Donald M. Stull

Contact Information

L. E. Dickson Instructor
University of Chicago
Department of Mathematics

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Research Interests

Geometric measure theory, computability theory and theoretical computer science

Education

Iowa State University

Ph.D. in Computer Science, 2018

- Advisor: Jack H. Lutz

University of Texas at Austin

B.S. in Computer Science, May 2011

Professional Experience

L. E. Dickson Instructor, University of Chicago, Department of Mathematics
September 2023 - Present

Postdoctoral Fellow, Northwestern University, Department of Computer Science
September 2021 - August 2023

Lecturer, Iowa State University, Department of Computer Science
September 2019 - July 2021

Postdoctoral Researcher, INRIA, Nancy, France
January 2018 - August 2019

Graduate Research Assistant, Iowa State University, Department of Computer Science
August 2011 - December 2017

Teaching Experience

L. E. Dickson Instructor, University of Chicago
Analysis in $\mathbb{R}^n$ II (accelerated), *Winter 2024, Winter 2025*
Analysis in $\mathbb{R}^n$ III (accelerated), *Spring 2024, Spring 2025*

Postdoctoral Fellow, Northwestern University
Design and Analysis of Algorithms, *Fall 2021*, *Spring 2022*, *Winter 2023*
Introduction to Kolmogorov Complexity, *Winter 2022*, *Fall 2022*

Lecturer, Iowa State University
Design and Analysis of Algorithms, *Fall 2019*, *Spring 2020*
Introduction to Object-Oriented Programming, *Fall 2019*, *Spring 2020*, *Fall 2020*
Introduction to Data Structures, *Fall 2020*

Graduate Teaching Assistant, Iowa State University
Design and Analysis of Algorithms (Graduate), *Fall 2015*, *Summer 2016*
Theory of Computation (Graduate), *Spring 2016*
Finite-State Information and Randomness, *Fall 2017*

Journal Publications

Jacob B. Fiedler and D. M. Stull, Universal sets for projections, *Indiana University Mathematics Journal*, to appear.

D. M. Stull, Pinned distance sets using effective dimension, *Israel Journal of Mathematics*, to appear.

D. M. Stull, The dimension spectrum conjecture for planar lines, *Journal of the London Mathematical Society*, 111 (6), 2025.

Neil Lutz and D. M. Stull, Projection theorems using effective dimension, *Information & Computation* 297, 2024.

Neil Lutz and D. M. Stull, Dimension spectra of lines, *Computability* 11, pp. 85-112, 2022.

Neil Lutz and D. M. Stull, Bounding the dimension of points on a line, *Information & Computation* 275, 2020.

Xiang Huang, Jack Lutz, Elvira Mayordomo and D. M. Stull, Asymptotic divergences and strong dichotomy, *IEEE Transactions on Information Theory* 67, 2021, pp. 6296-6305.

Timothy H. McNicholl and D. M. Stull, The isometry degree of a computable copy of ℓ^p, *Computability* 8(2), pp. 179-189, 2019.

Joe Clanin, Timothy H. McNicholl and D. M. Stull, Analytic computable structure theory and L^p spaces, *Fundamenta Mathematicae* 244(3), pp. 255-285, 2019.

Adam Case, Jack H. Lutz, and D. M. Stull, Reachability problems for continuous chemical reaction networks, *Natural Computing* **17** (2018), pp. 223-230.

Refereed Conference Publications

D. M. Stull, The dimension spectrum conjecture for planar lines, *Proceedings of the 49th International Colloquium On Automata, Languages and Programming (ICALP), 2022.*

D. M. Stull, Optimal oracles for point-to-set principles, *Proceedings of the 39th Annual Symposium on Theoretical Aspects of Computer Science (STACS), 2022*

Xiang Huang, Jack H. Lutz, Elvira Mayordomo, D. M. Stull, Asymptotic divergences and strong dichotomy, *Proceedings of the 37th Annual Symposium on Theoretical Aspects of Computer Science (STACS), 2020.*

Mathieu Hoyrup, Cristobal Rojas, Victor Selivanov and D. M. Stull, Computability on quasi-Polish spaces, *International Conference on Descriptional Complexity of Formal Systems (DCFS), 2019.*

Mathieu Hoyrup and D. M. Stull, Semicomputable points in Euclidean spaces, *International Symposium on Mathematical Foundations of Computer Science (MFCS), 2019.*

D. M. Stull, Results on the dimension spectra of planar lines, *Proceedings of the 43rd International Symposium on Mathematical Foundations of Computer Science (MFCS 2018).*

Neil Lutz, D. M. Stull, Projection theorems using effective dimension, *Proceedings of the 43rd International Symposium on Mathematical Foundations of Computer Science (MFCS 2018).*

Timothy H. McNicholl and D. M. Stull, The isometry degree of a computable copy of ℓ^p, *Proceedings of the 14th Annual Conference on Computability in Europe (CiE 2018).*

Mathieu Hoyrup, Diego Nava Saucedo and D. M. Stull, Semicomputable geometry, *Proceedings of the 45th International Colloquium on Automata, Languages, and Programming (ICALP 2018).*

Neil Lutz and D. M. Stull, Dimension spectra of lines, *Proceedings of the 13th Annual Conference on Computability in Europe (CiE 2017).*

Neil Lutz and D. M. Stull, Bounding the dimension of points on a line, *Proceedings of the 14th Annual Conference on Theory and Applications of Models of Computation (TAMC 2017).*

Xiang Huang, D. M. Stull, Polynomial space randomness in analysis, *Proceedings of the 41st International Symposium on Mathematical Foundations of Computer Science (MFCS 2016).*

Adam Case, Jack H. Lutz, and D. M. Stull, Reachability problems for continuous chemical reaction networks, *Proceedings of the Fifteenth International Conference on Unconventional Computation and Natural Computation (UCNC 2016).*

Robyn R. Lutz, Jack H. Lutz, James I. Lathrop, Titus H. Klinge, Divita Mathur, D. M. Stull, Taylor G. Bergquist, and Eric R. Henderson, Requirements analysis for a product family of DNA nanodevices, *Proceedings of the Twentieth IEEE International Requirements Engineering Conference (RE 2012).*

Book Chapters

D. M. Stull, Resource-bounded randomness and its applications, *Algorithmic Randomness: Progress and Prospects.*

Submitted Papers

Peter Cholak, Marianna Csornyei, Neil Lutz, Patrick Lutz, Elvira Mayordomo and D. M. Stull, Algorithmic information bounds for distances and orthogonal projections.

Marianna Csornyei and D. M. Stull, Improved bounds for radial projections in the plane.

Peter Cholak, Marianna Csornyei, Neil Lutz, Patrick Lutz, Elvira Mayordomo and D. M. Stull, Bounding the dimension of exceptional sets for orthogonal projections.

D. M. Stull, Optimal oracles for point-to-set principles.

Jacob B. Fiedler and D. M. Stull, Dimensions of pinned distance sets.

Jacob B. Fiedler and D. M. Stull, Pinned distances of planar sets with low dimension.

Awards and Honors

Research Excellence Award from the ISU Graduate College, Fall 2016

Invited Talks

Bourgain type inequalities using effective methods, AMS Fall Central Sectional Meeting, Special Section on Computability Theory, St. Louis University, October 18-19, 2025.

Exceptional sets for orthogonal projections, AMS Fall Central Sectional Meeting, Special Section on Harmonic Analysis, Geometric Measure Theory and Fractals, St. Louis University, October 18-19, 2025.

Optimal oracles and the point-to-set principle, South Eastern Logic Symposium 2025, University of Florida, March 1-2, 2025.

Effective dimension and geometric measure theory, University of Chicago Logic Seminar, February 13, 2025.

Exceptional sets for orthogonal projections, Canadian Mathematical Society Winter Meeting, Vancouver, BC, December 1, 2024.

Algorithmic methods in geometric measure theory, Rainwater Seminar, University of Washington, October 29, 2024.

Universal sets for projections and effective dimension, Iowa Colloquium on Information, Complexity and Logic, October 24, 2024.

Recent progress on the dimensions of pinned distance sets, Online Logic Seminar, October 4, 2024.

Recent progress on the dimensions of pinned distance sets, University of Pennsylvania Analysis Seminar, September 12, 2024.

Dimensions of pinned distance sets, Association for Symbolic Logic Annual Meeting, Iowa State University, May 14-17, 2024.

Projection theorems using effective dimension, Massachusetts Institute of Technology, Analysis Seminar, May 1, 2024.

Projection theorems for small sets of directions, AMS Fall Central Sectional Meeting, Special Section on Computability Theory, University of Wisconsin - Milwaukee, April 20-21, 2024.

Dimensions of pinned distance sets, University of Wisconsin Analysis Seminar, February 7, 2024.

Dimensions of pinned distance sets, University of Illinois Chicago Logic Seminar, October 10, 2023.

Dimensions of pinned distance sets, AMS Fall Central Sectional Meeting, Special Section on Harmonic Analysis in the Midwest, Creighton University, October 7-8, 2023.

Optimal oracles for point-to-set principles, University of Wisconsin Logic Seminar, December 6, 2022.

Pinned distance sets using effective dimension, University of California Los Angeles Logic Colloquium, December 2, 2022.

Pinned distance sets using effective dimension, Notre Dame Logic Seminar, University

of Notre Dame, November 15, 2022.

Pinned distance sets using effective dimension, Midwest Computability Seminar, University of Chicago, November 1, 2022.

Pinned distance sets using effective dimension, Effective Methods in Measure and Dimension, American Institute of Mathematics (AIM), August 15-19, 2022.

Optimal oracles for point-to-set principles, Southeastern Logic Symposium (SEALS), University of Florida, March 2022.

The dimension spectrum conjecture for planar lines, Midwest Computability Seminar, University of Chicago, January 2022.

Marstrand's projection theorem and computability theory, Penn State Logic Seminar, Pennsylvania State University, October 27, 2020 (virtual).

Projection theorems using effective dimension, Algorithmic Randomness Workshop, American Institute of Mathematics (AIM), August 10-14, 2020 (virtual).

Projection theorems using effective dimension, Iowa Colloquium on Information, Complexity, and Logic, April 9, 2020 (virtual).

Projection theorems using effective dimension, Southeastern Logic Symposium (SEALS), University of Florida, February 2020.

Semicomputable geometry, Iowa State University Logic Seminar, Iowa State University, October 31, 2019.

The effective dimension of points on lines, AMS-MMA Joint Mathematics Meeting 2019, AMS Special Session on Algorithmic Dimensions and Fractal Geometry, January 16-19, 2019.

Hausdorff dimension and Kolmogorov complexity, Computability and Category Theoretic Perspectives on Descriptive Set Theory, Swansea University, July 16-18, 2018.

Semicomputable geometry, Journées du GT Calculabilités du GDR IM, LIX, July 2-3, 2018.

Projection theorems using effective dimension, Workshop on Algorithmic Questions in Dynamical Systems, Institut de Mathématiques de Toulouse, March 26-29, 2018.

Effective dimension of planar lines, Midwest Computability Seminar, University of Chicago, October 24, 2017.

Effective dimension of points on lines, Iowa Colloquium on Information, Complexity and Logic (ICICL), Grinnell College, September 14th, 2017.

Polynomial space randomness and analysis, AMS Fall Central Sectional Meeting, Special Section on Effective Mathematics in Discrete and Continuous Worlds, University of St. Thomas, October 28-30, 2016.

Conference Talks

The dimension spectrum conjecture for planar lines. Forty-ninth International Collo-

quium on Automata, Languages and Programming (ICALP 2022), July 4-8, 2022.

Optimal oracles for point-to-set principles, Thirty-ninth International Symposium on Theoretical Aspects of Computer Science (STACS 2022), March 15-18, 2022.

Algorithmic randomness and fractal geometry, Logic Colloquium (LC 2021), July 19-24, 2021 (virtual).

Selection, divergence, and dichotomy, Thirteenth International Conference on Computability, Complexity and Randomness (CCR 2018), December 17-21, 2018.

The effective dimensions of points on lines, Thirteenth International Conference on Computability, Complexity and Randomness (CCR 2018), December 17-21, 2018.

Results on the dimension spectra of planar lines, 43rd International Symposium on Mathematical Foundations of Computer Science (MFCS 2018), August 27-31, 2018.

Projection theorems using effective dimension, 43rd International Symposium on Mathematical Foundations of Computer Science (MFCS 2018), August 27-31, 2018.

The isometry degree of a computable copy of ℓ^p, 14th Annual Conference on Computability in Europe (CiE 2018), July 30-August 3, 2018.

Semicomputable geometry, 45th International Colloquium on Automata, Languages, and Programming (ICALP 2018), July 10-13, 2018.

Dimension spectra of lines, 13th Annual Computability in Europe (CiE 2017), June 12-16, 2017.

Polynomial space randomness and analysis, 41st International Symposium on Mathematical Foundations of Computer Science (MFCS 2016), August 22-26, 2016.

Reachability problems for continuous chemical reaction networks, Fifteenth International Conference on Unconventional Computation and Natural Computation (UCNC 2016), July 11-15, 2016.