Marc Rußwurm

Assistant Professor in Machine Learning for Remote Sensing

Abstract

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2023 – today Tenure Track Assistant Professor at Wageningen University
2021 – 2023 Postdoctral Researcher at EPFL
2018 – 2022 Ph.D. Studies at TU Munich
2011 – 2018 Geodesy and Geoinformation Studies at TU Munich (B.Sc; M.Sc.)
1991 born in Germany

web marcrusswurm.com
Twitter twitter.com/MarcCoru
Google Scholar scholar.google.com/citations?user=MfGMG9wAAAAJ

Experience

Sept '23 – today Assistant Professor

Wageningen University

Tenure Track Assistant Professor in Machine Learning and Remote Sensing: Research Interests: Time Series, Domain Shift, Transfer Learning, Crop Type Mapping, Marine Debris Detection

Sept '21 – '23 Postdoctoral Researcher

École polytechnique fédérale de Lausanne

Environmental Computational Science and Earth Observation Laboratory: Research: Machine Learning and Earth Observation; Domain Shift and Transfer Learning. Self-supervised representation learning on globally distributed data.

Jan–Mar '20 Visiting Researcher Palo Alto, USA

Stanford University (Visit)

Lobell Lab and Sustainability and AI Lab
Few-Shot Meta Learning for the Remote Sensing context. Research received *Best Paper Award* at Earthvision 2020 worshop at CVPR

May '19 Short Visit OATML Oxford, UK

Oxford Applied Machine Learning Group (Visit)

Visit (one-week). Participation in ESA project:
Multi-image super-resolution on Satellite Data. Presentation about Machine Learning and Earth Observation.

Oct '18–Feb '19 Visiting Researcher Vannes, France

IRISA Institute (Visit)

Environment Observation with Complex Imagery:
Research stay. Early classifification of time series. Multi-objective optimization (optimize accuracy and earliness).

2018 - 2021 Research Associate and Ph.D. Candidate

Technical University of Munich

Chair of Remote Sensing Technology:
Research fields: Multi-temporal Earth observation, machine learning and computer vision. Methodical work related to methods of natural language processing and applied to vegetation monitoring for Earth observation.

July–Aug 2018 Participant—Frontier Developments Lab

University of Oxford & European Space Agency

Kellogg College in Oxford, UK & ESRIN Φ-lab, Frascati near Rome, Italy.
Deep multi-resolution satellite data-fusion for disaster relief. The Frontier Developments Lab is an research and commercial accelerator composed of teams with machine learning and Earth observation background.

2015–2018 Student Research Assistant

Technical University of Munich

Chair of Remote Sensing Technology:
Tutor 3rd MSc. Semester: Image Understanding III.

Education

2018 – Feb 2022 Technical University of Munich

Dr.-Ing. (Ph.D.)

Chair of Remote Sensing Technology:
Thesis: *Data-driven Feature Learning with Discriminative Models for Satellite Time Series* Ph.D. defense (23rd of Februrary 2022)

2015–June 2018 Technical University of Munich

Master of Science

Geodesy and Geoinformation (M.Sc): Machine Learning, Computer Vision, Deep Learning, Earth Observation, Remote Sensing, Photogrammetry.
Thesis: *Multi-temporal Land Cover Classification with Recurrent-Convolutional Neural Networks*
Cooperation: *Bavarian Ministry of Food, Agriculture and Forestry (StMELF).*

2011–2015 Technical University of Munich

Bachelor of Science

Geodesy and Geoinformation (B.Sc): Photogrammetry, Remote Sensing, Surveying, Cartography, Geo-informatics, Gravity Science, GNSS Science, and Land Management.
Thesis: *Tri-ocular Image Rectfification and Photogrammetric Reconstruction*

Scientific Involvement

Peer Review

Transactions on Geoscience and Remote Sensing (TGRS); Elsevier Remote Sensing of Environment (RSE); Geoscience and Remote Sensing Letters (GRSL); International Conference on Computer Vision (ICCV); Neural Information Processing Systems (NeurIPS);

Program Committees

EarthVision Workshop at CVPR (since 2021)

MAChine Learning for EArth ObservatioN (MACLEAN) workshop at ECML/PKDD (since 2019)

Awards

June 2020 Best paper - Earthvision Workshop at Computer Vision and Pattern Recognition Workshop (2020) (link)

Oct. 2017 Best presentation - NVIDIA Deep Learning Workshop at Leibnitz Supercomputing Center (LRZ)

July 2017 Best paper - Earthvision Workshop at Computer Vision and Pattern Recognition Workshop (2017) (link)

Sept. 2016 Best presentation - Polish-National Remote Sensing Conference (link)

Grants

2023-2024 Co-PI Swiss Data Science Center (SDSC) proposal: AI for Detecting Ocean Plastic Pollution with Tracking (ADOPT)

Stipends and mobility Grants

March 2020 DAAD-IFI Stipend for Research Stay at Lobell Lab, Stanford University

June. 2019 Travel Grants ICML Workshops on *AI for Social Good* and *Time Series*

May. 2019 Google Education Credits - 5k$ in Google Credits for Crop Type Mapping

June 2017 Travel grant - of International Society for Photogrammetry and Remote Sensing (ISPRS) (link)

Teaching

IGARSS 2023 — Time Series lecture in the Tutorial for Machine Learning for Remote Sensing Tutorial with Ribana Roscher, Ronny Hänsch, Claudio Persello

EPFL ENV-408 2023 — Lecture on Linear Regression

EPFL ENV-540 2023 — Exercises on deep learning for remote sensing

ISPRS Congress 2022 — Deep Learning for Satellite Time Series (Tutorial Session with Prof. Charlotte Pelletier)

advised students — Dilge Gül (Master Thesis); Julia Wälti (Semester Project); Sushen Jilla Venkatesa (Semester Project); Laura Pasero (Master Thesis); Arthur Chevalley (Semester Project); Corinna Frank (Master Thesis); Max Zollner (Semester Project); Jennifer Kriese (Semester Project)

2018 — TU Munich. Master level Geodesy and Geoinformation. Excercise Image understanding. Introduction to Deep Learning.

Publications

Google Scholar — scholar.google.com/citations?user=MfGMG9wAAAAJ

2023 (in submission) — Meta-learning to address diverse Earth observation problems across resolutions. Rußwurm M., Wang S., Kellenberger B., Roscher R., Tuia D.

Rußwurm, M., Venkatesa S. J., Tuia, D. (2023). Large-scale Detection of Marine Debris in Coastal Areas with Sentinel-2

2023 — Rußwurm, M., Courty, N., Emonet, R., Lefèvre, S., Tuia, D., & Tavenard, R. (2023). End-to-end learned early classification of time series for in-season crop type mapping. ISPRS Journal of Photogrammetry and Remote Sensing, 196, 445-456.

Frank, C., Rußwurm, M., Fluixa-Sanmartin, J., & Tuia, D. (2023). Short-term runoff forecasting in an alpine catchment with a long short-term memory neural network. Frontiers in Water, 5, 1126310.

2021 — Kondmann, L., Toker, A., Rußwurm, M., et al., (2021). DENETHOR: The DynamicEarthNET dataset for Harmonized, inter-Operable, analysis-Ready, daily crop monitoring from space. In Thirty-fifth Conference on Neural Information Processing Systems Datasets and Benchmarks Track (Round 2).

Mifdal, J., Carmo R., Rußwurm M. (2021). Towards detecting floating objects on a global scale with learned spatial features using Sentinel 2. ISPRS Ann. Photogramm. Remote Sens. Spatial Inf. Sci., V-3-2021, 285–293, 2021, 169:421 – 435.

Ph.D. contributions (cummulative)
2020 — Rußwurm, M. and Körner, M. (2020). Self-attention for raw optical satellite time series classification. ISPRS Journal of Photogrammetry and Remote Sensing, 169:421 – 435.

Rußwurm, M., Pelletier, C., Zollner, M., Lefèvre, S., and Körner, M. (2020). Breizhcrops: A time series dataset for crop type mapping. ISPRS - International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, XLIII-B2-2020:1545–1551.

Rußwurm, M., Ali, M., Zhu, X. X., Gal, Y., and Körner, M. (2020). Model and data uncertainty for satellite time series forecasting with deep recurrent models. In IGARSS 2020 - 2020 IEEE International Geoscience and Remote Sensing Symposium, pages 7025–7028. Nominated best Student Paper IGARSS 2020.

Rußwurm, M., Wang, S., Körner, M., and Lobell, D. (2020). Meta-learning for few-shot land cover classification. In 2020 IEEE/CVF Conference on

Computer Vision and Pattern Recognition Workshops (CVPRW), pages 788–796. EarthVision 2020 Best Paper Award.

Wang, S., Rußwurm, M., Körner, M., and Lobell, D. (2020). meta-learning for few-shot time series classification. In 2020 IEEE International Geoscience and Remote Sensing Symposium, IGARSS 2020. IEEE. Nominated best Student Paper IGARSS 2020.

Before Ph.D

2019

Ben Bischke, Jakub Fil, Ramona Pelich, Tim G. J. Rudner, Marc Rußwurm, Veronika Kopačková, and Piotr Biliński. Multi^{3}net: Segmenting flooded buildings via fusion of multiresolution,multisensor, and multitemporal satellite imagery, 2019.

2018

Marc Rußwurm and Marco Körner. Multi-Temporal Land Cover Classification with Sequential Recurrent Encoders, *ISPRS International Journal of Geo-Information*, 2018. (link)

2017

Marc Rußwurm and Marco Körner. Temporal Vegetation Modelling using Long Short-Term Memory Networks for Crop Identification from Medium-Resolution Multi-Spectral Satellite Images, *In Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR) Workshops* 2017. (best paper award, PDF)

Marc Rußwurm and Marco Körner. Multitemporal Crop Identification from Medium-Resolution Multi-Spectral Satellite Images based on Long Short-Term Memory Neural Networks, *International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences (ISPRS)*, 2017, volume XLII-1/W1, pp. 551-558. (PDF)

2015

Marc Rußwurm and Anthony Moore. ”Visualising the project landscape”: a spatialisation describing workload attributes as terrain, *In Environmental Earth Sciences* 2015, volume 74, pp. 7159-7172. (link)