

Daniel J. Hathaway Innovation Hall, University of Vermont, Burlington, Vermont

Daniel.Hathaway@uvm.edu

Education

University of Michigan (UM): Mathematics Ph.D. 2015, GPA 4.0

Advisor: Andreas Blass; Thesis: “Generalized Domination” Set Theory

Dissertation Committee: Andreas Blass, Peter Hinman, Sergey Fomin, Karen Smith, Yaoyun Shi

Rensselaer Polytechnic Institute (RPI): GPA 4.0, Class Rank 1, Co-terminal Mathematics MS, Mathematics and Computer Science Dual Major BS, 5/2010

Teaching

12 years Cumulative Teaching Own Classes

University of Vermont, Lecturer Fall 2018 to present, Promoted to Senior Lecturer 2023

Classes taught: Applied Linear Algebra 2522, Linear Algebra 2544, Fundamentals of Calculus II 1224, Calculus I 1234, Calculus II 1248, Real Analysis 2468, Fundamentals of Math 2055, Computer Science Discrete Structures 1640, Honors Course in Set Theory HCOL 186, Adv Engineering Math 3201

3 Independent Studies co-taught: Computability Theory, Set Theory of Large Cardinals, Forcing
Fall 2024 and Spring 2025- Sabbatical to write book “The Set Theory of Universally Baire Sets of Reals: An Introduction.”

Faculty Service:

2018/19- Math Club Committee, Putnam Committee, Admissions Days, Faculty Recruiting

2019/20- Course Coordinator for Applied Linear Algebra, Faculty Advisor for new Game Development Club, Chair of Math Club Faculty Committee, Putnam Committee

2020/21-Course Coordinator for Fundamentals of Math, Faculty Advisor for Game Development Club, Chair of Math Club Faculty Committee, Putnam Committee

2021/22, 2022/23, 2023/24- Faculty Advisor Game Development Club, Chair of Math Club Faculty Committee, Putnam Committee

Undergraduate Advising:

8-10 Advisees per year including BS Math, BA Math, Dual Major Math&Stats, Accelerated Masters Program, Biomedical Engineering, Math Minor; The students with Math Minors have had majors that included Data Science, Physics, Environmental Engineering, Health and Society, and Computer Science.

Graduate Advising: Phd Committee for Graduate Student (April 2021-Dec 2022)

University of Denver , Visiting Assistant Professor (Postdoc)- 3 yr. Sept 2015- June 2018,

Calc 1 & 2, Differential Equations, Linear Algebra , Geometry, Multivariable Calculus

Advisor: Natasha Dobrinen; Inclusion Training

University of Michigan, Ann Arbor - Graduate Student Instructor- Calculus 1 & 2, Pre-Calculus

6 semesters taught own class, 2010-2015

Graded for Math 582- Senior Level Set Theory Course -Winter 2014

RPI Undergrad-Teaching Assistant for Logic and Computability, Upper Division Math class 2010

Substitute Lecturer for Analysis II, Upper Division Math class, Spring 2010

Publications and Pre-Prints

- “HOD and Universally Baire Sets of Reals” with Gabriel Goldberg (Berkeley)- In progress.
- “Applying Generic Coding with Help to Uniformizations”, *The Annals of Pure and Applied Logic*, 174 (2023), no. 4, 103244, ISSN 0168-0072, <https://doi.org/10.1016/j.apal.2023.103244>.
- “Bounding 2D Functions by Products of 1D Functions” with Francois Dorais, *Mathematical Logic Quarterly*, 68 (2022), no 2, pp 202-212.
- “Generic Coding with Help and Amalgamation Failure” with Sy David Friedman, *Journal of Symbolic Logic*, 86 (2021), no 4, pp 1385-1395.

- “Classes of Barren Extensions” with Natasha Dobrinen, *Journal of Symbolic Logic*, 86 (2021), no 1, pp 178-209.
- “Perfect Tree Forcings for Singular Cardinals” with Natasha Dobrinen and Karel Prikry, *Annals of Pure and Applied Logic*, 171 (2020), no. 9, Article 102827.
- “Forcing and the Halpern-Lauchli Theorem” with Natasha Dobrinen, *Journal of Symbolic Logic*, 85(2020), no 1, pp 87-102.
- “Sacks Forcing and the Shrink Wrapping Property” with Osvaldo Guzman Gonzalez, *Fundamenta Mathematicae*, 248 (2020), no. 8, pp 33-47.
- “Ramsey Theory on Generalized Baire Space”, *Topology and Its Applications*, 235(2018), pp 104-112.
- “The Halpern-Lauchli Theorem at a Measurable Cardinal” with Natasha Dobrinen, *Journal of Symbolic Logic*, 82 (2017), pp 1560-1575.
- “Disjoint Borel Functions”, *Annals of Pure and Applied Logic*, 168 (2017), no.8, 1552-1563.
- “Weak Distributivity Implying Distributivity”, *Journal of Symbolic Logic*, 81(2016), pp 711-717.
- “Combinatorics of Reductions Between Equivalence Relations” with Scott Schneider, *Discrete Math.* 338 (2015), no. 11, 2089-2094.
- “A Simple C^* -algebra with Finite Nuclear Dimension which is Not Z -stable” with Ilijas Farah, Takeshi Katsura, and Aaron Tikuisis, Jan 2013, *Munster Journal of Mathematics* 7 (2014) no. 2, 515-528.
- “Continuity Induction”, *College Mathematics Journal*, May 2010.

Referee

Journal of Symbolic Logic, Archive for Mathematical Logic, Annals of Pure and Applied Logic, Proceedings of the American Mathematical Association, Israel Journal of Mathematics, Open Mathematics

Honors, Awards, Grants

University of Michigan- NSF Research Training Group Fellowship- Summer 2015
Allen Shields Memorial Fellowship- Winter 2015
NSF Research Training Group Fellowship- Fall Term 2014
Rackham Grad School Dissertation Fellowship- Winter Term 2014

Everett Memorial Scholarship Summer 2014, Dept Scholarship/Fellowship Summer 2013
Alice Webber Glover Fellowship in Mathematics Summers 2011 and 2012

RPI- International Medalist Scholarship, Leadership, and President Awards
Max Hirsch Prize- 1 Math Senior for outstanding ability in academics & career promise in Math- 2009
Founder’s Excellence Award -Creativity, Discovery, Leadership & Values (1% students)
IBM Thomas Watson Scholar and Scholarships- 2005-2008

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Mt Mansfield High School- Valedictorian 2005
AP State Scholar Vermont 2005 (#1 in State) and National AP Scholar
Vermont State Honor Scholarship, VT Green and Gold Scholar, Robert C. Byrd Federal Honor Scholarship

Research & Development **Bloomberg Financial:** Summer Intern R&D 2 years, NYC; 2009 User Interface Core Data Dept: Specified, designed and wrote Lua static type inference program. Program detects bugs in Lua code used in large host apps. 2010- Trading Systems Dept: Created testing software for sell-side equity order management system; Program enables debug of trading system products

IBM Electronic Design Automation Development: Summer Intern 3 yrs, Burlington, VT 2006, 2007, 2008: Programmed in C++ for Advanced Shapes Technology Dept; Designed algorithms and developed software for IBM's Common Shapes Infrastructure next gen geometry toolkit

RPI Undergrad Research: 9/06-5/07 Robot Motion Planning project relying on Multiple Integer Linear Programming to determine the parameterization of robots in a specified path to avoid collision

Invited Talks *Improving a Result of Mostowski: Amalgamation Failure*, Core Model Seminar Series, Sept 2023

The Lua Programming Language, UVM Game Development Club, April 2023

Rotations in 3D Space, UVM Math Club, October 2022

Forcing and the Halpern-Läuchli Theorem, AMS Western Virtual Sectional Meeting, Special Session on Ramsey Theory of Infinite Structures, May 2022

Introduction to Cardinal Exponentiation, UVM Math Club, April 2022

A relative of $ZF+DC+\omega_1$ is measurable, NY LOGIC: CUNY Set Theory Seminar, August 2020

Distributivity laws for Boolean algebras, UVM, unQVNTS Seminar, Oct 2019

Generic Coding with Help, North American Annual meeting of Association of Symbolic Logic, New York City, May 2019

Ultrafilters, UVM Math Club, Dec 2018

The Halpern-Läuchli Theorem and an Indestructible Partition Relation, AMS Sectional Meeting, Special Session on Large Cardinals and Combinatorial Set Theory, U Michigan, Ann Arbor, Oct 2018

Ramsey Theory on Generalized Baire Space, Joint Mathematics Meeting, Ramsey Theory Special Session, San Diego, Jan 2018, also Analysis/Logic seminar U Denver Sept 2017

Disjoint Infinity Borel Functions, 32nd Conference on Topology & its Applications, U Dayton, June 2017
Extended talk on same topic presented at Algebra/Logic seminar U Denver Sept 2017 and Overview presented at Joint Mathematics Meeting, San Diego, January 2018

The Halpern-Lauchi Theorem at a Measurable Cardinal, Assoc of Symbolic Logic Annual North America meeting, Boise State, March 2017, modified talk also given at U Denver Sept 2016 Logic Seminar

A Forcing to Add a New Omega Sequence, U of Denver, Nonclassical Logic Seminar Feb 2017

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Bounding 2D Functions by Products of 1D Functions, Front Range Logic Group, Colorado School of Mines Sept 2016

Disjoint Borel Functions, 2016 Boise Set Theory Conf at U San Diego Annual Meeting AAAS Pacific Div

Weak Distributivity Laws for Complete Boolean Algebras, U Denver, Logic & Algebra Seminar, Oct 2015

Introduction to Cardinal Characteristics, Union College, Invited Talk, Faculty/Student seminar, March 2015- Same talk also given at U Denver Nov 2015 Graduate Student Seminar

PCF Theory and Cardinal Invariants of the Reals, UM Logic Seminar, Sept 2014

Reducing Constructibility to Domination, 7th Young Set Theory Workshop, Bedlewo, Poland, May 2014

Some Applications of Real Valued Measurable Cardinals, UM Logic Seminar, Oct 2013

A Lower Bound for Generalized Dominating Numbers, UM Logic Seminar, Oct 2013

Applications of Almost Disjoint Functions to Generalized Dominating Numbers, UM Logic Seminar, Sept 2013

Domination of Baire Class One Functions from Baire Space to N , UM Logic Seminar, Feb 2013

Domination of Continuous Functions from Baire Space to N , U Toronto, Logic Seminar, Dec 2012

Computer Skills

Programming Languages: C++, Java, Python, Haskell
Mathematics Software: Mathematica, Matlab
DUArcade Computer Game Juried Exposition- Created, exhibited computer game Fractal Block World 2017, 2018

Associations Workshops

Core Model Induction Workshop, Rutgers, June 3-14, 2019, 2 week workshop by Invitation
Co-organizer Special Section on Set Theory, AMS Western Section Conference, U of Denver Oct 2016
Young Set Theory Workshop, Bedlewo, Poland, May 11-16, 2014 funded by YSTW grant
Young Set Theory Workshop, Oropa, Italy, June 9-13, 2013, funded by YSTW grant
Fields Institute, University of Toronto, Worldwide Thematic Program on Set Theory: Forcing, 2012 Fall Semester workshop with courses and conferences, funded by Fields Institute NSF grant
Phi Kappa Phi, Association for Symbolic Logic, American Mathematical Society, International House NYC
RPI: President of Math Club, Student Chapter of MAA, Pi Mu Epsilon Math Honor Society, Association for Computing Machinery (ACM)

Competitions

Putnam Exam – Individual top 11% ; RPI Team scored top 8% (team top scorer) 2007
Math Modeling Competition 2008- Meritorious Rank, Team scored 13% 1540 teams WW
ACM-RPI Programming C/C++ Competition sponsored by Bloomberg/Vanguard 2nd Place 3/2009