Karl Weisenburger

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LinkedIn • GitHub

EDUCATION

Ph.D. Candidate in Mathematics

Aug 2022 - Present

Purdue University (West Lafayette, IN)

B.S. in Applied Mathematics, Minor in Latin

2018 - 2022

Hillsdale College (Hillsdale, MI)

Honors: Summa Cum Laude (GPA: 3.95/4.0)

RESEARCH EXPERIENCE

Graduate Research Assistant

May 2023 - Present

Purdue University (West Lafayette, IN)

Advisors: Gregery Buzzard, Charles Bouman (Purdue)

Collaborator: Matthew Kemnetz (AFRL)

- Developed wind tunnel density measurement techniques in collaboration with the Air Force Research Laboratory (AFRL).
- Developed Bayesian techniques for solving inverse problems with sparse measurement data.

AFRL Scholar's Program Summer Intern

Summers 2024, 2025

Air Force Research Laboratory (Albuquerque, NM)

Mentor: Matthew Kemnetz

• Developed software, simulations, and mathematical models for tomographic wavefront sensing.

Laureates Honors Program Researcher

2021 - 2022

Hillsdale College (Hillsdale, MI)

 Developed sparse low-rank decomposition techniques for denoising neuronal network connectivity reconstructions.

Data Analytics Intern

May - Aug 2022

Build Central (Chicago, IL)

- Trained machine learning models to estimate construction project completion dates.
- Built data analysis dashboards to assist leadership in productizing construction analytics.

PUBLICATIONS

K. J. Weisenburger, G. T. Buzzard, C. A. Bouman, M. R. Kemnetz, "Tomographic wavefront sensing simulations for wind tunnel measurements," *Proc. SPIE 13619, Unconventional Imaging, Sensing, and Adaptive Optics 2025*, 136190R (2025). https://doi.org/10.1117/12.3063657

SELECTED PRESENTATIONS

- Tomographic Wavefront Sensing Simulations for Wind Tunnel Measurements, SPIE Optics + Photonics, San Diego, CA (Aug 2025).
- Tomographic Wavefront Sensing Simulations for Wind Tunnel Measurements, Directed Energy Professional Society (DEPS) S&T Symposium (May 2025).
- Algorithmic Techniques for Interpreting the Reconstructed Connectivity Matrix, Hillsdale College Math Department (Apr 2022).
- Harmonic Measure Distribution Functions and Circle Domains, Michigan MAA Spring Conference (Apr 2021).

TEACHING EXPERIENCE

Mathematics Teaching Assistant

Aug 2022 - May 2023

Purdue University (West Lafayette, IN)

Mathematics Teaching Assistant

Jan – May 2022

Hillsdale College (Hillsdale, MI)

Math Tutor

Hillsdale College (Hillsdale, MI)

Aug 2021 – May 2022

Learning Management System Student Consultant

Jul - Oct 2021

Hillsdale College (Hillsdale, MI)

LEADERSHIP & SERVICE

ESTEEM Mentor

2025 – **Present**

St. Thomas Aquinas Community Parish (West Lafayette, IN)

President 2020-2021

Hillsdale College Catholic Society (Hillsdale, MI)

- Recruited and managed three student boards.
- Organized large-scale speaker events, lecture series, and retreats.

Passages Program Participant

Jan 2020

Philos Project (Israel)

• Completed the Passages leadership program, including a nine-day trip to Israel, lectures, and coursework.

Community Volunteer, "A Few Good Men"

2019 - 2020

Hillsdale College (Hillsdale, MI)

TECHNICAL SKILLS

Languages & Tools: Python (JAX, NumPy), MATLAB, C++, LaTeX, Git.

 $\bf Research\ Areas:$ Bayesian Inverse Problems, Tomography, Sparse Reconstruction, Numerical Analysis.

AWARDS & HONORS

Recipient, Ruth L. Schulz Memorial Mathematics Prize $Hillsdale\ College\ (Hillsdale,\ MI)$	Feb 2022
Member, Laureates Honor Program Hillsdale College (Hillsdale, MI)	2021 - 2022
Member, Phi Kappa Phi Honor Society Hillsdale College (Hillsdale, MI)	2021 - 2022
Member, Kappa Mu Epsilon Math Honorary Hillsdale College (Hillsdale, MI)	2021 - 2022