

# – DR JAYNE LOUISE BIRKBY –

## CURRICULUM VITAE

Anton Pannekoek Institute for Astronomy, University of Amsterdam  
Science Park 904  
Amsterdam 1098XH, The Netherlands

Email: [jbirkby@uva.nl](mailto:jbirkby@uva.nl)  
Tel: +31 (0)64 139 9595  
Web: <http://staff.fnwi.uva.nl/j.l.birkby>

## RESEARCH INTERESTS

---

- Characterization of exoplanet atmospheres including composition, structure, and dynamics;
- Physical mechanisms responsible for the diversity of planetary systems;
- Development of ground-based instrumentation and techniques for detecting and characterizing Earth analogues (biomarkers);
- Detection of planetary storms and exomoons via development of high contrast imaging and spectroscopy techniques to monitor exoplanet variability;
- Fundamental properties of M-dwarfs and young stars via eclipsing binaries;
- Very high-resolution infrared/optical spectroscopy and high contrast imaging, high cadence direct imaging, and sub-millimag precision optical differential photometry;
- Diversity, equity and inclusion in academia.

## EDUCATION

---

**University of Cambridge - Ph.D** in Astrophysics, May 2012

Institute of Astronomy, Trinity Hall, Supervisor: Dr Simon Hodgkin

Thesis: *Observational Constraints on Low-Mass Stellar Evolution and Planet Formation*

**Durham University - MSci** in Physics and Astronomy, 1<sup>st</sup> Class Honours, June 2007

Trevelyan College, Supervisor: Dr John Osbourne

Masters Project: *Energy Dependent  $\gamma$ -ray Morphology in Pulsar Wind Nebulae*

## PROFESSIONAL APPOINTMENTS

---

<b>2017 - present</b>	<b>Assistant Professor, University of Amsterdam</b> , The Netherlands
2014 - 2017	NASA Sagan Fellow, Harvard-Smithsonian Center for Astrophysics, USA
2011 - 2014	Postdoctoral Fellow in Exoplanets, Leiden Observatory, The Netherlands
2007 - 2011	STFC PhD Candidate, Institute of Astronomy, University of Cambridge, UK
Jul-Sep 2007	Anglo-Australian Observatory Student Fellowship, AAO, Sydney, Australia

## TEACHING EXPERIENCE

---

**Lecturer:** *Planet Formation and Exoplanets*, University of Amsterdam, Masters level (2020)

**Course coordinator and Lecturer:** *Open Problems in Modern Astronomy*, University of Amsterdam, Masters level (2019)

Guest Lecturer: *Keerpunten: Exoplanets*, University of Amsterdam, Beta Gamma Bachelors (2019)

Guest Lecturer: *Big History: Exoplanets*, University of Amsterdam, Honours Bachelors level (2019)

**Course coordinator and Lecturer:** *Open Problems in Modern Astronomy*, University of Amsterdam, Masters level (2018)

Guest Lecturer: *Keerpunten: Exoplanets*, University of Amsterdam, Beta Gamma Bachelors (2018)

Guest Lecturer: *Big History: Exoplanets*, University of Amsterdam, Honours Bachelors level (2018)

Guest Lecturer: *Open Problems in Modern Astronomy*, University of Amsterdam, Masters level (2017)

Guest Lecturer: *From the Big Bang to Life*, Amsterdam University College, Bachelors level (2017)

Guest speaker: *Astronomy 189: Exoplanet Systems*, Harvard University Graduate level (2015)

Tutor of Natural Sciences Tripos, Part IA Mathematics, University of Cambridge (2009 - 2010)

## **PhD students**

- Oct 2019- Primary advisor to Lennart van Sluijs, University of Amsterdam  
Thesis: *The diversity of exoplanet atmospheres at high spectral resolution*
- Oct 2018- Primary advisor to Ben Suttleff, University of Amsterdam  
Thesis: *Of storms and exomoons: photometric monitoring of exoplanet atmospheres*
- Oct 2017- Primary advisor to Eleanor Spring, University of Amsterdam  
Thesis: *Reflective Properties of Exoplanet Atmospheres at High Spectral Resolution*  
Student received the *Royal Netherlands Astronomical Society Poster Prize* for this work
- Jan 2018- Co-advisor to Nichols Mehrle, MIT  
Project: *A High resolution view of the atmosphere of ups Andromeda b*
- Aug 2017- Co-advisor to Callie Hood, UC Santa Cruz  
Project: *Model-independent Measurements of Brown Dwarf Fundamental Properties*
- 2011 - 2015 Co-supervision of PhD students:  
Patricia Cruz, INTA-CSIC, Spain (now FAPESP fellow at University of São Paulo);  
Bas Nefs, Leiden Observatory, the Netherlands;  
Michele Cappetta, MPE, Germany;  
Jesus Zendejas, MPE, Germany

## **Masters students**

- 2019 - Primary advisor to Dion Linssen, University of Amsterdam  
Project: *A direct high-resolution spectrum of a non-transiting hot Jupiter*
- 2017 - 2018 Primary advisor to Diogo Gomes, University of Amsterdam  
Project: *A search for a thermal inversions in hot Jupiter atmospheres*  
Student now works as a data scientist in the Netherlands
- 2013 - 2014 Primary advisor to Andrej Dvornik, Leiden Observatory  
Project: *Optical Secondary Eclipses of Exoplanets with ULTRACAM*  
Student received PhD from Leiden, and is now a postdoc at Ruhr-Universität Bochum, Germany

## **BSc students**

- 2019 Primary advisor to Alaya Ben-Belkacem, University of Amsterdam  
Project: *The effect of host star spectral type on the detectability of exoplanet atmospheres*
- 2018 Primary advisor to Lucas Stapper, University of Amsterdam  
Project: *Peek-a-boo: Is Proxima b hiding in the flares?*
- 2018 Primary advisor to Floris Kummer, University of Amsterdam  
Project: *Meet the Neighbours: where should we look for Earth 2.0?*

## **Summer students**

- Jun-Aug 2016 Primary supervisor to Callie Hood, Harvard-Smithsonian CfA REU  
Project: *A search for a thermal inversion in the atmosphere of  $\tau$  Boo b*  
Student is now PhD candidate and UCSC, USA
- Jun-Aug 2015 Primary supervisor to Brianna Thomas, Harvard-Smithsonian CfA REU  
Project: *Characterizing Kepler Exoplanets in the Orbital Period Valley*  
**Student received the AAS Chambliss Undergraduate Award for this work**  
Student is now a PhD candidate at University of Washington
- Jun-Aug 2013 Primary supervisor David Murphy, LEAPS, Leiden Observatory  
Project: *Characterising Exoplanet Atmospheres with the GTC*  
Student received PhD from UCD, Ireland and is now lead system engineer on EIRSAT-1, Ireland's first satellite

## GRANTS, HONOURS, & AWARDS

---

Grassroots Science4All University of Amsterdam for ASPIRE (2019; €5,000)  
**European Research Council (ERC) Starting Grant (2018; €1.5 million)**  
NOVA 5 Network 2 (Netherlands Research School for Astronomy) (2018; €220,000)  
Leids Kerkhoven-Bosscha Fonds (LKBF) grant (2018; €800)  
NSF Mid Scale Innovations Program #1836008 (2018; \$1.5million, MAPS Science co-PI)  
NSF Mid Scale Innovations Program #1636647 (2017; \$2.4million, MAPS Science co-PI)  
NASA Keck PI Data Award (2016A; \$12,000)  
NASA Keck PI Data Award (2015B; \$16,000)  
NASA Carl Sagan Postdoctoral Fellowship at CfA, Harvard (2014-2017; \$348,795)  
Leids Kerkhoven-Bosscha Fonds (LKBF) (2012; €760)  
Graduate Student grant from the Cool Stars XVI conference committee (2010)  
Graduate Student grant from the Joint European National Astronomy Meeting committee (2010)  
Graduate Student Travel Bursary, Trinity Hall, University of Cambridge (2008)  
Certificate of Postgraduate Study Recognition Award, Trinity Hall, University of Cambridge (2008)  
Awarded STFC PhD Studentship at the University of Cambridge, UK (2007-2011)  
- national fellowship for graduate student research and UK equivalent to the NSF Graduate Research Fellowship  
Awarded Anglo-Australian Observatory Student Fellowship (Jun-Sep 2006)

## SERVICE TO ACADEMIA

---

### University and National

Director and Founder of ASPIRE (2019-present)  
- I instigated and lead a 10-week summer research program at API (UvA) aimed at international pre-PhD students from underserved backgrounds  
Co-coordinator of Amsterdam Origins of Life Center (AOC) (2018 - present)  
Member of the NOVA Equity and Inclusion Board (2019-present)  
Member of the Physics and Astronomy Exam Committee Accreditation panel (2019)  
Board member and Ambassador to the Lorentz Centre (Astronomy) (2018-present)  
UvA Physics & Astronomy Exam Committee member (2018-present)  
API/UvA Outreach Committee member (2018-present)  
UvA astronomy graduate admission committee (2017-present)  
Chair of the Harvard-Smithsonian Center for Astrophysics SSP / Small Scale seminar series (2014-2016)  
Chair of the Harvard-Smithsonian Center for Astrophysics Postdoctoral Council (2014-2015)  
Postdoctoral representative for the NOVA International Board meeting (2014)  
Chair of the *Leiden/ESA Astrophysics Program for Summer Students* (LEAPS) committee (2013)  
- instigated, coordinated and lead a summer research program for 16 international pre-PhD students  
Chair of the Leiden Observatory Exoplanet journal club (2011-2013)  
Chair of the Institute of Astronomy student seminar series (2008-2009)  
Chair of the Institute of Astronomy “*Current Topics*” journal club (2008-2009)

### Commissions of Trust and Membership of Societies

NASA Hubble Fellowship Program Panel member (2019)  
Thesis defence committee for Djoeke Schoonenberg, University of Amsterdam (Oct 2019)  
Referee for Nature (2018 - present)  
Thesis defence committee for Geert Jan Talens, Leiden University (Dec 2018)  
Member of the International Astronomical Union (IAU) (2018-present)  
Thesis defence committee for Jens Høijmakers, Leiden University (Nov 2017)  
Thesis defence committee for Henriette Schwarz, Leiden University (Jun 2017)  
Referee for Nature Astronomy (2017 - present)  
Referee for The Astronomical Journal (AJ; 2017 - present)  
Referee for Monthly Notices of the Royal Astronomical Society (MNRAS; 2017 - present)  
Panel member for Hubble Space Telescope TAC (2016)  
Independent reviewer for the Royal Society Innovation Award (2016)  
Member of the Women In Science at CfA (CfAWIS) group (2015-2017)  
Jayne Birkby – CV

External reviewer NASA ROSES XRP (2015)  
Member of the Harvard Origins of Life Initiative (2014-2017)  
Panel member NASA ROSES XRP proposal review (2014)  
Referee for The Astrophysical Journal (ApJ; 2014 - present)  
External reviewer OPTICON Time Allocation Committee (2013 - present)  
Referee for Astronomy & Astrophysics (A&A; 2012 - present)

### **Organisation of (International) Scientific Meetings**

SOC of Extreme Solar Systems IV, Reykjavik, Iceland, (2019)  
SOC of Exoclimates V, Oxford, UK (2019)  
SOC TESS Science Meeting, Boston, USA (2019)  
SOC of High Resolution Spectroscopy of Exoplanets and Stars conference, Nice, France (2018)  
Session Chair at Transiting Exoplanets conference, Keele, UK (2017)  
Session Chair at 229<sup>th</sup> AAS meeting, Grapevine, Texas, USA (2017)  
Co-Chair of SOC & LOC for the Harvard-Smithsonian Center for Astrophysics Postdoctoral Symposium (2014)  
Co-chair of SOC for the Dutch Exoplanet Day, Leiden Observatory (2013)

### **Major International Collaborations and Consortia**

Core member of the Dutch METIS/ELT Science Team (2018-present)  
Member of the MICADO/ELT Science Team (2018-present)  
Member of the International Science Development Team for the Thirty Meter Telescope (2018-present)  
Member of the Origins Space Telescope Exoplanets Working Group (2018-present)  
Chair of the MeerLICHT Eclipsing Binaries Working Group (2018-present)  
Member of the TESS Atmospheric Characterization Working Group (2017-present)  
Member of the MAPS/MMT consortium (2017 - present)  
Consulting Expert to the Giant Magellan Telescope (GMT) Science Advisory Committee (2016-present)  
Member of the LUVOIR Optical Near-Infrared Spectrograph (ONIRS) Science Team (2016-2017)  
Member of the RoPACS Marie Curie Initial Training Network (2009-2012)

### **SELECTED CONFERENCE TALKS AND COLLOQUIA**

---

Invited Review, Spirit of Lyot, Tokyo, Japan	Oct 2019
Invited Talk, AGU-AAS Exoplanets Workshop, Reykjavik, Iceland	Aug 2019
Invited Review, ExoClimes, Oxford, UK	Aug 2019
Invited Talk, Kavli ExoFrontiers, Cambridge, UK	Jul 2019
Invited Colloquium, ASTRON, NL	Apr 2019
Invited Colloquium, AIP Potsdam, Germany	Apr 2019
Invited Colloquium, IfA, Royal Observatory Edinburgh, UK	Mar 2019
Invited Talk, NOVA instrumentation day, Nijmegen, NL	Nov 2018
Invited Colloquium, SRON, NL	Nov 2018
Invited Review, PLATO Exoplanet workshop, Marseille, France	Nov 2018
Invited Colloquium, University of Michigan, USA	Oct 2018
Invited Talk, Multi-Dimensional Characterization of Distant Worlds workshop, Michigan, USA	Oct 2018
Invited Review, High Resolution Spectroscopy for Exoplanet atmospheres (HoRSE), Nice, France	Oct 2018
Plenary Talk, Cool Stars XX, Boston, USA (plenary talk)	Aug 2018
Invited Review, Spectroscopy of Exoplanets, Windsor, UK	Jul 2018
Invited Review, High-Resolution Spectroscopy and High-Contrast Imaging, Caltech, USA	Jun 2018
Invited Colloquium, Laboratoire d'Astrophysique de Marseille	May 2018
Invited Colloquium, University of Groningen, NL	Apr 2018
Invited Seminar, University College London, London, UK	Feb 2018
Invited Seminar, Lund University, Lund, Sweden	Jan 2018
Invited Talk, Sagan Fellows symposium, Caltech, California, USA	Nov 2017
Invited Colloquium, Institute of Astronomy, University of Cambridge, UK	Oct 2017
Invited Talk, MICADO ELT science team meeting, Leiden Observatory, NL	Sep 2017

Invited Faculty colloquium, University of Amsterdam, NL	Sep 2017
Invited Talk, “Are we alone?” Panel, South by Southwest, Austin, Texas, USA	Mar 2017
Invited Colloquium, NASA JPL, Pasadena, USA	Mar 2017
Invited Colloquium, Lowell Observatory, Flagstaff, USA	Mar 2017
Contributed Talk, 229 <sup>th</sup> AAS meeting, Grapevine, Texas, USA	Jan 2017
Invited Talk, TESS Science Team meeting, MIT, Cambridge, USA	Dec 2016
Invited Colloquium, Cornell University, Ithaca, USA	Nov 2016
Invited ITC luncheon, Harvard-Smithsonian Center for Astrophysics, Cambridge, USA	Nov 2016
Invited Colloquium, Columbia University, New York, USA	Oct 2016
Invited Seminar, UCSC, Santa Cruz, USA	Sept 2016
Invited Review, Exoplanets in the Era of the ELTs (GMT meeting), Monterey, USA	Sept 2016
Contributed Talk, Exoclimates IV, Squamish, Canada	Aug 2016
Invited Colloquium, University of Amsterdam, the Netherlands,	Jun 2016
Contributed Talk, UK Exoplanet Community Meeting, Exeter, UK	Mar 2016
Invited Colloquium, University of Austin, Texas, USA	Feb 2016
Contributed Talk, Extreme Solar Systems III, Hawai’i, USA	Dec 2015
Invited Seminar, University of Exeter, UK	Nov 2015
Contributed Talk, Twenty Years of Giant Exoplanets, Observatoire de Haute Provence, France	Oct 2015
Invited Seminar, Institute of Astronomy, University of Cambridge, UK	July 2015
Invited Review, Origins of Solar Systems, Gorden Research Conference, Massachusetts	Jun 2015
Invited Talk, TMT Science Forum, Washington DC, USA	Jun 2015
Invited Talk, Sagan Fellows Symposium, Caltech, USA	May 2015
Invited Seminar, Goddard Space Flight Center, ATLAST seminar series, Maryland, USA	May 2015
Invited Colloquium, SAp series, CEA-Saclay	Apr 2015
Invited Colloquium, Boston University, Massachusetts, USA	Mar 2015
Invited Seminar, Lunar and Planetary Laboratory Origins seminar, Arizona, USA	Mar 2015
Invited Seminar, Harvard-Smithsonian CfA Exoplanet lunch, Massachusetts, USA,	Nov 2014
Contributed Talk, Harvard-Smithsonian CfA Postdoctoral symposium, Massachusetts, USA,	Nov 2014
Invited Colloquium, University of Illinois, Illinois, USA	Oct 2014
Invited Talk, 30 years of $\beta$ Pic, IAP, Paris, France	Sept 2014
Invited Colloquium, University of Amsterdam, The Netherlands	Jul 2014
Contributed Talk, Planets Across the HR Diagram, University of Cambridge, UK	Jul 2014
Contributed Talk, Exoclimates III, Davos, Switzerland	Feb 2014
Contributed Talk, 223 <sup>rd</sup> AAS meeting, Washington DC, USA	Jan 2014
Contributed Talk, Dutch Exoplanet Day, Leiden Observatory, The Netherlands	Oct 2013
Invited Talk, Leiden Science Day, Leiden Observatory, The Netherlands	Sept 2013
Contributed Talk, National Astronomy Meeting. St. Andrews, UK	Jul 2013
Invited Talk, Hot Planets and Cool Stars, MPE Garching, Germany	Nov 2012
Invited Seminar, Institute of Astronomy, University of Cambridge, UK	May 2012
Contributed Talk, National Astronomy Meeting, Manchester, UK,	Mar 2012
Contributed Talk, Exoclimates II, Aspen CO, USA	Jan 2012
Contributed Talk, NOVA Network II meeting, Leiden Observatory, The Netherlands	Nov 2011
Contributed Talk, Extreme Solar Systems II, Wyoming, USA	Sept 2011
Invited Seminar, Institute of Astronomy, University of Cambridge, UK	Nov 2010
Contributed Talk, Joint European National Astronomy Meeting, Lisbon, Portugal	Sept 2010
Contributed Talk, Cool Stars XVI, Seattle WA, USA	Aug 2010
Contributed Talk, RoPACS Marie Curie Network meeting, MPE, Germany	May 2010
Contributed Talk, RoPACS Marie Curie Network meeting, IAC, Tenerife	Nov 2009
Contributed Talk, RoPACS Marie Curie Network meeting, Madrid, Spain	Jan 2009

## PRESS RELEASES AND PUBLIC OUTREACH

---

ASPIRE (UvA, Jun-Aug 2019)

Stargazing night at API “*Exoplanet Atmospheres*” (UvA, Dec 2018)

Press release: “*ERC Starting Grant award*” (NOVA/UvA 2018)

Podcast interview: “*Exoplanet atmospheres at high spectral resolution*” (Exocast 2018)  
Group leader at ‘How to make a comet’ exhibition at University of Amsterdam Science Park Open Day (2017)  
Assistant at local school’s invited observing night at University of Amsterdam Science Park (2017)  
Panelist at South by Southwest “*Are we alone?*”, Austin, Texas (March 2017)  
Press release: “*Water spotted in the atmosphere of nearby hot Jupiter exoplanet*” (New Scientist 2017)  
Volunteer astronomer at Cambridge Science Festival (over 1000 people in attendance) (2015, 2016)  
Press release: “*Length of exoplanet day measured for first time*” (ESO 2014)  
Tweeted for @Astrotweeps on Twitter (Dec 2014)  
Press release: “*Novel technique boosts hunt for water on planets around other stars*” (RAS 2013)  
with associated telephone interviews for science blogs, magazine articles, and German radio  
Podcast interview: “*Searching for water on exoplanets*” (The Jodcast 2013)  
Press release: “*UKIRT discovers impossible binary stars*” (RAS 2012)  
Press release: “*New way of probing exoplanets*” (ESO 2012)  
Podcast interview: “*Hot Jupiters orbiting low-mass stars*” (The Jodcast 2012)  
Assistant at the Leiden Oude Sterrewacht Science Festivals (2011-2013)  
Producer of the *AstroPod*: the Institute of Astronomy, University of Cambridge monthly podcast (2007-2010)  
Assistant at IoA, University of Cambridge Public Observing Evenings and Science Festivals (2007-2010)  
President of the Durham University Astronomical Society (2005-2006)

## OBSERVATIONAL & TECHNICAL SKILLS

---

### Principle Investigator Proposals:

Magellan (6.5m)/MagAO+vAPP (1 night co-PI: “*The stormy nature of a young giant exoplanet*” 2019)  
WHT (4.2m)/ISIS (5 nights: “*The M-dwarf Radius Anomaly: model-independent masses and radii from low-mass eclipsing binaries*” 2018)  
VLT (8m)/ESPRESSO (2 half-nights: “*Through the Looking Glass: Reflected Light from Another World with ESPRESSO*” 2018)  
IRTF (3.5m)/iSHELL (6 half-nights: “*A direct high-resolution spectrum of the non-transiting hot Jupiter HD 143105 b: chemical abundance ratios and a search for atmospheric stratification*” 2017)  
MMT (6.5m)/ARIES (13 nights: “*Exoplanet Atmospheres at High Resolution*” 2016ABC)  
Keck (10m)/NIRSPEC (2 half-nights: “*Measuring Atmospheric Abundances and Rotation of a Brown Dwarf with a Measured Mass and Radius*” 2016)  
IRTF (3.5m)/iSHELL (6 half-nights: “*A direct high-resolution spectrum of the hot Jupiter ups And b: Measuring detailed chemical abundances and the 3-D architecture of a multi-planet system*” 2016)  
Magellan (6.5m)/MagAO+vAPP (4 half nights: “*Chasing weather systems on an extrasolar planet*” 2016)  
TNG (3.5m)/HARPS-N (4 half nights: “*The optical albedo spectrum of a hot Jupiter*” 2016)  
Keck (10m)/NIRSPEC (4 half-nights: “*Measuring Atmospheric Abundances and Rotation of a Brown Dwarf with a Measured Mass and Radius*” 2015)  
TNG (3.5m)/HARPS-N (4 half nights: “*The optical albedo spectrum of a hot Jupiter*” 2015)  
MMT (6.5m)/ARIES (5 nights: “*Exoplanet Atmospheres at High Resolution*” 2015B&C)  
MMT (6.5m)/ARIES (5 nights: “*Exoplanet Atmospheres at High Resolution - A Pilot Study*” 2015A)  
VLT (8m)/CRIRES (10 hours: “*A detailed atmospheric characterisation of the non-transiting exoplanet  $\tau$  Boo b*” 2014)  
VLT (8m)/CRIRES (10 hours: “*The carbon chemistry and structure of the atmosphere surrounding the hot Jupiter HD 209458 b*” 2014)  
WHT (4m)/ISIS (6 nights: “*Spectroscopic characterisation of pre-main sequence eclipsing binaries discovered by CoRoT in NGC 2264*” 2014)  
WHT (4m)/ULTRACAM (4 nights: “*An ULTRACAM survey of hot Jupiter atmospheres*” 2013)  
WHT (4m)/LIRIS (3 nights: “*The effect of intense irradiation on hot Jupiter atmospheres with comparative exoplanetology*” 2013)

### Co-Investigator Proposals:

*Spitzer Space Telescope* (ID 11044, 132 hours); Keck 10m (NIRSPEC, 7 half nights) ; VLT 8m (CRIRES 49 hours, UVES 17 hours, FORS2 4 hours, VIMOS 5 hours); GEMINI 8m (GNIRS 11 hours); MMT 6.5m (ARIES 3 nights); WHT 4m (ACAM 4 nights, LIRIS 7 nights, ISIS 9 nights); VISTA 4m (VIRCAM 100 hours); INT 1.5m (WFC 12 nights, IDS 6 nights)

### On-site observing experience:

*GTC 10.4m* (OSIRIS 1 night Aug 2012); *VLT 8m* (CRIRES 4.5 nights April & July 2011); *MMT 6.5m* (ARIES  
Jayne Birkby – CV 6 / 11

5 nights Jan, Mar, May 2015); *WHT 4.2m* (ISIS 7 nights July 2010, ACAM 2 nights Aug 2012, ULTRACAM 4 nights July 2013, LIRIS 3 nights Sept 2013); *AAT 3.9m* (2dF+AAOmega 5 nights Aug 2006), *UKIRT 3.8m* (WFCAM 6 nights April 2008); *INT 2.5m* (WFC 6 nights July 2009), *IAC80 0.8m* (CAMELOT 7 nights June 2009)

**Data reduction and analysis expertise relevant to:** Very high-resolution infrared and optical echelle spectroscopy (CRIRES/VLT, ARIES/MMT, iSHELL/IRTF, IGRINS/DCT, HARPS-N/TNG), direct imaging (MagAO+vAPP/Magellen), time-resolved optical imaging with sub-millimag precision differential photometry (OSIRIS/GTC and ULTRACAM/WHT), wide-field infrared time-resolved imaging with millimag precision photometry (WFCAM/UKIRT), millimag precision optical differential spectrophotometry (ACAM/WHT), medium-to-high resolution multi-fibre optical spectroscopy (VLT/FLAMES in GIRAFFE+UVES mode).

## LANGUAGES

---

### Computing:

Extensive experience with IDL, detailed knowledge of ESO pipelines and *Gasgano* for CRIRES & FLAMES, proficient in IRAF, FORTRAN, HTML, and working knowledge of PYTHON, PERL, and BASH.

### Spoken:

English (native), Dutch (basic; A1 level in accordance with the Common European Framework 2011), French (basic; A grade AS level UK, 2002).

## REFERENCES

---

Prof. David Charbonneau	Harvard-Smithsonian Center for Astrophysics	dcharbonneau@cfa.harvard.edu
Prof. Ignas Snellen	Leiden Observatory, Universiteit Leiden	snellen@strw.leidenuniv.nl
Dr. Simon Hodgkin	IoA, University of Cambridge	sth@ast.cam.ac.uk

## PUBLICATIONS

---

### FIRST AUTHOR (REFEREED)

**5. Birkby, Jayne L.**, 2018, *Handbook of Exoplanets*, Springer, id 16, ISBN 978-3-319-55332-0  
“*Spectroscopic Direct Detection of Exoplanets*”

**Article summary:** First and only educational reference article for the high resolution spectroscopy technique for exoplanet atmospheres, aimed at graduate student level. Solidified this new technique into exoplanet textbooks and standard university education course materials.

**4. Birkby, J. L.**; Brogi, M.; de Kok, R. J.; Schwarz, H.; Snellen, I. A. G., 2017 *AJ*, 153, 138  
“*Discovery of water at high spectral resolution in the atmosphere of 51 Peg b*”;

**Article summary:** Definitive confirmation of the planetary nature of the Nobel Prize winning exoplanet, 51 Peg b, by measuring its true mass via the detection of Doppler-shifting water spectral features in its atmosphere.

**3. Birkby, J. L.**; Cappetta M.; Cruz P.; Koppenhoefer J.; Ivanyuk O.; Mustill A. J.; Hodgkin S. T.; Pinfield D. J.; Sipőcz B.; Kovács G.; Saglia R.; Pavlenko Y.; Barrado D.; Bayo A.; Campbell D.; Catalan S.; Fossati L.; Gálvez-Ortiz M.-C.; Kenworthy M.; Lillo-Box J.; Martín E. L.; Mislis D.; W. de Mooi E. J.; Nefs S. V.; Snellen I. A. G.; Stoev H.; Zendejas J.; del Burgo C.; Barnes J.; Goulding N.; Haswell C. A.; Kuznetsov M.; Lodieu N.; Murgas F.; Palle E.; Solano E.; Steele P.; Tata R., 2014, *MNRAS*, 440, 1470  
“*WTS-2 b: a hot Jupiter orbiting near its tidal destruction radius around a K-dwarf*”

**Article summary:** Demonstrated that by measuring the transit arrival times of hot Jupiters, the gradual decay of their orbits can be directly observed over the next decade, placing stringent constraints on the effect of stellar interior structure on tidal dissipation and the survival rate of close-in planets.

**2. Birkby, J. L.**; de Kok, R. J.; Brogi, M.; de Mooij, E. J. W.; Schwarz, H.; Albrecht, S.; Snellen, I. A. G., 2013, *MNRAS Letters*, 436, 35

“*Detection of water absorption in the dayside atmosphere of HD 189733 b using ground-based high-resolution spectroscopy at 3.2 microns*”

**Article summary:** First robust ground-based detection of water in an exoplanet atmosphere. First proof that ground-based high-resolution spectroscopy can be used to identify complex molecules, including potential biosignatures, even in the presence of significant contamination from Earth’s atmosphere.

**1. Birkby, Jayne**; Nefs, B; Hodgkin, S; Kovács, G; Sipőcz, B; Pinfield, D; Snellen, I; Mislis, D; Murgas, F; Lodieu, N; de Mooij, E; Goulding, N; Cruz, P; Stoev, H; Cappelletta, M; Palle, E; Barrado, D; Saglia, R; Martín, E; Pavlenko, Y; 2012, *MNRAS*, 426, 1507

“*Discovery and characterization of detached M dwarf eclipsing binaries in the WFCAM Transit Survey*”

**Article summary:** Measured accurate and precise fundamental properties of M-dwarfs binaries and demonstrated that the ‘radius-inflation’ problem for small stars persists even for isolated components in binaries, suggesting that their equation of state needs revising, with important ramifications for measuring the radii of their potentially habitable companion planets.

CO-AUTHOR (REFEREED AND WHITE PAPERS)

---

30. Snellen, Ignas; Albrecht, Simon; Anglada-Escude, Guillem; Baraffe, Isabelle; Baudoz, Pierre; Benz, Willy; Beuzit, Jean-Luc; Biller, Beth; **Birkby, Jayne**; Boccaletti, Anthony; van Boekel, Roy; de Boer, Jos; Brogi, Matteo; Buchhave, Lars; Carone, Ludmila; Claire, Mark; Claudi, Riccardo; Demory, Brice-Olivier; Desert, Jean-Michel; Desidera, Silvano Gaudi, Scott; Gratton, Raffaele; Gillon, Michael; Grenfell, John Lee; Guyon, Olivier; Henning, Thomas; Hinkley, Sasha; Huby, Elsa; Janson, Markus; Helling, Christiane; Heng, Kevin; Kasper, Markus; Keller, Christoph; Kenworthy, Matthew; Krause, Oliver; Kreidberg, Laura; Madhusudhan, Nikku; Lagrange, Anne-Marie; Launhardt, Ralf; Lenton, Tim; Lopez-Puertas, Manuel; Maire, Anne-Lise; Mayne, Nathan; Meadows, Victoria; Mennesson, Bertrand; Micela, Giuseppina; Miguel, Yamila; Milli, Julien; Min, Michiel; de Mooij, Ernst; Mouillet, David; N’Diaye, Mamadou; D’Orazi, Valentina; Palle, Enric; Pagano, Isabella; Piotto, Giampaolo; Queloz, Didier; Rauer, Heike; Ribas, Ignasi; Ruane, Garreth; Selsis, Franck; Snik, Frans; Sozzetti, Alessandro; Stam, Daphne; Stark, Christopher; Vigan, Arthur; de Visser, Pieter, 2019, White paper for ESA Voyage 2050, arXiv:1908.01803

*ESA Voyage 2050 White Paper: Detecting life outside our solar system with a large high-contrast-imaging mission*

29. López-Morales, Mercedes; Currie, Thayne; Teske, Johanna; Gaidos, Eric; Kempton, Eliza; Males, Jared; Lewis, Nikole; Rackham, Benjamin V.; Ben-Ami, Sagi; **Birkby, Jayne**; Charbonneau, David; Close, Laird; Crane, Jeff; Dressing, Courtney; Froning, Cynthia; Hasegawa, Yasuhiro; Konopacky, Quinn; Kopparapu, Ravi K.; Mawet, Dimitri; Mennesson, Bertrand Ramirez, Ramses; Stelter, Deno; Szentgyorgyi, Andrew; Wang, Ji; Alam, Munazza; Collins, Karen; Dupree, Andrea; Karovska, Margarita; Kirk, James; Levi, Amit; McGruder, Chima; Packman, Chris; Rugheimer, Sarah; Rukdee, Surangkhan, 2019, Astro2020: Decadal Survey on Astronomy and Astrophysics, science white papers, no. 162

*Detecting Earth-like Biosignatures on Rocky Exoplanets around Nearby Stars with Ground-based Extremely Large Telescopes*

28. Mazin, Ben; Artigau, E.; Bailey, V.; Baranec, C.; Beichman, C.; Benneke, B.; **Birkby, J.**; Brandt, T.; Chilcote, J.; Chun, M.; Close, L.; Currie, T.; Crossfield, I.; Dekany, R.; Delorme, J. R.; Dong, C.; Dong, R.; Doyon, R.; Dressing, C.; Fitzgerald, M. Fortney, J.; Frazin, R.; Gaidos, E.; Guyon, O.; Hashimoto, J.; Hillenbrand, L., 2019, Astro2020: Decadal Survey on Astronomy and Astrophysics, science white papers, no. 128

*Directly Imaging Rocky Planets from the Ground*

27. Kataria, Tiffany; Zellem, Robert T.; Fortney, Jonathan J.; Stevenson, Kevin B.; Tremblay, Luke; Line, Michael R.; Morley, Caroline; Halverson, Sam; Meshkat, Tiffany; Armus, Lee; **Birkby, Jayne**; Evans, Thomas M.; Fauchez, Thomas J.; Kopparapu, Ravi; Pontoppidan, Klaus; Roellig, Thomas L.; Wordsworth, Robin; Danchi, William C.; Greene, Thomas; Kane, Stephen R. Sakon, Itsuki; Stassun, Keivan; Swain, Mark R., 2019, Astro2020: Decadal Survey on Astronomy and Astrophysics, science white papers, no. 462

*The Mid-Infrared Search for Biosignatures on Temperate M-Dwarf Planets*

26. Alycia Weinberger; **Jayne Birkby**; Brendan Bowler; Mercedes López-Morales; Jared Males; Katie Morzinski; Sharon Wang, ed. Rebecca Bernstein, 2018, Giant Magellan Telescope Science Book, Chapter 2 p32 *Giant Magellan Telescope Science Book 2018: Exoplanets and Planet Formation*

25. Kempton, Eliza M. -R.; Bean, Jacob L.; Louie, Dana R.; Deming, Drake; Koll, Daniel D. B.; Mansfield, Megan; Christiansen, Jessie L.; López-Morales, Mercedes; Swain, Mark R.; Zellem, Robert T.; Ballard, Sarah; Barclay, Thomas; Barstow, Joanna K.; Batalha, Natasha E.; Beatty, Thomas G.; Berta-Thompson, Zach; **Birkby, Jayne**; Buchhave, Lars A.; Charbonneau, David; Cowan, Nicolas B. Crossfield, Ian; de Val-Borro, Miguel; Doyon, Ren-Ål; Dragomir, Diana; Gaidos, Eric; Heng, Kevin; Hu, Renyu; Kane, Stephen



R.; Kreidberg, Laura; Mallonn, Matthias; Morley, Caroline V.; Narita, Norio; Nascimbeni, Valerio; Pall  , Enric; Quintana, Elisa V.; Rauscher, Emily; Seager, Sara; Shkolnik, Evgenya L.; Sing, David K.; Sozzetti, Alessandro; Stassun, Keivan G.; Valenti, Jeff A.; von Essen, Carolina, 2018, *PASP*, 130, 993

*A Framework for Prioritizing the TESS Planetary Candidates Most Amenable to Atmospheric Characterization*

24. Mentel, R. T.; Kenworthy, M. A.; Cameron, D. A.; Scott, E. L.; Mellon, S. N.; Hudec, R.; **Birkby, J. L.**; Mamajek, E. E.; Schrimpf, A.; Reichart, D. E.; Haislip, J. B.; Kouprianov, V. V.; Hamsch, F. -J.; Tan, T. -G.; Hills, K.; Grindlay, J. E.; Rodriguez, J. E.; Lund, M. B.; Kuhn, R. B., 2018, *A&A*, 619, 157

*Constraining the period of the ringed secondary companion to the young star J1407 with photographic plates*

23. Packham, Chris; Honda, Mitsuhiko; Chun, Mark; Sakon, Itsuki; Richter, Matthew; Okamoto, Yoshiko; Kataza, Hirokazu; Marois, Christian; Meyer, Michael; Puravankara, Manoj; **Birkby, Jayne**; Crossfield, Ian; Curry, Thayne; Greathouse, Thomas; Herczeg, Gregory; Ichikawa, Kohei; Inami, Hanae; Imanishi, Masatoshi; Lopez-Rodriguez, Enrique, 2018, *SPIE*, 10702, id. 10702A0 12

*The key science drivers for MICHI: a thermal-infrared instrument for the TMT*

22. Cruz, Patricia; Diaz, Marcos; **Birkby, Jayne**; Barrado, David; Sip  cz, Brigitta; Hodgkin, Simon, 2018, *MNRAS*, 476, 5253

*Low-mass eclipsing binaries in the WFCAM Transit Survey: the persistence of the M-dwarf radius inflation problem*

21. Snellen, I. A. G.; D  sert, J. -M.; Waters, L. B. F. M.; Robinson, T.; Meadows, V.; van Dishoeck, E. F.; Brandl, B. R.; Henning, T.; Bouwman, J.; Lahuis, F.; Min, M.; Lovis, C.; Dominik, C.; Van Eylen, V.; Sing, D.; Anglada-Escud  , G.; **Birkby, J. L.**; Brogi, M., 2017, *AJ*, 154, 77

*Detecting Proxima b's Atmosphere with JWST Targeting CO<sub>2</sub> at 15  $\mu$ m Using a High-pass Spectral Filtering Technique*

20. Patricia Cruz, David Barrado, Jorge Lillo-Box, Marcos Diaz, **Jayne Birkby**, Mercedes L  pez-Morales, Jonathan J. Fortney, 2016, *A&A*, 595, 61

*A detection of the secondary eclipse of Qatar-1b in the Ks-band*

19. Brogi, M; de Kok, R. J.; Albrecht, S; Snellen, I. A. G.; **Birkby, J. L.**; Schwarz, H.; 2016, *ApJ*, in press arXiv:1512.05175

*Rotation and winds of exoplanet HD 189733 b measured with high-dispersion transmission spectroscopy*

18. Schwarz, Henriette; Brogi, Matteo; de Kok, Remco; **Birkby, Jayne**; Snellen, Ignas; 2015, *A&A*, 576, 111

*Evidence against a strong thermal inversion in HD 209458b from high-dispersion spectroscopy*

17. I. Snellen, R. de Kok, **J. L. Birkby**, B. Brandl, M. Brogi, C. Keller, M. Kenworthy, H. Schwarz, R. Stuik, 2015, *A&A*, 576, 59

*Combining High-Dispersion Spectroscopy (HDS) with High Contrast Imaging (HCI): Probing rocky planets around our nearest neighbours*

16. Hoeijmakers, H. J.; de Kok, R. J.; Snellen, I. A. G.; Brogi, M.; **Birkby, J. L.**; Schwarz, H.; 2014, *A&A*, 575, 20

*A search for TiO in the optical high-resolution transmission spectrum of HD 209458b: Hindrance due to inaccuracies in the line database*

15. Cruz, Patricia; Barrado, David; Lillo-Box, Jorge; Diaz, Marcos; **Birkby, Jayne**; L  pez-Morales, Mercedes; Hodgkin, Simon; Fortney, Jonathan J.; 2014, *A&A*, 574, 103

*Detection of the secondary eclipse of WASP-10b in the Ks-band*

14. Snellen, Ignas; Brandl, Bernhard; de Kok, Remco; Brogi, Matteo; **Birkby, Jayne**; Schwarz, Henriette; 2014, *Nature*, 509, 7498

*Fast spin of the young extrasolar planet beta Pictoris b*

**Article summary:** This paper measured the length of an exoplanet day for the first time and showed that its rotation velocity is consistent with an extrapolation of the Solar System mass-rotation velocity relationship, indicating a possible method for distinguishing between different modes of giant planet formation. It was the first demonstration that high-resolution spectroscopy from the ground can determine the dynamics of exoplanet atmospheres.

13. Brogi, M.; de Kok, R. J.; **Birkby, J. L.**; Schwarz, H.; Snellen, I. A. G., 2014, *A&A*, 565, 124  
*Carbon monoxide and water vapor in the atmosphere of the non-transiting exoplanet HD 179949 b*
12. de Kok, R. J.; **Birkby, J.**; Brogi, M.; Schwarz, H.; Albrecht, S.; de Mooij, E. J. W.; Snellen, I. A. G.; 2013, *A&A*, 561, 150  
*Identifying new opportunities for exoplanet characterisation at high spectral resolution*
11. Zendejas, J.; Koppenhoefer, J.; Saglia, R. P.; **Birkby, J. L.**; Hodgkin, S. T.; Kovács, G.; Pinfield, D. J.; Sipőcz, B.; Barrado, D.; Bender, R.; del Burgo, C.; Cappetta, M.; Martín, E. L.; Nefs, S. V.; Riffeser, A.; Steele, P., 2013, *A&A*, 560, 92  
*Searching for transits in the WTS with difference imaging light curves*
10. Kovács, G; Hodgkin, S; Sipőcz, B; Pinfield, D; Barrado, D; **Birkby, J.**; Cappetta, M; Cruz, P; Koppenhoefer, J; Martín, E L.; Murgas, F; Nefs, B; Saglia, R; Zendejas, J, 2013, *MNRAS*, 433, 889  
*A sensitivity analysis of the WFCAM Transit Survey for short-period giant planets around M dwarfs*
9. de Kok, R. J.; Brogi, M.; Snellen, I. A. G.; **Birkby, J.**; Albrecht, S.; de Mooij, E. J. W., 2013, *A&A*, 554, A82  
*Detection of carbon monoxide in the high-resolution day-side spectrum of the exoplanet HD 189733b*
8. Brogi, M.; Snellen, I. A. G.; de Kok, R. J.; Albrecht, S.; **Birkby, J. L.**; de Mooij, E. J. W., 2013, *ApJ*, 767, 27  
*Detection of Molecular Absorption in the Dayside of Exoplanet 51 Pegasi b?*
7. Snellen, I. A. G.; de Kok, R. J.; le Poole, R.; Brogi, M.; **Birkby, J.**, 2013, *ApJ*, 764, 182  
*Finding Extraterrestrial Life Using Ground-based High-dispersion Spectroscopy*
6. Nefs, S. V.; **Birkby, J. L.**; Snellen, I. A. G.; Hodgkin, S. T.; Sipőcz, B. M.; Kovács, G.; Mislis, D.; Pinfield, D. J.; Martín, E. L., 2013, *MNRAS*, 431, 3240  
*A highly unequal-mass eclipsing M-dwarf binary in the WFCAM Transit Survey*
5. Goulding, N. T.; Barnes, J. R.; Pinfield, D. J.; Kovács, G.; **Birkby, J.**; Hodgkin, S.; Catalán, S.; Sipőcz, B.; Jones, H. R. A.; Del Burgo, C.; Jeffers, S. V.; Nefs, S.; Gálvez-Ortiz, M. C.; Martín, E. L., 2012, *MNRAS*, 427, 3358  
*J-band variability of M dwarfs in the WFCAM Transit Survey*
4. Cappetta, M.; Saglia, R. P.; **Birkby, J. L.**; Koppenhoefer, J.; Pinfield, D. J.; Hodgkin, S. T.; Cruz, P.; Kovács, G.; Sipőcz, B.; Barrado, D.; Nefs, B.; Pavlenko, Y. V.; Fossati, L.; del Burgo, C.; Martín, E. L.; Snellen, I.; Barnes, J.; Bayo, A.; Campbell, D. A.; Catalan, S.; Gálvez-Ortiz, M. C.; Goulding, N.; Haswell, C.; Ivanyuk, O.; Jones, H. R.; Kuznetsov, M.; Lodieu, N.; Marocco, F.; Mislis, D.; Murgas, F.; Napiwotzki, R.; Palle, E.; Pollacco, D.; Sarro Baro, L.; Solano, E.; Steele, P.; Stoev, H.; Tata, R.; Zendejas, J., 2012, *MNRAS*, 427, 1877  
*The first planet detected in the WTS: an inflated hot Jupiter in a 3.35 d orbit around a late F star*
3. Nefs, S. V.; **Birkby, J. L.**; Snellen, I. A. G.; Hodgkin, S. T.; Pinfield, D. J.; Sipőcz, B.; Kovacs, G.; Mislis, D.; Saglia, R. P.; Koppenhoefer, J.; Cruz, P.; Barrado, D.; Martín, E. L.; Goulding, N.; Stoev, H.; Zendejas, J.; del Burgo, C.; Cappetta, M.; Pavlenko, Y. V., 2012, *MNRAS*, 425, 950  
*Four ultra-short-period eclipsing M-dwarf binaries in the WFCAM Transit Survey*  
**Article summary:** This paper demonstrated that ultra-short-period M-dwarf binaries (< 0.2 days) cannot have achieved such close orbits within the lifetime of the Universe, suggesting that current theories may be significantly underestimating the magnetic activity levels of these small stars, causing serious implications for characterizing the atmospheres and habitability of their planetary companions. I played a significant role in advising and co-writing this paper with the first author who was a graduate student at the time.
2. Brogi, M; Snellen, I A. G.; de Kok, R J.; Albrecht, S; **Birkby, Jayne**; de Mooij, E J. W., 2012, *Nature*, 486, 7404  
*The signature of orbital motion from the dayside of the planet  $\tau$  Boötis b*
1. Miszalski, Brent; Parker, Q. A.; Acker, A.; **Birkby, J. L.**; Frew, D. J.; Kovacevic, A., 2008, *MNRAS*, 384, 525  
*MASH-II: more planetary nebulae from the AAO/UKST  $H\alpha$  survey*

- Thomas, Brianna P. & **Birkby, Jayne L.**; 2016, *American Astronomical Society*, AAS Meeting #227, id.138.19  
*Investigating the Orbital Period Valley of Giant Planets in Kepler Data*
- Birkby, J. L.**; de Kok, R. J.; Brogi, M.; Snellen, I. A. G.; Schwarz, H.; de Mooij, E. J. W.; Albrecht, S.; 2013,  
*The ESO Messenger*, Dec 2013, no. 154  
*Characterising Exoplanet Atmospheres with High-resolution Spectroscopy*
- Birkby, J. L.**; Cappetta, M.; Cruz, P.; Koppenhoefer, J.; Ivanyuk, O.; Mustill, A.; Hodgkin, S. T.; Pinfield, D. J.; Sipőcz, B.; Kovács, G.; Saglia, R.; Pavlenko, Y.; RoPACS Collaboration, 2013, Hot Planets and Cool Stars, Garching, Germany, Edited by Roberto Saglia; EPJ Web of Conferences, Volume 47, id.01004  
*WTS-2 b: Too close for comfort?*
- Birkby, Jayne**; Snellen, I.; de Mooij, E.; Koppenhofer, J.; Nefs, B.; Albrecht, S.; Skillen, I.; Burrows, A., 2011, American Astronomical Society, ESS meeting 2, 12.03  
*Observations of Optical Secondary Eclipses of Transiting Hot Jupiters with the GTC*
- Birkby, J.**; Hodgkin, S.; Pinfield, D.; WTS Consortium, 2011, 16<sup>th</sup> Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun. ASP Conference Series, Vol. 448, 803  
*The WFCAM Transit Survey: A Search for Rocky Planets Around Cool Stars*
- Pascucci, I.; Laughlin, G.; Gaudi, B. S.; Kennedy, G.; Luhman, K.; Mohanty, S.; **Birkby, J.**; Ercolano, B.; Plavchan, P.; Skemer, A., 2011, 16<sup>th</sup> Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun. ASP Conference Series, Vol. 448, 469  
*Planet Formation Around M-dwarf Stars: From Young Disks to Planets*
- Birkby, J.**; Hodgkin, S.; Pinfield, D.; The WTS Consortium; RoPACS Initial Training Network Members, 2010, UKIRT Newsletter, no. 27, 29  
*The WFCAM Transit Survey*
- Birkby, J. L.**; Hodgkin, S. T.; Aigrain, S.; Irwin, J., 2009, Proceedings of the 15th Cambridge Workshop on Cool Stars, Stellar Systems and the Sun. AIP Conference Proceedings, Volume 1094, 832  
*The Monitor Project: a search for low mass EBs in the young open cluster M50*
- Birkby, Jayne**; Parker, Quentin; Miszalski, Brent; Acker, Agnes; Frew, David, 2007, Anglo-Australian Observatory Newsletter, No. 111, February 207, 22  
*Examples of new evolved planetary nebular from the SuperCOSMOS H-alpha survey*