Oliver James Hall

PhD student in asteroseismology

programming

Python, Git
Unix, LaTeX,
R, SQL (basic)

skills

Stan
PyMC3
emcee
Bayesian statistics
Hierarchical models
Asteroseismology
Software development & publication (Python)

languages

English, Dutch (bilingual)

contact

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research interests

With the recent successes of the *Kepler*, K2, *Gaia* and TESS missions, we have access to vast catalogues of astronomical data. I am interested in leveraging these data to draw new inferences of stellar physics through Bayesian population studies of asteroseismic data. I previously used hierarchical latent variable models to constrain the red clump distance ladder to an unprecedented precision. I am currently studying the relation between mass, age and rotation of solar-like stars in the *Kepler* field, and the correlation between properties of red clump giant populations.

presentations

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

conferences & workshops

2019 Oct.	T'DA 9 (**invited**)	Institute for Astronomy, HI, USA
2019 Aug.	Astro Hack Week 2019	Kavli Institude 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]** Invited to build the `periodogram` module of `lightkurve`	NASA Ames Research Centre, CA, USA
2018 Jan.	**Visit to SAC [1 week]** Invited to investigate & build tools for background subtraction of TESS FFIs	Aarhus University, Denmark

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education

2016 →2020 **PhD** in Physics & Astronomy — University of Birmingham, UK
Supervisor: Dr. Guy R. Davies
Thesis: "Applied advanced statistics in asteroseismology"

2012 →2016 **M.Sci.** Physics & Astrophysics — University of Birmingham, UK
Disseration supervisor: Prof. William J. Chaplin
1st Class w. Honours
Thesis: "Detecting Signatures of Stellar Activity Cycles in Solar-Type Stars Using Asteroseismic Analysis of P-Mode Amplitude Shifts"

2006 →2012 **Gymnasium** — Gemeentelijk Gymnasium Hilversum, Netherlands
8.5/10 average across eleven subjects

teaching and research

2019 **Advanced HE - Associate Fellow (AFHEA)** — Advanced HE

2019 **Access to Birmingham (A2B) supervisor** — University of Birmingham
Support applicants from disenfranchised backgrounds through the A2B scheme.

2017 →now **2nd Year Laboratory Projects Demonstrator** — University of Birmingham, UK
Taught students to build apparatus, understand their results. I marked their work and provided constructive feedback.

2016 →now **3rd Year Observatory Laboratory Supervisor** — University of Birmingham, UK
Supervised students using an observatory. Helped students understand their results as well as the use of IRAF, Unix, and Python.

2015 **Summer Undergraduate Reserach Experience (SURE)** — University of Leicester, UK
Performed a six-week project using Python to program a robotic arm system for testing a prototype focal plane for the Cherenkov Telescope Array.

2015 **Ogden Trust Teach Physics Intern** — Bishop Challoner Catholic College, Birmingham, UK
Helped teach pupils throughout lessons, prepared and taught a lesson & careers workshop of my own design.

outreach & engagement

2019 →now ***Author*, Astrobites Collaboration**
Write and edit monthly summaries of astronomy papers for an undergraduate level.
Committee member for **Advertising**, **Moderating**, **Hiring**, **Undergraduate Engagement**, and **Equality, Diversity & Inclusion**

2019 ***Developer*, State of The Universe collaboration** — Astro Hack Week 2019
Helped build and maintain an informative package for teachers and planetarium guides.

2018 →2019 ***Organiser*, 9th BEAR Conference** — University of Birmingham, UK
Organised local annual high performance computing conference.

2018 →now ***Demonstrator*, Applicant Visit Day** — University of Birmingham, UK
Developed and taught laboratory sessions for undergraduate applicants.

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.

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community services

2018 →now	Member of the `lightkurve` collaboration	NASA Ames Research Centre, CA, USA
2016 →now	Member of the *TESS Data for Asteroseismology* (T'DA) collaboration	
2016 →now	Member of the *TESS Asteroseismic Science Consortium* (TASC)	
2017	LOC member for TASC3/KASC11	University of Birmingham, UK

grants & awards

2019	**£815** - 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 Oustanding Intern 2015 - shortlisted	The Ogden Trust, UK

publications

Hall, O. J., Davies, G. R., Elsworth, Y. P. et al. [7 citations]
Testing asteroseismology with Gaia DR2: Hierarchical models of the Red Clump
Monthly Notices of the Royal Astronomical Society, 2019
`doi:10.1093/mnras/stz1092, arXiv:1904.07919`

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

Huber, D., Chaplin, W. J., Chontos, A ... **Hall, O. J.** ... et al. [12 citations]
A Hot Saturn Orbiting An Oscillating Late Subgiant Discovered by TESS
arXiv e-prints, 2019
`doi:10.3847/1538-3881/ab1488, arXiv:1901.01643`

Bugnet, L., García, R. A., Mathur, S., Davies, G. R., **Hall, O. J.**, Lund, M. N., Rendle, B. M. [1 citation]
FliPer$_{Class}$: In search of solar-like pulsators among TESS targets
arXiv e-prints, 2019
`doi:10.1051/0004-6361/201834780, arXiv:1902.09854`

Lightkurve Collaboration, Cardoso, J. V. d. M., Hedges, C. ... **Hall, O. J.** ... et al. [5 citations]
Lightkurve: Kepler and TESS time series analysis in Python
Astrophysics Source Code Library, 2018
`ascl:1812.013`

Bugnet, L., García, R. A., Davies, G. R. .. **Hall, O. J.** ... et al. [9 citations]
FliPer: A global measure of power density to estimate surface gravities of main-sequence solar-like stars and red giants
Astronomy & Astrophysics, 2018
`doi:0.1051/0004-6361/201833106, arXiv:1809.05105`

Khan, S., **Hall, O. J.**, Miglio, A. et al. [7 citations]
The Red-giant Branch Bump Revisited: Constraints on Envelope Overshooting in a Wide Range of Masses and Metallicities
The Astrophysical Journal, 2018
`doi:10.3847/1538-4357/aabf90, arXiv:1804.06669`

Davies, G. R., Lund, M. N. and Miglio, A. ... **Hall, O. J.** ... et al. [24 citations]
Using red clump stars to correct the Gaia *DR1 parallaxes*
Astronomy & Astrophysics, 2017
`doi:10.1051/0004-6361/201630066, arXiv:1701.02506`