

# 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 posession 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.	<b>Birmingham-Warwick Science Meet-Up</b> "Testing asteroseismology with Gaia DR2: Hierarchical Models & the Red Clump"	University of Warwick, UK
2018 Jul.	<b>TASC4/KASC11</b> "Testing asteroseismology with Gaia DR2: Luminosity of the Red Clump"	Aarhus University, Denmark
2017 Jul.	<b>TASC3/KASC10 (poster presentation)</b> "Mixture Models applied to Kepler backgrounds & development for TESS"	University of Birmingham, UK
2017 Apr.	<b>T'DA 2</b> "Estimating TESS backgrounds with mixture models – Update"	Aarhus University, Denmark
2016 Nov.	<b>T'DA 1</b> "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.	<b>Visit to the KeplerGO office [3 weeks]</b> Invited to help build the <b>periodogram</b> module of <b>lightkurve</b>	NASA Ames Research Centre, CA, USA
2018 Jan.	<b>Visit to SAC [1 week]</b> Invited to investigate & build tools for background subtraction of TESS FFIs	Aarhus University, Denmark

## 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  
1<sup>st</sup> Class w. Honours
- 2006 → 2012 **Gymnasium** Gemeentelijk Gymnasium Hilversum, Netherlands  
8.5/10 average across eleven subjects

## teaching and research

- 2017 → now **2<sup>nd</sup> 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 **3<sup>rd</sup> 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, 9<sup>th</sup> 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

## 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. P. et al.

*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<sub>Class</sub>: 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. [2 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. [6 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