

Ioannis Markakis

giannism713@gmail.com | github.com/giannism713 | linkedin.com/in/ioannis-markakis-4294b3361/ | (+30) 6989561108

EDUCATION & AWARDS

University of Crete

Bachelor's Degree Computer Science

Iráklion, Crete, Greece

September 2023 - Current

- GPA: 9.3/10.0, "X & A Karidis" Endowment Scholarship for Panhellenic Performance (top 16 entrance exam score)
- "Stelios Orphanoudakis" Distinguished Undergraduate Scholarship 2025 (top 6 in class)
- "Stelios Orphanoudakis" Distinguished Undergraduate Scholarship 2026 (top 6 in class)

Universitat Politècnica de Catalunya

Erasmus+ exchange program, studying Computer Science

Barcelona, Spain

September 2026 - Today (until January 2027)

Related Coursework: Computer Organization, Distributed Systems, Algorithms & Data Structures, Signal Processing, Digital Design, Parallel Computing, Software engineering, Linear Algebra, Discrete Math, Operating Systems, Computer Networks, Databases and Systems, Computer Architecture, Compilers for HPC, Supercomputing for Challenging Applications

ON-GOING WORK

- PEBS-based eviction policy for huge pages in the Linux Kernel** (thesis)
- Performance analysis on a combining tree split algorithm
- Formal methods applied to Linux kernel drivers using SPARK

RESEARCH EXPERIENCE

BSC - Barcelona Supercomputing Center

Visiting Junior Researcher

Barcelona, Spain

September 2026 - Today (until January 2027)

- Studying different implementations for writing drivers such as C, Rust, Ada and SPARK while keeping track of the setup and environment adjustments they need in order to function.
- Comparing these implementations in terms of security, protection for the programmer and the kernel, physical constraints and limitations from the kernel.

CARV - Institute of Computer Science FORTH with Dr. Angelos Bilas

Undergraduate Research Intern

Iráklion, Crete, Greece

October 2025 - Today

- Studied deeply a linux kernel memory offloading module [xHeap](#) analyzing its performance and benefits in memory pressure scenarios by using efficiently transparent huge pages.
- Implemented a mechanism that could use Intel PEBS to optimally drain PEBS Samples from the PEBS DS buffer handled by the hardware, to effectively sample and record statistics on the usage of huge pages in the testing application, keeping sampling overhead low so it doesn't affect the program's normal execution.
- Expressed the application's sampled addresses into a huge page eviction policy that chooses huge pages to evict based on usage coverage from the application and analyzed performance improvements.

CARV - Institute of Computer Science FORTH with Dr. Panagiota Fatourou

Undergraduate Research Intern

Iráklion, Crete, Greece

June 2025 - September 2025

- Benchmarked concurrent list-based data structure and their different implementations such as coarse-grain, fine-grain, optimistic, lazy and nonblocking synchronization, analyzing performance under varying workloads and drawing insights on scalability and efficiency.
- Explored advanced concurrent leaf oriented tree-based data structures, focusing on their ability to support high-performance operations and queries consisting of insert, delete and search operations.
- Tested a concurrent tree split algorithm that uses combining in the parent nodes, comparing with non combining algorithms, studying performance attributes and system properties.

CARV - Institute of Computer Science FORTH with Dr. Manolis Katevainis

Undergraduate Research Intern

Iráklion, Crete, Greece

June 2024 - September 2024

- Gained hands-on experience with I/O-CPU communication protocols including AXI4 and LMB.
- Designed and verified a multiprocessor arbiter in SystemVerilog using Xilinx Vivado, enabling efficient management of concurrent read/write requests from multiple clients, giving round robin priority and handling outstanding reads and writes.
- Implemented a benchmark with Microblaze processors that extended the use of the designed arbiter and actively used the studied communication protocols to validate performance and scalability by experimental analysis.

PROJECTS

- diff-enhanced** - diff-enhanced is a C-based automated testing tool designed to help students and instructors efficiently unit test C programs against a suite of input/output test cases.
- library-loan-concurrent** - This project implements a concurrent library loan system using MPI (Message Passing Interface) in C. The system simulates a distributed environment where multiple borrowers and libraries interact concurrently to borrow, lend, and donate books, by applying message-passing concurrency, process synchronization and fault tolerance techniques.
- restaurant-menu-concurrent** - This project implements a concurrent restaurant order processing system using C++20 and POSIX threads by applying deadlock prevention techniques and parallel task scheduling.

- **dual_port_bram_controller** - This project implements a parameterizable dual-port Block RAM (BRAM) memory controller in SystemVerilog, designed to support multiple CPUs (default 8) accessing shared memory resources efficiently.

ADDITIONAL INFO

Programming Languages: C, C++, Python, Java, JavaScript, SQL, Bash, Verilog, SystemVerilog

Frameworks & Tools: React Native, Node.js, Git, GitHub, Docker, Makefile, MPI, POSIX Threads, OpenMP

Hardware & Design Tools: Xilinx Vivado, Vitis, Verilator, FPGA design, Hardware/Software Co-design

Operating Systems & Environments: Linux, Windows, Shell Scripting, Virtualization