Srinath Kailasa | srinathkailasa@gmail.com | srinath.kailasa.18@ucl.ac.uk

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I am a PhD Researcher at UCL **working on high performance computing (HPC) software for simulating problems in science and engineering**. I'm interested in applying HPC to difficult scientific problems, and my research focuses on scaling Finite Element and Boundary Element solvers for wave propagation problems. I have significant software development experience in data science and machine learning, and have worked in different industries (Manufacturing, Insurance, Automotive). I am active in the open source software community, with contributions (small and large!) to numerous popular data science and numerical libraries, most significantly **ExaFMM, Traits, Envisage, Chaco, Numba, Scipy, Scikit-Learn** and more, including time being mentored by CPython and Numpy maintainers while an intern at Enthought.

EDUCATION

University College London — London, United Kingdom
MSc+PhD Mathematics & Computer Science (MSc with Distinction) — September 2018 - September 2024
Focus: My area of research is **software systems** for large scale **simulation** in **Rust** and **Python**. I write software to take advantage of distributed and heterogeneous hardware (mixed CPU/GPU) for scientific and engineering problems. My research focuses on solutions to the integral and differential equations that arise out of wave-phenomena, for example in electromagnetism, acoustics and other related fields. The goal of my PhD research is to develop simulation software for Maxwell's equations for electromagnetism that scales to petascale. I completed my MSc part time in order to fund my studies through working in the technology industry, and graduated top of my class.

Durham University — Durham, United Kingdom
MPhys Physics (Upper Second Class Honours) — October 2013 - May 2017
Focus: Condensed matter physics and scientific computing.

TECHNOLOGIES

Languages: Python (8 years), Matlab (3 years), Rust (2 years), C++/C , JavaScript (1 year), Miranda, Haskell, Go (< 1 year)
Tools: Data Science (Pandas, Numpy, SciPy, SKLearn, Numba) (5 years), **Distributed Computing (**MPI, OpenMP, Dask) (3 years), **Heterogeneous Computing** (CUDA, OpenCL) (3 years), **Databases** (Postgres, ElasticSearch, MongoDB) (2 years), **DevOps** (Docker, Singularity, TravisCI) (2 years), **Web Dev** (Flask, FastAPI, AWS, GCP) (1 year), **Deep Learning** (Tensorflow, Keras) (<1 year), **Frontend** (React, React-Native) (<1year)

EXPERIENCE

My professional experience is split between academia and industry, mainly in tech startups. Startups have taught me how to be resourceful and manage multiple stakeholders under tight deadlines and shifting requirements. Academia has led me to a diverse set of research labs and disciplines, from studying near-term quantum computing architectures in Cambridge, to analysing neural data and building models of brain function in Berlin, with the underlying theme of applying computation to solve scientific problems.

Flatiron Institute - Simons Foundation — New York, United States of America
PhD Research Intern — June 2022-August 2022

- I will be visiting the Centre for Computational Mathematics at the Flatiron Institute this summer.
- My project is unconfirmed, though will likely involve developing and extending their popular numerical open source libraries such as FinuFFT and FMM3D, as well as developing new codes to tackle simulation problems using deterministic (partial differential equations), and/or statistical (machine learning) methods.

DeGould Automotive — Remote
Software Engineer — November 2021-January 2022

- I moonlighted as a software engineer at a computer vision startup alongside my PhD.
- I worked primarily in **Python**, building ML Ops infrastructure, using **Kubernetes** and **Docker** in order to productionize research outputs.

Enthought — Cambridge, United Kingdom
Software Engineer, Intern — April 2019-September 2019

- I developed **computer vision software** for a client in the semiconductor industry to automate manufacturing defect detection using **Python** with **SciKit-Image, Keras** and **PyQT** for development, and **TravisCI** and **Docker** for the build environment.
- I contributed to popular Python open source projects (**Traits, Envisage, Chaco**), under the guidance of core maintainers of **CPython**.

Cytora London, United Kingdom
Software Engineer September 2017-December 2018

- I took ownership of the development of mission critical projects, operating under ambiguity, and changing requirements.
- I lead a team of three to develop greenfield **natural language processing software**, to process data from unstructured and structured source data, using **Python** with **Flask, ElasticSearch, PostgreSQL,** and **CircleCI, Docker** and **GCP** for deployment.

Cambridge Quantum/Honeywell Cambridge, United Kingdom
Research Intern June 2017-September 2017

- I was a summer researcher studying algorithms for the next generation of quantum computers where I collaborated with researchers from the University of Cambridge.
- I designed algorithms for compiling simple quantum algorithms on emerging quantum hardware topologies, inspired by classical sorting networks.

Humboldt University of Berlin Berlin, Germany
Research Intern June 2016-September 2016

- I was a summer researcher in computational neuroscience, working on models for olfaction in insect brains.
- I implemented neural-data analysis software in Python, and presented the outputs of my work at the Bernstein Conference for Computational Neuroscience.

PUBLICATIONS

[1] **Kailasa, S.** & Betcke, T. Domain Decomposition With Distributed Octrees in Rust, Manuscript in Preparation (2022).
[2] **Kailasa, S**., Wang, T., Barba, L. A. & Betcke, T. PyExaFMM: Designing a High-Performance Point Fast Multipole Solver in Python with Numba. Manuscript Submitted (2022).

PRESENTATIONS

[1] **Kailasa, S.** & Betcke, T. Electromagnetic Solvers for Exascale Machines in Rust. 8th European Congress on Computational Methods in Applied Sciences and Engineering (2022).
[2] **Kailasa, S**., Betkiewicz, R., Bardos, V., Kloppenburg, P. & Nawrot, M. P. Single Neuron Model Description and Intrinsic Properties of Different Neuron Types in the Cockroach Antennal Lobe. Bernstein Conference (2016).

PRIZES

[2020] UKRI Doctoral Training Prize, Full PhD Fees and Stipend.
[2019] UCL Enterprise Startup Battlefield, 3rd Place £1500.
[2017] Durham University Hackathon 'Durhack', Best Use of Data £50.
[2016] DAAD Scholarship, Summer Research Prize £2000.
[2014] BP STEM Scholarship, undergraduate funding £20,000.

REFERENCES

[1] Primary Supervisor - Timo Betcke, Professor of Computational Mathematics, University College London. t.betcke@ucl.ac.uk
[2] Secondary Supervisor - Iain Smears, Associate Professor of Applied Mathematics, University College London. i.smears@ucl.ac.uk

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PERSONAL

Date of Birth: 26 April 1994
Citizenship: United Kingdom
Languages: English (native) Telugu (B1) Spanish (A2) Hindi (A1)