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Education

Kansas State University

- **PhD** in Applied Mathematics. Aug 2022 – May 2027
- **Research Topic:** Developing deep learning algorithms for inverse problems. **Advisor:** Dinh-Liem Nguyen.
- *Friends of Mathematics Award in Research* – Awarded to top graduating student for research 2026–2027

Nanyang Technological University

- **B.Sc. (Honours with Distinction)** in Mathematical Sciences. Aug 2018 – June 2022
- *President Research Scholar* – Awarded to top-performing students for the undergraduate research 2019–2021

Academic Experiences

Graduate Research Assistant, Kansas State University Fall 2022 – Current

- Implemented Coulomb explosion simulations by numerically integrating coupled equations of motion to generate paired molecular-geometry and fragment-momentum datasets; evaluated MLP and VAE models for reconstructing 3D molecular structures, with the VAE achieving 0.09 a.u. mean per-atom position error and $R^2 \approx 0.99$ on held-out samples from eight isomers represented in training. (*J. Chem. Phys.* **164**, 244304, 2026.)
- Designed novel custom Fourier-domain model loss function for the multifrequency Helmholtz inverse source problems and integrated this to construct an unsupervised model-informed deep learning algorithm; reduced 3D convolution evaluation from $\mathcal{O}(N^6)$ to $\mathcal{O}(N^3 \log N)$ per frequency using inverse FFTs, recovering source coefficients from boundary measurements with 10% noise. (arXiv:2609.33062.)
- Derived explicit Fourier coefficients and proved decay estimates for periodized Helmholtz Green kernels; developed a spectral physics-informed deep learning algorithm jointly estimating scattering contrast and contrast source through coupled Lippmann–Schwinger and imaging equations, reconstructing 2D and 3D scatterers from noisy, phaseless boundary measurements. (arXiv:2609.33070.)

Graduate Teaching Assistant, Kansas State University Fall 2022 – Current

- Led tutorial and Python lab sessions for numerical linear algebra (MATH 551: Applied Matrix Theory) with an average teaching evaluation of 4.73/5.0.

Undergraduate Research Assistant, Nanyang Technological University 2019–2022

- Develop a large-scale sparse eigenvalue numerical scheme to to test a conjectured relation between the virtual homological spectral radius of finite type covers of a surface and the hyperbolic volume of the mapping torus with respect to a pseduo-Anosov mapping class for a small class of surfaces using Fox differential calculus. Computationally verified an open problem involving a lower bound conjecture, stemming from Geometric Topology. (Thesis).

Projects

OpenAI's AI Agent Security - Multi-Step Tool Attacks Kaggle Competition Summer 2026

- Implemented various deterministic red-teaming multi-step attack search algorithms (including a probe-based template race algorithm, a Go-Explore and Rainbow-teaming-style attack search algorithms) that drives tool-using LLM agents (GPT-OSS 20B, Gemma 4 26B-A4B) across safety guardrails into unsafe tool calls (data exfiltration, destructive writing).

Technical Skills & Professional Activities

- *Programming Languages:* Python, MATLAB, LaTeX.
- *Agentic tooling:* Claude Code
- *Cloud & DevOps:* Git, Linux (SLURM).
- *Libraries & Frameworks:* PyTorch, scikit-learn, pandas, NumPy, Hugging Face, TransformerLens.
- *Coursework:* An Introduction to Statistical Learning, Mathematics of Deep Learning, AI and Mathematics, Deep Learning, Pattern Recognition & Machine Learning, Functional Analysis, PDEs.
- *Certifications:* BlueDot AGI Strategy course, BlueDot Technical AI Safety course
- *Competitive Programming:* Codeforces (Specialist Rank)
- *Service:* Reviewer for NeurIPS2026 Interpretability for Discovery workshop
- *Reading Groups:* Bluedot AI Safety Evals Paper Reading Club, Bluedot Cyber × AI Reading Group, Universal Algorithmic Intelligence reading group