

Pat Devlin

Curriculum Vitae

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Employment

2017–2020 **Gibbs Assistant Professor**, *Yale University*, Connecticut.
Post-doctoral research and teaching position

Education and Professional Development

2018 **Yale Faculty Teaching Academy**, *Yale University*, Connecticut.
Teaching-development program through the Center for Teaching and Learning

2017–2018 **Project NExT Fellowship**, *Mathematics Association of America*.
Selection to the 2017 cohort of this national teaching development program

2011–2017 **PhD in Mathematics**, *Rutgers University*, New Jersey.
Advisor: Jeff Kahn Dissertation: *Stability results and extremal combinatorics*

2010 **MSc in Mathematical Sciences**, *University of Delaware*, Delaware.
Advisor: Wenbo Li

2008–2010 **BSc in Mathematical Sciences**, *University of Delaware*, Delaware.
Magna cum laude; minor in computer science

Research Interests

Combinatorics and theoretical computer science, especially probabilistic and extremal aspects

Mentorship and Departmental Service

- Putnam seminar coordinator *Rutgers 2015–2016*, Yale 2017–present
 - Initiated weekly problem solving seminar
 - Historic participation in Putnam exam at Yale
 - 150 students in 2018; 92 in 2017 (previous university record 27; average 18.4)
 - Over 2.5% of undergraduate student body took the exam in 2018
 - Presented MathFest 2019 talk titled *Community, belonging, and the Putnam*
- Young Scholars Program (Rutgers) Summer 2015, 2016, 2017, 2019
 - Four-week summer math program for talented high school students
 - Resident instructor and co-director Summer 2016, 2017
 - Ongoing research mentor and coordinator Fall 2015
- Yale Undergraduate Math Society faculty mentor 2017–present

Publications and Preprints

- [1] Aaron Berger, Ross Berkowitz, Pat Devlin, and Van Vu. Universality for real roots of random polynomials. 2019+. In preparation.
- [2] Ross Berkowitz and Pat Devlin. Bribing three voters in majority dynamics almost always suffices. 2019+. In preparation.

- [3] Matija Buric, Pat Devlin, Mo Hendon, Dru Horne, and Ben Lund. Perfect matchings and derangements on graphs. 2019+. Submitted. Preprint, arXiv:1906.05908.
- [4] Pat Devlin and Stephen Newman. Notes on the curling conjecture. 2019+. In preparation.
- [5] Pat Devlin and Tony Zeng. Fractals in Kaprekar’s function. 2019+. In preparation.
- [6] Deepak Bal, Ross Berkowitz, Pat Devlin, and Mathias Schacht. Hamiltonian Berge cycles in random hypergraphs. 2019+. Submitted. Preprint, arXiv:1809.03596.
- [7] Dagur Ásgeirsson and Pat Devlin. Palindromes in finite groups. 2019+. Submitted. Preprint, arXiv:1904.00467.
- [8] Ross Berkowitz, Pat Devlin, Michael Doppelt, Sonali Durham, Tessa Murthy, and Harish Vemuri. Connected-intersecting graph families. 2019+. Submitted. Preprint, arXiv:1901.01616.
- [9] Ross Berkowitz, Pat Devlin, Catherine Lee, Henry Reichard, and David Townley. Expected chromatic number of random subgraphs. 2019+. Submitted. Preprint, arXiv:1811.02018.
- [10] Hüseyin Acan, Pat Devlin, and Jeff Kahn. Proof of an entropy conjecture of Leighton and Moitra. *Journal of Combinatorial Theory, Series A*, 161:299–308, 2019.
- [11] David Brandfonbrener, Pat Devlin, Netanel Friedenberg, Yuxuan Ke, Steffen Marcus, Henry Reichard, and Ethan Sciamma. Two-vertex generators of Jacobians of graphs. *The Electronic Journal of Combinatorics*, 25, 2018.
- [12] Ross Berkowitz and Pat Devlin. A stability result using the matrix norm to bound the permanent. *Israel Journal of Mathematics*, 224(1):437–454, 2018.
- [13] Pat Devlin and Jeff Kahn. Perfect fractional matchings in k -out hypergraphs. *The Electronic Journal of Combinatorics*, 24(3), 2017.
- [14] Pat Devlin and Jeff Kahn. On stability in the Erdős-Ko-Rado Theorem. *SIAM J. Discrete Math.*, 30(2):1283–1289, 2015.
- [15] Pat Devlin and Howard J Nuer. A strange family of Calabi-Yau 3-folds. *String-Math 2014*, 93:245, 2014.
- [16] Pat Devlin and Edinah K Gngang. Primes Appearing in Prime Tower Factorization. 2014.
- [17] Pat Devlin and Edinah K Gngang. Some integer formula encodings and related algorithms. *Advances in Applied Mathematics*, 51(4):536–541, 2013.
- [18] Pat Devlin. Integer Subsets with High Volume and Low Perimeter. *Integers*, 12, 2012.

[Advised student theses not appearing above](#)

- [19] Sabrina Evans. Joy ride: how subway structure affects citizen happiness. 2019. Senior thesis.
- [20] Maxime Lukianchikov. Mathematics and magic. 2019. Student thesis.
- [21] Henry Reichard. Codes on the space of hypergraphs. 2018. Senior thesis.

- [22] Yunus Tunçbilek. Rare graphs and anti-Ramsey multiplicities. 2018. Senior thesis.
- [23] David Brandfonbrener. Algebraic graph theory, strongly regular graphs, and Conway's 99 problem. 2017. Senior thesis.
- [24] Sage Lazzaro. We solved an MTV reality show weeks before the finale using simple math – mathematical spoilers ahead. *The Observer*, November 2014.

Advising Undergraduate Research

- Led long-term research projects with a total of 31 students since fall 2017
- Co-director of Yale's summer math research program (SUMRY) for 2018
 - SUMRY projects for which I was not lead mentor are not mentioned in this document
- Senior theses advised: at Yale [1, 19, 21, 22, 23]; at the University of Iceland [7]
- Other student research led [4, 5, 8, 9, 11, 20, 24]

Equity and Outreach

- I-RISE Summer Math Program 2019
 - Designed and implemented remedial math program meeting three times a week
 - For teenage refugee students with severely limited or interrupted education opportunities
- *Uniform Convergence* by Corrine Yap 2017, 2018
 - Organized performances of this one-woman play at Yale and MathFest
 - Play explores cultural and societal barriers facing women and non-white mathematicians
- *Dimensions* (AWM student chapter) faculty mentor (Yale) 2017–present
- Yale Girls in Math High School Competition 2017–present
- MathCounts faculty mentor (Yale) 2017–present
 - Student-led outreach program for local primary schools
- Member and faculty mentor for *Math Alliance* 2017–present
- Center for Social Justice Education (Rutgers) 2016–2017
- Volunteer workshop facilitator for McNair scholars program (Rutgers) Spring 2016
- Volunteer at Youth Empowerment Services, New Brunswick 2012–2014
 - Outreach and tutoring program for low-income primary-school students.

Awards and Honors

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| 2018 | OZY Educator Award
<i>Nominated and won for Math as a Creative Art (Yale, spring 2018)</i> | |
| 2018 | Excellence in Teaching with Technology | Yale University |
| 2017 | Project NExT Fellowship | Mathematics Association of America |
| 2017 | Best math seminar presentation
Title: <i>Things I learned from my students (humorous and otherwise)</i> | Rutgers University |
| 2016 | TA Teaching Excellence Award | Rutgers University Math Department |
| 2011 | GAANN Fellowship | Rutgers University |
| 2010 | Barry M Goldwater Scholarship | |
| 2010 | Wolf Scholarship | University of Delaware Math Department |
| 2009 | Rees Scholarship | University of Delaware Math Department |

Selected Presentations and Invited Talks

- 2019 MAA MathFest - Topics section on diversity, equity, and inclusion
Community, belonging, and the Putnam exam
- 2019 Massachusetts Institute of Technology - Discrete math seminar
Real roots of random polynomials
- 2018 Amherst College - Colloquium speaker
All fun and games: Undergraduate research through play
- 2018 Center for Teaching and Learning at Yale University - Invited speaker
Fostering community through Canvas: inclusivity through online tools
- 2017 Math Majors of America Tournament for High Schools - Invited speaker
How to create interesting mathematics problems
- 2017 University of Pennsylvania - Probability seminar
An entropy conjecture of Leighton and Moitra
- 2016 Princeton University - Discrete math seminar
Matrices with large permanent

Teaching Experience

Courses for which I was the primary instructor or facilitator

The symbol ● indicates new courses I developed

- Multivariate calculus and linear algebra I Yale math 230 - Fall 2017, 2018, 2019
- Multivariate calculus and linear algebra II Yale math 231 - Spring 2018, 2019
 - Notoriously intensive first-year courses for highly-motivated prospective majors
 - Topics include real analysis, point-set topology, vector calculus, linear algebra over arbitrary fields, and differential forms on manifolds
- Problem solving seminar (Putnam preparation) Yale math 199 - Fall 2017, 2018, 2019
- I-RISE math program Summer 2019
- Algorithms and complexity theory Young Scholars Program – Summer 2016, 2017, 2019
- Extremal combinatorics (graduate level) Yale math 674 - Spring 2019
- Math as a creative art Yale math 77 - Spring 2018
- Problem solving seminar (Putnam preparation) Rutgers math 491 – Fall 2015, 2016
- Undergraduate honors seminar Rutgers math 492 – Spring 2016
- Probability Young Scholars Program – Summer 2015
- Probability Rutgers math 477 – Summer 2015
- Math for liberal arts majors (honors) Rutgers math 103 – Fall 2014
- Calculus 1 for majors Rutgers math 151 – Summer 2014
- Linear algebra with MATLAB component Rutgers math 250.c – Fall 2013
- Calculus 2 for majors Rutgers math 152 – Summer 2013
- Linear algebra Rutgers math 250 – Spring 2013

Courses for which I was a teaching assistant

- Linear algebra Rutgers math 250 – Fall 2015
 - Chosen to pioneer the first departmental use of online office hours.
- Calculus 1 for non-majors Rutgers math 135 – Spring 2015
- Calculus 3 for majors Rutgers math 251 – Spring 2014

- Calculus 1 for majors Rutgers math 151 – Fall 2012

[Directed reading programs and independent study](#)

- Worked with students in nine different semesters (Yale, Rutgers) 2014–present
 - Topics chosen include probabilistic methods, combinatorial game theory, graph algorithms, Markov chains, generating functions, and linear programming

————— [Pedagogical scholarship](#)

- Analysis of Yale’s SUMRY program 2017–present
 - Partnering with Yale’s Center for Teaching and Learning to quantize and publish on the effectiveness and structure of Yale’s mathematics REU
- Math for liberal arts majors (Rutgers) 2015–2016
 - Developed new proof-based course for non-majors and presented findings at MathFest

————— [Professional Service](#)

- Journal referee (various) and book referee (Yale University Press)
- Organizer for Yale combinatorics seminar 2017–present
- Volunteer to modernize Yale math department webpage 2017–2018
- Organizer for Rutgers discrete math seminar 2015–2017
- Math Teachers’ Circle facilitator: New Brunswick, NJ 2016–2017
- North Jersey Regional Science Fair judge 2013–present
 - Head judge of mathematics category 2014–present
 - Organizational committee member 2017
- Rutgers Aresty Research Symposium judge 2014, 2017
- Co-founder of Rutgers applied game theory seminar 2013
- Organizer for Rutgers graduate student “pizza seminar” 2012