# Max Cairney-Leeming

Oxford & Richmond, London

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## *Education*

### Lady Margaret Hall, Oxford University

*2019-current*

MMathCompSci Mathematics and Computer Science
First in Bachelors portion of degree, with 72.5% overall, awarded scholarships for strong performance across 1st and 2nd year
Master's thesis, supervised by Seth Flaxman (in progress)

### Kingston Grammar School

*2012-2019*

4 A* at A-Level in Mathematics, Further Mathematics, Physics and Latin
12 A* at GCSE

## *Experience*

### Department of Engineering, University of Oxford: Research Intern

*Summer 2022*

Project title: "Applying lattices & quaternions to the tractability of machine learning for polarisation adaptive optics", under Prof. Martin Booth. We plan to write a paper on our findings in the vacation.
Sought methods to improve ML performance & resource use for detection of polarisation aberrations from measurements, by identifying lattice structures in the cost functions modelled.
Discussed ideas & progress with my supervisor
Studied optics theory, through textbooks, building simulations and reimplementing papers.

### Opsydia: Engineering Intern

*Summer 2021*

Integrated new laser hardware into R&D optics table, from unboxing and optical path calibration to writing control software and testing it on real diamond samples. Focused on laser power safety, as the laser had no automatic safety features. Discussed my work regularly with team members and communicated with suppliers to solve bugs. Documented my software and presented it to the team.

### Tom Rocks Maths: Maths Outreach Intern

*Summer 2020*

Wrote, filmed and edited several videos focused on fractals and 3d printing, aimed at engaging young people with mathematics. Strengthened my communication skills through many iterations of the scripts, with guidance from Dr. Tom Crawford. Won a department prize for my first video.
Built fractals.maxcl.co.uk, including interactive diagrams, to explain Lindenmayer systems (also a video subject), and convert a fractal to a 3D-printable model, using a Rust server to do this efficiently, including processing millions of triangles to achieve smooth curves on the model.

### J A Kemp LLP: Intern

*Summers 2018, 2019*

Developed software to automatically file legal requests, incl. generating supporting documentation; and to compare internal data to those held by EU patent offices, working with lawyers throughout.

### Den Automation: Intern

*Summer 2017*

Built small but scalable IoT lighting system using microcontrollers and a Python server, with common IoT technology such as MQTT and Redis that I researched and selected myself, with some guidance from my mentor.

## *Skills*

### Communication

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| *Department Ambassador* | Helped students on a school visit to the Maths Institute with a range of challenging problems, worked at the Oxford Maths Festival welcoming and registering families, and answered and moderated questions on virtual open days. |
| *Debating* | Vice-president of school debating society, took part in many debates against students and alumni, spoke in front of large (roughly 1,000 people) and small audiences, with and without preparation. |

### Writing

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| *Essay prize* | Joint first prize in the Corpus Christi, Cambridge Languages and Linguistics essay prize, writing about voice assistants and their command of language. |
| *EPQ Level 2* | Wrote a 2,500-word essay on the USSR's space program and the effect of politics and culture upon its success and received an A*. |

### Leadership and organisation

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| *President, Oxford Millennium Orchestra* | Ran an orchestra of ~70 players from the university and city, restarting it post-COVID by recruiting >30 new players, and organising two very successful concerts in the Sheldonian Theatre. Organised concert logistics with venue staff; sourced and organised thousands of pages of sheet music; and managed weekly rehearsals to ensure we were well prepared for concerts.<br>Modernised ticketing system to allow easy payments with cards & online, resulting in record sales. |

## *Personal Projects*

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| *Software for Latin A-Level* | Wrote software to annotate Latin texts using an interactive web UI for colourful word-by-word annotation. Successfully used throughout my A-Level, in class and for revision, resulting in an A*. Sourced the texts from the Perseus online classics project. Also developed a vocabulary tester designed specifically for Latin grammar, using data parsed from Wiktionary data files. |
| *Budgeting software* | Created a personal budgeting system with automatic transactions imports using Open Banking. Learnt about budgeting and accounting practises to design UI.<br>Used Twilio to send updates about recent transactions and answer basic queries about budgets. |

## *Interests*

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| *AI and robotics* | Built a small autonomous robot on a week-long spring course, and learnt about and implemented a variety of common algorithms in Machine Learning on another course about AI.<br>Experimented with robotics using a small rover, with particular interest in using a LiDAR sensor to map out its surroundings, by mounting it on a stepper motor for 360° rotation |
| *Music* | Grade 8 Distinction on cello and a dedicated member of an award-winning youth orchestra for 7 years, including leading my section, and now a university orchestra, which I organised for a year.<br>Committed member of my college chapel choir throughout my time at Oxford. |