Jinsun Yoo

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Education

2021-Present ***Georgia Institute of Technology***, *Atlanta, GA*
Ph.D Student, School of Computer Science
- Thesis topic: "Efficient Performance Prediction in the Network Fabric for Distributed Machine Learning"
- Advisors: Umakishore Ramachandran, Tushar Krishna

2014-2021 ***Seoul National University***, *Seoul, Korea*
Bachelor of Computer Science & Business Administration

Projects

2024-Present **Flexible Modeling of Distributed ML Systems Across the Stack**, *PI: Tushar Krishna*
- Genie: Tool to test real scale-out network fabrics without needing GPUs. *Collaboration with HPE Labs*
- Flint: Tool to capture Chakra workload graphs directly from model code. *Collaboration with NVIDIA*
- CollectiveAPI: Representing arbitrary collective algorithm as a Chakra graph. *Collaboration with NVIDIA*

2023-Present **ASTRA-sim and Chakra**, *PI: Tushar Krishna*
- Lead maintainer for ASTRA-sim distributed ML simulator and Chakra workload trace frameworks.
- Spearheaded discussions for potential collaborations, future directions, and feature development.
- Enhanced fraemwork outreach through tutorials, documentations, talks, and feature contributions.
- Updated the ns-3 network backend for modeling RoCE fabrics.

2022-Present **Function as a Service on the Edge (FaaSEdge)**, *PI: Umakishore Ramachandran*
- Addressed system challenges to leveraging the FaaS paradigm within the public Edge context.
- Designed a programming model that abstracts the details of spatio-temporal semantics in Edge applications.

2021-2022 **MicroEdge**, *PI: Umakishore Ramachandran, Tushar Krishna*
- Resource scheduling frameworks for limited EdgeTPU resources on Edge applications.

Work Experience

2025-Present **Hewlett Packard Enterprise Labs**, *Research Associate Intern (Part-Time), Remote*
- Developed and deployed Genie on real multi-node Infiniband cluster.
- Leveraged verbs API to generate traffic following real workload characteristics encoded in Chakra graphs.
- Optimized performance to generate packets in realtime to follow GPU-based collective library performance.

Fall 2024 **NVIDIA**, *Software Engineer Intern*, *Santa Clara, CA*
- Leveraged PyTorch's torch.compile to obtain workload representation (Chakra graph) pre-GPU execution.
- Modified PyTorch to run representation of a GPU workload while executing on a CPU only platform.
- Used captured representations to run design space exploration.

Summer 2023 **Google**, *Software Engineer Intern*, *Madison, WI*
- Analyzed the workload of F1, Google's SQL engine, to support multitenancy and performance isolation

Summer 2022 **Google**, *Software Engineer Intern*, *Sunnyvale, CA*
- Prototyped an emulation based testbed for BGP policy validation using Kubernetes Network Emulation(KNE). Identified edge cases which were not detectable by previous test frameworks.

Publications

MLSys 2026 **MLCommons Chakra: Advancing Performance Benchmarking and Co-design using Standardized Execution Traces**
Srinivas Sridharan, ..., **Jinsun Yoo**, ..., Tushar Krishna

arXiv, also NSDI'25 Poster **Towards Easy and Realistic Network Infrastructure Testing for Large-scale Machine Learning**
Jinsun Yoo, ChonLam Lao, Lianjie Cao, Bob Lantz, Minlan Yu, Tushar Krishna, Puneet Sharma
arxiv:2504.20854

arXiv **Flint: Cluster-Less Design Space Exploration of Distributed Machine Learning Across the Stack**
Jinsun Yoo, Meghan Cowan, Changhai Man, Zheng Du, Taekyoung Heo, Srinivas Sridharan, Tushar Krishna
arxiv:2604.17550

HotI 2024, MICRO Spec. Iss., 2025 **Towards a Standardized Representation for Deep Learning Collective Algorithms**
Jinsun Yoo, William Won, Meghan Cowan, Nan(Ted) Jiang, Benjamin Klenk, Srinivas Sridharan, Tushar Krishna

ECTC 2026 **Demonstration of a 200×200 mm2 Glass Substrate for Large Area Packages**
Jaewon Lee, Hyunggyu Park, Seungwoo Cha, **Jinsun Yoo**, Srujan Penta, Tushar Krishna, Muhannad Bakir

Under Review **FaaS-STM: A new Programming Model for Geo-distributed Situation Awareness Applications**
Jinsun Yoo, Anirudh Sarma, Difei Cao, Adam Hall, Myungjin Lee, Umakishore Ramachandran

DEBS 2024 **FEO: Efficient Resource Allocation for FaaS at the Edge**
Anirudh Sarma, **Jinsun Yoo**, Jithin Sowan, Umakishore Ramachandran, Myungjin Lee

Middleware 2022 **MicroEdge: A Low-Cost Edge Cluster System Architecture for Scalable Camera Processing**
Difei Cao*, **Jinsun Yoo***, Zhuangdi Xu, Enrique Saurez, Harshit Gupta, Tushar Krishna, Umakishore Ramachandran (**Equal contribution*)
Best Paper!

Awards and Grants

May 2026 **NSDI 2025 Student Travel Grant**
Fall 2023 **CRNCH Research Fellowship Award**
Nov 2022 **Middleware 2022 Best Paper Award**

Talks and Presentation

Mar 2026 **Collective API Presentation**, *MLCommons Chakra WG*, Remote
Feb 2026 **Flint Presentation**, *Keysight*, Remote
Feb 2026 **Flint Presentation**, *Georgia Tech SCS Systems Seminar*, Atlanta, GA
Jan 2026 **Collective API Presentation**, *SRC JUMP2.0 ACE Winter Meeting*, Rosemont, IL
Oct 2025 **Genie Poster Presentation**, *SRC JUMP2.0 ACE Annual Report*, Rosemont, IL
May 2025 **Genie Poster Presentation**, *NSDI 2025*, Philadelphia, PA
Aug 2024 **ASTRA-sim and Chakra Tutorial**, *MICRO 2024*, Austin, TX
Aug 2024 **ASTRA-sim and Chakra Tutorial**, *HotI 2024*, Remote
Jun 2024 **Collective API Presentation**, *MLArchSys 2024 (ISCA workshop)*, Buenos Aires, Argentina
Feb 2024 **FaaSEdge Poster Presentation**, *CRNCH Summit 2024*, Atlanta, GA
Dec 2022 **MicroEdge Presentation**, *Middleware 2022*, Quebec, Canada

Teaching Experience

Fall 2024 **Guest Lecture**, *CS243 (Advanced Computer Networks)*, Harvard University
Topic: ASTRA-sim and Chakra Tutorial

Summer 2024 **Guest Lecture**, *CS2200 (Systems and Networks)*, Georgia Institute of Technology
Topic: Virtual Memory Address Translation

Fall 2023 **Teaching Assistant**, *CS6210 (Advanced Operating Systems)*, Georgia Institute of Technology

Community Service

Artifact Evaluation Committee: *OSDI '24, ATC '24, ASPLOS '25, OSDI '25*

May'23 - Apr'24 **SCS Graduate Student Association**: *Events Chair*
Organized logistics for events such as the Annual Gala, SCS PhD Welcome event, etc.