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 (Python)

languages

English, Dutch (bilingual)

contact

School of Physics &
Astronomy
University of Birmingham
B15 2TT
Birmingham
United Kingdom

ojh251@bham.ac.uk
ojhall94.github.io
GitHub/ojhall94
@asteronomer
ORCID/
0000-0002-0468-4775

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 catalogues 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**	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 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]**	NASA Ames Research Centre, CA, USA
	Invited to build the **periodogram** module of **Lightkurve**	
2018 Jan.	**Visit to SAC [1 week]**	Aarhus University, Denmark
	Invited to investigate & build tools for background subtraction of TESS FFIs	

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.	

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

community services

selected publications

refereed publications:

1. **Hall, O. J.**, Davies, G. R., Elsworth, Y. P. and 9 coauthors [9 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`

2. Khan, S., **Hall, O. J.**, Miglio, A., Davies, G. R., Mosser, B., Girardi, L., Montalbán, J. [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`

3. Bugnet, L., García, R. A., Davies, G. R., Mathur, S., Corsaro, E., **Hall, O. J.**, Rendle, B. M. [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`

4. 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`

5. Huber, D., Chaplin, W. J., Chontos, A and 139 coauthors including **Hall, O. J.** [14 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`

6. Davies, G. R., Lund, M. N., Miglio, A., Elsworth, Y. P. and 13 coauthors including **Hall, O. J.** [24 citations]
   Using red clump stars to correct the Gaia *DR1 parallaxes*
   Astronomy & Astrophysics, 2017
   `doi:10.1051/0004-6361/201630066, arXiv:1701.02506`

Software Publications:

1. Lightkurve Collaboration, Cardoso, J. V. d. M., Hedges, C., Gully-Santiago, M., Saunders, N., Cody, A-M., Barclay, T., **Hall, O. J.**, Sagear, S., Turtelboom, E., Zhang, J., Tzanidakis, A., Mighell, K., Coughlin, J., Bell, K., Berta-Thompson, Z., Williams, P., Dotson, J., Barentsen, G. [5 citations]
   Lightkurve: Kepler and TESS time series analysis in Python
   Astrophysics Source Code Library, 2018
   `ascl:1812.013`

Unrefereed Publications:

1. Khullar, G., Kholer, S., Konchady, T. , Foley, M., Hornsby, A. L., de los Reyes, M. A., Chirsari, N. E., Villar, V. A., Shin, K., Doughty, D., Shipp, N., Ramasawmy, J., Penoyre, Z., Lichtenberg, T., Storey-Fisher, K., **Hall, O. J.**, Lewis, B., Pearlman, A. B., Cárdenas-Avendaño, A., Bridge, J. S., González-Egea, E., Panwar, V., Slepian, Z., Zimmerman, M.
   Astrobites as a Community-led Model for Education, Science Communication, and Accessibility in Astrophysics
   arXiv e-prints, 2019
   `arXiv:1907.09496`