Spyridon Liaskonis

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Education

2020 - Present	Diploma (5 years) in Electrical and Computer Engineering **University of Thessaly**, Volos, Greece

Research Interests

High-Performance Computing, Hardware Accelerators, Embedded Systems, Computer Architecture, Operating Systems, Deep Learning.

Skills

- **Programming Languages , Libraries:** C, C++, Python, CUDA, OpenMP, OpenMPI, Verilog, HLS C/C++, MATLAB, NumPy, Matplotlib

- **Tools:** git, make, PyTorch, TensorFlow, Xilinx Vitis HLS, Xilinx Vivado, Intel Vtune Profiler, Intel Advisor, LaTeX, Linux, Bash, ONNX

Selected Academic Courses - Projects

ECE 429 Special Topic: Reinforcement Learning-driven Bitwidth Optimization for Neural Network Quantization on FPGAs (Ongoing) *Technologies:* FINN, PyTorch, Brevitas, Gymnasium, PetaLinux

- Developed RL reward functions for optimizing neural network quantization for FPGAs.

- Expanded framework support for various FPGA platforms.

- Tested and validated framework on various network architectures.

- Deployed the framework's quantized networks on various platforms, including the Alveo U250 and ZCU 102 and analyzed their performance.

ECE 340: Embedded Systems *Technologies:* C, OpenCL, Verilog, Vivado, Vitis HLS, PetaLinux

- Hardware acceleration of the Smith-Waterman Local Sequence Alignment algorithm for Genomics using the Vitis High-Level Synthesis toolset, on a low-power FPGA MPSoC.

- Performance measurement of bare-metal embedded software on an ARM processor.

- IEEE 754 compatible Floating-Point Adder in Verilog on an FPGA. Project Repository

ECE 415: High-Performance Computing *Technologies:* C, CUDA, OpenMP

- Parallel implementation of a Sobel Filter with OpenMP.

- GPU acceleration of a separable convolution kernel with CUDA.

- GPU acceleration of a histogram equalization algorithm with CUDA.

- CPU/GPU acceleration of an N-body simulation with OpenMP/CUDA. Project Repository

ECE494: Processor Design *Technologies:* FINN, PyTorch, Brevitas, ONNX

- Hardware acceleration of Quantized Deep Neural Networks on FPGAs using the FINN compiler by Xilinx

- Evaluation of several levels of quantization and the effects on accuracy, performance, and resource utilization.

ECE 445: Parallel & Distributed Computing *Technologies:* C, OpenMP, OpenMPI

- Designed and implemented parallel algorithms for matrix multiplication and the Jacobi method using OpenMP, focusing on thread distribution, scheduling, and performance optimization.

- Designed and implemented parallel algorithms for calculating communication costs in a distributed system, using MPI to measure point-to-point and broadcast communication times, and optimizing performance for matrix-vector multiplication and sorting algorithms. Project Repository

ECE 513: Circuit Simulation Algorithms *Technologies:* C++, FLEX, Bison, Eigen, CMAKE

- Developed a complete circuit simulation program like SPICE in C++.

- Implemented parsing, equation formulation, and solution techniques (direct and iterative methods) for linear circuits.

- Utilized sparse matrix techniques and external libraries (Eigen) for efficient computation.

- Performed transient analysis to simulate circuit behavior over time. Project Repository

— **ECE 447: Neuro-Fuzzy Computing** *Technologies:* PyTorch, NLTK

- Fine-tuned the BERT architecture for news classification
- Applied data preprocessing using NLTK.
- Trained and evaluated the model using PyTorch, optimizing performance through hyperparameter tuning.

— **ECE 318: Operating Systems** *Technologies:* Linux

- Benchmarking alternatives of Shortest-Job First (SJF) on a VM that emulates the API of the Linux scheduler.
- Implementation of a user-space file system based on FUSE with support for basic file operations.
- Modifying the SLOB memory allocator to use the First-fit algorithm for both page and block allocation.

— **ECE 333: Digital Systems Lab** *Technologies:* Verilog, Xilinx Vivado

- A 7-Segment Display Driver to display a scrolling message.
- A UART serial communication system.
- A VGA driver used to drive a conventional monitor and depict a variety of images. Project Repository

— **ECE 340: Concurrent Programming** *Technologies:* C, PThreads

- Implemented a coroutine-based system for concurrent code execution with explicit switching, using functions to manage execution contexts. Extended the implementation to support concurrent execution with threads using automatic switching via an alarm/timer and a round-robin scheduling policy.
- Implementation of many concurrent algorithms in C/Java using Semaphores/Monitors. Project Repository

Voluntary Work/Extra Curriculars

- Teaching Assistant for ECE219: Computer Organization and Design (September 2024- Present)
  Examination of laboratory assignments on MIPs assembly programming, Verilog implementation of a MIPs CPU, and performance analysis and optimization of computationally intensive algorithms on x86 CPUs.
  Reference: Prof. Nikolaos Bellas

- Teaching Assistant for ECE220: Numerical Analysis (February 2025 - Present)
  Assisted students in teaching lab sessions for a course covering key topics in numerical analysis and the application of numerical methods using MATLAB.
  Reference: Prof. Panagiota Tsompanopoulou

Languages

English: Professional Working Proficiency (ECCE Certification)
Greek: Native Speaker