Chrysanthos Pepi

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EDUCATION

Texas A&M University College Station, TX, USA
Doctor of Philosophy in Computer Engineering; GPA: *3.846/4.00* *Jan 2021 - Present (Exp. Grad. Aug 2025)*
Advisor: *Professor Paul V. Gratz*

University of Cyprus Nicosia, Cyprus
Bachelor of Science in Computer Engineering; GPA: *7.64/10.00* *Sep 2015 - Jun 2019*
Advisor: *Associate Professor Chrysostomos Nicopoulos*

WORK EXPERIENCE

Texas A&M University College Station, TX, USA
Graduate Teaching Assistant *Jan 2023 - Jan 2024, Jan 2025 - Present*

· Teaching Assistant for CSCE/ECEN 350 (Computer Architecture and Design), leading ARMv8 Assembly and Verilog labs using Raspberry Pi 400 and QEMU.

Texas A&M University College Station, TX, USA
Graduate Research Assistant *Jan 2021 - Jan 2023, Aug 2024 - Jan 2025*

· Examining the impact of rescheduling delays in out-of-order processors, focusing on performance penalties caused by load misses. Widely used simulators overlook these delays, leading to overly optimistic performance projections. Speculative scheduling techniques can mitigate rescheduling overhead and improve pipeline efficiency. [ChampSim]
· Developed infrastructure to model wrong-path execution in a trace-driven simulator, capturing its effects on both instruction and data streams. A comparative analysis of existing L1I/D, L2C, LLC prefetchers, and LLC replacement policies to assess their performance. Open-sourced tracing utilities to enhance collaboration and improve simulation precision. [ChampSim w/ gem5]
· Integrated a shadow branch decoding technique, Skia, that identifies and decodes unused bytes in cache lines fetched by FDIP, inserting them into a Shadow Branch Buffer (SBB). The SBB is accessed in parallel with the BTB, allowing FDIP to speculate despite a BTB miss. [gem5]
· Develop an automated approach to identifying performance bugs and generate assertions using data mined by gem5 simulator. Performance counters are carefully selected such that the machine learning model behaves differently between bugged and bug free designs. This technique is validated for core micro-architecture. [gem5]

Texas A&M University - Université catholique de Louvain Louvain-la-Neuve, Belgium
Graduate Teaching Assistant *May 2024 - June 2024*

· Teaching Assistant for CSCE/ECEN 350 and CSCE/ECEN 469 (Advanced Computer Architecture) as part of Texas A&M's Belgium Computer Architecture Summer Study Abroad program, with classroom facilities provided by Université catholique de Louvain.

Intel Corporation Hillsboro, OR, USA
Graduate Technical Intern *Jan 2024 - May 2024*

· Contributed to Front-End optimizations, focusing on the Branch Prediction Unit (BPU), with 7 out of 10 tasks successfully merged into the main branch of Intel's in-house simulator, leading to improved IPC performance.

AMD Austin, TX, USA
Server Performance Architect Intern *May 2023 - Aug 2023*

· Evaluated a novel cache model across various SoC configurations, identifying and resolving issues within AMD's in-house simulator during the process.

Intel Labs Santa Clara, CA, USA
Graduate Technical Intern *Jun 2022 - Aug 2022*

· Developed a Branch Prefetch Mechanism into Intel's in-house cycle-accurate simulator. This mechanism pre-decodes branches from the instruction cache that are skipped due to the Line Instruction Pointer advancing ahead within a cache line. By storing pre-decoded bytes in a new buffer, it will provide those bytes to the BTB ahead of their first access.

KIOS Centre of Excellence – University of Cyprus Nicosia, Cyprus
Research Engineer *Jun 2019 - Jan 2021*

· Developed the official application of the Cypriot Government based on Google-Apple Exposure Notification API. Implemented a middleware in Go in order to transform the data between the backend and the application.
· Introduced a localization solution that leverage Received Signal Strength (RSS) with Fine Timing Measurements (FTM) fingerprinting for indoor localization using Weighted k-Nearest-Neighbor (WKNN) and Probabilistic Minimum Mean Square Error (MMSE) with with a significant improvement over the traditional Wi-Fi signal strength fingerprinting approach.
· Designed positioning algorithms for indoor localization using Cellular, Wi-Fi, Bluetooth beacon and Magnetic signals amalgamated with Bayesian filtering methods. Created an android application and a desktop simulator using the libGDX game development framework.

multicore Computer Architecture Laboratory – University of Cyprus Nicosia, Cyprus
Undergraduate Technical Intern *Jun 2018 - Jul 2018*

· Studied the trace-based simulator ChampSim and illustrated flowcharts for each type of instruction and the interconnects between the main components of CPU and Cache.

PUBLICATIONS

· "Impact of Out-of-Order Rescheduling and Load Miss Prediction", C. Pepi, K. Le, P. V. Gratz, G. A. Pokam, *Under review.*
· "Correct Wrong Path", C. Pepi, B. R. Godala, S. P. Ramesh, K. Tibrewala, G. A. Pokam, D. A. Jiménez, P. V. Gratz, *Under review.*
· "Correct Wrong Path", B. R. Godala, S. P. Ramesh, K. Tibrewala, C. Pepi, G. A. Chacon, S. Kanev, G. A. Pokam, D. A. Jiménez, P. V. Gratz, D. I. August, IEEE Computer Architecture Letters (CAL), *To be listed.*
· "Skia: Exposing Shadow Branches", C. Pepi, B. R. Godala, K. Tibrewala, G. A. Chacon, P. V. Gratz, D. A. Jiménez, G. A. Pokam, D. I. August, 2025 ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), March 2025.
· "Indoor localization with Wi-Fi fine timing measurements through range filtering and fingerprinting methods.", S. Huilla, C. Pepi, M. Antoniou, C. Laoudias, S. Horsmanheimo, S. Lembo, M. Laukkanen, G. Ellinas, 2020 IEEE Annual International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC), October 2020.

PRESENTATIONS

· "Machine Learning for Microprocessor Performance Bug Localization", E. C. Barboza, C. Pepi, M. Ketkar, M. Kishinevsky, P. V. Gratz, J. Hu, Semiconductor Research Corporation (SRC), May 2022.

SKILLS

Languages	English, Greek (native)	**Programming Languages**	C, C++, Python
Scripting Languages	Bash	**Version Control**	Git

AWARDS & SCHOLARSHIPS

· 3x Intel Above and Beyond Award 2024 (1 Fearless Innovation & 2 Results Driven)
· HPST Scholarship 2024
· Thekla Protopapas Scholarship Award 2022, 2023, 2024
· SignalGeneriX Best Final Year Project Award 2019