HANNAH THERESA **RÜDISSER**

PhD Student in Heliophysics

MSc in Theoretical and Computational Physics · AUSTRIA

PERSONAL

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PROFESSIONAL EXPERIENCE

10/2022 – PRESENT

PHD STUDENT, AUSTRIAN SPACE WEATHER OFFICE, GEOSPHERE AUSTRIA, GRAZ

'Combining AI and Physical Models to advance Forecasting of Solar Coronal Mass Ejections'
Supervisors: Helmut Lammer, Christian Möstl • ERC, HELIO4CAST, 101042188, PI: Christian Möstl

09/2024 – 12/2024

VISITING RESEARCHER, ONERA, FRANCE, TOULOUSE

Automatic Real-Time Detection of Large-Scale Structures in Solar Wind In Situ Data
Supervisor: Gautier Nguyen • Research Stay

06/2024 – 10/2024

RESEARCHER, FRONTIER DEVELOPMENT LAB, HYBRID

Vigil 2.0: Predicting Solar Eruptions
Trillium Technologies • FDL Europe | Earth Systems Lab 2024

01/2018 – 08/2023

RIDING INSTRUCTOR & HORSE TRAINER, SELF-EMPLOYED, GRAZ

08/2020 – 12/2022

JUNIOR RESEARCHER, KNOW-CENTER GMBH, GRAZ

Time Series Event Detection for different use cases using Machine Learning
Supervisor: Andreas Windisch • Europlanet 2024 RI, 871149

05/2020 – 12/2020

SALES ASSISTANT, KRÄMER PFERDESPORT GMBH & CO KG, GRAZ

11/2018 – 07/2019
CASHIER, LIDL AUSTRIA, GRAZ

07/2018
STUDENT INTERN, SPACE RESEARCH INSTITUTE, AUSTRIAN ACADEMY OF SCIENCES, GRAZ
Colorado Ultraviolet Transit Experiment Data Simulator
Supervisor: Luca Fossati, Aickara Gopinathan Sreejith • FEMtech Summer Internship

07/2017
STUDENT INTERN, SPACE RESEARCH INSTITUTE, AUSTRIAN ACADEMY OF SCIENCES, GRAZ
Instrumental Meteorological Record for Styrian Village from 1819 to 1821
Supervisor: Bruno P. Besser • FEMtech Summer Internship

07/2016 – 07/2017
DELIVERER, ÖSTERREICHISCHE POST AG, GRAZ

07/2015 – 09/2015
INTERN, DRESSUR UND AUSBILDUNGSSTALL LANGEHANENBERG, BILLERBECK

EDUCATION

PRESENT
PHD IN PHYSICS, UNIVERSITY OF GRAZ, GRAZ
'Combining AI and Physical Models to advance Forecasting of Solar Coronal Mass Ejections'
Supervisors: Helmut Lammer, Christian Möstl

2020-2022
MASTER IN THEORETICAL AND COMPUTATIONAL PHYSICS, UNIVERSITY OF GRAZ, GRAZ
Graduated with Distinction
'Deep Learning for the Automatic Detection of Interplanetary Coronal Mass Ejections'
Supervisors: Ute V. Amerstorfer, Andreas Windisch

2019
EXCHANGE SEMESTER (ISEP), UNIVERSITY OF KENTUCKY, LEXINGTON
Machine Learning; Stars, Galaxies and the Universe; Interaction of Radiation with Matter,

2015-2020
BACHELOR IN PHYSICS, UNIVERSITY OF GRAZ, GRAZ
'Online Gaussian Process Regression'
Supervisors: Wolfgang von der Linden, Sascha Ranftl

GRANTS AND SCHOLARSHIPS

- Received a **Scholarship** for Travel Expenses by the Faculty of Natural Sciences at the University of Graz (2024, 3600€)
- Received a **Grant for Self-Organized Stays** from the International Office at the University of Graz (2024, 1889€)

- Received a **Grant** from the Doctoral School of Physics at the University of Graz to attend a Summer School (2024, 1000€)
- Received a **3.5 years fully funded PhD Studentship** within a Consolidator Grant by the European Research Council (PI Christian Möstl)

PEER-REVIEWED PUBLICATIONS

Weiler, E., C. Möstl, E. E. Davies, A. Veronig, U. V. Amerstorfer, T. Amerstorfer, J. Le Louëdec, M. Bauer, N. Lugaz, V. Haberle, **H. T. Rüdisser,** S. Majumdar, M. A. Reiss, **First observations of a geomagnetic superstorm with a sub-L1 monitor**, *Space Weather, 23, 3, 2025.* DOI: 10.1029/2024SW004260

Zhuang B., N. Lugaz , N. Al-Haddad , C. J. Farrugia, U. V. Amerstorfer, E. E. Davies, M. Temmer, **H. T. Rüdisser**, W. Yu, T. Gou, R. M. Winslow, **Influence of the Deformation of Coronal Mass Ejections on Their In-Situ Fitting with Circular-Cross-Section Flux Rope Models**. *Solar Physics, 300, 4, 38, 2025.* DOI: 10.1007/s11207-025-02444-w

Davies, E. E., **Rüdisser, H. T.,** U. V. Amerstorfer, C. Möstl, M. Bauer, E. Weiler, T. Amerstorfer, S. Majumdar, P. Hess, A. J. Weiss, M. A. Reiss, L. M. Green, D. M. Long, T. Nieves-Chinchilla, D. Trotta, T. S. Horbury, H. O'Brien, E. Fauchon-Jones, J. Morris, C. J. Owen, S. D. Bale, and J. C. Kasper, **Flux rope modeling of the 2022 Sep 5 CME observed by Parker Solar Probe and Solar Orbiter from 0.07 to 0.69 au.** *The Astrophysical Journal, 973, 51, 2024.* DOI: 10.3847/1538-4357/ad64cb

Rüdisser, H. T., A. J. Weiss, J. LeLouëdec, U.V. Amerstorfer, C. Möstl, E. E. Davies, H. Lammer, **Understanding the effects of spacecraft trajectories through solar coronal mass ejection flux ropes using 3DCOREweb.** *The Astrophysical Journal, 973, 150, 2024*. DOI: 10.3847/1538-4357/ad660a

Long, D., L. Green, F. Pecora, D. H. Brooks, H. Strecker, D. Orozco-Suarez, L. Hayes, E. E. Davies, U. V. Amerstorfer, M. Mierla, D. Lario, D. Berghmans, A. Zhukov, and **H. T. Rüdisser, The eruption of a magnetic flux rope observed by Solar Orbiter and Parker Solar Probe.** *The Astrophysical Journal, 955, 152, 2023.* DOI: 10.3847/1538-4357/acefd5

Rüdisser, H. T., Windisch, A., Amerstorfer,U. V., Möstl, C., Amerstorfer, T., Bailey, R. L., and Reiss, M. A., **Automatic Detection of Interplanetary Coronal Mass Ejections in Solar Wind In Situ Data.** *Space Weather, 20, 10, 2022.* DOI: 10.1029/2022SW003149

Reiss, M. A., Möstl, C., Bailey, R. L., **Rüdisser, H. T.,** Amerstorfer, U. V., Amerstorfer T., Weiss, A. J., Hinterreiter, J., and Windisch A., **Machine learning for predicting the Bz magnetic field component from upstream in situ observations of solar coronal mass ejections.** *Space Weather, 19, 12, 2021.* DOI: 10.1029/2021SW002859

Sreejith, A.G., Fossati, L., Fleming, B. T., France, K. C., Koskinen, T. T., Egan, A., **Rüdisser, H. T.,** and Steller, M., **Colorado Ultraviolet Transit Experiment Data Simulator.** *Journal of Astronomical Telescopes, Instruments, and Systems, 5, 1, 2019*. DOI: 10.1117/1.JATIS.5.1.018004

CONFERENCE TALKS

ARCANE: An Operational Framework for Automatic Realtime ICME Detection in Solar Wind In Situ Data (Highlight), *EGU General Assembly (27 April–2 May 2025), Vienna, Austria*

Enhancing Space Weather Forecasting with Machine Learning at the Austrian Space Weather Office, *RAS – Advancing Space Weather Forecasting: Bridging Gaps in Machine Learning (11 April 2025), Online*

ARCANE: An Operational Framework for Automatic Realtime ICME Detection in Solar Wind In Situ Data, *Machine Learning and Computer Vision in Heliophysics (7–9 April 2025), Sofia, Bulgaria*

3DCOREweb: Reconstruct CMEs using the 3D Coronal Rope Ejection Model, *Triennial Earth-Sun Summit (TESS) (7–12 April 2024), Dallas, TX USA*

Modeling CMEs as Large Scale Magnetic Flux Ropes, ÖGAA *Austrian Early Career Conference (8–9 March 2024), Salzburg, Austria*

3DCOREapp: Reconstruct CMEs using the "3D Coronal Rope Ejection Model", *European Space Weather Week (20–24 November 2023), Toulouse, France*

Automatic Detection of Interplanetary Coronal Mass Ejections in Solar Wind In Situ Data, *EGU General Assembly (23–28 April 2023), Vienna, Austria*

Automatic Detection of Interplanetary Coronal Mass Ejections, *Machine Learning and Computer Vision in Heliophysics (19–21 April 2023), Sofia, Bulgaria*

Automatic Detection of Interplanetary Coronal Mass Ejections in Solar Wind In Situ Data, *European Space Weather Week (24–28 October 2022), Zagreb, Croatia*

Machine Learning Pipeline for Automated Detection of Magnetospheric Boundaries, *Europlanet Science Congress (18–23 September 2022), Granada, Spain*

Automatic Detection of Interplanetary Coronal Mass Ejections, *EGU General Assembly (23–27 May 2022), Vienna, Austria*

Machine Learning Pipeline for Automated Detection of ICMEs, *Europlanet Science Congress (13–24 September 2021), Online*

SEMINAR TALKS

Combining AI and Physical Models to Advance Forecasting of Solar Coronal Mass Ejections, IRAP PEPS *(10 December 2024), Toulouse, France*

How to convene a scientific session, ST-ECS Networking Campfire *(15 November 2024), Online*

Space Weather Forecast at the Austrian Space Weather Office, ONERA DPHY-ERS Science *(24 October 2024), Toulouse, France*

Time Series Event Detection, Neural Networks 2 *(27 January 2023), FH Joanneum, Graz, Austria*

Automatic Detection of ICMEs in Solar Wind Data, Machine Learning in Heliophysics – Trailblazers in Graz *(21 April 2022), Space Research Institute, Austrian Academy of Sciences, Graz*

Automatic Detection of ICMEs in Wind, STEREO A and STEREO B Data using Deep Neural Networks and Computer Vision Techniques, Solar Orbiter Science Working Group *(7 June 2021), Online*

SESSION CONVENING

Machine Learning in Planetary Sciences and Heliophysics, ESSI1.11/PS7/ST4, *EGU General Assembly (27 April–2 May 2025), Vienna, Austria*

Machine Learning in Planetary Sciences and Heliophysics, ESSI1.5, *EGU General Assembly (15–19 April 2024), Vienna, Austria*

Machine Learning in Planetary Sciences and Heliophysics, ESSI1.3, *EGU General Assembly (23–28 April 2023), Vienna, Austria*

Machine Learning in Planetary Sciences, MITM5, *Europlanet Science Congress (18–23 September 2022), Granada, Spain*

Machine Learning in Planetary Sciences and Heliophysics, ITS2.1/PS1.2, *EGU General Assembly (23–27 May 2022), Vienna, Austria*

Machine Learning in Planetary Sciences, MITM8, *Europlanet Science Congress (13–24 September 2021), Online*

CONFERENCE POSTERS

ARCANE: An Operational Framework for Automatic Realtime ICME Detection in Solar Wind In Situ Data, *SWATNet Final Conference, (10-14 February 2025), Helsinki, Finland*

Automatic Realtime Detection of Large Scale Structures in Solar Wind In Situ Data, *European Space Weather Week (4–8 November 2024), Coimbra, Portugal*

Early warning for Solar Eruptions with VIGIL 2.0, *European Space Weather Week (4–8 November 2024), Coimbra, Portugal*

Understanding the effects of spacecraft trajectories through solar coronal mass ejection flux ropes using 3DCOREweb, *EGU General Assembly (15–19 April 2024), Vienna, Austria*

Machine Learning for solving the Bz Problem in Space Weather Forecasting, *AGU Fall Meeting (12–16 December 2022), Online*

Automatic Detection and Classification of Boundary Crossings in Spacecraft in situ Data, *Europlanet Science Congress (18–23 September 2022), Granada, Spain*

Automatic Detection and Classification of Boundary Crossings in Spacecraft in situ Data, *AGU Fall Meeting (13–17 December 2021), Online*

Automatic Detection of Interplanetary Coronal Mass Ejections, *AGU Fall Meeting (13–17 December 2021), Online*

Automatic Detection and Classification of Boundary Crossings in Spacecraft in situ Data, *Europlanet Science Congress (13–24 September 2021), Online*

Automatic Detection and Classification of ICMEs in Solar Wind Data, *EGU General Assembly (19–30 April 2021), Online*

SUMMER SCHOOLS

NASA's Living with a Star Heliophysics Summer School "Comparative Heliophysics", *(14-22 August 2024), Boulder, CO*

Operational Space Weather Fundamentals, *(13-17 May 2024), L'Aquila, Italy*

E-SWAN School "Space Weather Data, Models and Services", *(17-19 November 2023), Toulouse, France*

NASA's Living with a Star Heliophysics Summer School "Observational Heliophysics", *(17-21 July 2023), Online*

OUTREACH

Künstliche Intelligenz im Weltraumwetter: Automatische Erkennung von Sonnenstürmen, *Pint of Science Festival (21 May 2025), Graz, Austria*

Solar Storms – Predicting the Unpredictable, *Three Minute Thesis Competition (14 March 2025), Graz, Austria*

CERTIFICATES & PROJECTS

- **ESN BUDDY PROGRAM**
  Providing guidance and support for international students in Graz.
- **PODCAST: 'DURCHGEPLANT UND DURCHGEDREHT - DER PFERDEPODCAST'**
  Podcast on equestrianism.
- **MEDIATION AND CONFLICT MANAGEMENT**
  Member of the organization for mediation and conflict management in high school.
- **LAUNCH OF A WEATHER BALLOON TO STRATOSPHERE**
  Student project on performing measurements in the stratosphere using a weather balloon.
- **JUNIOR COMPANY**
  Founding the JUNIOR Company lumin[ø] within Junior Achievement Austria.
- **ENTREPRENEUR'S SKILLS CERTIFICATE**
  Acquiring entrepreneurial qualities and knowledge.