Bilal **Chughtai**

UNIVERSITY OF CAMBRIDGE BA & MMATH GRADUATE

☎ +447580830776 | ✉ brchughtaii@gmail.com

Education

Trinity Hall, University of Cambridge   *Cambridge, UK*

BA & MMATH IN MATHEMATICS   *2017 - 2021*

- 1st Year - Class 1 (72%)
- 2nd Year - Class 1 (83%, ranking 17 of 240)
- 3rd Year - Class 1 (unranked due to COVID-19 pandemic)
- 4th Year - Distinction (88%, ranking 22 of 272)
  Examinable courses: Quantum Field Theory, General Relativity, Cosmology, Field Theory in Cosmology.
  Essay: "The Search for CMB B-Mode Polarization from Inflationary Gravitational Waves" - 90%

Saint Olave's Grammar School   *London, UK*

SECONDARY AND SIXTH FORM EDUCATION   *2010 - 2017*

A levels: Mathematics A* • Further Mathematics A* • Physics A* • Chemistry A* • Biology AS A • EPQ A
University Entrance Exams: STEP1 S (117/120) • STEP2 S (116/120) • STEP3 1 (92/120) • MAT 74/100
GCSEs: 7 A*s • 3 As • FSMQ A

Experience

Cambridge Assessment   *Remotely from London, UK*

STEP EXAM MARKER   *July 2021*

- Worked in several small teams marking candidate scripts for the STEP Mathematics II and III exams.

Soft Matter Group, DAMTP, University of Cambridge   *Remotely from London, UK*

SUMMER RESEARCH PROJECT   *July - October 2020*

- Worked as part of the RAMP Epidemic Modelling Taskforce. In particular, on the PyRoss project; a python library for structured epidemiological compartment models.
- Focused on implementing, using and optimising new computational models within the library involving sophisticated control scenarios such as lockdowns, vaccinations and testing.
- Work involved reading papers, pen and paper calculations, model making, computational work, data analysis and written work. Defended my ideas weekly in group seminars.

Private Tutor   *London, UK*

SELF EMPLOYED   *May 2020 - Present*

- Over 150 hours of tutoring experience, mostly in GCSE and A level Maths.
- Written preparatory resources and tutored students in university entrance exams including the MAT, ENGAA and STEP.
- Provided mock interviews to university applicants in the physical sciences.
- Developed my ability in effectively communicating complex mathematical and scientific ideas to a range of age groups.

Metaswitch Networks   *Enfield, London, UK*

SOFTWARE ENGINEERING INTERN   *June 2019 - August 2019*

- Worked in the Support Tools team within Information Systems on enhancements to a Google Cloud based Business Intelligence platform.
- Picked up several new technologies quickly. Work required research, planning, writing, testing, and deployment stages. Participated in daily and weekly team meetings.
- Retired an old Linux Virtual Machine that was responsible for uploading data to Google BigQuery by migrating old C# Extract-Transfer-Load (ETL) processes to a newer, more robust infrastructure. These ETLs upload data daily from local databases to BigQuery, which I then used to produce dynamic reports for internal end users.
- Wrote python code to enhance permission deployment to a Google Project, to both improve speed and to reflect organisational changes better through use of active directory groups over raw emails. Deployed as jobs on a long GitLab CI/CD pipeline and also to run hourly via a dockerised crontab job.

Other Experience

Cambridge University Powerlifting Club   *Cambridge, UK*

WEBMASTER   *May 2021 - Present*

- Responsible for maintaining and updating the club website, as well as aiding the committee with technical tasks.
- Manage the website members only area and blog, hosting valuable resources and club news respectively.
- Assist in general running of the club through helping out at events such as freshers fair and introductory sessions, team training, in house mock competitions and socials.

Trinity Hall JCR
Trinity Hall, Cambridge, UK

WEBMASTER   *November 2017 - March 2020*

- Responsible for maintaining and updating the JCR website, as well as aiding the committee with technical tasks.
- Responsible for setting up and running the yearly college room ballot, the process by which students choose their room for the following academic year. This consists of a database storing the state of the ballot linked via a python script to a custom web app that displays this state in a more user friendly form, by overlaying live properties of the rooms onto a floor plan. Properties include a room's availability or occupant, its weekly rent, whether it is ensuite, etc. This was all run on a linux server that also hosts the website.
- Sat on the college IT Advisory Group, representing the undergraduate body regarding IT matters.
- Helped organise and run various 'freshers events' for new undergraduates at Trinity Hall.

Access and Outreach
Cambridge, UK

UNIVERSITY OF CAMBRIDGE   *October 2017 - Present*

- Student volunteer at many access and outreach events held both at Trinity Hall and at the maths faculty. This included running tours, workshops and answering questions, and more recently running online Q&A's and webinars.
- Helped run 'STEP support days' at Cambridge which gave comprehensive school students guidance for how to prepare for the STEP exams.

Mastana 2018
Cambridge, UK

PRODUCTION SUBCOMMITTEE   *November 2017 - February 2017*

- Worked in a core team of five people, responsible for all aspects of production of a large charity show, requiring several months of planning and generating over £3000
- Took the lead on sound design; including managing microphones, sound effects, and music.

Project Work

Part III Essay
University of Cambridge

4TH YEAR, MATHEMATICAL TRIPOS   *2021*

- The Part III essay is an extended piece of scientific writing. It involved reviewing recent literature on a certain modern topic in mathematics or theoretical physics, and collating the information elegantly and clearly.
- My essay "The Search for CMB B-Mode Polarization from Inflationary Gravitational Waves" described the science in full detail behind a very exciting current area of research in trying to understand fundamental physics via precision cosmology and was awarded 90%.

CATAM
University of Cambridge

2ND AND 3RD YEAR, MATHEMATICAL TRIPOS   *2018-2020*

- Contributing to my second and third years grades, CATAM - "Computer Aided Teaching of All Mathematics" - were a set of mathematical projects, requiring programming to complete. I used a combination of MATLAB and Python.
- Selected Projects:
    - Factorisation of large integers; Implementing and testing the effectiveness of a method using continued fractions taught in the Number Theory course.
    - Simulation of geodesic orbits around particular black hole metrics, a direct application of content taught in the General Relativity course.

Extended Project Qualification
Saint Olave's Grammar School

PHYLLOTAXIS   *2016-2017*

- Research project in which I investigated the emergence of geometric spirals in plants from both a mathematical and biological perspective; alternatively why and how do they form?
- Wrote and ran simulations to verify and better understand the mathematical model.
- Presented findings to a large group of students and teachers.

Skills

Programming	*Proficient:*	Python • MATLAB • LaTeX
	Familiar:	HTML • CSS • JavaScript • SQL
Technologies	*Proficient:*	Windows • Linux • Git
	Familiar:	Google Cloud Suite • Docker • CI/CD
Hobbies		Powerlifting • Bouldering

Honors & Awards

2021	**Parks Prize for Mathematics,** for "obtaining a particularly strong result in Tripos Examinations"	*Cambridge, UK*
2020	**Wylie Prize for Mathematics,** for "obtaining a particularly strong result in Tripos Examinations"	*Cambridge, UK*
2020, 2021	**Trinity Hall Bateman Scholarship,** for "obtaining a first class result in Tripos Examinations"	*Cambridge, UK*
2018, 2019	**Trinity Hall Scholarship,** for "obtaining a first class result in Tripos Examinations"	*Cambridge, UK*
2017	**HG Abel Prize,** for "outstanding A level results", awarded by Saint Olave's Grammar School	*London, UK*
2017	**Highest Performer at A-level,** Saint Olave's Grammar School	*London, UK*