Oliver James Hall
ESA Research Fellow - Asteroseismology & Statistics

programming

Python, Git
Unix, LaTeX,
SQL

skills

Stan
PyMC3
emcee
Bayesian statistics
Hierarchical models
Asteroseismology
Jupyter Notebooks
Science Communication &
Writing
Software development &
publication

languages

English, Dutch (bilingual)

contact

European Space Research
& Technology Centre
Keplerlaan 1
Postbus 299
2200 AG Noordwijk
The Netherlands

oliver.hall@esa.int
ojhall94.github.io
GitHub/ojhall94
@asteronomer
ORCID/
0000-0002-0468-4775
Tel: (+31)(0)614227748

presentations

2019 Nov. — **Seminar** — University of Exeter, UK
"Asteroseismology & Applied Statistics"

2019 Jul. — **TASC5/KASC12** — MIT, MA, USA
Invited talk: "Accessible Asteroseismology with Lightkurve"
Poster: "Improving gyrochronology of field stars with asteroseismic age and rotation"

2018 Dec. — **Birmingham-Warwick Science Meet-Up** — University of Warwick, UK
"Testing asteroseismology with *Gaia* DR2: Hierarchical Models & the Red Clump"

2018 Jul. — **TASC4/KASC11** — Aarhus University, Denmark
"Testing asteroseismology with *Gaia* DR2: Luminosity of the Red Clump"

2017 Jul. — **TASC3/KASC10** — University of Birmingham, UK
Poster: "Mixture Models applied to *Kepler* backgrounds & development for TESS"

2017 Apr. — **T'DA 2** — Aarhus University, Denmark
"Estimating TESS backgrounds with mixture models – Update"

2016 Nov. — **T'DA 1** — University of Birmingham, UK
"Estimating TESS backgrounds with mixture models"

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]** — NASA Ames Research Centre, CA, USA
Invited to build the **periodogram** & **seismology** modules of **Lightkurve**.

2018 Jan. — **Visit to SAC [1 week]** — Aarhus University, Denmark
Invited to investigate & build tools for background subtraction of TESS FFIs.

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 & employment

2020 →now	**ESA Research Fellow**	European Space Research & Technology Centre, Netherlands
	Supervisor: Ana Heras	
2016 →2020	**PhD** in Physics & Astronomy	University of Birmingham, UK
	Supervisor: Dr. Guy R. Davies	
	Thesis: "Ensemble Asteroseismology and Hierarchical Bayesian Models: New Inferences of Astrophysics with Oscillating Stars"	
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**, and **Equality, Diversity & Inclusion**	
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

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
   Contribution: Obtained fundamental seismic parameters for stellar sample.
   `doi:10.3847/2041-8213/ab6443, arXiv:1912.07604`

5. Montalbán, J., Mackereth, J. T., Miglio, A. and 16 coauthors including **Hall, O. J.**
   Chronologically dating the early assembly of the Milky Way
   arxiv e-prints, 2020. Under review for publication in Nature Astronomy
   Contribution: Obtained seismic parameters for stellar sample and helped develop hierachical model.
   `https://arxiv.org/abs/2001.04653`

6. Chaplin, W., Serenelli, A. M., Miglio, A. and 83 coauthors including **Hall, O. J.**
   Age dating of an early Milky Way merger via asteroseismology of the naked-eye star νIndi
   Nature Astronomy
   Contribution: Advised on systematic uncertainties in spectroscopic methods.
   `doi:10.1038/s41550-019-0975-9, arXiv:2001.04653`

7. 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`

8. 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`

9. 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`