

# Dr Raphaëlle D. HAYWOOD

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## CURRENT AND PREVIOUS POSITIONS

June 2017 – present      NASA Sagan Fellow, Harvard College Observatory, USA  
Oct. 2015 – June 2017    Postdoctoral Fellow, Harvard College Observatory, USA  
Apr. 2015 – Sep. 2015    STFC STEP Research Fellow, University of St Andrews, UK

## EDUCATION

Sept. 2011–Nov. 2015    PhD in Astrophysics, University of St Andrews, UK  
Thesis: *“Hide and Seek: Radial-Velocity Searches for Planets Around Active Stars”*  
Supervisor: Prof. Andrew Collier Cameron  
Sept. 2007–June 2011    Masters of Science in Physics, Imperial College London, UK  
Thesis: *“Stellar Activity and Variability of Young Sun-like Stars in the Region of Open Cluster NGC 6866”*  
Supervisor: Dr Yvonne Unruh  
June 2007                 French Baccalauréat, Lycée Jeanne d’Arc, Avallon, France  
Mention Très Bien with Félicitations du Jury (Scientific section)

## AWARDS AND PRIZES

Sept. 2016                 Springer Thesis Award: *Recognizing Outstanding Ph.D. Research*  
PhD thesis published by Springer International Publishing AG  
Switzerland in the *Springer Thesis Series*  
Prize awarded by Springer International Publishing AG (€500)  
Apr. 2014                 Grant to support a 4-week visit at the CfA, Cambridge, USA  
Awarded by the Royal Astronomical Society (£523)  
Apr. 2012                 Second prize of poster competition at the SUPA annual  
assembly, Edinburgh, UK  
Sponsored by SELEX-Galileo (£30)  
June 2007                 Prix de la Vocation Scientifique et Technique des Filles  
*“Prize for scientific and technological excellence for female students”*  
Awarded by the Ministère du Travail, des Relations Sociales, de la  
Famille et de la Solidarité, France (€1,000)

## LEADERSHIP ROLES

- Feb. 2016 – present Initiator and leader of the HARPS-N Solar Telescope meetings
- 15 March 2017 Co-leader (with Dr Heather Cegla) of the discussion session: “*The impact of stellar activity in exoplanet searches*” at the UK Community Exoplanet Meeting, St Andrews, UK
- Jan. 2016 – present Leader of the HARPS-North GTO *Kepler / K2* Target Selection Team
- Apr. 2012 –Apr. 2014 Leader of the mobile planetarium of the University of St Andrews, UK
- Sept. 2009 –Apr. 2011 Secretary of the Astronomy Society of Imperial College London, UK

## TEACHING, SUPERVISING & MENTORING EXPERIENCE

- 31 July – 4 Aug. 2017 Invited lecturer for the workshop: *Precision Spectroscopy: Towards Earth 2.0*, São Paulo, Brazil  
Total lecturing time: 3.5 hours
- June – Aug. 2017 Primary supervisor to Michael L. Palumbo (3rd year Physics undergraduate at the University of North Carolina, USA) for a 10-week project funded by a National Science Foundation grant (USA).  
Project: “*Radial-velocity signatures of magnetic features on the Sun observed as a star*”  
Co-supervisors: Dr Steven Saar & Dr Andrea Dupree
- 31 July 2017 Jury member for the MSc defense of Leonardo dos Santos (MSc candidate at USP, São Paulo, Brazil)
- Aug.–Sept. 2014 Supervisor to Laura Moran (2nd year Astrophysics MSci undergraduate at the University of St Andrews, UK) for a 6-week project, funded by a Cormack Bequest award.  
Project: “*Benchmarking a code for low-mass exoplanet detection in RV surveys*”
- 2012 – 2015 Instructor for undergraduate and graduate students at the James Gregory Telescope, St Andrews Observatory, UK
- Oct. 2011–Dec. 2013 Tutor & lab demonstrator for undergraduate Astronomy modules, University of St Andrews, UK  
Total teaching time (not including preparation and marking):  
- 1st year module: 20 h tutoring, 40 h demonstrating  
- 2nd year module: 10 h demonstrating
- Feb. – May 2012 Tutor for undergraduate module “*The Physical Universe*” intended for Arts & Humanities students, University of St Andrews, UK  
Total teaching time (not including preparation and marking): 10 h

- Jan. – June 2010 Took Imperial College MSci course: “Communicating Physics”  
Involved being a teaching assistant at Colfe’s Secondary School, London, UK
- 2007 – 2011 Academic Science Mentor for Exscitec, Imperial College Outreach Department (monthly)
- July 2008 Teaching Assistant in science at Quintin Kynaston Secondary School, London, UK (3 weeks)  
Funded by the UK’s Training and Development Agency for schools

### **OBSERVING EXPERIENCE**

- May 2016 TNG/HARPS-N, La Palma, Spain (8 nights)
- Nov. 2014 TNG/HARPS-N, La Palma, Spain (3 nights)
- Feb. 2012 1.93m/SOPHIE, Observatoire de Haute-Provence, France (5 nights)
- Jan. 2012 3.6m/HARPS, La Silla, Chile (9 nights)
- 2011 – 2014 James Gregory Telescope, St Andrews, UK (monthly 1-week runs in winter)

### **INVOLVEMENT IN OUTREACH**

- 6 Feb. 2017 *Science by the Pint* at The Burren, Somerville, MA, USA
- 29 Aug. 2016 Online post for the UK Solar Physics website  
<http://www.uksolphys.org/uksp-nugget/71-the-sun-as-an-exoplanet-host-star/>
- Oct. 2014 Presenter at *Café Scientifique*, Aikman’s pub, St Andrews, UK
- July 2013 Outreach talk about the planetarium, NAM, St Andrews, UK
- Oct. 2012, Nov. 2013 Talks at the Astronomical Society of Dundee, UK
- Jan. 2012 – Apr. 2015 Demonstrator for the mobile planetarium of the University of St Andrews, UK
- 2011 – 2015 Tour guide & instructor at the Observatory of St Andrews, UK
- 2011 – 2015 Participation in bi-annual observatory open nights and annual departmental open days at the University of St Andrews, UK

### **JOURNAL REFEREE**

MNRAS, A&A, ApJ, ApJ Letters

### **LANGUAGE SKILLS**

English & French: native speaker – German & Portuguese: elementary (A2)

## TALKS

*Including 12 seminars at other institutes, 4 invited and 15 contributed talks at conferences*

- Oct. 2018 (upcoming) Invited review, ESO Workshop, Garching, Germany
- 12 Oct. 2017 (upcoming) Contributed talk, *Know Thy Star – Know Thy Planet*, Pasadena, CA, USA
- 13 July 2017 CfA Summer Colloquium, Cambridge, MA, USA
- 23 June 2017 Contributed talk, *Kepler/K2 Science Conference*, Mountain View, CA, USA
- 3 March 2017 Invited seminar, IoA, Cambridge, UK
- 6 Jan. 2017 Thesis talk, *229th AAS meeting*, Grapevine, TX, USA
- 11 Dec. 2016 Invited seminar, IRAP, Toulouse, France
- 18 Nov. 2016 Seminar for the GMT series, CfA, Cambridge, MA, USA
- 3 Nov. 2016 Harvard Origins of Life Initiative Chalk Talk Lecture, Cambridge, MA, USA
- 27 Sept. 2016 Invited review, *GMT Community Science Meeting*, Monterey, CA, USA
- 22 Sept. 2016 Invited colloquium, Lowell Observatory, Flagstaff, AZ, USA
- 29 Aug. 2016 Invited talk, *Opportunity M*, Cambridge, MA, USA
- 5 July 2016 Contributed talk, *Exoplanets I*, Davos, Switzerland
- 7 June 2016 Contributed talk, *Cool Stars 19*, Uppsala, Sweden
- 23 May 2016 Invited seminar, Institute of Astrophysics, Porto, Portugal
- 15 Mar. 2016 Contributed talk, *UK Community Exoplanet Meeting*, Exeter, UK
- 22 Feb. 2016 Seminar, CfA, Cambridge, MA, USA
- 2 Dec. 2015 Invited seminar, Solar Group, University of St Andrews, UK
- 13 Nov. 2015 Invited seminar, Instrumentation group, CfA, Cambridge, MA, USA
- 12 July 2015 Invited seminar, Institute of Astrophysics, Porto, Portugal
- 17 June 2015 Invited keynote, *Mysteries of the Sun's magnetic field*, Warwick, UK
- 16 April 2015 Invited seminar, University of Tel Aviv, Israel
- 16 Sept. 2014 Contributed talk, *Towards Other Earths II*, Porto, Portugal
- 18 July 2014 Invited seminar, Institute for Astronomy, University of Hawaii, Hawaii, USA
- 7 July 2014 Invited seminar, CfA, Cambridge, MA, USA
- 27 June 2014 Invited seminar, University of Toronto, Canada
- 21 Apr. 2014 Contributed talk, *Rencontres du Vietnam*, Quy Nhon, Vietnam
- 21 Feb. 2014 Contributed talk, *Building Habitable Worlds*, Edinburgh, UK
- 17 Dec. 2013 Invited seminar, Observatoire de Paris (LESIA), Paris, France

4 July 2013	Contributed talk, <i>National Astronomy Meeting</i> , St Andrews, UK
5 June 2013	Contributed talk, <i>IAU Symposium 299</i> , Victoria, Canada
2 Apr. 2013	Seminar, Astronomy Group, University of St Andrews, St Andrews, UK
21 Mar. 2013	Contributed talk, <i>11th CoRoT Week</i> , Tenerife, Spain
13 Nov. 2012	Contributed talk, <i>SUPA-Cormack Meeting</i> , Edinburgh, UK
6 Nov. 2012	Contributed talk, <i>Gaia &amp; Exoplanets</i> , Turin, Italy
14 Mar. 2012	Contributed talk, <i>Exoplanets and their Host Stars</i> , Oxford, UK
6 Mar. 2012	Seminar, University of St Andrews, St Andrews, UK

## PUBLICATION LIST

21 published refereed articles, 654 citations, h-index: 11

### PUBLISHED FIRST-AUTHOR AND MAJOR CONTRIBUTIONS (8)

1. **R. D. Haywood**, A. Collier Cameron, Y. C. Unruh *et al.*, 2016. *The Sun as a planet-host star: Proxies from SDO images for HARPS radial-velocity variations*, MNRAS, 457, 4
2. **R. D. Haywood**, A. Collier Cameron, D. Queloz *et al.*, 2014. *Planets and Stellar Activity: Hide and Seek in the CoRoT-7 system*, MNRAS, 443, 3
3. H. A. C. Giles, A. Collier Cameron & **R. D. Haywood**, 2017. *A Kepler Study of Starspot Lifetimes with Respect to Light Curve Amplitude and Spectral Type*, in press at MNRAS (2017arXiv170708583G)
4. Dittmann, J. A., Irwin, J. M., Charbonneau, D., Bonfils, X., Astudillo-Defru, N., **Haywood, R. D.** *et al.*, 2017. *A temperate rocky super-Earth transiting a nearby cool star*, Nature, 544, 7650
5. M. López-Morales, **R. D. Haywood**, *et al.*, 2016. *Kepler-21b: A rocky planet around a V=8.25 magnitude star*, AJ, 152, 6
6. J.P. Faria, **R. D. Haywood**, B.J. Brewer, *et al.*, 2016. *Uncovering the planets and stellar activity of CoRoT-7 using only radial velocities*, A&A, 588, A31
7. S. K. Grunblatt, A. W. Howard & **R. D. Haywood**, 2015. *Determining the Mass of Kepler-78b with Nonparametric Gaussian Process Estimation*, ApJ, 808, 127
8. X. Dumusque, A. S. Bonomo, **R. D. Haywood**, *et al.*, 2014. *The Kepler-10 Planetary System Revisited by HARPS-N: A Hot Rocky World and a Solid Neptune-Mass Planet*, ApJ, 789, 154

### PUBLISHED REFEREED PROCEEDINGS (2)

9. **R. D. Haywood**, A.C. Cameron, D. Queloz, *et al.*, 2014. *Disentangling Planetary Orbits from Stellar Activity in Radial-Velocity Surveys*, *International Journal of Astrobiology*, 13, 155
10. **R. D. Haywood**, A.C. Cameron, D. Queloz, *et al.*, 2014. *Planets and Stellar Activity: Hide and Seek in the CoRoT-7 system*, *Proc. IAU Symposium No. 299*, 299, 237

OTHER CONTRIBUTIONS TO PUBLISHED REFEREED ARTICLES (11)

11. Malavolta, L., Borsato, L., Granata, V., Piotto, G., Lopez, E., Vanderburg, A., Figueira, P., Mortier, A., Nascimbeni, V., Affer, L., Bonomo, A. S. Bouchy, F., Buchhave, L.A., Charbonneau, D., Collier Cameron, A., Cosentino, R., Dressing, C. D., Dumusque, X., Fiorenzano, A. F. M., Harutyunyan, A., **Haywood, R. D.** *et al.*, 2017. *The Kepler-19 System: A Thick-envelope Super-Earth with Two Neptune-mass Companions Characterized Using Radial Velocities and Transit Timing Variations*, *AJ*, 153, 5
12. J.-F. Donati, L. Yu, C. Moutou, A.C. Cameron, L. Malo, K. Grankin, E. Hébrard, G.A.J. Hussain, A.A. Vidotto, S.H.P. Alencar, **R.D. Haywood**, *et al.*, 2016. *The hot Jupiter and magnetic activity of V830 Tau*, *MNRAS*, 465, 3
13. D.F. Phillips, A.G. Glenday, X. Dumusque, N. Buchschacher, A.C. Cameron, M. Ceconi, D. Charbonneau, R. Cosentino, A. Ghedina, **R. D. Haywood**, *et al.*, 2016. *An astro-comb calibrated solar telescope to search for the radial velocity signature of Venus*, *SPIE proc.*, 9912
14. A.F. Lanza, P. Molaro, L. Monaco, and **R. D. Haywood**, 2016. *Long-term radial-velocity variations of the Sun as a star: The HARPS view*, *A&A*, 587, A103
15. X. Dumusque, F. Borsa, M. Damasso, R. Díaz, P. C. Gregory, N.C. Hara, A. Hatzes, V. Rajpaul, M. Tuomi, S. Aigrain, G. Anglada-Escudé, A.S. Bonomo, G. Boué, F. Dauvergne, G. Frustagli, P. Giacobbe, **R. D. Haywood**, *et al.*, 2016. *The radial-velocity fitting challenge. II. First results of the analysis of the data set*, *A&A*, 598, A133
16. L. Buchhave, C.D. Dressing, X. Dumusque, K. Rice, A. Vanderburg, A. Mortier, M. López-Morales, M.S. Lundkvist, H. Kjeldsen, L. Affer, A.S. Bonomo, D. Charbonneau, A. Collier Cameron, R. Cosentino, P. Figueira, A.F.M. Fiorenzano, A. Harutyunyan, **R. D. Haywood**, *et al.*, 2016. *A 1.9 Earth radius rocky planet and the discovery of a non-transiting planet in the Kepler-20 system*, *AJ*, 152, 6
17. Motalebi, F., Udry, S., Gillon, M., Lovis, C., Ségransan, D., Buchhave, L. A., Demory, B. O., Malavolta, L., Dressing, C. D., Sasselov, D., Rice, K., Charbonneau, D., Collier Cameron, A., Latham, D., Molinari, E., Pepe, F., Affer, L., Bonomo, A. S., Cosentino, R., Dumusque, X., Figueira, P., Fiorenzano, A. F. M., Gettel, S., Harutyunyan, A., **Haywood, R. D.**, *et al.*, 2015.

*The HARPS-N Rocky Planet Search. I. HD 219134 b: A transiting rocky planet in a multi-planet system at 6.5 pc from the Sun, A&A, 584, id.A72*

18. Dressing, C. D., Charbonneau, D., Dumusque, X., Gettel, S., Pepe, F., Collier Cameron, A., Latham, D. W., Molinari, E., Udry, S., Affer, L., Bonomo, A. S., Buchhave, L. A., Cosentino, R., Figueira, P., Fiorenzano, A. F. M., Harutyunyan, A., **Haywood, R. D.** *et al.* 2014. *The Mass of Kepler-93b and The Composition of Terrestrial Planets, ApJ, 800, 135*
19. A. S. Bonomo, A. Sozzetti, C. Lovis, L. Malavolta, K. Rice, L. A. Buchhave, D. Sasselov, A. C. Cameron, D. W. Latham, E. Molinari, F. Pepe, S. Udry, L. Affer, D. Charbonneau, R. Cosentino, C. D. Dressing, X. Dumusque, P. Figueira, A. F. M. Fiorenzano, S. Gettel, A. Harutyunyan, **R. D. Haywood** *et al.* 2014. *Characterization of the Kepler-101 planetary system with HARPS-N. A hot super-Neptune with an Earth-sized low-mass companion, A&A, 572, id.A2*
20. Barros, S. C. C., Almenara, J.M., Deleuil, M., Diaz, R.F., Csizmadia, Sz., Cabrera, J., Chaintreuil, S., Collier Cameron, A., Hatzes, A., Lanza, A. F., Aigrain, S., Alonso, R., Bordé, P., Bouchy, F., Deeg, H., Erikson, A., Fridlund, M., Grziwa, S., Gandolfi, D., Guillot, T., Guenther, E., **Haywood, R. D.** *et al.* 2014. *Revisiting the transits of CoRoT-7b at a lower activity level, A&A, 569, id.A74*
21. F. Pepe, A.C. Cameron, D. W. Latham, E. Molinari, S. Udry, A. S. Bonomo, L. A. Buchhave, D. Charbonneau, R. Cosentino, C. D. Dressing, X. Dumusque, P. Figueira, A. F. M. Fiorenzano, S. Gettel, A. Harutyunyan, **R. D. Haywood** *et al.* 2013. *An Earth-sized planet with an Earth-like density, Nature, 503, 377*