

Alex Gough

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Education

Newcastle University <i>PhD Applied Mathematics</i> Thesis topic: Cosmic structure formation in the nonlinear regime Supervisor: Cora Uhlemann	Newcastle upon Tyne, UK 2020–Present
Oxford University (Balliol College) <i>MMathPhys Mathematical and Theoretical Physics, Distinction</i>	Oxford, UK 2019–2020
Oxford University (Balliol College) <i>BA Physics, 1st Class</i>	Oxford, UK 2016–2019

Experience

Research

School of Mathematics, Statistics, and Physics, Newcastle University <i>Postgraduate Researcher</i> Conducting research in the area of cosmology, with a focus on dark matter dynamics and statistical techniques for understanding cosmic large scale structures. [2]	Newcastle, UK 09/2020–Present
Sub-department of Astrophysics, University of Oxford <i>Astrophysics Research Intern</i> 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 <i>Physics Research Intern</i> 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 <i>Teaching assistant</i> I assist in running undergraduate physics and mathematics courses by facilitating virtual teaching, running problems classes, and marking assignment.	Newcastle, UK 09/2020–Present
The Ogden Trust/Gosford Hill School <i>Physics School Intern</i> 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 <i>Live event staff member</i> Helped support existing public outreach events run by Science Oxford including Saturday Science Clubs.	Oxford, UK 05/2018–01/2020
Sudbury Parks and Recreation <i>Science Specialist</i>	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–Present

Contribute articles summarising current astrophysics research to undergraduate level approximately once per month.

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

- **2021:** STFC School for New Astronomy Research Students
- **2021:** *One point statistics for cosmic structure*, BritGrav21
- **2021:** *Results from 1-point statistics in extended cosmologies*, Cosmology from Home 2021
- **2021:** *Modified gravity and dark energy from one point matter statistics*, Alternative Gravities and Fundamental Cosmology 2021

Public lectures.....

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

Awards

- **2021:** Postgraduate Prize: Achievement in Outreach

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.