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Christodoulos Stylianou

About

Research Engineer with expertise in High-Performance Computing (HPC), AI, and Data Analytics, with a growing interest in product management. Skilled in software development, training, and fostering collaboration between academia, industry, and government.

Work Experience

Feb 2024 – today **Scientific Colaborator**, *European University Cyprus (EUC)*, Nicosia, Cyprus.

- Lecturer at undergraduate courses for Computer Science and Electrical Engineering.
- Taught Programming Languages, (Advanced) Computer Architecture, Parallel Computing and Compiler Design.

June 2023 – today **Research Engineer**, *The Cyprus Institute (CyI)*, Nicosia, Cyprus.

- Led and managed Proof of Concept (PoC) projects to automate performance evaluations of High-Performance Computing (HPC) systems and optimize workflows for data-driven processes, showcasing product ownership and delivery expertise.
- Defined and prioritized requirements for PoC development in HPC, AI, and HPDA domains, aligning with stakeholders across academia, industry, and government.
- Acted as the interface between the National Competence Center (NCC) in Cyprus and European entities, facilitating cross-functional collaboration and ensuring seamless integration of project requirements.
- Utilized agile methodologies to plan, execute, and iterate on development projects, ensuring alignment with user needs and stakeholder expectations.
- Designed and implemented "Zephyr," a scalable mini-HPC cluster using Raspberry Pi boards, to demonstrate and promote the adoption of HPC technologies within local communities.
- Led training and upskilling programs on HPC and AI technologies, integrating feedback to refine product features and enhance user experience.
- Partnered with leadership to develop strategies for task management, iterative development, and stakeholder engagement, enabling successful delivery of software and hardware solutions.
- Gained hands-on experience in product management and agile development through mentorship, applying best practices to streamline workflows and drive project success.

June 2022 – Aug 2022 **HPC Intern**, *CyI*, Nicosia, Cyprus.

- Researched the use of generic device function pointers in CUDA kernels.
- Familiarized with PTX ISA and CUDA's JIT functionality.
- Explored the packaging and deployment of the developments as a Python library.

Mar 2021 – Sep 2021 **HPC Intern**, *CyI*, Nicosia, Cyprus.

- Worked as part of the Lattice QCD group in CaSToRC.
- Implemented parallel IO functionality for an open-source project (Lyncs-API).
- The implementation supports multiple backends (MPI-IO, Dask, HDF5) and was written in Python.

Oct 2019 – Sep 2022 **Teaching Assistant - Demonstrator**, *EPCC*, Edinburgh, UK.

- Acted as lab demonstrator for MSc courses in HPC and Data Science offered.
- Examples of courses are Numerical Algorithms for HPC, Advanced Message-passing Programming, Advanced Parallel Techniques, Data Analytics with HPC.

Oct 2017 – Dec 2017 **Software Developer Intern**, *Felcana*, London, UK.

- Learned software engineering process improvements and best practices.
- Responsible for researching and implementing various algorithms, such as moving averages and compression, to be used in the IoT devices designed by the start-up.

Education

2019–2024 **PhD in HPC, Computational & Data Science, Software Engineering**, *University of Edinburgh, School of Informatics, EPCC*, Edinburgh, UK.

- Optimizing sparse linear algebra through automatic sparse matrix storage format selection and dynamic switching on heterogeneous hardware.
- Developer and maintainer of Morpheus, a C++ library for efficient runtime sparse matrix format format switching and selection.
- Funded as part of the ASiMoV, a project jointly led by EPCC and Rolls-Royce, and includes the Universities of Bristol, Cambridge, Oxford and Warwick.

2018–2019 **MSc High Performance Computing with Data Science, Distinction**, *University of Edinburgh, School of Informatics, EPCC*, Edinburgh, UK.

- Obtained an all-around knowledge in HPC and Data Science.
- Extensively used MPI and OpenMP for Distributed and Shared Memory parallelism.
- Performed optimisations using compiler directives/flags and code refactoring in C.
- Experimented with non-deterministic messaging, through active messages and callbacks.

2014–2018 **MEng Electrical & Electronic Engineering w/ Management, 2:1**, *Imperial College London*, London, UK.

- **Relevant Courses:** Digital System Design • Embedded Systems • Real-Time DSP • Optimisation
- **Relevant Coursework:**
  - Thread safe firmware for precision control of brush-less motor using C.
  - Real-time speech enhancement based on spectral estimation using C.
  - Accelerating computationally intensive mathematical expressions using FPGAs.

2009–2012 **Secondary Education, GPA: 19.75/20**, *Kykkos A' Lyceum*, Nicosia, Cyprus.

Projects

Accelerating MCMC on multiple GPUs MSc Thesis

Supervisor: Dr Kevin Stratford

- Continuation of the MEng Thesis.
- Extended the Metropolis-Hastings algorithm to target multiple GPUs at a distributed environment whilst at the same time maintaining a single source code.
- The end result was a performance portable three-level hierarchical model of MPI-OpenMP-OpenACC written in C, to target multiple GPUs across multiple compute nodes.

Student Cluster Competition

- Annual competition between teams of students from different universities, part of the International Supercomputing Conference(ISC)
- Each team was responsible to design and build their supercomputing cluster and optimise certain applications based on their choice of hardware.
- Was responsible for optimising CP2K and SWIFT codes as well as assisting in the software configuration and installation on the cluster.

Accelerating MCMC on GPU MEng Thesis

Supervisor: Dr Christos-Savvas Bouganis

- The project tackles the modern issues of Markov Chain Monte Carlo implementations occurring by the adoption of Big Data and complex Bayesian models by investigating ways to accelerate them using modern GPUs.
- Metropolis-Hastings algorithm was mapped on GPU to perform a binary classification problem using logistic regression on large datasets unable to fit on the available memory.

Skills

Programming Languages: C, C++ , Python, Bash
Programming Models: MPI+X • OpenMP • CUDA/HIP • OpenACC • Kokkos
Tools/Methods: Make, CMake • git • Unit Testing (CUnit, gTest) • CI (GitHub Actions)
Languages: English (fluent) • Greek (native)

Participations

1. The International High-Performance Computing Summer School, Athens, Greece, June, 2022.
2. Student Cluster Competition at ISC19, Frankfurt, Germany, June, 2019.

Achievements

1. Programming challenge winner for the Fastest CPU code – The International High Performance Computing Summer School, Athens, June 2022.
2. 1st Pan-Cyprian Prize, Research by Students competition, Nicosia, Cyprus, May 2012
3. 1st Pan-European Prize, Energy Scouts Competition, Nicosia, Cyprus, May 2009

Scholarships & Awards

2020: A.G. Leventis Foundation Educational Grant
2020: Scholarship for Doctoral Studies - State Scholarships Foundation of Cyprus
2019: PhD Stipend as part of the EPSRC project ASiMoV (EP/S005072/1).
2012: Scholarship for Undergraduate Studies - State Scholarships Foundation of Cyprus