Antonios (Antonis) Psistakis

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My research lies at the intersection of **distributed systems**, **computer architecture**, and **high-performance computing**. I focus on **datacenter-scale memory disaggregation** and **fault-tolerant architectures**, developing systems that integrate **Compute Express Link (CXL)** devices, **SmartNICs**, and **RDMA** to support various **consistency and persistency models** at scale. As a key contact for collaborations with multiple CXL hardware vendors during my internship on Microsoft's **Architecture Pathfinding** team, I gained hands-on experience evaluating and prototyping emerging memory pooling and sharing devices. Building on this work, my goal is to advance **datacenter architectures** that are both highly efficient and fault-tolerant.

Education

PhD in Computer Science, *University of Illinois at Urbana-Champaign (UIUC)* — *Urbana, IL*, *Aug 2020 – Present*

- Expected Graduation: May 2026
- **Research Areas:** Architecture, Compilers, and Parallel Computing

MSc in Computer Science and Engineering, *University of Crete (UOC)* — *Heraklion, Greece*, *Sept 2017 – Nov 2019*

- **Specialization:** Microelectronic Systems Architecture, Parallel and Distributed Systems
- **Thesis:** "Handling of Memory Page Faults during Virtual-Address RDMA"
- GPA: 9.14 / 10.0

BSc in Computer Science, *University of Crete (UOC)* — *Heraklion, Greece*, *Sept 2013 – Jul 2017*

- **Thesis:** "IOMMU Support for Virtual-Address Remote DMA in an ARMv8 Environment"
- GPA: 8.5 / 10.0 (Ranked 3rd in class of 2017)

Research and Work Experience

Research Assistant, *UIUC and i-acoma group* — *Urbana, IL*, *Aug 2020 – Present*

- Research on consistency and persistency models in datacenters, exploiting the sub-microsecond latency of RDMA, utilizing SmartNICs, and designing efficient distributed transactions. Recently, focused on fault tolerance for leaderless and Compute Express Link (CXL)-enabled systems.
- *Supervisor: Prof. Josep Torrellas*

Graduate Research Intern, *Microsoft Research (Azure Systems Architecture & Pathfinding)* — *Mountain View, CA*, *May 2025 – Aug 2025*

- Emerging CXL memory pooling and sharing devices; exploring functionality and performance.

Graduate Research Intern, *Microsoft (Azure Research – Systems)* — *Redmond, WA*, *May 2024 – Aug 2024*

- CXL characterization and use case exploration for memory pooling.

Research Intern, *NVIDIA* — *Urbana, IL (remotely)*, *May 2022 – Aug 2022*

- Research on congestion control, fairness mechanisms, and formal analysis for CPU interconnects.

Research Engineer, *CARV Lab, ICS-FORTH* — *Heraklion, Greece*, *Dec 2019 – Aug 2020*

- Evaluated and expanded hardware prototypes, focusing on FPGA-based RDMA systems.
- *Supervisor: Prof. Manolis G.H. Katevenis*

Scholarships, Fellowships, and Awards

Graduate Student Fellowship, *Siebel School of Computing and Data Science, UIUC* — *Urbana, IL*, *Aug 2023 – Present*

Research Assistantship, *Siebel School of Computing and Data Science, UIUC* — *Urbana, IL*, *Aug 2020 – Present*

Mavis Future Faculty Fellowship, *The Grainger College of Engineering, UIUC* — *Urbana, IL*, *2025 – 2026*

Kenichi Miura Award, *Siebel School of Computing and Data Science, UIUC* — *Urbana, IL*, *2025 – 2026*

- Awarded for excellence in High Performance Computing

Graduate Student Assistantship, *Department of Computer Science, UOC* — *Heraklion, Greece*, *Nov 2017 – Nov 2019*

Training-Specialization Scholarship, *CARV, ICS-FORTH* — *Heraklion, Greece*, *Jul 2017 – Oct 2017*

Distinguished Undergraduate Scholarship "Stelios Orphanoudakis", *CARV, ICS-FORTH & UOC* — *Heraklion, Greece*, *2014 – 2017*

- Awarded for being among the top 3 students during the 1st, 2nd, and 3rd year of undergraduate studies

Conference and Journal Publications

1. Psistakis A., Ocalan B., Alverti C., Chaix F., Alagappan R., Torrellas J. *"Improving CXL Resilience through Data Replication"*. *Under submission*, 2025.

2. Psistakis A., Ocalan B., Chaix F., Alagappan R., Torrellas J. *"IASO: Recovery in Leaderless Distributed Systems"*. *Under submission*, 2025.

3. Zhong Y., Berger D., Zardoshti P., Saurez E., Nelson J., Ports D., **Psistakis A.**, Fried J., Cidon A. *"Oasis: Pooling PCIe Devices Over CXL to Boost Utilization"*. **20th ACM Symposium on Operating Systems Principles (SOSP)**, 2025.

4. Kokolis A., **Psistakis A.**, Reidys B., Huang J., Torrellas J. *"HADES: Hardware-Assisted Distributed Transactions in the Age of Fast Networks and SmartNICs"*. **51st Annual International Symposium on Computer Architecture (ISCA)**, 2024.

5. Psistakis A., Chaix F., Torrellas J. *"MINOS: Distributed Consistency and Persistency Protocol Implementation & Offloading to SmartNICs"*. **30th IEEE International Symposium on High-Performance Computer Architecture (HPCA)**, 2024.

6. Psistakis A., Chrysos N., Chaix F., Asiminakis M., Gianioudis M., Xirouchakis P., Papaefstathiou V., Katevenis M. *"Optimized Page Fault Handling during RDMA"*. **IEEE Transactions on Parallel and Distributed Systems (TPDS)**, 2022.

7. Kokolis A., **Psistakis A.**, Reidys B., Huang J., Torrellas J. *"Distributed Data Persistency"*. **IEEE Micro Top Picks in Computer Architecture**, vol. 42, no. 4, pp. 107–115, July–Aug. 2022.

8. Kokolis A., **Psistakis A.**, Reidys B., Huang J., Torrellas J. *"Distributed Data Persistency"*. **54th IEEE/ACM International Symposium on Microarchitecture (MICRO)**, 2021. *Selected as an IEEE Micro Top Pick in Computer Architecture.*

9. Psistakis A., Chrysos N., Chaix F., Asiminakis M., Gianioudis M., Xirouchakis P., Papaefstathiou V., Katevenis M. *"PART: Pinning Avoidance in RDMA Technologies"*. **14th IEEE/ACM International Symposium on Networks-on-Chip (NOCS)**, 2020.

10. Asvestopoulou T., Manousaki V., **Psistakis A.**, Nikolli E., Andreadakis V., Aslanides I.M., Pantazis Y., Smyrnakis I., Papadopouli M. *"Towards a Robust and Accurate Screening Tool for Dyslexia with Data Augmentation using GANs"*. **IEEE 19th International Conference on Bioinformatics and Bioengineering (BIBE)**, Athens, Greece, October 28–30, 2019.

Workshop Publications

11. Zhong Y., Berger D., Zardoshti P., Saurez E., Nelson J., **Psistakis A.**, Fried J., Cidon A. *"Beware, PCIe Switches! CXL Pools Are Out to Get You"*. **The ACM SIGOPS 20th Workshop on Hot Topics in Operating Systems (HotOS XX)**, Banff, Alberta, Canada, May 14–16, 2025.

12. Psistakis A., Alverti C., Torrellas J. *"LeaderlessCXL: Leaderless Distributed Systems in the Era of CXL" (Lightning Talk)*. **12th Workshop on Principles and Practice of Consistency for Distributed Data (PaPoC)**, in conjunction with ASPLOS 2025 and EuroSys 2025, Rotterdam, Netherlands, March 30–April 3, 2025.

13. Psistakis A., Ocalan B., Chaix F., Alagappan R., Torrellas J. *"IASO: Recovery in Leaderless Distributed Systems"*. **SOSP Doctoral Workshop (SySDW)**, in conjunction with the 29th ACM Symposium on Operating Systems Principles (SOSP), Koblenz, Germany, October 23–26, 2023.

14. Ploumidis M., Kallimanis N., Asiminakis M., Chrysos N., Xirouchakis P., Gianoudis M., Tzanakis L., Dimou N., **Psistakis A.**, Peristerakis P., Kalokairinos G., Papaefstathiou V., Katevenis M. *"Software and Hardware Co-Design for Low-Power HPC Platforms"*. **5th International Workshop on Communication Architectures for HPC, Big Data, Deep Learning and Clouds at Extreme Scale (ExaComm'19)**, in conjunction with the International Supercomputing Conference (ISC), Frankfurt, Germany, June 20, 2019.

15. Ploumidis M., **Psistakis A.**, Asiminakis M., Xirouchakis P., Gianioudis M., Peristerakis P., Chaix F., Papaefstathiou V., Chrysos N., Katevenis M. *"Exploiting the ExaNeSt Communication Primitives for a High Performance MPI Library"*. **ExascaleHPC: The ExaNoDe, ExaNeSt, EcoScale, and EuroEXA Projects**, in conjunction with the HiPEAC Conference, Manchester, UK, January 23, 2018.

Posters

1. Psistakis A., Chaix F., Torrellas J. *"MINOS: Distributed Consistency and Persistency Implementation and Offloading to SmartNICs"*. Poster presented at the **1st ACE Annual Review**, Urbana, Illinois, October 3–5, 2023.

2. Psistakis A., Peristerakis P., Xirouchakis P., Gianioudis M., Kalokairinos G., Chrysos N., Chaix F., Papaefstathiou V., Katevenis M. *"User-level RDMA with IOMMU Support on ARM Platforms"*. Poster presented at the **14th HiPEAC ACACES**, Advanced Computer Architecture and Compilation for Embedded Systems, 2018.

Invited Talks

1. *"Towards Efficient and Fault Tolerant CXL Sharing"*. **Open Compute Project (OCP) Global Summit**, October 2025.

2. *"Online Incremental Recovery from Node Failures in a Cluster"*. **ACE 2025 All Hands Meeting**, May 2025.

3. *"Consistency, Persistency, and Offloading Them into SmartNICs"*. **Intel**, February 2023.

Service

- Co-organizer, **Compilers, Architecture, and Parallel Programming (CAP) Seminar**, University of Illinois at Urbana-Champaign (UIUC), Urbana-Champaign, IL, USA, 2021–2023.
- Co-organizer, **1st Graduate Student Conference**, Department of Computer Science, University of Crete, Heraklion, Greece, October 2019.
- Co-organizer, **HiPEAC** student events, HiPEAC Computing Systems Week (CSW), Heraklion, Greece, October 2018.
  - HiPEAC Student Challenge V – Inspiring Futures! The HiPEAC Career Advice
  - Mentoring Session – HiPEAC CSW Autumn 2018

Teaching

University of Crete (UOC), *Graduate Teaching Assistant* — *Heraklion, Greece*, *Sept 2017 – Nov 2019*

- **Digital Design (CS-120)** – Fall 2017, Fall 2018
- **Computer Organization (CS-225)** – Spring 2018, Spring 2019

Technical Skills

- **Programming:** C, C++, Python, Bash, LaTeX, Verilog, and SystemVerilog
- **Simulation, Modeling & Verification:** SST, SimGrid, Pin, and TLC (TLA+ Model Checker)
- **Architectures:** x86, ARMv8, and RISC-V
- **Peripheral Devices:** SmartNICs, FPGAs, and CXL devices
- **Hardware Tools:** Xilinx (Vivado, SDK), Synopsys (VCS)
- **Operating Systems:** Linux, macOS, Windows