Daisuke Yamada

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GitHub: github.com/Daisuke0713

Education

University of Wisconsin - Madison — Madison, WI
PhD in Computer Science — Expected Graduation June 2028
Advisor: Vikas Singh

Carleton College — Northfield, MN
Bachelor of Arts: Mathematics (Honors) and Computer Science (Honors) — June 2023
GPA: 3.95/4.00
Study Abroad: Copenhagen (Machine Learning, 4.00 GPA), Budapest (Mathematics, 4.00 GPA)

Research Experience

Research Assistant with Professor Vikas Singh — Fall 2023 - Present

- Developing mathematical foundations for efficient and reliable AI systems, focusing on compositional structures and robustness of deep models.
- Introduced Clifford algebra-based decomposition achieving $O(d^2) \rightarrow O(\log^2 d)$ parameter reduction in LLM attention layers while maintaining accuracy/perplexity (accepted at NeurIPS 2025)
- Developed adaptive OOD detection framework with human feedback, maintaining false positive control under distribution shifts (under review at TMLR 2025)
- Investigated robustness of conformal prediction for LLM factuality, demonstrating coverage breakdown under distractors

Research Assistant with Professor Anna Rafferty — Fall 2022 - Spring 2023

- Replicated Image-Adaptive GANs for image reconstruction, optimizing training pipeline in PyTorch
- Analyzed model performance on benchmarks and identified inductive biases across facial features

Polymath Undergraduate REU — Summer 2021

- Answered open questions on preferential distribution $X(0, 1)$ in combinatorial probability within 13-person research team, deriving properties of density, expectation, and variance (published in PUMP Journal 2024)

Publications

- Composing Linear Layers from Irreducibles
  Travis Pence, **Daisuke Yamada**, Vikas Singh
  NeurIPS 2025

- Adaptive Scoring and Thresholding with Human Feedback for Robust Out-of-Distribution Detection
  Daisuke Yamada, Harit Vishwakarma, Ramya Korlakai Vinayak
  Preprint on arXiv (Under Review at TMLR 2025)

- Is Conformal Factuality Robust to Distractors?
  Daisuke Yamada, Reid Chen, Harit Vishwakarma, Ramya Korlakai Vinayak
  Preprint (Under Review)

Industry Experience

Machine Learning Software Engineer Intern MIAC Analytics, Summer 2022

- Built LSTM-based document extraction pipeline for financial documents, enabling automated data extraction integrated into production software
- Optimized template generation workflow, improving processing efficiency and code performance

Machine Learning Intern MIAC Analytics, Winter 2021

- Implemented CNN+RNN hybrid model for handwriting recognition on financial documents

Technical Skills

- **Languages:** Python, C/C++, Java, SQL, R
- **ML Frameworks:** PyTorch, TensorFlow, scikit-learn, NumPy
- **Tools:** Git, LaTeX, Linux, VS Code, Jupyter, Matplotlib

Teaching & Awards

- Teaching Assistant, UW Madison: CS 513, CS 240, CS 320 2023-2025
- Teaching Assistant, Carleton College: Mathematics and Statistics 2022
- Distinction on Senior Thesis in Computer Science and Mathematics, Carleton College 2023
- Patricia V. Damon Scholarship 2022
- Dean's List, Carleton College 2020–2022