

Dr. Harry A. Ballantyne

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DOB: 14/02/1996 | Nationality: British | Swiss work permit: B



Employment

- Research associate**, University Hospital Basel, Switzerland (Supervisor: Prof. Gunther Meinlschmidt)
- 01/2024– Present
- Researching AI-based methods for better understanding of mental, psychosocial and psychosomatic stress and disease
 - Using large language models (LLMs) via the Hugging Face platform and llama.cpp to simulate and investigate psychotherapeutic treatment
- Postdoctoral research associate**, University of Bern, Switzerland (Supervisor: Dr. Martin Jutzi)
- 09/2022– 12/2022
- Performing, analysing and writing up publications on the results of smoothed-particle hydrodynamics (SPH) impact simulations
 - Main research focus was on the impact-origin of Sputnik Planitia, a huge, ice-filled structure that dominates Pluto's surface
- PhD student**, University of Bern, Switzerland (Supervisor: Dr. Martin Jutzi)
- 08/2018– 09/2022
- Primary focus on smoothed-particle hydrodynamics (SPH) impact simulations using SPHLATCH, a code in C++ and Python
 - Teaching roles, including leading lab courses and designing/marking Master's level exams

Education

EPFL Extension School

CERTIFICATE OF OPEN STUDIES (COS) ON APPLIED DATA SCIENCE: MACHINE LEARNING

- 15 ECTS credits

Switzerland

12/2023 - Present

University of Bern

PHD IN PHYSICS WITH SPECIAL QUALIFICATION IN ASTRONOMY

- Advisor: Dr. Martin Jutzi
- Thesis title: Planetary-scale impacts and their geophysical consequences
- Grade: Summa cum laude honours

Switzerland

08/2018 - 09/2022

University of Sheffield

MPHYS PHYSICS AND ASTROPHYSICS WITH STUDY ABROAD

- Advisor: Dr. Richard Parker
- Thesis title: The effects of binary evolution on planet formation
- Grade: First class honours
- Study Abroad: One year as an exchange student at Monash University, Australia

United Kingdom/Australia

09/2014 - 06/2018

Skills

Programming Languages:

Python ★★★★★ C++ ★★★★★ Bash ★★★★★ Latex ★★★★★☆ R ★★★★★☆
Fortran ★★★★★☆ MatLab ★★★★★☆ Excel ★★★★★☆ HTML ★★☆☆☆ CSS ★★☆☆☆

Version Control:

Git

Languages:

English (native), German (A2 level)

Publications

PUBLISHED

Ballantyne, H. A., Asphaug, E., Denton, C. A., Emsenhuber, A. & Jutzi, M. (2024). Sputnik Planitia as an impactor remnant indicative of an ancient rocky mascon in an oceanless Pluto. *Nature Astronomy*. doi:10.1038/s41550-024-02248-1

Cheng, K. W., Rozel, A. B., Golabek, G. J., **Ballantyne, H. A.**, Jutzi, M. & Tackley, P. J. (2024). Mars's Crustal and Volcanic Structure Explained by Southern Giant Impact and Resulting Mantle Depletion. *Geophysical Research Letters*, 51, e2023GL105910. doi:10.1029/2023GL105910

Ballantyne, H. A., Jutzi, M., Golabek, G. J., Mishra, L., Cheng, K. W., Rozel, A. B. & Tackley, P. J. (2023). Investigating the feasibility of an impact-induced Martian Dichotomy. *Icarus*, 392, 115395. doi:10.1016/j.icarus.2022.115395

Ballantyne, H. A., Espaas, T., Norgrove, B. Z., Wootton, B. A., Harris, B. R., Pepper, I. L., Smith, R. D., Dommett, R. E., Parker, R. J. (2021). Long-term stability of planets in and around binary stars. *MNRAS*, 507, 4507. doi:10.1093/mnras/stab2324

IN REVIEW

Cheng, K. W., **Ballantyne, H. A.**, Golabek, G. J., Jutzi, M., Rozel, A. B. & Tackley, P. J. Combined impact and interior evolution models in three dimensions indicate a southern impact origin of the Martian Dichotomy. *Icarus* (in review).

Mentoring

03/2021– **Janis Witmer (co-supervised)**, Bachelor's student, Project: *Hit-and-run simulations of the Psyche forming impact* University of
Bern

Teaching Experience

09/2022– **Physics for medicine majors (bachelor's course)**, Teaching assistant for experiments and seminars

02/2022– **Physics practical course for biology majors (bachelor's course)**, Teaching assistant for experiments

02/2021– **Advanced statistical methods for physicists (master's course)**, Teaching assistant and examiner

02/2020– **Physics I practical course**, Teaching assistant for experiments

Presentations

Extensive experience presenting to a large audience, including international conferences such as:

- Lunar and Planetary Science Conference, Houston, USA (2021, 2022)
- Europlanet Science Congress, Various European Locations (2019, 2020, 2021, 2022)
- European Geosciences Union General Assembly, Vienna, Austria (2019)

Invited talks at various prestigious institutes including:

- University of Zurich (Zurich Planetary Seminar, 2022)
- Deutsches Zentrum für Luft und Raumfahrt, Berlin (3rd Workshop on Giant Collisions, 2022)
- ETH Zurich (ETH Zurich Planetary Geophysics Seminar, 2020)

Referees

Prof. Gunther Meinschmidt, University Hospital Basel, Hebelstrasse 2, 4031 Basel, gunther.meinschmidt@usb.ch

Dr. Martin Jutzi, University of Bern, Gesellschaftstrasse 6, 3012 Bern, martin.jutzi@unibe.ch

Prof. Brice-Olivier Demory, University of Bern, Gesellschaftstrasse 6, 3012 Bern, brice.demory@unibe.ch