

RACHEL BAILEY

<https://rachelbailey3.github.io/RachelBailey.github.io/>

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EDUCATION

- University Of Connecticut**, Doctoral Candidate, Mathematics *Fall 2019 - Present*
Advisors: Maria Gordina and Maxim Derevyagin
- University of Connecticut** Bachelor of Arts, Mathematics *Fall 2016-Fall 2018*
Minor in statistics
- Three Rivers Community College** *Spring 2015 -Spring 2016*

EMPLOYMENT

- Assistant Professor**, Bentley University *Fall 2024*
- Graduate Assistant**, University of Connecticut *Fall 2019-Present*
- Graduate Complex Analysis Qualifying Exam Tutor, UConn *Summer 2024, Summer 2021, Winter 2021*
- Graduate Complex Analysis Grader, UConn *Spring 2022*
- Undergraduate Math Q-Centor tutor, UConn *Spring 2018, Fall 2018*

TEACHING EXPERIENCE

- Assistant Professor** Bentley University
- MA 131-1 - Calculus I *Upcoming Fall 2024*
- Graduate Assistant** University of Connecticut
- MATH 1071Q Calculus for Business and Economics (*primary instructor*) *Fall 2023*
 - MATH 1131Q Calculus 1 (*teaching assistant*) *Fall 2019, Fall 2023*
 - MATH 2410 Elementary Differential Equations (*primary instructor*) *Spring 2023*
 - MATH 2110Q Multivariable Calculus (*teaching assistant*) *Fall 2022*
 - MATH 1132Q Calculus 2 (*teaching assistant*) *Spring 2020, Fall 2021*
 - MATH 1060Q Pre Calculus (*primary instructor*) *Fall 2020*

PAPERS

- R. Bailey and M. Derevyagin. *DEK-type orthogonal polynomials and a modification of the Christoffel formula*. J. Comput. Appl. Math. 438 (2024), Paper No. 115561.
- R. Bailey and M. Derevyagin. *Complex Jacobi matrices generated by Darboux transformations*. J. Approx. Theory 288 (2023), Paper No. 105876, 33 pp.
- R. Bailey and E. Gunawan. *Cluster Algebras and Binary Subwords*. Order 39 (2022), no.1, 55–69.

PEER-REVIEWED CONFERENCE PROCEEDINGS

- R. Bailey and E. Gunawan. *Cluster Algebras and Binary Words*. Sem. Lothar. Combin. 82B (2020), Art. 81, 12pp.

IN PREPARATION

B. Akwei, B. Atkins, R. Bailey, A. Dalal, N. Dinin, J. Kerby-White, T. McGuinness, T. Patricks, L. Rogers, G. Romanelli, Y. Su, A. Teplyaev. Convergence, Optimization and Stability of Singular Eigenmaps. (preprint), 2023.

R. Bailey, F. Baudoin, M. Gordina, T. Campos, A. Gannon, B. Hanzsek-brill, C. Marrs, A. Neuschotz, T. Rabe, and E. Winters. A Characterization of Fractional Gaussian Fields on S^1 and the d -Torus. (preprint), 2022.

UNDERGRADUATE RESEARCH MENTORSHIP

UConn Mathematics REU Graduate Mentor* Summer 2024
Laplacian Eigenmaps, orthogonon polynomials, quantum information

UConn Mathematics REU Graduate Mentor* Summer 2023
Laplacian Eigenmaps

UConn Directed Reading Program Spring 2023
Mentored an undergraduate student through a semester-long independent study on random walks on graphs

UConn Mathematics REU Graduate Mentor * Summer 2022
Fractional Gaussian Fields on Surfaces and Graphs

**Duties included of teaching an introduction to probability, helping write abstracts for the Young Mathematicians Conference, and directing students through the process of research and writing a research paper.*

HONORS AND AWARDS

UConn Summer Doctoral Dissertation Fellowship Summer 2024

UConn Predoctoral Fellowship Spring 2024

Louis J. Deluca Memorial Award: Excellence in Teaching Spring 2023

Connie Strange Graduate Community Award Spring 2023

UConn Provost "Excellence In Teaching" Fall 2019, Fall 2020

UConn Babbidge Scholar February 2017

UConn Aetna Award nominee for *The Language of Mathematics* January 2017

SERVICE

UConn Sports Analytics Symposium April 2024
Volunteer judge for the poster session

MathCounts February 2023/2024
Volunteer grader

UConn SIGMA Organizer Fall 2022-Spring 2024
Organized speakers for the weekly SIGMA seminar

Volunteer math tutor for the UConn Women in Math, Science and Engineering learning community *Spring 2022, Fall 2022*

Vice President of AMS Graduate Student Chapter Fall 2020-Spring 2023

Graduate Student Mentor Fall 2020-Present
Mentored first year graduate students

UConn AMS Integration Bee October 2019, March 2020, October 2021, and October 2022
Organized and judged the integration bee for undergraduate students both online and in person

RESEARCH EXPERIENCE

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| Research Assistant supported by NSF DMS grant no. 2246549 | Spring 2024 |
| Research Assistant supported by NSF DMS grant no. 2008844 | Summer 2021, Spring 2022 |
| Research Assistant through Research Excellence Program Award for 2020–2021 <i>Padé approximation in noise filtering, \$19,243</i> | Spring 2021, Summer 2021 |
| Research on Coxeter groups and cluster algebras | Summer 2018 |

INVITED TALKS

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| University of New Mexico Analysis Seminar <i>“DEK-Type Orthogonal Polynomials” (The Extended Version)</i> | April 2024 |
| University of Hartford Mathematics Colloquium <i>“A Random Walk Along the Theory of Orthogonal Polynomials”</i> | March 2024 |
| JMM Special Session: Numerical Analysis, Spectral Graph Theory, Orthogonal Polynomials, and Quantum Algorithms <i>“A new perspective on an old example”</i> | January 2024 |
| AWM JMM 2024 Poster Session and Workshop <i>“DEK-Type Orthogonal Polynomials”</i> | January 2024 |
| SIAM Quantum Walks on Graphs Workshop <i>“Orthogonal Polynomials and Quantum Walks on Graphs”</i> | April 2023 |
| JMM Special Session: Orthogonal Polynomials and their Applications III <i>“A Modification of the Christoffel Formula”</i> | January 2023 |
| Bridgewater State University Math Seminar <i>“Darboux Transformation and Exceptional Orthogonal Polynomials”</i> | December 2022 |
| Advances In Operator Theory and Applications to Mathematical Physics <i>“Modification of the Christoffel Formula”</i> | November 2022 |
| UConn Math Club <i>“An Introduction to Orthogonal Polynomials”</i> | September 2022 |
| SIAM Quantum Computing Workshop <i>“Probability in Quantum Computing”</i> | March 2022 |
| UConn SIGMA Seminar <i>“Orthogonal Polynomials and the Christoffel Formula”</i> | March 2022 |
| AMS Spring Eastern Sectional Meeting <i>“The Dubov-Eleonskii-Kulagin Polynomials and a Modification of the Christoffel Formula”</i> | March 2022 |
| UConn Mathematics Continued Conference <i>“Orthogonal Polynomials: When Analysis Meets Linear Algebra”</i> | October 2021 |
| Formal Power Series and Algebraic Combinatorics <i>Presented “Cluster Algebras and Binary Words” poster</i> | July 2019 |
| WIMIN at Smith College <i>“Binary Words and Antichains of Posets”</i> | September 2018 |

CONFERENCES AND WORKSHOPS

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| Séminaire de Mathématiques Supérieures 2023: Periodic and Ergodic Spectral Problems <i>SLMath Summer School</i> | <i>July 2023</i> |
| SIAM Quantum Walks on Graphs Workshop | <i>April 2023</i> |
| Advances in Operator Theory and Applications to Mathematica Physics | <i>November 2022</i> |
| Joint Mathematics Meeting 2023 | <i>January 2023, 2024</i> |
| UConn Teaching Seminar | <i>Fall 2022-Present</i> |
| UConn Mathematics Continued Conference | <i>October 2022, 2023, 2024</i> |
| Radboud Summer School (Nijmegen, Netherlands) <i>Orthogonal Polynomials, Special Functions and their Applications</i> | <i>August 2022</i> |
| MSRI Workshop: A Celebration for Women in Mathematics | <i>May 2022</i> |
| SIAM Quantum Computing Workshop | <i>March 2022</i> |
| Analysis Learning Seminar- University of Connecticut | <i>Fall 2020</i> |
| Binghamton University Graduate Conference in Algebra and Topology | <i>November 2020</i> |
| Formal Power Series and Algebraic Combinatorics (Ljubljana, Slovenia) | <i>July 2019</i> |

ORGANIZATIONS

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| Member of AWM | <i>Current</i> |
| Member of AMS | <i>Current</i> |
| Member of Pi Mu Epsilon Mathematical Society | <i>Inducted April 2019</i> |