

# Jianxin (Jason) Sun

# Curriculum Vitae

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## RESEARCH INTEREST

My research aims to establish the **core foundations of next-generation AI-driven scientific data analysis and visualization systems** capable of automatically analyzing large-scale, high-dimensional, and in situ scientific data with enhanced *expressivity*, *explainability*, and *scalability*, empowering **AI for Science** through accelerated scientific discovery and innovation across specialized and interdisciplinary domains.

## EDUCATION

- **University of Nebraska-Lincoln** **Sep. 2018 - May 2024**  
Ph.D. in Computer Science  
Advisor: Hongfeng Yu  
Lincoln, USA
- **Purdue University** **Sep. 2012 - May 2015**  
M.Sc. in Electrical and Computer Engineering  
Advisor: Avinash Kak  
West Lafayette, USA
- **Harbin Institute of Technology** **Sep. 2004 - Jun. 2008**  
B.Eng in Electronic and Information Engineering  
Harbin, China

## Research EXPERIENCE

- **Research Assistant Professor** **Sep. 2024 - Present**  
*School of Computing, University of Nebraska-Lincoln, Lincoln, NE*
- **Graduate Research Assistant** **Sep. 2018 - May 2024**  
*Visualization Lab, University of Nebraska-Lincoln, Lincoln, NE*
- **Research Intern** **May - Dec. 2021**  
*Mathematics and Computer Science, Argonne National Laboratory, Lemont, IL*
- **Graduate Research Assistant** **Sep. 2012 - May 2015**  
*Robot Vision Lab, Purdue University, West Lafayette, IN*

## PUBLICATIONS

([Google Scholar](#): citations = 575, h-index = 8, i10-index = 7)

- Yu Pan, Hongfeng Yu, Tianjiao Zhao, and **Jianxin Sun**, “Can Language Models Enable In-Context Database?”. IEEE Conference on Big Data, 2025
- Xinyan Xie, **Jianxin Sun**, Claire X. Shen, and Hongfeng Yu, “Interactive Hierarchical Edge Bundling of Large-Scale Graph through Prefetching”. IEEE Conference on Big Data, 2025
- Xinyan Xie, **Jianxin Sun**, Warren Z. Huang, Harkamal Walia, and Hongfeng Yu, “PanicleVis: A Multidimensional and Multilevel Graph-Based Visualization System for Spatiotemporal Panicle Phenotyping Data”. IEEE Conference on Big Data, 2025
- **Jianxin Sun**, David Lenz, Hongfeng Yu, Tom Peterka, “F-Hash: Feature-Based Hash Design for Time-Varying Volume Visualization via Multi-Resolution Tesseract Encoding”. IEEE Transactions on Visualization and Computer Graphics (TVCG, Proc. IEEE VIS, Vienna, Austria), 2025
- **Jianxin Sun**, David Lenz, Hongfeng Yu, Tom Peterka, “Make the Fastest Faster: Importance Mask Synthesis for Interactive Volume Visualization using Reconstruction Neural Networks”. IEEE Transactions on Visualization and Computer Graphics (TVCG), 2025

- Yu Pan, **Jianxin Sun**, Hongfeng Yu, Joe Luck, Geng Bai, Nipuna Chamara, Yufeng Ge, Tala Awada, “Building Multi-Agent Copilot towards Autonomous Agricultural Data Management and Analysis”. IEEE Conference on Big Data, Washington DC, USA, 2024
- Vesh R Thapa, **Jianxin Sun**, Katja Koehler-Cole, David Scoby, Geng Frank Bai, Yufeng Ge, Hongfeng Yu, Andrea Basche, “Estimating the Winter Biomass Potential of Four Cover Crop Species: Wheat, Rye, Triticale, and Canola”. ASA, CSSA, SSSA International Annual Meeting, 2024
- **Jianxin Sun**, David Lenz, Hongfeng Yu, Tom Peterka, “Adaptive Multi-Resolution Encoding for Interactive Large-Scale Volume Visualization through Functional Approximation”. Proceedings of IEEE Symposium on Large Data Analysis and Visualization (LDAV) 2024, St. Pete Beach, FL
- **Jianxin Sun**, Xinyan Xie, Hongfeng Yu, “RmdnCache: Dual Space Prefetching Neural Network for Large-Scale Volume Visualization”. IEEE Transactions on Visualization and Computer Graphics (TVCG), 2024
- **Jianxin Sun**, David Lenz, Hongfeng Yu, Tom Peterka, “Scalable Volume Visualization for Big Scientific Data Modeled by Functional Approximation”. IEEE Conference on Big Data, 2023
- **Jianxin Sun**, Xinyan Xie, Yu Pan, Yakub Islamov, Yufeng Ge, and Hongfeng Yu, “Visualization of 3D Hyperspectral Soil Mapping Data via Autoencoder-based Clustering”. IEEE Conference on Big Data, 2023
- **Jianxin Sun**, David Lenz, Hongfeng Yu, Tom Peterka, “MFA-DVR: Direct Volume Rendering of MFA Models”. Journal of Visualization, 2023
- Yu Shi, Hannah Tang, **Jianxin Sun**, Xinyan Xie, Huijing Du, Dandan Zheng, Chi Zhang, Hongfeng Yu, “Tissue-Specific Color Encoding and GAN Synthesis for Enhanced Medical Image Generation”. IEEE Conference on Big Data, 2023
- Jieting Wu, **Jianxin Sun**, Xinyan Xie, Tian Gao, Yu Pan, Hongfeng Yu, “Accelerating Web-based Graph Visualization with Pixel-Based Edge Bundling”. IEEE International on Big Data, 2023
- Yu Pan, **Jianxin Sun**, Hongfeng Yu, “LM-DiskANN: Low Memory Footprint in Disk-Native Dynamic Graph-Based ANN Indexing”. IEEE Conference on Big Data, 2023
- Yu Pan, **Jianxin Sun**, Hongfeng Yu, Geng Bai, Yufeng Ge, Joe Luck, Tala Awada, “Transforming Agriculture with Intelligent Data Management and Insights”. IEEE Conference on Big Data, 2023
- Sujan Shrestha, **Jianxin Sun**, Katja Koehler-Cole, Andrea Basche, Hongfeng Yu, “Empowering Cover Crop Decision Support with Visualization and Provenance Enhancement”. IEEE Conference on Big Data, 2023
- Ryan Haggerty; **Jianxin Sun**; Hongfeng Yu; Yusong Li, “Application of Machine Learning in Groundwater Quality Modeling - A Comprehensive Review”. Water Research, 2023
- Mohammad M. R. Lunar, **Jianxin Sun**, John Wensowitch, Michael Fay, Halit Bugra Tulay, Sai Suman, Brian Qiu, Deepak Nadig, Garhan Attebury, Hongfeng Yu, Joseph Camp, Can Emre Koksall, Dario Pompili, Byrav Ramamurthy, Morteza Hashemi, Eylem Ekici, Mehmet C. Vuran, “OneLNK: One Link to Rule Them All: Web-based Wireless Experimentation for Multi-vendor Remotely Accessible Indoor/Outdoor Testbeds”. ACM WiNTECH, 2021
- Tian Gao, Feiyu Zhu, Puneet Paul, Jaspreet Sandhu, Henry Akrofi Doku, **Jianxin Sun**, Yu Pan, Paul Staswick, Harkamal Walia, Hongfeng Yu, “Novel 3D Imaging Systems for High-Throughput Phenotyping of Plants”. Remote Sensing, 2021
- **Jianxin Sun**, Chunxia Wu, Yufeng Ge, Yusong Li, Hongfeng Yu, “Spatial-Temporal Scientific Data Clustering via Deep Convolutional Neural Network”. IEEE Conference on Big Data, 2019
- Tian Gao, **Jianxin Sun**, Feiyu Zhu, Henry Akrofi Doku, Yu Pan, Harkamal Walia, Hongfeng Yu, “Plant Event Detection from Time-Varying Point Clouds”. IEEE Conference on Big Data, 2019
- Li Zhang, **Jianxin Sun**, Cole Peterson, Bonita Sharif, Hongfeng Yu, “Exploring Eye Tracking Data on Source Code via Dual Space Analysis”. Working Conference on Software Visualization (VISSOFT), 2019

- Henry Medeiros, Donghun Kim, **Jianxin Sun**, Hariharan Seshadri, Shayan Ali Akbar, Noha M. Elfiky, Johnny Park, “Modeling Dormant Fruit Trees for Agricultural Automation”. Journal of Field Robotics, 2016
- Noha M. Elfiky, Shayan A. Akbar, **Jianxin Sun**, Johnny Park, and Avinash Kak, "Automation of Dormant Pruning in Specialty Crop Production: An Adaptive Framework for Automatic Reconstruction and Modeling of Apple Trees". CVPR Workshop on Perception Beyond the Visual Spectrum (PBVS), 2015
- **Jianxin Sun**, Dalei Wu, Song Ci. "Battery Capacity Footprinting and Optimization Analysis for Wireless Multimedia Communication". IEEE Globecom, 2011
- **Jianxin Sun**, Dalei Wu, Song Ci. " Battery-aware multimedia coding optimization by dynamic frequency scaling". International Conference on Computer Communications and Networks, 2011
- **Jianxin Sun**, Song Ci, Chien Jung-Hung, Park Shi-Hyun, Suh Irene H, Oleynikov Dmitry, and Siu Ka-Shun. "Innovative Effector Design for Simulation Training in Robotic Surgery". International Conference on BioMedical Engineering and Informatics (BMEI), 2010

### PREPRINTS/UNDER REVIEW

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- **Jianxin Sun**, David Lenz, Tom Peterka, Hongfeng Yu, “SASAV: Self-Directed Agent for Scientific Analysis and Visualization”. Under review for IEEE VIS, 2026
- Kuangshi Ai, Haichao Miao, Kaiyuan Tang, Nathaniel Gorski, **Jianxin Sun**, Guoxi Liu, Helgi Ingólfsson, David Lenz, Hanqi Guo, Hongfeng Yu, Teja Leburu, Michael Molash, Bei Wang, Tom Peterka, Chaoli Wang, Shusen Liu, “SciVisAgentBench: A Benchmark for Evaluating Scientific Data Analysis and Visualization Agents”. Under review for IEEE VIS, 2026
- Quan Nguyen, **Jianxin Sun**, Hongfeng Yu, “OpNet: Pixel Synthesis Neural Network for Interactive Volume Visualization”. Under review for IEEE VIS, 2026
- Xinyan Xie, **Jianxin Sun**, Hongfeng Yu, “Scalable Edge Bundling for Large Graphs based on High-Dimensional Feature Space Partitioning”. Under review for IEEE Transactions on Visualization and Computer Graphics (TVCG), 2025

### GRANT

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#### Received

- [DOE/ASCR] **Co-PI** (Subaward), “Scientific Data Management and Visualization to Advance AI for Science”, Source: DOE Office of Science. Award Amount: **\$625K of \$20M**, Award Period: 9/1/2025–9/30/2030, Location: University of Nebraska-Lincoln, Lead-PI: Valerie Taylor (Argonne National Laboratory). *My “F-Hash” paper provides promising and supportive results on funding success.*
- [DOE/ASCR] **Proposal Writing** (Subaward) during my Ph.D, “Implicit Continuous Representations for Visualization of Complex Data”, Source: DOE Office of Science. Award Amount: **\$450K of \$2.7M**, Award Period: 9/15/2022–9/14/2025, Location: University of Nebraska-Lincoln, Lead-PI: Tom Peterka (Argonne National Laboratory). *My “function approximation” work serves as the foundation of the proposal.*

#### Submitted

- [NVIDIA Academic Grant] **PI**, “Accelerating Implicit Neural Network Training from Large-Scale High-Dimensional Scientific Data via Multi-Resolution High Rank Tensor Encoding”, 2025
- [DOE EPSCoR] **PI**, “Green Visual Analytics of Large-scale Data”, 2025
- [NSF] **Co-PI**, “AI-BioTwin”, submitted to NSF 25-541 Test Bed: Toward a Network of Programmable Cloud Laboratories, 2025
- [NSF] **Co-PI**, “StormCast”, submitted to NSF 23-594: Geoinformatics (GI), 2025

- [NSF] Co-PI, “AI-Enabled Path Analysis and Forecast of Extratropical Cyclones and Associated Severe Weather Phenomena to Enhance Public Safety and Resilience”, submitted to NSF 25-530: Collaborations in Artificial Intelligence and Geosciences (CAIG), 2026

## AWARDS

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- AAMAS Conference Scholarship, London, UK 2021
- First Place Data Analytics Competition of Mutual of Omaha (🏆 top 4% team). 2019
- Chancellor’s Fellowship, University of Nebraska-Lincoln 2019
- Graduate Research Assistantship, University of Nebraska-Lincoln 2018-2025
- Graduate Teaching Assistantship, Purdue University 2012-2015
- Excellent Bachelor's Thesis (🏆 Awarded to top 1% students) 2008

## SERVICES

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### Conference Session Chair

- Algorithms and Workflows, IEEE Visualization Conference (VIS), 2025
- Papers Session 1, IEEE Workshop on Large Data Analysis and Visualization (LDAV), 2025

### Conference Program Committee Members

- IEEE Visualization Conference (VIS), Full Paper, 2025, 2026
- IEEE International Conference on Cluster Computing (CLUSTER), Data, Storage, and Visualization, Full Paper, 2025
- IEEE Symposium on Large Data Analysis and Visualization (LDAV), Full Paper, 2025

### Journal Paper Reviewers

- Journal of Transactions on Visualization and Computer Graphics (TVCG), since 2020
- Journal of Big Data Research, since 2019
- Journal of The Visual Computer, 2026

### Conference Paper External Reviewers

- IEEE Visualization Conference (VIS), 2021-2025
- IEEE International Conference on Cluster Computing (CLUSTER), 2025
- IEEE Pacific Visualization Symposium (PacificVis), 2025
- Eurographics/IEEE-VGTC Symposium on Visualization (EuroVis), 2023
- IEEE Symposium on Large Data Analysis and Visualization (LDAV), 2022, 2023
- IEEE International Conference on Big Data (IEEE BigData), 2021, 2022
- International Conference on Scientific and Statistical Database Management (SSDBM) 2021

## TEACHING

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- **Instructor, Holland Computing Center (HCC)** Jun. 2024  
Workshop Series: Introduction to Running Machine Learning Workflows on HPC, 20 students, HCC, University of Nebraska-Lincoln
- **Instructor, Purdue University** Sep. 2012 – May 2015  
ECE 20700, Electronic Measurement Techniques, 50 students, ECE, Purdue University  
Average student evaluation 4.5/5.0

## INVITED TALKS & PRESENTATION

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- **Computer Science Department, University of Cincinnati** Apr. 2026  
Invited Talk: “AI-Driven Scientific Visualization”  
Host: Dr. Justin Zhan
- **Computer Science Department, Baylor University** Mar. 2026  
Invited Talk: “Data Analytical Systems for AI for Science”

- Host: Dr. Jean Gao
- **Computer Science Department, Virginia Commonwealth University** **Dec. 2025**  
Invited Talk: “AI-Driven Scientific Visualization”  
Host: Dr. Kemal Akkaya
  - **IEEE VIS Conference** **Nov. 2025**  
Presentation 1: “F-Hash: Feature-Based Hash Design for Time-Varying Volume Visualization via Multi-Resolution Tesseract Encoding”  
Presentation 2: “Rmdncache: Dual-space prefetching neural network for large-scale volume visualization”
  - **Argonne National Laboratory** **Jun. 2024**  
Invited Talk: “Interactive Volume Visualization of Large-scale Scientific Data Modeled by Functional Approximation”  
Host: Dr. Tom Peterka
  - **Daugherty Water for Food Global Institute (DWFI) Research Forum** **Apr. 2024**  
Presentation: “Unveiling Soil Mapping through 3D Hyperspectral Imaging and Visualization”

## STUDENT SUPERVISION

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### University of Nebraska-Lincoln

- Xinyan Xie, Ph.D. Student Sep. 2020-Present
- Quan Nguyen, Ph.D. Student Sep. 2024- Present
- Charishma Garimella, Master Student Jan. 2025- Present
- Winston Hou, Undergraduate Student Dec. 2025- Present

## INDUSTRIAL EXPERIENCE

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- **Li-cor, Lincoln, NE** **Jun. 2015 - May 2018**  
Design Software Engineer
  - Work on MCU and Linux SOC, ARM embedded system development, device driver, kernel, and user space development in C/C++.

## OUTREACH

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- Tracks to the Future, Nebraska Transportation Center (2025)
- Omaha Millard West High School STEM Event (2025)
- Hour of Code & Tech Fair at Nebraska Innovation Campus (2019/2022/2023/2024/2025)
- Girls Code Lincoln visiting at visualization lab with hands-on activities (2023)
- The third annual Introduce a Girl to Engineering Day (2020)

## TECHNICAL SKILLS:

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- **Programming:** C/C++, Python, CUDA, Parallel Programming
- **Machine Learning:** Pytorch, TensorFlow, Pandas, scikit-learn
- **Data Visualization:** Visualization Toolkit(VTK), WebGL, Three.js, D3.js
- **Libraries:** OpenCV, OpenGL, Open MPI, Point Cloud Library(PCL)
- **Others:** GPU shader, JavaScript/HTML/CSS, AngularJS, Flask, Linux kernel