

PERSONAL INFORMATION


Federico Lombardi

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PERSONAL STATEMENT

Experienced Postgraduate in the application of geophysical techniques and especially Ground Penetrating Radar to geophysical problems ranging from civil engineering to geological prospection. Areas of research include:

- Geological and environmental investigation.
- Non-destructive testing of structure and engineering geophysics.
- Forensic and Security applications of GPR and other Geophysical Techniques.
- Application of numerical modelling to GPR.

WORK EXPERIENCE

07/2018–Present

Research Fellow

Department of Civil & Environmental Engineering - Politecnico di Milano, Milan (Italy)

Research grant under EU project AgriGeoH2O.

- Soil texture analysis through electromagnetic methods.
- Hydrogeophysics.
- Characterisation of agricultural terrains for efficient management.
- Features extraction and signal recognition.
- Data processing.

10/2017–Present

Associate Consultant

Associates (formerly Outsmart Insight), London (United Kingdom)

- Technology tracking and forecasting.
- Landscaping and mapping.
- Data selection and critical analysis.
- Reporting, data plotting and charting.

06/2014–06/2018

External consultant

Department of Civil & Environmental Engineering - Politecnico di Milano, Milan (Italy)

- GPR methodology for civil engineering.
- Software design and engineering.
- System development.
- Data acquisition, processing and visualisation.

02/2014–02/2015

System Engineer

Leonardo Company, Milan (Italy)

- Target signature simulation and modelling
- Detection and tracking algorithm development and implementation.

- Image processing and data analysis.

06/2012–02/2014

Research fellow

Department of Civil & Environmental Engineering - Politecnico di Milano, Milan (Italy)

Research grant under project MUS - Map Utility Systems.

- Effects of polarisation for linear targets and elongated objects.
- Influence of geometries on GPR imaging performance.
- Field trials planning and on site surveys.
- Software development.

EDUCATION AND TRAINING

04/2015–Present

Doctor of Philosophy

EQF level 8

Department of Electronic & Electrical Engineering - University College London, London (United Kingdom)

Thesis title: *DETERMINE: Novel Radar Techniques for Humanitarian Demining.*

Supervisor: *Prof. Hugh D. Griffiths.*

Thesis defended.

10/2009–04/2012

Master of Science

EQF level 7

Department of Electronic & Information Technology - Politecnico di Milano, Milan (Italy)

Thesis title: *MultiAzimuth 3D GPR Surveys.*

Supervisor: *Dr. Maurizio Lualdi.*

09/2006–09/2009

Bachelor of Science

EQF level 6

Department of Electronic & Information Technology - Politecnico di Milano, Milan (Italy)

Thesis title: *FMCW Radar Ambiguities Elimination in Multi-target Environment.*

Supervisor: *Dr. Ada V. Bosisio.*

03/2011–03/2011

ATHENS Project

Intensive workshop

Department of Electronic & Information Technology - Telecom ParisTech, Paris (France)

Title: *Sensor Array Signal Processing: Source Localisation and Separation.*

Lecturer: *Prof. Karim Abed-Meraim.*

PERSONAL SKILLS

Mother tongue(s)

Italian

Foreign language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C1	C2	C2

International English Language Testing System (IELTS) 7.5

Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user
Common European Framework of Reference for Languages

Communication skills

- Technical and non-technical communication skills.

- Public engagement and speaking confidence.
- Emotional engagement and the communication effectiveness.

Organisational / managerial skills

- Time management and activities prioritisation.
- Team working and organisational skills.

Digital skills

SELF-ASSESSMENT				
Information processing	Communication	Content creation	Safety	Problem solving
Proficient user	Proficient user	Proficient user	Independent user	Proficient user

Digital skills - Self-assessment grid

Proficiency in programming language:

- Matlab, C, CVI, Mathcad

Proficiency in writing tools:

- Latex, MS Office.

Proficiency in simulation tools:

- CST Studio Suite, Simulink, LabView.

ADDITIONAL INFORMATION

Publications

Journal publications:

- Lo Monte, F., **Lombardi, F.**, Felicetti, R., Lualdi, M., 2017, Ground-Penetrating Radar monitoring of concrete at high temperature. *Construction and Building Materials*, 151.
- **Lombardi, F.**, Griffiths, H., Wright, L., Balleri, A., 2017. Dependence of landmine radar signature on aspect angle. *IET Radar, Sonar & Navigation*, 11(6).
- Lualdi, M., **Lombardi, F.**, 2015. Utilities detection through the sum of orthogonal polarization in 3D georadar surveys. *Near Surface Geophysics*, 13.1.
- Lualdi, M., **Lombardi, F.**, 2014. Significance of GPR polarisation for improving target detection and characterisation. *Nondestructive Testing and Evaluation*. 29(4).
- Lualdi, M., **Lombardi, F.**, 2014 Combining orthogonal polarization for elongated target detection with GPR. *Journal of Geophysics and Engineering*, 11(5).
- Lualdi, M., **Lombardi, F.**, 2013. Effects of antenna orientation on 3-D ground penetrating radar surveys: an archaeological perspective. *Geophysical Journal International*, 196(2).
- Lualdi, M., **Lombardi, F.**, 2013. Orthogonal polarization approach for three dimensional georadar surveys. *NDT & E International*, 60.

Conference publications:

- Picetti, F., Testa, G., **Lombardi, F.**, Bestagini, P., Lualdi, M., Tubaro, S., 2018. Convolutional Autoencoder for Landmine Detection on GPR Scans, International Conference on Telecommunications and Signal Processing, August 2018, Athens, Greece.
- **Lombardi, F.**, Griffiths, H., Balleri, A., 2018. Landmine Internal Structure Detection from Ground Penetrating Radar Images, 2018 IEEE Radar Conference, April 2018, Oklahoma City, OK, United States.
- **Lombardi, F.**, Griffiths, H., Balleri, A., 2017. Bistatic Signature of Buried Landmines, 2017 *IET International Radar Conference*, October 2017, Belfast, United Kingdom.
- Lameri, S., **Lombardi, F.**, Bestagini, P., Lualdi, M., Tubaro, S., 2017. Landmine detection from GPR data using convolutional neural networks, *European Signal Processing Conference (EUSIPCO)*, August 2017, Kos, Greece.
- **Lombardi, F.**, Griffiths, H., Balleri, A., Lualdi, M., 2017. Preliminary Results on Multi Offset GPR for Imaging of Landmines, *International Workshop on Advanced GPR (IWAGPR)*, June 2017, Edinburgh, United Kingdom.

- **Lombardi, F.**, Griffiths, H., 2016. Influence of Internal Structure on Landmine Radar Signature, *European Radar Conference (EuRAD) 2016*, October 2016, London, United Kingdom.
- **Lombardi, F.**, Griffiths, H., Lualdi, M., 2016. The Influence of Spatial Sampling in GPR Surveys for the Detection of Landmines and IEDs, *European Radar Conference (EuRAD) 2016*, October 2016, London, United Kingdom.
- Wright L., Balleri A., Griffiths H., **Lombardi F.**, 2015. Multi-Perspective high range resolution profiles of landmines, *IEEE Radar Conference 2015*, October 2015, Johannesburg, South Africa.
- Felicetti R., Lo Monte F., Lualdi M., **Lombardi F.**, 2015. Concrete damage and spalling monitoring in fire test via ultrasonic pulse-echo and ground penetrating radar, *NDT-CE Symposium 2015*, September 2015, Berlin, Germany.

Submitted publications:

- **Lombardi, F.**, Lualdi, M., 2018. How the performance of GPR surveys is influenced by the dip and strike angle of rock fractures. *Geosciences*. Under revision.
- Lualdi, M., **Lombardi, F.**, 2018, Multipolarisation and multioffset GPR surveys for the assessment of an underground urban tunnel. *Near Surface Geophysics*. Under review.
- **Lombardi, F.**, Griffiths, H.D., Lualdi, M., Balleri, A., 2018. Evidence of internal structure of landmines from Ground Penetrating Radar. *IET - Radar, Sonar & Navigation*. Under revision.
- **Lombardi, F.**, Griffiths, H.D., Lualdi, M., 2018. Sparse Ground Penetrating Radar Acquisition: Implication for Buried Landmine Localisation and Reconstruction. *IEEE - Geoscience and Remote Sensing Letters*. Under revision.
- Picetti, F., **Lombardi, F.**, Bestagini, P., Lualdi, M., Tubaro, S., 2018. Landmine detection using autoencoders on multi-polarization GPR volumetric data. *IEEE - Transactions on Geoscience and Remote Sensing*. Under revision.
- Pagliaroli, A., Pergalani, F., Ciancimino, A., Chiaradonna, A., Compagnoni, M., de Silva, F., Foti, S., Giallini, S., Lanzo, G., Luzi, L., Macerola, L., Nocentini, M., Pizzi, A., Tallini, M., Teramo, C., **Lombardi, F.**, 2018. Site response analyses for seismic microzonation in complex contexts: relevant case histories in Central Italy. *Bulletin of Earthquake Engineering*. Under revision.

Teaching experience

- Politecnico di Milano - Teaching Assistant, "Non destructive testing" - Building and Construction Engineering, Civil and Environmental Engineering module. A.A. 2017/2018.
- University College London - Teaching Assistant, "Radar System" - Electronic and Electrical Engineering module. A.A. 2016/2017.

Memberships

- IEEE – Aerospace & Electronic System Society Board of Governors.
- IEEE – Aerospace & Electronic System Society Graduate Student Representative.
- IEEE Student.
- IET Student.
- COST Action TU1208 - Civil Engineering Applications of Ground Penetrating Radar.

Other professional activities

- Associate Editor of the AESS Magazine for the Student Highlights section.
- Regular reviewer for: "*Near Surface Geophysics*".
- Regular reviewer for: "*IET – Radar Sonar and Navigation*".
- Regular reviewer for: "*Elsevier – Construction & Building Material*".
- Regular reviewer for: "*IEEE – Geoscience and Remote Sensing Letters*".

Projects

Project **PoliMline**: Humanitarian Demining GPR System. Politecnico di Milano - Polisocial Award 2015-2016 (competition for scientific research with social impact – 3rd edition).

Projects

Project **MUS**: Mappatura Urbana dei Sottoservizi (Map utility System). Politecnico di Milano - 5per1000 funded project 2011 (financing universities and science research).