RACHEL BAILEY

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EDUCATION

University Of Connecticut, Doctoral Candidate, Mathematics — *Ph.D Expected May 2024*
Advisors: Masha 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*

TEACHING EXPERIENCE

MATH 1071Q Calculus for Business and Economics — *Fall 2023*
primary instructor (2 sections)

MATH 1131Q Calculus 1 — *Fall 2023*
teaching assistant (1 section)

MATH 2410Q Elementary Differential Equations — *Spring 2023*
primary instructor (2 sections)

MATH 2110Q Multivariable Calculus — *Fall 2022*
teaching assistant (2 sections)

MATH 1132Q Calculus 2 — *Fall 2021*
teaching assistant (2 sections)

MATH 1060Q Pre Calculus — *Fall 2020*
primary instructor (2 sections)

MATH 1132Q Calculus 2 — *Spring 2020*
teaching assistant (2 sections)

MATH 1131Q Calculus 1 — *Fall 2019*
teaching assistant (2 sections)

UNDERGRADUATE RESEARCH MENTORSHIP

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.*

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.

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.

HONORS AND AWARDS

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

MathCounts *February 2023*
Volunteer grader

UConn SIGMA Organizer *Fall 2022-Present*
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

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 *Spring 2021, Summer 2021*
Padé approximation in noise filtering, $19,243

Research on Coxeter groups and cluster algebras *Summer 2018*

WORK EXPERIENCE

MATH 5120 Complex Analysis Grader *Spring 2022*

Graduate Complex Analysis Preliminary Exam Tutor *Summer 2021, Winter 2021*

UConn Instructor/ Teaching Assistant *Fall 2019-Present*

Undergraduate Math tutor at UConn Q-Center Tutoring *Spring 2018, Fall 2018*

TALKS

JMM Special Session: Numerical Analysis, Spectral Graph Theory, Orthogonal Polynomials, and Quantum Algorithms *January 2024*
"A new perspective on an old example"

AWM JMM 2024 Poster Session and Workshop *January 2024*
"DEK-Type Orthogonal Polynomials"

OURFA2M2 *November 2023*
"Our Stories"

UConn Math Club *November 2023*
"Integrality of Binomial Coefficients"

SIAM Quantum Walks on Graphs Workshop *April 2023*
"Orthogonal Polynomials and Quantum Walks on Graphs"

JMM Special Session: Orthogonal Polynomials and their Applications III *January 2023*
"A Modification of the Christoffel Formula"

Bridgewater State University Math Seminar *December 2022*
"Darboux Transformation and Exceptional Orthogonal Polynomials"

Advances In Operator Theory and Applications to Mathematical Physics *November 2022*
"Modification of the Christoffel Formula"

UConn Math Club *September 2022*
"An Introduction to Orthogonal Polynomials"

SIAM Quantum Computing Workshop *March 2022*
"Probability in Quantum Computing"

UConn SIGMA Seminar *March 2022*
"Orthogonal Polynomials and the Christoffel Formula"

AMS Spring Eastern Sectional Meeting *March 2022*
"The Dubov-Eleonskii-Kulagin Polynomials and a Modification of the Christoffel Formula"

UConn Mathematics Continued Conference *October 2021*
"Orthogonal Polynomials: When Analysis Meets Linear Algebra"

Formal Power Series and Algebraic Combinatorics *July 2019*
Presented "Cluster Algebras and Binary Words" poster

WIMIN at Smith College *September 2018*
"Binary Words and Antichains of Posets"

CONFERENCES AND WORKSHOPS

Joint Mathematics Meeting 2024 *Upcoming January 2024*

AWM Workshop: Women in Operator Theory *Upcoming January 2024*

AWM Special Session on Mathematics in the Literary Arts and Pedagogy in Creative Settings *Upcoming January 2024*

Séminaire de Mathématiques Supérieures 2023: Periodic and Ergodic Spectral Problems *July 2023*
SLMath Summer School

JMM 2023 *January 2023*

UConn Teaching Seminar *Fall 2022-Present*

UConn Mathematics Continued Conference *October 2022*

Radboud Summer School (Nijmegen, Netherlands) *August 2022*
Orthogonal Polynomials, Special Functions and their Applications

MSRI Workshop: A Celebration for Women in Mathematics *May 2022*

SIAM Quantum Computing Workshop *March 2022*

UConn Mathematics Continued Conference *October 2021*

Analysis learning seminar- University of Connecticut *Fall 2020*

Binghampton University Graduate Conference in Algebra and Topology *November 2020*

Formal Power Series and Algebraic Combinatorics (Ljubljana, Slovenia) *July 2019*

ORGANIZATIONS

Member of AMS *Current*

Member of AWM *Current*

Member of Pi Mu Epsilon Mathematical Society *Inducted April 2019*