Curriculum Vitæ et Studiorum

Davide Spataro

March 11, 2016

Contents

1 Personal information and research activity

1.1 Personal information

Name and surname:	Davide Spataro
Address (Residential):	Via Madonna della Scala 4/b ,89844 Nicotera (VV), Italy
Address (Residential):	Via Belvedere 33075 Cordovado (PN), Italy
Address (UNICAL):	Università della Calabria,High Performance Computing Centre (HPCC), Ponte Pietro Bucci 22/B, 87036 Rende (CS), Italy
Address (UoE):	School of Engineering - Bell Building - University of Edinburgh - W Mains Rd, Edinburgh EH93JL (Scotland, UK)
E-mail:	davide90.spataro@gmail.com, davidespataro@davidespataro.it d.spataro@mat.unical.it
Date and place of birth:	14 February 1990, Vibo Valentia (VV), Italy
Phone:	+39 0963886097(landline), +39 3276324765(mobile), +44 07958679367(mobile)
Homepage:	`http://www.davidespataro.it`

1.2 Current position

- **Ph.D Research Visiting Student** at *School of Engineering*, *University of Edinburgh* (Scotland, United Kingdom).
- **Ph.D Student** at Department of Mathematics and Computer Science of the University of Calabria (Italy).

1.3 Previous positions

Academic Tutor of *Fundamentals of Computer Science* and *Object-Oriented Programming* at the Department of Mathematics and Computer Science, University of Calabria, Italy.

1.4 Research interests

Parallel Computing (GPGPU Computing, OpenMP, MPI, OpenACC, CUDA), Parallel Computational Paradigms (Cellular Automata), Discrete Modeling and Simulation, Scientific Visualization (Parallel Rendering, Computer Graphics, Real-time rendering). Big-Data tools and Simulation (Hadoop ecosystem).

1.5 Research activity

Starting from my MSc degree Thesis, I am collaborating with researchers from the University of Calabria (Italy), Plymouth University (UK) and University of Edinburgh (Scotland, UK) to studies on **Parallel Computing**, **Modeling and Simulations** in Computational Fluid Dynamics, and **Scientific Visualization**.

In particular, in the **modeling and simulating field** I exploit the computational power of Cellular Automata to model complex natural phenomena.

In the context of **Parallel Computing** my research focuses mainly on CUDA (besides MPI, OpenMP, OpenACC) application to accelerate complex systems models (e.g. simultaneous Cellular Automata models simulations).

I am working on a parallel rendering tool as part of the VELaSSCO project (EU 3.2M€ founded), which aims to be a fast and scalable platform for analysis of petascale numerical simulations.

1.6 Short Biography

Davide Spataro was born the 14^{th} February 1990 and grew up in Nicotera, a small city in Southern Italy. He attended the secondary school focusing on humanities and in 2008 he moved to Cosenza, city in which he lives, studies and works collaborating with some researcher of the Department of Mathematics and Computer Science on the modelling and simulation of complex systems and on computational fluid-dynamics. He studied piano and music since he was eight for ten years, long enough to make him addicted to classical and jazz music. In 2011, he obtained the Bachelor of Science in Computer Science at the University of Calabria. and since 2014 he holds the Master of Science (summa cum laude) at the University of Calabria. He is creative, and looking forward to earn a respectable scientists profile, he is highly motivated and willing to learn and to work hard to achieve results. He also loves coffee.

---

2 Education

2.1 University Education

Master of Science in Computer Science. I obtained the MSc degree in Computuer Science (**summa cum laude**) on **July 2014** at the University of Calabria.

Thesis title: Accelerating the new SCIARA-fv3 numerical model by different GPGPU strategies.
Thesis Supervisors: Prof. William Spataro, Prof. Donato D'Ambrosio

During the two-year degree the main courses I attended and exams taken are listed below:
Data Warehousing and Data Mining, Knowledge Management, Modeling and Simulation, Numerical Approximation and Algorithms, Network and Computer Security, Parallel Algorithms and Distributed Systems, Theoretical Computer Science, Intelligent Systems, Cryptography and Coding Theory.

Bachelor of Science in Computer Science. I obtained the BSc degree in Computer Science on **December 2011** at the University of Calabria.

Thesis title: B-finder a system for automatic detection of buildings from aerophotogrammetries.
Thesis Supervisors: Prof. Pasquale Rullo, Prof. Salvatore Iiritano

During the three-year degree the main courses I attended and exams taken are listed below:
Analysis, Discrete Mathematics, Integral Calculus, Physics, Operations Research, Probability Theory and Statistics, Computer Architecture, Data bases, Object-Oriented Programming, Algorithms and Data Structures, Computer Graphics, Graphical Interfaces and Event-Oriented Programming, Artificial Intelligence, Formal Languages and Compilers, Operating Systems and Networks, Software Engineering, Web based Information systems.

---

3 Research stays

3.1 National stays

- From 01/06/2011 to 21/12/2011 I had a **Stage** at Exeura. During the stage period I worked on the development of my BSc Thesis improving my computer vision, MATLAB, and image processing skills.

3.2 International stays

- From 01/11/2015 to present I am **research visiting student** at the School of Engineering, University of Edinburgh (UK) under the supervision of the Prof. Jin Ooi working on Parallel Rendering of PETASCALE DEM simulations.

- From 01/03/2013 to 31/10/2013 I had a **research visit** at the School of Computing and Mathematics, Plymouth University (UK) under the supervision of the Prof. Davide Marocco. During the visit period I worked on my Thesis by applying GPGPU techniques to the parallelization of the SCIARA-fv3 cellular automata model.

4 Publications

- Rahmat Hidayat, Davide Spataro, Elisa De Giorgio, William Spataro, Donato D'Ambrosio, **Multi-Agent System with Multiple Group Modelling for Bird Flocking on GPU**, *Proceedings of The 2016 International Conference on Parallel, Distributed and Network-Based Processing (PDP), February 17-19 2016, Crete, Greece*

- Alessio De Rango, Mauizio Macrí, Davide Spataro, Donato D'Ambrosio and William Spataro, **Efficient Lava Flows Simulations with OpenCL: A preliminary application for Civil Defence Purposes**, *Proceedings of The* 10^{th} *International Conference on P2P, Parallel, Grid, Cloud and Internet Computing, November 4-6, 2015, Krakow, Poland*

- Filippone G., Spataro W., D'Ambrosio D., Spataro D., Marocco D.,Trunfio G.A., **CUDA Dynamic Active Thread List Strategy to Accelerate Debris Flow Simulations** *Proceedings of The 2015 International Conference on Parallel, Distributed and Network-Based Processing (PDP)*, Turku, Finland, pp 330-338.

- Spataro D., D'Ambrosio D., Filippone G., Spataro W., **The new SCIARA-fv3 numerical model and acceleration by GPGPU strategies** *International Journal of High Performance and Applications*, `doi:10.1177/1094342015584520`.

- Spataro W., D'Ambrosio D., Filippone G.,Spataro D., G. Iovine, D. Marocco, **Lava flow modeling by the SCIARA-fv3 parallel numerical model**, *Proceedings of The 2014 International Conference on Parallel, Distributed and Network-Based Processing (PDP)*, Turin, Italy, Feb. 12-14, 2014, pp 330-338.

- G. Filippone, R. Parise, D. Spataro, D. D'Ambrosio, R. Rongo, and W. Spataro, **Evolutionary applications to Cellular Automata models for volcano risk mitigation**, *Proceedings of The 2014 International Conference on Workshop on Artificial Life and Evolutionary Computation (WIVACE)*, May 14-15 2014, Vietri sul Mare, Salerno, Italy.

5 Projects

5.1 Academic

SuSy Project - Predictive Survey System Definition of a predictive model based on neural networks and genetic algorithms for the classification of statistical surveys responses. (2014/2015)

OpenCAL - CUDA Complex Cellular Automata library OpenCAL (Open Cellular Automata Library) is a parallel multi-platform library for Complex Cellular Automata (CCA) (2015).
`- Cellular automata (complex and classic), CUDA, GPGPU, MPI, OPENGL, OPENMP.`

cuCompact - CUDA Stream Compaction A CUDA powered module for efficient and fast generic stream compaction on GPU, using intra-warp ballotting intrinsic function.
`- Cellular automata (complex and classic), CUDA, GPGPU.`

ACIADDRI - Multi Agents CUDA/OPENGL Bird Flock System Multi-Agent multiple group bird flocking modelling system open GPU using CUDA/OpenGL interoperability.
`- Cellular automata (complex and classic), CUDA, GPGPU.`

CuCCAl - CUDA Complex Cellular Automata library A CUDA powered library CuCCAl, acronym for Cuda complex cellular automata library, capable of hiding all the complexity behind the GPUGPU Complex Cellular Automaton programming process.
`- Cellular automata (complex and classic), CUDA, GPGPU.`

5.2 BS and MS degree

Robocode Competition I developed, in a team of three, a robocode robot using the Robocode framework within the context of the final exam and competition of the Intelligent System's course during Master's degree. My robot wins the competition.
During this project i worked in a team of three people mainly appliying concept and tecniques from : Artificial intelligence and data mining and gathering.

A 3D videogame: Big-Enthity I developed, in a team of two, a 3D videogame alongside a level editor using java and jMonkey 3D engine and jBox2D physics engine. It was developed as project for the course of Advanced Programming during my bachelor's degree.
During this project i worked in a team of three people mainly appliying concept and tecniques from: 3D programming, event programming, XML domain modelling, advanced data structures and algorithms.

Parallel linear system solver I developed, using MPI and OpenMP a parallel program for solving linear system of equations. It was part of the exam of Parallel algorithms and Distribuited System. Very good result in terms of efficiency and speedups were achived.