Sebastian Zieba

Curriculum Vitae

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Appointments

Sept. 2024 – present **NASA Sagan Fellow**, *Center for Astrophysics | Harvard & Smithsonian*, Cambridge, USA

Proposal title: Characterization of rocky exoplanet surfaces and atmospheres in the JWST era

July 2024 – Aug. 2024 **Postdoc**, *Max-Planck Institute for Astronomy (APEx Department)*, Heidelberg, Germany

Education

2020 – 2024 **PhD**, *Max-Planck Institute for Astronomy (APEx Department)*, Heidelberg, Germany & *Leiden Observatory*, Leiden, Netherlands

Supervisor: Prof. Dr. Laura Kreidberg

Supervisor: Prof. Dr. Ignas A.G. Snellen

Thesis: Pushing the Characterization of Exoplanet Atmospheres Down to Temperate Rocky Planets in the Era of JWST (link to thesis).

defended on June 25th 2024 with distinction (*cum laude*)

2017 – 2020 **Master Physics**, *Leopold Franzens University*, Innsbruck, Austria.

Thesis: *Time delay analysis of the δ Scuti pulsations in the exoplanet host star β Pictoris based on space and ground-based photometry*

Supervisor: Univ.-Prof. Mag. Dr. Konstanze Zwintz

Co-Supervisor: Associate Professor Dr. M.A. Matthew Kenworthy

2013 – 2017 **Bachelor Physics**, *Leopold Franzens University*, Innsbruck, Austria.

Supervisor: Univ.-Prof. Dr. Norbert Przybilla

First-author Publications

Full list of co-authored publications can be found in the Astrophysics Data System; h-index: 19.

- **S. Zieba**, L. Kreidberg, B. P. Coy, et al., *The dark and featureless surface of rocky exoplanet LHS 3844 b from JWST mid-infrared spectroscopy*, Nature Astronomy, Accepted, March 2026. [Citations: 0]
- **S. Zieba**, K. Zwintz, M. Kenworthy, et al., *The β Pictoris b Hill sphere transit campaign. II. Searching for the signatures of the β Pictoris exoplanets through time delay analysis of the δ Scuti pulsations*, Astronomy and Astrophysics, 687, A309, July 2024. [Citations: 2]
- **S. Zieba**, L. Kreidberg, E. Ducrot, et al., *No thick carbon dioxide atmosphere on the rocky exoplanet TRAPPIST-1 c*, Nature, 620, 746, August 2023. [Citations: 194]
- **S. Zieba**, L. Kreidberg, *PACMAN: A pipeline to reduce and analyze Hubble Wide Field Camera 3 IR Grism data*, The Journal of Open Source Software, 7, 4838, December 2022. [Citations: 4]
- **S. Zieba**, M. Zilinskas, L. Kreidberg, et al., *K2 and Spitzer phase curves of the rocky ultra-short-period planet K2-141 b hint at a tenuous rock vapor atmosphere*, Astronomy and Astrophysics, 664, A79, August 2022. [Citations: 70]
- **S. Zieba**, K. Zwintz, M. A. Kenworthy, et al., *Transiting exocomets detected in broadband light by TESS in the β Pictoris system*, Astronomy and Astrophysics, 625, L13, May 2019. [Citations: 68]

Fellowships & Awards

2024 *NASA Hubble Fellowship Program (NHFP), Sagan Fellow* at the Smithsonian Astrophysics Observatory (SAO)

2019 *Student Poster Competition Winner* at TESS Science Conference I

2019 Studienförderungspreis 2019 des Deutschen Freundeskreises der Universitäten in Innsbruck e.V.

Accepted observing proposals (as PI)

2023 *Exploring the boundary between rocky and gaseous planets with WASP-47 e.*
JWST Cycle 2 program — GO 3615

2023 *The search for regolith on the airless exoplanet LHS 3844 b.*
JWST Cycle 2 program — GO 4008

Accepted observing proposals (as co-PI)

2022 *Inside out: detecting a rock vapor atmosphere on the lava world TOI-2431 b.*
HST Cycle 29 program — GO 16660

Accepted observing proposals (as Co-I, selection)

2025 *Exo-Geology: Surface Spectral Features from a Rocky Exoplanet*
JWST Cycle 4 program — GO 7953

2025 *Mapping the Atmosphere and Interior of HAT-P-13b: The Next Benchmark for Exoplanetary Science*
JWST Cycle 4 program — GO 8233

2025 *Surveying Hellish Worlds: Lava Planets as Time Capsules of Thermal Evolution*
JWST Cycle 4 program — GO 8864

2023 *TRAPPIST-1 Planets: Atmospheres Or Not?*
JWST Cycle 2 program — GO 3077

2021 *A Hell of a Phase Curve: Mapping the Surface and Atmosphere of a Lava Planet K2-141b.*
JWST Cycle 1 program — GO 2347

2019 *Hunting for exocomets transiting the young naked-eye star 5 Vulpeculae.*
CHEOPS AO-1 2 program — ID 021

Grants

2025 JWST General Observers (GO) Program:
16,000 USD awarded to the project *Mapping the Atmosphere and Interior of HAT-P-13b: The Next Benchmark for Exoplanetary Science* (PI: Yamila Miguel, US-admin PI: Sebastian Zieba)

Software

2020 - present PACMAN — Pipeline to reduce and analyze HST/WFC3 data
Lead developer, hosted on GitHub

(Invited) Talks and Seminars (selection)

2019 Conference Talk: *TESS Science Conference I*, Cambridge, USA (video link)

Student Poster Competition Winner Talk: Transiting exocomets detected in broadband light by TESS in the β Pictoris system

2021 Conference Talk: *Europlanet Science Congress (EPSC)* (video link)

2022 CEHW Seminar at Penn State University

Atmospheres of lava planets: a case study for K2-141 b

2022 Conference Talk: *Rocky Worlds 2*, Oxford, UK

2023 Conference Talk: *Exoclimes VI*, Exeter, UK

2023 JPL Astrophysics Colloquium

The Frontier of Rocky Planet Characterization

2024 Conference Talk: *Extreme Solar Systems V*, Christchurch, NZ

2024 Conference Talk (invited): *European Geosciences Union (EGU) General Assembly 2024*, Vienna, Austria

2024 Conference Talk: *Exoplanets 5*, Leiden, Netherlands

2024 CfA Colloquium (video link)

Characterizing the surfaces of exoplanets with JWST

2025 Conference Talk: *Aspen Center for Physics: Atmospheric characterization of rocky to giant exoplanets in thermal emission with JWST*

2025 Conference Talk: *AAS 246*, Anchorage, USA

2025 Santa Barbara Astro Lunch Talk

Characterizing the surfaces of exoplanets with JWST

2025 Planetary Lunch Seminar at MIT

The Frontier of Rocky Exoplanet Characterization with JWST — Their Atmospheres and Surfaces in Emission

Community Service (selection)

2025 - present Organizer of the Exoplanet Pizza Lunch at the Center for Astrophysics | Harvard & Smithsonian

2025 - present Reviewer for UK Research and Innovation (UKRI) proposals

2025 - present Panel member and reviewer of ESA telescope proposals

2024 - present Reviewer for The Astrophysical Journal Letters (ApJL) Journal

Teaching Experience

May 2018 Substitute Lecturer for Univ.-Prof. Mag. Dr. Paul Scheier

Topic: Introduction to exoplanets

Jan 2019 Substitute Lecturer for Univ.-Prof. Mag. Dr. Konstanze Zwintz

Topic: Introduction to exoplanets

May 2019 Substitute Lecturer for Univ.-Prof. Mag. Dr. Konstanze Zwintz

Topic: Telescopes in Space: Kepler and TESS

Public Outreach Talks

2011 Science Day at the *Salzburg University of Education Stefan Zweig*
Talk: Planetology of the Moon and Mars as seen with *Google Maps*

2012 Science Day at the *Salzburg University of Education Stefan Zweig*
Talk: How do you find an exoplanet?

2013 Science Day at the *Salzburg University of Education Stefan Zweig*
Talk: Exoplanets - The search for the second Earth

2013 Astronomical Society of Salzburg
Talk: Exoplanets

2022 Private grammar school St. Rupert in Salzburg
Talk: Exoplanets and the first results from JWST

Interviews

2024 Looking for atmospheres in the ultimate quest for extraterrestrial life

Interview with Manon Boot on my accomplishments during my postdoctoral position at the MPIA and Leiden Observatory.