Cheng Xin

Purdue CS PhD · AI Agent Developer · Full-Stack ML Research & Engineering · OpenClaw Contributor

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SUMMARY

AI agent developer and ML research scientist with 7+ years of experience spanning **agent systems**, **evaluation workflows**, and **production ML infrastructure**, with publications at **NeurIPS, ICML, CVPR**. **OpenClaw Contributor** with hands-on experience designing and implementing **long-horizon agent workflows**, **tool/skill integration**, **session tracing**, **memory mechanisms**, and **offline evaluation loops**. Full-stack builder with strong **mathematical foundations** and industry engineering experience across **EA, Amazon, and Microsoft**.

TECHNICAL SKILLS

Agentic AI	`Agent Framework Dev` `Skill System Design` `MCP` `Multi-Agent Collaboration` `Memory Systems` `Agent Evaluation` `Session Management` `Tool Use`
Languages	`Python` `PyTorch` `TensorFlow` `Spark` `CUDA` `C++` `Java` `JavaScript` `SQL`
AI/ML	`LLM/VLM` `Transformer` `Diffusion Models` `Reinforcement Learning` `Data Pipeline` `Model Evaluation` `Prompt Engineering`
Infrastructure	`AWS` `Distributed Systems` `Database` `Full-stack Dev` `CI/CD`

OPEN-SOURCE CONTRIBUTIONS

OpenClaw — AI Agent Open-Source Platform `Feb 2026 — Present`

- **Active contributor and feature builder**: submitted **20 pull requests** across Skill modules, agent workflow logic, evaluation tooling, and developer-facing runtime features
- Designed and implemented reusable **Agent Skills** for research automation, task planning, web/social information retrieval, and multi-step orchestration, translating fuzzy user intents into executable agent workflows
- Worked directly with **MCP integration, tool routing, session/thread state, skill triggering, memory-aware workflows, and multi-model orchestration**, building a practical understanding of how agent systems fail, recover, and improve in long-horizon tasks

PROFESSIONAL EXPERIENCE

Rutgers University Department of Computer Science · Postdoctoral Researcher `Oct 2023 — Present`

Advisor: Prof. Jie Gao

- Built **OpenClaw-based agent workflow prototypes** for long-horizon task execution, covering planning, tool invocation, session tracing, and offline failure analysis for agent reliability experiments
- Designed **session-log evaluation pipelines** that convert multi-turn agent traces into structured supervision signals — including approvals, corrections, scope changes, and tool feedback — for iterative diagnosis and performance tuning
- Prototyped key **Agentic AI subsystems** including multi-agent collaboration patterns, long/short-term memory mechanisms, reflective evolution loops, and skill-triggered task execution
- Led development of **TopInG**, an interpretable graph learning framework achieving up to **20% improvement** in predictive accuracy and interpretability on molecular property prediction benchmarks
- Contributed to **DL3DV-10K**, a large-scale 3D vision benchmark with **10K+ real-world scenes**, supporting data curation and benchmark development for video generation and understanding research; project gained **550+ GitHub stars**

Purdue University Department of Computer Science · Ph.D. Research Assistant `Aug 2020 — Aug 2023`

Advisor: Prof. Tamal K. Dey

- Proposed **GRIL**, a topological vectorization framework with provable expressiveness guarantees, and translated the theory into practical ML pipelines for complex scientific data
- Developed **generalized persistence algorithms** for multi-parameter topological analysis, improving computational efficiency for large-scale scientific and geometric data processing

- Applied topology and geometry driven methods to **AI4Science** settings, connecting mathematical modeling with downstream tasks 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 **Spark-based ML pipelines** for large-scale player interaction data, covering data processing, feature engineering, and engagement prediction workflows
- Developed feature engineering and data compression methods that reduced data view size by **30–40%**, improving downstream analytics efficiency

Amazon Software Development Engineer Intern — May — Aug 2015

AWS Infrastructure Group · Seattle, WA

- Developed and deployed a **real-time data management system** for large-scale network message handling, contributing backend infrastructure for internal data pipelines and operational workflows

Koal Software Full-stack Development Engineer — Jul — Dec 2013

- Designed and implemented a complete web application stack, including **database schema design**, backend business APIs, NLP functionality, and frontend UI/UX

Microsoft Developer Intern — Jul — Nov 2012

- Diagnosed and resolved complex **SQL Server** issues for developers and enterprise users, building early hands-on experience in database systems, debugging, and query optimization

EDUCATION

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

`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 MDS 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

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)