Dr Cristian Rossi

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EXPERTISE AND SKILLS

- Remote sensing of the environment

- Earth observation for sustainability: energy transition, spatial finance, climate adaptation

- Data science

- Thought leadership *(85 publications, 11 invited talks, 45 talks at conferences, 10 interviews in general media, public Youtube lectures, 3 podcasts)*

- Scientific research planning and organisation (academic editorship, conference organisation, CDTs advisory panel)

- People management and student mentoring *(7 PhD students)*

- Project initialisation and partners and stakeholder management (all levels, including high-level politicians)

- Project budget planning and management *(8 bids written and won as PI/Co-PI)*

- Industrial and academic strategy, KPI tracking and organisation performance reporting

- Industrial and academic engagement

EDUCATION

- **Technical University of Munich**   **Munich, Germany**
  Ph.D. at the Faculty of Civil, Geo and Environmental Engineering (Dr.-Ing.)   *2013 – 2016*

  - Doctoral dissertation: *Uncertainty assessment of single-pass TanDEM-X DEMs in selected applications*. Supervisors: Prof. M. Eineder, Prof. R. Bamler. Objective of this research is to define strategies for assessing standard and alternative elevation accuracy methods for digital elevation models and to inspect the different capabilities of the bistatic system.

- **Polytechnic of Milan**   **Milan, Italy**
  Master's degree in Telecommunication Engineering (M.Sc.); signal processing specialisation   *2003 – 2006*

  - Master's thesis: *Multi-Image Antenna Pattern Estimation in SAR Systems*. Relator: Prof. A. Monti. An innovative technique for the derivation of the azimuth antenna pattern using a data stack was found as an alternative to the transponders exploitation. Patented and employed by the European Space Agency.

- **Polytechnic of Milan**   **Milan, Italy**
  Bachelor's degree in Telecommunication Engineering (B.Sc.)   *2000 – 2003*

  - Bachelor's thesis: *Radar Detection with the Nyman-Pearson Criteria*. Relator: Prof. G. Drufuca.

WORK EXPERIENCE AND MAIN PROJECTS

- **University of Oxford**   **Oxford, United Kingdom**
  Visiting Lecturer   *2020 – current*

  Responsible for the creation and teaching of the MSc/MPhil *Remote Sensing of the Environment* course at the School of Geography and the Environment. The course covers the fundamentals of remote sensing theory, applications and data science and explores Google Earth Engine for practical insights.

- **Centre for Greening Finance and Investment (CGFI)**   **Oxford, United Kingdom**
  Associate Research Fellow   *2023 – current*

  Researching on the use of remote sensing for the financial sector, with a focus on geospatial ESG.

- **Satellite Applications Catapult**   **Harwell Campus, United Kingdom**
  Geospatial Science Lead   *2022 – current*
  Principal Earth Observation Specialist   *2018 – 2022*
  Senior SAR Specialist   *2017*

  Coordinate with research and academic communities to ensure pull through of science to support organisation activities; technically leading large international projects and managing staff, partners and deliveries; researching and publishing on Earth observation data exploitation focused on innovation for sustainable development; transforming ideas into bids and partnerships; teaching about Earth observation data and algorithms through courses and seminars for academia at all levels; line management academic placements; supporting business development and government operations; define and capture research KPI.

  Main projects:

    - *Carbon Accounting*, Project lead (2023-ongoing)
    - *Methane monitoring data supply for the UK*, Project lead (2023-ongoing)
    - *Geospatial ESG frameworks*, Technical lead (2022-ongoing)
    - *Deep Learning for GeoAsset and climate impact*, Technical lead (2020-2022)
    - *State of AI for EO*, Technical lead (2022)
    - *Satellites for Wildlife*, Technical lead (2021-2022)
    - *Use of innovative techniques for the battery research*, Technical lead (2017-2021)
    - *BRIGITAL*, Principal Investigator (2018-2021)
    - *Satellite-enabled monitoring of tailings dams*, Technical lead (2019-ongoing)
    - *Space Enabled Monitoring of Unregulated Gold Mining (IPP Colombia)*, Technical lead (2018-2019)
    - *NovaSAR mission*, Science manager (2018-ongoing)
    - *Asset Monitoring with Satellites and IoT Technologies (AMSIT)*, Principal Investigator (2017-2018)

- **German Aerospace Center (DLR), Earth Observation Center (EOC-IMF)**   **Oberpfaffenhofen, Germany**
  Research Scientist   *2008 – 2017*

  Developing the integrated TanDEM-X processor (ITP) with lead on the raw DEM calibration and generation; researching, presenting and publishing on novel interferometric Synthetic Aperture Radar (SAR) algorithms, with focus on signal processing, agriculture, volcanology, urban development and security; supporting academic activities and tutoring; partnering with international organisations in delivering solutions for projects.

  Main projects:

    - *PrimeDEM*, Project manager (2016-2017)
    - *Paddy-rice Fields Monitoring*, Principal Investigator (2014-2017)
    - *FUTUREVOLC*, Principal Investigator of the DLR WP (2014-2017)
    - *High-Resolution 3D EO Data Analysis for Safeguard Activities*, Technical lead (2013-2016)
    - *OptiRadarFusion*, Technical lead (2012-2013)
    - *Tomopolis*, Principal Investigator (2011-2012)
    - *Interferometric TanDEM-X Processor (ITP)*, Principal researcher and developer (2009-2017)
    - *Surface Current Estimation*, Principal researcher (2008-2015)

- **ARESYS s.r.l., a Politecnico di Milano spin-off**   **Milan, Italy**
  Project Engineer   *2006 – 2008*

  Delivering software solutions for the exploitation of Synthetic Aperture Radar (SAR) data.

Main projects:

– *Sentinel-1 Instrument Simulator Module-2*, Principal researcher and developer (2007-2008)
– *PSInSAR module for the SARscape software* (©SARMAP). Principal developer (2007-2008)

PROFESSIONAL CERTIFICATIONS

- Chartered Engineer in Information Technology (EU)

BIDS WRITTEN/WON AS PI

- **Use of innovative techniques to ensure Li brine supply for the low-cost battery market (LiBol) (£250k)**, Environmental remote sensing, Innovate UK

- **Artificial Intelligence for Batteries (£500k)**, Environmental remote sensing, UK Space Agency

- **Deep Learning for GeoAsset (£500k)**, Environmental remote sensing, Children Investment Fund Foundation

- **Space Enabled Monitoring of Unregulated Gold Mining (£4.3M)**, Environmental remote sensing, UK Space Agency

- **COLombian COcoa (COLCO) (£1M)**, Agricultural remote sensing, UK Research and Innovation

- **BRIGITAL (£125K)**, Infrastructures, Innovate UK/NRC

- **Project Lithium (£1M)**, Environmental remote sensing, Innovate UK

- **Tomopolis (€500K)**, Infrastructures, DLR

MEDIA COVERAGE

- **The Economist**, international magazine, "Searching for lithium deposits with satellites", republished by other media, interview, 08.02.2018

- **Youtube**, 18 videos, "Earth Observation 101", lecture series, 2022

- **Engineering Matters**, podcast, "Saving Structures with Satellites", interview, 30.04.2020

- **In-Orbit**, podcast, "Sustainable Finance", "Sustainable Land Use", interviews, 20.06.2023 and 11.07.2023

- **IEEE Transaction on Geoscience and Remote Sensing**, scientific magazine, front cover image, vol. 53(12) 12.2015

- **Red Uno**, Bolivian TV channel, *Que no me pierda* late night TV show, interview with British ambassador J. Thornton, 05.03.2018

- **Reuters**, international news agency, "Britain looks to ancient mines for electric future", republished by other media, interview, 27.04.2018

- **Geographical**, UK royal geographical society magazine, "Electric dreams", interview, 07.2018

- **BBC news and ITV News**, UK news, "Potential lithium 'hotspots' can be identified from space, study finds", republished by other media, interview, 12.07.2018

- **The Sunday Times**, UK newspaper, "There's lithium in them thar hills, Poldark", interview, 22.07.2018

- **Materials World**, engineering materials magazine, "Satellite search for cornish lithium", interview, 01.03.2018

- **Das Erste**, first German TV channel, *W Wie Wissen* scientific TV show, "The top 5 Earth observation applications", cited as top application, 30.05.2015

SCIENTIFIC PRODUCTION

H-index: 21, full publication list: `https://scholar.google.com/citations?user=lFxENJgAAAAJ&hl=en`

- **International Journals and book chapters (SCI-Indexed)**

1. M. Bayaraa, B. Sheil, **C. Rossi**, "InSAR and Numerical Modelling for Tailings Dam Monitoring – the Cadia failure case study", Géotechnique, Sep. 2022, pp. 1-19.
2. S. Selvakumaran, Z. Sadeghi, M. Collings, **C. Rossi**, T. Wright, A. Hooper, "Comparison of in situ and interferometric synthetic aperture radar monitoring to assess bridge thermal expansion", Proceedings of the Institution of Civil Engineers - Smart Infrastructure and Construction, vol. 175(2), Jun. 2022, pp. 73-91
3. **C. Rossi**, L. Bateson, M. Bayaraa, A. Butcher, J. Ford, A. Hughes, "Framework for Remote Sensing and Modelling of Lithium-Brine Deposit Formation", Remote Sensing, vol. 14(6), Mar. 2022, pp. 1-22.
4. D. Curnick, A. Davies, C. Duncan, R. Freeman, D. Jacoby, H. Shelley, **C. Rossi**, O. Wearn, M. Williamson, N. Pettorelli, "SmallSats: a new technological frontier in ecology and conservation?", Remote Sensing in Ecology and Conservation, vol. 8(2), Apr. 2022, pp.139-150.
5. E. Magnússon, F. Pálsson, M. Gudmundsson, T. Högnadóttir, **C. Rossi**, T. Thorsteinsson, B. Ófeigsson, E. Sturkell, T. Jóhannesson, "Development of a subglacial lake monitored with radio-echo sounding: Case study from the Eastern Skafta Cauldron in the Vatnajokull ice cap, Iceland", The Cryosphere, vol. 15(8), Aug. 2021, pp.3731-3749
6. K. Halicioglu, E. Erten, **C. Rossi**, "Monitoring Deformations of Istanbul Metro Line Stations through Sentinel-1 and Levelling Observations", Environmental Earth Sciences, vol. 80(9), May 2021, pp 1-10.
7. S. Selvakumaran, **C. Rossi**, E. Barton, C. Middleton, "Interferometric Synthetic Aperture Radar (InSAR) in the Context of Bridge Monitoring", book chapter from "Advances in Remote Sensing for Infrastructure Monitoring", Springer, 2021
8. D. Cusson, **C. Rossi**, I. Ozkan, "Early warning system for the detection of unexpected bridge displacements from radar satellite data", Journal of Civil Structural Health Monitoring, vol. 11(1), Feb. 2021, pp.189-204
9. S. Selvakumaran, **C. Rossi**, A. Marinoni, G. Webb, J. Bennetts, E. Barton, S. Plank, C. Middleton, "Combined InSAR and Terrestrial Structural Monitoring of Bridges", IEEE Transaction on Geoscience and Remote Sensing, Vol. 58(10), Apr. 2020, pp. 7141-7153.
10. J. Truckenbrodt, T. Freemantle, C. Williams, T. Jones, D. Small, C. Dubois, C. Thiel, **C. Rossi**, A. Syriou, G. Giuliani, "Towards Sentinel-1 SAR Analysis-Ready Data: A Best Practices Assessment on Preparing Backscatter Data for the Cube", Data, Vol. 4, Jul. 2019, pp. 1-37.
11. E. Erten, **C. Rossi**, "The worsening impacts of land reclamation assessed with Sentinel-1: the Rize (Turkey) test case", International Journal of Applied Earth Observation and Geoinformation, Vol. 74, Jan. 2019, pp. 57-64.
12. S. Dumont, F. Sigmundsson, M. Parks, V. Drouin, G. Pedersen, I. Jónsdóttir, Á. Höskuldsson, A. Hooper, K. Spaans, M. Bagnardi, M. Gudmundsson, S. Barsotti, K. Jonsdottir, T. Högnadóttir, E. Magnusson, A. Hjartardottir, T. Dürig, **C. Rossi**, B. Oddsson, "Integration of SAR data into monitoring of the 2014-2015 Holuhraun eruption, Iceland: Contribution of the Icelandic Volcanoes Supersite and the FutureVolc projects", Frontiers in Earth Science, Vol. 6, Dec. 2018, pp. 1-19.
13. S. Selvakumaran, S. Plank, C. Geiss, **C. Rossi**, C. Middleton, "Remote monitoring to predict bridge failure and collapse using Interferometric Synthetic Aperture Radar (InSAR) stacking techniques", International Journal of Applied Earth Observation and Geoinformation, Vol. 73, Dec. 2018, pp. 463-470.
14. G. Baier, **C. Rossi**, M. Lachaise, X. Zhu, R. Bamler, "A nonlocal InSAR filter for high-resolution DEM generation from TanDEM-X interferograms", IEEE Transaction on Geoscience and Remote Sensing, Vol. 204, Jan. 2018, pp. 244-259.
15. M. Dirscherl, **C. Rossi**, "Geomorphometric analysis of the 2014-2015 Bardarbunga volcanic unrest, Iceland", Remote Sensing of Environment, Vol. 204, 2018, pp. 244-259.
16. **C. Rossi**, "Rice plant height monitoring from space with bistatic interferometry", book chapter from "Rice", InTech, January 2017.
17. **C. Rossi**, C. Minet, T. Fritz, M. Eineder, R. Bamler, "Temporal monitoring of subglacial volcanoes with TanDEM-X - application to the 2014-2015 eruption within the Bardarbunga volcanic system, Iceland", Remote Sensing of Environment, Vol. 181, Aug. 2016, pp. 186-197.
18. **C. Rossi**, M. Eineder, "High-resolution InSAR building layovers detection and exploitation", IEEE Transaction on Geoscience and Remote Sensing, Vol. 53, Dec. 2015, pp. 6457-6468.
19. R.Deo, **C. Rossi**, T. Fritz, M. Eineder, Y.S. Rao, "Framework for Fusion of Ascending and Descending Pass TanDEM-X Raw DEMs", IEEE J-STARS, Vol. 8, Jul. 2015, pp. 3347-3355.

20. E. Erten, **C. Rossi**, O. Yuzugullu, "Polarization Impact in TanDEM-X Data Over Vertical-Oriented Vegetation: The Paddy-Rice Case Study", IEEE Geoscience and Remote Sensing Letters, Vol. 12, Jul. 2015, pp. 1501-1505.
21. **C. Rossi**, E. Erten, "Paddy-rice monitoring using TanDEM-X", IEEE Transaction on Geoscience and Remote Sensing, Vol. 52, Feb. 2015, pp. 900-910.
22. S. Duque, **C. Rossi**, T. Fritz, "Single-Pass Tomography With Alternating Bistatic TanDEM-X Data", IEEE Geoscience and Remote Sensing Letters, Vol. 12, Feb. 2015, pp. 409-413.
23. R. Romeiser, H. Runge, S. Suchandt, R. Kahle, **C. Rossi**, P. Bell, "Quality Assessment of Surface Current Fields From TerraSAR-X and TanDEM-X Along-Track Interferometry and Doppler Centroid Analysis", IEEE Transaction on Geoscience and Remote Sensing, Vol. 52, May 2014, pp. 2759-2772.
24. **C. Rossi**, S. Gernhardt, "Urban DEM generation, analysis and enhancements using TanDEM-X", ISPRS Journal of Photogrammetry and Remote Sensing, Vol. 85, Nov. 2013, pp. 120-131.
25. **C. Rossi**, F. Rodriguez Gonzalez, T. Fritz, N. Yague Martinez, M. Eineder, "TanDEM-X Calibrated Raw DEM Generation", ISPRS Journal of Photogrammetry and Remote Sensing, Vol. 73, Sep. 2012, pp. 12-20.
26. U. Munzer, C. Mayer, L. Reichel, H. Runge, T. Fritz, **C. Rossi**, A. Gudmundsson, "NRT-Monitoring am Vulkanausbruch Eyjafjallajökull (Island) mit TerraSAR-X", Photogrammetrie - Fernerkundung - Geoinformation, Vol. 5, Nov. 2010, pp. 339-354.

PROGRAMMING LANGUAGES ANS SPECIALISED SOFTWARE

Matlab, IDL, Python, ENVI, C, SNAP, GAMMA, QGIS, ArcGIS, JavaScript, Google Earth Engine.

LANGUAGES

Italian (native), English (very good, spoken and written), German (good, spoken and written), Spanish (good, spoken and written).