


# HANNAH THERESA RÜDISSE


PhD Student in Heliophysics

MSc in Theoretical and Computational Physics • AUSTRIA


## PERSONAL




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## PROFESSIONAL EXPERIENCE

09/2024 – PRESENT

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 – PRESENT

RESEARCHER, FRONTIER DEVELOPMENT LAB, HYBRID

Vigil 2.0: Predicting Solar Eruptions

Trillium Technologies • FDL Europe | Earth Systems Lab 2024

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

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

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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

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- Received a **Scholarship** for Travel Expenses by the Faculty of Natural Sciences at the University of Graz (2024, 3504€)
- Received a **Grant for Self-Organized Stays** from the International Office at the University of Graz (2024, 1645€)

- 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

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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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/10.1117/1.JATIS.5.1.018004)

## CONFERENCE TALKS

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**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

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**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

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**Machine Learning in Planetary Sciences and Heliophysics**, ESS11.5, *EGU General Assembly* (15–19 April 2024), Vienna, Austria

**Machine Learning in Planetary Sciences and Heliophysics**, ESS11.3, *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

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**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 ICMs in Solar Wind Data**, *EGU General Assembly (19–30 April 2021), Online*

## SUMMER SCHOOLS

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**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*

## CERTIFICATES & PROJECTS

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- **ESN BUDDY PROGRAM**  
Providing guidance and support for international students in Graz.
- **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.