

# Cheng Xin

Applied AI/ML Research Engineer · Generative AI, Evaluation, and Agent Systems

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## SUMMARY

Applied AI/ML engineer-scientist with hands-on experience across **large-scale data pipelines**, **model evaluation**, and **feedback-driven iteration loops** for **generative AI** and **agent systems**. Strong at turning research-style exploration into practical workflows: **benchmark design**, **data collection/curation/cleaning**, **evaluator design**, **failure analysis**, and **quality-improvement pipelines**. Built production-facing ML/data systems at **EA and AWS**, research-grade **AIGC benchmarks** at Rutgers/CVPR scale, and recent **OpenClaw-based agent evaluation and memory workflows** for **long-horizon task execution**. Comfortable bridging **model quality**, **data quality**, and **product constraints** in fast-moving applied teams.

## TECHNICAL SKILLS

### Languages

Python PyTorch TensorFlow Spark CUDA C++ Java SQL JavaScript

### AI/ML

Image/Video Generation 3D Vision Diffusion Models Transformer VLM/LLM Evaluation Agentic AI  
Benchmarking Model Evaluation Data-Centric Iteration Reinforcement Learning

### Data & Infra

Data Pipeline Data Collection/Curation Session Log Analysis Feedback Signal Extraction Memory Systems  
Spark AWS Distributed Systems Database Full-stack Dev

### Research

Generative AI AI4Science Geometric/Topological ML Trustworthy/Interpretable AI

## PROFESSIONAL EXPERIENCE

### Rutgers University Department of Computer Science · Postdoctoral Researcher

Oct 2023 – Present

Advisor: Prof. Jie Gao

- Leading an ongoing follow-up project on **physics-plausibility evaluation for video generative models**, aimed at designing a distance / scoring metric between videos that better reflects physical realism
- Designing the dataset, human-labeling protocol, mixed real + synthetic data setup, and evaluation workflow; also exploring lightweight feedback / reward-style optimization ideas for better video-generation training signals
- Designed evaluation workflows over **agent session logs** to convert multi-turn conversations into structured supervision signals, including approvals, corrections, dissatisfaction, scope changes, and tool / environment feedback
- Built **OpenClaw-based memory and agent workflows** for long-horizon task execution, session tracing, and offline quality analysis, helping support engineering experiments on agent reliability and behavior improvement
- Led development of **TopInG**, an interpretable AI framework achieving up to **20% improvement** in both prediction accuracy and interpretability on molecular property prediction benchmarks

### Purdue University Department of Computer Science · Ph.D. Research Assistant

Aug 2020 – Aug 2023

Advisor: Prof. Tamal K. Dey

- Contributed to **DL3DV-10K**, a large-scale dataset/benchmark with **10K+ real-world scenes** for video generation and understanding; focused on data collection and evaluation-related testing
- Proposed **GRIL**, a topological vectorization framework with **provably stronger expressiveness**, outperforming prior methods on ML pipelines for complex scientific data
- Developed **generalized persistence algorithms**, achieving significant computational speedup for multi-parameter data analysis
- Applied topology-based mathematical tools to **AI4Science** problems, bridging theory with practical applications in drug discovery and materials design

### Electronic Arts (EA) Machine Learning Scientist Intern

May – Aug 2018

Big Data & Analytics · Redwood City, CA

- Built end-to-end **ML pipeline on Spark** processing large-scale player interaction data for engagement prediction
- Developed feature engineering and data compression techniques, reducing data view size by **30–40%**
- Implemented relational learning methods on large-scale databases for player behavior modeling

### Amazon Software Development Engineer Intern

May – Aug 2015

AWS Infrastructure Group · Seattle, WA

- Developed and deployed **real-time data management system** for large-scale network message handling, building foundational infrastructure for data pipelines
- Designed fault-tolerant message parsing and storage pipeline, enabling efficient data ingestion for downstream data analysis

**Koal Software** Full-stack Development Engineer

Jul – Dec 2013

Platform Group · Shanghai

- Designed and implemented complete web application: backend database schema, business logic APIs, natural language processing, and frontend UI/UX

**Microsoft** Developer Intern

Jul – Nov 2012

Database Business Intelligence Group · Shanghai

- Diagnosed and resolved complex SQL Server technical issues for enterprise customers, gaining deep expertise in database systems and query optimization

## EDUCATION

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**Ph.D. in Computer Science** · Purdue University

2023

Dissertation: Decomposition and Stability of Multiparameter Persistence Modules · Advisor: Prof. Tamal K. Dey

**M.S. in Computer Science** · Lehigh University

2016

Thesis: Machine Learning Techniques for Medical Image Analysis · Focus: Computer vision, deep learning for healthcare

**B.Eng. in Software Engineering** · Tongji University, Shanghai

2013

## SELECTED PUBLICATIONS

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**ICML 2025** C. Xin et al. "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"

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

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

## HONORS & LEADERSHIP

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**1st Place**, Microsoft College Code Competition (2017 @ OSU, 2015 @ Lehigh)

**Area Chair**, TAG-DS Workshop 2026; **Reviewer**, ICML, ICLR, NeurIPS, SoCG

**Graduate Course Lecturer**: Design and Analysis of Algorithms (45 students, 2025)

**Teaching Assistant**: Data Structures & Algorithms (200 students), Computational Geometry (30 students)