Nithin Chalapathi

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Research interests: scientific machine learning, inverse problems, representation learning, and efficient model training.

Education

University of California, Berkeley

August 2021 - present; expected May 2027

- Ph.D. and M.S. in EECS, expected to be conferred together at Ph.D. completion.
- Advisor: Aditi S. Krishnapriyan. GPA: 3.812 (as of November 2, 2026).

University of Utah

August 2017 - May 2021

- Honors B.S. in Computer Science and B.S. in Applied Mathematics; both cum laude. GPA: 3.956.
- Honors thesis: *Adaptive Covers of the Mapper Graph using Information Theory*. Supervisor: Bei Wang Phillips.

Research and professional experience

UC Berkeley / BAIR - Graduate Researcher

August 2021 - present

- Develop scalable machine learning methods for physical systems and inverse problems with Aditi S. Krishnapriyan, using JAX, PyTorch, and distributed training.
- Led PDEInvBench's benchmark design and initial implementation, generated simulation data, supervised training, and co-mentored the first author. Other research includes physics-informed hard constraints and Neural Spectral Methods.

Flatiron Institute, Center for Computational Mathematics - Research Intern

May - August 2026 | Host: Pilar Cossio

- Led the technical work and overall direction of EMber, learning shared representations for cryo-EM inverse problems. Owned data processing, model training, and evaluation.
- Organized a biweekly CryoCollege seminar on foundational and recent cryo-EM research.

Anyscale - Research Engineer Intern

May 2025 - April 2026

- Designed and implemented disaggregated multimodal training with Ray Compiled Graphs and PyTorch; coauthored the accompanying article and open-source implementation.
- Built vision-language reinforcement learning support in SkyRL and helped port it to the Tinker-compatible backend. Contributed multimodal support to vLLM's generation endpoint and led writing of the SkyRL VLM article.

University of Utah / Scientific Computing and Imaging Institute - Undergraduate Research Assistant

January 2019 - June 2021

- Researched computational topology, neural-network interpretability, visualization, and model/data compression with Bei Wang Phillips and Ganesh Gopalakrishnan, collaborating with Vinu Joseph.

Powerhouse Venture Fund - Machine Learning Intern

May - August 2020

- Built a React/Flask dashboard to search and analyze startups using public data and internal notes; used text representations and classification to organize the information.

Amazon Last Mile Route Planning - Software Development Engineer Intern

May - August 2019

- Rebuilt and deployed a route-analysis application with React, Java, and AWS Lambda. Owned testing and CI/CD; the intern project was later adopted as a production dashboard.

Selected publications

Equal contribution is indicated by an asterisk. Full publication list on Google Scholar.

- **Nithin Chalapathi**, Theo Sternlieb, Ethan Han, Sonya M. Hanson, Pilar Cossio, Aditi S. Krishnapriyan, Ritwik Gupta. EMber: Learning the Shared Latent Structure of Cryo-EM Inverse Problems. *arXiv preprint*, 2026.
- Divyam Goel, **Nithin Chalapathi**, Sanjeev Raja, Aditi S. Krishnapriyan. PDEInvBench: A Comprehensive Dataset and Design Space Exploration of Neural Networks for PDE Inverse Problems. *Transactions on Machine Learning Research (TMLR)*, 2026.
- Yiheng Du, **Nithin Chalapathi**, Aditi S. Krishnapriyan. Neural Spectral Methods: Self-supervised learning in the spectral domain. *ICLR*, 2024.
- Haotian Li*, **Nithin Chalapathi***, Huamin Qu, Alvin Cheung, Aditya G. Parameswaran. Inferring Visualization Intent from Conversation. *ACM CIKM*, 2024.
- **Nithin Chalapathi**, Yiheng Du, Aditi S. Krishnapriyan. Scaling physics-informed hard constraints with mixture-of-experts. *ICLR*, 2024.

Teaching

UC Berkeley - Head Graduate Student Instructor

Fall 2026 | CS180/280A: Computer Vision and Computational Photography

- Teach discussion sections and hold office hours. Instructors: Alexei (Alyosha) Efros and Ren Ng.

UC Berkeley - Graduate Student Instructor

Spring 2024 | Physics-Inspired Machine Learning

- Co-designed assignments on deep learning, graph neural networks, and constraints in machine learning. Gave lectures on JAX and diffusion models. Instructor: Aditi S. Krishnapriyan.

Spring 2023 | CS186: Databases

- Led discussions and designed a query-optimization competition using TPC-H. Instructor: Alvin Cheung.

Technical writing

- Introducing Vision-Language Reinforcement Learning in SkyRL. Anyscale, April 2026.
- 30% Faster Multimodal AI Training with Ray and Disaggregated Hybrid Parallelism. Anyscale, December 2025.

Selected recognition

- CRA Outstanding Undergraduate Researcher Award finalist, 2021.
- Eccles Distinguished Scholarship, University of Utah, 2017.

Technical skills

Languages: Python, C++, Java, JavaScript, TypeScript, SQL.

Machine learning and scientific computing: JAX, Flax, Equinox, PyTorch, Ray, NumPy, SciPy, pandas, scikit-learn; distributed training, model parallelism, and mixed precision.

Engineering: React, Flask, Docker, AWS, Redis, PyTest, JUnit, Jasmine, and Jest.