

Robert L. Miller

Curriculum Vitae

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+1 (315) 247-9427 ☎
<http://www.rlmiller.org> =

Work

Quid, Inc. — Research & Development Team

- Senior Software Engineer, July 2011–present.
- Production responsibilities:
 - Release management
 - Systems architecture development
 - Maintaining stability of production servers
 - Improving research code to production level
 - RESTful API, messaging queues, distributed computing
 - Optimizing algorithms and infrastructure for scalability and performance
- Research activities:
 - Sparse linear algebra for large scale network projections
 - Non-negative matrix factorization and nonlinear regression
 - Information theory
 - Clustering algorithms for networks
 - Natural language processing
 - Machine learning techniques for classifying technologies and predicting market values and disruptive technology

The Sage Project (open source mathematical software)

- Software Developer, October 2006–present.
- Release Manager, March 2008–July 2010.

Education

Max Planck Institut für Mathematik, Bonn, Germany

- Declined a visiting postdoctoral fellowship, Spring 2012.

Mathematical Sciences Research Institute, Berkeley

- Teaching assistant, graduate workshop on elliptic curves, Summer 2010.
- Postdoctoral fellow, arithmetic statistics program, Spring 2011.

University of Warwick Mathematics Institute

- Visiting fellow, Autumn 2010.

University of Washington

- Ph.D. in Mathematics, August 2010.
- National Science Foundation graduate fellowships, 2008–2010.
- Google fellowship to write mathematical software, 2008.
- Teaching assistant, October 2005–June 2008.
- Research assistant, October–December 2009.
- Lecturer, July 2008–June 2010.

Syracuse University

- B.S. in Mathematics, December 2004.
- B.A. in Philosophy, December 2004.
- Archimedes Prize for undergraduate mathematics.
- President, Pi Mu Epsilon honorary mathematics society.
- Teaching assistant, January–May 2005.
- Calculus Clinic, August 2002–December 2004.

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Papers

1. Second isogeny descents and the Birch and Swinnerton-Dyer conjectural formula — with Brendan Creutz (31 pages, submitted 2011)
2. Explicit isogeny descent on elliptic curves — with Michael Stoll, to appear in *Mathematics of Computation* (17 pages, 2011)
3. Proving the Birch and Swinnerton-Dyer conjecture for specific elliptic curves of analytic rank zero and one — *LMS Journal of Computation and Mathematics* 14 (2011) 327–350.
4. Codes and Supersymmetry in One Dimension — with Charles Doran *et al.*, to appear in *Advances in Theoretical and Mathematical Physics* (48 pages, 2008).

Skills

Communication

- Coauthored *The Computational Frontiers of L-Functions, Lie Groups, and Supersymmetry*, called “probably the best of this year’s SCREMS proposals” by the director and awarded \$106,869 by the NSF in 2008.
- Gave over thirty talks on topics including number theory, combinatorics, computer science, education and open source software in America, Austria, Canada, England, France, Germany, Holland, Hungary and Spain, at venues including UC Berkeley, Cambridge, the Clay Math. Inst. and several German castles.

Leadership

- Release managing a major software distribution (the open source mathematics program Sage— roughly 100,000 users and 100 citations in the last year).
- Working on a large scale software project involving up to fifty different contributors at each release. Successfully guiding software evolution in the midst of a changing code base and disparate aims amongst developers.

Software Engineering

- C, C++, Java, Python, Cython, Ruby, SQL, bash, make, valgrind
- High-level object-oriented software design, including building a software package which provides several different front-end data types for the user to do computations, each of which accesses a common set of low-level backends which are hidden from sight.
- Low-level optimized algorithmic design for computation of various polynomials, groups and other data and questions relating to graphs, codes, elliptic curves and other arithmetic and combinatorial objects.
- Build systems on a wide variety of architectures and operating systems.
- Running large distributed computations on supercomputing clusters.
- Ability to combine programming skills with careful attention to subtle theoretical details in implementing original, complex mathematical algorithms as well as examining existing implementations for correctness.

References

- Prof. William Stein, Ph.D. advisor, wstein@math.washington.edu
- Prof. John Cremona, postdoctoral supervisor, J.E.Cremona@warwick.ac.uk
- Prof. Chris Godsil, cgodsil@uwaterloo.ca
- W. Bryan Smith, supervisor, wbsmith@gmail.com
- Bong Munoz, bong@techie.com