Sarah Days-Merrill

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EDUCATION

University of Vermont — Burlington, VT
Ph.D. in Mathematical Sciences, Advisor: Dr. Christelle Vincent — Anticipated May 2024
GPA: 3.74/4.00

- Dissertation (In Progress): Ring Learning with Errors as a candidate for safe encryption against quantum computers.
- Course Work: Abstract Algebra III, Abstract Algebra IV, Algebraic Topology, Measure Theory, Complex Analysis, Topics in Combinatorics, Algebraic Number Theory, Algorithm Design and Analysis, Algebraic Curves and Surfaces, Elliptic Curves and Modular Forms, Algebraic Theory of Differential Equations.

Bridgewater State University — Bridgewater, MA
B.S. in Mathematics - Concentrations in Pure Math and Statistics - Minor in Computer Science — May 2019
GPA: 3.97/4.00

- Thesis: "Firefighter Problem Played on Infinite Graphs" under the supervision of Dr. Rachel Stahl.
- Course Work: Single Variable Calculus I and II, Transition to Advanced Mathematics, Linear Algebra, Multivariable Calculus, Abstract Algebra I and II, Graph Theory, Differential Equations, Real Analysis I and II, Applied Math, Statistical Methods I and II, Probability Theory, Regression Analysis, Mathematical Statistics, Computer Science I and II, Intro to Computer Organization, Data Structures and Algorithms, Organization to Programming Languages, Introduction to Databases.

EXPERIENCE

Center for Academic Success at the University of Vermont — Burlington, VT
Academic Support Program Assistant — September 2023 - present

- Assist Supplementary Instructions (SI) Program and Tutoring Center.
- Observe SI leaders and provide feedback for effective instruction.
- Collect and analyze data to track student improvement.

The Education Annex — Williston, VT
Tutor — April 2022 - May 2023

- Tutor and mentor elementary, middle, and high school students within the Winooski School District in mathematics, reading, and writing.
- In-person and remote sessions.

Akamai Technologies, Inc. — Cambridge, MA
Software Engineering Intern — Summer 2019

- Converting Radix Tree from C++ to Python for analysis purposes in the Mapping Department.
- Profile the code for optimization.
- Utilize unit tests in Python to validate the outcome with expected results.

Bridgewater State University — Bridgewater, MA
Equipment Room Supervisor — September 2015 - May 2019

- Assist the Athletic Department through interactions with the school community; answering phone calls, handling equipment rentals, setting up equipment, organizing deliveries, etc.
- Responsible for training new employees.

Teaching

Graduate Teaching Assistant at the University of Vermont, Burlington, VT Fall 2019 - present
Primary instructor for "College Algebra" (Math 009), "Pre-Calculus" (Math 010), "Fundamentals of Calculus I" (Math 019).
Experience teaching in-person, hybrid, and remote.

Grader at the University of Vermont, Burlington, VT Spring 2023
Grader for Cryptography (Math 259)

Grader at the University of Vermont, Burlington, VT Spring 2020
Grader for Topology (Math 295)

Teaching Assistant at Bridgewater State University, Bridgewater, MA Fall 2018 - Spring 2019
Primary instructor for "Problem Solving in Math" (Math 143).

Teacher's Aide at P.A.C.E. Head Start, New Bedford, MA August 2014 - June 2015
Plan and assist daily lessons and activities for children ages 3-5 years old. Ensure a safe and stimulating learning environment.

Research

University of Vermont Burlington, VT
Graduate Research Assistant Summer 2020 and Summer 2021

- Ring Learning with Errors (RLWE)
- Explore background in Algebraic Number Theory. Compare non-dual RLWE, dual RLWE, and PLWE (Polynomial Ring Learning with Errors) problems. Implement attacks in SageMath to determine security conditions.
- Advise undergraduate students with researching and writing Honors Thesis.

Bridgewater State University Bridgewater, MA
Undergraduate Honors Thesis Fall 2018 - Spring 2019

- "Firefighter Problem Played on Infinite Graphs"
- Explore infinite graphs within the rules of the Firefighter Problem, generalizing known results with additional requirements to the problem.

Louisiana State University Baton Rouge, LA
Research Experience for Undergraduates (REU) Summer 2018

- "Developing a Neural Natural Language Generation Approach for a Medical Spoken Dialogue System with PyTorch"
- Research topics of Machine Learning, incorporate Recurrent Neural Networks and Encoder-Decoder Approach with Long Short-Term Memory and Attention.

Bridgewater State University Bridgewater, MA
Undergraduate Honors Contract Fall 2017

- "Simple Random Walks"
- Implementing the Ballot Theorem, the Reflection Principle, Recurrent and Transient, Arcsine Laws, Stirling's Formula, Borel-Cantelli Part I.

Skills

- **Programming Languages:** Python, Java, C++, R, MySQL, SageMath.
- **Certifications:** EEC Preschool Teacher.

Presentations and Talks

- AGNES at University of Massachusetts Amherst — November 2022
- Math Chats at Bridgewater State University — May 2019
- MassURC at University of Massachusetts Amherst — April 2019
- Math Chats at Bridgewater State University — May 2018
- StARS Symposium at Bridgewater State University — April 2018
- Mid-Year Symposium at Bridgewater State University — May 2016

Conferences and Workshops

- BIRS - Banff International Research Station for Mathematical Innovation and Discovery — August 20, 2023 - August 25, 2023
  Isogeny Graphs in Cryptography

- Career Mobility Committee, SACNAS, Women in STEM, and oSTEM - University of Vermont — March 14, 2023
  Leading with Emotional Intelligence in STEM

- Center for Teaching and Learning - University of Vermont — December 15, 2022
  You Don't Have to Grade Like That! Exploring Grading Alternatives

- AGNES - Algebraic Geometry Northeastern Series — November 18, 2022 - November 20, 2022
  University of Massachusetts Amherst

- Community-building in the Langlands Program Conference — August 13, 2022 - August 19, 2022
  Hausdorff Center For Mathematics, Bonn, Germany - Remote participation

- Equidistribution and Arithmetic Dynamics Conference — June 20, 2022 - June 24, 2022
  Oklahoma State University - Remote participation

- AMS MRC Models and Methods for Sparse (Hyper)Network Science — June 5, 2022 - June 11, 2022
  Information Loss in Weighted Hypergraph Line Graphs

- The Inclusive STEM Teaching Project — March 23, 2022 - May 12, 2022
  edX Teaching Course

- BIRS-CMO Workshop — April 24, 2022 - April 29, 2022
  Algebraic Methods in Coding Theory and Communication

- Center for Teaching and Learning - University of Vermont — March 1, 2022
  Increasing Student Motivation: Strategies that Work with Guest Speaker Dr. Saundra McGuire

- Center for Teaching and Learning - University of Vermont — February 22, 2022
  Teach STEM Students How to Learn: Metacognition is the Key! with Guest Speaker Dr. Saundra McGuire

- Center for Teaching and Learning - University of Vermont — October 5, 2021 - November 8, 2021
  Equity-Centered Trauma-Informed Education, *by Alex Shevrin Venet Book Group*

- Center for Teaching and Learning - University of Vermont — September 13, 2021
  But I'm Not a Writing Teacher! - Teaching Writing in Your Discipline

- MSRI Summer Graduate School — June 7, 2021 - June 18, 2021
  Sparsity of Algebraic Points

- Center for Teaching and Learning - University of Vermont   May 20, 2021
  Contemplative Practices for Anti-Racist Education and Trauma Informed Teaching, with Guest Speaker Dr. Kamilah Majied
- Center for Teaching and Learning - University of Vermont   May 19, 2021
  Teaching with Teams
- Center for Teaching and Learning - University of Vermont   April 30, 2021
  Writing Your Teaching Philosophy
- Center for Teaching and Learning - University of Vermont   March 19,2021
  Teaching in Higher Education
- Center for Teaching and Learning - University of Vermont   March 18, 2021
  Having Fun and Grabbing Interest in Large Remote Classes
- Continuing and Distance Education - University of Vermont   July 7, 2020 - July 20, 2020
  Online Teaching Boot Camp

Leadership and Service

- Women in STEM - University of Vermont   March 2023 - present
  Club member.
- Graduate Teaching Program - University of Vermont   January 2021 - December 2022
  Graduate College, Center for Teaching and Learning, Writing in the Disciplines Program

  Develop professional skills for a career in higher education.
- Peer Leader - Bridgewater State University   Fall 2018 - Spring 2019
  Advise and support first year STEM students.
- Group Leader for the CPDC - Bridgewater State University   Fall 2017 - Fall 2018
  CPDC - Children's Physical Developmental Clinic

  Design fun and engaging activities to promote physical activities for children with special needs between the ages of 3 - 18 years old.
- Member of Pi Mu Epsilon   Inducted Spring 2018
  National Honorary Mathematics Society - Massachusetts Gamma Chapter

Scholarships and Awards

- Nam Sang Kil Scholarship in Mathematics   May 2023
  * In recognition of the value of education as a path toward betterment of mankind, this scholarship is presented to an outstanding student in honor of Chairman Nam.
- Bruce and Patricia Bartlett Internship Scholarship   June 2019
- James Fitzgerald Award   May 2019
  * For having the highest GPA in the mathematics graduating class.
- Outstanding Academic Achievement   May 2019
  * For the completion of Commonwealth Honors in Mathematics.
- Bridgewater State University Student of Excellence Award   April 2019
  * For demonstrating a holistic approach to learning by engaging in intellectual and personal growth opportunities both in and out of the classroom.
- ASA DataFest Winner: "Best Use of External Data" - Bridgewater State University   March 2019
- Patricia Quinn Bartlett '67 Scholarship   March 2018

        * For undergraduate student's academic success.

– ASA DataFest Winner: "Best Use of External Data" - Bridgewater State University   March 2018

– Dr. Marilyn Christian Federico '57 Scholarship   March 2017

– Dr. Mary Moore Jarvis Scholarship   October 2016