

David Davies

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RESEARCH INTERESTS

- λ -Calculus (and variants)
- Classical Logic
- Type Theory
- Theorem Provers
- Curry-Howard Correspondence
- Functional Programming Languages

EDUCATION

MEng (1st Class Hons) | Joint Mathematics and Computer Science, Imperial College London 2017 — 2021

- Achieved 80% in Final Year
- 100% marks in Master's Individual Project, for which I won the Donald Davies prize.

Secondary School | West Buckland School, North Devon 2011 — 2017

- A Level: A*A*A* in Maths, Further Maths, Chemistry
- Academic & Music Scholarship, Sixth form Maths & Chemistry Prizes
- Grades 1,2 in STEP I, II (resp.), 67 in MAT
- GCSE: 8A*2A (incl. English & Maths), FSMQ: A

ACADEMIC PROJECTS

Theorem Proving in Classical Logic | Master's Individual Project 2021

- Extended current research into λ -calculi with control operators; both simply and dependently typed, by adding dependent disjunction elimination, inductive data and co-data to current classical calculi.
- Designed and implemented a proof assistant (programming language), with dependent types and control operators, able to prove statements that are not provable (but classically true) in previous theorem provers.

XCCLAIM | 3rd Year Group Project 2020

- Team of 6; project to create a decentralised system for exchanging between specific cryptocurrencies.
- Created webapp for users, smart contract to handle Ethereum exchanges and Python CLI for currency backing.
- Involved implementing an abstract design laid out by a research paper.

WORK EXPERIENCE

Imperial College London | Undergraduate Teaching Assistant Jan — Apr 2020

- Lead weekly tutorials for 8 first year students; covering Graph Theory, Algorithms, Logic
- Mark and provide feedback for weekly submissions from the tutees.

NHS Digital | Data Science Intern Jun — Sept 2020

- Realistic Data Synthesis with ML, to speed up access to realistic data for researchers
- Reviewed current literature in data synthesis, implemented this into a data generator to mimic arbitrary datasets

PUBLICATIONS

David Davies, Steffen van Bakel, Nicolas Wu. *Candid: A Dependently Typed Programming Language with Control Operators for Classical Logic*. Submitted to Proceedings of the ACM on Programming Languages (2022).

AWARDS

2021 Donald Davies Prize: Best final year undergraduate computing project in Joint Maths and Computer Science, Imperial College London

CONFERENCES & EVENTS

Apr 2021 Midlands Graduate School in the Foundations of Computing, Attendee, Virtual

TECHNICAL SKILLS

Proficient: Haskell, Java, Python, ML (Tensorflow)

Other Skills: Lean, Agda, Webdev (Javascript), CI/CD, Version Control, Prolog, SQL

INTERESTS

- Lead guitar and sang in a 3-piece band (2015-18). 100+ gigs, some to over 1000 people. From this I gained strong presentation skills; I am comfortable, and can happily communicate, with audiences of any size.
- Grade 8 Violin, which I have played for 16 years.
- 1 of 6 students selected for South West Music School's composition class (2014-16); I learned how to structure and complete multiple long-term creative projects. Workshops at the end of each term involved writing a piece for ensemble within 3 days, giving me experience in working to a tight deadline.
- IC Hockey Men's 4s; Imperial Live Music Society.