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

2024 – Present

Senior Software Engineer, Medtronic Digital Technologies
Remit: Real-time AI on videos from robot-assisted surgeries.
Technologies: C/C++, python, GTest, CMake, zenoh, DDS
• Development of microservice-based application using zenoh for IPC.
• Leading development of general purpose modules for ser/des, IPC and error handling.
• Retrieval of high-frequency video and AI data for further processing.

2022 – 2024

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.
• Systems engineering to define interfaces and requirements of satellite subsystems.

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.