

# Curriculum Vitae of Patrick Barth

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## Contact

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## Work experience

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

2021	<b>Student Presentation Award</b> NoRCEL Meeting, 29-31 March 2021, St Andrews, UK (online)
2019 - 2023	<b>St Leonard's Interdisciplinary Doctoral Scholarship</b> University of St Andrews, UK
2017 - 2018	<b>Baden-Württemberg-Stipendium</b> Scholarship for distinguished students studying abroad
2013	High School Graduation Award of the German Physical Society (DPG)

## Students

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

Since 2019	<b>Host and organizer of the <a href="#">Journal Club</a></b> St Andrews Centre for Exoplanet Science
Autumn 2021	<b>Demonstrator for “Astronomy and Astrophysics 1” lab</b> held by Dr. Alexander Scholz, School of Physics and Astronomy, University of St Andrews, UK
Spring 2021	<b>Guest lecture for “Chemistry of the Solar System” lecture</b> held by Dr. Paul Savage and Prof. Christiane Helling, School of Earth and Environmental Sciences, University of St Andrews, UK
Spring 2021	<b>Tutor for “Computational Astrophysics” lecture</b> held by Dr. Peter Voitke, Dr. Christiane Helling, and Dr. Martin Dominik, School of Physics and Astronomy, University of St Andrews, UK
Autumn 2020	<b>Demonstrator for “Astronomy and Astrophysics 1” lab</b> held by Dr. Alexander Scholz, School of Physics and Astronomy, University of St Andrews, UK
Spring 2020	<b>Tutor for “Computational Astrophysics” lecture</b> 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.**, 2021, *An upper limit on late accretion and water delivery in the TRAPPIST-1 exoplanet system*, Nature Astronomy 2021. [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 CH<sub>4</sub>, CO<sub>2</sub> and H<sub>2</sub>O 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

27 May 2022	<p>“Nitrogen fixation by lightning and its role for early life on Earth and exoplanets”</p> <p><a href="#">EGU General Assembly 2022</a>, Vienna, Austria</p>
15 March 2022	<p>“The role of lightning for early life on Earth and exoplanets: connecting experiments and simulations”</p> <p><a href="#">Hypatia Colloquium Series</a>, ESO (online)</p>
5 Feb. 2022	<p>“The role of lightning for early life on Earth and exoplanets”</p> <p>invited talk, St Andrews Interdisciplinary Science Conference, UK</p>
15 Sept. 2021	<p>“Tracking the role of lightning-produced nitrate for early life with nitrogen isotopes in spark discharge experiments”</p> <p><a href="#">AbGradCon 2021</a>, ELSI, Japan (online)</p>
9 July 2021	<p>“Tracking the role of lightning-produced nitrate for early life with nitrogen isotopes in spark discharge experiments”</p> <p><a href="#">Goldschmidt 2021</a>, Lyon, France (online)</p>
28 May 2021	<p>“Magma Ocean Evolution of the TRAPPIST-1 planets”</p> <p>invited talk, NASA ‘Quantifying Habitability’ Science Working Group (online)</p>
29 April 2021	<p>“Modelling the influence of high-energy radiation on the atmospheric composition of the hot Jupiter HD 189733b”</p> <p><a href="#">vEGU21</a> (online)</p>
31 March 2021	<p>“Understanding the role of lightning in the formation of organic molecules on early Earth”</p> <p><a href="#">NoRCEL</a> Meeting, St Andrews, UK (online)</p>
26 Nov. 2020	<p>“Modelling the influence of high-energy radiation on the atmospheric composition of HD 189733b”</p> <p>CHAMELEON kick-off meeting, University of St Andrews, UK (online)</p>
17 Nov. 2020	<p>“What’s the role of lightning in the origin of life”</p> <p>Out Thinkers (LGBT+ STEM Week 2020), University of St Andrews, UK (online)</p>
21 Oct. 2020	<p>“Modelling the influence of high-energy radiation on the atmospheric composition of HD 189733b”</p> <p>Scottish Exoplanet and Brown Dwarf Meeting, University of Edinburgh, UK (online)</p>
24 July 2020	<p>“MOVES IV: Modelling the influence of high-energy radiation on the atmospheric composition of HD 189733b”</p>

- 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
- Basics: Fortran

## Languages

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

## Volunteer Experience

Since 2020      **University of St Andrews Liberal Democrats**  
 Treasurer

Since 2021      **St Andrews Whisky Society**  
 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