Caroline Matson | CV

81 Maple Avenue – Cortland, NY – USA

 (703) 517-3822   •   caroline.matson@colorado.edu

Education

University of Colorado (CU Boulder) **Boulder**
Ph.D. in Mathematics, advisor David Grant *May 2020*
Dissertation title: "Multidimensional formal group laws with complex multiplication."

University of Colorado **Boulder**
Masters in Mathematics *May 2016*

University of Virginia **Charlottesville**
B.S. in Mathematics *May 2013*

University of Virginia **Charlottesville**
B.A. in Cognitive Science with concentration in Computer Science *May 2013*

Research

Interests

My research interests are in arithmetic geometry, the intersection of number theory and algebraic geometry. I study multidimensional formal groups with complex multiplication, or large endomorphism rings, and use these to answer questions about Galois extensions of p-adic fields. I am also interested in questions relating moduli spaces, arithmetic dynamics, and the local Langlands program.

Publications

- Matson, C. L. (2020). *Multi-dimensional Formal Group Laws with Complex Multiplication* (Doctoral dissertation, University of Colorado at Boulder).
- Bradford, L., Harris, M., Jones, B., Komarinski, A., Matson, C., & O'Shea, E. (2014). The refined lecture hall theorem via abacus diagrams. *The Ramanujan Journal*, 34(2), 163-176.

Schools

- Arithmetic and Algebraic Geometry in Ann Arbor (AAGAA) *August 2019*
- Arizona Winter School: Chromatic Homotopy Theory *March 2019*
- Arizona Winter School: Iwasawa Theory *March 2018*
- MSRI Summer Graduate School: Commutative Algebra and Related Topics *May 2017*

Grants

- United Government of Graduate Students (UGGS) Individual Travel Grant *Fall 2019*
  This competitive grant provided $300 in funding for me to travel to present a poster at the Arithmetic and Algebraic Geometry in Ann Arbor conference at the University of Michigan.
- ASSETT Development Award *Fall 2015*
  My team and I were granted $4,475 by the CU Boulder ASSETT program to support the creation

of 3D-printed models for classroom use.
- o Summer Graduate School Fellowship   *Summer 2016*
  I was granted $6,000 by the CU Boulder graduate school to support my summer research.

Talks and Posters

Conferences

- o *The commutant monoid of a power series map.*   *September 2020*
  Binghamton University number theory seminar, held remotely.
- o *The moduli stack of formal groups.*   *September 2020*
  Madison Moduli Weekend, hosted virtually by the University of Wisconsin.
- o *Formal groups with complex multiplcation. (Invited)*   *January 2020*
  Special Session "Explicit Methods in Arithmetic Geometry in Characteristic p" at the Joint
  Mathematics Meeting in Denver.
- o *Formal group laws with complex multiplication. (Poster)*   *October 2019*
  Midwest Arithmetic Geometry and Number Theory conference hosted at the Ohio State University.
- o *Formal group laws with complex multiplication. (Poster)*   *August 2019*
  Arithmetic and Algebraic Geometry in Ann Arbor hosted at the University of Michigan.
- o *Multidimensional Formal Group Laws.*   *April 2019*
  Front Range Number Theory Day, hosted at CU Boulder. One of several "lightning talks," short
  introductions to research questions.
- o *Higher-dimensional formal groups.*   *May 2018*
  Strength in Numbers graduate conference hosted at Queen's College.
- o *Algebraic techniques in the study of elliptic curves.*   *April 2018*
  KUMUNU graduate conference hosted at the University of Nebraska.
- o *New results on the Coxeter group structure of lecture hall partitions.*   *January 2013*
  AMS Session on Undergraduate Research in Combinatorics and Number Theory at the Joint
  Mathematics Meeting in San Diego.

Local talks

- o *Heights of formal group laws.*   *November 2019*
  CU Boulder chromatic homotopy theory reading seminar.
- o *Multidimensional formal group laws with complex multiplication.*   *October 2019*
  Colorado State University math department number theory lab.
- o *From Affine to Zariski: Demystifying algebraic geometry.*   *September 2019*
  CU Boulder math department graduate student seminar.
- o *The main conjecture of the Iwasawa theory of elliptic curves.*   *March 2018*
  CU Boulder math department number theory seminar.
- o *Perfectoid spaces.*   *September 2017*
  CU Boulder "Tangents," a seminar for a general math audience with pizza and beer.
- o *Knot theory.*   *September 2015*
  CU Boulder "STEMinar," an interdisciplinary seminar with a STEM focus.
- o *The lecture hall theorem.*   *February 2014*
  CU Boulder "Slow Pitch," a seminar aimed at a first-year math graduate student audience.

Teaching Experience

Instructor of Record
- Student Academic Success Center (SASC) Calculus 2 Co-Seminar *Spring 2019*
- Student Academic Success Center (SASC) Calculus 3 Co-Seminar *Spring 2018*
  Responsibilities: Ran a small supplemental course aimed at supporting historically underserved student populations; attended SASC community events; worked in the math help room (the 'M'); participated in pedagogical development and discussions on gender and race.

Instructor of Record for a Coordinated Course
- Math 2400, Calculus 3 *Fall 2018, Fall 2019*
- Math 2300, Calculus 2 *Spring 2016, Fall 2017, Summer 2020*
- Math 1300, Calculus 1 *Fall 2014, Spring 2015*
  Responsibilities: Taught a lecture section for 4 hours per week; wrote and graded quizzes; wrote, proctored, and graded exams; met with the other instructors once per week; and worked for 1-2 hour(s) per week as a tutor in the Math Achievement Resource Center (MARC).

Teaching Assistant
- Math 2400, Calculus 3 *Fall 2017*
- Math 1310, Calculus of Stochastics and Modeling *Spring 2017*
- Math 2300, Calculus 2 *Fall 2015, Spring 2020*
- Math 1300, Calculus 1 *Spring 2014*
- Finite Math *Fall 2013*
  Responsibilities: Ran a weekly recitation section in which students worked in groups on guided discovery activities; graded weekly homework assignments; proctored and graded exams; met weekly with the other TA's to work through the activities; and worked for 3 hours per week as a tutor in the MARC.

Training and Workshops

- Career Mentoring Workshop (CaMeW) hosted at Mount Holyoke *June 2018*
  Workshop aimed at women in their final years of a mathematics Ph.D. program to prepare for the job market.
- Communicating Mathematics Effectively hosted at the University of Washington *June 2018*
  Workshop aimed at late-stage graduate students and postdocs to help improve research talks and mathematical writing.

- Critical Issues in Mathematics Education held at MSRI *February 2018*
  An annual conference held at MSRI for educators of all levels, aimed at developing techniques for creating a more inclusive environment in mathematics.
- Be the Change hosted at CU Boulder *January 2018*
  To quote: "Practicing inclusive excellence for student success and faculty well-being."
- Inquiry-Based Learning (IBL) Workshop hosted at CU Boulder *August 2016*
  A 3 day workshop designed to help teachers incorporate IBL into the classroom.
- Seminars through the Graduate Teacher Program at CU Boulder *Fall 2013–Present*

Attended over 20 seminars on as part of the Certificate in College Teaching.
- o Mathematics teaching seminar at CU Boulder   *Fall 2013–Spring 2014*
  The math department runs a weekly one credit hour pedagogy seminar for graduate students.

Training through the Graduate Teacher Program (GTP) at CU Boulder........................

- o Attended over 20 hours of pedagogy workshops put on by the GTP.
- o Attended over 20 hours of department-specific teacher training.
- o Completed two video-recorded teaching observations and consultations with a lead TA.
- o Participated in two classroom observations and evaluations by faculty members.

Service

Community...

- o Panelist for STEM Launch, a K-8 school   *December 2016*
  Gave feedback to middle school students regarding their science projects on national parks.

Student Academic Success Center (SASC)..

- o Interviewed candidates for the role of Lead Instructional Assistant.   *May 2019*

Student Government at CU Boulder...

- o Senator to the CU Student Government   *Spring 2016—Fall 2016*
  Served as one of two graduate senators in the CU Student Government legislative branch overseeing
  student policies and a budget of 23 million dollars.
- o Math department representative   *Fall 2014—Fall 2017*
  Served as representative to the United Government of Graduate Students.

Association of Women in Mathematics...

- o Ran a final exam study and review session for students in any section of calculus 3.   *May 2018*

Math Department at CU Boulder..

- o Co-organized a seminar for professional development for graduate students.   *Fall 2018*
- o Helped plan the prospective graduate student weekend.   *Spring 2017*
- o Co-organized a weekly study session for early graduate students preparing
  to take the preliminary exam in algebra.   *Fall 2016*

Just for Fun

- o Designed and implemented three "Escape Rooms" for student review   *Fall 2018—Spring 2019*
  and for team-building with undergraduate instructional assistants.
- o Placed 2nd in the Washington Post Hunt.   *2016*
  An annual riddle hunt organized by humorists Dave Barry, Gene Weingarten, and Tom Shroder
  and put on by the Washington Post Magazine. Cash prize of $500.