

SARAH RUGHEIMER

CONTACT INFORMATION	Atmospheric Oceanic & Planetary Physics Clarendon Laboratory, Oxford University Sherrington Rd, Oxford, UK OX1 3PU	US Phone: +1 (617) 870-4913 UK Phone: +44 (0)7506 364848 sarah.rugheimer@physics.ox.ac.uk www.sarahrugheimer.com
CITIZENSHIP	Switzerland and USA	
LANGUAGES	English (native), German (medium)	
RESEARCH INTERESTS	I study the climate and atmospheres of habitable exoplanets. My research particularly focuses on the star-planet interaction, studying the effect of UV activity on the atmospheric chemistry and the detectability of biosignatures in a planet's atmosphere with future missions such as JWST/ELT and mission concepts such as LUVOIR and LIFE.	
APPOINTMENTS	Glasstone Research Fellow , Oxford University Glasstone Postdoctoral Research Fellowship Hugh Price Fellowship at Jesus College, Oxford	Oct 2018 - present
	Simons Research Fellow , University of St. Andrews Simons Origins of Life Postdoctoral Research Fellow	Oct 2015 - Sept 2018
	Research Associate , Cornell University, Carl Sagan Inst.	Feb 2015 - Aug 2015
EDUCATION	Harvard University , Cambridge, MA M.A. in Astronomy Ph.D. in Astronomy & Astrophysics • Thesis Title: Hues of Habitability: Characterizing Pale Blue Dots Around Other Stars • Advisors: Lisa Kaltenegger and Dimitar Sasselov • Chosen as one of 8 PhD students at Harvard in Arts and Sciences as a 2014 Harvard Horizons Scholar: www.gsas.harvard.edu/harvardhorizons	September 2008 - January 2015* <i>June 2010</i> <i>June 2010 - January 2015</i>
	* Harvard recognized a 1.5 years delay in time caring for terminally ill father.	
	University of Calgary , Calgary, Alberta Canada B.Sc. (First Class Honors), Physics	September 2003 - June 2007 • Graduated top of class in Department of Physics and Astronomy • Senior Thesis Topic: Uses of Attractive Bose-Einstein in Atom Interferometers • Undergrad summer research projects: placing quantum dots in phospholipid vesicles as a precursor to tracking active neuron cells with Dr. X.L. Wu (2003); modeling MEG data on brain surfaces generated from MRI data with Dr. Mingui Sun (2005); and numerically modeled Earth-like planets in the habitable zone of the nearby star system of HD 69830 with Dr. Haghhighipour (2006).
AWARDS	<ul style="list-style-type: none">• TED 2020 Fellow• Glasstone Oxford Postdoctoral Research Fellowship• Hugh Price Fellowship at Jesus College, Oxford• Simons Postdoctoral Origins of Life Fellowship• BSA Rosalind Franklin Prize in the Physical Sciences and Math 2019• Barrie Jones Astrobiology Outreach and Education Award 2019• Caroline Herschel Prize Lectureship 2018• 2014 Harvard Horizons Scholar• D.A.A.D Fellowship for International Research Collaboration in Germany• Derek Bok Center Distinction in Teaching Award for <i>The Energetic Universe</i>, Spring 2012, Harvard University• Venkatesan Silver Medallion, for being the top graduate in my physics class at the University of Calgary in 2007	

COMMUNITY
INVOLVEMENT

[LIFE - Large Interferometer for Exoplanets](#) mission design Core Team Member
Editor for Oxford Research Encyclopedia of Planetary Science at Oxford University Press
Co-organizer for Lorentz Exocomet Workshop, May 2019
Co-organizer for Lorentz LIFE Workshop, rescheduled for 2021 due to COVID
LOC for Exoclines Oxford, Aug 2019

OBSERVING
PROPOSALS

Co-I on HST Cycle 22 - The MUSCLES Treasury Survey: Measurements of the Ultraviolet Spectral Characteristics of Low-mass Exoplanetary Systems (PI - Kevin France, ID 13650)
Co-I on HST Cycle 25 The Mega-MUSCLES Treasury Survey: Measurements of the Ultraviolet Spectral Characteristics of Low-mass Exoplanetary Systems (PI - Cynthia Froning, ID 15071)
Co-I on HST Cycle 25 The M Dwarf UV Spectra Irradiating Nearby Transiting Terrestrial Planets (PI - Zach Berta-Thompson, ID 15264)

PUBLICATIONS

Referred Publications (4 first author, 2 second author, 6 third author, 29 total)

Rimmer, P., Ranjan, S., and **Rugheimer, S.** (2020) Starting Life and Finding Life on Rocky Planets *in review Elements*

Kaltenegger, L., Lin, Z., **Rugheimer, S.** (2020) Finding signs of life on transiting earth-like planets: high-resolution transmission spectra of earth through time around FGKM host stars. *ApJ*, 904:10. doi:10.3847/1538-4357/abb9b2

*Gregory, B., Claire, M., and **Rugheimer, S.** (2020) Photochemical modelling of atmospheric oxygen levels suggests two stable states. *in review at EPSL*

*Student Advised

Stüeken, E., Som, S.M., Claire, M., **Rugheimer, S.**, Sherf, M., Sproß, L., Tosi, N., Ueno, Y., and Lammer, H. (2020) Mission to planet earth: the first two billion years, *Space Sci Rev*, 216:31, doi:10.1007/s11214-020-00652-3

Melbourne, K., Youngblood, A., France, K., Froning, C.S., Pineda, J.S., Shkolnik, E.L., Wilson, D.J., Wood, B.E., Basu, S., Roberge, A., Schlieder, J.E., Cauley, P.W., Loyd, R.O.P., Newton, E.R., Schneider, A., Arulanantham, N., Berta-Thompson, Z., Brown, A., Buccino, A.P., Kempton, E., Linsky, J., Logsdon, S.E., Mauas, P., Pagano, I., Peacock, S., Redfield, S., **Rugheimer, S.**, Schneider, P.C., Teal, D.J., Tian, F., Tilipman, D., and Vieytes, M. (2020) Estimating the Ultraviolet Emission of M dwarfs with Exoplanets from Ca II and H-alpha. *AJ*, 160: 6. doi:10.3847/1538-3881/abbf5c

Linsky, J.L., Wood, B.E., Youngblood, A., Brown, A., Froning, C.S., France, K., Buccino, A.P., Cranmer, S.R., Mauas, P., Miguel, Y., Pineda, S., **Rugheimer, S.**, Vieytes, M., Wheatley, P.J., Wilson, D.J. (2020) The relative emission from chromospheres and corae: dependence on spectral type and age. *ApJ*, 902:1. doi:10.3847/1538-4357/abb36f

Dandouras, I., Blanc, M. Fossati, L., Gerasimov, M., Guenther, E.W., Kislyakova, K.G., Lammer, H., Lin, Y., Marty, B., Mazelle, C., **Rugheimer, S.**, Scherf, M., Sotin, C., Sproß, L., Tachibana, S., Wurz, P., Yamauchi, M. (2020) Future Missions related to the determination of the elemental and isotopic composition of Earth, Moon and the terrestrial planets. *Space Science Reviews*, 216, 121. doi:10.1007/s11214-020-00736-0t

France, K., Duvvuri, G., Egan, H., Koskinen, T., Wilson, D.J., Youngblood, A., Froning, C.S., Brown, A., Alvarado-Gomez, J.D., Berta-Thompson, Z.K., Drake, J.J., Garraffo, C., Kaltenegger, L., Kowalski, A.F., Linsky, J.F., Loyd, R.O.P., Mauas, P.J.D., Miguel, Y., Pineda, J.S., **Rugheimer, S.** Schneider, P.C., Tian, F., and Vieytes, M. (2020) The

High-Energy Radiation Environment Around a 10 Gyr M Dwarf: Habitable at Last? *AJ* 160, 5. doi:10.3847/1538-3881/abb465

Kaltenegger, L., Madden, J., Lin, Z., **Rugheimer, S.**, Segura, A., Luque, R., Palle, E., and Espinoza, N. (2019) The Habitability of GJ 357 d : Possible Climates and Observability. *ApJL* 883:L40. doi:10.3847/2041-8213/ab3d40

Rimmer, P. & **Rugheimer, S.** (2019) Hydrogen Cyanide in Nitrogen-Rich Atmospheres of Rocky Exoplanets. *Icarus*, 329: 124-131. doi:10.1016/j.icarus.2019.02.020

Rimmer, P., Shorttle, O., & **Rugheimer, S.** (2019) Oxidised Micrometeorites are Evidence for Low Atmospheric Pressure on the Early Earth. *Geochemical perspective letters*, 9: 38-42. doi:10.7185/geochemlet.1903

*Kawashima, Y. & **Rugheimer, S.** (2019) Theoretical Reflectance Spectra of Earth-Twins Through Their Evolutions: Impact of Clouds and Detectability of O₂, H₂O, and CH₄ with LUVIOR Telescope. *ApJ*, 157:5. doi:10.3847/1538-3881/ab14e3

*Student Advised

Froning, C., Kowalski, A., France, K., Loyd, R.O.P., Schneider, C., Youngblood, A., Wilson, D., Brown, A., Berta-Thompson, Z., Pineada, J.S., Linsky, J., **Rugheimer, S.** and Miguel, Y. (2019) A Hot Ultraviolet Flare on the M Dwarf Star GJ 674, *ApJ*, 871(2):L26. doi:10.3847/2041-8213/aaffcd

Rugheimer, S. and Kaltenegger, L. (2018) Spectra of Earth-like Planets Orbiting FGKM Stars Through Geological Evolution, *ApJ*, 854:19. doi:10.3847/1538-4357/aaa47a

Airapetian, V.S. et al. and 46 co-authors including **Rugheimer, S.** (2019) Impact of Space Weather on Climate and Habitability of Terrestrial Type Exoplanets, *International Journal of Astrobiology* 1-59. doi:10.1017/S1473550419000132

Schwieterman, E.W., Kiang, N.Y., Parenteau, M.N., Harman, C.E., DasSarma, S., Fisher, T.M., Arney, G.N., Hartnett, H.E., Reinhard, C.T., Olson, S.L., Meadows, V.S., Cockell, C.S., Walker, S.I., Grenfell, J.L., Hegde, S., **Rugheimer, S.**, Hu, R., Lyons, T.W. (2018) Exoplanet Biosignatures: A Review of Remotely Detectable Signs of Life, *Astrobiology* 18(6), 663-708. doi:10.1089/ast.2017.1729

Blumenthal, S.D., Mandell, A.M., Hébrard, E., Batalha, N.E., Cubillos, P.E., **Rugheimer, S.**, Wakeford, H.R. (2018) A Comparison of JWST Spectra From Equilibrium and Disequilibrium Chemistry Models in Gaseous Planets. *ApJ* 853, 138. doi:10.3847/1538-4357/aa9e51

Loyd, R.O.P., France, K., Youngblood, A., Schneider, C., Brown, A., Hu, R., Segura, A., Linsky, J., Redfield, S., Tian, F., **Rugheimer, S.**, Miguel, Y., Froning, C. (2018) The Muscles Treasury Survey V: FUV Flares on Active and Inactive M Dwarfs. *ApJ* 867:71. doi:10.3847/1538-4357/aae2bd

Youngblood, A., France, K., Loyd, R.O.P., Brown, A., Mason, J.P., Schneider, P.C., Tilley, M.A., Berta-Thompson, Z.K., Buccino, A., Froning, C.S., Hawley, S.L., Linsky, J., Mauas, P.J.D., Redfield, S., Kowalski, A., Miguel, Y., Newton, E.R., **Rugheimer, S.**, Segura, A., Roberge, A., and Vieytes, M. (2017) The Muscles Treasury Survey IV: Scaling Relations for Ultraviolet, Ca II K, and Energetic Particle Fluxes from M Dwarfs. *ApJ*. 843: 31. doi:10.3847/1538-4357/aa76dd

Domagal-Goldman Shawn D., Wright Katherine E., & 47 co-authors including **Rugheimer, S.**, (2016) Astrobiology Primer 2.0, *Astrobiology* 16: 8, 561-653. doi:10.1089/ast.2015.1460

France, K., Loyd, R.O.P., Youngblood, A., Brown, A., Schneider, P.C., Hawley, S.L., Froning, C.S., Linsky, J.L., Roberge, A., Buccino, A.P., Davenport, J., Fontenla, J.M., Kaltenegger, L., Kowalski, A.K., Mauas, P., Miguel, Y., Redfield, S., **Rugheimer, S.**, Tian, F., Vieytes, M.C., Walkowicz, L.M., and Weisenburger, K.L. (2016) The MUSCLES Treasury Survey I: Motivation and Overview, *ApJ*, 820: 2, 89. [doi:10.3847/0004-637X/820/2/89](https://doi.org/10.3847/0004-637X/820/2/89)

Youngblood, A., France, K., Loyd, R.O.P., Linsky, J.L., Redfield, S., Schneider, P.C., Wood, B.E., Brown, A., Froning, C., Miguel, Y., **Rugheimer, S.**, and Walkowicz, L. (2016) The MUSCLES Treasury Survey II: Intrinsic Lyman Alpha and Extreme Ultraviolet Spectra of K and M Dwarfs with Exoplanets, *ApJ*. 824: 2, 101. [doi:10.3847/0004-637X/824/2/101](https://doi.org/10.3847/0004-637X/824/2/101)

Loyd, R.O.P., France, K., Youngblood, A., Schneider, C., Brown, A., Hu, R., Linsky, J., Froning, C.S., Redfield, S., **Rugheimer, S.**, and Tian, F. (2016) The MUSCLES Treasury Survey III: XRay to Infrared Spectra of 11 M and K Stars Hosting Planets, *ApJ*. 824: 2, 102. [doi:10.3847/0004-637X/824/2/102](https://doi.org/10.3847/0004-637X/824/2/102)

Rugheimer, S., Kaltenegger, L., Segura, A., Linsky, J. and Mohanty, S. (2015) Influence of UV activity on the Spectral Fingerprints of Earth-like Planets around M dwarfs. *ApJ*. 809:57. [doi:10.1088/0004-637X/809/1/57](https://doi.org/10.1088/0004-637X/809/1/57)

Rugheimer, S., Segura, A., Kaltenegger, L., Sasselov, D. (2015) Surface UV fluxes for Earth-like planets around FGKM stars. *ApJ*. 806:137. [doi:10.1088/0004-637X/806/1/137](https://doi.org/10.1088/0004-637X/806/1/137)

Miguel, Y., Kaltenegger, L., Linsky, J. and **Rugheimer, S.** (2015) The Effect of Lyman alpha Radiation on Mini-Neptune Atmospheres Around M Stars: Application to GJ 436b. *MNRAS*. 446: 345-353. [doi:10.1093/mnras/stu2107](https://doi.org/10.1093/mnras/stu2107)

Kaltenegger, L., Sasselov, D. and **Rugheimer, S.** (2013) Water Planets in the Habitable Zone: Atmospheric Chemistry, Observable Features, and the case of Kepler-62e and -62f. *ApJL*. 775: L47. [doi:10.1088/2041-8205/775/2/L47](https://doi.org/10.1088/2041-8205/775/2/L47)

Rugheimer, S., Kaltenegger, L., Zsom, A., Segura, A., Sasselov, D., (2013) Spectral Fingerprints of Earth-like Planets around FGK Stars. *Astrobiology*. March 2013, 13(3): 251-269. [doi:10.1089/ast.2012.0888](https://doi.org/10.1089/ast.2012.0888)

Kaltenegger, L, Miguel, Y. and **Rugheimer, S.**, (2012) Rocky exoplanet characterization and atmospheres. *International Journal of Astrobiology* 11(04): 297-307.

CONFERENCE
PROCEEDINGS

Rugheimer, S., Qiang Liu, Robert J. Scialabassi, and Mingui Sun. Displaying Raw MEG Measurements with FreeSurfer. 32nd NE Bioengineering Conference. April 2006.

SELECTED
WHITE PAPERS

Quanz et al., S and 47 co-authors including **Rugheimer, S.** (2019) Atmospheric characterization of terrestrial exoplanets in the mid-infrared: biosignatures, habitability & diversity *White paper for the Voyage 2050 long-term plan in the ESA Science Programme* [arXiv:1908.0131](https://arxiv.org/abs/1908.0131)

Fortney, J. et al. and 86 co-authors including **Rugheimer, S.** (2019) The Need for Laboratory Measurements and Ab Initio Studies to Aid Understanding of Exoplanetary Atmospheres. *Astro2020 Science White Paper*, [arXiv:1905.07064](https://arxiv.org/abs/1905.07064)

Parry, I. and 22 co-authors including **Rugheimer, S.** (2018) SUPERSHARP - Segmented Unfolding Primary for Exoplanet Research via Spectroscopic High Angular Resolution Photography. [arXiv:1801.06111](https://arxiv.org/abs/1801.06111)

Domagal-Goldman, S. and 40 co-authors including **Rugheimer, S.** (2018) Life Beyond the Solar System: Remotely Detectable Biosignatures. This is a white paper that was submitted to the National Academies of Sciences Study: Astrobiology Science Strategy for the Search for Life in the Universe. [arXiv:1801.06714](https://arxiv.org/abs/1801.06714)

Airapetian, V. S. , Danchi, W. C.1, Dong, C. F.3, **Rugheimer, S.** and 32 co-authors (2018) Life Beyond the Solar System: Space Weather and Its Impact on Habitable Worlds. Submitted to the National Academy of Sciences in support of the Astrobiology Science Strategy for the Search for Life in the Universe. [arXiv:1801.07333](https://arxiv.org/abs/1801.07333)

ADVISING
EXPERIENCE

University of St. Andrews, St Andrews, UK

- **Co-advising PhD student Bethan Gregory** **Sept 2016 - present**
Thesis: “Numerical modelling of oxygen isotopes over Earth’s history”, thesis submitted Sept 2020, viva Dec 2020

University of Oxford, Oxford, UK

- **Pastoral advisor for physics PhD student RJ Graham Oct 2018 - present**
Thesis: “The Silicate Weathering Feedback and its Influence on Rocky Planet Climate”
- **Pastoral advisor for physics PhD student Jinzhao Sun Oct 2018 - present**
Thesis: “Coupling of magnetic order and charge transport in the europium topological semimetal candidates

Kavli Exoplanet Atmospheres Summer Program, Santa Cruz, CA

- **Advised graduate student Yui Kawashima** **Summer 2016**
Project title: “Impact of clouds on detecting oxygen with LUVOIR” paper published
- **Advised postdoc Dr. Liu Hui-Gen** **Summer 2016**
Project title: “TRAPPIST-1 and Assessing the Habitability of Ultra-cool Dwarfs”

Cornell University, Ithaca, NY

- **Mentored PhD student Thea Kozakis** **Jan 2015 - July 2016**
Project title: “Habitability of White Dwarfs”

TEACHING
EXPERIENCE

University of St. Andrews, St. Andrews, Scotland, UK

- **Astrobiology: The Search for Life in the Universe, ID1006** **Spring 2017**
I designed and led a new first year interdisciplinary module with 105 students. The course remains one of the highest enrolled at the University.
- **Environmental Geochemistry, ES 5010** **Spring 2016**
Taught module “Mineral evolution through geological history” for this senior level geology course

Tufts University, Medford, MA USA

- **Life on Earth and Beyond** **Fall 2013**
 - Visiting Lecturer Fall 2013 to teach a course of my own design at Tufts ExCollege and offered for full credit at Tufts University as a natural science credit.
 - Course filled to maximum capacity within 1 hour of registration opening
 - One of 4 courses requested back by Tufts ExCollege for following semester
 - Nominated by graduating seniors in 2016 for this course as having been one of the “most impactful to your intellectual and personal development while at Tufts”
 - Complete course evals: http://www.sarahrugheimer.com/EXP022_Eval.pdf

Harvard University, Cambridge, MA USA

Teaching Fellow for following courses:

- **The Energetic Universe** **Spring 2012**
 - An introductory Astronomy course for non-majors taught by Robert Kirshner.
 - Received Distinction in Teaching Award
- **Stellar and Planetary Astrophysics** **Fall 2010**
 - A graduate level Astronomy course taught by Dimitar Sasselov.
- **Life as a Planetary Phenomenon** **Spring 2010**
 - An introductory Astrobiology course for non-majors taught by Dimitar Sasselov.

Teacher Training

- Completed Harvard's Bok Center Teaching Certificate
- Harvard University's "Scientists Teaching Science" hands-on course on active learning and effective science education with Professor Philip Sadler
- Harvard University's Bok Center Course "Problems with the Blackboard: Tools for Teaching Science & Math" with John Girash.
- Harvard University's Finding Your Voice workshop on giving effective presentations with Nancy Houfek.

SELECTED PRESS Feature article I wrote for New Scientist: [Is There Anybody Out There?](#)

Articles or interviews about my research:

[Announcement as a TED 2020 Fellow](#)

[Interview on my podcast and TED fellowship from University of Calgary](#)

[British Science Festival Lecture Summary: Are we alone in the Universe?](#)

[Are We Alone? British Science Association Rosalind Franklin Prize Interview](#)

[Phys.org - Earth holds the key to detecting life beyond our solar system](#)

[Planetary.org - Creating a guidebook for Earth's hypothetical twin](#)

[BBC Radio 4 Inside Science - Understanding Biosignatures](#)

[Cornell - Astronomers create array of Earth planet models](#)

[Daily Mail UK - Computer models reveal how Earth-like Planets Evolve in Time](#)

[Harvard Gazette - Doctoral student focuses on atmosphere in search for extrasolar life](#)

[Flathead Beacon - Looking for life beyond our own](#)

PRESENTATIONS **Selected Invited Oral**

- University of Belfast colloquium, 28 Oct 2020
- University of Hertfordshire colloquium, 7 Oct 2020
- *Detecting Pre-biosignatures: Failed biosphere or planet ready for life?* Antibiosignatures U Chicago remote conference 27 May 2020
- University of Florida colloquium, 13 Feb 2020
- Barrie Jones Award Lecture, 6 Dec 2019
- BSA Rosalind Franklin Prize Lectureship, 10 Sept 2019
- ETH Zurich Earth Sciences colloquium, 1 Oct 2019
- Northwestern colloquium, 12 April 2019
- University of Warwick habitability colloquium, 21 March 2019
- University of Cambridge colloquium, 5 Feb 2019
- University of Heidelberg colloquium, 5 Dec 2018
- *Hues of Habitability* Royal Astronomical Society and Royal Geological Society, London, 20 Nov 2018
- *Hues of Habitability* Caroline Herschel Lecture, Herschel Society, Bath, 21 Nov 2018
- *Biosignatures, Atmospheres, & Implications for Life* ISSI Workshop, Bern, Oct 2018
- *FVCC Commencement Address*, Kalispell, Montana, May 2018
- *UV, Biosignatures, and Life* Columbia University, colloquium, 18 April 2018
- *UV, Biosignatures, and Life* NYU - Abu Dhabi, colloquium, 8 Oct 2017
- *UV, Biosignatures, and Life* Climate Science, Atmospheres and Life: From the Earth and Beyond, University of Cambridge, 17 May 2017

- *How to Detect Life on Another Planet*, Next in Science, Radcliffe Institute for Advanced Study, Harvard, 14 Oct 2016
- *Terrestrial exoplanets under Mdwarf Irradiation*, Opportunity M, Harvard, Aug 2016
- *A Review of Biosignatures*, NExSS, 27 June 2016
- *Characterizing Pale Blue Dots Around FGKM Stars*, AGU, San Fran, 18 Dec 2015

Selected Contributed Oral

- *Detecting Pre-Biosignatures in the atmospheres of Earth-like planets around M and G stars*, British Planetary Society Conference, 13 Jan 2020
- *Detecting Biosignatures and Pre-Biosignatures in the Atmospheres of Earth-like Planets Around Other Stars with High Resolution Spectroscopy*, HoRSE - High Resolution Spectroscopy for Exoplanet Atmospheres, Nice France, 2 October 2018
- *Prebiotic Signatures and Geological Progression of Biosignatures* ESO Diversis Mundi: The Solar System in an Exoplanetary context (OPSIII), Chile, 7 March 2018
- *Remote Detectability of Oxygen Through Geological Time Around FGKM Stars*, AbSciCon, Phoenix, 24 April 2017
- *Using the PandExo JWST Simulator*, UK EXOM, St. Andrews, UK, March 2017
- *Importance of UV in Characterizing Pale Blue Dots Around FGKM Stars*, Extreme Solar Systems - Kona, Hawaii, Dec 2015
- *UV Surface Environments of Earth-like Planets Orbiting FGKM Stars Through Geological Evolution*, AbSciCon - Chicago, IL, June 2015
- *Characterizing Pale Blue Dots Around Other Stars*, AAS Dissertation Talk - Seattle, WA, January 2015
- *Influence of UV activity on the Spectral Fingerprints of Earth-like Planets around M dwarfs*, EB1 - Search for Life Beyond the Solar System - Tuscon, AZ, March 2014
- *Influence of UV activity on the Spectral Fingerprints of Earth-like Planets around M dwarfs*, Max Planck Institute for Astronomy - Heidelberg, Germany, 5 March 2014
- *Comparison of Transit Spectra of the First Small Exoplanets in the HZ Kepler 62 e & f*, Division for Planetary Sciences - DPS - Denver, Oct 2013
- *Cosmic Habitability*, AbGradCon, Sweden, June 2010

MENTORING & SERVICE

At UC Santa Cruz and the University of St. Andrews, I developed two workshops for PhD students on the impostor syndrome and public speaking which have run in my department and are now being run University wide through Student Services. At Columbia University, I was invited to develop a mental health workshop for the equity and diversity program and have now given that at several institutions. I also volunteered for a geoscience outreach to local Scottish secondary schools called GeoBus and am on the Equality and Diversity Committee at St. Andrews. I also helped launch WISSA - Women in Science at St. Andrews and served as our School's representative.

Currently, I mentor two D.Phil students at Oxford in the Physics department. At St. Andrews, I mentored formally a PhD student in geology. I was a mentor through Harvard Graduate Woman in Science and Engineering (HGWISE) for a female undergraduate student at Harvard. I served as a departmental representative on the HGWISE board in 2011 to 2013. I also was a mentor for an internal graduate mentoring program. For four years (2009-2013), I served as one of two graduate representatives on the Committee for Academic Studies which monitored the progress of all graduate students in our department and advocated for student concerns.

PUBLIC OUTREACH

This year I wrote and recorded a 10 lecture series for the Teaching Company and Amazon Originals called "[Searching for Extraterrestrial life](#)" released November 2020.

I am also a TED 2020 Fellow which is a fellowship that begins this year but is a permanent TED association with future potential to give continuing talks at TED mainstage conferences. Due to COVID, my TED mainstage talk has been recorded remotely and is due to be released in the Spring of 2021. The TED Fellows Program is a highly competitive program for junior academics, artists, and entrepreneurs that the TED selection committee believes have shown unusual accomplishment in their respective disciplines and for their future impact potential.

I co-host a podcast with Dr. Sarah Ballard called "[Self-care with Drs. Sarah](#)" where we discuss techniques for productivity, mental health, and successfully managing the pressures of academia to bring your full engagement to science in a sustainable way.

On BBC Radio 4's *Inside Science* with Adam Rutherford I gave an [interview](#) on the prospect of detecting biosignatures in the next few decades and the steps required to be prepared for observations with JWST and large ground-based observatories. I was a guest again on BBC Radio 4's [The Curious Cases of Rutherford and Fry](#) with Drs. Adam Rutherford and Hannah Fry.

Through GeoBus, I've led workshops on Mars exploration and scientific literacy, and created a [youtube video on biosignatures](#) in a minute. This video was chosen as for the Goldschmidt 2017 Wild Orbit Film Festival.

I am interested in science and education policy and how scientists can better communicate our findings to the public. With two other graduate students I launched PolicyLab in 2013 as an outlet for Harvard science graduate students where I served as senior editor the communications director.

In 2019, I wrote a feature article for the Aug 31st issue of New Scientist "Is Anybody Out There?" I have written for Science in the News (STIN), a public outreach organization dedicated to presenting scientific concepts to the public. Scientific literacy and reforming the way we teach science are fundamental to our future economic, social, and world growth and sustainability. The articles I have written include "Can Humans Play Red Rover?"; "A Tale of Two Worlds"; and "Are We Alone? - How astronomers hope to find life in the Universe."

I have spoken [on live radio at Boston's National Public Radio \(NPR\)](#) about finding Earth-like planets and biosignatures, and was on a [panel at MIT](#) to discuss the science behind the movie *Interstellar*. At the Edinburgh Science Festival, I was on a panel about the ethics of detecting and potentially interacting with alien life.

INTERESTS

I love high altitude and glacier mountaineering and have climbed e.g. Cayambe (18,996' / 5790m), Chimborazo - Veintimilla (20,440' / 6230m), Mt. Rainier (14,410' / 4392 m), Mt. Baker (10,781' / 3286 m), Mt. Kilimanjaro (19,341' / 5895 m), and Aconcagua (22,841' / 6962 m). I also competed internationally in Irish Dance for 11 years.

ACADEMIC REFERENCES

Prof. Tony Prave ap13@st-andrews.ac.uk
Head of School Earth & Environmental Sciences, University of St. Andrews

Prof. Dimitar Sasselov dsasselov@cfa.harvard.edu
Phillips Professor of Astronomy, Harvard University
Director of Origins of Life Initiative

Prof. Lisa Kaltenegger lkaltenegger@astro.cornell.edu
Associate Professor at Cornell University
Director of Carl Sagan Institute

Prof. Ray Pierrehumbert raymond.pierrehumbert@physics.ox.ac.uk
Halley Professor of Physics, University of Oxford

Teaching reference: **Prof. Robert Kirshner** rkirshner@cfa.harvard.edu
Clowes Professor of Science, Harvard University
Chief Program Officer for Science at the Gordon & Betty Moore Foundation