Neil Lutz
Visiting Assistant Professor, Swarthmore College
Affiliate Assistant Professor, Iowa State University

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Education

Ph.D. in Computer Science, Rutgers University, 2017
Dissertation: *Algorithmic Information, Fractal Geometry, and Distributed Dynamics*
Advisor: Rebecca N. Wright

M.S. in Mathematics, Rutgers University, 2016
Committee chair: Michael Saks

B.S. in Mathematics with General Honors, University of Chicago, 2008

Research Interests

Algorithmic information theory, algorithmic game theory, fractal geometry, and dynamics

Teaching Experience

Visiting Assistant Professor, Computer Science Department, Swarthmore College
- Algorithms, fall 2021

Lecturer, Department of Computer and Information Science, University of Pennsylvania
- Introduction to Algorithms (undergraduate), fall 2020 (online)

Lecturer, Department of Computer Science, Iowa State University
- Introduction to Data Structures (Java), spring 2020
- Theory of Computing (undergraduate), fall 2019

Instructor, Department of Computer and Information Science, University of Pennsylvania
- Algorithms & Computation (graduate), spring 2019
- Introduction to Algorithms (undergraduate), fall 2017 and 2018
- Theory of Computation (graduate, co-taught with Sampath Kannan), spring 2018

Course Developer, Penn Engineering Online Learning, University of Pennsylvania, fall 2018
- Mathematical Foundations of Computer Science (graduate, co-developed with Val Tannen)

Research Experience

Postdoctoral Researcher, Department of Computer and Information Science, University of Pennsylvania, supervised by Sampath Kannan, fall 2017–summer 2019

Graduate Research Assistant, Center for Discrete Mathematics and Theoretical Computer Science (DIMACS), Rutgers University, supervised by Rebecca Wright, fall 2012–spring 2016

Visiting Research Fellow, School of Computer Science and Engineering, Hebrew University of Jerusalem, supervised by Michael Schapira, summer–fall 2015

Graduate Research Assistant, Department of Computer Science, Rutgers University, supervised by Michael Saks, fall 2011 and summer 2012

NYC Turing Fellow, Flat World Knowledge, summer 2011

Caltech Summer Undergraduate Research Fellow and NASA Space Grant Fellow, Jet Propulsion Laboratory, summers 2006–2008

Publications in Journals

"Dimension Spectra of Lines," Neil Lutz and D. M. Stull, *Computability*, to appear 2021.

"Fractal Intersections and Products via Algorithmic Dimension," Neil Lutz, *ACM Transactions on Computation Theory (TOCT)*, 2021.

"Bounding the Dimension of Points on a Line," Neil Lutz and D. M. Stull, *Information and Computation* 275, 2020

"Algorithmic information, plane Kakeya sets, and conditional dimension," Jack H. Lutz and Neil Lutz, *ACM Transactions on Computation Theory (TOCT)* 10(2), 2018.

"Dynamics at the Boundary of Game Theory and Distributed Computing," Aaron D. Jaggard, Neil Lutz, Michael Schapira, and Rebecca N. Wright, *ACM Transactions on Economics and Computation (TEAC)* 5(3), 2017.

"Lines missing every random point," Jack H. Lutz and Neil Lutz, *Computability* 4(2), 2015.

Publications in Refereed Conference Proceedings

"Service in Your Neighborhood: Fairness in Center Location" Christopher Jung, Sampath Kannan, and Neil Lutz, *Proceedings of the First Symposium on Foundations of Responsible Computing (FORC 2020)*.

"Quantifying the Burden of Exploration and the Unfairness of Free Riding," Christopher Jung, Sampath Kannan, and Neil Lutz, *Proceedings of the Thirty-First Annual ACM-SIAM Symposium on Discrete Algorithms (SODA 2020)*.

"Robustness and Games Against Nature in Molecular Programming," Jack H. Lutz, Robyn R. Lutz, Neil Lutz, and Matthew Riley, *Proceedings of the 41st International Conference on Software Engineering: New Ideas and Emerging Results (ICSE-NIER 2019)*.

"Projection Theorems Using Effective Dimension," Neil Lutz and D. M. Stull, *Proceedings of the 43rd International Symposium on Mathematical Foundations of Computer Science (MFCS 2018)*.

"Fractal Intersections and Products via Algorithmic Dimension," Neil Lutz, *Proceedings of the 42nd International Symposium on Mathematical Foundations of Computer Science (MFCS 2017)*.

"Brief Announcement: Stateless Computation," Danny Dolev, Michael Erdmann, Neil Lutz, Michael Schapira, and Adva Zair, *Proceedings of the 36th ACM Symposium on Principles of Distributed Computing (PODC 2017)*.

"Dimension Spectra of Lines," Neil Lutz and D. M. Stull, *Unveiling Dynamics and Complexity: Proceedings of the 13th Conference on Computability in Europe (CiE 2017)*.

"Bounding the Dimension of Points on a Line," Neil Lutz and D. M. Stull, *Proceedings of the 14th Annual Conference on Theory and Applications of Models of Computation (TAMC 2017)*.

"Algorithmic information, plane Kakeya sets, and conditional dimension," Jack H. Lutz and Neil Lutz, *Proceedings of the 34th International Symposium on Theoretical Aspects of Computer Science (STACS 2017)*.

"Self-stabilizing uncoupled dynamics," Aaron D. Jaggard, Neil Lutz, Michael Schapira, and Rebecca N. Wright, *Proceedings of the 7th International Symposium on Algorithmic Game Theory (SAGT 2014)*.

"Lines missing every random point," Jack H. Lutz and Neil Lutz, *Language, Life, Limits: Proceedings of the 10th Conference on Computability in Europe (CiE 2014)*.

Expository Publications

"Who Asked *Us?* How the Theory of Computing Answers Questions about Analysis," Jack H. Lutz and Neil Lutz, *Complexity and Approximation*, Ding-Zhu Du and Jiw Wang (eds.), Springer, 2020.

"Open Problems Column: Some open problems in algorithmic fractal geometry," Neil Lutz, edited by William Gasarch, *SIGACT News* 48(4), 2017.

Manuscripts

"Dimension and the Structure of Complexity Classes," Jack H. Lutz, Neil Lutz, and Elvira Mayordomo, arXiv.

"Algorithmically Optimal Outer Measures," Jack H. Lutz and Neil Lutz, arXiv:2006.08468.

"Extending the Reach of the Point-to-Set Principle," Jack H. Lutz, Neil Lutz, and Elvira Mayordomo, arXiv:2004.07798.

"Stateless Computation," Danny Dolev, Michael Erdmann, Neil Lutz, Michael Schapira, and Adva Zair, arXiv:1611.10068.

Invited Talks at Conferences

Special Session on Computability Theory, ASL North American Annual Meeting, Notre Dame University, June 2021

Sixteenth International Conference on Computability, Complexity and Randomness (CCR), Isaac Newton Institute for Mathematical Sciences, University of Cambridge, June 2020 (postponed)

"New Applications of Point-to-Set Principles," *Southeastern Logic Symposium (SEALS)*, University of Florida, February 2020

"Algorithmic Dimensions of Projected Points," *AMS-ASL Special Session on Algorithmic Dimensions and Fractal Geometry*, Joint Mathematics Meetings, Baltimore, MD, January 2019

"Algorithmic Dimensions of Projected Points," *Fourteenth International Conference on Computability, Complexity and Randomness (CCR)*, Santiago, Chile, December 2018

"Effective Dimensions of Projected Points," *Fifteenth International Conference on Computability and Complexity in Analysis (CCA)*, Lake Kochel, Germany, August 2018

Selected Talks at Workshops, Seminars, and Colloquia

"Point-to-Set Principles," joint tutorial with Jack H. Lutz and D.M. Stull at *Algorithmic Randomness*,

American Institute of Mathematics, San Jose, CA, August 2020 (online)

"Algorithmically Optimal Outer Measures," *Seventeenth International Conference on Computability and Complexity in Analysis (CCA)*, Bologna, Italy, August 2020 (online)

"Fractal Slices, Projections, and Products via Algorithmic Dimension," *Midwest Computability Seminar*, University of Chicago, February 2020

"Algorithmic Dimensions of Projected Points," *Iowa Colloquium on Information, Complexity, and Logic (ICICL)*, Grinnell College, October 2019

"Free-riding with Bandits: Shirking the Burden of Exploration," Simons Institute for the Theory of Computing, University of California, Berkeley, July 2018

"Fractal Intersections and Products via Algorithmic Dimension," *Continuity, Computability, Constructivity — From Logic to Algorithms (CCC)*, Nancy, France, June 2017

"Algorithmic Fractal Geometry," University of Pennsylvania, May 2017

"Stateless Computation," U.S. Naval Research Laboratory, May 2017

"Fractal Geometry via Algorithmic Information" (short talk), *New York Area Theory Day*, New York University, December 2016

"Algorithmic Information, Plane Kakeya Sets, and Conditional Dimension," *DIMACS Theory of Computing Seminar*, Rutgers University, March 2016

Participation in Invitation-Only Programs

Computability Theory, Oberwolfach Research Institute for Mathematics, Oberwolfach, Germany, April–May 2021

Algorithmic Randomness, American Institute of Mathematics, San Jose, CA, August 2020 (online)

Descriptive Set Theory and Computable Topology, Schloss Dagstuhl, Wadern, Germany, April 2020 (postponed)

Summer Cluster: Fairness, Simons Institute for the Theory of Computing, University of California, Berkeley, May–July 2019

Summer Cluster: Algorithmic Fairness, Simons Institute for the Theory of Computing, University of California, Berkeley, July 2018

Nexus of Computation and Information Theories, Centre International de Rencontres Mathématiques, Marseille, France, and Institut Henri Poincaré, Paris, France, January–February 2016

Professional Activities

Member of program committee, *ACM Conference on Fairness, Accountability, and Transparency (FAccT 2021)* and *Sixteenth International Conference on Computability and Complexity in Analysis (CCA 2019)*

Reviewer for *Information and Computation*, *Theoretical Computer Science*, and *ACM Symposium on the Theory of Computing (STOC)*

Grants and Awards

Best Student Paper at the *42nd International Symposium on Mathematical Foundations of Computer Science (MFCS)*, Aalborg, Denmark, August 2017

Travel support from the French National Center for Scientific Research to attend the *Nexus of Computation and Information Theories* program in Marseille and Paris, France, January–February 2016

Association for Symbolic Logic travel grant to attend the *10th Conference on Computability in Europe (CiE)*, Budapest, Hungary, June 2014