

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

PROFESSIONAL EXPERIENCE

The Math Citadel

Academic Researcher

March 2019 - present

- Conduct original research in mathematics, including fuzzy sets/algebras, stochastic geometry, graphical probabilistic models
- Develop software packages:
 - Design and implement fuzzy anomaly detection techniques
 - 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 graph theory, automated reasoning, scientific computing.
 - Designed, implemented, and deployed novel graph clustering algorithms. Optimized with high-performance linear algebra libraries.
 - Constructed systems for knowledge representation and formal inference across large relational structures
 - Developed signal processing tools
- Wrote research articles and 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, L^AT_EX

Libraries

NumPy, SciPy, BLAS, LAPACK

Web

HTML, CSS, OWL, RDF, Gopher, AWS

Databases

SQL, Solr, ElasticSearch, Cypher

Radio

NEC2, GNURadio, SDR

PUBLICATIONS AND PREPRINTS

Double Orthogonal Factorization Systems

(with C.B. Aberlé, Elena Caviglia, Rubén Maldonado, Luca Mesiti, Dorette Pronk, and Tanjona Ralaivaosoana)
Preprint, arXiv:2509.26343, submitted. (2025)

Logical Limit Laws for Layered Permutations and Related Structures

(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

(with Cassandra 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)

LICENSES AND CERTIFICATIONS

EPA Part 608 Universal Certification

July 2025

For service of stationary HVACR equipment and handling of refrigerants.