- [13] Jason Gross. *Jason Gross’ Wishlist for Coq*. Jan. 2014. URL: <https://people.csail.mit.edu/jgross/personal-website/presentations/coq-8.6-wishlist/jgross-coq-8-6-wishlist-no-pause.pdf>.
- [14] Jason Gross. *POPL: Minute Madness: Category Theory in Coq, and Program Synthesis*. Presented at the 41st ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL’14). Jan. 2014. URL: <https://people.csail.mit.edu/jgross/personal-website/presentations/popl-2014-minute-madness/jason-gross-minute-madness.pdf>.
- [15] Jason Gross. *CSAIL Student Workshop 2013: Computational Higher Inductive Types: Computing with Custom Equalities*. Presented at the 2014 MIT CSAIL Student Workshop. Oct. 2013. URL: <https://people.csail.mit.edu/jgross/personal-website/presentations/csw-2013/jgross-presentation-no-pause.pdf>.

- [16] Jason Gross. *Building Database Management on top of Category Theory in Coq*. Presented as a student talk at the 40th ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL'13). Jan. 2013. URL: <https://people.csail.mit.edu/jgross/personal-website/presentations/pop1-2013/jgross-student-talk.pdf>.
- [17] Jason Gross. *POPL: Minute Madness: Database Management on top of Category Theory in Coq: Category of Relational Schemas = Category of Categories*. Presented at the 40th ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL'13). Jan. 2013. URL: <https://people.csail.mit.edu/jgross/personal-website/presentations/pop1-2013/minute-madness.pdf>.
- [18] Brenden M. Lake, Ruslan Salakhutdinov, Jason Gross, and Joshua B. Tenenbaum. "One shot learning of simple visual concepts". In: *Proceedings of the 33rd Annual Conference of the Cognitive Science Society*. 2011. URL: <https://people.csail.mit.edu/jgross/personal-website/papers/LakeEtAl2011CogSci.pdf>.