

Samuel Balco

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Research Software Engineer with a PhD in Computer Science, specialising in functional programming, formal logics, theorem provers, and string diagrams.

Employment

Plow Technologies

Research Software Engineer

REMOTE

February 2021 – present

University of Leicester

Research Software Engineer in the Department of Genetics and Genome Biology

LEICESTER, UNITED KINGDOM

March 2020 – January 2021

Worked in the bioinformatics group, led by Professor Anthony J. Brookes, on tools for data discovery and access. Built discovery tools using React on the front end and a mixture of PHP, Python and Haskell on the back end. Used Docker and CI/CD to insure build repeatability and ease of deployment and testing. Developed and open sourced the [quickjs-hs](#) library, used to interact with the [QuickJS](#) JavaScript engine.

Skills

Programming languages: Haskell, JavaScript (React), Python, Scala, Java, PHP, Isabelle/HOL, Agda, Lean

Technologies: Docker, CI/CD (Github Actions/Microsoft Azure), Cloud (Google Firebase/Heroku), Databases (Postgres/MySQL/Neo4j), REST services, SMT solvers (Z3/CVC4)

Languages: English (*native speaker*), Slovak (*native speaker*), German (*elementary proficiency*)

Education

University of Leicester

PhD in Computer Science

LEICESTER, UNITED KINGDOM

October 2016 – September 2020

- Helped design the [2019 Compiler Construction](#) and [2019 Programming Languages](#) courses at Chapman University.
- Worked on string diagrams and a new version of the [calculus toolbox](#).
- Was the team leader of the university team at the [Audi Autonomous Driving Challenge 2018](#).
- Was one of the organisers of [MGS 2017](#), a graduate Easter school in Computer Science.
- Attended the [Marktobersdorf Summer School](#) and the [Dresden ICCL Summer School](#) in 2017.

University of Oxford

Master's degree in Computer Science

OXFORD, UNITED KINGDOM

October 2015 – September 2016

Final thesis on formalising intersection types along with proofs of subject invariance for the λ -Y calculus. The thesis and code is available on [GitHub](#).

University of Leicester

Bachelor's degree in Computer Science

LEICESTER, UNITED KINGDOM

September 2012 – June 2015

Dissertation on formalising display calculi in Isabelle/HOL and building a supporting toolbox for reasoning about their properties in Isabelle, which was presented at the [ALCOP 2015](#) conference in Delft.

Publications

[Software Tool Support for Modular Reasoning in Modal Logics of Actions](#) S. Balco, S. Frittella, G. Greco, A. Kurz, A. Palmigiano, *Proc. ITP 2018*

[Partially monoidal categories and the algebra of simultaneous substitutions](#) S. Balco, A. Kurz, *arXiv pre-print*

[Nominal String Diagrams](#) S. Balco, A. Kurz, *Proc. CALCO 2019, received the best paper award*

[Display calculi and nominal string diagrams](#) S. Balco, *PhD thesis*

Interests

Electronics (e.g. Arduino, Raspberry Pi, ESP32), [hacking](#) (former member of the Nottingham hackerspace [Nottinghamhack](#)) and DIY (working with a laser cutter, 3D printer, interested in metalworking, etc.), swimming, skiing and playing tennis. Recently designed and helped build a [fort](#).

References

[Prof. Alexander Kurz](#) - Professor at Chapman University akurz@chapman.edu

[Dr. Tom Ridge](#) - Senior Lecturer at the University of Leicester tr61@le.ac.uk