Anna Karanika

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

Research Interests

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

Education

University of Illinois at Urbana-Champaign (UIUC) — Urbana, IL, USA
Ph.D. in Computer Science — *Aug 2020 – Present*
Advised by Professor Indranil (Indy) Gupta

University of Thessaly (UTh) — Lamia, Greece
M.Sc. in Computer Science — *Oct 2019 – Jun 2020*
Advised by Professor Kostas Kolomvatsos

University of Thessaly (UTh) — Volos, Greece
Diploma (B.Eng. + M.Eng.) in Electrical and Computer Engineering — *Sep 2014 – Jun 2019*
Advised by Professors Kostas Kolomvatsos and George Stamoulis

Publications

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

DPRG Research Group, University of Illinois at Urbana-Champaign — Urbana, IL, USA

Graduate Research Assistant — *Aug 2020 – Present, Part-time*

- Design and implementation of SkyrosFS, an externally-synchronous replicated file system.
- Design of a middleware that identifies Internet-of-Things action start and completion times.
- Conducting a study of central vs. per-device smart home control applications.
- Worked on Skytali, 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

Undergraduate 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

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.

APOSTOLAKIS Engineering — Farsala, Greece

PLC Programmer and SCADA Designer — *Jul 2017 – Aug 2017, Internship*

- Developed electrical control panels which are integrated with local water pump automation mechanisms. These panels at pump stations interpret digital output signals from the SCADA control center, transmitted through ethernet, to manage the operation of valves and pumps. Additionally, the control panels at tank stations initiate the refilling of water tanks by sending commands to the pump station panels upon activation of the float switch.

Teaching Experience

Computer Science Department, University of Illinois at Urbana-Champaign — Urbana, IL, USA

Graduate Teaching Assistant — *Spring 2023, Part-time*

- 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

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

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