

CURRICULUM VITAE FOR MATTHEW BAKER

November 2009

School of Mathematics
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POSITIONS HELD:

- Georgia Institute of Technology (Fall 2007 – Present) Associate Professor
- Georgia Institute of Technology (Fall 2004 – Summer 2007) Assistant Professor
- University of Georgia (Fall 2002 – Summer 2004) Assistant Professor
- University of Paris 7 (Summer 2003) Visiting Professor
- Harvard University (Fall 2000 – Summer 2002) Benjamin Peirce Assistant Professor
- Harvard University (Fall 1999 – Summer 2000) NSF Postdoctoral Fellow

EDUCATION:

- Ph. D., Mathematics, University of California at Berkeley (1999)
- B. S., Mathematics, University of Maryland at College Park (1994),
summa cum laude with highest honors

DISSERTATION:

- Torsion Points on Modular Curves (Advisor: Robert Coleman)

HONORS, AWARDS, AND FELLOWSHIPS:

- University System of Georgia Board of Regents Teaching Excellence Award (FY2010)
- NSF Research Grant DMS-0901487 (2009 – 2012)
- Georgia Tech CETL/BP Junior Faculty Teaching Award (2007)
- NSF Research Grant DMS-0600027 (2006 – 2009)
- NSF Research Grant DMS-0300784, joint with Robert Rumely (2003 – 2006)
- Georgia Tech Class of 1969 Teaching Fellow (2004)
- NSF Postdoctoral Research Fellowship (1999 – 2003)
- Alfred P. Sloan Dissertation Fellowship (1998 – 1999)
- Simons Foundation Award for Excellence in Mathematics (1997)
- Department of Defense NDSEG Graduate Fellowship (1995 – 1998)
- Phi Kappa Phi National Fellowship (1994)
- University of Maryland Regents Scholarship (1990 – 1994)

PUBLICATIONS:

- (1) Potential Theory and Dynamics on the Berkovich Projective Line, with Robert Rumely (book), to appear in the AMS Surveys and Monographs series (462 pages).
- (2) Harmonic Morphisms and Hyperelliptic Graphs, with Serguei Norine, to appear in *International Math. Research Notices*.

- (3) A Finiteness Theorem for Canonical Heights Attached to Rational Maps over Function Fields, *J. Reine angew. Math.* **626** (2009), 205–233.
- (4) Specialization of Linear Systems from Curves to Graphs, *Algebra and Number Theory* **2**, no. 6 (2008), 613–653.
- (5) A Finiteness Property of Torsion Points, with Su-ion Ih and Robert Rumely, *Algebra and Number Theory* **2**, no. 2 (2008), 217–248.
- (6) An Introduction to Berkovich Analytic Spaces and Non-Archimedean Potential Theory on Curves, in *p-adic Geometry* (Lectures from the 2007 Arizona Winter School), AMS University Lecture Series, 2008.
- (7) Uncountable Sets and an Infinite Real Number Game, *Mathematics Magazine* **80**, no.5 (December 2007), 377–380.
- (8) Riemann-Roch and Abel-Jacobi Theory on a Finite Graph, with Serguei Norine, *Advances in Mathematics* **215** (2007), 766–788.
- (9) Harmonic Analysis on Metrized Graphs, with Robert Rumely, *Canad. J. Math.* **59**, no. 2 (2007), 225–275.
- (10) A Lower Bound for Average Values of Dynamical Green’s Functions, *Mathematical Research Letters* **13**, no. 2 (2006), 245–257.
- (11) Equidistribution of Small Points, Rational Dynamics, and Potential Theory, with Robert Rumely, *Ann. Inst. Fourier (Grenoble)* **56**, no. 3 (2006), 625–688.
- (12) Metrized Graphs, Laplacian Operators, and Electrical Networks, with Xander Faber, *Contemporary Mathematics* **415**, Proceedings of the Joint Summer Research Conference on Quantum Graphs and Their Applications, Snowbird, Utah, 2006.
- (13) Global Discrepancy and Small Points on Elliptic Curves, with Clayton Petsche, *International Math. Research Notices* **61** (2005), 3791–3834.
- (14) Finiteness Results for Modular Curves of Genus at Least 2, with Enrique González-Jiménez, Josep González, and Bjorn Poonen, *Amer. J. Math.* **127**, no. 6 (2005), pp. 1325–1387.
- (15) Canonical Heights, Transfinite Diameters, and Polynomial Dynamics, with Liang-Chung Hsia, *J. Reine angew. Math.* **585** (2005), 61–92.
- (16) Equidistribution of Small Subvarieties of Abelian Varieties, with Su-ion Ih, *New York J. Math.* **10** (2004), pp. 279–285.
- (17) A Lower Bound for the Canonical Height on Abelian Varieties over Abelian Extensions, with Joseph Silverman, *Mathematical Research Letters* **11** (2004), 377–396.
- (18) Torsion Points on Curves and Galois Theory, with Ken Ribet, Les XXIIèmes Journées Arithmétiques (Lille, France), *Journal de Théorie des Nombres de Bordeaux* **15** (2003), pp. 11–32.
- (19) Lower Bounds for the Canonical Height on Elliptic Curves over Abelian Extensions, *International Math. Research Notices* **29** (2003), pp. 1571–1589.
- (20) Automorphisms of $X_0^*(p)$, with Yuji Hasegawa, *Journal of Number Theory* **100**, no. 1 (2003), pp. 72–87.
- (21) Torsion Packets on Curves, with Bjorn Poonen, *Compositio Math.* **127** (2001), pp. 109–116.
- (22) Torsion Points on Modular Curves, *Inventiones Math.* **140** (2000), pp. 487–509.
- (23) Cartier Points on Curves, *International Math. Research Notices* **7** (2000), pp. 353–370.

- (24) Kamienny's Criterion and the Method of Coleman and Chabauty, *Proceedings of the A.M.S.* **127**, no. 10 (1999), pp. 2851–2856.

PREPRINTS:

- (1) Preperiodic Points and Unlikely Intersections, with Laura DeMarco, preprint (24 pages).
- (2) Metric Properties of the Tropical Abel-Jacobi Map, with Xander Faber, submitted (32 pages).

PROFESSIONAL EXPERIENCE:

- Center for Communications Research SCAMP Summer Program (Summer 2001, Fall 2002). Research on cryptography.
- National Security Agency Director's Summer Program (Summer 1992, Summer 1994). Research on cryptography.

DEPARTMENTAL SERVICE:

- Georgia Tech mathematics department Strategic Hiring Plan Committee (2009)
- Georgia Tech mathematics department Hiring Committee (2009)
- Georgia Tech mathematics department Chair Search Committee (2007-2008)
- Georgia Tech mathematics department Graduate Committee (2006-2009)
- Georgia Tech mathematics department Putnam Examination coordinator (2006-2009)
- Georgia Tech mathematics department REU coordinator (2005-2006, 2008-2009), supervised five REU students during this time
- Georgia Tech mathematics department Graduate Comprehensive Exam Committee (2005-2006, 2008-2009)
- Georgia Tech ACO program Comprehensive Exam Committee (2005-2006, 2008-2009)
- Georgia Tech mathematics department Elections and Nominations Committee (2005-2007)
- Developed and ran "Analysis on Metrized Graphs" REU (joint with Robert Rumely), University of Georgia (Summer 2003).
- Organized University of Georgia number theory seminar (2003 – 2004)
- University of Georgia mathematics department personnel committee (2003 – 2004)
- Harvard mathematics department colloquium committee, intensive advising committee, and graduate admissions committee (2000-2001)
- Co-organized seminar at Harvard University on Modular Curves and Modular Forms (2000)

PROFESSIONAL SERVICE:

- Co-organizer of AIM workshop on the Uniform Boundedness Conjecture in Arithmetic Dynamics (January 2008)
- Served on NSF grant panel (Fall 2007, Fall 2003)
- Organizer (with Bjorn Poonen) of special session in Arithmetic Geometry at the AMS/MAA Joint Meetings in New Orleans (January 2007)
- Organizer (with Dino Lorenzini) of special session in Arithmetic Geometry at the AMS/MAA Joint Meetings in Atlanta (January 2005)
- Reviewer of over 60 papers for AMS Math Reviews (Fall 1999 – Present)

- Referee for papers in a number of prominent journals, including Journal of the AMS, Inventiones Math., Duke Math. J., International Math. Research Notices, J. Reine Angew. Math. (Crelle's Journal), Algebra and Number Theory, J. London Math. Soc., Math. Annalen, J. Number Theory, and Mathematical Research Letters.

PROFESSIONAL AFFILIATIONS:

- American Mathematical Society (1995 – Present)
- Mathematical Association of America (1995 – Present)

PLENARY TALKS:

- *Graphs and arithmetic geometry*, Plenary talk, Journées Arithmétiques, Saint-Étienne, France, Summer 2009.
- *Potential theory on Berkovich spaces*, Five hour-long talks at the Arizona Winter School, Tucson, AZ, March 2007.
- *Geometry of points over $\overline{\mathbb{Q}}$ of small height I,II*, Two hour-long talks at MSRI Introductory workshop on Rational Points on Higher-Dimensional Varieties, January 2006.
- *Torsion points on curves and Galois theory*, Plenary talk, Journées Arithmétiques, Lille, France, Summer 2001.

OTHER SELECTED INVITED TALKS:

- Fall 2010, Invited Address at the AMS Southeastern Section Meeting, University of Richmond (forthcoming)
- Summer 2010, Workshop on “Algebra and Arithmetic in Complex Dynamics”, University of Illinois, Chicago (forthcoming)
- Spring 2010, Invited Number Theory Lecture Series, University of Michigan (forthcoming)
- Fall 2009, MSRI workshop on “Tropical Geometry in Combinatorics and Algebra”, Berkeley, CA
- Fall 2008, Workshop on “Tropical Algebra” at Tulane University
- Fall 2008, Berkeley-Stanford Joint Algebraic Geometry Colloquium, Berkeley, CA
- Summer 2008, MSRI workshop on “Modular Forms and Arithmetic”, Berkeley, CA
- Spring 2008, “Day of Arithmetic” at Emory University
- Winter 2008, AIM workshop on the Uniform Boundedness Conjecture in Arithmetic Dynamics, Palo Alto, CA
- Fall 2007, Number theory and algebraic geometry seminar talks at the University of Georgia
- Spring 2007, Colloquium talk at University of Wisconsin at Madison
- Winter 2007, AMS special session at the Joint Meetings in New Orleans, LA
- Fall 2006, Joint number theory seminar at CUNY/Columbia/NYU
- Summer 2006, Number theory seminar at University of Paris 7
- Summer 2005, IV Workshop on Dynamical Systems, San Pedro de Atacama, Chile
- Summer 2005, Conference on Quantum Graphs and their Applications, Snowbird, Utah
- Summer 2005, Conference on Algebraic Dynamics, Wesleyan University
- Fall 2004, Colloquium talk at Indiana University

- Fall 2004, Number theory and Mathematical physics seminars at Texas A&M
- Summer 2004, Conference on Algebraic Dynamics, CUNY Graduate Center
- Spring 2004, Colloquium talk at Emory University
- Summer 2003, Arithmetic Geometry seminar at University of Paris 7
- Fall 2003, Joint number theory seminar at CUNY/Columbia/NYU
- Spring 2003, Workshop on “The Many Aspects of Mahler’s Measure” in Banff, Canada
- Fall 2002, Number theory seminars at University of Texas, Austin and McGill University
- Spring 2002, Number theory seminars at Brown University, University of Washington, and Brandeis University, and AMS special session in Atlanta, Georgia
- Fall 2001, Number theory seminars at University of Wisconsin, University of Michigan, and University of Maryland
- Summer 2001, Number theory seminar at University of Rennes
- Fall 1999–Spring 2001, Number theory seminars at Columbia University, Princeton University, University of Paris, Boston University, McGill University, and Stanford University, and colloquium talks at University of Georgia, Brown University, and the Center for Communications Research in Princeton
- Winter 1999, AMS special session in San Antonio, TX
- Fall 1998, AMS special session in Tucson, AZ

GRADUATE AND UNDERGRADUATE STUDENTS SUPERVISED:

- Farbod Shokrieh, Ph.D. student, Georgia Tech (2007–Present)
- Ye Luo, Masters thesis supervision, Georgia Tech (2008–Present)
- David Krumm, Masters degree, Georgia Tech (2008)
- Aisha Arroyo, Georgia Tech summer REU project (2009)
- Stefan Froehlich, Georgia Tech summer REU project (2008)
- Daniel Connelly, Georgia Tech summer REU project (2008)
- Rebecca Reitman, Georgia Tech senior project (2007)
- Adam Tart, Georgia Tech senior project (2006)
- Ander Steele, Georgia Tech summer REU project (2005, 2006)
- Dragos Ilas, Georgia Tech summer REU project (2006)
- Matthew Tanzy, Georgia Tech summer REU project (2005)
- Kai Laemmle, University of Georgia masters thesis (2004)
- Paul Pollack, University of Georgia senior thesis (2003)
- Anna Medvedovsky, Harvard University senior thesis (2001)

POSTDOCTORAL FELLOWS SUPERVISED:

- Josephine Yu (Georgia Tech)
- Clayton Petsche (University of Georgia)
- Su-ion Ih (University of Georgia)