

Aravinth Krishnan Ravi

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EDUCATION

Kansas State University	Manhattan, KS
PhD in Mathematics	June 2027
Research Interests: Deep learning methods to solve inverse problems	
Advisor: Dinh-Liem Nguyen	
Nanyang Technology University	Singapore
Bachelor of Science (Honours with Distinction) in Mathematical Sciences (Pure Mathematics)	June 2022
Thesis title: <i>A conjecture for the eigenvalues of pseudo-Anosov mappings of surfaces</i> (Link)	
Advisor: Andrew James Kricker	

AWARDS AND HONORS

M&H International Scholarship	Fall 2026
Center for the Integration of Undergraduate, Graduate and Postdoctoral Research Graduate Scholarship	Spring 2026
Dr. William L. Stamey Mathematics Scholarship	Academic Year 25/26
L. Aileen Hostinsky Memorial Scholarship	Spring 2026
Karl Stromberg Memorial Scholarship	Fall 2025
Kansas State University AI Symposium: Humans and Machines, Best Poster - 3rd Place	Fall 2025
Nanyang Technological University President Research Scholar	Academic Year 21/22
Nanyang Technological University President Research Scholar	Academic Year 20/21

PUBLICATIONS

In Preparation

1. Shumalia Ambreen, D.L. Nguyen, N. Nguyen, **Aravinth K. Ravi**, Cat-Su Tran. Resolution Analysis of Imaging Function under Weak Scattering Assumptions, 2026.

Submitted

1. D.L. Nguyen, N. Nguyen, **Aravinth K. Ravi**. A Spectral Model-Informed Neural Network for Inverse Source Problems, *Inverse Problems*, 2026.
2. D.L. Nguyen, N. Nguyen, **Aravinth K. Ravi**. A Model-Informed Deep Learning Algorithm for Phaseless Inverse Scattering Problems, *SIAM Journal of Applied Mathematics*, 2026.

Accepted

1. A. Ghanaatian, **A. K. Ravi**, J. Stallbaumer, H. V. S. Lam, A. Rudenko, L. Greenman, N. Albin, D. Caragea, and D. Rolles. Neural Network Based Molecular Structure Retrieval from Coulomb Explosion Imaging Data. *Journal of Chemical Physics*, 2026.

RESEARCH EXPERIENCE

Visiting Scholar, Control, Optimization and Learning Group, Nanyang Technological University Summer 2026

- Worked on constructed a new neural network architecture and conducted theoretical analysis with Dr. Yongcun Song.
- Extension of the inexact Uzawa method to solve inverse problems involving linear PDEs.

Graduate Research Assistant, Kansas State University Spring 2025 - Fall 2025

- Designed an integrated dimensionality-reduction and variational autoencoder learning framework to recover the initial atomic positions from the final ion momenta, with an average per-atom position error of approximately 0.1 atomic units, i.e. to within 5% of the typical bond lengths. Distilled complex statistical predictions into interpretable visualizations for inter-disciplinary collaboration. (*arXiv:2602.14205*, 2026)
- Architected an unsupervised PDE-based deep learning numerical schemes utilizing Tensorflow with a spectral-based physics-informed loss function, mathematically justified using asymptotic and Fourier analysis. Able to recover unknown parameter with 30% relative error despite 10% noise, together with reducing the computational cost from $O(N^6)$ to $O(N^3 \log N)$, reducing time taken from 5 hours to 0.5 hours.

Research Associate, Nanyang Technological University Summer 2022

- Worked with Dr. Andrew James Krickler to develop a numerically-stable, large-scale sparse eigenvalue numerical scheme to compute virtual homological spectral radii using Fox differential calculus. Computationally verified an open problem involving a lower bound conjecture, stemming from Geometric Topology, for a small class of surfaces.

INDUSTRY EXPERIENCE

Machine Learning Intern, Institute for Infocomm Research, A*Star, Singapore Fall 2021

- Worked on predictive maintenance for cranes to determine the Remaining Useful Life (RUL) of components using multi-variate regression on sensor data to forecast failures before they occur. Gained exposure to IoT communication protocols (like MQTT) used in real-time industrial sensor systems.

TALKS

Invited

The 12th International Conference Inverse Problems: Modeling and Simulation Conference, Malta Summer 2026

10th Annual Meeting, SIAM Central States Section, University of Arkansas Fall 2025

9th Annual Meeting, SIAM Central States Section, University of Missouri-Kansas City Fall 2024

Contributed

15th Ohio River Analysis Meeting, University of Kentucky Spring 2026

International Mathematics and Statistics Student Research Symposium (Virtual) Spring 2025

American Mathematical Society (AMS) Central Sectional Meeting, University of Kansas Spring 2025

Poster Presentations

Research and the State, Kansas State University Fall 2025

K-State AI Symposium, Kansas State University Fall 2025

SUMMER SCHOOLS

Applied Harmonic Analysis and Machine Learning, Machine Learning Genoa Center (MaLGa), Genoa, Italy Fall 2024

Machine Learning Crash Course, Machine Learning Genoa Center (MaLGa), Genoa, Italy Summer 2024

OIST-Oxford-SLMATH Summer Graduate School on Analysis and PDEs, Okinawa, Japan Summer 2024

TEACHING & SERVICE

Undergraduate Research Mentor

Undergraduate research mentor - Connor Green

Spring 2026

Topic: *Inverse problems in control theory*

Directed Reading Program

Directed Reading Program - JJ Heos

Spring 2026

Topic: *An Introduction to inverse scattering theory*

Directed Reading Program - Connor Green

Fall 2025

Topic: *Introduction to Trajectory Optimization*

Teaching

Differential Equations (Recitation instructor)

Spring 26

Applied Matrix Theory (Lecturer)

Summer 25

Applied Matrix Theory (Coordinator in Charge)

Summer 23, Summer 26

Applied Matrix Theory (MATLAB Instructor)

Fall 23, Spring 24

Calculus I (Grader)

Summer 24

Calculus I (Recitation instructor)

Fall 22, Spring 23, Fall 24

Spring Mathematical Modelling Seminar

Fall 2022

Departmental Service

Sonia Kovalevsky Day - Math Workshops for Middle School Students

Spring 2026

Prospective Student Visiting Weekend

Spring 2025

University Service

International Buddies Co-event Officer

Fall 2025-Spring 2026

SKILLS

Programming languages: Python, Matlab

Competitive Programming: Codeforces - Rank: Specialist (**Top 25% globally**)

Libraries/Frameworks: PyTorch, scikit-learn, pandas, NumPy, TensorFlow, SciPy

Cloud & DevOps: Git

Language: English (Fluent)