Salvatore Cardamone
Curriculum Vitae

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About Me

I'm a software engineer with 8 years of experience in developing high-performance code for mathematical applications; spanning satellite telecommunications, optical spectroscopy for biomedical imaging and quantum chemistry. I've worked in teams deploying a myriad of technical and managerial practices, and have a track record in delivering high-quality software and project documentation alike.

Employment

2022 – Present **Senior Software Engineer, BAE Systems Digital Intelligence**
Remit: Satellite communications using software-defined radios. Development is for real-time systems with latency and power constraints.
Technologies: Debian, C/C++, python, GTest, Bazel, ZeroMQ
- Development of low-level transceiver components (principally forward error correction).
- Satellite tracking using real-time control systems for optical downlink communications.
- Novel modem development for optical communications links.
- Produce documentation detailing design process for senior management.

2021 – 2022 **Senior Signal Processing Engineer, CoMind Technologies**
Remit: Deployment of DSP pipeline for processing interferometric data.
Technologies: C/C++, python, CMake, HDF5, SQL
CoMind is a venture-backed startup working on the development of non-invasive brain-computer interface technologies using near-infrared interferometry. My work included:
- Scoping and implementing DSP pipeline in real-time.
- Collaboration with optical hardware team to optimise device performance and SNR.
- Development of low-level software, including control suites, for digital acquisition and waveform generation.

2018 – 2021 **Senior Engineer, Cambridge Consultants Ltd**
- Implementation of 5G physical layer from 3GPP specification (primarily forward error correction and channel estimation/ equalisation).
- Development of scheduler for multi-master Bluetooth networks to mitigate clock desynchronisation.
- Appraisal of high-performance computing platform for multinational for workloads in geophysical resource estimation and AI.
- I led the quantum technologies special interest group, obtaining internal funding for the development of demonstrators (quantum key distribution and quantum-inspired recommendation algorithms).

Education

2016 – 2018 **Postdoctoral Research Associate**
Theoretical Chemistry, *The University of Cambridge*
Part of consortium to deploy common workloads in high-performance computing onto FPGAs using novel high-level synthesis techniques. Development of software package implementing variants of Quantum Monte Carlo, leveraging parallelism in the form of multithreading, multiprocessing, SIMD, along with GPU and FPGA co-processing.

2012 – 2016 **Doctor of Philosophy**
Theoretical Chemistry, *The University of Manchester*
Thesis: An interacting quantum atoms approach to constructing a conformationally dependent biomolecular force field by Gaussian process regression: Potential energy surface sampling and validation.

2009 – 2012 **Bachelor of Science**, 1st Class (Hons) (2nd in year)
Biochemistry, *The University of Sheffield*

Computer Skills

Languages (Primary languages in bold): **C/C++(11/14/17)**, **python**, bash, rust, MATLAB
C/C++ Libraries : STL, LLVM, GTest/GMock, Eigen, Boost
C/C++ Language Extensions: CUDA, MPI, OpenMP, OpenCL, Vitis HLS
python Libraries: ctypes, numpy, scipy, matplotlib, unittest, simpy, PYNQ
General Tooling and Build Systems : git, JIRA, GNU Make, CMake, bazel

Awards and Prizes

July 2015 **BBSRC Funded Studentship**
Daresbury National Laboratory, Warrington
Implemented a novel isokinetic ensemble thermostatting methodology within the framework of the DL_POLY molecular dynamics package.

Summer 2011 **The Biochemical Society Bursary Award**
Waltho Lab, University of Sheffield
Performed molecular dynamics simulations on phosphoglucokinase.

Summer 2007 **The Nuffield Foundation Scholarship**
Loadman Lab, Bradford Institute for Cancer Therapeutics
Evaluated the efficacy of a tumour-specific compound targeting matrix metalloproteinases.

Conferences

talks **FPL, 2018**, *Dublin, Ireland*
FPGAs and Quantum Monte Carlo: Automated Porting using CAOS
Paderborn Centre for Parallel Computing, 2018, *Paderborn, Germany*
FPGAs in a Multiprocessing Environment for Quantum Monte Carlo
Xilinx, 2018, *Dublin, Ireland*
Numerical Precision in Quantum Monte Carlo and Importance for FPGAs
HiPEAC, 2017, *Stöckholm, Sweden*
FPGA Acceleration of Diffusion Monte Carlo

Academic Publications

10 publications with in excess of 200 citations. Can be found at Google Scholar.