PERSONAL INFORMATION

Maria Carmela Raguso

[redacted]

JOB APPLIED FOR
POSITION
PREFERRED JOB
STUDIES APPLIED FOR
PERSONAL STATEMENT

Research Scientist (Radar Remote Sensing/ Planetary Geophysics)

WORK EXPERIENCE

March 2020 - Present

Research Associate in Planetary Science

California Institute of Technology (Caltech), Pasadena CA, USA

- Comparative analysis of multi-angle and multi-frequency (X-, L-, and S-band) SAR data to constrain surface roughness and dielectric properties of volcanic and tectonic features.
- Extraction and segmentation of planar surfaces from LiDAR data to investigate the structural characteristics of Venus tesserae.
- Unlocking the Climate Record Preserved in Mars' Polar Layered Deposits Through the Use of High-Resolution Sounder Data Products.
- Advanced 3D-PSTD Simulations of Radar Sounders Signal from Phobos, Enceladus and Jovian Moons.

Business or sector Space Science Research

April 2020 - Present

NASA Postdoctoral Scientist

Jet Propulsion Laboratory (JPL), Pasadena CA, USA

- Monostatic/Multi-static GPR Signal Processing, modelling and software testing for the Cooperative Autonomous Distributed Robotic Explorer (CADRE) Mission.
- Exploring implication for change detection between S-band X-band SAR images in preparation for NASA's VERITAS Mission.
- Monitoring of CO_2 Seasonal Variations at the Martian Polar Ice Cups Using SHARAD Data.
- Radar Subsurface Investigation of the Jezero Crater: Clutter Analysis using Sounder Repeated Passes (SRP).

Business or sector Space Science Research

Sept 2018 – March 2020

Geophysics and Planetary Science (GPS) Post-Doctoral Fellow

California Institute of Technology (Caltech), Pasadena CA, USA

- Radar Data Inversion Techniques applied to Cassini SAR to characterize the dielectric properties and geomorphology of Titan's surface via multi-angular backscattering analysis.
- Validation of Pseudo-Spectral Time-Domain (PSTD) Clutter Simulator for Planetary Sounder Radar: SHARAD and MARSIS cases.
- Resolution Enhancement of Cassini SAR Data.

Business or sector Space Science Research

Jan 2015 – Sept 2017

Visiting PhD Student

Cornell University, Ithaca, NY, USA

- Ground Processing of Cassini SAR Imagery of Titan.
- Super-Resolution algorithms applied to Planetary Sounders (SHARAD/MARSIS).

Business or sector Space Science Research

EDUCATION AND TRAINING

Oct. 2014 – Sept.2018

PhD in RADAR and REMOTE SENSING ()

Sapienza University of Rome

- Sounder Data Processing and Techniques for Geophysical Parameters Estimation.

Dec. 2018 – Sept.2014

Master's degree in Communication Engineering (110/110 cum laude)

Sapienza University of Rome

- Multi-Orbit Coherent Processing Applied to SHARAD Data

PERSONAL SKILLS

Mother tongue(s): Italian

Other language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C2	C2	C2
	Replace with name of language certificate. Enter level if known.				
Spanish	A2	A2	A2	A1	A1
	Replace with name of language certificate. Enter level if known.				

Organisational / managerial skills

- leading organizer of scientific seminar sessions (Caltech) and working groups (VERITAS Mission)

Job-related skills

- Geophysical Data Processing (RADAR, LIDAR)
- Experience obtaining grant funding (NASA NPP, NSF) and in writing proposals (NASA ROSES)
- Planetary Mission Design (from concept development to implementation and planning)
- Data Science, including statistical analysis, deep learning, and scientific computing (MATLAB, Python, IDL)

ADDITIONAL INFORMATION

PUBLICATIONS

[1] M.C. Raguso, M. Mastrogiuseppe, D.C. Nunes, N.E. Putzig, R. Seu, Multi-Orbit Sounder Coherent Data Processing for Clutter Suppression Applied to SHARAD Sounder data, in *IEEE Transactions on Geoscience and Remote Sensing*, *in preparation* (2025).
[2] Cascioli et al., High-resolution surface characterization catalogue of Icelandic Venus analog terrains in *Icarus*, *in preparation* (2025)
[3] Whitten J., Hensley, S., Raguso, M., Campbell, B., Jaeger, M., Mastrogiuseppe, M., Nunes, D., Prats, P., Smrekar, S., Stock, J., and Zebker, H. Iceland Radar Backscatter and Topography Measurements of the VERITAS 2023 Iceland Campaign Data with Implications for the VERITAS Mission, *in preparation* (2025)
[4] Raguso, M. C., Nunes, D. C., Shoemaker, E. S., Russell, P., Paige, D. A., & Hamran, S. E. (2024). Analysis of orbital sounding in context with in-situ ground penetrating Radar at Jezero Crater, Mars. Geophysical Research Letters, 51(19), e2024GL109027.
[5] Raguso, M. C., Mastrogiuseppe, M., Gambacorta, L., Di Achille, G., & Seu, R. (2024). Range resolution enhancement of SHAllow RADar (SHARAD) data via bandwidth extrapolation technique: Enabling new features detection and improving geophysical investigation. Icarus, 419, 115803
[6] Gambacorta, L., Raguso, M. C., Mastrogiuseppe, M., & Seu, R. (2022). UWB processing applied to multifrequency radar sounders: The case of MARSIS and comparison with SHARAD. *IEEE Transactions on Geoscience and Remote Sensing*, *60*, 1-14
[7] Lei, Y., Raguso, M. C., Mastrogiuseppe, M., Elachi, C., & Haynes, M. S. (2022). Validation of a pseudospectral time-domain (PSTD) planetary radar sounding simulator with SHARAD radar sounding data. IEEE Transactions on Geoscience and Remote Sensing, 60, 1-15
[8] Poggiali, V., Mastrogiuseppe, M., Hayes, A. G., Seu, R., Mullen, J. P., Birch, S. P. D., & Raguso, M. C. (2019). High-resolution topography of Titan adapting the delay/Doppler algorithm to the Cassini RADAR altimeter data. *IEEE Transactions on Geoscience and Remote Sensing*, *57*(9), 7262-7268
[9] Piazzo, L., Raguso, M. C., Seu, R., Mastrogiuseppe, M., (2019). Signal Enhancement for planetary sounders. *Electronics Letters, 55(3), 153-155.*

Conferences

IGARSS 2025 — S. Hensley, J. Whitten, M. Raguso, B. Campbell, M. Jaeger, M. Mastrogiuseppe, D. Nunes, P. Prats, S. Smrekar, and H. Zebker. Iceland Radar Backscatter and Topography Measurements of the VERITAS 2023 Iceland Campaign Data with Implications for the VERITAS Mission.

EGU 2025 — Raguso, M.C., Mastrogiuseppe, M., Lombardo, P., & Pastina, D. (2025). *Enhancing SHARAD Subsurface Imaging on Mars through a combination of Very-Large Roll (VLR) Maneuvers and Super-Resolution Techniques* (No. EGU25-20114). Copernicus Meetings.

LPSC 2025 — Raguso, M.C., Whitten, J. L., Hensley, S., Buczkowski, D., Cascioli, G., Hamilton, C., Herrick, R.R., Head, J.W., Jozwiak, L., Mastrogiuseppe, M., Nunes, D.C., Prats, P., Smrekar, S.E., Stock, J. and Zebker, H. (2025) Askja Volcanic Complex explored with 2023 VERITAS Iceland Campaign FSAR Data. Lunar Planet. Sci. LVI, Lunar Planet. Inst., Houston (abstr. #2037).

LPSC 2025 — S.A. Mendoza, M.C. Raguso, S. Hensley, S.E. Smrekar (2025) Compression Methods of Synthetic Aperture Radar (SAR) Data: Decimation and Averaging to Enhance Visibility of Geologic Features. Lunar Planet. Sci. LVI, Lunar Planet. Inst., Houston (abstr. #1770).

AGU 2024 — Raguso, M. C., Mastrogiuseppe, M., Murra, A., Campbell, B. A., Hensley, S., Nunes, D. C., ... & Smrekar, S. Enhancing Venus Mission Readiness: Insights into the lava flow from the 2023 VERITAS Iceland Field Campaign SAR dataset.

Seminars

Sept 2024 — GPS Seminars Series (Caltech)
TOPIC: Comparative analysis of multi-angle and multi-frequency (X-, L-, and S-band) SAR data to constrain surface roughness and dielectric properties of volcanic and tectonic features.

Jan 2023 — Postdoc Seminars Series (JPL)
TOPIC: CO_2 Seasonal Monitoring at the Martian South Pole and Subsurface Investigation over Jezero crater using Advanced Radar Processing Techniques with SHARAD Sounder Data.

Dec 2022 — Postdoc Seminars Series (JPL)
TOPIC: Radar Investigation of the Jezero Crater: Clutter Analysis using Sounder Repeated Passes (SRP).

Mar 2016 — Planetary Talk at Department of Astronomy (Cornell)
TOPIC: SHARAD Multi-Orbit Coherent Processing and Super Resolution Processing Applied to SHARAD Data.

Honours and awards

2021 — NASA ROSES-21 Mars Data Analysis Program (MDAP), 2021.
2020-2022— NASA Postdoctoral Fellowship, NASA/Jet Propulsion Laboratory (JPL)
2021 — NASA Group Achievement Award – Venus Emissivity, Radio Science, InSAR, Topography, and Spectroscopy (VERITAS). NASA Selected Mission.
2019 – NASA Group Achievement Award – Cassini Radar
2015-2016 — Visiting Research Scholar Support, Sapienza University of Rome
07/2015 — Sapienza support Grant for attending the International Summer School of Radar/SAR
2015-2017 — Doctor of Philosophy Scholarship, Sapienza University of Rome

Memberships

Venus Exploration Early Career working group (VEXAG), 2021 – Present
Mars Exploration Early Career working group (MEPAG), 2020 – Present
American Association for The Advancement of Science (AAAS), 2022 – Present
American Postdoctoral Association (NPA), 2019 – Present
European Geophysical Union (EGU), 2018 – Present
American Geophysical Union (AGU), 2017 – Present

Space Mission Participation

2017 - current	VERITAS (Selected)[NASA/ASI/DLR/CNES] – VERITAS/VISAR Science Team
2014 - current	MRO (Selected)[NASA/ASI] – SHARAD Science Team; Postdoc Collaborator
2014 - current	MEX (Selected)[NASA/ESA] – MARSIS Science Team; PhD Collaborator
2020 – 2023	Mars2020 (Selected)[NASA/ESA] – Perseverance/RIMFAX Science Team Affiliate
2015-2018	Cassini (Selected)[NASA/ESA/ASI] – RADAR Team; Graduate Student Collaborator

Training

Nov. 2023 Semi-supervised Machine Learning: Regression and Classification. Caltech
Jun. 2017 International Planetary Probe Workshop. ESA, ESOC
Sept. 2015 6th Land Remote Sensing Training Course. ESA, Romania
Jul. 2015 International Summer School of Radar/SAR. Fraunhofer Institute, Germany
Jan. 2015 3rd Advanced Course on Radar Polarimetry. ESA ESRIN, Italy