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Europass Curriculum Vitae

Personal information

Surname(s) / First name(s)	**Speziale Ettore**
Address(es)	via Provinciale 7, 22013, Vercana (CO), Italy
Nationality(-ies)	Italian
Date of birth	11 February 1984
Gender	Male
Homepage	http://speziale-ettore.github.com
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Desired employment/ Occupational field

Design and development of enhanced software architectures

Work experience

October 2012 - ?	Internship
Occupation of position held	Researcher
Main activities and responsibilities	Optimized the Nanox task-based data-flow scheduler for OpenCL applications. The basic scheduler was developed during a previous internship in the same institution
Name and address of employer	Barcelona Supercomputing Center, calle Jordi Girona 31, 08034, Barcelona, Spain
Type of business or sector	Research
January 2012 – June 2012	Code Optimization and Transformation
Occupation of position held	Teaching Assistant
Main activities and responsibilities	Compiler middle-end analysis and optimizations. Introduction to LLVM compiler internals. Goal is to teach students how exploiting LLVM to implement some simple compiler analysis/optimizations
Name and address of employer	Politecnico di Milano, Dipartimento di Elettronica ed Informazione, via Ponzio 34/5, 20133, Milano (MI), Italy
Type of business or sector	University
January 2012 – June 2012	Principi dei Linguaggi di Programmazione
Occupation of position held	Teaching Assistant
Main activities and responsibilities	Introduction to features implemented by mainstream languages, with focus on C++: inheritance, static/dynamic/type polymorphism, operator overloading, ... Introduction to basic memory management: free lists, pooled allocators, basic garbage collection algorithms. Introduction to parallel programming models: shared memory vs message passing paradigms
Name and address of employer	Politecnico di Milano, Dipartimento di Elettronica ed Informazione, via Ponzio 34/5, 20133, Milano (MI), Italy
Type of business or sector	University

December 2011 - January 2012	Software Compilers
Occupation of position held	Teaching assistant
Main activities and responsibilities	Automatic compiler-building tools (flex and bison). Introducing compilers internal structure: teaching how a syntax-directed front-end for a C-like language works and how to add support for new language constructs
Name and address of employer	Università della Svizzera italiana, Advanced Learning and Research Institute, via Buffi 13, CH-6904, Lugano, Switzerland
Type of business or sector	University
June 2011 - October 2011	Internship
Occupation of position held	Researcher
Main activities and responsibilities	Extended the Nanox task-based data-flow scheduler in order to accept, schedule and execute OpenCL commands across a cluster. The whole cluster can be represented using a single OpenCL device, thus commands can be scheduled on the more suitable device in the cluster
Name and address of employer	Barcelona Supercomputing Center, calle Jordi Girona 31, 08034, Barcelona, Spain
Type of business or sector	Research
September 2010 - January 2011	Linguaggi Formali e Compilatori
Occupation of position held	Teaching assistant
Main activities and responsibilities	Automatic compiler-building tools (flex and bison). Introducing compilers internal structure: teaching how a syntax-directed front-end for a C-like language works and how to add support for new language constructs
Name and address of employer	Politecnico di Milano, Dipartimento di Elettronica ed Informazione, via Ponzio 34/5, 20133, Milano (MI), Italy
Type of business or sector	University
September 2010 - January 2011	Fondamenti di Informatica
Occupation of position held	Teaching assistant
Main activities and responsibilities	Supervise students during laboratory activities. Course goal is to learn writing simple programs using the C language
Name and address of employer	Politecnico di Milano, Dipartimento di Elettronica ed Informazione, via Ponzio 34/5, 20133, Milano (MI), Italy
Type of business or sector	University
February 2010	Linguaggi Formali e Compilatori
Occupation of position held	Teaching assistant
Main activities and responsibilities	Supervise students during the preparation of the Linguaggi Formali e Compilatori exam. Course goal is to introduce formal languages and basic compilation techniques, such as languages classification, parsing algorithms, and attribute grammars
Name and address of employer	Politecnico di Milano, Dipartimento di Elettronica ed Informazione, via Ponzio 34/5, 20133, Milano (MI), Italy
Type of business or sector	University

January 2010 - Current	Research collaborator
Occupation of position held	Developer
Main activities and responsibilities	The PARallel PAradigms and Run-time MAnagement techniques for Many-core Architectures (www.2parma.eu) European project aims at overcoming the lack of parallel programming models and run-time resource management techniques to exploit the features of many-core processor architectures. Members of the Formal Languages and Compilers Group of Politecnico di Milano are involved in the project by providing compilers targeting many-core architectures
Name and address of employer	Politecnico di Milano, Dipartimento di Elettronica ed Informazione, via Ponzio 34/5, 20133, Milano (MI), Italy
Type of business or sector	University
September 2009 - January 2010	Fondamenti di Informatica
Occupation of position held	Teaching assistant
Main activities and responsibilities	Supervisor students during laboratory activities. Course goal is to learn writing simple programs using the C language
Name and address of employer	Politecnico di Milano, Dipartimento di Elettronica ed Informazione, via Ponzio 34/5, 20133, Milano (MI), Italy
Type of business or sector	University
September 2009 - December 2009	Research collaborator
Occupation of position held	Developer
Main activities and responsibilities	Enhanced ILDJIT dynamic compiler in order to exploit the Mono BCL
Name and address of employer	Politecnico di Milano, Dipartimento di Elettronica ed Informazione, via Ponzio 34/5, 20133, Milano (MI), Italy
Type of business or sector	University
2002 and 2001 summers	Summer job
Occupation of position held	Computer technician
Main activities and responsibilities	Personal computer assembling and customer care. Wiring, installation and maintenance of networks for small and medium companies
Name and address of employer	C.R.C. Di De Bernardi C. & C. SAS, via Giuseppe Mazzini 5, 23823, Colico (LC), Italy
Type of business or sector	Office machines, trade, rental, repair

Education and training

July 2010	ACACES summer school
Principal subjects/ Occupational skills covered	Advanced skills on computer architecture and compilation techniques for high performance and embedded systems. Focus on parallel programming model and parallel programs optimization. Courses attended: – Multi-core Programming Models and their Compilation Challenges: compilation of explicitly parallel languages and related optimizations – Compilation for Multi-core Processors: automatic parallelization of sequential programs, auto-vectorization and streaming languages – System Virtualization: virtual machine technologies – File Systems and Storage Technologies: physical and logical data organization, introduction to mainstream file system designs
Name and type of organisation providing education and training	HiPEAC
January 2010 - Current	Ph.D. student in Computer Engineering
Thesis	The shift from architectures tuned for sequential programming models to ones optimized for parallel processing follows from the inability of further enhance sequential performance due to power and memory walls. On the other hand, efficient exploitation of parallel computing units looks a hard task. Indeed, to get performance improvements it is necessary to carefully tune applications, as proven by years of High Performance Computing using MPI. To lower the burden of parallel programming, parallel programming models expose a simplified view of the hardware, by relying on abstract parallel constructs, such as parallel loops or tasks. Mapping of those constructs on parallel processing units is achieved by a mix of optimizing compilers and run-time techniques. However, due to the availability of an huge number of very different parallel architectures, hiding low-level details often prevents performance to be comparable with the one of hand-tuned code. My dissertation aims at analyzing inefficiencies related to the usage of parallel computing units, and to optimize them from the runtime perspective. In particular, we analyze the optimization of reduction computations when performed together with barrier synchronizations. Moreover, we show how runtime techniques can exploit affinity between data and computations to limit as much as possible the performance penalty hidden in NUMA architectures, both in the OpenMP and MapReduce settings. We then observe how a lightweight JIT compilation approach could enable better exploitation of parallel architectures, and lastly we analyze the resilience to faults induction of synchronization primitives, a basic building block of all parallel programs
Principal subjects/ Occupational skills covered	Parallel programming models, memory optimizations, synchronization primitives
Advisor	Professor Stefano Crespi Reghizzi
Name and type of organisation providing education and training	Politecnico di Milano

September 2006 - July 2009	Student in Computer Engineering
Type of qualification awarded	Master of Science Degree in Computer Engineering (marks 108/110)
Thesis	Multithreading support in ILDJIT dynamic compiler The ILDJIT virtual machine is an open source implementation of the ECMA-335 specs, developed at Politecnico di Milano. Thesis main contribution was augmenting ILDJIT in order to execute multi-threaded programs. Multi-threading allows to split an application into threads, that can be run in parallel on architectures that expose some kind of hardware parallelism, such as multi-processor or multi-core machines. The main problem involved into multi-threading support are mapping user-defined threads into operating system provided threads and implementing an efficient communication mechanism between threads. Inside the ILDJIT virtual machine the first problem is addressed by linking each user defined thread to an operating system thread, while the latter is resolved through the implementation of an optimized locking algorithm
Principal subjects/ Occupational skills covered	Advanced skills on some aspects of computer science. Focus on design and implementation of compilers. Computer science related courses includes: – Linguaggi Formali e Compilatori (Formal Languages and Compilers): languages classification, parsing algorithms, and attribute grammars – Ingegneria del Software 2 (Software Engineering 2): development models – Laboratorio Software (Laboratory of Operating Systems and Software Design): Unix system programming – Analisi e Progetto di Sistemi Critici (Analysis and Design of Critical Systems): Petri nets, and first order temporal logic – Sistemi Distribuiti (Distributed Systems): Lamport's clocks, inter-node communication, distributed agreement, distributed data storage, . . . – Trasformazione ed Ottimizzazione del Codice (Program Transformation and Optimization): intermediate representation, optimizations, code generation, and memory management – Architettura dei Calcolatori (Computer Architectures): scalar and super-scalar machines, pipeline model, . . . – Design and Analysis of Algorithms: computational classes, and asymptotic complexity
Name and type of organisation providing education and training	Politecnico di Milano

September 2003 - March 2007	Student in Computer Engineering
Type of qualification awarded	Bachelor of Science Degree in Computer Engineering (marks 93/110)
Thesis	NLFS: progetto di un filesystem basato sui metadati File systems usually organize data in a tree structure, in order to both provide a clear environment to the users and to efficiently support data access. However, this kind of organization does not allow classifying data in multiple classes, due to the hierarchical structure of the tree. NLFS is a filesystem that stores data in an unordered set. Each file can be marked with one or more labels. Such labels are organized in indexes, allowing searching files by expressing a query above the labels. With this organization, a file can be classified into multiple topics
Principal subjects/ Occupational skills covered	Basic skills of engineering and computer science subjects. Computer science related courses includes: – Informatica {1,2} (Computer Science {1,2}): procedural and system programming – Ingegneria del Software (Software Engineering): OO programming model and unit testing – Informatica 3 (Computer Science {3}): algorithms and their computational complexity – Informatica Teorica (Theoretical Computer Science): computational models
Name and type of organisation providing education and training	Politecnico di Milano
September 1998 - July 2003	High school courses
Type of qualification awarded	Secondary school-leaving certificate of Computer Science Technicians (marks 82/100)
Principal subjects/ Occupational skills covered	Design and development of small software systems
Name and type of organisation providing education and training	Istituto Tecnico Industriale Statale Enea Mattei di Sondrio

Personal skills and competences

Mother tongue(s) **Italian**

Other language(s) English

Self-assessment *European level*(*)	Understanding		Speaking		Writing
	Listening	Reading	Spoken interaction	Spoken production	
English	A2 Basic user	C2 Proficient user	B1 Independent user	B1 Independent user	B2 Independent user

(*) *Common European Framework of Reference (CEF) level*

Operating systems	Good skills with “Unix-like” operating systems. Skills ranging from system administration to low-level programming
Software development methodologies	Knowledge and application of agile software development models. Good knowledge of tools for project automation, in particular the GNU tool chain
Programming languages	Excellent knowledge of OpenCL. Good skills on C, C++, C# and Java languages. Knowledge of Ruby and Python scripting languages
Compiler internals	Knowledge of GCC C and Fortran front-ends. Ability to write simple GCC analysis/transformation passes over GIMPLE tuples. Basic knowledge of both LLVM and CLANG internals
Compiler construction tools	Knowledge of flex, bison, and gperf tools
Others	Knowledge of LaTeX language for scientific paper writing
Social skills and competences	Good attitude of group work, learnt during university projects
Skills acquired during university projects	Collaboration to ILDJIT virtual machine development in garbage collector and multithreading areas
Open source	Author of OpenCRun, an LLVM-based OpenCL runtime for multi-core i386/amd64 CPUs
Driving license	Motorcycle (class A) and auto (class B) licenses

Further info

Awards

Ph.D. funded by an ST Microelectronics scholarship
Internships at Barcelona Supercomputing Center have been supported by HiPEAC grants

Publications

Ettore Speziale, Andrea di Biagio, and Giovanni Agosta. An optimized reduction design to minimize atomic operations in shared memory multiprocessors. In *HIPS*, 2011

Andrea di Biagio, Ettore Speziale, and Giovanni Agosta. Exploiting thread-data affinity in OpenMP with data access pattern. In *Euro-Par*, 2011

Paolo Roberto Grassi, Mariagiovanna Sami, Ettore Speziale, and Michele Tartara. Analyzing the sensitivity to faults of synchronization primitives. In *DFT*, 2011

Speziale Ettore and Michele Tartara. A lightweight approach to compiling and scheduling highly dynamic parallel programs. In *HotPar'12 (Poster)*, 2012

References

Ph.D. advisor

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HiPEAC host

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