# 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

## languages

English, Dutch (bilingual)

## contact

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## presentations

| | | |
|---|---|---|
| 2019 Nov. | **Seminar**<br>"Asteroseismology & Applied Statistics" | University of Exeter, UK |
| 2019 Jul. | **TASC5/KASC12**<br>**Invited talk:** "Accessible Asteroseismology with Lightkurve"<br>Poster: "Improving gyrochronology of field stars with asteroseismic age and rotation" | MIT, MA, USA |
| 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**<br>Poster: "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 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]**<br>Invited to build the **periodogram** & **seismology** modules 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 |

## grants & awards

| | | |
|---|---|---|
| 2019 | **£815** - Ogden Trust 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 |

# education

2016 →2020 **PhD** in Physics & Astronomy (expected completion: May 2020) — 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
Dissertation 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
Supported applicants from disenfranchised backgrounds through the A2B scheme.

2017 →2019 **2nd Year Laboratory Projects Demonstrator** — University of Birmingham, UK
Taught students to build apparatus and understand their results. I marked their work and provided constructive feedback.

2016 →2019 **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 Research 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 at an undergraduate level.
Committee member for Advertising, Moderating, Hiring, **Undergraduate Engagement**, **Equality, Diversity & Inclusion**, and management of the **Astrotweeps** platform.

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 →2019 ***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

# selected publications

## first author publications:

1. **Hall, O. J.**, Davies, G. R., Elsworth, Y. P. and 9 coauthors
   *Testing asteroseismology with Gaia DR2: Hierarchical models of the Red Clump*
   Monthly Notices of the Royal Astronomical Society, 2019
   *Summary*: Constrained the luminosity of the Red Clump and the *Gaia* DR2 parallax zero-point offset simultaneously using hierarchical latent variable models.
   `doi:10.1093/mnras/stz1092, arXiv:1904.07919`

## contributing author publications:

2. Khan, S., **Hall, O. J.**, Miglio, A., Davies, G. R., Mosser, B., Girardi, L., Montalbán, J.
   *The Red-giant Branch Bump Revisited: Constraints on Envelope Overshooting in a Wide Range of Masses and Metallicities*
   The Astrophysical Journal, 2018
   *Contribution:* Used Mixture Models to constrain the position of the Red-Giant Branch Bump.
   `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.
   *FliPer: A global measure of power density to estimate surface gravities of main-sequence solar-like stars and red giants*
   Astronomy & Astrophysics, 2018
   *Contribution:* Helped develop the FliPer metric & its machine learning implementation.
   `doi:0.1051/0004-6361/201833106, arXiv:1809.05105`

4. Silva Aguirre, V., Stello, D., Stokholm, A. and 75 coauthors including **Hall, O. J.**
   *Detection and characterisation of oscillating red giants: first results from the TESS satellite*
   The Astrophysical Journal, 2019
   *Contribution:* Obtained fundamental seismic parameters for stellar sample.
   `arXiv:1912.07604`

5. Chaplin, W., Serenelli, A. M., Miglio, A. and 82 coauthors including **Hall, O. J.**
   *Age dating of an early Milky Way merger via asteroseismology of the naked-eye star $\nu$Indi*
   Nature Astronomy, 2020
   *Contribution:* Advised on systematic uncertainties in spectroscopic methods.
   `doi:10.1038/s41550-019-0975-9, arXiv:2001.04653`

6. 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
   *Contribution*: Aided with interpretation of systematic uncertainties on effective temperature.
   `doi:10.1051/0004-6361/201834780, arXiv:1902.09854`

7. Huber, D., Chaplin, W. J., Chontos, A and 139 coauthors including **Hall, O. J.**
   *A Hot Saturn Orbiting An Oscillating Late Subgiant Discovered by TESS*
   arXiv e-prints, 2019
   *Contribution*: Checked proper use and interpretation of *Gaia* parallaxes.
   `doi:10.3847/1538-3881/ab1488, arXiv:1901.01643`

8. Davies, G. R., Lund, M. N., Miglio, A., Elsworth, Y. P. and 13 coauthors including **Hall, O. J.**
   *Using red clump stars to correct the* Gaia *DR1 parallaxes*
   Astronomy & Astrophysics, 2017
   *Contribution*: Verified results found by lead authors.
   `doi:10.1051/0004-6361/201630066, arXiv:1701.02506`

**software publications:**

9. 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.
*Lightkurve: Kepler and TESS time series analysis in Python*
Astrophysics Source Code Library, 2018
*Contribution:* Led development of the 'periodogram' and 'seismology' modules.
`ascl:1812.013`

**white papers:**

10. Khullar, G., Kholer, S., Konchady, T. and 32 coauthors including **Hall, O. J.**
*Astrobites as a Community-led Model for Education, Science Communication, and Accessibility in Astrophysics*
arXiv e-prints, 2019
`arXiv:1907.09496`