MINGZHE LI

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EDUCATION BACKGROUND

University of Utah, United States 8/2020-10/2025
Ph.D. in Computing (Data Management and Analysis), GPA: 3.967/4.0

University of Southern California, United States 1/2018-12/2019
M.S. in Computer Science, GPA: 3.81/4.0

Zhejiang University, China 9/2013-6/2017
B.Eng. in Computer Science, GPA: 3.61/4.0; Major GPA: 3.82/4.0

RESEARCH INTEREST

- Data visualization, topological data analysis, computational topology, machine learning, high-performance computing

PUBLICATION

- Mingzhe Li, Dwaipayan Chatterjee, Franziska Glassmeier, Fabian Senf, Bei Wang. Tracking Low-Level Cloud Systems with Topology. In *IEEE Workshop on Topological Data Analysis and Visualization (TopoInVis) at IEEE VIS*, 2025. arXiv link
- Mingzhe Li, Hamish Carr, Oliver Rubel, Bei Wang, Gunther H. Weber. Extremely Scalable Distributed Computation of Contour Trees via Pre-Simplification. In *IEEE Workshop on Large Data Analysis and Visualization (LDAV)*, 2025. arXiv link
- Mingzhe Li, Xinyuan Yan, Lin Yan, Tom Needham, Bei Wang. Flexible and Probabilistic Topology Tracking with Partial Optimal Transport. *IEEE Transactions on Visualization and Computer Graphics*, 31(10), pages 7951-7969, 2025. DOI link
- Mingzhe Li, Hamish Carr, Oliver Rubel, Bei Wang, Gunther H. Weber. Distributed Augmentation, Hypersweeps, and Branch Decomposition of Contour Trees for Scientific Exploration. *IEEE Transactions on Visualization and Computer Graphics*, 31(1), pages 152-162, 2025. DOI link
- Mingzhe Li, Carson Storm, Austin Yang Li, Tom Needham, Bei Wang. Comparing Morse Complexes Using Optimal Transport: An Experimental Study. In *IEEE Visualization and Visual Analytics (VIS) Short Paper*, pages 41-45, 2023. DOI link
- Mingzhe Li, Sourabh Palande, Lin Yan, Bei Wang. Sketching Merge Trees for Scientific Visualization. In *IEEE Workshop on Topological Data Analysis and Visualization (TopoInVis) at IEEE VIS*, pages 61-71, 2023. DOI link
- Kamonphop Srisopha, Chukiat Phonsom, Mingzhe Li, Daniel Link, Barry Boehm. On Building an Automatic Identification of Country-Specific Feature Requests in Mobile App Reviews: Possibilities and Challenges. In *Proceedings of the IEEE/ACM 42nd International Conference on Software Engineering Workshops (ICSEW'20)*, pages 494-498, 2020. DOI link

MANUSCRIPT

- Mingzhe Li, Peer Nowack, Bei Wang. *Spatiotemporal Detection and Uncertainty Visualization of Atmospheric Blocking Events*, manuscript, 2025.

SELECTED WORK EXPERIENCES

University of Notre Dame, IN, USA 11/2025-current
Research Fellow, College of Engineering
Supervisor: Prof. Thomas O'Sullivan
- Independent & collaborative research with Prof. Erin Chambers and other researchers
- Mentor graduate, undergraduate, and summer students at ND

Lawrence Berkeley National Laboratory, CA, USA 5/2024-8/2024
Graduate Student, Scientific Data Division
Supervisor: Prof. Michael Mohoney
- Extending distributed computations on contour trees to enhance the performance of important contour extraction

Lawrence Berkeley National Laboratory, CA, USA 5/2023-8/2023
Graduate Student, Scientific Data Division
Supervisor: Dr. Gunther Weber
- Collaborated on designing and developing distributed algorithms to simplify contour trees for scientific visualization tasks

Los Alamos National Laboratory, NM, USA 5/2022-8/2022
Graduate Student, ISTI
Supervisor: Dr. Li-Ta Lo
- Collaborated with VTK-m contributors to verify, test, and refactorize the code to compute augmented contour trees.

Microsoft, Beijing, China 5/2019-8/2019
Software Engineer Intern, STCA

- Collaborated on extending Microsoft Excel's max path length limit (C/C++), enabling access to long-path files from Windows Explorer, Excel backstage, and external links.
- Updated document inspector and compatibility checker (C/C++) to support backward compatibility with legacy Excel files.

Desay SV Automotive, Nanjing, China 8/2017-11/2017
Machine Learning Intern, R&D department

- Collaborating with machine learning scientists to apply real-world road videos to distinguish lanes for autonomous driving
- Designed and implemented a model of road lane recognition using different neural networks, including Deeplab-v2 and FCN (Fully Convolutional Networks); achieved an accuracy of 96% for lane recognition

RELATED COURSEWORK

- Computational Topology, Advanced Algorithms, Scientific Data Visualization, Advanced Data Visualization, Machine Learning, Data Mining, Natural Language Processing, Parallel Computing

SELECTED ACADEMIC PROJECTS

Tracking Low-Level Cloud Systems with Topology, SCI, University of Utah 8/2023-12/2024

- Designed and implemented a framework to track clouds from satellite images based on merge trees
- Outperformed existing cloud-tracking frameworks and other topology-based tracking methods based on evaluations on robustness and other statistics

Distributed Branch Decomposition for scientific exploration, SCI, University of Utah 8/2023-3/2024

- Designed and implemented distributed algorithms to compute the geometry-based importance and simplification of contour trees
- Enabled highly efficient distributed contour tree simplification and contour extraction, outperforming the state-of-the-art single-node parallel implementation by up to 98.76 times

Comparing Morse Complexes using Optimal Transport, SCI, University of Utah 1/2023-5/2023

- Proposed methods to apply distances based on optimal transport (OT) to the comparative analysis of Morse Complexes

Flexible Topology Tracking with Partial Optimal Transport, SCI, University of Utah 4/2021-1/2024

- Designed a novel framework to compare merge trees with partial optimal transport, enabling topological feature tracking
- Achieved better performance in trajectory continuity and feature matching accuracy than other state-of-the-art frameworks

Sketching Merge Trees, SCI, University of Utah 8/2020-5/2023

- Created a new framework to apply matrix sketching techniques to analyze ensembles of merge trees for scientific visualization.
- Enabled computing the Fréchet Mean of merge trees, vectorizing the merge trees, and applications including finding representatives and modes from the scientific data ensembles, clustering the scientific data based on merge trees, and detecting outliers from the ensemble of merge trees

SERVICE

IEEE Transactions on Visualization and Computer Graphics - Reviewer, 2025
IEEE PacificVis - Reviewer, 2025
EuroVis - Reviewer, 2025
IEEE VIS & VIS Short - Reviewer, 2025

AWARDS AND HONORS

Provost's Postdoctoral Fellowship at the University of Notre Dame 9/2025
First Prize in the 15th Zhejiang University Programming Contest 4/2015
Second Prize in the 12th ACM/ICPC College Student Programming Contest in Zhejiang Province 5/2015
Second Prize in Science and Technology Innovation at Zhejiang University 6/2015

SKILLS

Programming: Paraview, VTK-m, TTK, VTK, Python, C/C++, OpenMP, MPI, JavaScript, Java, MySQL, MATLAB, HTML, CSS, PyTorch, Tensorflow, scikit-learn, Node.js, Angular, OpenCV, OpenGL

Languages: English, Chinese