Abbey Bourdon

CONTACT INFORMATION	Department of Mathematics and Statistics Wake Forest University Winston-Salem, NC 27109	*Phone:* (336) 758-4991 *E-mail:* bourdoam@wfu.edu *Web:* http://users.wfu.edu/bourdoam/

EDUCATION

Wesleyan University, Middletown, Connecticut

Ph.D., Mathematics, May 2014

- Dissertation Topic: "A Uniform Version of a Finiteness Conjecture for CM Elliptic Curves"
- Advisor: Christopher Rasmussen

University of Richmond, Richmond, Virginia

B.A., Mathematics and Music Performance/Literature (Summa Cum Laude), May 2007

EMPLOYMENT

Wake Forest University, Winston-Salem, North Carolina   **July 2017-present**
Associate Professor (July 2023-present)
Assistant Professor (July 2017-June 2023)

University of Georgia, Athens, Georgia   **August 2014 - May 2017**
Postdoctoral Associate

Wesleyan University, Middletown, Connecticut   **September 2009 - May 2014**
Graduate Teaching Assistant

King Low Heywood Thomas, Stamford, Connecticut   **September 2007 - August 2009**
Upper School Mathematics Teacher

VISITING APPOINTMENTS

Simons Laufer Mathematical Sciences Institute, Berkeley, California   **January - May 2023**
Research Member

AWARDS AND GRANTS

NSF DMS-2145270 CAREER, *Exceptional Points on Modular Curves*, 2022-2027.
Award for Excellence in Research, Wake Forest University, 2024
NSF DMS-2137659 LEAPS, *Isolated Points on Curves*, 2021-2024.
A.J. Sterge Faculty Fellowship, 2019-2022.
AWM-NSF Mentoring Travel Grant, 2021.
Award for Distinguished Teaching by a Beginning Faculty Member, MAA Southeastern Section, 2021.
Phi Beta Kappa, University of Richmond, 2007.

SCHOLARLY WORK

1. (with Tyler Genao) *Uniform polynomial bounds on torsion from rational geometric isogeny classes*, available at arxiv.org:2409.08214.

2. (with Nina Ryalls and Lori D. Watson) *Minimal torsion curves in geometric isogeny classes*, available at arxiv.org:2407.14322.

3. (with Filip Najman) *Sporadic points of odd degree on $X_1(N)$ coming from $\mathbb{Q}$-curves*, available at arxiv.org:2107.10909.

4. (with Sachi Hashimoto, Timo Keller, Zev Klagsbrun, David Lowry-Duda, Travis Morrison, Filip Najman, Himanshu Shukla and an appendix by Maarten Derickx and Mark van Hoeij) *Towards a classification of isolated j-invariants*, Math. Comp. **94** (2025), no. 351, 447-473.

5. (with David Gill, Jeremy Rouse, and Lori D. Watson) *Odd degree isolated points on $X_1(N)$ with rational j-invariant*, Res. Number Theory **10** (2024), no 1, Paper No. 5, 32 pp.

6. (with Holly Paige Chaos) *Torsion for CM elliptic curves defined over number fields of degree 2p*, Proc. Amer. Math. Soc. **151** (2023), no. 3, 1001-1015.

7. (with Pete L. Clark) *Torsion points and isogenies on CM elliptic curves*, J. London Math. Soc. **102** (2020), no. 2, 580-622.

8. (with Pete L. Clark) *Torsion points and Galois representations on CM elliptic curves*, Pacific J. Math. **305** (2020), no. 1, 43-88.

9. (with Özlem Ejder, Yuan Liu, Frances Odumodu, and Bianca Viray) *On the level of modular curves that give rise to isolated j-invariants*, Adv. Math. **357** (2019), 106824, 33.

10. (with Pete L. Clark and James Stankewicz) *Torsion points on CM elliptic curves over real number fields*, Trans. Amer. Math. Soc. **369** (2017), no. 12, 8457-8496.

11. (with Paul Pollack) *Torsion subgroups of CM elliptic curves over odd degree number fields*, Int. Math. Res. Not. IMRN (2017), no. 16, 4923-4961.

12. (with Pete L. Clark and Paul Pollack) *Anatomy of torsion in the CM case*, Math. Z. **285** (2017), no. 3, 795-820.

13. *A uniform version of a finiteness conjecture for CM elliptic curves*, Math. Res. Lett. **22** (2015), no. 2, 403-416.

TEACHING EXPERIENCE	**Wake Forest University**, Winston-Salem, North Carolina	**July 2017 - present**

Instructor

- Math 111: Calculus with Analytic Geometry I (Fall 2024)
- Math 112: Calculus with Analytic Geometry II (Fall 2017, Fall 2020, Fall 2024)
- Math 117: Discrete Mathematics (Spring & Fall 2018, Spring & Fall 2019, Fall 2021, Spring & Fall 2022, Spring 2024)
- Math 121: Linear Algebra I (Fall 2023)
- Math 172: Mathematics and Social Justice (Fall 2023)
- Math 191: Research Exploration in Mathematics (Spring 2024, Spring 2025)
- Math 243/682: Codes and Cryptography (Fall 2022)
- Math 321: Modern Algebra I (Spring 2024)
- Math 345/645: Number Theory (Spring 2018, Spring 2019, Spring 2022, Summer 2023)
- Math 346/646: Modern Number Theory (Fall 2019)
- Math 372: Mathematics, Statistics, and Society (Fall 2021, Fall 2022)
- Math 721: Abstract Algebra (Fall 2020)
- Math 722: Abstract Algebra (Spring 2021)

University of Georgia, Athens, Georgia   **August 2014 - May 2017**

Instructor

- Math 8430: Elliptic Curves (Spring 2017)
- Math 2260: Calculus II for Science and Engineering (Spring 2015, Spring 2017)
- Math 4400/6400: Number Theory (Spring 2016)
- Math 3300: Applied Linear Algebra (Fall 2015)
- Math 2250: Calculus I for Science and Engineering (Fall 2014)

Wesleyan University, Middletown, Connecticut   **September 2009 - December 2013**

Instructor

- Math 500: Graduate Pedagogy (Fall 2013)
- Math 122: Calculus I, Part II (Spring 2013)
- Math 117: Introductory Calculus (Fall 2011)

Teaching Assistant

- Math 261: Abstract Algebra (Fall 2013)
- Math 228: Discrete Mathematics (Fall 2012)
- Math 264: Algebraic Geometry (Spring 2012)
- Math 223: Linear Algebra (Spring 2011)
- Math 121: Calculus I, Part I (Fall 2010)

- Math 111: Introduction to Mathematical Thought (Spring 2010)
- Math 221: Vectors and Matrices (Fall 2009)

Center for Prison Education, Middletown, Connecticut   **July 2012 - December 2013**

Instructor

- Introductory Algebra (Summer/Fall 2012)
- Intermediate Algebra (Spring/Summer 2013)

Co-Instructor

- Math 107: A Review of Algebra and Graphing and Precalculus (Fall 2013)

King Low Heywood Thomas, Stamford, Connecticut   **September 2007 - August 2009**

Upper School Mathematics Teacher

- Algebra II (Fall 2007-Spring 2009)
- Precalculus (Fall 2007-Spring 2009)
- Honors Calculus (Fall 2008-Spring 2009)

UNDERGRADUATE ADVISING

Jacobi Gilbert, Senior Thesis Advisor, Spring 2025-present.
Bella Liu, Independent Study, URECA Summer Fellow, & Senior Thesis Advisor, Spring 2022-Fall 2023.
Xingyu (Jax) Hou, Independent Study, Spring 2022.
Mingzhi (Leo) Li, Senior Thesis Advisor, Fall 2018-Spring 2019.

GRADUATE ADVISING

Michael Eddy, Master's Thesis Advisor, Spring 2025-present.
Chris Calger, Master's Thesis Advisor, Spring 2025-present.
Meghan Lee, Master's Thesis Advisor, Spring 2024-Spring 2025.
Hailey Maxwell, Master's Thesis Advisor, Spring 2024-Spring 2025.
Giacomo Viazzo, Master's Thesis Advisor, Spring 2022-Spring 2023.
Nina Ryalls, Master's Thesis Advisor, Spring 2021-Spring 2022.
David Gill, Master's Thesis Advisor, Spring 2019-Fall 2020.
Holly Paige Chaos, Master's Thesis Advisor, Summer 2018-Spring 2020.

POSTDOCTORAL ADVISING

Thomas Kindred, Postdoctoral Teaching Advisor, Fall 2021-Spring 2022.
Lori D. Watson, Postdoctoral Research Advisor, Summer 2019-Summer 2022.

MATH ALLIANCE

Meagan Hodge, Pre-doctoral Mentor, Fall 2022-Spring 2024.

CONFERENCE & SEMINAR PRESENTATIONS

Polynomial Bounds on Torsion from Rational Geometric Isogeny Classes, Number Theory Seminar, Brown University, February 2025.

Polynomial Bounds on Torsion from Rational Geometric Isogeny Classes, Number Theory Seminar, University of Georgia, January 2025.

Minimal Torsion Curves in Geometric Isogeny Classes, AMS Eastern Sectional Meeting, University at Albany, October 2024.

Minimal Torsion Curves in Geometric Isogeny Classes, Algebra and Number Theory Seminar, Emory University, September 2024.

An Algorithm for Isolated j-invariants, Number Theory Seminar, Ohio State University, March 2024.

Torsion Points of Elliptic Curves, Distinguished Lecture for Students, MAA Southeastern Sectional Meeting, University of Tennessee at Knoxville, March 2024.

An Algorithm for Isolated j-invariants, Algebra/Number Theory Seminar, University of Rochester, February 2024.

An Algorithm for Isolated j-invariants, AMS Special Session on Arithmetic Geometry with a View toward Computation, Joint Mathematics Meetings in San Francisco, CA, January 2024.

An Algorithm for Isolated j-invariants, Modular curves and Galois representations, Zagreb, Croatia, September 2023.

Minimal Torsion Curves in Geometric Isogeny Classes, COUNT, COmputations and their Uses in Number Theory, Marseille, France, March 2023.

Minimal Torsion Curves in Geometric Isogeny Classes, Connections Workshop: Diophantine Geometry, Berkeley, CA, February 2023.

Sporadic Torsion on Elliptic Curves, Bayou Arithmetic Research Days (BARD) 1, Louisiana State University, November 2022.

Sporadic Torsion on Elliptic Curves, Algebra Seminar, Virginia Tech, October 2022.

Sporadic Torsion on Elliptic Curves, Colloquium, University of North Carolina - Greensboro, October 2022.

Minimal Torsion Curves in Geometric Isogeny Classes, Mordell 2022, Cambridge, UK, August 2022.

Sporadic Points of Odd Degree on $X_1(N)$ Coming from $\mathbb{Q}$-curves, Modern Breakthroughs in Diophantine Problems, Banff International Research Station, Canada, June 2022.

Towards a Classification of Sporadic j-invariants, Number Theory Seminar, Boston University, April 2022.

Towards a Classification of Sporadic j-invariants, Rational Points 2022, Franken-Akademie Schloss Schney, Germany, April 2022.

Torsion Subgroups of CM Elliptic Curves in Degree $2p$, Number Theory Seminar (online), University of British Columbia, December 2021.

Diophantine Geometry and Isolated Points on Curves, Colloquium (online), Wellesley College, December 2021.

Families of Sporadic Points on Modular Curves, Rational Points and Galois Representations (online), University of Pittsburgh, May 2021.

Isolated Points on Modular Curves, Seminar on Number Theory and Algebra (online), University of Zagreb, December 2020.

On Isolated Points of Odd Degree, Algebra Seminar (online), University of Connecticut, October 2020.

On Isolated Points of Odd Degree, Special Session on Coding Theory, Cryptography, and Number Theory, AMS Fall Southeastern Sectional Meeting (online), October 2020.

On Isolated Points of Odd Degree, Number Theory Seminar of the Institut de Mathématiques de Jussieu (online), Paris, France, September 2020.

On Isolated Points of Odd Degree, Modern Breakthroughs in Diophantine Problems (online), Banff International Research Station, August 2020.

On Isolated Points of Odd Degree, Algebra, Geometry, and Number Theory Seminar, Tufts University, February 2020.

Torsion Points of Elliptic Curves, Colloquium, Washington and Lee University, November 2019.

Isolated Points on Modular Curves, Algebra Seminar, Wesleyan University, October 2019.

Isolated Points on Modular Curves, Ninth Annual Upstate Number Theory Conference, Cornell Uni-

versity, April 2019.

Torsion Points of Elliptic Curves, Pi Mu Epsilon Colloquium Series, Elon University, April 2019.

Sporadic Points on Modular Curves, Coding, Cryptography, and Number Theory (CCNT) Seminar, Clemson University, April 2019.

Sporadic Points on Modular Curves, Mid-Atlantic Seminar On Numbers (MASON) III, James Madison University, February 2019.

Torsion Points and Isogenies on CM Elliptic Curves, AMS Special Session on Number Theory, Arithmetic Geometry, and Computation, Joint Mathematics Meetings in Baltimore, MD, January 2019.

Torsion Points and Isogenies on CM Elliptic Curves, Palmetto Number Theory Series (PANTS) XXXI, University of South Carolina, December 2018.

Rational Torsion Points on CM Elliptic Curves, Colloquium, Appalachian State University, November 2018.

Sporadic Points with j-invariant of Bounded Degree, Torsion groups and Galois representations of elliptic curves, University of Zagreb, Croatia, June 2018.

Sporadic Points with j-invariant of Bounded Degree, Connecticut Summer School in Number Theory (CTNT) Conference, University of Connecticut, June 2018.

Torsion Points of Elliptic Curves, Colloquia, James Madison University, April 2018.

Sporadic Points on Modular Curves, Arithmetic of Algebraic Curves, University of Wisconsin-Madison, April 2018.

Sporadic Points on Modular Curves, Algebra Seminar, University of Virginia, March 2018.

Degrees of CM Points on $X_1(M,N)$, Algebraic Geometry and Number Theory Seminar, Rice University, October 2017.

Degrees of CM Points on $X_1(M,N)$, Special Session on Algebraic Curves and their Applications, AMS Fall Southeastern Sectional Meeting, University of Central Florida, September 2017.

Torsion Points on CM Elliptic Curves, AMS Special Session on Discrete Structures in Number Theory, Joint Mathematics Meetings in Atlanta, GA, January 2017.

Torsion in Isogeny Classes of CM Elliptic Curves, Mid-Atlantic Seminar on Numbers (MASON) I, Towson University, October 2016.

Torsion in Isogeny Classes of CM Elliptic Curves, Palmetto Number Theory Series (PANTS) XXVI, University of North Carolina Greensboro, September 2016.

CM Elliptic Curves: All the Small Rings, Number Theory Seminar, University of Georgia, September 2016.

Torsion in Odd Degree, Algebraic Geometry, Arithmetic Geometry, and Commutative Algebra Seminar, University of South Carolina, March 2016.

Torsion Points of Elliptic Curves, Graduate Student Seminar, University of Georgia, February 2016.

Torsion in Odd Degree, AMS Special Session on Number Theory and Cryptography, Joint Mathematics Meetings in Seattle, WA, January 2016.

Stratification of Torsion in Odd Degree, Palmetto Number Theory Series (PANTS) XXV, Clemson University, December 2015.

Torsion in Odd Degree, Algebra Seminar, Emory University, December 2015.

Olson Degrees of CM Elliptic Curves, Algebra Seminar, Wesleyan University, October 2015.

Torsion in Odd Degree for CM Elliptic Curves, Number Theory Seminar, University of Georgia, September 2015.

The Anatomy of Torsion for CM Elliptic Curves, Workshop for Young Researchers held in association with the conference Elementary, analytic, and algorithmic number theory: Research inspired by the mathematics of Carl Pomerance, University of Georgia, June 2015.

Olson Degrees of CM Elliptic Curves, Algebraic Geometry and Number Theory Seminar, Clemson University, April 2015.

Torsion Points on CM Elliptic Curves over Number Fields of Odd Degree, Southeast Regional Meeting on Numbers (SERMON) XXVII, Winthrop University, March 2015.

Torsion Points of Elliptic Curves, Colloquium Series, University of Richmond, November 2014.

Rational Torsion on CM Elliptic Curves over Real Number Fields, Special Session on Galois Theory and Its Interactions with Algebra and Number Theory, AMS Fall Southeastern Sectional Meeting, University of North Carolina Greensboro, November 2014.

Torsion Points on CM Elliptic Curves over Real Number Fields, Number Theory Seminar, University of Georgia, October 2014.

A Uniform Version of a Finiteness Conjecture for CM Elliptic Curves, AMS Session on Number Theory, Joint Mathematics Meetings in Baltimore, MD, January 2014.

Rationality of ℓ-torsion Points on CM Elliptic Curves, Maine/Québec Number Theory Conference, University of Maine, October 2013.

A Uniform Version of a Finiteness Conjecture for CM Elliptic Curves, Algebra Seminar, University of Connecticut, October 2013.

Torsion Point Fields of CM Elliptic Curves, Upstate New York Number Theory Conference, Binghamton University, April 2013.

Uniform Bound on Certain CM Cases of the Rasmussen/Tamagawa Conjecture, Everytopic Seminar, Brandeis University, April 2013.

Uniform Bound on Certain CM Cases of the Rasmussen/Tamagawa Conjecture, Algebra Seminar, Wesleyan University, November 2012.

PROFESSIONAL SERVICE

Project leader for "Modular Curves and Galois Representations" in the graduate workshop *Arithmetic Geometry at UNT*, May 2025.

Steering Committee, Southeastern Affiliate of Math Alliance, November 2023-present.

Co-organizer of *Algebraic Points on Curves* conference, Institute for Computational and Experimental Research in Mathematics (ICERM), June 2025.

Panelist for "Getting into a PhD Program," Field of Dreams Conference in Atlanta, GA, November 2024.

Co-organizer of *Palmetto Number Theory Series (PANTS) XXXVIII* conference, Wake Forest University, September 2024.

Panelist for "Building a Successful Research Career in Mathematics," AMS Committee on the Profession Panel Discussion, Joint Mathematics Meetings in San Francisco, CA, January 2024.

Panelist for "Writing Research/Teaching/Diversity Statements for Job Applications", Simons Laufer Mathematical Sciences Institute, March 2023.

Panelist for "From day 1 to PhD", Graduate Research Opportunities for Women (GROW), Duke University, October 2022.

Panelist for the National Science Foundation.

Reviewer for MathSciNet.

Referee for *Acta Arithmetica*, *Algebra and Number Theory*, *Experimental Mathematics*, *Forum Mathematicum*, *International Journal of Number Theory*, *Journal of the London Mathematical Society*, *Mathematical Research Letters*, *Mathematics of Computation*, *New York Journal of Mathematics*, *Pacific Journal of Mathematics*, *Proceedings of the American Mathematical Society*, *Research in Number Theory*, *Revista Matemática Iberoamericana*, *Transactions of the American Mathematical Society*.

Speaker in Project NExT session on Equitable Teaching and Inclusivity, August 2021.

Co-organizer of *Building a Diverse and Inclusive Mathematics Major* panel discussion, Project NExT, August 2018.

Project co-leader, Women in Numbers (WIN) 4, Banff International Research Station, August 2017.

Co-organizer of *Elliptic Curves* special session, AMS Southeastern Sectional Meeting, March 2016.

Panel member for *The Big Picture: Succeeding in the Job Market*, Graduate Student Boot Camp, University of Georgia, June 2015.

UNIVERSITY & DEPARTMENT SERVICE

Faculty advisor, Association for Women in Mathematics Student Chapter, Fall 2019-present.

Mathematics major advisor, Wake Forest University, Fall 2023-present.

Committee for the Liberal Arts Core Curriculum, Fall 2023-Fall 2024.

Mathematics minor advisor, Wake Forest University, Spring 2021-Spring 2023.

Principle faculty member, *Growth Mindset in STEM*, Wake Forest University, Fall 2018-Spring 2022.

Chair of Math Club/Pi Mu Epsilon Committee, Department of Mathematics and Statistics, Wake Forest University, Fall 2018-Spring 2022.

Lower division advisor, Wake Forest University, Fall 2018-Spring 2021.

Held mock class at Wake Forest University Discovery Day (April 2018, April 2019) and Pathways to Wake Forest (September 2018).

Other service within the Department of Mathematics and Statistics:

- Hiring Committee, 2020-2021 & 2023-2024 & Fall 2024.
- Graduate Committee, Fall 2021-Spring 2023.
- MST 117 Course Coordinator, Fall 2021-Spring 2023.
- Equity Committee, 2020-2021.
- Undergraduate Curriculum Committee, 2017-2019.
- Space Committee, 2017-2018.

OUTREACH

Developed lesson plan "Exploring Gaps Between Primes" for distribution through the Scientific Research and Education Network (SciREN) and participated in networking event with local K-12 educators, April 2016.

Initiated a mathematics program within the Center for Prison Education at Wesleyan University and taught courses from Introductory Algebra to Precalculus, Summer 2012-Fall 2013.