

MATTHEW J. KUKLA

<https://mkukla.net> \diamond matt.kukla@verizon.net

EDUCATION

University of Maryland

Mathematics, BSc.

awarded May 2022

College Park, Maryland, USA

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

PROFESSIONAL EXPERIENCE

BlueHalo Labs

Research Engineer

June 2022 - present

Rockville, Maryland, USA

- Researcher in mathematics, focused on applications to automated reasoning, scientific computing.
 - Design, implement, and deploy novel graph clustering algorithms. Optimize with high-performance linear algebra libraries.
 - Build tools for reasoning across relational structures
 - Develop and evaluate topological, geometric methods for data classification
- Write research articles, technical reports for delivery to government, academic, and private-sector customers

The Math Citadel

Researcher

March 2019 - present

- Conduct original research in pure and applied mathematics, including:
 - Fuzzy sets and algebras
 - Graphical probabilistic models
- Develop software packages:
 - Build digital signal processing software
 - Optimize numerical methods
- Contribute to technical articles, professional lectures, and notes

Patton Electronics

Software Engineering Intern

Summer 2016

Gaithersburg, Maryland, USA

- Developed a Linux-based operating system for prototype VDSL router
- Wrote, patched hardware-specific kernel modules

SKILLS

Programming Languages

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

Operating Systems

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

Tools, Libraries

Shell scripting, sed/AWK, Git, L^AT_EX, NumPy, SciPy, BLAS

Web, Cloud

HTML, CSS, Gopher, OpenSearch, Solr

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

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

George Washington University Computability & Complexity Seminar (2025)

Double Factorization Systems and Double Fibrations

7th International Conference on Applied Category Theory (2024)

Double Categorical Limits

The Adjoint School (2024)

Logical Limit Laws for Layered Permutations and Related Structures

University of Maryland Logic Seminar (2022)

Categorical Mirror Symmetry of Elliptic Curves (two lecture series)

University of Maryland Geometry and Physics Seminar (2018)

Generalized Calabi-Yau Manifolds

University of Maryland Geometry and Physics Seminar (2018)

CONFERENCES AND WORKSHOPS ATTENDED

7th International Conference on Applied Category Theory

University of Oxford (2024)

The Adjoint School

University of Oxford (2024)

6th International Conference on Applied Category Theory

University of Maryland (August 2023)

University of Maryland Geometry Festival

University of Maryland (May 2019)

Witt Vectors, Deformations, and Absolute Geometry

University of Vermont (June 2018)