

Alex Gough

School of Mathematics, Statistics, and Physics – Newcastle University
Newcastle, UK

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(Last updated February 2, 2022)

Education

Newcastle University

PhD Applied Mathematics

Thesis topic: Cosmic structure formation in the nonlinear regime

Supervisor: Cora Uhlemann

Newcastle upon Tyne, UK

2020–Present

Oxford University (Balliol College)

MMathPhys Mathematical and Theoretical Physics

Parts A&B: 1st Class

Part C: Distinction

Oxford, UK

2016–2020

Experience

Research

School of Mathematics, Statistics, and Physics, Newcastle University

Postgraduate Researcher

Conducting research in the area of cosmology, with a focus on dark matter dynamics and statistical techniques for understanding cosmic large scale structures. [2, 3]

Newcastle, UK

09/2020–Present

Sub-department of Astrophysics, University of Oxford

Astrophysics Research Intern

Conducted research on an extension to standard statistical modelling techniques for polarised foregrounds in future CMB experiments [1].

Oxford, UK

06/2019–09/2019

Manoharan Lab, Harvard University

Physics Research Intern

Designed and built an inline holographic microscope to track nanoparticles in solution, with modifications for dark-field holography.

Cambridge, MA, USA

06/2015–09/2015

Education/Teaching

School of Mathematics, Statistics, and Physics, Newcastle University

Teaching assistant

Assisted in running undergraduate physics and mathematics courses by facilitating virtual teaching, running problems classes, and marking assignments.

Newcastle, UK

09/2020–07/2021

The Ogden Trust/Gosford Hill School

Physics School Intern

Helped rewrite KS3 schemes of work and mark exams. Planned and delivered a supplementary lesson to A level students. Ran a careers workshop for year 9 students.

Oxford, UK

06/2018–07/2018

Science Oxford

Live event staff member

Helped support existing public outreach events run by Science Oxford including Saturday Science Clubs.

Oxford, UK

05/2018–01/2020

Sudbury Parks and Recreation

Science Specialist

Sudbury, MA, USA

07/2017–08/2017

Designed and ran demonstrations/activities for children ages 5–10 at a summer camp.

Lincoln Sudbury Regional High School

Sudbury, MA, USA

Maths/Science Tutor

12/2016–01/2017

Worked with students referred to academic support centre on homework and school work, particularly focusing on mathematics and sciences.

Museum of Science

Boston, MA, USA

Early Childhood Interpretation Intern

06/2016–08/2016

Assisted in daily operation of the Discovery Center by maintaining and running exhibits and activities for children ages 0–8. Assisted in professional development of new volunteers.

Kumon Math and Reading Center

Sudbury, MA, USA

Early Learning Educator/Grader

09/2013–06/2014

Worked individually with children to develop basic reading and number skills. Marked math and reading exercises.

Miscellaneous

Oxford Taekwondo School

Oxford, UK

Assistant Instructor

09/2016–06/2020

Oxford Taekwondo School

Oxford, UK

Treasurer

06/2018–06/2019

Giorgio's Taekwondo

Sudbury, MA, USA

Instructor

09/2010–09/2016

Outreach and Inclusivity Work

MSP transition project/Partners school

Newcastle upon Tyne

Author

Summer 2021

Wrote notes for incoming maths/physics students, helped with PARTNERS summer school.

Astrobites collaboration

International

Contributing Author

01/2021–01/2022

Contributed articles summarising current astrophysics research into bite sized pieces, with the principal audience of undergraduates.

Department of Physics, Oxford

Oxford, UK

Public Outreach Volunteer

01/2020–04/2020

Participated in running events to increase scientific literacy, reaching thousands of children and adults each year.

Museum of Science

Boston, MA, USA

Discovery Center Volunteer

06/2015–06/2016

Assisted in daily operation of the Discovery Center by maintaining and running exhibits and activities for children ages 0–8.

Presentations and Conferences

Conferences and workshops

- **2022:** *Probing extended cosmologies with clustering statistics beyond the average*, DEX XVIII
- **2021:** *Modified gravity and dark energy from one point matter statistics*, Alternative Gravities and Fundamental Cosmology 2021
- **2021:** *Results from 1-point statistics in extended cosmologies*, Cosmology from Home 2021

- **2021:** *One point statistics for cosmic structure*, BritGrav21
- **2021:** STFC School for New Astronomy Research Students

Public lectures.....

- **2020:** *The Skeleton of Our Universe*, Newcastle Astronomical Society

Awards

- **2021:** Postgraduate Prize: Achievement in Outreach
- **2019:** Ken Allen Prize for Experimental Work

Other Qualifications

- ITF Taekwondo 4th Dan (GB-4-355)
- ITF Taekwondo International Instructor (2183)

Publications

- [1] S. Azzoni, M. Abitbol, D. Alonso, **A. Gough**, N. Katayama, and T. Matsumura. A minimal power-spectrum-based moment expansion for CMB B-mode searches. *Journal of Cosmology and Astroparticle Physics*, 2021(05):047, May 2021.
- [2] M. Cataneo, C. Uhlemann, C. Arnold, **A. Gough**, B. Li, and C. Heymans. The matter density PDF for modified gravity and dark energy with Large Deviations Theory. *arXiv e-prints*, page arXiv:2109.02636, Sept. 2021.
- [3] **A. Gough** and C. Uhlemann. One-point statistics matter in extended cosmologies. *Universe*, 8(1), 2022.