

Personal Information

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Education

- ⇒ Oct 2014 - Oct 2020 - **PhD in Electrical Engineering and Computer Science**, Politehnica University of Bucharest
- ⇒ Sep 2003 - Jul 2004 – **Master of Engineering in Embedded Systems Design** - University of Lugano, Switzerland, in collaboration with Eidgenössische Technische Hochschule Zürich (ETHZ) and Politecnico di Milano.
- ⇒ Sep 1998 - Jul 2003 – **Bachelor of Science** - Politehnica University of Bucharest, Romania – Computer Science Department. Entrance examination score – 100% (same score achieved also at Academia de Studii Economice, Bucharest); degree GPA – 93.6%; graduation project score – 100%.

Work Experience

- ⇒ Oct 2014 - Oct 2020 - research assistant at Politehnica University of Bucharest, Romania: research on compilation for custom-width Connex wide vector processor – we use LLVM: developed a back end for Connex accelerator, worked with LLVM's loop vectorizer. Studied parallel programming models and languages: familiar with OpenCL, CUDA, OpenMP. Developed an improved video alignment algorithm in OpenCV with NVIDIA GPU support – see <https://github.com/alexsusu/video-diff>. Wrote 4 papers; 1 more under preparation.
- ⇒ Sep 2017 – Nov 2017 - research internship with PARKAS lab, École Normale Supérieure, Paris, France - applied polyhedral compilation to optimize certain stencil pattern SPEC CPU benchmarks.
- ⇒ Jul 2011 – 2012 - senior software engineer at Enea, Bucharest, Romania.
- ⇒ 2009-2011, 2012 – worked in the spare time on a project, iCam, a video surveillance solution for mobile phones uploading via 3G, WiFi and Bluetooth media to YouTube and similar, which allows viewing in real time the recorded data in a browser or a PC standalone application that also analyzes the media in order to detect interesting events. iCam runs on Symbian, Android, RaspberryPi, Windows Mobile, iPhone and feature phones. See <https://code.google.com/p/icam-mobile-revival/> (or) for downloads and details.
- ⇒ May 2008 – Aug 2008 – internship with Microsoft Research, Redmond, WA, USA: application level CPU power management using Markov Decision Process models built from profiled data: implemented the work on an improved version of Wattch/SimpleScalar simulator (possible to port it on Linux); used Microsoft Phoenix compiler framework to analyze C applications, including a few SPEC CPU benchmarks. Mentors: Aman Kansal, Feng Zhao, Sumit Gulwani, Kalyan Basu.
- ⇒ Dec 2006 – Mar 2007 – internship with Google, Mountain View, CA, USA. Mentors: Dan Moisa, David Butcher.
- ⇒ Oct 2004-2008 – research assistant in the department of Computer and Communication Sciences of the Swiss Federal Institute of Technology in Lausanne (EPFL). Worked on stochastic behavioral system modeling and optimization using the probabilistic model checking tool PRISM and personally developed tools; co-developed a TDMA based MAC protocol in TinyOS; added a dependability layer to the GIOTTO real-time system. Took management and entrepreneurship courses as part of minor program in Management of Technology.
- ⇒ Jul – Sep 2005 – internship in the MTC laboratory, EPFL, under the supervision of prof. Thomas Henzinger – adding fault tolerance to the GIOTTO platform (used RT Linux, added host failure detection for an RT-Ethernet driver).
- ⇒ Aug 2002 - Feb 2003 – software developer at QSP Software, Bucharest, Romania: developed under the SCO OpenServer 5.0.5 UNIX environment an application that imports data from an ISAM database to an Oracle database, using the Oracle ProC precompiler and the C-ISAM library.
- ⇒ 2002 – free-lance programmer: co-developed an online shop in PHP and MySQL. Also I have developed an administration backoffice application in Access, with VBA.
- ⇒ Oct 2001-May 2002 – network administrator and software developer in IBM's eBusiness Academy laboratory, Politehnica University of Bucharest.
- ⇒ Nov 2000 - Jul 2001 – student in the CISCO Networking Academy Program, Politehnica University of Bucharest, www.academiacisco.ro. Obtained 100% score at the exams for the first three semesters.
- ⇒ Aug 1999 - May 2001 – software developer in the RAV (Romanian AntiVirus) team of GeCAD Software, Bucharest, Romania. Developed the following components of RAV: digital signature for the RAV module files; decompression of RAR, ACE, TAR, LHA, LZEXE, UUE, Base64, RPM, RTF, MIME and HLP formats - mostly wrappers of existing libraries, but also full implementations for the simpler formats; responsible for the design and implementation of MailRelay, a universal mail-scanner for Windows platforms.

Teaching Experience

⇒ Spring 2007 – Proposed a project for the “Problem Solving in Computer Science” doctoral course at EPFL held by professor Tom Henzinger; Teaching Assistant for the “Theory and Practice of Programming” undergraduate level course at EPFL in 2006.

⇒ Fall 2005-2006 – Main Teaching Assistant for the “Design Technologies for Integrated Systems” masters level course at EPFL of professor Giovanni De Micheli. Held 24+4 h of recitations on VHDL, SystemC and other topics, proposed and managed the homeworks, projects and graded the tests for a class of 15 master students.

⇒ Spring 2003 – Teaching Assistant for the “Functional Programming” senior level course at Politehnica University of Bucharest of professor Cristian Giumale. Held recitations on Scheme and Caml programming languages, managed the projects and graded the exam for a class of 30 undergraduate students.

Research Supervision

⇒ Fall 2006-2007 - Radu-Ioan Paise - Masters semester project: “Modeling and Evaluating with PRISM the Operation of Environmentally Powered Wireless Sensor Nodes”

Services

⇒ Conference referee: IEEE/ACM International Conference on Computer-Aided Design (ICCAD) 2006, International Conference on Very Large Data Bases (VLDB) 2009.

⇒ Co-organizer of the EPFL phase of the ACM International Collegiate Programming Contest, Spring and Fall 2006, 2007, 2009: contest infrastructure setup, proposed problems, obtained funding for travel expenses. Coach for one EPFL team for ACM ICPC SWERC 2007 edition in Lisbon, Portugal.

Extra-curricular

Playing tennis, skating, playing guitar; dancing salsa and tango; participant at robotics clubs; past member of ARO (Romanian Association at EPFL) and GSA (Graduate Student Association at EPFL).

Skills

Natural languages proficiency

English – very good. TOEFL test score – 273 out of 300 in 2003.

French – good

German – beginner

Italian – medium level

Romanian – native

Computer fundamentals and technologies that I worked with during my studies or jobs:

C (5+ years), C++ (4+ years), Python (2+ years), Haskell, ML (OCaml, F#), Java, Ruby, Perl, ASM (x86, etc), PHP, JavaScript, MySQL.

C optimizing compilers: LLVM (and Clang), CIL, MSR Phoenix, SUIF, GCC, own “pet” project; worked with the following compiler internals: frontend, IR, dataflow analysis, loop vectorization, code gen (SIMD instruction selection, instruction scheduling, register allocation).

Knowledge of application profilers (gprof, gcov, valgrind, MS Visual Studio F1 and PGO profilers); oprofile; simulators and emulators: SimpleScalar+Wattch CPU simulator (0.5 years), QEMU, Simics.

Mobile application development on Android, Symbian, Windows Mobile and iPhone (overall 1.5 years); frameworks used: Scripting Layer for Android (SL4A), Android SDK and NDK, PyS60, Symbian C++, PyObjC, Objective C, J2ME. Expertise in camera and Bluetooth APIs for these OSes. Developed home automation projects with Symbian phones and Arduino.

Parallel programming: NVIDIA CUDA, OpenMP; UNIX: POSIX threads, IPC, sockets (overall 2 years).

Real-time OSes: OSE, RT-Linux, some VxWorks (overall 1 year).

Knowledge of GUI APIs: Qt and PyQt (PySide) with mobility extensions (about 1 year); some Windows MFC.

Multimedia frameworks: VLC, Gstreamer.

Experience with Verilog, SystemC, VHDL synthesis using Xilinx ISE (Vivado), Synopsys Design Compiler and Power Compiler.

“Power user” and administration for Linux, Windows; MacOS.

Advanced algorithms, data structures.

Knowledge of numerical packages: NumPy (1 year), SciPy; Matlab; Computer Algebra Systems (GMP, sympy).

Knowledge of formal verification: CS logic fundamentals, tools: BLAST, SMT solvers (Z3, etc).

Knowledge of 2D and 3D graphics: developed a simple 3D rendering engine in 1996.

Knowledge of entropy encoding and dictionary-based compression algorithms – wrote in 1994 an LZW implementation using a trie data structure I designed, with better compression ratios than the GIF image file format..

Awards

- ⇒ memberships: Microsoft Alumni Network 2009-2011, ACM (2016-present; also due to participation in various instances at the ACM ICPC SEERC programming contest – 2001, etc).
- ⇒ included in the “Top 100 Engineers in 2011”.
- ⇒ 2003 – Politehnica University of Bucharest Excellence Fellowship.
- ⇒ May 2002 – 1st place out of 41 presentations at the Communication Session from the CS Department of the Politehnica University of Bucharest with the presentation “The Architecture of an eLearning Environment”.
- ⇒ 2000 – “Master C Programmer” and “C++ Programmer” diplomas from Brainbench.
- ⇒ 1998-2002 – Politehnica University of Bucharest Merit Fellowship.
- ⇒ Various mentionable positions at computer programming contests, obtained during highschool and college.

Publications – see <http://sites.google.com/site/alexsusu/> for an updated publication list

Refereed Journal Papers and Book Chapters:

Alexandru E. Şuşu. “A Vector-Length Agnostic Compiler for the Connex-S Accelerator with Scratchpad Memory”, ACM Transactions on Embedded Computing Systems (TECS), Vol. 19, No. 6, Oct 2020

Alexandru E. Şuşu, Michele Magno, Andreea Acquaviva, David Atienza and Giovanni De Micheli, “Reconfiguration Strategies for Environmentally Powered Devices: Theoretical Analysis and Experimental Validation”, Lecture Notes in Computer Science Transactions on High-Performance Embedded Architectures and Compilers (HiPEAC), vol. 4050, Springer-Verlag, January 2007, ISBN: 978-3-540-71527-6, ISSN: 0302-9743, pp. 341-360.

Refereed Conference Papers:

Alexandru E. Şuşu. “Compiling Efficiently with Arithmetic Emulation for the Custom-Width Connex Vector Processor”, Workshop on Programming Models for SIMD/Vector Processing (WPMVP) 2019

Alexandru E. Şuşu. “Compiling for the Wide Connex Processor”, International Conference on Parallel Architectures and Compilation Techniques (PACT) 2018 (extended abstract)

Alexandru E. Şuşu, Radu Hobincu, Călin Biră, Lucian Petrică, Gheorghe Ştefan. “A Source-to-Source Vectorizer for the Connex SIMD Accelerator”, EuroLLVM 2017 (poster)

Alexandru E. Şuşu. “The iCam Mobile Video Surveillance Distributed System”, CSCS 2017

Alexandru E. Şuşu, Valeriu Codreanu, Georgios Evangelidis, Lucian Petrică. “Efficient Implementation of a Video Change Detection Algorithm”, COMM 2016

Alexandru E. Şuşu. “Stochastic Optimization for Environmentally Powered WSNs Using MDP Models with Multi-Epoch Actions”, ICINCO 2010

Alexandru E. Şuşu, Andrea Acquaviva, David Atienza, Giovanni De Micheli. “Stochastic Modeling and Analysis for Environmentally Powered Wireless Sensor Nodes”, 6th Intl. Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks (WiOpt) 2008.

Technical Reports

Alexandru E. Şuşu, Aman Kansal, Feng Zhao. “Application-Level Speculative Processor Power Management”, Microsoft Research Tech Report, 2012

Book chapter in “Python on Symbian” (http://www.developer.nokia.com/Community/Wiki/Python_on_Symbian): describing in detail the Bluetooth protocol and the API offered in PyS60.

Cristian Giumale and Alexandru Şuşu. “Functional Programming Applications” (book in Romanian), 112 pages, Editura Politehnică, 2005, used as laboratory curricula for the Functional Programming course at Politehnica University of Bucharest.

Theses:

Predoctoral project, EPFL: “Adding a Fault Tolerance Service to the GIOTTO System”, July 2005.

Master thesis, University of Lugano: “GENI: a framework for GENERating compiler Ir”, July 2004.

Bachelor thesis, Politehnica University of Bucharest: “A scheduling algorithm for the CASH compiler” (in Romanian), July 2003.

References

1. Gheorghe M. Ştefan, professor, Politehnica University of Bucharest, Romania, email: gheorghe.stefan@upb.ro
2. Cristian Giumale, professor, Politehnica University of Bucharest, Romania, email: giumale@cs.pub.ro
3. Giovanni De Micheli, professor, EPFL, Switzerland, email: giovanni.demicheli@epfl.ch
4. Aman Kansal, Microsoft Research, Redmond, USA, email: amankansal@live.com, kansal@microsoft.com

Additional references are available on request.