

Cheng Xin

Postdoctoral Researcher · Rutgers University, Department of Computer Science

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BIO

Cheng Xin received his Ph.D. in Computer Science from **Purdue University** under the supervision of Prof. Tamal K. Dey, and is currently a postdoctoral researcher in the Department of Computer Science at **Rutgers University**, advised by Prof. Jie Gao. His research spans **Topological and Geometric Machine Learning**, **interpretable AI**, **AI for Science**, and **Model Evaluation**. He has published in top-tier conferences including **NeurIPS**, **ICML**, **CVPR**, and **SoCG**; he was selected for the **Shanghai Baiyulan Talent Program - Young Talent Project** (2025), has served as **Area Chair for TAG-DS Workshop 2026**, and has reviewed for **ICML**, **ICLR**, **NeurIPS**, and **SoCG**.

RESEARCH INTERESTS

Topological and Geometric Machine Learning Interpretable AI AI for Science Model Evaluation Multiparameter Persistence

RESEARCH & EDUCATION

Rutgers University Department of Computer Science Oct 2023 – Present

Postdoctoral Researcher, Advisor: Prof. Jie Gao

- Developing topological frameworks for **interpretable AI**; TopInG improves both prediction performance and explanation quality on molecular graph benchmarks.
- Researching **non-Euclidean representation learning**, hyperbolic algorithms, AI for Science, model evaluation, and multi-agent learning in social settings.

Purdue University Department of Computer Science Aug 2020 – Aug 2023

Ph.D. in Computer Science, Advisor: Prof. Tamal K. Dey

- Dissertation: *Decomposition and Stability of Multiparameter Persistence Modules*.

The Ohio State University Department of Computer Science and Engineering Jan 2017 – Aug 2020

Ph.D. Student / Research Assistant, Advisor: Prof. Tamal K. Dey

- Developed generalized persistence algorithms and stability theory for multiparameter persistent homology.

Lehigh University Department of Computer Science Jan 2014 – May 2016

M.S. in Computer Science, Advisor: Prof. Xiaolei Huang

- Thesis: *Machine Learning Techniques for Cervigram Image Analysis*; research on medical image analysis and machine learning applications.

Tongji University Shanghai, China Sep 2009 – Jul 2013

B.Eng. in Software Engineering

INVITED TALKS

"TopInG: Topologically Interpretable Graph Learning via Persistent Rationale Filtration"

Conference on Topological Data Analysis: Recent Developments and Applications, University of Missouri, November 2025

"Understanding through Shape of Data: Topological Data Analysis for Interpretable AI"

Management Science and Information Systems Department Colloquium, Rutgers University, October 2024

"Exploring Representations Beyond Euclidean Geometry"

John Hopcroft Center Seminar, Shanghai Jiao Tong University, June 2024

"Multiparameter Persistence and Its Applications"

Theory Seminar, Department of Computer Science, Rutgers University, November 2023

"Generalized persistence algorithm for decomposing multi-parameter persistence modules"

Applied Algebraic Topology Network Seminar, July 2020

HONORS AND ACADEMIC SERVICE

Selected for the Shanghai Baiyulan Talent Program - Young Talent Project, 2025

Area Chair, TAG-DS Workshop, 2026

Reviewer, ICML, ICLR, NeurIPS, SoCG

PUBLICATIONS

ICML 2025 C. Xin, F. Xu, X. Ding, J. Gao, J. Ding. "TopInG: Topologically Interpretable Learning via Persistent Rationale Filtration"

NeurIPS 2025 C. Deng, J. Gao, K. Lu, F. Luo, C. Xin[†]. "Johnson-Lindenstrauss Lemma Beyond Euclidean Geometry"

NeurIPS 2024 C. Deng, J. Gao, K. Lu, F. Luo, H. Sun, C. Xin[†]. "Neuc-MDS: Non-Euclidean Multidimensional Scaling Through Bilinear Forms"

ICML 2024 S. Haddadan, C. Xin, J. Gao. "Optimally Improving Cooperative Learning in a Social Setting"

CVPR 2024 L. Ling, ..., C. Xin, et al. "DL3DV-10K: A Large-Scale Scene Dataset for Deep Learning-Based 3D Vision"

TMLR 2024 S. Zhang, C. Xin, T. K. Dey. "Expressive Higher-Order Link Prediction through Hypergraph Symmetry Breaking"

ICML-W 2023 C. Xin, S. Mukherjee, S. N. Samaga, T. K. Dey. "GRIL: A 2-parameter Persistence Based Vectorization for Machine Learning"

SoCG 2026 S. Mukherjee, S. N. Samaga, C. Xin, S. Oudot, T. K. Dey. "D-GRIL: End-to-End Topological Learning with 2-parameter Persistence"

SoCG 2026 C. Deng, J. Gao, K. Lu, F. Luo, C. Xin. "Locality Sensitive Hashing in Hyperbolic Space"

JACT 2022 T. K. Dey, C. Xin[†]. "Generalized persistence algorithm for decomposing multiparameter persistence modules"

arXiv 2021 T. K. Dey, C. Xin[†]. "Rectangular Approximation and Stability of 2-parameter Persistence Modules"

SoCG 2018 T. K. Dey, C. Xin[†]. "Computing Bottleneck Distance for 2-D Interval Decomposable Modules"

PR 2017 T. Xu, H. Zhang, C. Xin, et al. "Multi-feature based benchmark for cervical dysplasia classification evaluation"

MLMI 2015 T. Xu, C. Xin[†] et al. "A New Image Data Set and Benchmark for Cervical Dysplasia Classification Evaluation"

[†] authors alphabetically ordered · * co-first author

INDUSTRIAL EXPERIENCE

Electronic Arts (EA) Machine Learning Scientist Intern May – Aug 2018

Big Data Group · Redwood City, CA

- Large-scale machine learning on **Spark**; graph learning on relational databases, attribute evaluation and selection, and dataset compression.

Amazon Software Development Engineer Intern May – Aug 2015

AWS Infrastructure Group · Seattle, WA

- Developed a data management system for receiving, parsing, storing, and retrieving network messages.

Koal Software Software Developer Jul – Dec 2013

Shanghai, China

- Worked on backend databases, business logic, APIs, and frontend UI development.

Microsoft Developer Support Intern Jul – Nov 2012

Data Intelligence Group · Shanghai, China

- Handled technical support cases related to SQL Server.

TEACHING EXPERIENCE

Lecturer, Design and Analysis of Algorithms, Rutgers University, Fall 2025, approximately 45 graduate students

Teaching Assistant, Data Structures and Algorithms, Purdue University, Spring 2023, approximately 200 undergraduate students

Teaching Assistant, Computational Geometry, Purdue University, Fall 2020, approximately 30 graduate students

SKILLS

Python PyTorch Spark Keras Java C C++ MATLAB R

REFERENCES

Confidential recommendation letters available via Interfolio Dossier Delivery.

Dr. Tamal K. Dey

Professor, Computer Science, Purdue University
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Dr. Jie Gao

Professor, Computer Science, Rutgers University
jg1555@cs.rutgers.edu

Dr. Feng Luo

Professor, Mathematics, Rutgers University
fluo@math.rutgers.edu