

Anna Karanika

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TECHNICAL SUMMARY

Specializing in distributed systems and large-scale ML infrastructure. Experienced with PyTorch data loading, and distributed tracing tools. Research in hybrid parallelism for LLMs, and abstractions that enhance observability, fault-tolerance and scalability in distributed systems. Augmented open-source systems with the above abstractions.

EDUCATION

University of Illinois Urbana-Champaign (UIUC)

Ph.D. in Computer Science

Advised by Professor Indranil (Indy) Gupta

University of Thessaly (UTh)

M.Sc. in Computer Science

Advised by Professor Kostas Kolomvatsos

University of Thessaly (UTh)

Diploma (B.Eng. + M.Eng.) in Electrical and Computer Engineering

Advised by Professors Kostas Kolomvatsos and George Stamoulis

Urbana, IL, USA

Aug 2020 – May 2026

Lamia, Greece

Oct 2019 – Jun 2020

Volos, Greece

Sep 2014 – Jun 2019

INDUSTRY EXPERIENCE

Apple

AIML Intern

Seattle, WA, USA

May 2024 – August 2024, Internship

- Designed and implemented a peer-to-peer ephemeral cache for ML dataset shards for the training duration.
- Download time decreased by 10×. Integrated with PyTorch.
- Worked in the Iris team of MLPT.

Twitter

Engineering Intern

San Francisco, CA, USA

May 2022 – August 2022, Internship

- Developed a method for pinpointing the appropriate Zipkin sampling rate for tracing incoming user requests so that events and trends are maintained for debugging while storage requirements decrease by 10–1000×.
- Developed a tool that creates traces' Zipkin JSON representations from tables where services record info.
- Worked with Rebecca Isaacs in the Infrastructure Optimization Performance (IOP) Team.

RESEARCH EXPERIENCE

DPRG Research Group, University of Illinois Urbana-Champaign

Graduate Research Assistant

Urbana, IL, USA

Aug 2020 – Present, Part-time

- [Ph.D. Thesis] Exploring distributed model placement methods for LLM inference locally within a smart space.
- [Ph.D. Thesis] Designed an abstraction on top of RPC that enhances observability and programmability in an Internet-of-Things setting towards reliability and energy-efficiency.
- [Ph.D. Thesis] Conducted a human study of smart home control interfaces. Found that users prefer central control in the general case, but turn to decentralized interfaces when troubleshooting or in need of finer-grained control.
- [Ph.D. Thesis] Worked on CoMesh, a system that alleviates the workload of centralized automation managers more than 10× in a commercial edge mesh by decentralizing control for large-scale device and automation management.
- Designed SkyrosFS, an externally-synchronous replicated file system, which utilizes speculation to decrease the amount of replicated write operations, by skipping invalid operations, thus increasing throughput.
- Analyzed Cross-System Interaction (CSI) failures that occur more than 20% of the time when independent and interacting cloud systems interact with each other.

iPRISM Research Group, University of Thessaly

Graduate Researcher

Volos, Greece

Mar 2019 – Jul 2020, Part-time

- Designed an interpretable machine learning scheme for securing data quality on storage nodes at the edge.
- Worked on demand-driven proactive task scheduling at the edge.
- Proposed task scheduling methods at the edge based on machine learning and bio-inspired algorithms.

PUBLICATIONS

Conference Publications

- [C5] Lilia Tang, Chaitanya Bhandari, Yongle Zhang, **Anna Karanika**, Shuyang Ji, Indranil Gupta, Tianyin Xu. “**Fail through the Cracks: Cross-System Interaction Failures in Modern Cloud Systems.**” In *EuroSys*, 2023.
- [C4] **Anna Karanika**, Ioannis Filippopoulos, Angelika Kokkinaki, Panagiotis Efstathiadis, Ioannis Tsilikas, Yiannis Kiouvrekis. “**Extensive Use of RFID in Shipping.**” In *EMCIS*, 2020.
- [C3] **Anna Karanika**, Panagiotis Oikonomou, Kostas Kolomvatsos, Christos Anagnostopoulos. “**An Ensemble Interpretable Machine Learning Scheme for Securing Data Quality at the Edge.**” In *CD-MAKE*, 2020.
- [C2] **Anna Karanika**, Panagiotis Oikonomou, Kostas Kolomvatsos, Thanasis Loukopoulos. “**A Demand-driven, Proactive Tasks Management Model at the Edge.**” In *FUZZ-IEEE*, 2020.
- [C1] **Anna Karanika**, Madalena Soula, Christos Anagnostopoulos, Kostas Kolomvatsos, George Stamoulis. “**Optimized Analytics Query Allocation at the Edge of the Network.**” In *IDCS*, 2019.

Journal Publications

- [J3] **Anna Karanika**, Rui Yang, Xiaojuan Ma, Jiangran Wang, Shalni Sundram, Indranil Gupta. “**There is More Control in Egalitarian Edge IoT Meshes.**” *IEEE TNSM*, Special Issue on ‘Resilient Communication Networks for a Hyper-Connected World’, to appear, 2025.
- [J2] Panagiotis Oikonomou, **Anna Karanika**, Christos Anagnostopoulos, Kostas Kolomvatsos. “**On the Use of Intelligent Models towards Meeting the Challenges of the Edge Mesh.**” *ACM CSUR*, vol. 54, no. 1, 2021, pp. 1–42.
- [J1] Madalena Soula, **Anna Karanika**, Kostas Kolomvatsos, Christos Anagnostopoulos, George Stamoulis. “**Intelligent Tasks Allocation at the Edge based on Machine Learning and Bio-Inspired Algorithms.**” *Springer EVOS*, vol. 13, no. 2, 2021, pp. 221–242.

Book Chapters

- [BC1] Panagiotis Efstathiadis, **Anna Karanika**, Nestoras Chouliaras, Leandros Maglaras, Ioanna Kantzavelou. “**Smart Cars and Over-the-Air Updates.**” *CybET*, edited by Leandros Maglaras, Ioanna Kantzavelou, CRC Press, 2021, pp. 137–152.

SKILLS

Languages: Python, Java, C/C++, Shell/Bash, SQL, Scala, JavaScript, MATLAB, Go, R, \LaTeX

Systems: Apache Maven, Git, Docker, Linux

Parallel & Distributed Computing: OpenMP, CUDA, MPI, Zipkin

Machine Learning: llama.cpp, PyTorch, Scikit-Learn, Keras

Edge Computing: Raspberry Pi, Home Assistant, Matter, WireShark

PROFESSIONAL SERVICE

External Reviewer: ATC’24

Artifact Evaluation Committee: EuroSys’25, SOSP’25, NSDI’26, EuroSys’26