YUAN LUO

◇ Email: mail@yluo.org ◇ Personal website: `https://yluo.org`

PROFILE

PhD candidate at UC Davis with 4+ years of experience in computational topology, geometry, and machine learning, hoping to solve practical challenges with my technical skills including:
Languages: C++ and Python(Numpy, Pandas, PyTorch, scikit-learn)
Tools: CMake, Git, Docker and Tmux

EDUCATION

University of California, Davis *2022 - 2026(expected)*
Ph.D. in Applied Mathematics *GPA 4.0/4.0*

University of Chicago *2020 - 2022*
M.S. in Computational and Applied Mathematics *GPA 3.8/4.0*

University of Liverpool *2016 - 2020*
B.S. (First Class Honors) in Applied Mathematics *GPA 3.8/4.0*

WORK EXPERIENCE

Research Internship
July 2024 - September 2024 *International Computer Science Institute*

- Developed and implemented an optimized C++ algorithm with Python binding for computing absolute multi-parameter persistent homology, utilizing a dynamic tree API.
- Designed and built a machine learning framework for graph classification, achieving performance on par with existing methods.

NSF-Mathematical Sciences Graduate Internship
Jun 2023 - August 2023 *Lawrence Berkeley National Laboratory*

- Developed faster topological optimization heuristics in Pytorch
- Developed a new image processing method guided by topology

RESEARCH EXPERIENCE

Accelerating Persistent Homology Computations with Warm Starts
Apr 2021 - Jul 2021 *University of Chicago*

- Developed algorithms (C++) to accelerate persistent homology computations based on updating associated matrix factorizations

Topology-Preserving Dimensionality Reduction via Interleaving Optimization
Dec 2021 - Jan 2022 *University of Chicago*

- Developed a dimensionality reduction approach on high dimensional data via Interleaving optimization
- Developed a topological type-I/II error to identify the correspondence between original and projected datasets

FELLOWSHIP AND AWARDS

NSF-MSGI Summer Fellowship *June 2023*

GGAM Summer Fellowship 2023 from UC Davis *Sep 2023*

OTHER CODING PROJECTS

Packages: Torch-TDA and BATS

Natural Language Processing: Used Transformer to decrypt encrypted message generated by RSA algorithm.