

Sam Kay

MATHEMATICIAN · MUSICIAN · PRIVATE TUTOR

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Incoming PhD student at Durham University specialising in astrophysical fluid dynamics

Personal Profile

As a highly motivated and dedicated student with a deep passion for learning and personal growth, I consistently go above and beyond in my studies. I am recognised for my exceptional work ethic and efficient time management skills, which have enabled me to consistently meet deadlines and attain outstanding academic results. I possess an unwavering aspiration to succeed and am always endeavouring to elevate myself to new heights of accomplishment.

Education

Durham University

Durham, UK

Master of Mathematics (MMath)

Sept 2021 - Current

- In my fourth year of a Master's degree in Mathematics.
- First year: 74.5%, Second year: 78.6%, Third year: 81.2%, allowing a predicted First Class grade at the end of this year and overall.
- Involved with the Mathematical Society.
- **Current Modules:** Advanced Quantum Theory, General Relativity, Geophysical & Astrophysical Fluids, Superstrings.

New College Pontefract

Pontefract, West Yorkshire

A-Levels

Sept 2019 - June 2021

- A* in Mathematics, A* in Further Maths, A in Chemistry, AS Music.
- Awarded with Certificate of Outstanding Effort and Performance in Further Maths.

Kettlethorpe High School

Wakefield, West Yorkshire

GCSEs

Sept 2014 - June 2019

- 11 qualifications (Levels 9-6).
- Includes Mathematics 9, Physics 8, Chemistry 8, Music 9, A* with Distinction in Further Maths.

University Projects

Symmetries and Particles

Oct 2024 - Current

MMath research project

- Researching the construction of the Standard Model of Particle Physics via gauge theories and spontaneous symmetry breaking.
- Deepening my understanding through reading academic papers and lecture notes from various sources.
- Will produce a report of my research, alongside an academic poster and presentation.

Chalkdust magazine & Chalkboard Ultra podcast

Sept 2023 - Current

Mathematics outreach and communication

- Writing and editing for a popular maths magazine, distributed nationally among universities.
- Hosting a podcast bringing light to all areas of mathematics, with conversations among PhD students and lecturers.

On Modelling Seismic Waves

Dec 2022 - Jan 2023

Mathematical Modelling module

- Conducted research into how we can simulate the effects of seismic waves to better understand the Earth's structure.
- A solo project, programming 2-dimensional partial differential equation solvers into Python.
- Produced a typeset essay to display my findings, receiving a 1:1 (77) in my Mathematical Modelling module.

Partitions in Some of Their Glory

Jan 2022 - Mar 2022

Discrete Mathematics module

- Gave an introduction to the field of *Partitions*, a very useful tool in Discrete Mathematics.
- Developed my understanding of Partitions by seeking extra problems from my tutors and through extensive reading.
- The final project was a collaboration with four of my peers, giving a presentation to other students and academic advisors.
- Produced a report of my findings, achieving a 1:1 (76) overall in my Discrete Mathematics module.

Skills

Programming  (Overleaf/TeXShop), Python, HTML, Desmos, VisualPDE.

Soft Skills Teamwork, Problem-solving, Organisation, Data analytics, Critical thinking, Report writing, Presentation skills.

Miscellaneous Microsoft Excel, Canva, sleight of hand and card magic.

Volunteering

Stephenson College JCR

Maths subject representative

- Point of guidance contact for students regarding mathematical sciences.
- An advisory role for those needing help with exam techniques, module choices, and general academic problems.

Stephenson College

Jan 2025 - Current

Butler Jazz & Butler Soul Band

President

- Leading two bands after being the lead pianist for two years and Librarian for one year prior.
- Directing rehearsals, booking gigs, organising charity events, overseeing the executive team, managing band finances.
- Improved skills in performance, public speaking, organisation and networking with other bands.

Josephine Butler College

Sept 2023 - Nov 2024

Work Experience

Stephenson Central

Bartender

- Responsible for managing the bar through promotions, selling, transactions, stock control, and ensuring a smooth operation.
- Cleaned and restocked whilst customer flow was slow.

Durham, UK

Sept 2023 - Current

Island Lake Camp

Summer Camp Councillor

- Mentor and councillor for children aged 6-16 at a sleep-away summer camp in America.
- Worked as a part of the STEM and Outdoor Adventure departments, ensuring children were safe and engaged in their activities.

Starrucca, Pennsylvania

Summers 2023 & 2024

MyTutor.co.uk

Maths and Science Tutor

- Tutoring in a classroom environment via video call.
- Private tutoring with 100% return business.

Remote

Jan 2022 - June 2024

Institute of Sales Professionals

Data Research Assistant and Analyst

- Supporting the creation, deployment, and analysis of survey and research projects.
- Project of interest: a study with Cranfield University, delivering insights on the impacts of coaching within sales.

Remote

Jan 2022 - Dec 2022

Achievements

'23-'25 **3x College Scholar Award**, Stephenson College

Durham University

'22-'24 **3x Competitor**, 24 Hours of Le Maths

DU MathSoc

2020 **Regional Finals Competitor**, Senior Team Maths Challenge

UKMT

2019 **The Maureen Winderbank Trophy**, KHS Presentation Event

Kettlethorpe High

2019 **Younge Award for Music**, KHS Presentation Event

Kettlethorpe High

2018/19 **Head Boy**, Leadership role

Kettlethorpe High

Interests

Fitness Regularly attend the gym and enjoy running, trained towards a black belt in Tae Kwon-Do.

Performing Lead pianist and keytar player for a pop/funk band among friends.

Scouting Graduated through to Explorer level, began training to become a Young Leader.

Music Worked towards ABRSM Grade 7 classical piano, played the guitar since age eight.

References available upon request.