YU LU

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EDUCATION

University of California, Merced (UC Merced) Ph.D in 2025
- Major: Applied Mathematics
- Research topics: NonConvex Optimization; Deep Learning; Signal Processing
- Advisor: Dr. Roummel F. Marcia
- GPA: 3.9

University of Chicago Spring 2025
- Visiting Ph.D. Student
- Completed Ph.D. dissertation as a visiting Ph.D Student
- Host Professor: Dr. Rebecca Willett

Stanford University Summer & Fall 2023
- Visiting Ph.D Student
- Courses: Artificial Intelligence (CS 221); Machine Learning (CS 229); Convex Optimization (EE 364A)
- GPA: 3.8

University of California, Los Angeles (UCLA) B.S. in 2020
- Major: Mathematics
- Research interests: Optimization; Numerical Analysis
- Major GPA: 3.7

WORK EXPERIENCE

Meta Platforms, Inc. June 2025 - Now
- Position: Research Scientist, ML & AL
- Organization: Ranking & Foundational AI

INTERNSHIP EXPERIENCE

Argonne National Laboratory (ANL) Fall 2024
- Project: *Adaptive Fly-scan Measurements for Medical Images*
- Coding Experience: Python and PyTorch
- Advisor: Dr. Thomas Lynn, Dr. Ming Du and Dr. Sven Leyffer
- Summary: This project aims to develop an optimized fly-scan path for efficient image completion. We designed an acquisition function to replace the distortion function as our loss function. By using a gradient-based method, we minimize this loss function to obtain an optimal set of discrete scan points. We then leverage a heuristic algorithm to create an optimized path that connects all the selected scan points. Finally, we implemented inverse distance weighted (IDW) interpolation for accurate image reconstruction. The results were visualized using Python's plotting libraries, showing the progression from initial scan points to optimized paths, and improvements were quantified using metrics such as PSNR.

Lawrence Berkeley National Laboratory (LBNL) Summer 2024
- Project: *Exploring the Epigenetic Basis of Pathogenicity in Bacteria Using Deep Learning Method*
- Coding Experience: Python, Bash, PyTorch, HPC
- Advisor: Dr. Lorenzo Aureli and Dr. Frederik Schulz
- Summary: This project aims to develop a deep learning model to determine whether DNA methylation in bacteria is pathogenic. We collect and clean the data using the CheckM2, HMM, and SeqKit packages. Then, we apply encoding and decoding frameworks to design a specialized model for prediction. An interesting side finding is that using the same data as a 1D vector input or a 2D matrix input can affect the model's accuracy.

PUBLICATIONS AND PREPRINT

[1] Haifan Gong, Yu Lu, and Haofeng Li. "Anonymous submission". In: *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*. 2026, **Submitted**.

[2] Yu Lu, Kevin Bui, and Roummel F Marcia. "Nonconvex Negative Binomial Model". In: *Inverse Problems and Imaging* (2026), **Submitted**.

[3] Yu Lu, Ming Du, and Sven Leyffer. "Optimizing Paths for Adaptive Fly-Scan Microscopy". In: *2026 IEEE International Symposium on Biomedical Imaging (ISBI)*. 2025, **Accepted**.

[4] Yu Lu and Roummel F Marcia. "Noise Model Statistics Regularization for Deep Learning Biomedical Imaging". In: *2025 IEEE Medical Measurements and Applications (MeMeA)*. IEEE. 2025, pp. 1–6.

[5] Haifan Gong, Yu Lu, and Haofeng Li. "Domain Generalized Medical Landmark Detection via Robust Boundary-Aware Pre-Training". In: *Proceedings of the AAAI Conference on Artificial Intelligence*. Vol. 39. 3. 2025, pp. 3140–3148.

[6] Yu Lu, Kevin Bui, and Roummel F Marcia. "Negative Binomial Matrix Completion". In: *2024 IEEE 34th International Workshop on Machine Learning for Signal Processing (MLSP)*. IEEE. 2024, pp. 1–6.

[7] Yu Lu, Kevin Bui, and Roummel F. Marcia. "Alternating Direction Method of Multipliers for Negative Binomial Model with the Weighted Difference of Anisotropic and Isotropic Total Variation". In: *2024 IEEE International Conference on Multimedia and Expo (ICME)*. 2024, pp. 1–6.

[8] Yu Lu and Roummel F Marcia. "Sparse Signal Reconstruction for Overdispersed Low-Photon Count Biomedical Imaging Using ℓ_p Total Variation". In: *2024 IEEE International Symposium on Biomedical Imaging (ISBI)*. IEEE. 2024, pp. 1–5.

[9] Yu Lu and Roummel F Marcia. "Overdispersed Photon-Limited Sparse Signal Recovery Using Nonconvex Regularization". In: *2023 IEEE 9th International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP)*. IEEE. 2023, pp. 191–195.

[10] Yu Lu and Roummel F Marcia. "Negative Binomial Optimization for Low-Count Overdispersed Sparse Signal Reconstruction". In: *2023 31st European Signal Processing Conference (EUSIPCO)*. IEEE. 2023, pp. 1948–1952.

[11] Yu Lu and Roummel F Marcia. "Sparse Overdispersed Photon-Limited Signal Recovery with Upper and Lower Bounds". In: *2023 IEEE 9th International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP)*. IEEE. 2023, pp. 181–185.

TALKS

Negative Binomial Matrix Completion September 2024
- IEEE MLSP 2024
- Imperial College, London, UK

Alternating Direction Method of Multipliers for Negative Binomial Model with the Weighted Difference of Anisotropic and Isotropic Total Variation August 2024
- IEEE ICME 2024
- Niagra Falls, Canada

UNet Model in Predicting August 2024
- JGI Seminar
- LBNL, Berkeley, CA

DNA Methylation and Bacteria Pathogenicity July 2024
- JGI Internship Seminar
- LBNL, Berkeley, CA

ACADEMIC SERVICE

- Reviewer for *IEEE Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP)* 2025
- Reviewer for *IEEE International Conference on Multimedia and Expo (ICME)* 2024 - 2026
- Reviewer for *International Conference on Learning Representations (ICLR)* 2025
- TPC Reviewer for *IEEE International Symposium on Biomedical Imaging (ISBI)* 2025 - 2026
- Reviewer for *IEEE International Symposium on Biomedical Imaging (ISBI)* 2024
- Reviewer for *Journal of X-Ray Science and Technology* 2023 - 2025

TEACHING EXPERIENCE

University of California, Merced (UC Merced) 2021 - Present

- Teaching Assistant
- Courses: Calculus II, III; Linear Algebra; Complex Analysis; Numerical Analysis.

AWARDS

- AMAT Excellence in Research Award Spring 2025
- Applied Mathematics Travel Fellowship at UC Merced Fall 2024
- JGI (Joint Genome Institute) Summer Fellowship Summer 2024
- IEEE TCMC (Technical Community on Multimedia Computing) Scholarships Spring 2024
- Applied Mathematics Summer Research Fellowship at UC Merced Summer 2023

TECHNICAL SKILLS AND ONLINE COURSES

- **Programming Skills:** Python, PyTorch, MATLAB, BASH, Julia, C++, Java, SQL
- **Online Courses:**
  - *Structure and Interpretation of Computer Programs* (UC Berkeley 61A)
  - *Data Structures* (UC Berkeley 61B)
  - *Deep Learning for Computer Vision* (Stanford 231N)