Dr. Klaus Paschek | Curriculum Vitae

Max Planck Institute for Astronomy (MPIA)
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Web links in blue

Research Interests

Origins of Life — Biosignatures & Habitability — Planetary Interior-Atmosphere Coupling
Prebiotic Chemistry — Meteoritic Organics — Laboratory Astrochemistry — Tides & Icy Moons

Academic Positions

Post-doc **Since Jul. 2025**
Max Planck Institute for Astronomy & University of Jena *Heidelberg, Germany*
Laboratory Project (Since Jul. 2025): *Catalytic Effects on Sugar Synthesis in Interstellar Ice Analogs*, using electron-beam irradiation of ice analogs with subsequent mass-spectrometric analysis
Computational Project (Since Jul. 2026): *Coupling VULCAN and petitRADTRANS: Implications of early Earth geology on HCN and RNA-building block formation*, linking interior-driven volatile outgassing to atmospheric photochemistry and observable spectra

Education

🎓 **Dr. rer. nat. (Ph.D.) Astrophysics** **May 2021 – Jun. 2025**
Max Planck Institute for Astronomy & Heidelberg University *Heidelberg, Germany*
Thesis: *From Space to the Hadean Earth: Prebiotic Synthesis and the Origins of Life*
Advisors: **Thomas K. Henning**, Dmitry A. Semenov, Michael Hausmann
Awarded on **10. Jun. 2025**.

🎓 **M.Sc. Physics** **Apr. 2018 – Mar. 2021**
Max Planck Institute for Astronomy & Heidelberg University *Heidelberg, Germany*
Thesis: *Formation of Nucleobases and Ribose in Carbonaceous Planetesimals*
Advisors: **Thomas K. Henning**, Cornelis P. Dullemond, Dmitry A. Semenov
Including an Erasmus+ abroad semester at Leiden University, Netherlands, from Sep. 2018 – Feb. 2019.

🎓 **B.Sc. Physics** **Oct. 2014 – Mar. 2018**
Heidelberg University *Heidelberg, Germany*
Thesis: *Simulation of Tidal Accelerations in the Solar System for the Search for Liquid Solvents in Celestial Bodies [German]*
Advisors: **Michael Hausmann**, Hubert Klahr, Georg Lars Hildenbrand

Publications (9)

First author (5)

1. **Paschek, K.**; Henning, T.K.; Molaverdikhani, K.; Miyazaki, Y.; Pearce, B.K.D.; Pudritz, R.E.; Semenov, D.A.
   Deep Mantle-Atmosphere Coupling and Carbonaceous Bombardment: Options for Biomolecule Formation on an Oxidized Early Earth.
   The Astrophysical Journal **2025**, 985, 50, doi:10.3847/1538-4357/adc39b.
2. **Paschek, K.**[†]; Lee, M.[†]; Semenov, D.A.; Henning, T.K.
   Prebiotic Vitamin B_3 Synthesis in Carbonaceous Planetesimals.
   ChemPlusChem **2024**, e202300508, doi:10.1002/cplu.202300508.
   [†]Paschek & Lee share first authorship.
   Featured as the journal's cover, doi:10.1002/cplu.202400008.

3. **Paschek, K.**; Semenov, D.A.; Pearce, B.K.D.; Lange, K.; Henning, T.K.; Pudritz, R.E.
Meteorites and the RNA World: Synthesis of Nucleobases in Carbonaceous Planetesimals and the Role of Initial Volatile Content.
The Astrophysical Journal **2023**, 942, 50, doi:10.3847/1538-4357/aca27e.
4. **Paschek, K.**; Kohler, K.; Pearce, B.K.D.; Lange, K.; Henning, T.K.; Trapp, O.; Pudritz, R.E.; Semenov, D.A.
Possible Ribose Synthesis in Carbonaceous Planetesimals.
Life **2022**, 12, 404, doi:10.3390/life12030404.
5. **Paschek, K.**; Roßmann, A.; Hausmann, M.; Hildenbrand, G.
Analysis of Tidal Accelerations in the Solar System and in Extrasolar Planetary Systems.
Applied Sciences **2021**, 11, 8624, doi:10.3390/app11188624.

Co-author (4)

1. OoLEN; et al. incl. **Paschek, K.**
What it takes to solve the origin of life: An integrated review. Part 1–Experimental methods and data repositories.
Cell Reports Physical Science **2026**, 7, 4, 103212, doi: 10.1016/j.xcrp.2026.103212.
2. OoLEN; et al. incl. **Paschek, K.**
What it takes to solve the origins of life: An integrated review. Part 2: Theoretical methods and emerging trends.
Cell Reports Physical Science **2026**, 7, 4, 103211, doi: 10.1016/j.xcrp.2026.103211.
3. Peng, Z.; **Paschek, K.**; Xavier, J.C.
What Wilhelm Ostwald Meant by "Autokatalyse" and Its Significance to Origins-of-life Research: Facilitating the Search for Chemical Pathways Underlying Abiogenesis by Reviving Ostwald's Thought That Reactants May Also Be Autocatalysts.
BioEssays **2022**, 44, 2200098, doi:10.1002/bies.202200098. **PDF** (open access)
4. Hildenbrand, G.; **Paschek, K.**; Schäfer, M.; Hausmann, M.
Cryovolcanism in the Solar System and Beyond: Considerations on Energy Sources, Geological Aspects, and Astrobiological Perspectives.
In Astronomy and Planetary Science - From Cryovolcanism to Black Holes and Galactic Evolution (IntechOpen, **2022**), doi:10.5772/intechopen.105067.

Honors & Awards

Otto Haxel Dissertation Prize for Physics **Jul. 2026**
1st rank 2025, € 6,000
KIT Freundeskreis und Fördergesellschaft (KFG), German Physical Society (DPG) *Universities Heidelberg, Göttingen, KIT*

Ph.D. thesis awarded *"summa cum laude"* **Jun. 2025**
University Heidelberg
Highest distinction in Germany, equivalent to highest grade of 1.0 ("very good").

Service

Executive Board Member **2022 – 2026**
Origin of Life Early-Career Network (OoLEN) *International Scientist Network*

Conference Co-Organizer (LOC & SOC) **Jun. – Jul. 2025**
Frontiers in Astrobiology and Origins of Life Conference (FALCON 2025) *Reykjavík, Iceland*

Journal & Proposal Referee **2025 – 2026**
Nature Communications, Communications Chemistry, Icarus, Discover Life, UK Research and Innovation Funding Service (UKRI)

Mentorship & Teaching

Research Mentor **2024 – 2026**

- *Mijin Lee, Summer Internship and Bachelor thesis, 2024 – 2026* *MPI for Astronomy, Germany*
  Thesis Title: "Synthesis of Prebiotic Vitamin B_3 and Lipids in Carbonaceous Planetesimals"
  (1 paper published, 1 manuscript in revision)
- *Malin Moll, Master thesis, 2025 – 2026*
  Thesis Title: "Insights Into Prebiotic Sugar Formation in an Astrochemical Context"

Doctoral Tutor **Jun. 2021 – Aug. 2021**
Tutor in advanced lab course for physics students *Heidelberg University, Germany*

Scientific Assistant **Mar. 2018 – Feb. 2021**
Tutor in beginners lab course for physics students *Heidelberg University, Germany*

Outreach

Interview for Outreach Article **Spring 2026**
MaxPlanckResearch Science Magazine—Life's Primordial Brew

Public Lecture Presenter (YouTube Stream) **02. Feb. 2026**
Astro & Co—The Formation of the Building Blocks of Life in Space and on Early Earth [German] *Haus der Astronomie, Heidelberg, Germany*

Invited Public Lecture Presenter **23. Oct. 2025**
Science Café "From stardust to life—Tracing the cosmic story of our origins" *Nijmegen, Netherlands*

OoLEN BlueSky/Twitter Account Co-Moderator **2024 – 2026**
oolen.bsky.social

Presentations

Invited Conference Presentation

Molecular Origins of Life, Munich (MOM 2026) **Jun. 2026**
LMU Munich *Munich, Germany*

Invited Seminars

EU COST Action PLANETS Seminar (online) **17. Sept. 2025**
EU COST Action PLANETS

Astrochemistry seminar (online) **28. Jul. 2022**
National Astronomical Observatory of Japan, Division of Science *Tokyo, Japan*

Star and Planet Formation Journal Club (online) **23. Feb. 2022**
Max Planck Institute for Extraterrestrial Physics (MPE) *Garching, Germany*

Contributed Conference Presentations

Biennial European Astrobiology Conference (BEACON 2025) **Jul. 2025**
European Astrobiology Institute (EAI) *Reykjavík, Iceland*

Frontiers in Astrobiology and Origins of Life Conference (FALCON 2025) **Jun. – Jul. 2025**
Astrobiology Graduates in Europe (AbGradE) & Origin of Life Early-Career Network (OoLEN) *Reykjavík, Iceland*

4th Interdisciplinary Origin of Life Meeting for Early Career Researchers (IOoL2024) **Sep. 2024**
Origin of Life Early-Career Network (OoLEN) *Strasbourg, France*

Biennial European Astrobiology Conference (BEACON 2023) **May 2023**
European Astrobiology Institute (EAI) *La Palma, Spain*

Joint AbGradE and EPEC Early-Career Astrobiology Conference (AbGradEPEC 2023) — **May 2023**
Astrobiology Graduates in Europe (AbGradE) & Europlanet Early Career (EPEC) network — *La Palma, Spain*

3rd Interdisciplinary Origin of Life Meeting for Early Career Researchers (IOoL2022) — **May 2022**
Origin of Life Early-Career Network (OoLEN) — *Montréal, Canada*

Towards Molecular Complexity: At the Crossroads Between Astrophysics and Biochemistry — **May 2022**
Max Planck Institute for Astronomy — *Heidelberg, Germany*

Posters

Astrochemistry: From Quantum to Cosmos — **Oct. 2025**
Dutch Astrochemistry Network (DAN III) — *Nijmegen, Netherlands*

Latsis Symposium 2022: The Origin and Prevalence of Life — **Aug. – Sep. 2022**
ETH Zurich — *Zurich, Switzerland*

EAI Summer School: Life on Earth and Beyond — **May – Jun. 2022**
European Astrobiology Institute (EAI) — *Ven Island, Sweden*

Programming & Software

Languages	Python, C/C++ (incl. pybind11), FORTRAN, R, Mathematica, Octave, HTML-CSS
Laboratory	Origin, FreeStyle & Compound Discoverer (Thermo Fisher Sci., mass spectrometry)
Operational	Git, SSH, Linux, shell/bash, Make, mamba/conda
Visualization	Blender, GIMP, Inkscape, ChemDraw, matplotlib, ggplot2, gnuplot
Typesetting	LaTeX, Microsoft Office, LibreOffice

Last updated: 11. November 2026