

Robert Dougherty-Bliss

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Research interests

Experimental mathematics; symbolic-numeric computation; difference equations; combinatorics; number theory

Academic positions

Dartmouth College

Instructor of Applied and Computational Mathematics

2024–

Mentor: Peter Winkler

Johannes Kepler University, Linz

Visitor

August 2023

Host: Manuel Kauers

Education

Rutgers University — New Brunswick

Ph.D. Mathematics

2019–2024

Advisor: Doron Zeilberger

Oglethorpe University

B.S. Mathematics; Computer Science

2014–2019

Summa cum laude, with honors

Publications

- [1] Robert Dougherty-Bliss, Natalya Ter-Saakov, Mits Kobayashi, and Eugene Zima. “Dyadically resolving trinomials for fast modular arithmetic”. 2025+. URL: <https://arxiv.org/abs/2508.11043>.
- [2] Robert Dougherty-Bliss, Charles Kenney, and Doron Zeilberger. “Creating Decidable Diophantine Equations”. In: *The American Mathematical Monthly* (2025). DOI: 10.1080/00029890.2025.2555161.
- [3] Robert Dougherty-Bliss, Christoph Koutschan, Natalya Ter-Saakov, and Doron Zeilberger. “The (Symbolic and Numeric) Computational Challenges of Counting 0-1 Balanced Matrices”. In: *Enumer. Comb. Appl.* 5.2 (2025), Paper No. S2R14, 8.
- [4] Robert Dougherty-Bliss and Natalya Ter-Saakov. “The Comma Sequence is Finite in Other Bases”. In: *J. Integer Seq.* 28.5 (2025), Art. 25.5.5, 18.
- [5] Robert Dougherty-Bliss and Manuel Kauers. “Hardinian Arrays”. In: *Electronic Journal of Combinatorics* 30 (2023).
- [6] Robert Dougherty-Bliss and Doron Zeilberger. “Exploring general Apéry limits via the Zudilin–Straub t-transform”. In: *Journal of Difference Equations and Applications* 29.1 (2023), pp. 32–42.
- [7] Robert Dougherty-Bliss and Doron Zeilberger. “Lots and Lots of Perrin-Type Primality Tests and Their Pseudo-Primes”. In: *Integers* 23 (2023).
- [8] Robert Dougherty-Bliss. “Integral Recurrences from A to Z”. In: *The American Mathematical Monthly* 129.9 (2022), pp. 805–815.

- [9] Robert Dougherty-Bliss. “The Meta-C-Finite Ansatz”. In: *Fibonacci Quart* 60.5 (2022), pp. 143–150.
- [10] Robert Dougherty-Bliss, Christoph Koutschan, and Doron Zeilberger. “Tweaking the Beukers integrals in search of more miraculous irrationality proofs à la Apéry”. In: *The Ramanujan Journal* 58.3 (2022), pp. 973–994.
- [11] AJ Bu and Robert Dougherty-Bliss. “Enumerating restricted Dyck paths with context-free grammars”. In: *Integers* 21 (2021), pp. 1–14.
- [12] Robert Dougherty-Bliss and Doron Zeilberger. “Experimenting with Apéry Limits and WZ pairs”. In: *Maple Transactions* 1.2 (2021).
- [13] Robert Dougherty-Bliss and Doron Zeilberger. “Automatic conjecturing and proving of exact values of some infinite families of infinite continued fractions”. In: *The Ramanujan Journal* (2020), pp. 1–17.
- [14] K. Abernathy, Z. Abernathy, R. Dougherty-Bliss, C. Mayer, and H. Whiteside. “Global dynamics of a cancer stem cell treatment model”. In: *International Journal of Dynamical Systems and Differential Equations* 9.2 (2019), pp. 176–186.

Invited talks and presentations

- [1] *p-adically resolving trinomials*. 6th International Computer Algebra Conference, Moscow (online). 2025.
- [2] *Enumerating Balanced Matrices*. MAA MathFest, Sacramento. 2025.
- [3] *Modular arithmetic with trinomial moduli*. Rutgers Experimental Mathematics Seminar. 2025.
- [4] *Modular arithmetic with trinomial moduli*. Waterloo Symbolic Computation Seminar. 2025.
- [5] *On relative primality and other properties of trinomials*. Computer Assisted Mathematics, St. Petersburg (online). 2025.
- [6] *Balanced Matrices*. Dartmouth Combinatorics Seminar. 2024.
- [7] *Enumerating Balanced Matrices*. Differential Algebra and Related Topics XII (Beijing). 2024.
- [8] *Rectangular Hardinian Arrays*. Poster at ISSAC. 2024.
- [9] *The Comma Sequence is Finite in Other Bases*. Fall AMS Central Sectional. 2024.
- [10] *New primality tests and their (very large) pseudoprimes*. Institute für Algebra Seminar. Linz, Austria, 2023.
- [11] *New primality tests and their (very large) pseudoprimes*. Fall AMS Southeastern Sectional. Mobile, Alabama, 2023.
- [12] *Gosper’s algorithm and Bell numbers*. Fall AMS Southeastern Sectional. Chattanooga, Tennessee, 2022.
- [13] *The Meta C-finite ansatz*. 20th International Fibonacci Conference. Sarajevo, Bosnia e Herzegovina, 2022.
- [14] *The Meta-C-finite ansatz*. Rutgers Experimental Mathematics Seminar. 2022.
- [15] *Combinatorial Union Busting with Stopped Strings*. New York Combinatorics Seminar. 2021.
- [16] *More irrationally good approximations from Beukers integrals*. Combinatorial and Additive Number Theory. 2021.

- [17] *Automagic Inverse Continued Fraction Calculators*. Rutgers Experimental Mathematics Seminar. 2020.
- [18] *The Ergonomics of Computer Algebra*. Rutgers Experimental Mathematics Seminar. 2019.

Outreach talks

- [1] *How to compute with big numbers*. Rutgers Undergraduate Mathematical Association. 2025.
- [2] *What to do when you don't know*. Dartmouth Mathematical Society. 2025.
- [3] *Identities*. Baruch College REU. 2024.
- [4] *Proofs by Example*. DIMACS / Baruch College REU. 2023.
- [5] *Proofs by Example*. Rutgers Undergraduate Mathematical Association. 2023.
- [6] *When does a sum have an answer?* Rutgers Undergraduate Mathematical Association. 2022.
- [7] *Mathematical biology for fun and profit*. Central Washington University Math Club. 2021.

Teaching

Dartmouth College.....

Linear Algebra, Differential Equations, Multivariable Calculus, Introduction to Calculus

Rutgers University.....

As instructor: Number Theory (Summer 2021, 2022)

As teaching assistant: Real Analysis (Spring 2021, Fall 2021, Fall 2023), Abstract Algebra (Fall 2023), Calculus III (Fall 2022), Calculus II (Spring 2022, Spring 2023), Calculus I (Fall 2020)

Professional service

Invited Paper Session: Computers and Combinatorics	MAA MathFest
<i>Co-organizer</i>	<i>2026</i>
Invited Paper Session: Probability and Combinatorics	MAA MathFest
<i>Co-organizer</i>	<i>2026</i>
Symbolic Combinatorics Minisymposium	SIAM AG
<i>Co-organizer</i>	<i>2025</i>
Experimental Mathematics Seminar	Rutgers University
<i>Co-organizer</i>	<i>2020–2024</i>
American Mathematical Society Graduate Chapter	Rutgers University
<i>President</i>	<i>2020–2024</i>
Undergraduate Directed Reading Program	Rutgers University
<i>Mentor</i>	<i>2023</i>
Arkansas Undergraduate Mathematics Competition	
<i>Problem writer / grader</i>	<i>2023</i>
DIMACS REU	
<i>Graduate school panel panelist</i>	<i>2022</i>
MoMath Masters	National Museum of Mathematics
<i>Problem writer</i>	<i>2021</i>
Graduate Liaison Committee	Rutgers University
<i>Member</i>	<i>2020–2022</i>

Combinatorics and Algebras from A to Z

Co-organizer

Birthday conference in honor of Doron Zeilberger and Amitai Regev.

2021

Reviewer for: Journal of Number Theory, The American Statistician, Discrete Mathematics, Discrete Mathematics Letters, Journal of Computational Algebra, European Journal of Combinatorics

Awards

Rutgers University.....

Excellence in Leadership and Teaching Award 2024

University-wide award for leadership and teaching.

TA Teaching Excellence Award 2022, 2023

In recognition of valuable contributions to undergraduate teaching in the math department.

Oglethorpe University.....

James Edward Oglethorpe Award 2019

In recognition of scholarship, leadership, and character. Awarded by university faculty vote.

Sally Hull Weltner Award for Scholarship 2019

Awarded to Senior with highest grade-point average.

Ronald L. Carlisle Prize 2019

Given to outstanding Senior in mathematics and computer science.

Past Positions

Data Scientist

Government Accountability Office  2023

Statistical Consultant

League of Women Voters of New Jersey 2022

Summer Fellow and Instructor

Metric Geometry and Gerrymandering Group, Tufts University and MIT 2018, 2019

Summer Instructor

Oglethorpe University 2017

Summer Fellow

Winthrop University 2016