SarahArpin

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contact

Boulder, CO
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programming

Sage
Python
LaTeX

teaching tools

Blackboard
D2L
Canvas

college courses taught

College Algebra
Pre-Calculus
Matrix Algebra
Calculus I, II, & III
Intro. to Statistics
Number Theory
Axiomatic Geometry
Calc. for Life Sci.

interests

In Fall 2020, I began my fifth year as a graduate student at the University of Colorado Boulder. I am working under the advisorship of Dr. Katherine E. Stange. My research focuses on algebraic number theory and arithmetic geometry, specifically the structures of supersingular isogeny graphs and their applications to cryptography. I am looking at the structure of the supersingular ℓ-isogeny graph. The methods I use include looking at properties of certain subgraphs, using Sage to program explicit examples, and translating graph structure questions to other related algebraic objects (quaternion algebras, Hecke operators). I am also interested in higher genus curves in characteristic p. I am currently part of a collaborative project looking at a certain family of superelliptic curves over function fields over finite fields advised by Douglas Ulmer.

experience

since 2016 **Grad Student TA/Lecturer: University of Colorado Boulder, Boulder, CO**
Responsibilities included lecturing and TA-ing undergraduate mathematics courses, and tutoring in the Mathematics Academic Resource Center.

2017 **Summer Research Assistant: University of Colorado Boulder, Boulder, CO**
Completed research on algebraic number theory problems relating to the new cryptographic protocol ring learning with errors. Advised by Dr. Katherine E. Stange

2011 – 2016 **Adjunct Lecturer: CUNY Hunter College, New York, N.Y.**
Responsibilities included teaching undergraduate and mixed undergraduate/graduate level courses, and curriculum development of new courses.

2014 – 2016 **Adjunct Lecturer: Mercy College, Dobbs Ferry, N.Y.**
Responsibilities include teaching undergraduate level courses.

education

since 2016 **Ph.D. candidate in Pure Mathematics** — University of Colorado Boulder; Boulder, CO
Research in Algebraic Number Theory

2016 – 2019 **M.S. in Applied Mathematics** — University of Colorado Boulder; Boulder, CO
Completed as work towards Ph.D.

2010 – 2012 **M.A. in Pure Mathematics** — CUNY Hunter College; New York, N.Y.
Concentration in Number Theory

2004 – 2008 **B.A. in Liberal Arts** — Sarah Lawrence College; Bronxville, N.Y.
Concentration in Mathematics and Cryptography

publications and pre-prints

2021 **Twisted Monogeneity** — In preparation
With Sebastian Bozlee, Leo Herr, and Hanson Smith

2021 **On the arithmetic of a twisted constant family of superelliptic curves** — In preparation
with Richard Griffon, Libby Taylor, and Nicholas Triantafillou

2019 **Adventures in Supersingularland** — to appear, Experimental Mathematics
With Catalina Camacho-Navarro, Kristin Lauter, Joelle Lim, Kristina Nelson, Travis Scholl, Jana Sotáková. https://arxiv.org/abs/1909.07779

presentations

2021 **JMM: Joint Mathematics Meetings** Virtual Conference
Invited to speak in the AMS Special Session on Mathematics of Cryptography

2019 **Western Algebraic Geometry Symposium** Salt Lake City, UT
Presented a poster

2019 **Number Theory Series in LA** LosAngeles, CA
Contributed Talk Speaker

2019 **Front Range Number Theory Day** Boulder, CO
Lightning talk presentation on Supersingular Isogeny Graphs.

2018 **JMM: Joint Mathematics Meetings** San Diego, CA
Presented on RLWE summer 2017 research work.

university activities

2020 – 2021 **Mentor to Undergraduates in the CU Boulder Experimental Math Lab**
Mathematics of COVID in Society Project

since 2019 **Math Department Graduate Student Lead Mentor**

2018 – 2020 **Math Department Graduate Student Representative**

since 2018 **Co-Director of STEMinar**

2018 – 2019 **Mentor to Undergraduates in the CU Boulder Experimental Math Lab**
Binomial Transformation Project

2017 – 2018 **UGGS Graduate Student Peer Mentor**

since 2016 **Diversity Committee Member**

conferences and workshops

2020 **Zoom: Women in Numbers 5** Banff, Canada
Workshop participant in isogeny-based cryptography group.

2020 **Zoom: Front Range Number Theory Day - Fall** Colorado State University, Fort Collins, CO
Co-organizer.

2020 **Zoom: Front Range Number Theory Day - Spring** University of Colorado, Boulder, CO
Co-organizer.

2020 **JMM: Joint Mathematics Meetings** Denver, CO
Special Session Co-organizer

2019 **Front Range Number Theory Day - Fall** Colorado State University, Fort Collins, CO
Co-organizer.

2019 **Western Algebraic Geometry Symposium** Salt Lake City, UT
Presented a poster

2019 **Number Theory Series in LA** LosAngeles, CA
Contributed Talk Speaker

2019 **Sage Days 103: Women in Sage** St. Louis, MI
Workshop participant

2019 **MRC: Explicit Methods in Arithmetic Geometry in Characteristic p** Whispering Pines, RI
Workshop participant.

2019 **Microsoft Research** Bellevue, WA
Invited working group participant. Hosted by Kristin Lauter and the Cryptography Research Group

2019 **Front Range Number Theory Day - Spring** University of Colorado, Boulder, CO
Co-organizer and lightning talk presenter.

2019 **AMS Spring Sectional Meeting** UH Manoa, Manoa, HI
Conference participant.

2019 **HINT: Hawaii Number Theory Conference** UH Manoa, Manoa, HI
Conference participant.

2018 **Western Algebraic Geometry Symposium** Eugene, Oregon
Conference participant.

2018 **Front Range Number Theory Day - Fall** Colorado State University, Fort Collins, CO
Conference participant.

2018 **Open Questions in Cryptography and Number Theory (Alice Silverberg's Birthday)** UC Irvine, Irvine, CA
Conference and working group participant.

2018 **Connecticut Summer School in Number Theory** UCONN, Storrs, CT
Workshop and conference participant.

2018 **Hartshorne's 80th Birthday Conference** University of Illinois, Chicago
Conference participant.

2018 **Graduate Workshop in Algebraic Geometry for Women and Mathematicians of Minority Genders** MIT/Harvard; Boston, Mass.
Conference and workshop participant.

2018 **JMM: Joint Mathematics Meetings** San Diego, CA
Presented with collaborators on RLWE summer research work.

2017 **USTARS: Under-Represented Students in Topology and Algebra Research Symposium** Amherst College; Amherst, Mass.
Conference participant.