Andrew Gracyk

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Education

PURDUE UNIVERSITY 2025-PRESENT
PhD, Mathematics
Studying with Rongjie Lai

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN 2021-2023
MS, Statistics
Advised by Xiaohui Chen
DIGIMAT, NSF fellowship
Affiliated with Grainger College of Engineering

UNIVERSITY OF CALIFORNIA SANTA BARBARA 2019-2021
MA, Applied Mathematics
Advised by Paul Atzberger
Thesis: *Convolutional neural networks in learning Fokker-Planck equations*
Atzberger Research Group

UNIVERSITY OF CALIFORNIA LOS ANGELES 2015-2019
BS, Applied Mathematics, minor in Statistics
ALD/PES Honor Society
Worked with Chris Anderon in the math department and briefly with Frederic Schoenberg in the statistics department

LONDON SCHOOL OF ECONOMICS 2018
Summer study abroad

Research

Complex variational autoencoders admit Kähler Structure, 2025.

The calculus of variations of the Transformer on the hyperspherical tangent bundle, 2025.

Geometric flow regularization in latent spaces for smooth dynamics with the efficient variations of curvature, 2025.

Observability conditions for neural state-space models with eigenvalues and their roots of unity, 2025.

Variational autoencoders with latent high-dimensional geometric flows for dynamics, 2024. In the 23rd International Conference of Numerical Analysis and Applied Mathematics, ICNAAM, 2025 (extended abstract).

Ricci flow regularization in latent spaces for the forward learning of partial differential equations, 2024. Presented in SIAM Conference on Applications of Dynamical Systems (DS25) 2025.

GeONet: a neural operator for learning the Wasserstein geodesic, with Xiaohui Chen, in Uncertainty in Artificial Intelligence (UAI) 2024. Presented in Brown's CRUNCH machine learning and applied mathematics group.

Academic employment

UIUC STATISTICS DEPARTMENT, TEACHING ASSISTANT 2021-2022

Held discussion sections for ~60 students weekly. Lectured and assisted students in statistics material, and created original statistics material for student practice.

- STAT 400, Statistics and Probability I with Kelly Findley
- STAT 400, Statistics and Probability I with Ha Nguyen

UCSB MATH DEPARTMENT, TEACHING ASSISTANT 2019-2020

Held discussion sections for ~100 students weekly, and prepared and lectured on original material and practice problems in integral calculus. Held a final review session, speaking in front of 60+ students.

- Math 3B, Integral Calculus with Mychelle Parker
- Math 3B, Integral Calculus with Hauchen Chen
- Math 3B, Integral Calculus with Mihai Putinar
- Math 3B, Integral Calculus with Darren Long

Graduate research organizations

DATA AND INFORMATICS GRADUATE INTERN-TRAINEESHIP: MATERIALS AT THE ATOMIC SCALE (DIGIMAT) 2022-2023

Intern/trainee of DIGIMAT research association in materials and data science, co-hosted by the National Center for Supercomputing Applications and Materials Research Lab, affiliated with the National Science Foundation for research sponsorship

ATZBERGER RESEARCH GROUP 2020-2021
Group at UCSB under Paul Atzberger that researches stochastic analysis, statistical mechanics, scientific computation, and machine learning

Undergraduate research experience

- Statistics research assistant in imaging under Frederic Schoenberg, 2019
- Statistics research in financial stochastic processes, 2019
- Mathematics research in numerical analysis under Chris Anderson, 2018
- Mathematics research in numerical analysis for stochastic differential equations

Honors

SIGMA XI SCIENTIFIC RESEARCH SOCIETY NOMINATED MEMBER 2025
DIGIMAT NSF FELLOWSHIP 2022-2023
GRADUATE BLOCK FELLOWSHIP GRANT AT UIUC 2021-2022
ALD/PES HONOR SOCIETY AT UCLA 2016-2019
DEAN'S LIST FOR SEVERAL QUARTERS AT UCLA 2015-2019

Outreach

STATISTICS INCOMING GRADUATE STUDENT INTRODUCTION PANELIST, 2022
UCSB APPLIED MATH GRADUATE SUMMER SEMINAR ORGANIZER, 2020
Organized a small summer seminar among mathematics graduate students to discuss research

Presentations

Regularization in latent spaces with high-dimensional linear geometric flows for variational autoencoders
ICNAAM 2025 virtual presentation

Ricci flow-guided autoencoders in learning time-dependent dynamics
SIAM Conference on Applications of Dynamical Systems poster presentation, 2025

GeONet: a neural operator for learning the Wasserstein geodesic
UAI poster presentation, UAI 2024

Diffusion normalizing flow
Xiaohui Chen and Yun Yang reading group presentation, University of Illinois Urbana-Champaign, 2022

GeONet: a neural operator for learning the Wasserstein geodesic
Harnessing Data for Materials symposium, Chicago, with Duke University and University of Chicago, 2022

The basics of PyTorch with NNs, CNNs, and PINNs
DIGIMAT professional development seminar, University of Illinois Urbana-Champaign, 2022

Convolutional neural networks in learning Fokker-Planck equations
MA thesis defense, University of California, Santa Barbara, 2021

Machine learning in solving the Poisson equation diffusion constant
SIAM graduate seminar, University of California, Santa Barbara, 2020

Convolutional neural networks in learning partial differential equations
Applied math summer seminar, University of California, Santa Barbara, 2020

Convolutional neural networks in learning partial differential equations
Graduate Simulation Seminar series, University of California, Santa Barbara, 2020

A special case of global regularity for the Navier-Stokes equation
Applied math summer seminar, University of California, Santa Barbara, 2020

Organizations

AMERICAN MATHEMATICAL SOCIETY (AMS)
SOCIETY FOR INDUSTRIAL AND APPLIED MATHEMATICS (SIAM)
UNDERGRADUATE MATHEMATICS STUDENTS ASSOCIATION (UMSA) AT UCLA

Industry experience

Consolidated Communications Networking Intern in 2015

Skills

PyTorch, Python, R (all advanced); MATLAB (Octave) (intermediate); Git
English (native); French, Spanish (basic, 3 classes each)