Dr. Marco Lavalle

Dr. Marco Lavalle has over 12 years of experience in the broad areas of science, engineering, and management with fundamental contribution in Earth Observation mission design and formulation, polarimetric and interferometric radar algorithms development, large data processing and production systems, scientific data analysis and simulation, products and algorithms calibration and validation, technical management for research and space flight projects, international projects coordination, and personnel management.

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Appointments	<i>Head of the SAR Algorithms and Processing Group</i> , Jan. 2022 – present NASA Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA
	Research Scientist and Technical Manager , Jan. 2012 – present NASA Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA
	<i>Visiting Professor</i> , Jul. 2020 – Dec. 2020; Jun. 2022 – present Sapienza University, Dept. Information Eng., Electronics and Telecommunications, Rome, Italy
	NASA Postdoctoral Program Fellow , Jan. 2010 – Jan. 2012 NASA Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA
Education	 Ph.D. Signal Processing and Remote Sensing with highest honors, Dec. 2009 University of Rennes 1, Dept. Electrical Engineering, France Advisor: Prof. Eric Pottier (co-tutored) Committee: S. Cloude, F. Rocca, A. Moreira, JM. Lopez-Sanchez, YL. Desnos
	 Ph.D. Applied Electromagnetics, Dec. 2009 University of Rome Tor Vergata, Dept. Systems and Computer Science, Italy Advisor: Prof. Domenico Solimini (co-tutored) Committee: F. Lombardini, R. Lanari, L. Ferro-Famil, E. Pottier
	<i>Master Electrical Engineering with honors</i> , Jul. 2006 University of Rome Tor Vergata, Italy
	Bachelor Electrical Engineering with honors , Jul. 2004 University of Rome Tor Vergata, Italy
Nationality	Citizenship: Italian
	United States immigration status: <i>Legal Permanent Resident</i> , Category EB-1 Outstand- ing Professors and Researchers
	Current location: <i>Pasadena, CA</i> . Temporary location (JunSept. 2022): <i>Rome (Italy)</i> as Visiting Professor at Sapienza University.

Experience Technical management for research and flight projects. Head of the Synthetic Aperture Radar (SAR) Algorithms and Processing Group responsible for designing, developing, and deploying Level-0 to Level-3 operational processors for the Ground Segment of NASA/JPL SAR missions • Current main projects are *NISAR* (NASA-ISRO SAR), *OPERA* (Observational Products for End-Users from Remote Sensing Analysis), and *VER*-*ITAS* (Venus Emissivity, Radio science, InSAR, Topography, And Spectroscopy) • Plan, manage, and coordinate activities for various Earth Observation projects mainly related to SAR algorithms definition, processing, information extraction, and data production • Establish a strategic vision for the SAR algorithms and processing activities at JPL.

Personnel management. Line manager of about 15 full-time employees, 2-3 postdocs, and 1-2 contractors, for a total of about 15 to 20 individuals • Recruit, develop, mentor, and maintain a high-performance engineering and science group to support various project, technology, and research tasks at JPL • Interface with line, task, and program managers to schedule and manage workforce for SAR Ground Segment activities at JPL.

Leadership and notable roles. Principal Investigator for the JPL and NASA ESTO Distributed Aperture Radar Tomographic Sensors (DARTS) project and Decadal Survey Incubator (DSI) project • Technical lead and manager of the DARTS team with about 15 engineers and scientists • Nominated and selected for the 1-year JPL Leadership and Mentoring Program • Member of the NASA Surface Topography and Vegetation (STV) Incubator Study Team • Member of the NISAR Project Science Team, ESA ROSE-L Mission Advisory Group, and CYGNSS Science Team • Deputy Instrument Scientist for the proposed JPL Enceladus mission.

International projects. Co-Project Scientist for the joint ESA-NASA Multi-mission Algorithm and Analysis Platform (MAAP) • External NASA member of the ESA ROSE-L Mission Advisory Group • Member of the NISAR Project Science Team that interacts closely with the Indian partners • Invited speaker at several international meetings and universities.

Scientific and technical contribution to the field of Earth Observation. Contributed to the generation of a global seasonal coherence dataset from Sentinel-1 • Led the development of tomographic and interferometric radar algorithms for mapping vegetation vertical structure at JPL • Led the Decadal Survey's white paper of a multifrequency, multi-baseline space interferometer to measure 3D ecosystem structure and dynamics • Led the design of the community software toolbox PLAnT for processing multi-dimensional satellite data • Formulated the Random-Motion-over-Ground model to enable estimation of structural and dynamic properties of soil and vegetation from interferometric radar data • Contributed to the development of a high-performance C++ library to ingest NASA satellite data in software frameworks • Designed and validated statistics- and physics-based algorithms and electromagnetic simulators for current and future NASA missions • Led the development of innovations in the processor to generate the global NASA Digital Elevation Model from the SRTM data • Published the first peer-reviewed paper using long-baseline interferometric NASA UAVSAR airborne data for 3D forest imaging • Contributed to define the architecture and implement the algorithms of the ISCE and PolSARPro software toolboxes • Contributed to the development and testing of a parallel scattering simulator for complex random media · Uncovered and formulated analytically the physical mechanisms driving the sensitivity of temporal coherence versus forest properties observed by interferometric satellite radars • Formulated the basic theory and published the first peer-reviewed paper on compact polarimetric radar interferometry for monitoring natural random media.

Research Interests

Satellite data processing and interpretation • image feature extraction • algorithms design and implementation • statistical modeling • system optimization • multidimensional remote sensing observation technologies • big data mining and largescale processing • high-performance software frameworks • modeling and remote sensing of natural random media • electromagnetic scattering theory • environmental parameter estimation • machine learning and artificial intelligence • ecosystem parameter modeling • carbon cycle science • lidar-radar synergy and comparative assessment • radar polarimetry and polarimetric interferometry • tomography of volumetric natural media • design of remote sensing observation strategies • small-sat mission design.

Technical and Communication Skills

- Technical skills Extensive programming and scripting experience with C/C++, Python, Matlab, and Jupyter Notebooks. Experience with the development of simulation and image processing tools. Familiarity with IDL, Fortran, and Julia. Regular user of high-performance and open-source libraries including Boost, Gdal and Armadillo. Familiarity with OpenCV and OpenMP libraries. Experienced Linux and Mac user.
- Languages English (fluent), Italian (fluent), French (beginner-intermediate), Spanish (beginner)

Funding and Grants

4/2022–present	An OSSE Framework for STV Multi-Mission Design and Performance Evaluation (PI: Marco Lavalle), <i>NASA Science Mission Directorate: Decadal Survey Incubator Program</i>
7/2021–present	Evaluation of X-band TerraSAR-X/TanDEM-X data for Surface Topography and Vegeta- tion mapping (PI: Marco Lavalle), <i>NASA Commercial Satellite Data Acquisition Program</i>
8/2020–present	Visiting Professor at Sapienza University to co-develop bio-physical retrieval algorithms for NISAR and ROSE-L missions (PI: Marco Lavalle), <i>Sapienza University, Rome</i>
4/2020–present	Distributed Aperture Radar Tomographic Sensors for Surface Topography and Vegeta- tion Mapping (DARTS) (PI: Marco Lavalle), <i>NASA Instrument Incubator Program</i>
9/2019–present	Joint radar time-series retrieval framework for ecosystem science and land applications (PI: Marco Lavalle), <i>JPL Research and Technology Development Funds</i>
8/2019–present	Surface Topography and Vegetation: From Scientific Objectives to TomoSAR Measurements (PI: Marco Lavalle), <i>NASA Decadal Survey Incubation Study Teams</i>
5/2019–present	Distributed Aperture Radar Tomographic Sensors (DARTS): Trade Study and Technology Demonstration (PI: Marco Lavalle), <i>Strategic Research and Technology Development</i>
9/2018–present	Project Scientist for joint ESA-NASA Multi-Mission Analysis Platform (MAAP) (PI: Marco Lavalle), NASA Earth Science and Technology Office and Terrestrial Ecology Program
06/2018–present	Joint ESA-NASA Multi-Mission Analysis Platform (MAAP) (PI: Marco Lavalle), NASA Earth Science and Technology Office
2/2018-present	Dynamic Mapping of Tropical Wetlands and Inundations with CYGNSS (Co-I: Marco Lavalle), <i>CYGNSS Competed Science Team</i>

9/2017-9/2019	Tomographic radar imaging of forest canopies and comparison with lidar-derived wave- forms and structural metrics (PI: Marco Lavalle), <i>NASA Terrestrial Ecology Program</i>
8/2016-9/2019	SInCohMap: Exploitation of Sentinel-1 interferometric coherence for land cover and vegetation mapping (Co-I: Marco Lavalle), <i>European Space Agency</i>
9/2016-9/2017	Advisor of future satellite radar missions for mapping 3-D vegetation structure and dynamics (PI: Marco Lavalle), <i>NASA Earth Science Program</i>
8/2016-8/2017	Vertical profile and 3-D vegetation structure demonstration from airborne UAVSAR AfriSAR campaign data (Co-I: Marco Lavalle), <i>NASA Earth Science Program</i>
3/2013-3/2016	Extraction of structural and temporal parameters of forests from repeat-pass polarimetric- interferometric radar data (PI: Marco Lavalle), <i>NASA Terrestrial Ecology Program</i>
1/2012-12/2016	NASADEM: Creating an enhanced NASA global digital elevation model and new derived products (PI: Sean Buckley), <i>MEASURES Program</i>
9/2012–present	Development of algorithms and tools for vegetation remote sensing for the L/S–band NASA-ISRO SAR (NISAR) mission (PI: Paul Rosen), <i>Earth Systematic Missions Program</i>
1/2010-present	Modeling interferometric temporal decorrelation observed by the NASA airborne instru- ment UAVSAR (Co-I: Marco Lavalle), <i>NASA Earth Science and Technology Office</i>
1/2010-1/2012	Remote sensing of vegetation 3-D structure (PI: Marco Lavalle), NASA Postdoctoral fellowship

Honors and Awards

3/2022–present	Leadership and Mentoring Program Award Nominated and selected as a participant for the 1-year Leadership and Mentoring Program at the Jet Propulsion Laboratory
8/2020–present	Associate Professor Habilitation Italian Ministry of Education, University and Research, Group ING/INF-03
9/2021	Voyager Award, NASA JPL/Caltech For creative and proactive formulation of future radar concepts and measurements
6/2020	Voyager Award, NASA JPL/Caltech For developing tomographic multi-static radar mission concepts to map three- dimensional vegetation structure and dynamics
6/2020	Cover page, IEEE Transaction on Geoscience and Remote Sensing Figure 18 from Shiroma and Lavalle (2020) showing TomoSAR-based extraction of digital terrain and surface models featured in the June 2020 issue of IEEE TGRS
9/2019	Lew Allen Award for Excellence, NASA JPL/Caltech For sustained leadership in creating and advancing new Earth-science applications of Interferometric Synthetic Aperture Radar
3/2020	Bonus Team Award, NASA JPL/Caltech For successful development and delivery of the Pilot implementation for the Multi- mission Algorithm and Analysis Platform (MAAP)
8/2019	NASA Honors Team Award For advancing NASA leadership in Earth Science by significantly improving Shuttle Radar Topography Mission data products with novel processing enhancements

7/2019	NASA Early Career Public Achievement Medal For outstanding early career achievement in developing techniques and mission concepts for the remote sensing of vegetation and snow
6/2019	Green Card Outstanding Professors and Researchers category (first preference EB-1)
1/2017	Certificate of Recognition, NASA JPL/Caltech For Five Years of Service at NASA Jet Propulsion Laboratory
11/2015	Bonus Team Award, NASA JPL/Caltech For soil moisture estimation from polarimetric ALOS-2 SAR data
12/2009	Ph.D. with "mention trés honorable" Ph.D. committee, University of Rennes 1, Rennes, France
6/2008	Best Student Paper Award 7^{th} European conference on Synthetic Aperture Radar, Friedrichshafen, Germany
7/2007	Scholarship International Space University, Summer Session Program at Beihang University, Beijing, China
9/2006	Scholarship University of Rome Tor Vergata, GeoInformatics Ph.D. School, Rome, Italy
7/2006	Award for excellence in M.S. and B.S. courses Sebastiano e Rita Raeli Foundation, University of Rome Tor Vergata, Rome, Italy

Higher-Education Teaching and Mentorship

4/2022	<i>Lecturer</i> of two classes in the course of Physics of Remote Sensing at the California Institute of Technology, Electrical Engineering Department
3/2022–present	<i>Co-mentor</i> of a graduate student at Sapienza University on Sentinel-1 coherence modeling and processing for global land-cover mapping
7/2021	<i>Lecturer</i> of PhD-level course on SAR Polarimetry, Polarimetric SAR Interferometry, and SAR Tomography, Sapienza University
4/2021	Co-lecturer at the 6th ESA Advanced Course on Radar Polarimetry, ESA/ESRIN
10/2020–present	<i>Advisor</i> of graduate student at Sapienza University (Rome) on SAR polarimetry for soil moisture retrieval and wetland characteristics mapping
3/2020–present	Advisor of JPL Postdoctoral Researcher on land cover mapping with ESA Sentinel-1 data
9/2019–present	Advisor of JPL Postdoctoral Researcher on biomass mapping with airborne radar and lidar instruments
3/2020–present	Advisor of Ph.D. Student from University of Sannio (Italy) on wetland mapping with CYGNSS
5/2019–present	<i>Advisor</i> of Ph.D. student from Sejong University (Seoul) on polarimetric-interferometric radar applications
9/2019–9/2020	<i>Advisor</i> of Ph.D. student from Sapienza University on machine learning algorithms for radar and optical satellite data

9/2018-9/2019	<i>Advisor</i> of Ph.D. student from Sapienza University on machine learning algorithms for radar and optical satellite data
9/2017–9/2018	Mentor of Fulbright Scholar on tomographic imaging with satellite Tandem-X data
7/2017	<i>Mentor</i> of summer undergraduate student on interpretation of multi-year/multi-season airborne radar data for satellite ecosystem algorithms
7/2017	<i>Mentor</i> of summer undergraduate student on regression analysis of multi-frequency radar data collected over snow by airborne and ground-based instrumentation
8/2016–present	<i>Advisor</i> of Ph.D. student at the University of Leicester on active/passive remote sensing data fusion for global mapping of vegetation structure with future satellite missions
1/2016–present	<i>Advisor</i> of Ph.D. student at the Indian Institute of Technology Kanpur on polarimetric radar tomography for robust multi-baseline estimation of vegetation vertical structure
10/2015	Tutorial lecturer on land-cover/land-use change with radar polarimetry, NASA Ames, CA
10/2014	Tutorial lecturer on land-cover/land-use change with radar polarimetry, USGS, VA
7/2014	<i>Mentor</i> of Glendale College instructor under the JPL Faculty Award on soil moisture modeling with polarimetric-interferometric radar data
6/2012	Mentor, NASA Jet Propulsion Laboratory, summer 2012 Mentored two Caltech undergraduate students (radar processing) Mentored one Stanford graduate student (estimation of ionospheric distortions) Mentored one California State University graduate student (change detection)
3/2012	<i>Advisor</i> of Ph.D. student from the University of Montreal, Canada, on polarimetric- interferometric radar processing for terrestrial ecosystem applications
9/2008	Teaching assistant, tutorial on radar polarimetry, ALOS PI Symposium, Rhodes, Greece
4/2008	Teaching assistant, course of radar processing, University of Rome Tor Vergata, Italy
4/2007	Teaching assistant, course of electromagnetics, University of Rome Tor Vergata, Italy
1/2007	Teaching assistant, tutorial on radar polarimetry, PolInSAR workshop, Frascati, Italy

Reviews and International Community Service

<i>Chair and co-organizer</i> of invited session "Technology and science advances of SmallSat distributed SAR systems", IEEE International Geoscience and Remote Sensing Symposium 2021, Bruxelles, Belgium
Associate Editor of IEEE Transactions on Geoscience and Remote Sensing
<i>Guest Editor</i> of Frontiers in Earth Science Special Issue "Advances of Synthetic Aperture Radar Technology in the era of Big Data"
Member of scientific committee for ESA PolInSAR Workshop 2021
Member of organizing committee, ESA Climate Office's Biomass Change Workshop 2020
Co-organizer of session on Earth and Space Science Informatics at AGU Fall Meeting
Member of the CARD4L SAR Products Definition Team
Reviewer of book proposal for Cambridge University Press
Lead Science Panel Reviewer at European Space Agency

2013-present	NASA Panel Reviewer for different NASA programs and awards
7/2017	<i>Co-Chair and co-organizer</i> of workshop on bistatic radar scattering models to progress development of active/passive bistatic radar satellite constellations
7/2015	<i>Chair and organizer</i> of invited session on interferometric temporal decorrelation, IEEE International Geoscience and Remote Sensing Symposium 2015, Milan, Italy
2013-present	Principal Investigator of Japanese ALOS-2 satellite data
7/2013	<i>Chair and organizer of invited session</i> on polarimetric radar interferometry, IEEE Inter- national Geoscience and Remote Sensing Symposium 2013, Melbourne, Australia
2013–present	<i>Member</i> of scientific committee, International Workshop on Science and Applications of SAR Polarimetry and Polarimetric Interferometry, ESA, Frascati, Italy
2012–present	<i>Member</i> of scientific committee, IEEE International Geoscience and Remote Sensing Symposium (IGARSS)
2012-present	Referee of journal CANADIAN JOURNAL OF REMOTE SENSING
2012-present	Referee of journal International Journal of Remote Sensing
2011-present	Member, American Geophysical Union (AGU). Referee of journal RADIO SCIENCE
2010-present	Referee of journal REMOTE SENSING OF ENVIRONMENT (Elsevier)
2009–present	Referee of journal RADAR, SONAR AND NAVIGATION (IET)
2008–present	Member, Institute of Electrical and Electronics Engineers (IEEE) Referee of journals IEEE TRANSACTIONS ON GEOSCIENCE AND REMOTE SENSING, IEEE GEOSCIENCE AND REMOTE SENSING LETTERS, IEEE JOURNAL OF SELECTED TOPICS IN APPLIED EARTH OBSERVATIONS AND REMOTE SENSING

Publications

In review

- M. Lavalle, C. Telli, N. Pierdicca, U. Khati, O. Cartus, and J. Kellndorfer, "Model-based retrieval of land parameters from Sentinel-1 coherence and backscatter time-series," *Geoscience and Remote Sensing Letters, IEEE*, Sept. 2022 (in review).
- E. Loria, M. Russo, Y. Wang, G. Giangregorio, C. Galdi, M. Di Bisceglie, B. Wilson-Downs, M. Lavalle, A. O'Brien, Y. Jade Morton, and C. Zuffada, "Comparison of gnss-r coherent reflection detection algorithms using simulated and measured CYGNSS data," *IEEE Transactions on Geoscience and Remote Sensing*, Oct. 2022 (in review).
- S. Ghosh, A. Bhattacharya, U. G. Khati, and M. Lavalle, "Gaussian processes retrieval of forest above ground biomass from L-band full polarimetric simulated NISAR data," *International Journal of Applied Earth Observation and Geoinformation*, Oct. 2022 (in review).
- E. Loria, S. Prager, I. Seker, R. Ahmed, B. Hawkins, and M. Lavalle, "Modeling the effects of oscillator phase noise and synchronization on multistatic sar tomography," *IEEE Transactions on Geoscience and Remote Sensing*, 2022 (in review).

Peer-reviewed journal papers

J. Kellndorfer, O. Cartus, M. Lavalle, C. Magnard, P. Milillo, S. Oveisgharan, B. Osmanoglu, P. A. Rosen, and U. Wegmüller, "Global seasonal Sentinel-1 interferometric coherence and backscatter data set," *Nature Scientific Data*, vol. 9, no. 73, 2022.

- B. D. Chapman, I. M. Russo, C. Galdi, M. Morris, M. di Bisceglie, C. Zuffada, B. Downs, M. Lavalle, E. Loria, and A. J. O'Brien, "Comparison of sar and cygnss surface water extent metrics," *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, vol. 15, pp. 3235–3245, 2022.
- G. H. X. Shiroma, M. Lavalle, and S. M. Buckley, "An area-based projection algorithm for SAR radiometric terrain correction and geocoding," *IEEE Transactions on Geoscience and Remote Sensing*, vol. 60, pp. 1–23, 2022.
- T. Fatoyinbo, J. Armston, M. Simard, S. Saatchi, M. Denbina, M. Lavalle, M. Hofton, H. Tang, S. Marselis, N. Pinto, S. Hancock, B. Hawkins, L. Duncanson, B. Blair, C. Hansen, Y. Lou, R. Dubayah, S. Hensley, C. Silva, J. R. Poulsen, N. Labrière, N. Barbier, K. Jeffery, D. Kenfack, M. Herve, P. Bissiengou, A. Alonso, G. Moussavou, L. T. White, S. Lewis, and K. Hibbard, "The NASA AfriSAR campaign: Airborne SAR and lidar measurements of tropical forest structure and biomass in support of current and future space missions," *Remote Sensing of Environment*, vol. 264, p. 112533, 2021.
- U. Khati, M. Lavalle, and G. Singh, "Time-series L-band SAR and GEDI for forest above-ground biomass mapping of sub-tropical forest," *Frontiers in Earth Science*, vol. 9, p. 948, Oct. 2021.
- I. Seker and M. Lavalle, "Tomographic Performance of Multi-Static Radar Formations: Theory and Simulations," *Remote Sensing*, vol. 13, no. 4, p. 737, Feb 2021.
- M. Pourshamsi, J. Xia, N. Yokoya, M. Garcia, M. Lavalle, E. Pottier, and H. Balzter, "Tropical forest canopy height estimation from combined polarimetric sar and lidar using machine-learning," *ISPRS Journal of Photogrammetry and Remote Sensing*, vol. 172, pp. 79–94, 2021.
- G. H. X. Shiroma and M. Lavalle, "Digital Terrain, Surface, and Canopy Height Models From InSAR Backscatter-Height Histograms," *IEEE Transactions on Geoscience and Remote Sensing*, vol. 58, no. 6, pp. 3754–3777, 2020.
- U. Khati, M. Lavalle, G. H. Shiroma, V. Meyer, and B. Chapman, "Assessment of forest biomass estimation from dry and wet SAR acquisitions collected during the 2019 UAVSAR AM-PM campaign in Southeastern United States," *Remote Sensing, Forest Biomass and Carbon Observation with Remote Sensing Special Issue*, pp. 1–17, 2020.
- A. W. Jacob, F. Vicente-Guijalba, C. Lopez-Martinez, J. M. Lopez-Sanchez, M. Litzinger, H. Kristen, A. Mestre-Quereda, D. Ziółkowski, M. Lavalle, C. Notarnicola, G. Suresh, O. Antropov, S. Ge, J. Praks, Y. Ban, E. Pottier, J. J. Mallorquí Franquet, J. Duro, and M. E. Engdahl, "Sentinel-1 InSAR coherence for land cover mapping: A comparison of multiple feature-based classifiers," *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, vol. 13, pp. 535–552, 2020.
- I. El Moussawi, D. Ho Tong Minh, N. Baghdadi, C. Abdallah, J. Jomaah, O. Strauss, M. Lavalle, and Y.-N. Ngo, "Monitoring Tropical Forest Structure Using SAR Tomography at L- and P-Band," *Remote Sensing*, vol. 11, no. 16, 2019.
- C. Albinet, A. S. Whitehurst, L. A. Jewell, K. Bugbee, H. Laur, K. J. Murphy, B. Frommknecht, K. Scipal, G. Costa, B. Jai, R. Ramachandran, M. Lavalle, and L. Duncanson, "A Joint ESA-NASA Multimission Algorithm and Analysis Platform (MAAP) for BIOMASS, NISAR, and GEDI," *Surveys in Geophysics*, Jun 2019.
- U. Khati, M. Lavalle, and G. Singh, "Spaceborne tomography of multi-species Indian tropical forests," *Remote Sensing of Environment*, vol. 229, pp. 193 212, 2019.
- I. El Moussawi, D. Ho Tong Minh, N. Baghdadi, C. Abdallah, J. Jomaah, O. Strauss, and M. Lavalle, "L-Band UAVSAR tomographic imaging in dense forests: Gabon forests," *Remote Sensing*, vol. 11, no. 5, 2019.

- B. Riel, M. Denbina, and M. Lavalle, "Uncertainties in forest canopy height estimation from polarimetric interferometric SAR data," *IEEE Journal of Selected Topics in Applied Earth Observations* and Remote Sensing, vol. 11, no. 10, pp. 3478–3491, Oct 2018.
- M. Pourshamsi, M. Garcia, M. Lavalle, and H. Balzter, "A machine-learning approach to polinsar and lidar data fusion for improved tropical forest canopy height estimation using nasa afrisar campaign data," *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, vol. 11, no. 10, pp. 3453–3463, Oct 2018.
- J. Jung, S. Yun, D. Kim, and M. Lavalle, "Damage-mapping algorithm based on coherence model using multitemporal polarimetric–interferometric SAR data," *IEEE Transactions on Geoscience and Remote Sensing*, vol. 56, no. 3, pp. 1520–1532, March 2018.
- J. Jung, D.-J. Kim, M. Lavalle, and S.-H. Yun, "Coherent change detection using InSAR temporal decorrelation model: A case study for volcanic ash detection," *Geoscience and Remote Sensing, IEEE Transactions on*, vol. 54, no. 10, pp. 5765–5775, Oct. 2016.
- M. Lavalle and S. Hensley, "Extraction of structural and dynamic properties of forests from polarimetric-interferometric SAR data affected by temporal decorrelation," *Geoscience and Remote Sensing, IEEE Transactions on*, vol. 53, no. 9, pp. 4752–4767, Sept 2015.
- M. Lavalle and K. Khun, "Three-baseline InSAR estimation of forest height," *Geoscience and Remote Sensing Letters, IEEE*, vol. 11, no. 10, pp. 1737–1741, Oct. 2014.
- M. Lavalle, M. Simard, and S. Hensley, "A temporal decorrelation model for polarimetric radar interferometers," *Geoscience and Remote Sensing, IEEE Transactions on*, vol. 50, no. 7, pp. 2880–2888, July 2012.
- M. Simard, S. Hensley, M. Lavalle, R. Dubayah, N. Pinto, and M. Hofton, "An empirical assessment of temporal decorrelation using the Uninhabited Aerial Vehicle Synthetic Aperture Radar over forested landscapes," *Remote Sensing*, vol. 4, no. 4, pp. 975–986, April 2012.
- M. Lavalle, D. Solimini, E. Pottier, and Y.-L. Desnos, "Compact polarimetric SAR interferometry," *Radar, Sonar Navigation, IET*, vol. 4, no. 3, pp. 449–456, June 2010.

Books

M. Lavalle, *Vegetation Remote Sensing by Polarimetric Space Interferometers*. LAMBERT Academic Publishing (Ph.D. Dissertation), 2012, ISBN: 978-3-659-23369-2.

Community and technical reports

- A. Donnellan, D. Harding, P. Lundgren, K. Wessels, A. Gardner, M. Simard, C. Parrish, C. Jones, Y. Lou, J. Stoker, J. Ranson, B. Osmanoglu, M. Lavalle, S. Luthcke, S. Saatchi, and R. Treuhaft, "Observing Earth's Changing Surface Topography and Vegetation Structure: A Framework for the Decade," NASA Surface Topography and Vegetation Incubation Study, Mar. 2021.
- S. Buckley, P. Agram, and M. Lavalle, "Algorithm Theoretical Basis Document: NISAR Mission Level-2 Products," Jet Propulsion Laboratory, California Institute of Technology, Dec. 2016.
- M. Lavalle, R. N. Treuhaft, S. Hensley, A. Moreira, K. Papathanassiou, D. Schimel, R. Pavlick, M. Shimada, M. Keller, and H. Balzter, "3D Vegetation Structure and Dynamics," The National Academies of Sciences, Engineering, and Medicine – Decadal Survey for Earth Science and Applications from Space, Mar. 2016.
- M. Lavalle, "Polarimetric calibration of ALOS-PALSAR," European Space Agency, Frascati (Italy), Aug. 2007.

Invited talks

- M. Lavalle, P. A. Rosen, M. W. Davidson, and G. Bawden, "Co-flier Concepts for NISAR and ROSE-L," in *ESA Living Planet Symposium 2022*, June 2022.
- M. Lavalle and al., "The Joint NASA-ESA Multi-Mission Algorithm and Analysis Platform (MAAP)," in *ESA Phi Week 2020*, September 2020.
- M. Lavalle, G. Shiroma, B. Riel, B. Hawkins, and S. Hensley, "NASA TomoSAR and lidar experiments over boreal forests: Extraction of ecosystem parameters from multi-frequency radar tomograms," in *Living Planet Symposium 2019, European Space Agency*, May 2019.
- M. Lavalle and G. Shiroma, "Three-dimensional polarimetric covariance matrix via InSAR histograms: A case study with L-band and P-band NASA ABoVE data," in 2019 IEEE International Geoscience and Remote Sensing Symposium (IGARSS), July 2019.
- M. Lavalle, "Forest height from PolInSAR and TomoSAR at L-band: Sensitivity to different biomes and environmental factors and potential synergies with lidar data," Workshop on Space-based Measurement of Forest Properties for Carbon Cycle Research, International Space Science Institute, Bern, Switzerland, Nov. 2017.
- M. Lavalle, "A new suite of ecosystem products with the NASA/JPL UAVSAR instrument: The 2016 AfriSAR experiments in Gabon," in 2017 IEEE International Geoscience and Remote Sensing Symposium (IGARSS), July 2017.
- M. Lavalle, "Applications of SAR polarimetry and PolInSAR in Earth Science," Korean Aerospace Research Institute (KARI), Daejeon, Korea, Feb. 2016.
- M. Lavalle, "Monitoring forests and forest changes with SAR polarimetry and polarimetric SAR interferometry," Seoul National University, Seoul, Korea, Feb. 2015.
- M. Lavalle, "The RMoG PolInSAR model to retrieve forest height," BIOMASS Mission Advisory Group science meeting, ESA European Space Research and Technology Centre, Jun. 2014.
- M. Lavalle, "Introduction to polarimetric decompositions and polarimetric interferometry," in *Naval Postgraduate School, Monterey, CA*, March 2013.
- M. Lavalle, "Introduction to SAR polarimetric target decompositions and SAR polarimetric interferometry," Seoul National University, Seoul, Korea, Sept. 2013.
- M. Lavalle, "Tackling temporal decorrelation in repeat-pass polarimetric interferometry," in Advanced Course on Radar Polarimetry, European Space Agency, Frascaty, Italy, Jan. 2013.
- M. Lavalle, "PolSAR and PolInSAR activities at JPL," in Advanced Course on Radar Polarimetry, European Space Agency, Frascati, Italy, Jan. 2011.
- M. Lavalle, "Fun with polarimetric SAR interferometry," Niigata University, Graduate School of Science and Technology, Niigata, Japan, Nov. 2010.

Invited talks with conference proceedings

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