

Calum Hughes

CONTACT

INFORMATION

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RESEARCH

INTERESTS

Category Theory, ∞ -Category Theory, Homotopy theory, Homotopy type Theory (HoTT), Algebraic Topology and also topics in Analysis. I am particularly interested in the interface between Category Theory and other areas of study.

EDUCATION

University of Manchester PhD in pure mathematics funded by the Dame Kathleen Ollerenshaw PhD Studentship, supervised by Dr Nicola Gambino. The working title is “*Effective model structures on groupoid objects and homotopy type theory.*”

University of Sheffield

- MMath in Mathematics, first class honors, 2022.
 - Master’s Thesis: “*The Dold-Kan Correspondence*” supervised by Prof. Sarah Whitehouse.

RESEARCH

INTERNSHIPS

1. Undergraduate Research Internship project: “*Simplicial Sets*”, supervised by Dr. James Brotherston. This was a competitive position funded by the School of Mathematics and Statistics.
2. “*Dynamics of Linear Operators: Limit Sets in Finite Dimensions*” project, supervised by Dr. Dimitrios Roxanas, funded by the London Mathematical Society. This was a competitive UK-wide place to study a 2-month project over the summer of 2021 (work still in progress; potential for a publication).

ACADEMIC

PRESENTATIONS

1. “Category Theory and Simplicial Sets,” Undergraduate Summer Research presentations 2019-2020, University of Sheffield, September 2020.
2. “An Introduction to Simplicial Sets,” [Tomorrow’s Mathematicians Today conference](#), The University of Greenwich, March 2021.
3. “Dynamical Systems and Chaos,” Undergraduate Summer Research 2020-2021, University of Sheffield, September 2021.
4. “A visual introduction to homology and homotopy,” Sheffield maths department undergraduate lectures, 2022.
5. “The Dold-Kan Correspondence,” MMath presentations, 2022.

PARTICIPATION IN

CONFERENCES

AND SEMINARS

1. String Topology, Algebraic Topology seminar, University of Sheffield, 2020
2. MiaowMiaow, Category Theory seminar, University of Sheffield, 2021.
3. Tomorrow’s Mathematicians Today conference, The University of Greenwich, March 2021.
4. Categories and Companions Symposium, June 8 -12, 2021.
5. London Mathematical Society Summer School 2021, University of Swansea, 12 - 23 July 2021.

6. University of Sheffield Category Theory reading group, October 2021- June 2022.
7. Mini Course on E_∞ -operads given by Ieke Moerdijk.
8. YAMCATS 28, University of Cambridge.

PRIZES AND AWARDS

- **Dame Kathleen Ollerenshaw PhD Studentship**
- **T. M. Flett Prize in Pure Mathematics** for the best performance in Pure Mathematics modules 2022.
- Awarded Undergraduate Research Bursary from the London Mathematical Society 2021.
- **T. M. Flett Prize in Pure Mathematics** for the best performance in Pure Mathematics modules 2020.
- Awarded Undergraduate Research Internship bursary from the University of Sheffield School of Mathematics and Statistics, 2020.
- **Best Team Submission** in the School of Mathematics and Statistics annual team Mathematics challenge, 2018.

OTHER RELATED ACTIVITIES

- I am a student representative on the School of Mathematics and Statistics Teaching Committee.
- I am a Level 4 academic representative for the Staff Student Forum.
- I have regularly attended Advanced Problem Solving sessions at the University of Sheffield. These involve working on difficult Algebra or Analysis problems unlike that which we would see in our modules and presenting our solutions to each other as part of a group.
- I participated in the Simon Marais international mathematics competition.
- I am a member of the Institute of Mathematics and its Applications (IMA).
- I have tutored students in GCSE Maths, A-level Maths and A-level English Literature.

TECHNICAL SKILLS

Programming: Python, \LaTeX , SageMath, R, Haskell, Adga, MATLAB.

OTHER ROLES

- President of the University of Sheffield Allotment Society 2019-2020.
- Treasurer of the University of Sheffield Allotment Society 2020-2021.
- Finance and Development Officer of the University of Sheffield Allotment Society 2021-2022.