

Curriculum Vitae of

Michele Martone

PERSONAL INFORMATION

Address

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]



[REDACTED]
Nationality

[REDACTED]
Italian

Date of birth

[REDACTED]

Country of Residence

Germany

CURRENT POSITION

From December 2009, **Researcher / Project Engineer**, Satellite SAR Systems Department, Microwaves and Radar Institute, German Aerospace Center (DLR), Oberpfaffenhofen, Germany.

EDUCATION

- November 2019, **Ph.D. (Dr.-Ing.) in Electrical Engineering and Information Technology**, Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany. Thesis Title: *Onboard Quantization for Interferometric and Multichannel Synthetic Aperture Radar (SAR) Systems*, Supervisor: Prof. Dr.-Ing. habil. Alberto Moreira, Co-Supervisor: Prof. Dr. Antonio Iodice.
- October 2009, **Master Degree in Telecommunication Engineering** (with honours), University of Naples “Federico II”, Naples, Italy. Thesis Title: *Modified Scattering Decomposition for Soil Moisture Estimation from Polarimetric X-Band Data*, Supervisor: Prof. Dr. Antonio Iodice.
- December 2006, **Bachelor Degree in Telecommunication Engineering** (with honours), University of Naples “Federico II”, Naples, Italy. Thesis Title: *Analisi Frattale dei Profili Altimetrici di Titano Acquisiti dalla Sonda Cassini (Fractal Analysis of Titan’s Profiles Acquired by the Cassini Altimeter)*, Supervisor: Prof. Dr. Antonio Iodice.

RESEARCH EXPERIENCE

Since end of 2009 Dr. Martone has been working at the Microwaves and Radar Institute at the German Aerospace Center (DLR), Oberpfaffenhofen, Germany, as research scientist and project engineer. He has been co-responsible for the SAR system performance and optimization of the TerraSAR-X and TanDEM-X spaceborne SAR missions with main focus on the generation of the TanDEM-X global digital elevation model (DEM). He has also been involved in the preliminary study for the SARah mission for the analysis and optimization of the radargrammetric and interferometric SAR performance, in the high-resolution wide-swath (HRWS) X-band phase 0/A study focusing on board data volume reduction

aspects, and he has been responsible for the data reduction concept and simulation tool in the frame of the ESA study CalDuction in collaboration with industry partners. In 2019-2020, Dr. Martone has been project manager for the ESA Earth Explorer HydroTerra phase 0/A system studies focused on the definition of SAR performance models and calibration methods of a geosynchronous (GEO-SAR) mission, and starting from 2020 he has been responsible for the mission performance aspects in the frame of the BioCaMPS project in support of the Biomass mission. In 2022-2023 Dr. Martone has been project manager for the ESA Projects ARTISTE (Artificial Intelligence for SAR Data Compression) and DARE4MSAR (Data Volume Reduction for Multichannel SAR Systems), focused on the development of innovative SAR data compression methods for next-generation SAR systems.

His main research interests include SAR systems design and interferometry, SAR image classification, artificial intelligence algorithms, and the development of innovative methods for efficient SAR data volume reduction and quantization for present and future SAR systems, such as multichannel and staggered SAR. In particular, in the field of the biosphere, he has been focusing on the development of machine-learning based algorithms for land cover classification and forest mapping for the generation of the global TanDEM-X Forest/Non-Forest Map, and of innovative methods for deforestation monitoring using multi-temporal, multi-baseline radar interferometric information from TanDEM-X and Sentinel-1 data. Currently, he is Editor of the Special Issue of Remote Sensing MDPI “SAR for Forest Mapping II”.

Dr. Martone has authored and co-authored 26 peer-reviewed journal papers and more than eighty conference papers (h-index: 18), and holds 3 patents in the field of SAR. A list of selected publications in peer-reviewed journals and conference papers can be found in the bibliography.

AWARDS

- **Best Paper Award**, German Microwave Conference (GeMiC), Mar. 2019, for the paper entitled: *Predictive Quantization for Staggered Synthetic Aperture Radar*. Authors: N. Gollin, M. Martone, M. Villano, P. Rizzoli, and G. Krieger.
- **DLR Science Award 2018** for outstanding scientific achievements, documented in the following refereed publication: P. Rizzoli, M. Martone, C. Gonzalez, C. Wecklich, D. Borla Tridon, B. Bräutigam, M. Bachmann, D. Schulze, T. Fritz, M. Huber, B. Wessel, G. Krieger, M. Zink, and A. Moreira: *Generation and Performance Assessment of the Global TanDEM-X Digital Elevation Model*, ISPRS Journal of Photogrammetry and Remote Sensing, vol. 73, pp. 119-139, Oct. 2017.
- **Best Poster Award**, Worldcover Conference, ESA, Frascati, March 2017, for the contribution entitled: P. Rizzoli, M. Martone, C. Wecklich, C. Gonzales, J. L. Bueso Bello, G. Krieger, and M. Zink: *Deriving Forest/Non-Forest Maps from TanDEM-X Interferometric SAR Data*.
- **Certificate of Recognition** of TanDEM-X Achievements and Impact at EUSAR 2012 (Group Achievement).
- **DLR Certificate of Recognition 2010** - TanDEM-X (Group Achievement).

SELECTED PUBLICATIONS

- H-Index: 18 (Google Scholar, status November 6, 2023)
- Total Citations: 1954 (Google Scholar, status November 6, 2023)
- Total Peer-Reviewed Publications: 26
- Total Conference Papers > 80
- Total Patents Granted: 3

1 Peer Reviewed Journals Papers

1. N. Gollin, R. Scheiber, M. Martone, P. Rizzoli, G. Krieger: *SAR Imaging in Frequency Scan Mode: System Optimization and Potentials for Data Volume Reduction*, IEEE Transactions on Geoscience and Remote Sensing, vol. 61, pp. 1-20, Dec. 2022.
2. N. Gollin, J. Giez, M. Martone, P. Rizzoli, R. Scheiber, G. Krieger: *Dynamic Predictive Quantization for Staggered SAR: Experiments With Real Data*, IEEE Geoscience and Remote Sensing Letters, vol. 20, pp. 1-5, Nov. 2022.
3. M. Martone, N. Gollin, P. Rizzoli, G. Krieger: *Performance-Optimized Quantization for SAR and InSAR Applications*, IEEE Transactions on Geoscience and Remote Sensing, vol. 60, pp. 1-22, Jun. 2022.
4. J. L. Bueso Bello, M. Martone, C. Gonzalez, F. Sica, P. Valdo, P. Posovszky, A. Pulella, P. Rizzoli: *The Global Water Body Layer from TanDEM-X Interferometric SAR Data*, Remote Sensing MDPI, vol. 13, n. 24 (5069), Dec. 2021.
5. F. Sica, S. Bretzke, J. L. Bueso-Bello, M. Martone, P. Prats, M.J. Gonzalez-Bonilla, M. Schmidt, P. Rizzoli: *InSAR Decorrelation at X-Band from the Joint TanDEM-X/PAZ Constellation*, IEEE Geoscience and Remote Sensing Letters, vol. 18, n. 12, pp. 2107-2111, Dec. 2021.
6. M. Martone, N. Gollin, M. Villano, P. Rizzoli, G. Krieger: *Predictive Quantization for Data Volume Reduction in Staggered SAR Systems*, IEEE Transactions on Geoscience and Remote Sensing, vol. 58, n. 8, pp. 5575-5587, Aug. 2020.
7. M. Martone, M. Villano, M. Younis, G. Krieger: *Efficient Onboard Quantization for Multichannel SAR Systems*, IEEE Geoscience and Remote Sensing Letters, vol. 16, n. 12, pp. 1859-1863, Dec. 2019.
8. M. Nannini, M. Martone, P. Rizzoli, P. Prats-Iraola, M. Rodriguez-Cassola, A. Reigber, A. Moreira: *Coherence-Based SAR Tomography for Spaceborne Applications*, Remote Sensing of Environment, vol. 225, pp. 107-114, May 2019.
9. M. Martone, F. Sica, C. Gonzalez, J. L. Bueso-Bello, P. Valdo, P. Rizzoli: *High-Resolution Forest Mapping from TanDEM-X Interferometric Data Exploiting Nonlocal Filtering*, Remote Sensing, Sep. 2018.
10. M. Martone, P. Rizzoli, C. Wecklich, C. Gonzalez, J. L. Bueso Bello, P. Valdo, D. Schulze, M. Zink, G. Krieger, A. Moreira: *The Global Forest/Non-Forest Map from TanDEM-X Interferometric SAR Data*, Remote Sensing of Environment, vol. 205, pp. 352-373, Feb. 2018.
11. P. Rizzoli, M. Martone, C. Gonzalez, C. Wecklich, D. Borla Tridon, B. Bräutigam, M. Bachmann, D. Schulze, T. Fritz, M. Huber, B. Wessel, G. Krieger, M. Zink, A. Moreira: *Generation and Performance Assessment of the Global TanDEM-X Digital Elevation Model*, ISPRS Journal of Photogrammetry and Remote Sensing, vol. 73, pp. 119-139, Oct. 2017.

12. J. L. Bueso-Bello, M. Martone, P. Prats-Iraola, C. Gonzalez, T. Kraus, J. Reimann, M. Jagär, B. Bräutigam, P. Rizzoli, M. Zink: *Performance Analysis of TanDEM-X Quad-Polarization Products in Pursuit Monostatic Mode*, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (JSTARS), vol. 10, n. 5, pp. 1853-1869, May 2017.
13. P. Rizzoli, M. Martone, H. Rott, A. Moreira: *Characterization of Snow Facies on the Greenland Ice Sheet Observed by TanDEM-X Interferometric SAR Data*, Remote Sensing, vol. 9, n. 4, pp. 315-338, Mar. 2017.
14. M. Martone, P. Rizzoli, G. Krieger: *Volume Decorrelation Effects in TanDEM-X Interferometric SAR Data*, IEEE Geoscience and Remote Sensing Letters, vol. 13, n. 12, pp. 1812-1816, Dec. 2016.
15. A. Gruber, B. Wessel, M. Martone, A. Roth: *The TanDEM-X DEM Mosaicking: Fusion of Multiple Acquisitions Using InSAR Quality Parameters*, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (JSTARS), vol. 9, n. 3, pp. 1047-1057, Mar. 2016.
16. M. Martone, B. Bräutigam, P. Rizzoli, N. Yague-Martinez, G. Krieger: *Enhancing Interferometric SAR Performance Over Sandy Areas: Experience From the TanDEM-X Mission*, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (JSTARS), vol. 9, n. 3, pp. 1036-1046, Mar. 2016.
17. M. Martone, B. Bräutigam, G. Krieger: *Quantization Effects in TanDEM-X Data*, IEEE Transactions on Geoscience and Remote Sensing, vol. 53, n. 2, pp. 583-597, Feb. 2015.
18. D. Borla Tridon, M. Bachmann, D. Schulze, C. Ortega-Miguez, D. Polimeni, M. Martone, J. Böer, M. Zink: *TanDEM-X: DEM Acquisition in the Third Year*, International Journal of Space Science and Engineering, vol. 1, n. 4, pp. 367-381, Feb. 2014.
19. M. Martone, B. Bräutigam, G. Krieger: *Azimuth-Switched Quantization for SAR Systems and Performance Analysis on TanDEM-X Data*, IEEE Geoscience and Remote Sensing Letters, vol. 11, n. 1, pp. 181-185, Jan. 2014.
20. M. Martone, P. Rizzoli, B. Bräutigam, G. Krieger: *First Two Years of TanDEM-X Mission: Interferometric Performance Overview*, Radio Science, vol. 48, n. 5, pp. 617-627, Sep. 2013.
21. G. Krieger, M. Zink, M. Bachmann, B. Bräutigam, D. Schulze, M. Martone, P. Rizzoli, U. Steinbrecher, J. Walter Antony, F. De Zan, I. Hajnsek; K. Papathanassiou, F. Kugler, M. Rodriguez-Cassola, M. Younis, S. Baumgartner, F. Lopez Dekker, P. Prats-Iraola, A. Moreira: *TanDEM-X: A Radar Interferometer with Two Formation Flying Satellites*, Acta Astronautica, vol. 89, pp. 83-98, Apr. 2013.
22. P. Rizzoli, B. Bräutigam, T. Kraus, G. Krieger: *Relative Height Error Analysis of TanDEM-X Elevation Data*, International Society for Photogrammetry and Remote Sensing (ISPRS) Journal of Photogrammetry and Remote Sensing, vol. 73, pp. 30-38, Sep. 2012.
23. M. Martone, B. Bräutigam, P. Rizzoli, C. Gonzalez, M. Bachmann, G. Krieger: *Coherence Evaluation of TanDEM-X Interferometric Data*, International Society for Photogrammetry and Remote Sensing (ISPRS) Journal of Photogrammetry and Remote Sensing, vol. 73, pp. 21-29, Sep. 2012.

2 Conference papers

1. P. Rizzoli, J. L. Bueso Bello, R. Diniz Dal Molin, D. Carcereri, C. Gonzalez, M. Martone, L. Dell'Amore, N. Gollin, P. Milillo, M. Zink: *The Value of InSAR Coherence in TanDEM-X and Sentinel-1 for Monitoring World's Forests*, European Geosciences Union (EGU) General Assembly, May 2022, Vienna, Austria.

2. P. Rizzoli, A. Pulella, F. Sica, J. L. Bueso-Bello, M. Martone, M. Zink: *Fast Monitoring of Amazonas Deforestation by Combining Sentinel-1 and TanDEM-X Interferometric SAR Data*, ForestSAT Conference, Washington, D.C., USA, Oct. 2018.
3. J. L. Bueso-Bello, P. Prats-Iraola, M. Martone, P. Rizzoli, B. Bräutigam: *Performance Evaluation of the TanDEM-X Quad Polarization Acquisitions in the Science Phase*, European Conference on Synthetic Aperture Radar (EUSAR), Hamburg, Germany, Jun. 2016.
4. M. Martone, P. Rizzoli, B. Bräutigam, G. Krieger: *A Method for Generating Forest/Non-Forest Maps from TanDEM-X Interferometric Data*, IEEE Geoscience and Remote Sensing Symposium (IGARSS), Milan, Italy, Jul. 2015.
5. M. Villano, M. Martone, V. Del Zoppo, G. Krieger: *Joint Effects of On-Board Doppler Filtering and Quantization in Spaceborne SAR Systems*, IEEE GOLD Remote Sensing Conference, Berlin, Germany, Jun. 2014.
6. M. Martone, B. Bräutigam, G. Krieger: *Decorrelation Effects in Bistatic TanDEM-X Data*. International Geoscience and Remote Sensing Symposium (IGARSS), Munich, Germany, Jul. 2012.