

Research Experience

The Open University

Milton Keynes, UK

PhD Student, Astronomy Research Group, School of Physical Sciences

2017 - 2021

- PhD title: "Variable Stars in the SuperWASP All Sky Survey" supervised by Professor Andrew Norton and Dr Ulrich Kolb, funded by the DISCnet Centre for Doctoral Training.
- Highly skilled in observational astronomy, both photometric and spectroscopic, data cleaning and reduction, spectral fitting routines, and modelling using software such as PHOEBE, MESA, and binary_c.
- Achieved 8 successful PI and Co-I bids for telescope time, and E.A. Milne Travelling Fellowship.

My research focuses on various aspects of stellar variability. I used a recent reanalysis of the SuperWASP archive to discover a new type of binary star, near-contact red-giant eclipsing binaries, which we believe may be the progenitors of the rare transient, red novae. I identified these objects during the creation of the *SuperWASP Variable Stars Zooniverse* citizen science project, and have since devised and led a 2 year long photometric and spectroscopic follow-up campaign to characterise the radial velocities of these low-mass giant binaries. I am now modelling the systems and their evolutionary pathways, and will soon be publishing the results of this work.

Previously, my research focused on using the SuperWASP archive to investigate unique stars displaying a rotational modulation in their light curve with corresponding X-ray observations. By cross-matching with large data sets, I published work on the characterisation of the rotation-activity relation for SuperWASP and ASAS-SN field stars.

Education

University of Leicester

Leicester, UK

2:1 (Hons) MPhys Physics with Space Science and Technology

2013 - 2017

- Master's projects: Searching for Variable Sources, The Formation of Hot Jupiters.
- Third year projects: Detecting Transiting Exoplanets, Catching and Disposing of Space Junk.

Nara Women's University

Nara, Japan

Summer Research Programme

August 2016

- A scientific and cultural research programme to explore the ecology and diet of sika deer in Nara.

Journal Publications

- **Thiemann, Heidi B.**, Norton, A.J., Kolb, U.C., (2021), *Investigation of near-contact red giant eclipsing binary stars*, (in prep)
- **Thiemann, Heidi B.**, Norton, A.J., Kolb, U.C., Dickinson, H.J., McMaster, A., (2021), *SuperWASP Variable Stars: Classifying Light Curves Using Citizen Science*, (in prep)
- Rawls, M. L., **Thiemann, Heidi B.**, Walkowicz, L. M., Peel, M. W., Grange, Y. G., (2020), *Satellite Constellation Internet Affordability and Need*, RNAAS
- **Thiemann, Heidi B.**, Norton, A.J., Kolb, U.C., (2020), *The stellar rotation-activity relation for a sample of SuperWASP field stars*, PASA

Other Publications (Non-Refereed)

- **Thiemann, Heidi B.**, Norton, A.J., Kolb, U.C., Dickinson, H.J., McMaster, A., (2020), *SuperWASP Variable Stars: Classifying Light Curves Using Citizen Science*, to appear in: Proceedings of ADASS (ASP)
- Dudley, J., **Thiemann, Heidi B.** (2020), *Assessing the Quality of Space Job Adverts*, Space Skills Alliance
- **Thiemann, Heidi B.**, Dudley, J. (2020), *Skills demand for early career space jobs*, Space Skills Alliance
- Dudley, J., **Thiemann, Heidi B.** (2020), *Towards a space competencies taxonomy*, Space Skills Alliance
- Robson, D., et al. (2019), *Assessing the Impact of Space School UK*, Proceedings of the 3rd Symposium on Space Educational Activities

Conference Posters

- *SuperWASP Variable Stars: Classifying Light Curves Using Citizen Science*, ADASS 2020
 - *Red novae candidates: An investigation of long-period near-contact giant binaries*, RAS Early Career Online Poster Exhibition 2020
 - *Red Giant Binary Stars: A new discovery?*, OU Postgraduate Research Poster Exhibition 2020
 - *The rotation-activity relation*, National Astronomy Meeting 2019
 - *Diversity in student space activities in the UK*, 50th Lunar and Planetary Science Conference 2019
 - *Initial results of the rotation-activity relation*, Time-Domain Astronomy: A High Energy View 2018
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Selected Talks

- *Red novae candidates? An investigation of long-period near-contact giant binaries*, EAS 2020
 - *Megaconstellations and Astronomy*, 2nd Summit for Space Sustainability (invited) 2020
 - *Data science in the space sector*, DISCnet Annual Showcase (invited) 2019
 - *Stellar variability in SuperWASP*, SAAO colloquia series (invited) 2019
 - *Diversity in student space activities in the UK*, National Astronomy Meeting 2019
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Teaching Experience

- Maths Assessor**, The Open University 2019 - Present
- Marking maths coursework from 50 Students in Secure Environments (SiSE).
- Zooniverse Project Collaborator**, The Open University 2018 - Present
- Researcher and collaborator on the *SuperWASP Variable Stars* citizen science project.
- Night Duty Astronomer**, The Open University 2018 - Present
- Teaching 60 undergraduates per year to independently use the *PIRATE* telescope.
- Course Facilitator**, FutureLearn Winter 2018
- Answering questions and encouraging discussion on forums for the *In the Night Sky: Orion* MOOC.
- Senior Mentor**, Space School UK 2014 - Present
- Responsible for giving lectures and leading workshops to educate 180 young people on a variety of space topics, alongside pastoral care and safeguarding. Responsible for training 2-5 Junior Mentors per year.
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Industry and Management Experience

- Co-Founder and Director**, Space Skills Alliance 2019 - Present
- Founder and director of the think tank addressing the UK space sector skills shortage. Expert in the space skills domain, and have published analysis on diversity and skills shortages in the sector.
- Visiting Scientist**, STFC/Rutherford Appleton Laboratory Summer 2019
- Worked with the Earth Observation Department to update the Python-based Sentinel-2 cloud detection algorithm and image processor 's2cloudless' to run with Sentinel-3 inputs, including visible and SWIR.
- Advisor (previously Director)**, SpaceCareers.uk 2015 - Present
- Managed a team of 10 people to build and grow SpaceCareers.uk, making it the go-to resource for the space sector, reaching over 1.5 million page views. Organised numerous national careers events for young people.
- Advisor (previously Treasurer on Executive Committee)**, UKSEDS 2015 - 2019
- Managed a team of 40 volunteer staff and led the organisation of multiple national conferences. Provided young people with opportunities to further their careers, and managed a charity budget of ~£30,000.

Hands-On Observing Experience

- *1.9m Telescope (SpUpNIC)*, 14 nights, SAAO, South Africa **2019**
- *PIRATE Telescope*, over 650 hours, The Open University, Tenerife **2018-Present**
- *piCETL Telescope*, 2 nights, University of Leicester, UK **2016**

Successful Proposals

- *SALT (RSS)*, Co-I, 2.6 hours **2020**
- *SALT (RSS)*, Co-I, 8.5 hours **2020**
- *Liverpool Telescope (FRODOSpec)*, PI, 6.1 hours **2020**
- *Liverpool Telescope (FRODOSpec)*, PI, 6.6 hours **2020**
- *1.9m Telescope (SpUpNIC)*, PI, 14 nights **2019**
- *Liverpool Telescope (FRODOSpec)*, PI, 21.2 hours **2019**
- *SALT (RSS)*, Co-I, 9.7 hours **2019**
- *Las Cumbres Observatory (multiple instruments)*, PI, 28 hours **2019**

Successful Funding

- *E.A. Milne Travelling Fellowship (£1000)*, Royal Astronomical Society **2019**
- *Small Grants Fund*, Institute of Physics **2018**
- *DISCnet PhD Funding*, DISCnet Centre for Doctoral Training **2017–2021**
- *Outreach Grant Fund (£500)*, University of Leicester **2015**
- *Undergraduate Conference Travel Fund*, University of Leicester **2015**

Awards and Achievements

- *Rising Star Award Finalist*, FDM everywoman in Technology **2020**
- *Outreach and Public Engagement Award*, The Open University **2020**
- *Sir Arthur Clarke Award for contributions to the space sector*, Arthur C. Clarke Foundation **2019**
- *RAS Poster Competition Second Prize*, Oxford University Press **2019**
- *Invitation to the Royal Garden Party*, Department for Business, Energy & Industrial Strategy **2019**
- *Voice of the Future 2019*, The Open University **2019**
- *Future Leaders Award Finalist*, University of Leicester **2019**
- *The Dean's Award*, Nara Women's University **2016**
- *Advancing Gender Equality Award*, University of Leicester **2016**
- *Voice of the Future 2015*, Royal Astronomical Society **2015**

Skills

Scientific

- Substantial track record of working in observational astronomy (spectroscopic and photometric), planning, and data reduction for both in-person and queue-scheduled facilities.
- Skilled at creating and working with large data sets, statistical analysis, and clear visualisation and presentation of the data, and publishing the results.
- Passionate about citizen science and how to accomplish impactful science through collaborative methods.

Computer programming

- 4 years' experience with Python (including numerous scientific modules and libraries such as SciPy, NumPy, Pandas, scikit-learn, Astropy, TensorFlow), and experience writing astronomy-specific programmes.
- Some experience of working with JavaScript, R, and SQL.
- Excellent and continually developing familiarity with astronomical programmes including: IRAF, PyRAF, VaST, AstrolmageJ, DS9, PHOEBE, binary_c, FDBinary, MESA, PyHammer, TOPCAT.

Communication

- Confident communicator and public speaker, capable of delivering scientific presentations and public talks.
- Highly skilled at writing, with experience writing scientific publications and popular science pieces.

General Information Technology

- Highly competent in UNIX operating system Linux, and Microsoft Office.
- Confident in use of general software such as Google Drive, Slack, L^AT_EX, Overleaf, as well as photo and video editing software, and social media management tools.

Service and Impact Activities

- Commissioned by the UK Space Agency to carry out the 2020 Space Census, the first national census of the UK's space workforce demographics and skills needs.
- Currently serving as a member of the Space Skills Advisory Panel (SSAP), advising the UK Space Agency on skills provision, which will be fed into the National Space Skills Institute (NSSI).
- Currently serving as a member of the Royal Astronomical Society's Optical Working Group, working on understanding and mitigating the effects of mega-constellations on astronomy.
- Currently serving on the committee of the Space Universities Network (SUN), working to enhance the quality of space teaching in UK universities.
- Social Media Manager for Women In Aerospace-Europe (WIA-E).
- Represented the Royal Astronomical Society and The Open University in the Voice of the Future events in the House of Commons.

Supervision Experience

Summer Internship Student, SpaceCareers.uk/The Open University

Summer 2018

- Supervised an undergraduate student for an 8 week Space Placement in INdustry (SPIN) internship, guiding them towards creating new space outreach and careers materials for SpaceCareers.uk.

Public Engagement

- Led the development and organisation of national competitions, events, and conferences for more than 2,500 young people interested in the space industry and space careers.
 - Regular speaker for Irish primary schools as part of the *Space Speaker in your Classroom* initiative.
 - Engaged with students from across the country through the *I'm a Scientist* programme.
 - Founded *PubhD-OU*, an informal monthly event for academics to share their research.
 - Actively engaged with STEM Ambassador events, and regular speaker for *Careers Launch* events.
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Professional Affiliations

- Fellow of the Royal Astronomical Society
 - Member of the Institute of Physics
 - Member of Women In Aerospace - Europe
 - Member of the Space Universities Network
 - Member of Astronomers for Planet Earth
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Language Skills

- English - Native
 - French - Intermediate
 - Japanese - Beginner
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Driving License

- Full, clean UK driver's license, held since 2014.
 - Manual transmission; experience with 4-wheel drives on and off road.
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Hobbies and Interests

I enjoy baking scientifically accurate cakes, hiking and the outdoors, and learning Japanese in my spare time. When possible, I also take part in winch-launch gliding at the local flying club.

References

Professor Andrew Norton, Professor Carole Haswell, Dr. Ulrich Kolb, Dr. Helen Fraser