

Christopher Housholder

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Education

Missouri State University – Honors College

B.S. Pure Mathematics and B.S. Data Science; Honors Diploma

Aug. 2022–Dec. 2026 (expected)

Springfield, MO

- **GPA: 4.0/4.0.** Coursework includes Real Analysis, Complex Analysis, Functional Analysis, Numerical Analysis.

Selected Research Experience

Harmonic Analysis:

Advisors: Dr. Alex Iosevich & Dr. Eyvindur Pálsson

- **The Fourier Ratio on Resistance Spaces and Applications to Electrical Networks**
Christopher Housholder, Alex Iosevich, Steven J. Miller, and Eyvindur Pálsson.
- **The Fourier Ratio of Elliptic, Hyperelliptic, and L -Function Families**
Yuval Amit, Lucas Chen, Christopher Housholder, Joshua Im, Alex Iosevich, Steven J. Miller, Eyvindur Pálsson, and Devayani Pradhan.
- **The Fourier Ratio and Sensitivity to Sensor Placement**
Nico Alberti, Christopher Housholder, Alex Iosevich, Steven J. Miller, and Eyvindur Pálsson.

Combinatorics & Graph Theory:

Advisor: Dr. Steven Senger

- **Bounds on Distinct and Repeated Dot Product Trees** — *Published by CANT 2024*
Aaron Autry, Slade Gunter, Christopher Housholder, and Steven Senger.
- **VC-Dimension of Subsets of Hamming Graphs** — *Accepted in Graphs and Combinatorics*
Christopher Housholder, Layna Mangiapanello, and Steven Senger.

Analytic Number Theory:

Advisor: Dr. Steven J. Miller

- **Breaking Universality in the Lower Order Terms in the 1-level and 2-level Density of Holomorphic Cusp Newforms**
Yuval Amit, Lucas Chen, Lawrence Dillon, Christopher Housholder, Xiaoyao Huang, Joshua Khan, Say-Yeon Kwon, Meiling Laurence, Steven J. Miller, Vishal Muthuvel, Devayani Pradhan, Luke Rowen, Pramana Saldin, Connor Yau, and Steven Zanetti.
- **Bounding The Number of Zeros Near the Central Point in Families of Cuspidal Newforms** — *Preprint on arXiv*
Lucas Chen, Christopher Housholder, Joshua Khan, Steven J. Miller, and Devayani Pradhan.

Numerical Analysis:

Advisor: Dr. Animesh Biswas

- **Spatial-Temporal Nonlocal Traffic Dynamics: Analytical Properties, Adaptive Kernel Formulation, and Empirical Validation** — *Submitted to IEEE Transactions on Intelligent Transportation Systems*
Shaurya Agarwal, Animesh Biswas, Christopher Housholder, and Archie Huang.

Machine Learning:

Advisor: Dr. Yifan Zhang

- **Rethinking the Encoder-Decoder Structure for Transformer-Based Time Series Forecasting** — *Published by ITNG Springer 2026*
Christopher Housholder, Xuantong Ning, Zelun He, and Yifan Zhang.

Awards, Leadership, and Professional Experience

- **Chief of Staff, Williams College SMALL REU** selected by former Director Steven J. Miller to support program administration, mentoring, and research coordination.
- **1st Place** — CNAS Undergraduate Research Symposium x4
- **President**, Association of Computing Machinery at MSU.
- **Cofounder and Secretary**, Webster County 100 Club.
- **Chief Information Officer**, Omni Manufacturing Inc.

Presentations

- **MAKO Undergraduate Mathematics Research Conference** *VC-Dimension of Subsets of Hamming Graphs*
- **The 23rd International Conference on Information Technology: New Generations** *Rethinking the Encoder-Decoder Structure for Transformer-Based Time Series Forecasting*
- **The 22nd International Conference on Fibonacci Numbers and Their Applications** *Random Fibonacci Tilings*
- **SUMRY Mini-conference** *The Fourier Ratio and Sensitivity to Sensor Placement*
- **Young Mathematicians Conference** *The Fourier Ratio and Sensitivity to Sensor Placement*

Technical Skills

Programming, computing, and systems: Python, PyTorch, NumPy/SciPy, PySpark, MapReduce, C/C++, Java, SQL, Git, Linux, and LaTeX.