

MATTHEW J. KUKLA

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EDUCATION

University of Maryland

Mathematics, BSc.

awarded May 2022

College Park, Maryland, USA

- Selected for First-Year Innovation and Research Experience (FIRE)

PROFESSIONAL EXPERIENCE

The Math Citadel

Academic Researcher

March 2019 - present

- Conduct original research in mathematics, including fuzzy sets/algebras, graphical probabilistic models
- Develop software packages:
 - Build digital signal processing plugins
 - Develop and implement fuzzy temporal anomaly detection methods
 - Optimize numerical methods
- Contribute to technical articles and professional lecture material

BlueHalo Labs

Research Engineer

June 2022 - May 2025

Rockville, Maryland, USA

- Researcher in mathematics with a focus on automated reasoning, graph theory, scientific computing, signal processing
 - Designed, implemented, and deployed novel graph clustering algorithms. Optimized with high-performance linear algebra libraries.
 - Constructed systems for knowledge representation and logical reasoning across large relational structures
- Wrote research articles, technical reports for delivery to government, academic, and private-sector customers

SKILLS

Programming Languages

C, OCaml, Python, Fortran, Julia, Prolog, Java, MATLAB

Operating Systems

Linux, UNIX (BSD and Solaris), MS-DOS

Tools

Shell scripting, sed, AWK, Git, \LaTeX

Libraries

NumPy, SciPy, BLAS, LAPACK

Web

HTML, CSS, OWL, RDF, Gopher, AWS

Databases

SQL, Solr, ElasticSearch, Cypher

PUBLICATIONS AND PREPRINTS

Logical Limit Laws for Layered Permutations and Related Structures

Joint with Samuel Braunfeld.

Published, Enumerative Combinatorics and Applications. 2 no. 4. (2021)

Colored Convex Linear Orders and Logical Limit Laws

Preprint. (2021)

Rings of Typed Ordered Fuzzy Numbers

Joint with Rachel Traylor.

Preprint, arXiv:2010.07764. (2020)

SELECTED TALKS

Relational Structures, Logical Limit Laws, and Layered Permutations

Knots in Washington 51, George Washington University (2025)

First-Order Logical Limit Laws, Ordered Structures, and Permutation Classes

Computability & Complexity Seminar, George Washington University (2025)

Double Factorization Systems and Double Fibrations

7th International Conference on Applied Category Theory, University of Oxford (2024)

Double Categorical Limits

The Adjoint School (2024)

Logical Limit Laws for Layered Permutations and Related Structures

Logic Seminar, University of Maryland (2022)

Categorical Mirror Symmetry of Elliptic Curves (two lecture series)

Geometry and Physics Seminar, University of Maryland (2018)

Generalized Calabi-Yau Manifolds

Geometry and Physics Seminar, University of Maryland (2018)