

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

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research interests

With the recent success of the *Kepler* and K2 missions, and the ongoing release of data from *Gaia* and TESS, we are in possession of a vast amount of astronomical data. I am interested in leveraging these large data sets to make inferences of stellar physics, & 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 unprecedented precision. My current work focuses on studying the relation between mass, rotation and age of solar-like stars in *Kepler* and K2 fields.

presentations

- | | | |
|-----------|--|------------------------------|
| 2018 Dec. | Birmingham-Warwick Science Meet-Up | University of Warwick, UK |
| | <i>"Testing asteroseismology with Gaia DR2: Hierarchical Models & the Red Clump"</i> | |
| 2018 Jul. | TASC4/KASC11 | Aarhus University, Denmark |
| | <i>"Testing asteroseismology with Gaia DR2: Luminosity of the Red Clump"</i> | |
| 2017 Jul. | TASC3/KASC10 (poster presentation) | University of Birmingham, UK |
| | <i>"Mixture Models applied to Kepler backgrounds & development for TESS"</i> | |
| 2017 Apr. | T'DA 2 | Aarhus University, Denmark |
| | <i>"Estimating TESS backgrounds with mixture models – Update"</i> | |
| 2016 Nov. | T'DA 1 | University of Birmingham, UK |
| | <i>"Estimating TESS backgrounds with mixture models"</i> | |

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] | NASA Ames Research Centre, CA, USA |
| | Invited to help 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
"AsteroSeismology with Kepler, K2 and TESS"
- 2012 → 2016 **M.Sci. Physics & Astrophysics** University of Birmingham, UK
Dissertation 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

- 2017 → now **2nd Year Laboratory Projects Demonstrator** University of Birmingham, UK
Taught students to build apparatus, understand their results, marked their work and provided constructive feedback.
- 2016 → now **3rd Year Observatory Laboratory Supervisor** University of Birmingham, UK
Supervised students in their research using an observatory. Helped students understand their results as well as the use of IRAF, Unix, and Python.
- 2015 **Summer Undergraduate Research Experience (SURE)** University of Leicester, UK
Performed a six-week project using Python to program a robotic arm system to perform experimental testing on a prototype focal plane for the Cherenkov Telescope Array under Dr. Jon Lapington.
- 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 **lightcurve** 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

2018	IOP Research Student Conference Fund - £300 (<i>declined</i>)	Institute of Physics, UK
2016	Royal Society Partnership Grant - £3000	The Royal Society, UK
2015	Teach Physics Outstanding Intern 2015 - shortlisted	The Ogden Trust

publications

Hall, O. J., Davies, G. R., Elsworth, Y. et al.

Testing asteroseismology with Gaia DR2: Hierarchical models of the Red Clump

Submitted to MNRAS

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. [1 citation]

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. [5 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. [20 citations]

Using red clump stars to correct the Gaia DR1 parallaxes

Astronomy & Astrophysics, 2017

doi:10.1051/0004-6361/201630066, arXiv:1701.02506