

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, [St Andrews Centre for Exoplanet Science](#), UK

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, [St Andrews Centre for Exoplanet Science](#), UK
 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 & Grants

2022	Outstanding Student and PhD candidate Presentation (OSPP) Award EGU General Assembly, 23-27 May 2022, Vienna, Austria
2022	Meeting Attendance Bursary Geochemistry Group (Mineralogical Society of Great Britain and Ireland/Geological Society of London)
2022	Postgraduate Conference Funding Grant School for Earth and Environmental Sciences, University of St Andrews
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

2020 - 2021	Lukas Rossmanith Undergraduate research assistant, spark experiments and analysis, co-supervision with Dr. Eva Stüeken
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Teaching & Organisation

Since 2021	Organizer of the Physics and Astronomy at St Andrews Inclusion Diversity and Equity Seminar (Panda StrIDES) School of Physics and Astronomy, University of St Andrews, UK
2019 - 2022	Organizer of the Exoplanet Journal Club St Andrews Centre for Exoplanet Science
Autumn 2020/2021	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 2020/2021	Tutor for “Computational Astrophysics” lecture held by Dr. Peter Woitke, Dr. Christiane Helling, and Dr. Martin Dominik, School of Physics and Astronomy, University of St Andrews, UK

Publications

- Rodgers-Lee, D., et al., incl. **Barth, P.**, 2023, *The energetic particle environment of a GJ 436 b-like planet*, MNRAS 521, 5880. [DOI](#), [arXiv](#).
- 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

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| 21 October 2022 | “Follow the Nitrogen – Using isotopes to trace nitrogen fixation by lightning on the early Earth”
Graz-Vienna Exoplanet Scientists Meeting , Vienna, Austria |
| 11 August 2022 | “Follow the Nitrogen – Using isotopes to trace nitrogen fixation by lightning on the early Earth”
NoRCEL Meeting , St Andrews, UK |
| 21 July 2022 | “Nitrogen fixation by lightning and its role for early life on Earth and exoplanets”
Leverhulme Centre for Life in the Universe , University of Cambridge, 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”**
Out Thinkers (LGBT+ STEM Week 2020), University of St Andrews, UK (online)
- 21 Oct. 2020 **“Modelling the influence of high-energy radiation on the atmospheric composition of HD 189733b”**
Scottish Exoplanet and Brown Dwarf Meeting, University of Edinburgh, UK (online)
- 24 July 2020 **“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	<p>“Tracking the role of lightning for early life with nitrogen isotopes in spark experiments”</p> <p>LGBTQ+ STEMinar, Glasgow, UK (online)</p>
Sept. 2020	<p>“X-rays, UV, and co: detrimental or beneficial to the origin of life?”</p> <p>Royal Astronomical Society Early Career Poster Exhibition 2020</p>
26 Aug. 2020	<p>“X-rays, UV, and co: detrimental or beneficial to the origin of life?”</p> <p>The STEM Village Virtual Symposium 2020</p>
27-31 July 2020	<p>“MOVES IV: Modelling the influence of high-energy radiation on the atmospheric composition of HD 189733 b”</p> <p>Exoplanet 3, Heidelberg, Germany (online)</p>
6-8 April 2020	<p>“MOVES IV: Modelling the influence of stellar XUV-flux and cosmic rays on the atmospheric composition of HD 189733 b”</p> <p>UKEXOM, Birmingham, UK (cancelled due to COVID-19)</p>
9-13 March 2020	<p>“MOVES IV: Modelling the influence of stellar XUV-flux and cosmic rays on the atmospheric composition of HD 189733 b”</p> <p>Cloud Academy II, Les Houches, France (cancelled due to COVID-19)</p>
15-20 Sept. 2019	<p>“Desiccation of the TRAPPIST-1 Planets During Their Magma Ocean Phase”</p> <p>EPSC-DPS Joint Meeting, Geneva, Switzerland (presented by Ludmila Carone)</p>
24-28 June 2019	<p>“Desiccation of the TRAPPIST-1 Planets During Their Magma Ocean Phase”</p> <p>Astrobiology Science Conference, Seattle, WA, USA (presented by Rory Barnes)</p>
24-28 June 2019	<p>“Desiccation of the TRAPPIST-1 Planets During Their Magma Ocean Phase”</p> <p>“Star-planet interaction” workshop, Ringberg, Germany (presented by Ludmila Carone)</p>

Outreach

April 2023	<p>ZIB Zack Mini, Children TV, ORF, Austria</p> <p>Answering a child’s question on the shape of the universe</p>
2022 - 2023	<p>Mobile Pavilion for Steiermark Schau 2023</p> <p>Cooperation between Scientists and Artists to produce content and artwork for an exhibition pavilion presented in Vienna and Styria in 2023</p>
2022 - 2023	<p>“What makes a planet habitable?”</p> <p>Talks to Astronomical Societies throughout the UK (online): Aylesbury Astronomical Society, Astronomical Society of Edinburgh, Mexborough & Swinton Astronomical Society, SIGMA Moray’s Astronomy Club</p>
26 June 2022	<p>“How do we find exoplanets?”</p> <p>Dundee Science Centre, UK</p>
17 March 2022	<p>Global Science Show, STEM Ambassador Edition</p> <p>Video: A Spark For Life</p>
Sept. 2021	<p>A Spark in a Flask (with Emma Puranen)</p> <p>in Around Distant Suns, edited by Emma Puranen, Guardbridge Books, 2021.</p>

	Anthology of science fiction short stories in collaboration with researchers at the St Andrews Centre for Exoplanet Science
2020 - 2022	STEM Ambassador, STEM Learning, UK
2019 - 2022	Mobile Planetarium
	University of St Andrews, School for Physics and Astronomy

Skills

- Languages: German (native), English (fluent), French (B1), Spanish (B1)
- Programming Languages: Python, C, Fortran, C++
- Microsoft Office, LaTeX
- Drivers license (Type B, Germany)

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