Oliver James Hall

PhD student in asteroseismology

programming

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

skills

Stan
emcee
TensorFlow
Bayesian statistics
Hierarchical models
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

The recent success of the *Kepler* and K2 missions, and the ongoing release of data from *Gaia* and TESS, we have access to a vast amount of astronomical data. I am interested in leveraging these data sets to make inferences of stellar physics and analysis systematics. I do this through a Bayesian use of populations of asteroseismic data, in combination with other sources. I have used hierarchical models to study systematics and constrain the Red Clump standard candle to high precision. My current work focuses on studying the relation between mass, rotation and age of solar-like stars in the *Kepler* field.

presentations

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 presentation)** *"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 Jan.	T'DA 8	Aarhus University, Denmark
2018 Oct.	T'DA 5	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 help 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
"Asteroseismology with Kepler, K2 and TESS"

2012 →2016 **M.Sci.** Physics & Astrophysics — University of Birmingham, UK
Disseration supervisor: Prof. William J. Chaplin
1st Class w. Honours

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

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
I helped teach pupils throughout lessons. and 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 for the website Astrobites.

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.

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

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grants & awards

2019	Alumni Fund One-Off Grants - £815	The Ogden Trust, UK
2018	IOP Research Student Conference Fund - £300 *(declined)*	Institute of Physics, UK
2016	Royal Society Partnership Grant - £3000	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. [2 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

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
arXiv:1902.09854

Huber, D, Chaplin, W. J., Chontos, A ... **Hall, O. J.** ... et al. [3 citations]
A Hot Saturn Orbiting An Oscillating Late Subgiant Discovered by TESS
arXiv e-prints, 2019
arXiv:1901.01643

Lightkurve Collaboration, Cardoso, J. V. d. M., Hedges, C. ... **Hall, O. J.** ... et al. [2 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. [7 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. [22 citations]
Using red clump stars to correct the Gaia *DR1 parallaxes*
Astronomy & Astrophysics, 2017
doi:10.1051/0004-6361/201630066, arXiv:1701.02506