

Curriculum Vitae of Patrick Barth

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Contact

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Work experience

Since 2022 **Visiting Researcher**
[Space Research Institute, Austrian Academy of Sciences](#), Graz, Austria
Since 2019 **Postgraduate Researcher**
University of St Andrews, School for Physics and Astronomy & School for Earth
and Environmental Sciences, UK
[St Andrews Centre for Exoplanet Science](#)
Feb. - July 2017 **Student Research Assistant**
[Max Planck Institute for Astronomy](#), Heidelberg, Germany

Education

Since 2019 **PhD in Astronomy**
University of St Andrews, School for Physics and Astronomy & School for Earth
and Environmental Sciences, UK
[St Andrews Centre for Exoplanet Science](#)
Supervisor: Prof. Christiane Helling & Dr. Eva Stüeken
2017 - 2018 **International Student**
University of Washington, Seattle, United States of America
2017 - 2019 **Master of Science in Physics** (2-year program)
Final Grade: 1.1 (very good), University of Heidelberg, Department of Physics and
Astronomy, Germany
2013 - 2017 **Bachelor of Science in Physics**
Final grade: 1.7 (good), University of Heidelberg, Department of Physics and As-
tronomy, Germany
2013 **Abitur**
Final grade: 1.1 (very good), Karl-Friedrich-Gymnasium Mannheim, Germany

Awards

2022	Outstanding Student and PhD candidate Presentation (OSPP) Award EGU General Assembly, 23-27 May 2022, Vienna, Austria
2021	Student Presentation Award NoRCEL Meeting, 29-31 March 2021, St Andrews, UK (online)
2019 - 2023	St Leonard's Interdisciplinary Doctoral Scholarship University of St Andrews, UK
2017 - 2018	Baden-Württemberg-Stipendium Scholarship for distinguished students studying abroad
2013	High School Graduation Award of the German Physical Society (DPG)

Students

since 2020	Lukas Rossmanith Undergraduate research assistant, spark experiments and analysis, co-supervision with Dr. Eva Stüeken
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Teaching & Organisation

Since 2019	Host and organizer of the Journal Club St Andrews Centre for Exoplanet Science
Autumn 2021	Demonstrator for “Astronomy and Astrophysics 1” lab held by Dr. Alexander Scholz, School of Physics and Astronomy, University of St Andrews, UK
Spring 2021	Guest lecture for “Chemistry of the Solar System” lecture held by Dr. Paul Savage and Prof. Christiane Helling, School of Earth and Environmental Sciences, University of St Andrews, UK
Spring 2021	Tutor for “Computational Astrophysics” lecture held by Dr. Peter Voitke, Dr. Christiane Helling, and Dr. Martin Dominik, School of Physics and Astronomy, University of St Andrews, UK
Autumn 2020	Demonstrator for “Astronomy and Astrophysics 1” lab held by Dr. Alexander Scholz, School of Physics and Astronomy, University of St Andrews, UK
Spring 2020	Tutor for “Computational Astrophysics” lecture held by Dr. Peter Voitke, Dr. Christiane Helling, and Dr. Martin Dominik, School of Physics and Astronomy, University of St Andrews, UK

Publications

- Raymond, S. N., et al., incl. **Barth, P.**, 2022, *An upper limit on late accretion and water delivery in the TRAPPIST-1 exoplanet system*, Nature Astronomy 6, 80–88. [DOI](#), [arXiv](#).
- **Barth, P.** et al., 2021, *Magma Ocean Evolution of the TRAPPIST-1 planets*, Astrobiology 21, 11.

[DOI](#), [arXiv](#), [GitHub](#).

- **Barth, P.** et al., 2021, *MOVES IV. Modelling the influence of stellar XUV-flux, cosmic rays, and stellar energetic particles on the atmospheric composition of the hot Jupiter HD 189733b*, MNRAS, 502, 6201. [DOI](#), [arXiv](#).
- Woitke, P., et al., incl. **Barth, P.**, 2021, *Coexistence of CH₄, CO₂ and H₂O in exoplanet atmospheres*, A&A 646, A43. [DOI](#), [arXiv](#).
- Barnes, R., et al., incl. **Barth, P.**, 2020, *VPLanet: The Virtual Planet Simulator*, PASP, 132, 024502. [DOI](#), [arXiv](#), [GitHub](#).
- Carone, L., Baeyens, R., Mollière, P., **Barth, P.**, et al., 2020, *Equatorial retrograde flow in WASP-43b elicited by deep wind jets?*, MNRAS, 496, 3582. [DOI](#), [arXiv](#).

Talks

11 August 2022	“Follow the Nitrogen – Using isotopes to trace nitrogen fixation by lightning on the early Earth” NoRCEL Meeting, St Andrews, UK
27 May 2022	“Nitrogen fixation by lightning and its role for early life on Earth and exoplanets” EGU General Assembly 2022 , Vienna, Austria
15 March 2022	“The role of lightning for early life on Earth and exoplanets: connecting experiments and simulations” Hypatia Colloquium Series , ESO (online)
5 Feb. 2022	“The role of lightning for early life on Earth and exoplanets” invited talk, St Andrews Interdisciplinary Science Conference, UK
15 Sept. 2021	“Tracking the role of lightning-produced nitrate for early life with nitrogen isotopes in spark discharge experiments” AbGradCon 2021 , ELSI, Japan (online)
9 July 2021	“Tracking the role of lightning-produced nitrate for early life with nitrogen isotopes in spark discharge experiments” Goldschmidt 2021 , Lyon, France (online)
28 May 2021	“Magma Ocean Evolution of the TRAPPIST-1 planets” invited talk, NASA ‘Quantifying Habitability’ Science Working Group (online)
29 April 2021	“Modelling the influence of high-energy radiation on the atmospheric composition of the hot Jupiter HD 189733b” vEGU21 (online)
31 March 2021	“Understanding the role of lightning in the formation of organic molecules on early Earth” NoRCEL Meeting, St Andrews, UK (online)
26 Nov. 2020	“Modelling the influence of high-energy radiation on the atmospheric composition of HD 189733b” CHAMELEON kick-off meeting, University of St Andrews, UK (online)
17 Nov. 2020	“What’s the role of lightning in the origin of life”

21 Oct. 2020	Out Thinkers (LGBT+ STEM Week 2020), University of St Andrews, UK (online) “Modelling the influence of high-energy radiation on the atmospheric composition of HD 189733b”
24 July 2020	Scottish Exoplanet and Brown Dwarf Meeting, University of Edinburgh, UK (online) “MOVES IV: Modelling the influence of high-energy radiation on the atmospheric composition of HD 189733b” NOVO Nordisk Meeting, Niels Bohr Institute, University of Copenhagen, Denmark (online)
23 June 2020	“MOVES IV: Modelling the influence of high-energy radiation on the atmospheric composition of HD 189733b” Summer Meeting, St Andrews Centre for Exoplanet Science, UK (online)
18 Dec. 2019	“Magma Ocean Model for Terrestrial (Exo)Planets” invited talk, PSF-Coffee, MPIA, Heidelberg, Germany
10 Oct. 2019	“Magma Ocean Model for Terrestrial (Exo)Planets” VPL Meeting, University of Washington, Seattle, US
23 Aug. 2019	“Magma Ocean Model for Terrestrial (Exo)Planets” Summer Meeting, St Andrews Centre for Exoplanet Science, UK
27 March 2019	“Coupled Atmosphere-Interior Model for Terrestrial Planets - Application to Early Earth” General Meeting SPP 1833 Habitable Earth, DFG, Cologne, Germany
30 April 2017	“Zirkulation mit Wolkenbildung in planetaren Atmosphären” (G)Astro-Seminar, jDPG, Bad Kreuznach, Germany
11 Jan. 2017	“Large-Scale Circulation with Cloud Formation in Planetary Atmospheres” invited talk, PSF-Coffee, MPIA, Heidelberg, Germany

Posters

14 Jan. 2022	“Tracking the role of lightning for early life with nitrogen isotopes in spark experiments” LGBTQ+ STEMinar, Glasgow, UK (online)
Sept. 2020	“X-rays, UV, and co: detrimental or beneficial to the origin of life?” Royal Astronomical Society Early Career Poster Exhibition 2020
26 Aug. 2020	“X-rays, UV, and co: detrimental or beneficial to the origin of life?” The STEM Village Virtual Symposium 2020
27-31 July 2020	“MOVES IV: Modelling the influence of high-energy radiation on the atmospheric composition of HD 189733 b” Exoplanet 3 , Heidelberg, Germany (online)
6-8 April 2020	“MOVES IV: Modelling the influence of stellar XUV-flux and cosmic rays on the atmospheric composition of HD 189733 b” UKEXOM, Birmingham, UK (cancelled due to COVID-19)
9-13 March 2020	“MOVES IV: Modelling the influence of stellar XUV-flux and cosmic rays on the atmospheric composition of HD 189733 b” Cloud Academy II, Les Houches, France (cancelled due to COVID-19)

15-20 Sept. 2019	“Desiccation of the TRAPPIST-1 Planets During Their Magma Ocean Phase” EPSC-DPS Joint Meeting, Geneva, Switzerland (presented by Ludmila Carone)
24-28 June 2019	“Desiccation of the TRAPPIST-1 Planets During Their Magma Ocean Phase” Astrobiology Science Conference, Seattle, WA, USA (presented by Rory Barnes)
24-28 June 2019	“Desiccation of the TRAPPIST-1 Planets During Their Magma Ocean Phase” “Star-planet interaction” workshop, Ringberg, Germany (presented by Ludmila Carone)

Outreach

26 June 2022	“How do we find exoplanets?” Dundee Science Centre
17 March 2022	Global Science Show, STEM Ambassador Edition Video: A Spark For Life
Sept. 2021	A Spark in a Flask (with Emma Puranen) in Around Distant Suns , edited by Emma Puranen, Guardbridge Books, 2021. Anthology of science fiction short stories in collaboration with researchers at the St Andrews Centre for Exoplanet Science
Since 2020	STEM Ambassador, STEM Learning, UK
Since 2019	Mobile Planetarium University of St Andrews, School for Physics and Astronomy

Programming Skills

- Intermediate: Python, C, Fortran
- Basics: C++

Languages

- Native language: German
- Fluent: English
- Basics: Spanish, French

Volunteer Experience

	University of St Andrews Liberal Democrats
2020 - 2022	Treasurer
	St Andrews Whisky Society
2021 - 2022	Secretary

2019 - 2021	Ordinary Committee member SaintsLGBT+, University of St Andrews Student Association
2019 - 2021	Postgraduate Officer Hector-Seminar Alumni Association, Germany
2019 - 2021	Vice President
2015 - 2019	Secretary
2013 - 2019	Election Worker in Mannheim, Germany