CHRIS CUMMINS

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EDUCATION

2018 (expected) **Ph.D, Informatics** *(ongoing)*
University of Edinburgh, School of Informatics
Advisers: H. LEATHER & P. PETOUMENOS

Developing novel compiler optimisations for patterns-based parallel programming. My research focuses on the intersection of algorithmic skeletons and compilers, aiming to address the challenge of parallel programming through the efficient compilation of high-level patterns.

2015 **MSc by Research, Pervasive Parallelism** *(Distinction)*
University of Edinburgh, School of Informatics
Thesis: *Autotuning Stencil Codes with Algorithmic Skeletons*
Advisers: H. LEATHER & P. PETOUMENOS

Runtime adaptive tuning for heterogeneous parallelism, demonstrating $3.79\times$ speedup of multi-GPU stencil programs. Achieved using supervised machine learning, distributed training sets, and synthetic benchmark generation. High-level GPGPU programming with OpenCL. Currently preparing for two workshop publications and submission to the ACM TACO journal.

2014 **MEng Electronic Engineering & Computer Science** *(First Class Honours)*
Aston University, School of Engineering & Applied Science
Thesis: *Protein Isoelectric Point Database*
Adviser: I. T. NABNEY

Created and open sourced a novel search engine and research tool for molecular biochemistry. Developed full integration of BLAST search tools, a publicly accessible API, and tooling to generate synthetic payloads from confidential datasets for whitebox systems testing. Published in Bioinformatics journal.

PROFESSIONAL EXPERIENCE

2012–2013 **Intel Corporation**
Open Source Developer intern

Patched `ioctl` subsystem in Linux kernel. Developed a novel SIMD register visualisation tool for Intel GPU assembly programming. Implemented GTK+ support for Wayland display server. Fixed memory and usability bugs in GNOME desktop applications. Developed particle effects engine for a 3D rendering program. Rapid prototyping of Android applications. Numerous contributions to open source projects.

2010–2014 **Freelance**
Web Developer

Full-stack development for small businesses, including graphic design and branding. Frontend experience with JavaScript; backend development using Clojure, Node.js, PHP, MySQL, PostgreSQL, and Jekyll. Clients have included publishing companies, musicians, and a beauty parlour.

2008 **Rolls Royce Holdings plc**
Work placement in the Design Methods & Improvements team.

PUBLICATIONS

2015 E. Bunkute, C. Cummins, F. Crofts, G. Bunce, I. T. Nabney, D. R. Flower. **PIP-DB: The Protein Isoelectric Point Database**. Bioinformatics, 31(2), 295-296. Chicago

A proteins isoelectric point or pI corresponds to the solution pH at which its net surface charge is zero. Since the early days of solution biochemistry, the pI has been recorded and reported, and thus literature reports of pI abound. The Protein Isoelectric Point database (PIP-DB) has collected and collated these data to provide an increasingly comprehensive database for comparison and benchmarking purposes. A web application has been developed to warehouse this database and provide public access to this unique resource. PIP-DB is a web-enabled SQL database with an HTML GUI front-end. PIP-DB is fully searchable across a range of properties.

AWARDS

2014 **Institute of Engineering & Technology Prize**

Annual prize for the top student at Aston University who showed distinction and outstanding merit on an IET accredited course.

2009 **Arkwright Scholarship, Rolls Royce Holdings plc**

A funded industrial scholarship awarded to less than 250 students nationwide for demonstrating exceptional skill in design & technology subjects.

2009 **Engineering Education Scheme of England**

Research & development of a (now patented) supermarket trolley mounted shopping aid. Responsible for designing the wireless power and charging system.

2008 **AESSEAL Design Innovation Award**

Cash prize for first place in an industrial 3D CAD competition.