



Martina Lodigiani

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Date of birth: 10/08/1995 **Nationality**: Italian

ABOUT ME

I'm an electronic engineer with a strong background in environmental sensing applications. Over the past years, particularly during my PhD and post-doctoral research, I developed hybrid skills in the fields of engineering and snow science/glaciology. Through specialized courses, like the Snow Observer program by AINEVA, and extensive fieldwork, I've not only acquired technical knowledge but also developed personal skills necessary for operating in challenging mountainous environments, including high altitudes and varied terrains, either with or without snow. I'm now seeking opportunities to apply my skills in developing innovative monitoring solutions for environmental, and especially cryosphere, applications.

WORK EXPERIENCE

[15/04/2024 – Current]

Ground Station System Engineer

Leaf Space

City: Lomazzo | **Country**: Italy

Study and development of ground station systems for satellite communications, including on-site installation, maintenance and troubleshooting.

[01/10/2023 – 14/04/2024]

Post-doc researcher

University of Pavia

City: Pavia | **Country**: Italy

Development and enhancement of radar systems for cryosphere monitoring, including field tests of the system and post-processing analysis of radar traces.

[01/10/2020 – 01/10/2023]

PhD student in Electronic, Computer Science and Electric Engineering

University of Pavia

City: Pavia | **Country**: Italy

Development and enhancement of radar systems for cryosphere monitoring. Field tests of the system. Post-processing analysis of radar traces. Development of an EM and analytical model for surface roughness estimation for remote sensing applications.

[10/2022 – 02/2023]

Guest Researcher

University of Oslo

City: Oslo | **Country**: Norway

Study of feasibility of a SoC UWB radar module for dry snowpack investigation.

[02/2020 – 07/2020]

Trainee

Finnish Meteorological Institute

City: Helsinki and Sodankylä | **Country**: Finland

Study of above-the-ground radar systems and analysis of the radar traces.

[31/12/2018 – 28/02/2020]

Sales assistant

Leroy Merlin

City: Pavia | **Country:** Italy

[25/04/2018 – 30/12/2018]

Shop cashier

Leroy Merlin

City: Pavia | **Country:** Italy

EDUCATION AND TRAINING

[01/10/2020 – 01/10/2023]

PhD in Electronic, Computer Science and Electric Engineering

University of Pavia

City: Pavia | **Country:** Italy | | **Final grade:** Excelent | **Thesis:** Microwave Radar Systems for Cryosphere Monitoring

[2017 – 2020]

Master Degree in Electronic Engineering - Space Communication and Sensing

University of Pavia

City: Pavia | **Country:** Italy | | **Final grade:** 110L/110 | **Thesis:** Study on data processing for snowpack monitoring using above-the-ground radars

[2013 – 2018]

Bachelor Degree in Electronic and Computer Science Engineering

University of Pavia

City: Pavia | **Country:** Italy | | **Final grade:** 95/110 | **Thesis:** Ground station SNOWBEAR in polar environment (Svalbard): analysis of the satellite link in K band

SKILLS

Digital Skills

Microsoft Office (Outlook, Excel, Word, PowerPoint) | MATLAB&Simulink | ANSYS (HFSS) | C, C++ Language | Python | Linux | Atlassian stack (Jira, Confluence, ...) | LaTeX | Arduino | RaspberryPi

Technical Skills

Synthetic Aperture Radar | RADAR Gound Penetration | Remote Sensing | Earth Observation | Geographical Informational Systems (GIS)

Professional Experiences

Snow Science | Glaciology | Meteorology | Self and Organized Avalanche Rescue

LANGUAGE SKILLS

Mother tongue(s): Italian

Other language(s):

English

LISTENING C1 READING C1 WRITING C1

SPOKEN PRODUCTION B2 SPOKEN INTERACTION B2

French

LISTENING B2 READING B2 WRITING B2

SPOKEN PRODUCTION B2 SPOKEN INTERACTION B2

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

PUBLICATIONS

- [2024] **Mixed Analytical-Numerical Modelling of Radar Backscattering for Seasonal Snowpacks**
M. Lodigiani, C. Marin and M. Pasian, "Mixed Analytical-Numerical Modelling of Radar Backscattering for Seasonal Snowpacks", IEEE Journal of Selected Topic in Applied Earth Observations and Remote Sensing, submitted
- [2024] **Monitoring wet snow with a multiband dual-receiver radar system**
M. Lodigiani, L. Silvestri, P. F. Espìn-López, and M. Pasian, "Monitoring wet snow with a multiband dual-receiver radar system", IEEE Transaction on Geoscience and Remote Sensing, submitted
- [2024] **Seasonal Snow Melting Process Investigation in Polar Environment Using a Dual-Receiver Radar Architecture**
M. Lodigiani, L. Silvestri, P. F. Espìn-López, and M. Pasian, "Seasonal Snow Melting Process Investigation in Polar Environment Using a Dual-Receiver Radar Architecture", 2024 18th European Conference on Antennas and Propagation (EuCAP), Glasgow, UK, 2024, in print
- [2023] **Multi-frequency SAR images for investigations of the cryosphere: preliminary results of CRIOSAR project**
S. Pettinato, E. Santi, S. Paloscia, F. Baroni, S. Pilia, L. Santurri, F. Bovenga, A. Belmonte, A. Refice, I. Argentiero, R. Colombo, G. Bramati, B. Di Mauro, C. Marin, G. Cuzzo, L. De Gregorio, M. Callegari, M. S. Heredia, C. Notarnicola, M. Pasian, M. Lodigiani, L. Silvestri, E. Cremonese, "Multi-frequency SAR images for investigations of the cryosphere: preliminary results of CRIOSAR project", International Geoscience and Remote Sensing Symposium (IGARSS 2023), Pasadena, California, 2023, pp. 1585-1588
- [2023] **Monitoring Wet Snow with a Dual-Receiver Radar Architecture: Preliminary Experimental Results**
M. Lodigiani, L. Silvestri, R. Barella, C. Marin and M. Pasian, "Monitoring Wet Snow with a Dual-Receiver Radar Architecture: Preliminary Experimental Results," 2023 17th European Conference on Antennas and Propagation (EuCAP), Florence, Italy, 2023, pp. 1-4
- [2022] **Monitoring of snow water equivalent and snowmelt through space-borne synthetic aperture radar techniques**
S. Pettinato, M. Pasian, F. Bovenga, R. Colombo, M. Di Biagio, E. Santi, S. Paloscia, L. De Gregorio, C. Notarnicola, G. Cuzzo, C. Marin, F. Baroni, R. Barella, M. Callegari, M. Lodigiani, G. Bramati, E. Cremonese, A. Belmonte, A. Refice, "Monitoring of snow water equivalent and snowmelt through space-borne synthetic aperture radar techniques", 2022 52nd European Microwave Conference (EuMC), Milan, Italy, 2022, pp. 91-94

[2022] **Multi-Spectral Analysis of Dry Alpine Seasonal Snowpack**

M. Lodigiani, L. Silvestri, R. Barella, C. Marin, B. Di Mauro, R. Colombo, C. Notarnicola and M. Pasian, "Multi-Spectral Analysis of Dry Alpine Seasonal Snowpack," 2022 52nd European Microwave Conference (EuMC), Milan, Italy, 2022, pp. 76-79

[2022] **Snowpack and glacier monitoring using a multiband dual-receiver radar architecture**

M. Lodigiani and M. Pasian, "Snowpack and glacier monitoring using a multiband dual-receiver radar architecture," XXIV Riunione Nazionale di Elettromagnetismo (XXII RiNEm), Catania, Italy, September 18-21, 2022

[2022] **Multiband radar system for snowpack and glacier monitoring in Alpine area**

M. Lodigiani, P. F. Espin-López, L. Silvestri, and M. Pasian, "Multiband radar system for snowpack and glacier monitoring in Alpine area," Cryosphere 2022, Reykjavik, Iceland, August 21-26, 2022

[2022] **Glacier Monitoring with Dual-Receiver Radar Architecture: Preliminary Experimental Results**

M. Lodigiani, L. Silvestri, M. Pasian, "Glacier Monitoring with Dual-Receiver Radar Architecture: Preliminary Experimental Results", IGARSS 2022 - 2022 IEEE International Geoscience and Remote Sensing Symposium, Kuala Lumpur, Malaysia, 2022, pp. 3794-379

[2022] **A Novel PIFA Antennas Design With Capacitive Load for Glacier Monitoring Applications**

M. Lodigiani, N. Delmonte and M. Pasian, "A Novel PIFA Antennas Design With Capacitive Load for Glacier Monitoring Applications," 2022 16th European Conference on Antennas and Propagation (EuCAP), 2022, pp. 1-3

[2022] **Temporal SAR signature of the high-altitude Alpine snowmelt**

C. Marin, M. Lodigiani, C. Notarnicola, and M. Pasian, "Temporal SAR signature of the high-altitude Alpine snowmelt," 3rd International Conference on Snow Hydrology (SnowHydro 2022), Grenoble, France, February 1-4, 2022

[2022] **Proof-of-Concept for a Ground-Based Dual-Receiver Radar Architecture to Estimate Snowpack Parameters for Wet Snow**

P. F. Espin-López, M. Lodigiani, M. Barbolini, F. Dell'Acqua, L. Silvestri, and M. Pasian, "Proof-of-Concept for a Ground-Based Dual-Receiver Radar Architecture to Estimate Snowpack Parameters for Wet Snow," IEEE Transactions on Geoscience and Remote Sensing, vol. 60, Art no. 4301909, pp. 1-9, 2022

[2021] **Numerical Investigation on the Effect of the Snowpack Surface Roughness on the Radar Echo**

M. Pasian, M. Lodigiani, C. Marin, V. Premier and C. Notarnicola, "Numerical Investigation on the Effect of the Snowpack Surface Roughness on the Radar Echo," 2021 IEEE International Geoscience and Remote Sensing Symposium IGARSS, 2021, pp. 848-851

CONFERENCES AND SEMINARS

- [17/03/2024 – 22/03/2024] **18th European Conference on Antennas and Propagation (EuCAP 2024)**
Glasgow, Scotland (UK)
Presentation of the paper "Seasonal Snow Melting Process Investigation in Polar Environment Using a Dual-Receiver Radar Architecture"
- [26/03/2023 – 31/03/2023] **17th European Conference on Antennas and Propagation (EuCAP 2023)**
Florence, Italy
Presentation of the paper "Monitoring Wet Snow with a Dual-Receiver Radar Architecture: Preliminary Experimental Results"
- [25/10/2022 – 26/10/2022] **IEEE Nordic Circuits and Systems Conference (NorCAS 2022)** Oslo, Norway
- [25/09/2022 – 30/09/2022] **European Microwave Week (EuMW 2022)** Milan, Italy
Presentation of the work "Multi-Spectral Analysis of Dry Alpine Seasonal Snowpack"
- [18/09/2022 – 21/09/2022] **XXIV Riunione Nazionale di Elettromagnetismo (RiNEm 2022)** Catania, Italy
Presentation of the paper "Snowpack and Glacier Monitoring using a Multi-band Dual-Receiver Radar Architecture"
- [21/08/2022 – 26/08/2022] **Cryosphere 2022** Reykjavik, Iceland
Presentation of the paper "Multiband radar system for snowpack and glacier monitoring in Alpine area"
- [17/07/2022 – 23/07/2022] **International Geoscience and Remote Sensing Symposium (IGARSS 2022)**
Kuala Lumpur, Malaysia
Presentation of the paper "Glacier Monitoring with Dual-Receiver Radar Architecture: Preliminary Experimental Results"
- [27/03/2022 – 01/04/2022] **16th European Conference on Antennas and Propagation (EuCAP 2022)**
Madrid, Spain
Presentation of the paper "A Novel PIFA Antennas Design With Capacitive Load for Glacier Monitoring Applications"
- [12/07/2021 – 16/07/2021] **International Geoscience and Remote Sensing Symposium (IGARSS 2021)**
Brussels, Belgium
Presentation of the paper "Numerical Investigation on the Effect of the Snowpack Surface Roughness on the Radar Echo"

PROJECTS

- [02/04/2024 – 12/2024] **RADARC2 (funded by the INTERACT TA/RA in the framework of the European Union's project Horizon 2020)**
The aim of the field campaign linked to this project was to test the non-commercial radar architecture SNOWAVE, developed at the University of Pavia, with different snow condition (dry, moist, wet..) and mounted on an elevated platform, in order to test its functionality and the effect of the surface roughness on the back-scattered power.

[03/2023 – 04/2023] **RADARC (funded by the INTERACT TA/RA in the framework of the European Union's project Horizon 2020)**

The researches in this project were focused on the analysis of wet snow conditions, as it has been possible to monitor it from the very beginning (dry condition to moist) to the end of the melting season (run-off phase), by means of SNOWAVE, a dual-receiver multi-band radar system.

[07/2021 – 07/2023] **CRIOSAR - Applicazioni SAR multifrequenza alla criosfera (funded by Agenzia Spaziale Italiana - ASI)**

The CRIOSAR project aims to utilize multi-frequency SAR data to study the cryosphere, focusing on natural hazard risks and water resource management. Its primary objective is to develop innovative algorithms for understanding phenomena like permafrost deformation, SAR signal extinction, snow water equivalent estimation, and soil freeze/thaw status.

[03/2020 – 04/2020] **ARCTIC-GBR (funded by the INTERACT TA/RA in the framework of the European Union's project Horizon 2020)**

The objectives of ARCTIC-GBR were to improve the accuracy and reliability of the results of an already existing radar system, SNOWAVE, and to demonstrate its use for monitoring the melting phases of wet snowpacks. The campaign has to be suspended after 5 days due to Covid-19,

[2020 – 2024] **SNOWAVE**

Development and enhancement of a multi-band dual-receiver radar system for snowpack and glacier monitoring.

COURSES AND SCHOOLS

[02/07/2021 – 09/07/2021] **12th International Summer School on Radar/SAR**

Organized by Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR

[22/05/2023 – 27/05/2023] **Satellite Microwave Remote Sensing Course - ESA ESTEC - Noordwijk, The Netherlands**

Organized by the European Space Agency (ESA), in collaboration with the Association of Retired ESA Staff (ARES) - with ESA Education Scholarship

[2023 – 2023] **Course of "Snow Observer" - AINEVA (certified)**

- Basic Alpine Snow Science and Meteorology
- Advanced Alpine Snow Science and Meteorology
- Techniques for Self-Rescue and Organized Avalanche Rescue
- Observation and Survey Methods

OTHER ACTIVITIES

[2021 – 2023] **PhD student representative in the Electronics, Computer Science and Electrical Engineering PhD board and quality board at the University of Pavia at the University of Pavia**

[2021 – 2023] **IEEE Student Branch Pavia Treasurer and Pavia Engineering Student Branch Chair**

[2021 – 2023] **Tutor of “Circuiti Elettrici Lineari” for BS student in Ingegneria Elettronica e Informatica (University of Pavia)**

[25/09/2022 – 30/09/2022] **Student Volunteer at EuMW 2022**

[27/03/2023 – 31/03/2023] **Student Volunteer at EuCAP 2023**