Parth Shimpi

curriculum vitae

School of Mathematics and Statistics
University of Glasgow
Glasgow G12 8QQ, UK.

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Education

exp. 2026 **PhD in Mathematics**, *University of Glasgow*, Glasgow, UK.
Supervisor: Michael Wemyss.

2022 **MMath (Part III)**, *University of Cambridge*, Cambridge, UK.
Merit.

2021 **BA in Mathematics**, *University of Cambridge*, Cambridge, UK.
First class honours, top 25% in cohort.

Research

I study algebraic geometry and its interactions with homological algebra and representation theory, focusing on three dimensional hypersurface singularities via the lens of the homological minimal model programme.

2024 **Torsion pairs and 3-fold flops**, *In preparation*.

Given a flopping contraction $X \to Z$ over a three-dimensional isolated cDV singularity, we classify all t-structures, bricks, and spherical objects in $D^b_Z(X)$ that are intermediate with respect to the category of perverse sheaves.

Other Academic Projects

As an undergraduate, I undertook research projects in geometry and foundations.

2022 **Derived Equivalences in Algebra and Geometry**, *Algebraic Geometry*.
Supervised by Dr Ian Grojnowski

Essay submitted as a part of Part III at Cambridge, develops the theory of derived categories and proves Beilinson's theorem on the generators of $D^b(\mathbb{P}^n)$ and the Bernstein-Gel'fand-Gel'fand correspondence between symmetric and exterior algebras.

2021 **Chow rings of stacks of expansions**, *Algebraic Geometry*.
Supervised by Dr Dhruv Ranganathan

The ring QSym of quasi-symmetric functions is known to arise as the Chow ring of an algebraic stack. We found an alternate proof of the result by giving a combinatorial construction of the said stack, and using this to exhibit geometric analogs of the bialgebra structure on QSym.

2020 **Rewrite systems in New Foundations**, *Set theory*.
Supervised by Dr Thomas Forster

Studied a reduction rule for stratified formulae arising in Quine's New Foundations, addressing questions of confluence and termination using techniques from Lambda Calculus.

Awards & Scholarships

2022	**ERC Scholarship**, *College of Science and Engineering*, University of Glasgow. Funding for doctoral studies
2021	**Stephen Hawking Award**, *Gonville and Caius College*, University of Cambridge. For progressing into Part III of the Mathematics Tripos
2019, 2021	**Examination Prize**, *Gonville and Caius College*, University of Cambridge. For achieving First class result in end of year exams
2018	**Cambridge Trust Scholarship**, *Cambridge Trust*, University of Cambridge. Award of £40,000 towards undergraduate studies
2018	**Scholarship**, *Gonville and Caius College*, University of Cambridge. Award of £40,000 towards undergraduate studies
2017	**Kishore Vaidnyanik Protsahan Yojana**, *Indian Institute of Science*, Bengaluru. For achieving an all-India rank of 61 in the qualification exam.
2016	**National Talent Search (Exam) Scholarship**, *NCERT*, Government of India.

Service & Activities

2024	**Mentor**, *Count me in*, University of Edinburgh. Led a project on tropical geometry, as a part of a six–week research internship for UK undergraduates.
2024	**Organizer**, *Glasgow & Edinburgh Algebra Research Seminar (GEARS)*, Scotland.
2023,2024	**Organizer**, *Glasgow Algebra Pre–Seminar (GAPS)*, Glasgow.
2022	**Back-end software developer**, *Stoa*, Bangalore. Server-side web development with Kotlin and MongoDB.
2021	**Organizer**, *Junior Algebraic Geometry Reading Group*, Cambridge.
2020–22	**President**, *the Archimedeans (Cambridge University Mathematics Society)*.
2021–22	**Vice President**, *CamTeX (Cambridge University TEX Society)*.
2019–22	**Student Ambassador**, *Faculty of Mathematics*, University of Cambridge. Mentor and assist prospective students with problem solving, STEP, and mock interviews.
2020, 2021	**Workshop coordinator**, *Sutton Trust Summer Schools*, University of Cambridge.
2020, 2021	**Interview moderator**, *International Mathematics Olympiad*, St. Petersburg, Russia.
2019	**Team guide**, *International Mathematics Olympiad*, Bath, UK.
2019	**A-level mathematics teacher**, *Fravashi International Academy*, Nashik, India.

Languages and Computing

Languages	English (native), Marathi (native), Hindi (fluent), Japanese (beginner)
Coding	Haskell (intermediate), Kotlin (intermediate), Python (intermediate), Javascript (beginner)