

# Anna Karanika

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📍 Thomas M. Siebel Center for Computer Science, 201 North Goodwin Avenue, Urbana, IL, 61801-2302

## RESEARCH INTERESTS

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Distributed Systems, Internet of Things, Edge Computing, State Machine Replication, Cloud Computing, Storage Systems, Software Reliability

## EDUCATION

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### 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 – Present*

Lamia, Greece

*Oct 2019 – Jun 2020*

Volos, Greece

*Sep 2014 – Jun 2019*

## PUBLICATIONS

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### Conference Publications

- [C6] **Anna Karanika**, Rui Yang, Xiojuan Ma, Jiangran Wang, Shalni Sundram, Indranil Gupta. “**CoMesh: Fully-Decentralized Control for Sense-Trigger-Actuate Routines in Edge Meshes.**” *arXiv preprint arXiv:2303.00207*, 2023.
- [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

- [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.

## RESEARCH EXPERIENCE

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### **DPRG Research Group, University of Illinois Urbana-Champaign**

Urbana, IL, USA

*Graduate Research Assistant*

*Aug 2020 – Present, Part-time*

- Exploring Cross-Vendor Interactions within Internet of Things environments (xV-IoT).
- Design of an abstraction on top of RPC that enhances observability and control in the Internet-of-Things setting.
- Conducting a human study of central vs. per-device smart home control schemes.
- Design and implementation of SkyrosFS, an externally-synchronous replicated file system.
- 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 routine management.
- Analyzed Cross-System Interaction (CSI) failures that occur more than 20% of the times when independent and interacting cloud systems interact with each other.
- Collaborated with Profs. Indranil Gupta, Ramnatthan Alagappan, Tianyin Xu, Camille Cobb and Karrie Karahalios. Mentored 1 undergraduate and 2 graduate students.

### **iPRISM Research Group, University of Thessaly**

Volos, Greece

*Graduate Researcher*

*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.
- Collaborated with Profs. Kostas Kolomvatsos, George Stamoulis, Christos Anagnostopoulos and Thanasis Loukopoulos.

## INDUSTRY EXPERIENCE

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### **Apple**

Seattle, WA, USA

*AIML Intern*

*May 2024 – August 2024, Internship*

- Designed and implemented a peer-to-peer ephemeral cache for ML dataset shards.
- Download time decreased by an order of magnitude.
- Released as part of an internal data loading library for PyTorch.
- Worked with Li Li, Shiwen Zhao and Ming-Chuan Wu.

### **Twitter**

San Francisco, CA, USA

*Engineering Intern*

*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, Mihir Nanavati and Yuri Vishnevsky in the Infrastructure Optimization Performance (IOP) Team, part of which is now an independent company.

## TEACHING EXPERIENCE

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### **Computer Science Department, University of Illinois Urbana-Champaign**

Urbana, IL, USA

*Graduate Teaching Assistant*

*Spring 2023/24 & Fall 2024, Part-time*

- CS425 Distributed Systems
- CS525 Advanced Distributed Systems

### **Digital Systems Department, University of Thessaly**

Larissa, Greece

*Graduate Teaching Assistant*

*Fall 2019, Part-time*

- Y103 Introduction to Programming

### **Electrical and Computer Engineering Department, University of Thessaly**

Volos, Greece

*Undergraduate Teaching Assistant*

*Spring 2018, Part-time*

- ECE120 Engineering Drawing

## SKILLS

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**Languages:** C/C++, Java, Python, Go, Bash, JavaScript, SQL, Scala, MATLAB, R, L<sup>A</sup>T<sub>E</sub>X, HTML, CSS

**Technologies:** Apache Maven, Git, Docker, Linux, Node.js, Scikit-Learn, Keras, TensorFlow, OpenMP, CUDA, MPI, WireShark, Raspberry Pi