

Robert Jarolim

22.03.1992

✉ robert.jarolim@gmail.com

git github.com/RobertJaro

id orcid.org/0000-0002-9309-2981



Education

- 01/2021 – 12/2023 **PhD in Physics**
University of Graz
"Frontiers of artificial intelligence in solar physics"
pass with distinction
- 08/2018 – 12/2020 **Master of Science in Physics**
University of Graz / Graz University of Technology
"Solar image enhancement and quality assessment with deep learning"
pass with distinction
- 10/2015 – 08/2018 **Bachelor of Science in Physics**
University of Graz / Graz University of Technology
"Solar Viewer - A Python based data viewer for solar physics"
pass with distinction
- 09/2007 – 06/2012 **Higher Technical Education Institute (Computer Science)**
HTL Kaindorf/Sulm
"Automated Report - Automated report generation based on server statistics" (cooperation with the SSI Schaefer GmbH)
pass with distinction

Awards

- 2025 **Josef Krainer Förderungspreis**, Steirisches Gedenkwerk.
- 2024 **ESPD Patricia Edwin PhD Thesis Prize**, European Solar Physics Division.
 IAU PhD Prize for Division E Sun and Heliosphere, International Astronomical Union.
- 2022 **Early-Career Award** for the best poster presentation, Machine Learning in Heliophysics Conference (Boulder, CO, USA).
- 2021 **Würdigungspreis** for excellent academic performance during the Master thesis, Austrian Ministry of Sciences (BMBWF).
- 2019 **Early-Career Award** for the best poster presentation, Machine Learning in Heliophysics Conference (Amsterdam, Netherlands).
- 2018 **Scholarship for excellent performance 2017/18**, University of Graz.
- 2017 **Scholarship for excellent performance 2016/17**, University of Graz.

Work Experience

- 12/2023 – present **NASA Jack Eddy Postdoctoral Fellow**
High Altitude Observatory / NCAR, Boulder, USA
"Physics-informed neural networks for the simulation of solar magnetic fields"

Work Experience (continued)

- 03/2019 – 12/2023 ■ **Junior Researcher/PhD candidate - SOLARNET (international EU H2020 project)**
University of Graz, Graz, Austria
"Solar Physics Research Integrated Network Group (SPRING)"
- 08/2023 – 12/2023 ■ **Science CO-I - Instrument-To-Instrument tool (NASA MDRAIT project)**
Trillium Technologies Inc., USA
- 06/2023 – 08/2023 ■ **Team lead - Frontier Development Lab**
ESA ESRIN, Frascati Italy and online; **invited**
"SSA live-twin for space-weather"
- 06/2022 – 08/2022 ■ **Researcher - Frontier Development Lab**
SETI Institute, Mountain View, CA, USA; **invited**
"4pi: The Sun as a fully-resolved Star"
- 05/2013 – 10/2015 ■ **Senior System Analyst - Java software engineer**
BearingPoint GmbH, Vienna and Premstaetten, Austria

Selected Publications

- 1 **Jarolim, R.,** Thalmann, J.K., Veronig, A.M., Podlachikova, T. (2023). Probing the solar coronal magnetic field with physics-informed neural networks. *Nature Astronomy*, 7, 1171–1179.
- 2 **Jarolim, R.,** Tremblay, B., Muñoz-Jaramillo, A., Bintsi, K.M., Jungbluth, A., Santos, M., Vourlidas, A., Mason, J., Sundaresan, S., Downs, C., Caplan, R. (2024). SuNeRF: AI enables 3D reconstruction of the solar EUV corona. *The Astrophysical Journal Letters*, 961 L31.
- 3 **Jarolim, R.,** Tremblay, B., Rempel, M., Molnar, M., Veronig, A.M., Thalmann, J.K., Podlachikova, T. (2024). Advancing non-linear force-free magnetic field extrapolations through multi-height magnetic field observations. *The Astrophysical Journal Letters*, 963 L21.
- 4 **Jarolim, R.,** Veronig, A. M., Hofmeister, S., Heinemann, S. G., Temmer, M., Podladchikova, T., Dissauer, K. (2021). Multi-channel coronal hole detection with convolutional neural networks. *Astronomy & Astrophysics*, 652, A13.
- 5 **Jarolim, R.,** Veronig, A., Pötzi, W., Podladchikova, T. (2025). A deep learning framework for instrument-to-instrument translation of solar observation data. *Nature Communications*, in press.

Selected International Oral Presentations

- 1 **Frontiers of Artificial Intelligence in Solar Physics** (2024). International Astronomical Union - General Assembly (Cape Town, SA). **invited**
- 2 **Tomographic Reconstructions with Physics-Informed Neural Radiance Fields** (2024). PUNCH 5 Science Meeting (Boulder, USA). **invited**
- 3 **SuNeRF: AI enables 3D reconstruction of the solar EUV corona** (2023). EGU (Vienna, Austria). **invited**
- 4 **Physics-Informed Neural Networks** (2023). International Workshop on Machine Learning and Computer Vision in Heliophysics (Sofia, Bulgaria). **invited**
- 5 **Artificial intelligence for ground-based solar observations: feature detection, data homogenization, and reconstruction** (2022). 4th SOLARNET Forum (online). **invited**

Selected Poster Presentations

- 1 **ITI for the Sun: Improved intercalibration of multi-instrument heliophysics data series** (2022). *Winner of the early-career award for the best poster presentation.* Machine Learning in Heliophysics Conference (Boulder, CO, USA).
- 2 **Multi-Channel Coronal Hole Detection with Convolutional Neural Networks** (2019). *Winner of the early-career award for the best poster presentation.* Machine Learning in Heliophysics Conference (Amsterdam, Netherlands).

Scientific and Community services

Referee for peer-review	■ Space Weather Journal, Astronomy & Astrophysics, Monthly Notices of the Royal Astronomical Society
Co-Supervision of Bachelor Thesis	■ Solar magnetic field extrapolation (Felix Gep; 2023)
Co-Supervision of Master Thesis	■ Magnetostatic magnetic field simulations (Moritz Buchner; ongoing)
Co-Supervision of PhD Thesis	■ Image enhancement for ground-based solar observations (Christoph Schirninger; ongoing)
Lectures	■ Data Analysis in Astrophysics (Uni Graz)
Membership	■ International Space Weather Action Team (ISWAT)
	■ International Astronomical Union (IAU)

Public outreach

- 07/2023 ■ **Probing the solar coronal magnetic field with physics-informed neural networks.** Press release.
• <https://physik.uni-graz.at/de/neuigkeiten/detail/article/weltraum-wetter-forscherinnen-der-universitaet-graz-entwickeln-methode-um-sonnenausbrueche-vorherzusagen-1/>
• <https://science.apa.at/power-search/9239885369648781127>
• <https://www.diepresse.com/14399376/mehr-vorwarnzeit-vor-sonnenstuermen>
• <https://phys.org/news/2023-07-artificial-intelligence-enables-insights-solar.html>
- 06/2021 ■ **Holes in the solar atmosphere: artificial intelligence spots coronal holes to automate space weather prediction.** Press release.
• <https://physicsworld.com/a/artificial-intelligence-can-spot-holes-in-the-suns-corona/>
• <https://gizmodo.uol.com.br/inteligencia-artificial-pode-ajudar-identificar-buracos-coronais-no-sol/>
• <https://phys.org/news/2021-06-artificial-intelligence-coronal-holes-automate.amp>
• <https://news.uni-graz.at/de/detail/article/dunkle-seiten/>
- 12/2020 ■ **Artificial Intelligence sets sights on the Sun.** Press release.
• <https://www.skoltech.ru/en/2020/12/artificial-intelligence-sets-sights-on-the-sun/>
• https://www.eurekalert.org/pub_releases/2020-12/sios-ais121420.php
• https://cordis.europa.eu/article/id/428789-artificial-intelligence-achieves-human-like-assessment-of-quality-of-sun-images?WT.mc_id=exp&fbclid=IwAR0_f2YsvKiqShhEeLuu-VVf5cadYnWM1N4pf_UxpNJzUKPd42oTEqqCVDA
- 01/2020 ■ **Solar Image Enhancement with Artificial Intelligence.** The Science of EST book contribution.
• https://est-east.eu/index.php?option=com_content&view=article&id=911&lang=en