Lin **Yan**

Assistant Professor · Department of Computer Science · Iowa State University

801-413-4123 | linyan@iastate.edu | LynneYan

Education

University of Utah — *Utah, U.S.A*

Ph.D. in Computing — *Aug. 2017 - May. 2022*

- Advisor: Bei Wang Phillips
- Research Area: Topological Data Analysis, Data Visualization, Machine Learning, and Data Mining
- Dissertation: Merge Trees and Their Variants for Scientific Visualization

Shanghai Jiao Tong University — *Shanghai, China*

M.S. in Control Science and Engineering — *Sep. 2010 - Mar. 2013*

- Advisor: Xingqun Zhan
- Research Area: GNSS Signal Acquisition and Processing, Real - Time Kinematic (RTK) Technology

Shanghai Jiao Tong University — *Shanghai, China*

B.S. in Automation — *Sep. 2006 - June. 2010*

- Core Courses: C++, Digital Electronics Technology, Analog Electronic Technology, Discrete Control System, Digital Signal Processing

Research Interests

- Topological Data Analysis
- Data Visualization
- Uncertainty Visualization
- Machine Learning
- Data Mining

Honors & Awards

2024 **IEEE VGTC VIS Doctoral Dissertation Award**, *link*

Skills

Programming Python, Node.JS, C/C++, PavaView, Topology Tool Kits, VTK, Numpy, JavaScript, Matlab, LaTeX

Languages English, Chinese

Publications

- **Lin Yan**, Topology-Based Visualization Techniques for Scientific Data Exploration. IEEE Computer Graphics and Applications, 2025. (accepted)
- Nathaniel Gorski, Xin Liang, Hanqi Guo, **Lin Yan**, Bei Wang. A General Framework for Augmenting Lossy Compressors with Topological Guarantees. IEEE Transactions on Visualization and Computer Graphics (TVCG, IEEE Pacific Visualization Symposium (PacificVis) TVCG Journal Track), accepted, 2025.
- Yuxiao Li, Xin Liang, Bei Wang, Yongfeng Qiu, **Lin Yan**, Hanqi Guo. MSz: An Efficient Parallel Algorithm for Correcting Morse-Smale Segmentations in Error-Bounded Lossy Compressors. IEEE Transactions on Visualization and Computer Graphics (TVCG, Proceedings of IEEE Visualization Conference), 2024.
- Fangfei Lan, Brandi Gamelin, **Lin Yan**, Jiali Wang, Bei Wang, Hanqi Guo. Topological Characterization and Uncertainty Visualization of Atmospheric Rivers. Eurographics Conference on Visualization (EuroVis), 2024.
- **Lin Yan**, Hanqi Guo, Tom Peterka, Bei Wang, Jiali Wang. TROPHY: A Topologically Robust Physics-Informed Tracking Framework for Tropical Cyclones. IEEE Transactions on Visualization and Computer Graphics (TVCG, Proceedings of IEEE Visualization Conference), 2023.
- **Lin Yan**, Xin Liang, Hanqi Guo, Bei Wang. TopoSZ: Preserving Topology in Error-Bounded Lossy Compression. IEEE Transactions on Visualization and Computer Graphics (TVCG, Proceedings of IEEE Visualization Conference), 2023.
- **Lin Yan**, Luke van Roekel, Paul Ullrich, Bei Wang, Hanqi Guo. Multi-Level Robustness for 2D Vector Field Feature Tracking, Selection, and Comparison. Computer Graphics Forum, 2023.
- Mingzhe Li, Sourabh Palande, **Lin Yan**, Bei Wang. Sketching Merge Trees for Scientific Visualization. IEEE Workshop on Topological Data Analysis and Visualization (TopoInVis) at IEEE VIS, pages 61-71, 2023.
- **Lin Yan**, Talha Bin Masood, Farhan Rasheed, Ingrid Hotz, Bei Wang. Geometry Aware Merge Tree Comparisons for Time-Varying Data. IEEE Transactions on Visualization and Computer Graphics, 2022.

- **Lin Yan**, Talha Bin Masood, Raghavendra Sridharamurthy, Farhan Rasheed, Vijay Natarajan, Ingrid Hotz, Bei Wang. Scalar Field Comparison with Topological Descriptors: Properties and Applications for Scientific Visualization. Eurographics Conference on Visualization (EuroVis), 2021. Computer Graphics Forum, 40(3), pages 599-633, 2021.
- Tushar Athawale, Dan Maljovec, **Lin Yan**, Chris R. Johnson, Valerio Pascucci, Bei Wang. Uncertainty Visualization of 2D Morse Complex Ensembles Using Statistical Summary Maps. IEEE Transactions on Visualization and Computer Graphics, 2020.
- Roxana Bujack, **Lin Yan**, Ingrid Hotz, Christoph Garth, Bei Wang. State of the Art in Time-Dependent Flow Topology: Interpreting Physical Meaningfulness Through Mathematical Properties. Eurographics Conference on Visualization (EuroVis), 2020.
- **Lin Yan**, Yusu Wang, Elizabeth Munch, Ellen Gasparovic, Bei Wang. A Structural Average of Labeled Merge Trees for Uncertainty Visualization. IEEE Transactions on Visualization and Computer Graphics (TVCG, Proceedings of IEEE Visualization Conference), 2019.
- **Lin Yan**, Yaodong Zhao, Paul Rosen, Carlos Scheidegger, Bei Wang. Homology-Preserving Dimensionality Reduction via Manifold Landmarking and Tearing. Visualization in Data Science (VDS) at IEEE Visualization Conference, 2018.
- Hua Wang, **Lin Yan**, Heng Huang, and Chris Ding. From Protein Sequence to Protein Function via Multi-Label Linear Discriminant Analysis. IEEE/ACM Transactions on Computational Biology and Bioinformatics, 2016.
- Hongchang Gao, **Lin Yan**, Weidong Cai, Heng Huang. Anatomical Annotations for Drosophila Gene Expression Patterns via Multi-Dimensional Visual Descriptors Integration: Multi-Dimensional Feature Learning. Proceedings of the 21th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining. ACM, 2015.
- Hongchang Gao, Chengtao Cai, Jingwen Yan, **Lin Yan**, Joaquin Goni Cortes, Yang Wang, Feiping Nie, John West, Andrew Saykin, Li Shen, Heng Huang. Identifying connectome module patterns via new balanced multi-graph normalized cut. International Conference on Medical Image Computing and Computer-Assisted Intervention. Springer, Cham, 2015.
- **Lin Yan**, Xingqun Zhan. Advantage analysis and verification of the GPS/BeiDou integrated satellite navigation system. Journal of Shanghai Jiao Tong University, 47(8): 1169-1172, 2013.

Work Experience

Iowa State University - Assistant Professor
Iowa, U.S.A

Department of Computer Science — *January 2024 - present*

- Responsibilities include teaching, research, and service. Her research involves developing analysis and visualization methods for scientific data exploration.

Argonne National Laboratory - Postdoctoral Fellowship
Illinois, U.S.A

Environmental Science & Mathematics and Computer Science Division — *June 2022 - December 2023*

- Developed topological techniques which can be applied to earth science and address critical questions such as feature tracking, uncertainty quantification, and critical structure retrieval.

Argonne National Laboratory - Summer Internship
Illinois, U.S.A

Mathematics and Computer Science Division — *May 2021 - August 2021*

- Developed analysis and visualization methods for understanding uncertainties in ensemble ocean climate models.
- Proposed a topology-preserving scalar field compression technique.

Los Alamos National Laboratory - Summer Internship
New Mexico, U.S.A

Data Science at Scale School — *May 2019 - August 2019*

- Feature detection through classical vector field topology.
- Extended the definitions of source, sink, and saddle in classic steady vector field to finite-time vector field

Shanghai Jiao Tong University - Engineer
Shanghai, China

Department of Electronic Engineering — *May 2013 - July. 2016*

- Designed and maintained interactive websites for ee.sjtu.edu.cn
- Participated in international projects in a joint research lab between Shanghai Jiao Tong University and the University of Texas at Arlington

Teaching Experience

Instructor
Iowa, U.S.A

Assistant Professor — *January 2024 - present*

- COM S 321: Introduction to Computer Architecture and Machine-Level Programming, Iowa State University, Spring 2024
- COM S 573: Machine Learning, Iowa State University, Spring 2025
- COM S 573: Machine Learning, Iowa State University, Fall 2025

Guest Lectures
Illinois, U.S.A

Postdoctoral Fellowship — *August 2022*

- CSE 5559: AI for Visualization, the Ohio State University, Fall 2022

Teaching Assistant

Utah & Texas, U.S.A

PhD Student

- CSE 5334 Data Mining, University of Texas at Arlington, Fall 2016
- CSE 1320 Intermediate Programming with C, University of Texas at Arlington, Spring 2017
- CS 2100 Discrete Structures, University of Utah, Spring 2020 & Fall 2020

Services

Panelist

U.S.A

National Science Foundation *2024*

- NLP/IR SMALL Panel in the Information & Intelligent Systems Division (IIS)

Program Committee

U.S.A

Chair *2023-2025*

- IEEE Workshop on Topological Data Analysis and Visualization in conjunction with IEEE VIS 2023, Melbourne, Australia (TopoInVis 2023).
- IEEE Workshop on Topological Data Analysis and Visualization in conjunction with IEEE VIS 2024, Florida, U.S.A (TopoInVis 2024).
- IEEE Workshop on Topological Data Analysis and Visualization in conjunction with IEEE VIS 2025, Vienna, Austria (TopoInVis 2025).

Reviewer

Journal

- IEEE Transactions on Visualization and Computer Graphics (TVCG)
- Computer Graphics Forum (CGF)

Conference

- IEEE Visualization Conference
- Eurographics Conference on Visualization (EuroVis)
- IEEE Pacific Visualization (PacificVis)