

Jason Gross

jgross@mit.edu — (631) 790-8962 — <http://people.csail.mit.edu/jgross/>

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. 4.8/5.0

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: 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

EXPERIENCE

MIT

September 2013–Present

Researcher

Cambridge, MA

- Researching program synthesis as it applies to the Bedrock compiler, with Adam Chlipala
- Collaboratively working on implementing one of the world's first algorithm-level-optimizing compilers

MIT

Fall 2009–Present

Teacher

Cambridge, MA

- Taught classes on \LaTeX , 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

Web Page Designer

Commack, NY

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

COMPUTER SKILLS

- Proficient skills – Coq, \TeX macro language, Mathematica, git, Python, JavaScript, BASIC
- Working knowledge – \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 L^AT_EX
- 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] 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>.
- [2] 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>.
- [3] 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>.
- [4] 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>.
- [5] 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>.
- [6] 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>.
- [7] 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>.
- [8] 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-itp-submission-final.pdf>.

- [9] Jason Gross. *Presentation Proposal for of 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>.
- [10] 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>.
- [11] 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>.
- [12] 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>.
- [13] 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/popl-2013/jgross-student-talk.pdf>.
- [14] 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/popl-2013/minute-madness.pdf>.
- [15] 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>.