

# Andrew Gracyk

## Education

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PURDUE UNIVERSITY, in progress  
PhD, Mathematics

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN, 2023  
MS, Statistics  
Mentored by Xiaohui Chen  
DIGIMAT

UNIVERSITY OF CALIFORNIA, SANTA BARBARA, 2021  
MA, Applied Mathematics  
Mentored by Paul Atzberger  
Atzberger Research Group

UNIVERSITY OF CALIFORNIA, LOS ANGELES, 2019  
BS, Applied Mathematics, minor in Statistics  
Mentored by Chris Anderson in the Mathematics Department and Frederic Schoenberg in the Statistics Department

LONDON SCHOOL OF ECONOMICS  
Study abroad

## Papers

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- [9] Complex normalizing flows can be information Kähler-Ricci flows, 2026, ([arXiv](#))
- [8] Pseudo-differential-enhanced physics-informed neural networks, 2026, ([arXiv](#))
- [7] Complex variational autoencoders admit Kähler Structure, 2025, submitted, ([arXiv](#))
- [6] Inexact calculus of variations on the hyperspherical tangent bundle and its connections to the attention mechanism, 2025, ([arXiv](#))
- [5] Geometric flow regularization in latent spaces for smooth dynamics with the efficient variations of curvature, 2025, submitted, ([arXiv](#))
- [4] Observability conditions for neural state-space models with eigenvalues and their roots of unity, 2025, to be submitted as a conference paper, ([arXiv](#))
- [3] Variational autoencoders with latent high-dimensional steady geometric flows, 2025, in ICNAAM 2025 with Springer Proceedings in Mathematics and Statistics, ([arXiv](#))

[2] Ricci flow regularization in latent spaces for the forward learning of partial differential equations, 2024, presented in SIAM Conference on Applications of Dynamical Systems, ([arXiv](#))

[1] GeONet: a neural operator for learning the Wasserstein geodesic, 2022, with Xiaohui Chen, in UAI 2024, presented in Brown CRUNCH group, ([arXiv](#))

## Supplemental manuscripts

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Foundations of continuity equations for their neural applications, graduate reading course notes at Purdue University with Rongjie Lai

## Academic affiliations

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Center for Computational and Applied Mathematics (CCAM) at Purdue University, partially-affiliated graduate  
Purdue Department of Mathematics  
Grainger College of Engineering at UIUC, affiliated researcher  
DIGIMAT at UIUC, fellow  
UIUC Department of Statistics  
Atzberger Research Group, partially with UC Santa Barbara Physics and Mechanical Engineering, researcher and mentee  
UC Santa Barbara Mathematics  
UCLA Department of Mathematics, UCLA Department of Statistics, undergraduate student

## Awards

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Sigma Xi Honor Society  
Fellow affiliated with Grainger College of Engineering  
DIGIMAT NSF Fellowship  
Graduate Block Fellowship Grant at UIUC  
ALD/PES Honor Society at UCLA  
Dean's list for multiple quarters at UCLA

## Presentations

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Reading course notes with Rongjie Lai at Purdue University, presented material weekly for a semester in slides format in 1-on-1 discussions

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

## Industry Experience

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DIGIMAT Research Intern-Trainee, 2022-2024

Consolidated Communications networking intern, 2015

## Skills

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PyTorch, Python (advanced, 7 years experience); R (advanced); MATLAB (Octave) (intermediate); Git  
English (native); French, Spanish (basic, 3 classes each)