Dr. Edd Barrett

Web: eddbarrett.co.uk   Email: edd@theunixzoo.co.uk   Telephone: (on request)
Address: (on request)

A confident and experienced open-source developer and computer scientist.

Education

2014 PhD in Computer Science from University of Kent
My thesis "Range Analysis of Binaries with Decision Procedures" investigates the applicability of Boolean satisfiability and linear programming to the static program analysis of machine code.

2009 BSc Hons. Computing from Bournemouth University
First class with honours. Dissertation titled "3c: A JIT Compiler with LLVM" describes the implementation of a JIT for a dynamically typed object-oriented programming language using LLVM.

2002 A- and AS-levels from Queen Mary's College, Basingstoke
Including Computing, Physics, Electronics and Mathematics.

Employment

2013– Research Associate, King's College London
Research on: programming language composition (building VMs which can run programs written in a mix of languages, fast); reliable benchmarking methodology; and new dynamic compilation techniques.

2009–2013 Part time teacher at University of Kent
Teaching C, UNIX, logic programming and Java at undergraduate and masters level.

2009–2013 Outreach project at University of Kent
Teaching programming fundamentals to schools (age 13-16) using Lego robotics.

2007–2008 Bournemouth University
Placement year as a part of undergraduate studies. UNIX systems administration (Solaris, Linux, OpenBSD) and in-house development.

2003–2005 Tectonics Ltd.
Maintenance and reimplementation of a legacy stock management system, programming industrial CNC routers for kitchen manufacturing, systems administration, IT support.

Skills

Programming Languages I am an experienced programmer. I am currently most fluent in Python, Rust, and C. I've also worked in Java, Prolog, OCaml, C++, Lua, Ruby and PHP in the past. I have also worked on several JITted language implementations for (e.g.) Python, PHP and Prolog. I can learn new programming languages and paradigms on demand.

Software Engineering I'm an advocate of good software engineering practice. I use version control, write tests, file bugs, and take part in code reviews on a frequent (pretty much daily) basis.

Computer Science Since 2009 I've worked in an academic environment, publishing papers on both theoretical and practical topics including: language composition, JIT compilation, benchmarking, abstract interpretation, optimisation problems, and propositional logic.

Systems Administration I'm at home with a UNIX-like system. I maintain my own personal web and mail server. Most of my machines run OpenBSD, but I also feel at home with Linux.

Academic Service/Organisation

I've served on the committees of several computer science conferences, workshops and journals, including: ICOOOLPS, DLS, Dyla, COMLAN, JOT, SoCP, MoreVMs, ICW, <Programming> and MPLR. I've served on the organising committee of MoreVMs several times. I was publicity chair for ECOOP'19 and DLS'14.

I co-organised Barcamp Canterbury 2012–2014 and 2019. Each summer I volunteer at folk festivals.

Software Contributions

Yorick A meta-tracing system based on the Rust compiler. This work is ongoing at King's College London.

PyHyp A composed JITted VM capable of executing (fast) a mix of Python and PHP code. The system enables fine-grained language interoperability, allowing: cross-language scoping; passing objects between languages; cross-language exceptions etc. This work was published in ECOOP'16.

Krun A benchmarking harness designed to reduce the impact of confounding variables upon benchmark measurements. This tool was used in work that was published in OOPSLA'17.

Unipycation A composed JITted VM capable of executing (fast) a mix of Python and Prolog code. I also implemented the same composition upon the JVM and C for performance evaluation. This work made appearances in COMLAN and VMIL'13.

OpenBSD project Developer for an open-source UNIX distribution since October 2009. I work mostly on the ports tree, which involves patching and packaging third party software (TeX Live, Neovim, IPython, Syncthing, ...). I've also worked a little in the kernel and on a few user-space programs.

Dgen/SDL project Implemented a debugger for an open-source games console emulator written in C/C++ (just for fun).

Selected Publications

- E. Barrett, C. F. Bolz-Tereick, R. Killick, S. Mount and L. Tratt. Virtual Machine Warmup Blows Hot and Cold. *Object-Oriented Programming, Systems, Languages and Applications (OOPSLA)*, October 2017.

- E. Barrett, C. F. Bolz, L. Diekmann, L. Tratt. Fine-grained Language Composition: A Case Study. *European Conference on Object-Oriented Programming (ECOOP)*, July 2016.

- E. Barrett, C. F. Bolz, L. Tratt. Approaches to Interpreter Composition. *Computer Languages, Systems and Structures (COMLAN)*, December 2015.

- E. Barrett, C. F. Bolz, L. Tratt. Unipycation: A Case Study in Cross-language Tracing. *Virtual Machines and Intermediate Languages (VMIL)*, October 2013.

- E. Barrett. Range Analysis of Binaries with Decision Procedures. *PhD thesis*, March 2014.

- E. Barrett, A. M. King. Range Analysis of Binaries with Minimal Effort. *Formal Methods in Critical Systems (FMICS)*, August 2012.

Hobbies and Interests

I am an electronics hobbyist, and enjoy repairing old 80's technology (my office is full of micro-computers and audio kit which I have repaired). I enjoy reading sci-fi novels (both classic and contemporary) and listening to music (mostly rock/metal and dark ambient). In the summer I grow my own vegetables and sometimes I make beer. I exercise frequently and climb once a week.

References

Dr. Andy King (PhD. Supervisor)
School of Computing
Cornwallis Buildings
University of Kent
Canterbury
England
CT2 7NZ
Tel: +44 (0)1227 827911
a.m.king@kent.ac.uk

Laurence Tratt (PI for Post Doc.)
N7.05, Bush House,
Strand Campus,
King's College London,
Strand, London,
England,
WC2R 2LS
Tel: +44 (0)20 7848 7997
laurence.tratt@kcl.ac.uk