# 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 succes 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**<br>*"Testing asteroseismology with Gaia DR2: Hierarchical Models & the Red Clump"* | University of Warwick, UK |
| 2018 Jul. | **TASC4/KASC11**<br>*"Testing asteroseismology with Gaia DR2: Luminosity of the Red Clump"* | Aarhus University, Denmark |
| 2017 Jul. | **TASC3/KASC10 (poster presentation)**<br>*"Mixture Models applied to* Kepler *backgrounds & development for TESS* | University of Birmingham, UK |
| 2017 Apr. | **T'DA 2**<br>*"Estimating TESS backgrounds with mixture models – Update"* | Aarhus University, Denmark |
| 2016 Nov. | **T'DA 1**<br>*"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]**<br>Invited to help build the `periodogram` module of `lightkurve` | NASA Ames Research Centre, CA, USA |
| 2018 Jan. | **Visit to SAC [1 week]**<br>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

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 Reserach Experience (SURE)** — University of Leicester, UK
Performed a six-week project using Python to program a robotic arm system to perform experimantal 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 `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

| | | |
|---|---|---|
| 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 |

## 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**