

Oliver James Hall

PhD student in asteroseismology

programming

Python, Git
Unix, LaTeX,
SQL

skills

Stan
PyMC3
emcee
Bayesian statistics
Hierarchical models
Asteroseismology
Jupyter Notebooks
Software development &
publication

languages

English, Dutch (bilingual)

contact

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Astronomy
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presentations

- 2019 Nov. **Seminar** University of Exeter, UK
"Asteroseismology & Applied Statistics"
- 2019 Jul. **TASC5/KASC12** MIT, MA, USA
Invited talk: "Accessible Asteroseismology with Lightkurve"
Poster: "Improving gyrochronology of field stars with asteroseismic age and rotation"
- 2018 Dec. **Birmingham-Warwick Science Meet-Up** University of Warwick, UK
"Testing asteroseismology with *Gaia* DR2: Hierarchical Models & the Red Clump"
- 2018 Jul. **TASC4/KASC11** Aarhus University, Denmark
"Testing asteroseismology with *Gaia* DR2: Luminosity of the Red Clump"
- 2017 Jul. **TASC3/KASC10** University of Birmingham, UK
Poster: "Mixture Models applied to *Kepler* backgrounds & development for TESS"
- 2017 Apr. **T'DA 2** Aarhus University, Denmark
"Estimating TESS backgrounds with mixture models – Update"
- 2016 Nov. **T'DA 1** University of Birmingham, UK
"Estimating TESS backgrounds with mixture models"

conferences & workshops

- 2019 Oct. T'DA 9 (**invited**) Institute for Astronomy, HI, USA
- 2019 Aug. Astro Hack Week 2019 Kavli Institute for Cosmology, UK
- 2019 Jul. TASC5/KASC12 (**invited**) MIT, MA, USA
- 2019 Jan. T'DA 8 Aarhus University, Denmark
- 2018 Oct. T'DA 5 (**invited**) Ohio State University, OH, USA
- 2018 Jul. T'DA 4 Aarhus University, Denmark
- 2018 Jul. TASC4/KASC11 Aarhus University, Denmark
- 2018 Jun. The Wetton Workshop 2018 University of Oxford, UK
- 2017 Dec. T'DA 3 KU Leuven, Belgium
- 2017 Jul. TASC3/KASC10 University of Birmingham, UK
- 2017 Apr. T'DA 2 Aarhus University, Denmark
- 2016 Nov. Asteroseismology of stellar activity cycles Observatoire de la Côte d'Azur, France
- 2016 Nov. T'DA 1 University of Birmingham, UK

research visits

- 2018 Oct. **Visit to the KeplerGO office [3 weeks]** NASA Ames Research Centre, CA, USA
Invited to build the **periodogram** & **seismology** modules of **Lightkurve**.
- 2018 Jan. **Visit to SAC [1 week]** Aarhus University, Denmark
Invited to investigate & build tools for background subtraction of TESS FFIs.

grants & awards

- 2019 **£815** - Ogden Trust Alumni Fund One-Off Grants The Ogden Trust, UK
- 2018 **£300** - IOP Research Student Conference Fund (*declined*) Institute of Physics, UK
- 2016 **£3000** - Royal Society Partnership Grant The Royal Society, UK
- 2015 Teach Physics Outstanding Intern 2015 - shortlisted The Ogden Trust, UK

education

2016 → 2020	PhD in Physics & Astronomy (expected completion: May 2020) Supervisor: Dr. Guy R. Davies <i>Thesis:</i> "Applied advanced statistics in asteroseismology"	University of Birmingham, UK
2012 → 2016	M.Sci. Physics & Astrophysics Dissertation supervisor: Prof. William J. Chaplin 1 st Class w. Honours <i>Thesis:</i> "Detecting Signatures of Stellar Activity Cycles in Solar-Type Stars Using Asteroseismic Analysis of P-Mode Amplitude Shifts"	University of Birmingham, UK
2006 → 2012	Gymnasium 8.5/10 average across eleven subjects	Gemeentelijk Gymnasium Hilversum, Netherlands

teaching and research

2019	Advanced HE - Associate Fellow (AFHEA)	Advanced HE
2019	Access to Birmingham (A2B) supervisor Supported applicants from disenfranchised backgrounds through the A2B scheme.	University of Birmingham
2017 → 2019	2nd Year Laboratory Projects Demonstrator Taught students to build apparatus and understand their results. I marked their work and provided constructive feedback.	University of Birmingham, UK
2016 → 2019	3rd Year Observatory Laboratory Supervisor Supervised students using an observatory. Helped students understand their results as well as the use of IRAF, Unix, and Python.	University of Birmingham, UK
2015	Summer Undergraduate Research Experience (SURE) Performed a six-week project using Python to program a robotic arm system for testing a prototype focal plane for the Cherenkov Telescope Array.	University of Leicester, UK
2015	Ogden Trust Teach Physics Intern Helped teach pupils throughout lessons, prepared and taught a lesson & careers workshop of my own design.	Bishop Challoner Catholic College, Birmingham, UK

outreach & engagement

2019 → now	Author, Astrobites Collaboration Write and edit monthly summaries of astronomy papers at an undergraduate level. Committee member for Advertising, Moderating, Hiring, Undergraduate Engagement, Equality, Diversity & Inclusion , and management of the Astrotweeps platform.	
2019	Developer, State of The Universe collaboration Helped build and maintain an informative package for teachers and planetarium guides.	Astro Hack Week 2019
2018 → 2019	Organiser, 9th BEAR Conference Organised local annual high performance computing conference.	University of Birmingham, UK
2018 → 2019	Demonstrator, Applicant Visit Day Developed and taught laboratory sessions for undergraduate applicants.	University of Birmingham, UK
2016 → 2017	Partnered Researcher, Royal Society Partnership Grant Developed and taught a series of lessons and lab activities engaging Year 9 pupils with exoplanet characterisation and asteroseismology.	

community services

2018 → now	Member of the Lightcurve collaboration	NASA Ames Research Centre, CA, USA
2016 → now	Member of the <i>TESS Data for Asteroseismology</i> (T^{DA}) collaboration	
2016 → now	Member of the <i>TESS Asteroseismic Science Consortium</i> (TASC)	
2017	LOC member for TASC3/KASC11	University of Birmingham, UK

selected publications

first author publications:

1. **Hall, O. J.**, Davies, G. R., Elsworth, Y. P. and 9 coauthors
Testing asteroseismology with Gaia DR2: Hierarchical models of the Red Clump
Monthly Notices of the Royal Astronomical Society, 2019
Summary: Constrained the luminosity of the Red Clump and the Gaia DR2 parallax zero-point offset simultaneously using hierarchical latent variable models.
doi:10.1093/mnras/stz1092, arXiv:1904.07919

contributing author publications:

2. Khan, S., **Hall, O. J.**, Miglio, A., Davies, G. R., Mosser, B., Girardi, L., Montalbán, J.
The Red-giant Branch Bump Revisited: Constraints on Envelope Overshooting in a Wide Range of Masses and Metallicities
The Astrophysical Journal, 2018
Contribution: Used Mixture Models to constrain the position of the Red-Giant Branch Bump.
doi:10.3847/1538-4357/aabf90, arXiv:1804.06669
3. Bugnet, L., García, R. A., Davies, G. R., Mathur, S., Corsaro, E., **Hall, O. J.**, Rendle, B. M.
FliPer: A global measure of power density to estimate surface gravities of main-sequence solar-like stars and red giants
Astronomy & Astrophysics, 2018
Contribution: Helped develop the FliPer metric & its machine learning implementation.
doi:10.1051/0004-6361/201833106, arXiv:1809.05105
4. Silva Aguirre, V., Stello, D., Stokholm, A. and 75 coauthors including **Hall, O. J.**
Detection and characterisation of oscillating red giants: first results from the TESS satellite
The Astrophysical Journal, 2019
Contribution: Obtained fundamental seismic parameters for stellar sample.
arXiv:1912.07604
5. Chaplin, W., Serenelli, A. M., Miglio, A. and 82 coauthors including **Hall, O. J.**
Age dating of an early Milky Way merger via asteroseismology of the naked-eye star ν Indi
Nature Astronomy, 2020
Contribution: Advised on systematic uncertainties in spectroscopic methods.
doi:10.1038/s41550-019-0975-9, arXiv:2001.04653
6. Bugnet, L., García, R. A., Mathur, S., Davies, G. R., **Hall, O. J.**, Lund, M. N., Rendle, B. M.
FliPer_{Class}: In search of solar-like pulsators among TESS targets
arXiv e-prints, 2019
Contribution: Aided with interpretation of systematic uncertainties on effective temperature.
doi:10.1051/0004-6361/201834780, arXiv:1902.09854
7. Huber, D., Chaplin, W. J., Chontos, A. and 139 coauthors including **Hall, O. J.**
A Hot Saturn Orbiting An Oscillating Late Subgiant Discovered by TESS
arXiv e-prints, 2019
Contribution: Checked proper use and interpretation of Gaia parallaxes.
doi:10.3847/1538-3881/ab1488, arXiv:1901.01643
8. Davies, G. R., Lund, M. N., Miglio, A., Elsworth, Y. P. and 13 coauthors including **Hall, O. J.**
Using red clump stars to correct the Gaia DR1 parallaxes
Astronomy & Astrophysics, 2017
Contribution: Verified results found by lead authors.
doi:10.1051/0004-6361/201630066, arXiv:1701.02506

software publications:

9. Lightkurve Collaboration, Cardoso, J. V. d. M., Hedges, C., Gully-Santiago, M., Saunders, N., Cody, A-M., Barclay, T., **Hall, O. J.**, Sagar, S., Turtelboom, E., Zhang, J., Tzanidakis, A., Mighell, K., Coughlin, J., Bell, K., Berta-Thompson, Z., Williams, P., Dotson, J., Barentsen, G.
Lightkurve: Kepler and TESS time series analysis in Python
Astrophysics Source Code Library, 2018
Contribution: Led development of the 'periodogram' and 'seismology' modules.
ascl:1812.013

white papers:

10. Khullar, G., Kholer, S., Konchady, T. and 32 coauthors including **Hall, O. J.**
Astrobites as a Community-led Model for Education, Science Communication, and Accessibility in Astrophysics
arXiv e-prints, 2019
arXiv:1907.09496