Alfie Richards

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Summary

Third year student studying computer science and mathematics at the University of Bath. Enthusiastic about compilers, language design, functional programming, and sharing computer science with others. Worked successfully in multiple teams as a developer in different fields and technologies. Looking for opportunities to learn and work in fields of academic interest.

Education

University of Bath, Bath *Computer science and mathematics, Predicted first class degree, 80.56%*

September 2019 to Current

1st Year

Principles of Programming 1 and 2
Covered the basics of programming in C, Java, and Python, including OOP, complexity, and multi threading.

Computer Science as an Engineering Discipline
Covered system design principles, computer science ethics, and group organisation methodologies such as scrum.

Analysis 1/2
Introduction to Mathematical Analysis.

Algebra 1/2
Introduction to group theory, linear algebra, and number theory.

2nd Year

Foundations of Computation
Introduces formal models of computation and corresponding classes of formal languages.

Functional Programming
Introduction to functional programming, the lambda calculus, and how logical and semantic foundations are translated into usable languages.

Data Structures and Algorithms
Builds understanding of algorithms and data structures and how to apply them to facilitate the empirical assessment of algorithmic differences.

Databases
Aims to provide a systems-based understanding of data, data modelling, storage, access, retrieval and protection.

Artificial Intelligence
A detailed introduction to formal artificial intelligence.

Comparative Programming Languages
Introduction to a variety of programming languages with comparisons.

Integrated Group-Based Project
Develops technical, management and team work skills necessary for the successful development of a multidisciplinary software project.

3rd Year

Compilers
Acquired an understanding and appreciation of techniques of compilation and interpretation of programming languages. Wrote a simple compiler.

Individual Project
Built an individual computer science project to an agreed proposal. Project is an interpreter library for a new functional templating language.

Parallel Computing
Gained ability to recognise and understand different forms of parallelism. Gained skills to develop simple parallel systems.

Group Theory
Demonstrated knowledge and understanding of the basic theory of groups and the constructions and tools developed around them.

Lord Williams School, Thame

September 2012 to July 2019

A Level's
A* in Further Mathematics, Mathematics, Physics and an A in Chemistry

GCSE's
7 A/A* (or equivalent), including mathematics and english
10 A* to C (or equivalent)

Employment

Backslash Builds, Bath *- Developer*
June 2021 to September 2021
Backslash builds is a digital development agency based in Bath. Successfully worked full time in a scrum team developing an administration web application for a customer over summer break. Worked alongside CTO architecting and designing products. Gained experience in professional agile development. Learned a variety of professional skills.

University of Bath, Computer Science Department *- Ambassador work and teaching*
September 2020 to Current
Two part time role within the department. First role, running Technical Labs and the second, as a student ambassador helping with outreach for new students.

Racketware, Towersey *- Developer*
July 2018 to September 2018
Racketware is a startup fitness device company, while there helped develop a sensor to record and give feedback on squash technique and games. Worked alongside the founder, writing, designing and testing an early version of an android app to communicate with and control the device. Worked closely with the CEO designing and bringing to market the product. Learned invaluable lessons about product development and gained experience working alongside a career developer and innovator. Has continued involvement in the company as a shareholder.

Rumsey's Chocolaterie, Thame *- Barista and junior chef*
February 2017 to June 2017
Rumsey's is a luxury cafe and chocolaterie. Worked as a barista and kitchen assistant part time in a team within a pressured environment and gained skills in customer service and communication.

Projects

Technical Labs
Led a small team in putting on a series of technical sessions on various tools useful for computer scientists, such as UNIX command lines, git, debuggers, build automations tools, etc. Researched and wrote the notes for each session and then worked with a mutual to stream the sessions live. Collaborated with a specialists who checked notes and submitted corrections and recommendations.
https://technical-labs.link

Set Card Game - *C#, .NET Core, ASP.NET, ReactJS, SignalR*
Developed Set Card Game while learning React and C# for summer internship. Produced design requirements including user stories. Architected and built system in a team of 2.
https://setcardgame.onrender.com/

ASL Translate - *Java, Android, SQLite*
In the university Integrated Group Based Project coursework a machine learning model and mobile app for translating the American Sign Language alphabet was developed from idea to implementation.

--C Compiler - *C, Bison, Yacc, MIPS, SPIM*
In Compilers university coursework developed a compiler for —C, a cutdown version of C, to MIPS, an assembly language.

Lambda Calculus Reducer - *Haskell*
In a university Functional Programming coursework developed a system to carry out beta reductions on lambda calculus terms until fully reduced.

Volunteering

BCSS committee - *University of Bath Student Union*
Current competition leader in the committee of the Bath Computer Science Society.

National Citizenship Service
Led a team of 9 who organised a charity dinner for over 60 people raising over £1000 for a local charity.

Event organiser and bar worker - *Community events*
Regularly worked in a team organising events in the local village such as a comedy festival (Towersey Fringe), multiple plays and charity events.

Senior student - *Lord Williams School*
Member of the elected team to represent the student body and organise events.

Academic representative - *University of Bath*
Part of a team of 4 representing my peers to improve student welfare.

Activities/ Interests

Mathematics
Lifelong mathematics enthusiast. Attended lectures at the department for mathematics at Oxford and the Royal society. Represented Lord Williams School in national mathematics competitions and have competed in UKMT Mathematics challenge many times and the BMO.

Competitive computing and hackathons
Participated in and ran internal University of Bath competitions. Competed in larger competitions such as Google's Hashcode as well as in hackathons with groups friends and gained experience in optimisation and complexity.

Language design and Compilers
I have a deep interest in these topics and have read literature in the area.

Industry aware
Closely follows industry news to keep up to date with current news.

Technical Skills

Version control, build automation, continuous development systems, deployment systems
Has experience in these tools from teaching them in Technical Labs as well as personal use.

Command line tools
Proficiency and familiarity command line tools and interfaces as part of a daily workflow.

Low level languages
Familiarity with C, Rust, Haskell from university courses, personal use, and reading academic literature in the area.

Parsers and Lexers
Familiarity with Yacc, Bison, and Lalrpop from various courseworks and projects.

Mobile Development
Native apps in Swift and UIKit on iOS and in Java on Android

Web front end
React, JavaScript, HTML, CSS, ReactSpring

Web back end
C#, .NET Core, ASP.NET, PostgreSQL, Node.JS, Flask

Data Science and ML
R, Python, NumPy, SciKitLearn, Pandas, PyTorch, Tensor Flow, Keras

Awards

University of Bath
- Netcraft prize for outstanding results

Lord Williams School
- George Shrimpton Prize for Mathematics
- Parents Association award for Contribution to Sixth Form
- Warden Smith prize for academic excellence
- Prize for Overall Excellence in Results

UK Mathematics Trust
- Hamilton Olympiad - Distinction
- Cayley & Maclaurin Olympiad - Merit
- British Mathematical Olympiad round 1 - Distinction
- Senior/ Intermediate Mathematics challenge - Gold / Best in School 4 times

References

Paul Mellor, CEO, Racketware
paul@racketware.co.uk

Russell Bradford, Senior Lecturer, University of Bath - *Personal Tutor and Project Supervisor*
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