Robert POLLACK

http://math.bu.edu/people/rpollack
rpollack@math.bu.edu

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Employment

2015–present	**Boston University**, Professor
2009–2015	**Boston University**, Associate Professor
2004–2009	**Boston University**, Assistant Professor
2002–2004	**University of Chicago**, VIGRE Dickson Instructor
2003–2004	**University of Chicago**, NSF Postdoctoral Fellow
2001–2002	**University of Washington**, NSF Postdoctoral Fellow

Research Interests

- ⋆ Elliptic curves and modular forms
- ⋆ p-adic L-functions and Iwasawa theory
- ⋆ p-adic variation of automorphic forms
- ⋆ $\mathcal{L}$-invariants and slopes of modular forms

Education

June 2001	**Harvard University**, Ph.D.
June 1997	**Harvard University**, M.A.
May 1996	**Washington University**, B.S.

Visiting positions

July 2021	**Max Planck Institute for Mathematics (Bonn)**, Visiting Scientist
2016–2018	**Max Planck Institute for Mathematics (Bonn)**, Visiting Scientist

Awards

2016–2017	Simons Fellowship in Mathematics
2010	Gitner Award for Distinguished Teaching (College-wide award)
2006–2007	Sloan Research Fellowship

Research grants

2017–2021	NSF grant DMS-1702178 Iwasawa theory of extended eigenvarieties
2013–2017	NSF grant DMS-1303302 p-adic variation in Iwasawa theory

2010–2013	NSF grant DMS-1001768 p-adic local Langlands and Iwasawa theory
2007–2010	NSF grant DMS-0701153 Overconvergent cohomology of higher rank groups
2004–2007	NSF grant DMS-0439264 (joint with Tom Weston) p-adic variation of supersingular Iwasawa invariants
2001–2004	NSF postdoctoral fellowship DMS-0102036 p-adic L-series of modular forms at supersingular primes

Other grants

2016–2017	NSF conference grant DMS-1601028 (co-PI) L-functions and Arithmetic
2014–2015	NSF conference grant DMS-1404999 (co-PI) p-adic Variation and Number Theory
2013–2016	NSF grant DMS-1404999 (co-PI) Boston University/Keio University Workshops
2005	NSF conference grant DMS-0509836 Open Questions and Recent Developments in Iwasawa Theory

Papers accepted in peer reviewed journals

- ⋆ Slopes of modular forms and reducible Galois reps: an oversight in the ghost conjecture
  to appear in *Proceedings of the AMS*
  joint with John Bergdall
- ⋆ On μ-invariants and congruences with Eisenstein series
  Compositio Mathematica, 155 (2019), no. 5, 863–901.
  joint with Joël Bellaïche
- ⋆ Slopes of modular forms and the ghost conjecture, II
  Transactions of the AMS, 372 (2019), no. 1, 357–388.
  joint with John Bergdall
- ⋆ Slopes of modular forms and the ghost conjecture
  IMRN, (2019), no. 4, 1125–1144.
  joint with John Bergdall
- ⋆ A remark on non-integral p-adic slopes for modular forms
  Comptes Rendus Mathematique, 355 (2017), no. 3, 260–262.
  joint with John Bergdall
- ⋆ On the freeness of anticyclotomic Selmer groups of modular forms
  International Journal of Number Theory, 13 (2017), no. 6, 1443–1455.
  joint with Chan-Ho Kim and Tom Weston
- ⋆ Explicit computations of Hida families via overconvergent modular symbols
  Research in Number Theory, 2 (2016), Art. 25, 54 pp.
  joint with Evan Dummit, Marton Hablicsek, Robert Harron, Lalit Jain, Daniel Ross

⋆ Arithmetic properties of Fredholm series for p-adic modular forms
Proceedings of the London Mathematical Society, (2016) 113 (4) 419–444
joint with John Bergdall

⋆ Overconvergent modular symbols
Computations with Modular Forms (Heidelberg 2011), *Contributions in Mathematical and Computational Sciences*, Vol. 6, Springer, 2014, 69–105

⋆ Critical slope p-adic L-functions
Journal of the London Mathematical Society, 87 (2013), no. 2, 428–452
joint with Glenn Stevens

⋆ Hilbert modular forms and the Gross-Stark conjecture
Annals of Mathematics, (2) 174 (2011), no. 1, 439–484
joint with Samit Dasgupta (lead author) and Henri Darmon

⋆ Mazur-Tate elements of non-ordinary modular forms
Duke Mathematical Journal, 156 (2011), no. 3, 349–385
joint with Tom Weston

⋆ On anticyclotomic μ-invariants of modular forms
Compositio Mathematica, 147 (2011), no. 5, 1353–1381
joint with Tom Weston

⋆ Overconvergent modular symbols and p-adic L-functions
Annales Scientifiques de l'École Normale Supérieure, (4) 44 (2011), no. 1, 1–42
joint with Glenn Stevens

⋆ A construction of rigid analytic cohomology classes for congruence subgroups of $SL_3(\mathbb{Z})$
Canadian Journal of Mathematics 61 (2009) no. 3, 674–690
joint with David Pollack

⋆ Two p-adic L-functions and the weak Birch and Swinnerton-Dyer conjecture
L-Functions & Galois Representations, London Math Society LNS 320 (2007), 300-332
joint with Masato Kurihara

⋆ Kida's formula and congruences of modular forms
Documenta Mathematica, 2006, Extra volume (in honor of J. Coates), 615–630
joint with Tom Weston

⋆ Iwasawa theory of elliptic curves at supersingular primes over number fields
Journal für die Reine und Angewandte Mathematik, 598 (2006), 71–103
joint with Adrian Iovita

⋆ Variation of Iwasawa invariants in Hida families
Inventiones Mathematicae, 163 (2006), no. 3, 523–580
joint with Matthew Emerton and Tom Weston

⋆ The efficient calculation of Stark-Heegner points via overconvergent modular symbols
Israel Journal of Mathematics, 153 (2006), 319–354
joint with Henri Darmon

⋆ An algebraic version of a theorem of Kurihara
Journal of Number Theory, 110 (2005) no. 1, 164–177

⋆ The main conjecture for CM elliptic curves at supersingular primes
Annals of Mathematics, (2) 159 (2004), no. 1, 447–464
joint with Karl Rubin

⋆ On the p-adic L-function of a modular form at a supersingular prime
Duke Mathematical Journal, 118 (2003) no. 3, 523–558

Papers currently under review

⋆ Explicit reciprocity laws and Iwasawa theory for modular forms, arXiv:2210.02013
joint with Matthew Emerton and Tom Weston

⋆ Non-vanishing of critical L-values in Hida families, arXiv:2208.02769
joint with Vlad Serban

⋆ p-adic Gross-Zagier at critical slope & a conjecture of Perrin-Riou, arXiv:1811.08216
joint with Kazim Büyükboduk and Shu Sasaki

Preprints

⋆ $\mathcal{L}$-invariants via p-adic L-functions: computations and a distribution conjecture
joint with John Bergdall

Graduate student advising

Kâzim Büyükboduk	visiting graduate student from Stanford (Fall 2006)
Myoungil Kim	PhD received Spring 2011 currently a lecturer at Seoul National University
Cong Xue	visiting graduate student from Ecole Polytechnique (Spring 2013)
Chan-Ho Kim	PhD received Spring 2013 currently a postdoc at KIAS
Ian Sprung	PhD received Spring 2013 currently Assistant Professor at Arizona State University (tenure-track) (unofficial PhD student; official advisor was J. Silverman at Brown)
Ben Fischer	PhD received Spring 2016 current teaching at the Loomis Chaffee Schoo
Jiawei An	visiting graduate student from Peking (Fall 2022–Spring 2023)

Postdoctoral advising

Peter Gräf	DFG fellowship (Spring 2022–current)
John Bergdall	NSF postdoctoral fellowship (2014–2016)
Rob Harron	BU Postdoctoral Faculty Fellow (2009–2011)

Conferences Organized

October 2022	2022 AMS Sectional Meeting on Iwasawa theory at UMass Amherst
June 2016	L-functions and arithmetic, Harvard University (in honor of Karl Rubin's 60^{th} birthday)
September 2015	Boston-Keio summer workshop, Boston University

June 2014	p-adic variation in number theory, Boston University (in honor of Glenn Stevens' 60^{th} birthday)
September 2011	Boston-Keio summer workshop, Boston University
June 2005	Open questions and recent developments in Iwasawa theory, Boston University (in honor of Ralph Greenberg's 60^{th} birthday)
October 2004	Midwest number theory conference, University of Chicago

Lecture Series Presented

August 2011	Overconvergent modular symbols (5 lectures) Computations with Modular Forms, Heidelberg, Germany
March 2011	Overconvergent modular symbols (3 lectures) Arizona Winter School, Tucson
August 2007	Iwasawa theory of elliptic curves (4 lectures) Summer School on Iwasawa Theory, McMaster, Canada

Select Conference Talks

Jan 2023	JMM-AMS special session on arithmetic geometry (scheduled)
June 2018	Math. is a long conversation: a celebration of Barry Mazur, Harvard
May 2018	Iwasawa Theory and Related Topics, Heidelberg, Germany
November 2017	3rd Japanese-German NT Workshop, MPI, Bonn, Germany
February 2017	p-adic Methods for Galois Rep's & Modular Forms, Barcelona, Spain
September 2016	Automorphic Forms: theory and computation, Kings College, London
September 2015	p-adic Hodge theory & Iwasawa theory, Bielefeld University, Germany
May 2013	XV-ième colloque pan-québécois des étudiants de l'lSM, McGill
April 2013	AMS Spring Eastern Sectional Meeting, Boston College
February 2013	Sage Day 44: Overconvergent Modular Forms, University of Wisconsin
September 2012	Rational points on curves, Oxford, England
May 2011	Upstate number theory conference, Cornell
July 2010	Iwasawa 2010, Toronto, Canada
December 2009	Cycles and special values of L-series, CRM, Barcelona, Spain
December 2009	Sage Day 18: Computations related to the BSD conjecture, Harvard
July 2009	PCMI 2009: Arithmetic of L-functions, Park City, Utah
July 2008	Iwasawa 2008, Irsee, Germany
July 2006	p-adic modular forms and applications, Luminy, France
August 2005	Cryptography and related math, Chuo University, Tokyo, Japan
June 2005	Open questions and recent developments in Iwasawa theory, BU
January 2004	Far Hills 2004 workshop, Far Hills, Canada

July 2004	Iwasawa 2004, Besançon, France
November 2003	Birch and Swinnerton-Dyer conference, Princeton
September 2003	Cryptography and related math, Chuo University, Tokyo, Japan
August 2003	Current trends in arithmetic geometry, Banff, Canada
June 2002	XIII Rencontres arithmétiques, Caen, France
May 2002	Canadian Number Theory Association VII, Montreal, Canada

Select Seminar Talks

March 2023	Michigan State (scheduled)
Nov 2022	Columbia (scheduled)
May 2022	MIT
April 2022	Harvard University
February 2021	KIAS, Korea (online)
October 2020	UC Dublin, Ireland (online)
February 2019	Boston University
January 2018	Köln number theory seminar, Germany
November 2017	Heidelberg Oberseminar, Germany
October 2017	University Paris Sud (Orsay) number theory seminar
March 2016	Stanford University
February 2014	University of Chicago
May 2013	McGill University, Montreal, Canada
March 2010	Harvard University
December 2009	Koç University, Istanbul, Turkey
May 2008	University of Washington
December 2006	Steklov Institute, Moscow, Russia
August 2005	Keio University, Tokyo, Japan
February 2004	University of Toronto, Canada
September 2003	University of Tokyo, Japan
February 2002	Stanford University
January 2001	Princeton University

Courses taught

Spring 2023	MA124 – Calculus II (1 section plus course coordinator)
Fall 2022	MA741 – Graduate Algebra 1
Spring 2022	MA542 – Undergraduate Algebra II

Fall 2021	MA124 – Calculus II (course coordinator)
Spring 2021	MA124 – Calculus II (1 section plus discussion section coordinator)
Spring 2020	MA842 – Pseudo-deformation theory
Spring 2019	MA542 – Undergraduate Algebra II
Fall 2018	MA123 – Calculus I
Fall 2018	MA511 – Real Analysis
Spring 2016	MA124 – Calculus II (1 section plus course coordinator)
Fall 2015	MA124 – Calculus II
Spring 2015	MA124 – Calculus II (discussion section coordinator)
Spring 2015	MA564 – Introduction to Topology
Fall 2014	MA841 – Euler systems
Spring 2014	MA844 – Algebraic Number Theory
Fall 2013	MA124 – Calculus II
Spring 2013	MA124 – Calculus II (1 section plus discussion section coordinator)
Spring 2012	MA124 – Calculus II (1 section plus discussion section coordinator)
Fall 2011	MA124 – Calculus II
Fall 2011	MA511 – Real Analysis
Spring 2011	MA242 – Linear Algebra
Fall 2010	MA129 – Honors Calculus
Fall 2010	MA741 – Graduate Algebra
Spring 2010	MA242 – Linear Algebra
Fall 2009	MA129 – Honors Calculus
Fall 2009	MA541 – Undergraduate Algebra I
Fall 2008	MA124 – Calculus II
Spring 2008	MA542 – Undergraduate Algebra II
Spring 2007	MA542 – Undergraduate Algebra II
Spring 2007	MA844 – Iwasawa Theory
Spring 2006	MA742 – Graduate Algebra II
Fall 2005	MA123 – Calculus I
Fall 2005	MA741 – Graduate Algebra I
Spring 2005	MA242 – Linear Algebra
Spring 2005	MA341 – Number Theory
Fall 2004	MA242 – Linear Algebra
2002-2003	203/204/205 – Analysis (University of Chicago)

Educational Outreach

Teachers	Focus on Mathematics, Boston University -mentored teachers' research projects, Fall 2005, Fall 2007
	Ross Program for Teachers, Ohio State University -worked with teachers for 1 week on number theory, Summer 2005
	SESAME for teachers, University of Chicago -instructor of weekly course on unique factorization, Spring 2004
High school students	PROMYS, Boston University -taught 6 week course on representation theory, Summers 2008, 2013 -research lab mentor, Summers 2005, 2007
	Summer Institute of Mathematics, University of Washington -instructor of 3 week course on elliptic curves, Summers 2003, 2005 -instructor of 3 week course on sums of squares, Summer 2004
	Ross program, Ohio State University -instructor of 1 week course on class numbers, Summer 2004
Elementary students	Math activities, Morse Elementary school -met with 2nd and 3rd graders in this elementary school and led them through enrichment math activities, 2019, 2021
	Math Circle, Tobin Elementary school -co-ran and created a weekly math circle for children (ages 5-9) in this elementary school, 2015-2016
	The Math Circle, Harvard University -instructor of weekly course on modular arithmetic, Spring 1999

Code development

- ⋆ developed number theory packages in Sage, Magma
- ⋆ code for the following available at `https://github.com/rpollack9974`
  - ∘ slopes of modular forms sorted by residual representation
  - ∘ $\mathcal{L}$-invariants of modular forms sorted by residual representation
  - ∘ Iwasawa invariants of elliptic curves
  - ∘ Overconvergent modular symbols (also intrinsically available in SAGE)