NEIL LUTZ
Visiting Assistant Professor, Swarthmore College
Lecturer, University of Pennsylvania

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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, and fractal geometry

TEACHING EXPERIENCE

Visiting Assistant Professor, Computer Science Department, Swarthmore College
· Directed Reading: Machine-Assisted Proof, fall 2025
· Theory of Computation, fall 2022, fall 2025
· Algorithms, fall 2021, spring 2023, spring 2024, spring 2025
· Special Topics: Quantum Computing, fall 2024
· Special Topics: Computational Geometry, fall 2023
· Directed Reading: Algorithmic Mechanism Design, fall 2022
· Special Topics: Algorithmic Game Theory, spring 2022

Lecturer, Department of Computer and Information Science, University of Pennsylvania
· Algorithms & Computation (graduate), summers 2022–2025 (remote)
· Introduction to Algorithms (undergraduate), fall 2020 (remote)

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
· Algorithms & Computation (graduate, co-developed with Sampath Kannan and Anindya De)
· Mathematical Foundations of Computer Science (graduate, co-developed with Val Tannen)

RESEARCH EXPERIENCE

Visiting Assistant Professor, Computer Science Department, Swarthmore College, fall 2021–present

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

NASA Space Grant Fellow, Jet Propulsion Laboratory, summer 2008

Caltech Summer Undergraduate Research Fellow, Jet Propulsion Laboratory, summers 2006 and 2007

PUBLICATIONS IN JOURNALS

"Algorithmically Optimal Outer Measures," Neil Lutz and Jack H. Lutz, *ACM Transactions on Computation Theory (TOCT)*, to appear 2025.

"Projection Theorems Using Effective Dimension," Neil Lutz and D. M. Stull, *Information and Computation* 297, 2024.

"Extending the Reach of the Point-to-Set Principle," Jack H. Lutz, Neil Lutz, and Elvira Mayordomo, *Information and Computation* 294, 2023.

"Dimension and the Structure of Complexity Classes," Jack H. Lutz, Neil Lutz, and Elvira Mayordomo, *Theory of Computing Systems* 67 (Commemorative Issue for Alan L. Selman), 2023.

"Dimension Spectra of Lines," Neil Lutz and D. M. Stull, *Computability* 11(2), 2022

"Fractal Intersections and Products via Algorithmic Dimension," Neil Lutz, *ACM Transactions on Computation Theory (TOCT)* 13(3), 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.

"Examining the reuse of open textbooks," John Levi Hilton III, Neil Lutz, and David Wiley, *International Review of Research in Open and Distributed Learning (IRRODL)* 13(2), 2012.

PUBLICATIONS IN REFEREED CONFERENCE PROCEEDINGS

"Extending the Reach of the Point-to-Set Principle," Jack H. Lutz, Neil Lutz, and Elvira Mayordomo, *Proceedings of the 39th International Symposium on Theoretical Aspects of Computer Science (STACS 2022)*.

"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.

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

Preprint Manuscripts

"Algorithmic Information Bounds for Distances and Orthogonal Projections," Peter Cholak, Marianna Csörnyei, Neil Lutz, Patrick Lutz, Elvira Mayordomo, and D. M. Stull, arXiv.

"Lineal Extensions of Kakeya Sets Missing Every ee-Random Point," Neil Lutz, Spencer Park Martin, and Rain White, arXiv:2507.05475.

"Bounding the Dimension of Exceptional Sets for Orthogonal Projections," Peter Cholak, Marianna Csörnyei, Neil Lutz, Patrick Lutz, Elvira Mayordomo, and D. M. Stull, arXiv:2411.04959.

"Algorithmic Information Bounds for Distances and Orthogonal Projections," *AMS Special Session on New Directions in Geometric Measure Theory and Effective Methods*, Joint Mathematics Meetings, Washington, DC, January 2026

"Applying Algorithmic Dimensions to Classical Problems," *19th Conference on Computability in Europe (CiE)*, Batumi, Georgia, July 2023 (remote)

"The Point-to-Set Principle in Metric Spaces and Complexity Classes," *Sixteenth International Conference on Computability, Complexity and Randomness (CCR)*, Isaac Newton Institute for Mathematical Sciences, University of Cambridge, June 2022

"Dimension and the Structure of Complexity Classes," *Southeastern Logic Symposium (SEALS)*, University of Florida, March 2022 (remote)

"Algorithmically Optimal Outer Measures," *Special Session on Computability Theory*, ASL North American Annual Meeting, Notre Dame University, June 2021 (remote)

"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

"Algorithmic information properties of points on lines," Iowa State University, September 2025

"Applying Algorithmic Dimensions to Classical Problems," *New England Recursion and Definability Seminar*, Wellesley College, October 2023

"Applying Algorithmic Dimensions to Classical Problems," *Effective Methods in Measure and Dimension*, American Institute of Mathematics, San Jose, CA, August 2022

"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 (remote)

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

"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

Effective Methods in Measure and Dimension, American Institute of Mathematics, San Jose, CA, August 2022

Descriptive Set Theory and Computable Topology, Schloss Dagstuhl, Wadern, Germany, November 2021 (remote)

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

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

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, *Nineteenth International Conference on Computability, Complexity and Randomness (CCR 2026)*, *Nineteenth International Conference on Computability and Complexity in Analysis (CCA 2022)*, *ACM Conference on Fairness, Accountability, and Transparency (FAccT 2021)*, and *Sixteenth International Conference on Computability and Complexity in Analysis (CCA 2019)*

Paper reviewer for *Symposium on Theoretical Aspects of Computer Science (STACS)*, *Information and Computation*, *Theoretical Computer Science*, and *ACM Symposium on the Theory of Computing (STOC)*

Grant proposal reviewer for the *Ministry of Education (Singapore)* and the *Eugene M. Lang Center for Civic and Social Responsibility*

Grants and Awards

Aydelotte Curricular Grant, Swarthmore College, 2025

Faculty Research Support Award, Swarthmore College, 2024–2025

Associate Investigator on Marsden Fund grant 23-VUW-118: *Connections between Computability Theory, Effective Descriptive Set Theory, and Geometric Measure Theory.* Awarded by the Royal Society of New Zealand Te Apārangi in the amount of NZ\$712,000 $\approx$ US\$433,000

Faculty Research Support Award, Swarthmore College, 2023–2024

Structured Quartet Research Ensemble (SQuaRE) grant, American Institute of Mathematics, 2023–2024

Faculty Research Support Award, Swarthmore College, 2022–2023

Faculty Research Support Award, Swarthmore College, 2021–2022

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