

Daniel Hast

email: drh@rice.edu
phone: (616) 773-8322
<http://math.rice.edu/~dh47/>

Rice University
Department of Mathematics – MS 136
6100 Main Street
Houston, TX 77005

EMPLOYMENT	Rice University, G. C. Evans Instructor University of Wisconsin–Madison, Graduate Assistant	2018 – 2013 – 2018
EDUCATION	University of Wisconsin–Madison Ph.D. in Mathematics Advisor: Prof. Jordan S. Ellenberg University of Michigan, Ann Arbor B.S. with High Honors in Mathematics (with minor in physics)	2013 – 2018 2009 – 2013
RESEARCH INTERESTS	My main areas of interest are in arithmetic algebraic geometry, Diophantine geometry, and arithmetic statistics.	
PUBLICATIONS & PREPRINTS	<i>Rational points on solvable curves over \mathbb{Q} via non-abelian Chabauty</i> , with Jordan S. Ellenberg. Submitted; preprint at https://arxiv.org/abs/1706.00525 <i>Higher moments of arithmetic functions in short intervals: a geometric perspective</i> , with Vlad Matei. <i>International Mathematics Research Notices</i> (2018); preprint at https://arxiv.org/abs/1604.02067	
ONGOING RESEARCH PROJECTS	Investigating extensions of Minhyong Kim’s non-abelian generalization of the method of Chabauty and Coleman to broader classes of curves over number fields. This project is aimed at developing an explicit p -adic proof of Faltings’ theorem for higher genus curves. Collaborating with Vlad Matei and Joseph Gunther on counting tetragonal curves over finite fields.	
TEACHING EXPERIENCE	G. C. Evans Instructor, Rice University: Math 306 (Elements of Abstract Algebra) Math 102 (Single Variable Calculus II) Math 365 (Number Theory) Teaching Assistant, University of Wisconsin–Madison: Math 376 (Multivariable Calculus & Differential Equations) Math 375 (Multivariable Calculus & Linear Algebra) Algebra Summer Enhancement Program (SEP) for new graduate students at UW–Madison Math 114 (Algebra and Trigonometry) Math 234 (Multivariable Calculus) Math 221 (Calculus & Analytic Geometry)	Spring 2019 Fall 2018 Fall 2018 Spring 2018 Fall 2017 Summer 2017 Fall 2016 Fall 2015, Fall 2014 Fall 2013
HONORS & AWARDS	Granted research assistantships on algebraic geometry/number theory NSF-RTG grant.	Spring & summer 2014–2017

	<i>Chancellor's Opportunity Award</i> , UW-Madison Department of Mathematics	Fall 2013
	<i>M.S. Keeler Department of Mathematics Merit Scholarship</i> , University of Michigan Math. Dept., for demonstrating outstanding mathematical talent through coursework and competitions	2009–2013
	<i>Michigan Tradition Scholarship</i> , University of Michigan	2009–2013
	<i>William J. Branstrom Freshman Prize</i> , University of Michigan	2010
REFEREE WORK	Referee for <i>Compositio Mathematica</i> and <i>Algebra & Number Theory</i>	
PROGRAMMING EXPERIENCE	Proficient with \LaTeX , Python, Ruby, Java, JavaScript, HTML, Macaulay2, Magma, and Sage.	
OUTREACH & ORGANIZATION	Member of the Current Math Seminar committee, which organizes expository talks by graduate students in preparation for colloquium, at Rice University.	2018 – 2019
	Directed a reading course on algebraic geometry and elliptic curves with a Rice University undergraduate.	Fall 2018
	Helped organize the Geometry of Redistricting conference at UW–Madison in partnership with Tufts University's Metric Geometry and Gerrymandering Group.	Oct. 2017
	Co-founder and seminar organizer for the UW–Madison AMS Student Chapter.	2014 – 2017
	President of the AMS Student Chapter.	2015 – 2017
	Directed five undergraduate reading courses on elementary number theory, elliptic curves, algebraic geometry, history of mathematics, and p -adic analysis through the Directed Reading Program.	2015 – 2017
	Co-organizer for a seminar on R. Lazarsfeld's <i>Positivity in Algebraic Geometry</i> .	Fall 2016
	Member of a Mathematics department committee on inclusion and discrimination.	Fall 2016
	Co-organizer for the UW–Madison Directed Reading Program, a program where undergraduates work with graduate student mentors on a reading course and a presentation to their peers.	Fall 2016
	Ran a booth demonstrating the Monty Hall problem at Saturday Science, a public outreach event at the Wisconsin Institute for Discovery.	Aug. 2016

	Gave a presentation on my research in number theory to a group of high school interns with the Wisconsin IceCube Particle Astrophysics Center.	Feb. 2015
	Gave a presentation on modular arithmetic and quadratic reciprocity to a group of high school students in the Madison Math Circle.	Oct. 2014
CONFERENCE PRESENTATIONS	“Rational points and unipotent fundamental groups,” invited talk at the Texas Algebraic Geometry Seminar at Texas A&M.	Nov. 2018
	“Rational points and unipotent fundamental groups,” invited talk in the <i>From Hyperelliptic to Superelliptic Curves</i> AMS Special Session at the AMS Sectional Meeting in Ann Arbor.	Oct. 2018
	“Diophantine finiteness via Selmer varieties and unramified correspondences,” poster at RTG Lectures in Arithmetic Geometry at Rice University.	Feb. 2017
	“Higher Moments of Arithmetic Functions in Short Intervals,” talk at the Midwest Number Theory conference at University of Illinois at Chicago.	Oct. 2015
	“The Geometry of Short Intervals in Function Field Arithmetic,” talk at the Midwest Algebraic Geometry Graduate Conference at University of Illinois at Chicago.	Apr. 2015
	“3-Periodic Orbits of Polygonal Outer Billiards,” talk at CURM conference at Penn State University.	Nov. 2011
	“3-Periodic Orbits of Polygonal Outer Billiards,” talk at MathFest in Lexington, Kentucky.	Aug. 2011
SEMINAR TALKS	Invited talk at Berkeley’s number theory seminar.	Apr. 2019
	Invited talk at Northwestern University’s number theory seminar.	Mar. 2019
	“Rational points and unipotent fundamental groups,” invited talk at Ohio State University’s algebraic geometry seminar.	Oct. 2018
	“Rational points and unipotent fundamental groups,” at Rice University’s algebraic geometry / number theory seminar.	Sept. 2018
	“Rational points on solvable curves over \mathbb{Q} via non-abelian Chabauty,” invited talk at UC Irvine number theory seminar.	Jan. 2018
	Talk in the AMS Contributed Paper Session on Number Theory at the 2018 Joint Mathematics Meetings in San Diego.	Jan. 2018
	“Rational points on solvable curves over \mathbb{Q} via non-abelian Chabauty,” research talk in the UW–Madison number theory and representation theory seminar.	Sept. 2017

	“Finiteness of integral points on curves via the Chabauty–Coleman–Kim method,” talk on ongoing research in the UW–Madison number theory and representation theory seminar.	Dec. 2015
	“The Geometry of Arithmetic Functions in Short Intervals,” talk on my research with Vlad Matei, in the UW–Madison graduate number theory seminar.	Sept. 2014
	Expository talks in the UW–Madison graduate number theory seminar:	
	– “Lang’s conjectures and uniformity of rational points”	Nov. 2017
	– “The direct summand conjecture”	Jan. 2017
	– “Introduction to arboreal Galois representations”	Oct. 2016
	– “The Local-to-Global Principle and Approximation Theorems”	Feb. 2016
	– “Grothendieck’s Étale Fundamental Group”	Feb. 2015
	– “The Chabauty–Coleman Method for Elliptic Curves”	Feb. 2014
	– “Congruence Subgroups, Hecke Operators, and Galois Representations”	Nov. 2013
	“Jacobians, path integrals, and fundamental groups of curves,” series of two expository talks in the UW–Madison graduate algebraic geometry seminar.	Mar. 2016
	“The Weight-Monodromy Conjecture and Perfectoid Spaces,” series of three expository talks in the UW–Madison graduate algebraic geometry seminar.	Fall 2014
WORKSHOPS	Participated in “The Arithmetic of Hyperelliptic Curves” summer school and workshop at the International Centre for Theoretical Physics in Trieste, Italy	Aug. 2017
	Participated in the Arizona Winter School in Arithmetic Geometry:	
	– Bhargav Bhatt’s project group	March 2017
	– Ravi Vakil’s project group	March 2015
	– Jordan Ellenberg’s project group	March 2014
	Participated in the “Motivic Invariants and Singularities” Thematic Undergraduate Summer School at the Center for Mathematics in Notre Dame.	May 2013
	Worked with Dr. Dmitriy Boyarchenko on a project on the Weil representation and the metaplectic group during a summer REU program at University of Michigan.	2012
	Worked with Dr. Filiz Dođru and Neil DeBoer on a dynamical systems problem during a summer REU at Grand Valley State University.	2011

CONFERENCES ATTENDED	Algorithmic Number Theory Symposium conference at UW–Madison	July 2018
	“Mathematics is a Long Conversation: A Celebration of Barry Mazur” at Harvard University	June 2018
	Arithmetic of Algebraic Curves conference at UW–Madison	April 2018
	CA+ (commutative algebra) conference at University of Minnesota	Sept. 2017
	“Emory Conference on Higher Obstructions to Rational Points” conference at Emory University.	May 2017
	Fields Medal Symposium at University of Toronto.	Nov. 2016
	“Kummer classes and anabelian geometry” workshop on Mochizuki’s work on the abc conjecture at University of Vermont.	Sept. 2016
	Arithmetic algebraic geometry conference at New York University.	Aug. 2016
	Workshop and conference on higher-dimensional algebraic geometry at University of Utah.	June 2016
	“Local and Global Methods in Algebraic Geometry” conference at University of Illinois at Chicago.	May 2016
	2016 Joint Mathematics Meetings in Seattle.	Jan. 2016
	“Non-Archimedean Geometry and Its Applications” conference at University of Michigan.	June 2015
	“ p -adic Methods in Number Theory,” at UC–Berkeley.	May 2015
	Midwest Number Theory conference and the Bateman–Halberstam Number Theory conference at University of Illinois, Urbana–Champaign.	June 2014
	Midwest Algebraic Geometry Graduate Conference at University of Illinois at Chicago.	Feb. 2014
	2014 Joint Mathematics Meetings in Baltimore.	Jan. 2014