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 Keppler 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, Christoph Koutschan, Natalya Ter-Saakov, and Doron Zeilberger. "The (Symbolic and Numeric) Computational Challenges of Counting 0-1 balanced matrices". arXiv preprint arXiv:2410.07435. 2024.

[2]   Robert Dougherty-Bliss and Natalya Ter-Saakov. "The Comma Sequence is Finite in Other Bases". arXiv preprint arXiv:2408.03434. 2024.

[3]   Robert Dougherty-Bliss and Manuel Kauers. "Hardinian Arrays". In: *Electronic Journal of Combinatorics* 30 (2023).

[4]   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.

[5]   Robert Dougherty-Bliss and Doron Zeilberger. "Lots and Lots of Perrin-Type Primality Tests and Their Pseudo-Primes". In: *Integers* 23 (2023).

[6]   Robert Dougherty-Bliss. "Gosper's algorithm and Bell numbers". Submitted. 2022.

[7]   Robert Dougherty-Bliss. "Integral Recurrences from A to Z". In: *The American Mathematical Monthly* 129.9 (2022), pp. 805–815.

[8]   Robert Dougherty-Bliss. "The Meta-C-Finite Ansatz". In: *Fibonacci Quart* 60.5 (2022), pp. 143–150.

[9]   Robert Dougherty-Bliss, Christoph Koutschan, and Doron Zeilberger. "Tweaking the Beukers integrals in search of more miraculous irrationality proofs á la Apéry". In: *The Ramanujan Journal* 58.3 (2022), pp. 973–994.

[10]   AJ Bu and Robert Dougherty-Bliss. "Enumerating restricted Dyck paths with context-free grammars". In: *Integers* 21 (2021), pp. 1–14.

[11]   Robert Dougherty-Bliss and Doron Zeilberger. "Experimenting with Apéry Limits and WZ pairs". In: *Maple Transactions* 1.2 (2021).

[12]   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.

[13]   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]   Robert Dougherty-Bliss. *Balanced Matrices*. Dartmouth Combinatorics Seminar. 2024.

[2]   Robert Dougherty-Bliss and George Spahn. *Rectangular Hardinian Arrays*. Poster at ISSAC. 2024.

[3]   Robert Dougherty-Bliss and Natalya Ter-Saakov. *The Comma Sequence is Finite in Other Bases*. Fall AMS Central Sectional. 2024.

[4]   Robert Dougherty-Bliss. *New primality tests and their (very large) pseudoprimes*. Institute für Algebra Seminar. Linz, Austria, 2023.

[5]   Robert Dougherty-Bliss. *New primality tests and their (very large) pseudoprimes*. Fall AMS Southeastern Sectional. Mobile, Alabama, 2023.

[6]   Robert Dougherty-Bliss. *Gosper's algorithm and Bell numbers*. Fall AMS Southeastern Sectional. Chattanoga, Tennesee, 2022.

[7]   Robert Dougherty-Bliss. *The Meta C-finite ansatz*. 20th International Fibonacci Conference. Sarajevo, Bosnia e Herzegovina, 2022.

[8]   Robert Dougherty-Bliss. *The Meta-C-finite ansatz*. Rutgers Experimental Mathematics Seminar. 2022.

[9]   Robert Dougherty-Bliss. *Combinatorial Union Busting with Stopped Strings*. New York Combinatorics Seminar. 2021.

[10]   Robert Dougherty-Bliss. *More irrationally good approximations from Beukers integrals*. Combinatorial and Additive Number Theory. 2021.

[11]   Robert Dougherty-Bliss. *Automagic Inverse Continued Fraction Calculuators*. Rutgers Experimental Mathematics Seminar. 2020.

[12]   Robert Dougherty-Bliss. *The Ergonomics of Computer Algebra*. Rutgers Experimental Mathematics Seminar. 2019.

Outreach talks

[1]   Robert Dougherty-Bliss. *Identities*. Baruch College REU. 2024.

[2]   Robert Dougherty-Bliss. *Proofs by Example*. DIMACS / Baruch College REU. 2023.

[3]   Robert Dougherty-Bliss. *Proofs by Example*. Rutgers Undergraduate Mathematical Society. 2023.

[4]   Robert Dougherty-Bliss. *When does a sum have an answer?* Rutgers Undergraduate Mathematical Society. 2022.

[5]   Robert Dougherty-Bliss. *Mathematical biology for fun and profit*. Central Washington University Math Club. 2021.

Teaching

Rutgers University

Number Theory   *Summer 2021, Summer 2022*
Instructor

Introduction to Real Analysis   *Spring 2021, Fall 2021, Fall 2023*
Teaching assistant

Introduction to Abstract Algebra   *Fall 2023*
Teaching assistant

Calculus III   *Fall 2022*
Teaching assistant

Calculus II   *Spring 2022, Spring 2023*
Teaching assistant

Calculus I   *Fall 2020*
Teaching assistant

Professional service

Undergraduate Directed Reading Program   **Rutgers University**
Mentor   2023

Arkansas Undergraduate Mathematics Competition
Problem writer / grader   2023

DIMACS REU
Graduate school panel panelist   2022

MoMath Masters   **National Museum of Mathematics**
Problem writer   2021

Experimental Mathematics Seminar   **Rutgers University**
Co-organizer   2020–

American Mathematical Society Graduate Chapter   **Rutgers University**
President   2020–

Graduate Liaison Committee   **Rutgers University**
Member   2020–2022

Combinatorics and Algebras from A to Z
Co-organizer   2021
Birthday conference in honor of Doron Zeilberger and Amitai Regev.

Reviewer for: Journal of Number Theory, The American Statistician, Discrete Mathematics, Discrete Mathematics Letters

Awards

Rutgers University

TA Teaching Excellence Award   *2022, 2023*
In recognition of valuable contributions to undergraduate teaching.

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*