

Charalampos Antoniadis

Curriculum Vitae, update: 22nd of September 2014

Contact Information:

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Personal Information:

- Date of Birth: Aug 14th 1988
- Greek Nationality and Citizenship

Experience:

- **Researcher at ATHENA**
November 2014-Present
- **Researcher at CERTH**
March 2014-Present
- **Research Assistant at VLSI & EDA Tools Lab**
University of Thessaly
March 2012 - Present
- **Research Assistant at CSL Lab**
University of Thessaly
June 2010 - February 2012 (1 year 9 months)

Education:

- Sept 2012 – July 2014:
MSc in Computer Science, University of Thessaly, Volos, Greece
G.P.A: 9.38/10
- Sept 2006 - 2011:
Diploma in Computer and Communication Engineering
University of Thessaly, Greece
G.P.A: 8.77/10 (Class of 2006 valedictorian)

Foreign Languages:

- Greek Fluent (native speaker)
- **English Excellent**, Cambridge First Certificate In English

Honors and Awards:

- Beneficiary of Computer and Communication Engineering Department Master studies Fellowship (Based on ranking)
- Beneficiary of Cisco Academy Scholarship, Department of Computer and Communication Engineering, University of Thessaly 2010,2011 (Based on ranking)
- **Honorable mention in TAU contest 2014 Timing Contest** on Removing Common Path Pessimism.

Areas of interest:

- VLSI Design
- Electronic Design Automation

- Parallel Computer Architectures
- Embedded Systems

Technical Skills:

- Programming Languages & Programming Models:
C/C++, CUDA, Pthreads, OpenMP
- Hardware Description Languages:
VHDL, Verilog
- Mathematic Software:
Matlab
- Hardware CAD Tools:
Xilinx's EDK & ISE tool, ModelSim, PSpice
- Operating Systems:
GNU Linux (Fedora, Ubuntu, SUSE)
Windows (XP, 7)
- Other know-how:
Intel VTune Performance Analyzer, Eclipse, gprof, Microsoft Visual Studio, LaTeX, Vim

Peer-reviewed Publications:

- Kostas Theocharoulis, Charalambos Antoniadis, Nikolaos Bellas, C.D. Antonopoulos. **Implementation and Performance Analysis of Seal Encryption on FPGA, GPU, and Multicore Processors**. *IEEE Symposium on Field-Programmable Custom Computing Machines (FCCM), Short paper*. May 1-3, 2011, Salt Lake City, UT
- Muhsen Owaida, Christos D. Antonopoulos, Nikolaos Bellas, Konstantis Daloukas, Charalambos Antoniadis, Konstantinos Krommidas, Georgios Tsoublekas. **Implementation and Performance Comparison of the Motion Compensation Kernel of the AVS Video Decoder on FPGA, GPU and Multicore Processors**. *IEEE Symposium on Field-Programmable Custom Computing Machines (FCCM), Poster*. May 1-3, 2011, Salt Lake City, UT
- Muhsen Owaida, Christos D. Antonopoulos, Nikolaos Bellas, Konstantis Daloukas, Charalambos Antoniadis. **Massively Parallel Programming Models Used as Hardware Description Languages: The OpenCL Case**. *International Conference on Computer-Aided Design (ICCAD)*, November 6-10, 2011, San Jose, CA
- Alessandro Cevrero (EPFL), Nestor Evmorfopoulos, Charalampos Antoniadis, Paolo Ienne (EPFL), Yusuf Leblebici (EPFL), Andreas Burg (EPFL) and George I. Stamoulis. **"Fast and Accurate BER Estimation Methodology for I/O Links Based on Extreme Value Theory"**. *Design, Automation & Test in Europe (DATE)*. March 19-22, 2013, Grenoble, France.
- Charalampos Antoniadis, Georgios Karakonstantis (Queen's), Nestoras Evmorfopoulos, Andreas Burg (EPFL) and George I. Stamoulis. **"On the Statistical Memory Architecture Exploration and Optimization"**. *Design, Automation & Test in Europe (DATE) (appear in DATE 2015)*

Diploma Thesis:

- **“Automated Bitwidth Analysis using LLVM Compiler infrastructure”**. Bitwidth Analysis is used to determine the minimum number of bits required to represent program variables. It can be used for designing energy efficient processors, finding more parallelism in SIMD processors and implementing application-specific accelerators. I implemented Bitwidth Analysis using LLVM Compiler’s API and I examined how it affects hardware synthesis starting from a high level language, in terms of area, clock frequency and power dissipation of the final circuit.

Advisors: Nikolaos Bellas, Christos D. Antonopoulos

Master Thesis:

- **“On the Exploration and Optimization of Caches under Parametric Variations”**. In this master thesis, a tool for capturing the effect of parametric variations on caches and identifying the design solutions that can ensure robust operation with minimum overhead is being presented. Specifically, parametric variations are being modeled within a popular cache simulation framework and cache performance is being evaluated by tuning various knobs at the circuit and architecture layer. By enabling the tool to find the optimum configurations under various constraints we allow designers to make early in the design cycle the right choices that can improve yield and efficiency. Apparently, such solutions differ substantially from the ones obtained if variations are neglected, further necessitating the use of the proposed tool.

Advisors: Nestoras Evmorfopoulos, George Stamoulis, Panagiota Tsompanopoulou

Projects*:

- **Implementation of a custom JPEG-like codec in C**. Term project for CE550 Video and Audio compression.
This project demonstrates the encoding/decoding process of an image. The basic steps are file reading/writing, DCT (Discrete Cosine Transformation)/IDCT (Inverse Discrete Cosine Transformation), Quantization/IQuantization and Huffman Entropy Encoder/Decoder. I followed baseline profile of JPEG standard.
- **Implementation of a memory hierarchy emulator in C**. Term project for CE432 Computer Architecture.
In this project we emulated a typical memory hierarchy system of a common processor. We modeled L1, L2, L3 caches and a translation from virtual to physical pages mechanism with TLB.
- **Implementation of the SEAL encryption algorithm on GPU using CUDA and on multicore processors using pthreads and Intel SSE instruction set architecture**.
The aim of this project was to map and optimize SEAL encryption algorithm on different architectures. I tried to exploit different types of parallelism found in SEAL algorithm and map these efficiently on GPU and Intel i7 platforms.
- **Implementation of AVS Motion Compensation algorithm on GPU using CUDA**.
In this project I mapped and optimized the AVS Motion Compensation algorithm on GPU. I assigned to each GPU thread the process of one pixel to exploit the massively parallelism provided by GPU.
- **Find minimum transistors’ widths with Logical Effort method using C**. Term project for CE330 Digital VLSI System Design.

Logical Effort method is used to find the minimum width of transistors. Decreasing the size of transistors' width leads to a faster circuit. After I had found the critical path of the circuit I used logical effort method on this path.

- **Power Grid Analysis and Digital Circuit Optimization via Geometric Programming** using Matlab. Term project for CE532 Microprocessor Design.
The first part of this project had to do with how we can model the power delivery network of an ASIC circuit and analyze it. The second part of this project had to do with finding the transistors' widths that optimize the circuit under design constraints in clock speed, area and power dissipation using geometric programming.
- **Implementation of an ADC** (Analog to Digital Converter) with Agilent's ADS. Term Project for Analog VLSI Design CE438.
We deployed an ADC based on MAXIM's AN810 flash architecture. In this project I had to implement the back end of the analog part of the ADC which included a track & latch circuit and a D flip-flop.
- **Experimental evaluation of AVS video decoder on Microblaze processor on FPGA.** Term project for CE430 Embedded Systems.
The project included installation of Linux OS on Microblaze processor and evaluation of the performance of AVS video decoder.
- Implementation of a **software tool** that produces a **parameterize-able**, in terms of throughput and latency, **Verilog description of CORDIC algorithm** in C++. Evaluation of the final circuit with Xilinx tools. Independent project in CSL lab.
- Implementation of **SJF (Shortest Job First) process scheduling policy** and **support semaphore service in Minix OS** in C. Term project for CE222 Operating Systems.
The project included the replacement of the current Minix OS process scheduling policy with SJF (Shortest Job First) and the implementation of the infrastructure to support semaphore services.

* A complete list of all my projects can be sent after request.

Funded Projects:

- **NanoTrim: A Continuous Transistor Re-sizing Toolset.**
 - **Co-Funded by:** European & National Funds
 - **Partners:** CERTH/IRETETH, UTH, AUTH, HELIC S.A, NESSOS S.A
 - **Duties:**
 - **Responsible for the completion of the Cell re-Sizing Toolset part of the project.**
 - Design the Software Architecture.
 - Design the Cell Sizing Algorithm.
 - Provide all the necessary documentation.
 - Talk to the managers of the project.

Teaching Experience:

- Teaching Assistant, Fall semester 2012-2013
Circuit Simulation, instructor Nestor Evmorfopoulos
The course includes the development of a Spice-like circuit simulator for both DC and Transient Analysis in C/C++.
Duties:
 - Student assistance/evaluation in the term project.

- Laboratory Assistant, Fall semester 2012-2013
Digital Electronics, instructor Nestor Evmorfopoulos
 Student assistance in the laboratory. The laboratory includes transistor-level experiments on digital circuits using PSpice.
 Duties:
 - Examine students on their homeworks.
 - Teach student the appropriate theoretical background for their homework.
- Laboratory Assistant,
Introduction to Computer Design and Organization I, Spring Semester 2010-11
 Assembly language Lab, instructor Professor Nikolaos Bellas
 The laboratory includes programming problems in MIPS assembly language.
 Duties:
 - Examine students on their homeworks.
 - Student assistance in the laboratory.
- Teaching Assistant, Spring Semesters 2009-10, 2010-11
Differential Equations, instructor Professor Manolis Vavalis
 The course includes methods of solving ordinary differential equations.
 Duties:
 - Help students with differential equations problems.
 - Produce course notes
- Laboratory Assistant, Fall Semester 2009-10
Circuit Analysis Lab, instructor Professor George Efthivoulidis.
 Student assistance in the laboratory. The laboratory introduces basic lab instruments and design of simple circuits.
 Duties:
 - Familiarization of students with laboratory equipment (Multimeter, Signal Generator, Oscilloscope, Power Supply, Breadboard)
 - Assistance in the conduction of experiments and measurements
 - Assistance in the interpretation of experimental data

Recommendation

Letters:

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cda@inf.uth.gr

Hobbies:

- Playing the guitar, piano
- Playing basketball, football