



PATRIZIA SAVI

Curriculum Vitae (28/04/2025)

Nationality: Italy
Date of Birth: March 6th 1959

Languages: Italian (native speaker)
English (fluent)

Present position: Associate Professor of Electromagnetic Fields at Politecnico di Torino
Head of Microwaves and Remote Sensing Laboratory (MiReS Lab)

Work address: Politecnico di Torino,
Electronics and Telecommunications Department (DET)
Corso Duca degli Abruzzi, 24, 10129, Torino, Italy

Phone number: +39-011-090-4074

Email address: patrizia.savi@polito.it

ORCID: [0000-0001-9585-310X](https://orcid.org/0000-0001-9585-310X)

Scopus Author ID: [7005438782](https://scopus.com/authid/detail.uri?authorid=7005438782)

Google Scholar ID: <https://scholar.google.com/citations?hl=it&user=PjbsYi8AAAAJ>

ResearchGate ID: https://www.researchgate.net/profile/Patrizia_Savi

Education

1974-1978 *Liceo classico*, C. Cavour, Torino, Italy.

1978-1985 *Laurea* (equivalent to Master Degree) in Electronic Engineering from Politecnico di Torino, Italy.

1994 Diploma of piano from *Conservatorio Giuseppe Verdi* of Torino, Italy.

Main research topics (most recent on top)

- Biosensors based on graphene and other carbon based materials
- Shielding properties of composites and cement filled with carbonaceous material
- Global Navigation Satellite System Reflectometry (GNSS-R) for soil moisture retrieval
- Time domain reflectometry for dielectrics and soil characterization
- Numerical methods: method of moment, finite element method
- Waveguide discontinuities and microwave filters
- Frequency Selective Surfaces (FSS)
- Analysis of dielectric radomes

Detailed Research activities

- **1998 - now:** Associate Professor in the group of Applied Electromagnetics and Photonics (Microwave sensors and materials) of the Electronic and Telecommunications Department, worked on numerical methods (high-order finite element method); mobile communication channel modeling; time-domain reflectometry measurements for dielectric and soil characterization; measurements of aeronautic cable-harness submitted to EM illumination. Current research topics: microwave analysis and applications of composite materials and films based on carbon fiber, carbon nanotubes, graphene and biochar, Global Navigation Satellite System Reflectometry (GNSS-R) for soil moisture retrieval.
- **1988 - 1998:** Researcher at the Centro Studi Propagazione e Antenne (CESPA) of the National Research Council of Italy, worked on the main research topics of the Center: antennas and diffraction, optics for telecommunications, microwave circuits and devices. Obtained relevant results published in international journals on analysis and design of dielectric radomes for prediction and correction of the bore-sight errors in airborne radar systems, analysis and synthesis of Frequency Selective Surfaces. Introduced a new Italian patented filter configuration with coupling dual-mode cavities and a new algorithm for the synthesis of filters with an arbitrary number of mono-modal cavities.
- **1986-1987:** Consultant at Aeritalia Caselle, Torino, worked on: electromagnetic models based on the geometrical theory of diffraction for the analysis of the interaction between the aircraft and the on-board antennas, near-field antenna measurements with spherical near-field techniques, update of computer codes dealing with spherical near-field far-field transformation based on the spherical waves expansion.
- **1986:** Research activity at Electronic Department of Politecnico di Torino for the analysis of guided propagation in periodic structures.

International and national cooperation

- Since 2019 cooperation with Prof. Isabella Natali-Sora and Professor Giuseppe Ruscica, Università di Bergamo, Italy, on carbon-based cementitious composites.
- Since 2018 cooperation with Dr. Yan Jia, Nanjing University of Posts and Telecommunications, Nanjing 210046, China, on GNSS Reflectometry.

- Since 2016 cooperation with Dr. M. Yasir, Division of Microrobotics and Control Engineering, Department of Computing Science, University of Oldenburg, 26129 Oldenburg, Germany on graphene tunable devices.
- Cooperation with Prof. K. Naishadham, Georgia Technology, Atlanta, USA, ‘visiting professor’ at Politecnico di Torino from June 2017 to April 2018 on tunable devices.
- Cooperation with Dr. Ololade Sanusi (vising PhD student, 2017) and Prof. Langis Roy of Department of Electrical, Computer and Software Engineering, Faculty of Engineering and Applied Science, UOIT, Canada, on microstrip antennas.
- Since 2017 Cooperation with Dr. Simone Quaranta, University of Ontario Institute Technology: Faculty of Science, Oshawa, ON, Canada, now at CNRISMN, Istituto per lo Studio dei Materiali Nanostrutturati, Rome, Italy.
- Since 2013 cooperation with the Department of Applied Science and Technology (DISAT) of Politecnico di Torino, Materials and Processes for micro and nano Technology group.

Other activities and recognitions

1989-1999 Member of the Organizing Committee of the International Conference on Electromagnetic in Advanced Applications (ICEAA) held in Torino, Italy from 1989 to 1999, every two years.

2015 Organizer of the technical session on Remote Sensing for UAV surveillance applications for the Research and Technology for Society and Industry (RTSI) Symposium, September 16-18, Torino, Italy, **2015**.

2016 Senior Member of the *Institute of Electrical and Electronics Engineers (IEEE)*, member # 40216633

2016 Member of the Technical Committee of the Conference IEEE, International Symposium on Antennas and Propagation (APSYM 2016), Cochin, India, 15 – 17 December 2016.

2017 Organizer in cooperation with prof. K. Naishadham, Georgia Tech, Atlanta, of the workshop SWS03: Nanotechnology Applications of Antennas and Wireless Sensing, (EuCAP 2019), Paris, France, 19-24 March 2017.

2018 Winner of a project Proof of Concept (PoC) ‘A glucose RF biosensor (RaFrBio), Vertis Venture 3 Technology Transfer VV3TT 2018 POC Program, January 2019-March 2021.

2019 Invited paper to the Convened Session ‘GNSS antennas and antennas system’, 13th European Conference on Antennas and Propagation (EuCAP 2018), Krakov, Poland, 31 March – 5 April, 2019.

2020 Invited paper to IEEE APSYM-2020 International Symposium on Antennas and Propagation organized by the Department of Electronics, Cochin University of Science and Technology (CUSAT), Cochin, India.

2022 obtained the qualification as Full Professor of Electromagnetic Fields (09/F1).

2024 Senior Member of the *International Union of Radio Science*, member # M2410010585.

Reviewer activities

Reviewer of MIUR for projects PRIN and FIRB. Inserted in the list scientific expert REPRISE of MIUR.

Reviewer for IET Electronics Letters, Sensors, Micromachines, Polymers, IEEE Transaction on Electromagnetic Compatibility, IEEE Transaction on Antennas and Propagation, IEEE Transaction on Wireless Communications, IEEE Antennas and Wireless Propagation Letters, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, EURASIP Journal on Wireless Communications and Networking, IEEE Transaction on Instrumentation and Measurements, Electromagnetics Progress in Electromagnetic Research, and many others.

Teaching activities

More than 50 courses at Politecnico di Torino in Italian and in English. Among the others: Electromagnetic Fields, Electromagnetic Compatibility, Radio-frequency Issues in Wireless Systems, Radar and Remote Sensing.

Scientific advisor of several Master thesis students and PhD students: Advisor of 5 PhD students, advisor of more than 60 Master thesis student, co-advisor of 4 Master thesis student.

Project coordinator of Alta Scuola Politecnica (ASP):

- Pol.Gr.O.R.A.T., A new Concept for Cubesat Missions, 2017
- RaFRBio, A RF glucose sensor, 2018.

Research Contracts

- *Caratterizzazione di cementi additivati con biochar*, Agritech, spoke 8, task 8.1.3, ENI S.p.A., Unità VELAB (Laboratori di Venezia), Italy, 2025.
- *Caratterizzazione a Radio-Frequenza del materiale TPS (Thermal Protection System)*, Thales Alenia Space S.p.A, Torino, Italy, 2024.
- *Caratterizzazione delle proprietà dielettriche di cementi additivati con Biochar*, ENI S.p.A., Unità VELAB (Laboratori di Venezia), Italy, 2022.
- *Caratterizzazione a Radio-Frequenza del materiale TPS (Thermal Protection System)*, Thales Alenia Space S.p.A, Torino, Italy, 2022.
- *Development of cementitious composites with shielding properties through the addition of biochar and PVC in the frequency band 5.85-8.2 GHz*, R. ED. El. S.r.l., Campo Calabro (RC), Italy, 2021-2022.
- *RaFrBio, a glucose RF biosensor*, Vertis Venture 3 Technology Transfer VV3TT 2018 POC Program, 2019-2020.
- *Electromagnetic shielding evaluation by waveguide technique and electrical permittivity measurements on carbon-modified cementitious composites and relevant advice for EMI shielding*, Italcementi, Bergamo, Italy, October 2019-October 2020.
- *Complex Permittivity measurements on carbon-modified cementitious mixtures*, Italcementi, Bergamo, Italy, June 2017-June 2018.

- *Characterization of RF electrical properties of carbon-based composites*, Thales Alenia Space, S.p.A, Torino, Italy, 2016.
- *Assessment of electrical performance of structures based on CFRP laminates composites filled with graphene and carbon nanotubes*, Thales Alenia Space, S.p.A, Torino, Italy, 2015.
- *SMAT-F2: Surveillance and monitoring of the territory for civil purposes based on unmanned aircraft system*, Regione Piemonte, (WP3, responsible for the research line D3.1.1 Sensor Configuration), 2013-2015.
- *HIRF High Intensity Radiated Field*, European Project, 2010-2013.
- *Center for Multimedia Radio Communications (CERCOM)*, Politecnico di Torino, responsible for the research line WP1.4: Radio Channel modeling, 2001-2004.
- *Feasibility study for the realization of filters in rectangular waveguide and reciprocal diplexer for millimeter waves*, MIKOM s.r.l. Monza, Italy, 1995.
- *Electromagnetic characterization of frequency selective screens*, CSELT, Torino, Italy, 1991.
- *Four-channel radiometer diplexer design*, Matra Espace S.A., Toulouse, France, 1990.
- *Study of electromagnetic windows*, Electronic S.p.A. , Roma, 1990.
- *Modelling of dielectric radomes*, Aeritalia S.p.A., Caselle, Torino, Italy, 1989.

Scientific Publications

On Scopus 119 entries with 1678 citations and h-index 21, (28/04/2025). For a complete list: <https://iris.polito.it/cris/rp/rp05452?start=0&sortBy=6&order=ASC&type=all#.YAigO-hKjDc>

Most cited papers:

- R. Orta, P. Savi, R. Tascone, D. Trincherro, "Synthesis of multiple-ring resonator filters for optical system," *IEEE Photonics Technology Letters*, vol. 7, pp. 1447-1449, Dec. 1995, Scopus citations: 137.
- R. A. Khushnood, S. Ahmad, P. Savi, J.-M. Tulliani, M. Giorcelli, G.A. Ferro, "Improvement in electromagnetic interference shielding effectiveness of cement composites using carbonaceous nano/micro inerts," *Construction and Building Materials*, vol. 85, pp. 208-216, April 2015, Scopus citations: 115.
- Y. Jia, S. Jin, P. Savi, Y. Gao, J. Tang, Y. Chen, and W. Li, "GNSS-R Soil Moisture Retrieval Based on a XGboost Machine Learning Aided Method: Performance and Validation", *Remote Sensing*, vol. 11, no. 14, pp. 1-25, 2019, Scopus citations: 99
- F. DAVIS, R. Fantini, M. Mondin, P. Savi, "Small scale fading for High Altitude Platform (HAP) propagation channels," *IEEE Journal of Selected Areas in Communication*, vol. 20, no. 3, pp. 641-647, Apr. 2002, Scopus citations: 93.
- A. A. Khan, P. Savi, S. Quaranta, M. Rovere, M. Giorcelli, A. Tagliaferro, C. Rosso, C. Jia, "Low-Cost Carbon Fillers to Improve Mechanical Properties and Conductivity of Epoxy Composites", *Polymers*, vol. 9, n. 12, pp. 642-654, 2017, Scopus citations: 89.

- M. Yasir, P. Savi, S. Bistarelli, A. Cataldo, M. Bozzi, L. Pellegrini, S. Bellucci, "A Planar Antenna with Voltage-Controlled Frequency Tuning Based on Few-Layer Graphene", *IEEE Antennas and Wireless Propagation Letters*, vol. 16, pp. 2380-2383, June 2017, Scopus citations: 80.

PhD students

- Yuekun Pei, cycle 27, *GNSS Reflectometry for land surface monitoring and buried object detection*, (co-tutor). Electronic and Communication Engineering, 16/12/2014.
- Muna Hajj Yahya, cycle 27, *Microwave characterization of multi-walled carbon nanotubes polymer composites*, Electronic and Communication Engineering, 23/12/2014.
- Yan Jia, cycle 29, *Global Navigation Satellite System Reflectometry for land applications*, Electronic and Communication Engineering, 08/02/2017.
- Ahamd Bayat, cycle 30, *RF characterization and applications of carbon based composites*, Electronic and Communication Engineering, 30/04/2018.

Thesis students

Tutor of 66 Mater Thesis; co-tutor of 4 Master Thesis and tutor of 2 Bachelor Thesis.

Corso di laurea Magistrale (Master Thesis)

2023

Implementation of a software tool for automatic generation of harness routing for spacecraft applications, Andrea Di Mauro, Computer Engineering 21/04/2023.

2020

Biochar addition to a lime-hemp insulating plaster, Federica Abi Khaled, Paolo Erriquez, Architettura per il progetto sostenibile, 03/03/2020, co-tutor.

2019

DC/DC converter performance in low temperature environment, Marco Capasso, Electronic engineering, 18/12/2019.

Microwave shielding effectiveness study of composites materials and coating based on graphene, MWCNT and biochar, Damiano Cirelli, Electronic Engineering, 16/04/2019.

2018

Study and of a low-power remote sensor node based on LoRa, Alessandro Berruti, Electronic Engineering, 20/04/2018.

Electrical Power System design for a Lunar Outpost, Andrea D'Amaro, Electronic Engineering, 14/12/2018.

Measuring and modeling techniques for extremely low frequency characterization of electromagnetic field emissions in space applications, Marco Nicoletto, Mechatronic Engineering, 14/12/2018.

2017

Design and realization of RF/Microwave biosensors for Biomolecular detection, Ashkan Arvandi, Electronic engineering, 26/10/2017.

Sistemi di trasmissione a base di nanotubi di carbonio per uso biosensoristico, Edoardo Bronzini, Material engineering, 14/12/2017, co-tutor.

Biochar thick films for microwave applications, Guo Ying, Electronic Engineering, 15/12/2017.

Microwave characterization of polymers with biochar as filler for shielding applications, Li Rui, Electronic Engineering, 15/12/2017.

2016

Experimental investigations on mechanical and electrical properties of carbon nanotubes composites, Puthoor Jose Suneeth, Electronic Engineering, 25/07/2016.

2015

Carbon nanotubes composites for microwave applications, Asis Atif, Electronic Engineering, 23/10/2015.

2014

GNSS-R: circular polarization measurements and data analysis, Maurizio Campanella, Electronic Engineering, 12/12/2014.

Global Navigation Satellite System Reflectometry: Software Optimization for Data Processing, Yuanzhi Ma, Electronic Engineering, 25/07/2014.

Carbon Nanotubes: antennas applications, Bian Wu, Electronic Engineering, 12/12/2014.

Wideband frequency characterization of Multi-walled Carbon Nanotube Composites, Muhammad Yasir, Electronic Engineering, 24/10/2014.

2013

GNSS Remote Sensing, Jiajia Hu, Electronic Engineering, 22/07/2013.

Antennas design for GNSS remote sensing applications, Jiaqi Hu, Electronic Engineering, 21/03/2013.

Patch antennas design and realization for GNSS Reflectometry, Yan Jia, Electronic Engineering, 11/12/2013.

Capacitive sensors for permittivity determination: analysis and measurements, Yan Pang, Electronic Engineering, 22/07/2013.

Permittivity measurements: commercial sensors and applications, Yidan Wu, Electronic Engineering, 21/03/2013.

2012

GNSS for reflectometry applications: antennas design, Tianlan Ren, Electronic Engineering, 18/09/2012.

FSTD – *flight simulation training devices*, Andrea Scalogna, Electronic Engineering, 18/09/2012.

Corso di laurea specialistica (Master thesis)

2013

Small antennas for wireless applications: analysis and measurements, Nie Huizi , Electronic Engineering, 16/10/2013.

2012

Riflettometria nel Dominio del Tempo (TDR) per il calcolo della permittività dielettrica, Abdelrahman Mahmud Khalil Baniyounes, Electronic Engineering, 27/03/2012.

Riflettometria nel Dominio del Tempo (TDR) per il calcolo della permittività dielettrica, Ganiela Egro, Electronic Engineering, 27/03/2012.

Studio della diafonia per linee multiconduttori, Jackson Feunkeu Minkomou, Electronic Engineering, 27/03/2012.

Riflettometria nel Dominio del Tempo per l'analisi delle caratteristiche dielettriche dei materiali, Giovanni Mazzotta, Electronic Engineering, 28/11/2012.

Riflettometria GNSS per il telerilevamento dell'umidità del suolo: misure ed analisi, Songchao Yi, Electronic Engineering, 02/07/2012, (co-tutor: R. Notarpietro).

Riflettometria GNSS per il telerilevamento dell'umidità del suolo: misure ed analisi, Jun Zhou, Electronic Engineering, 02/07/2012, (co-tutor: R. Notarpietro).

2011

Analisi e misure per lo studio della diafonia di cablaggi complessi, Ahmad Abdel Majid Sulaiman Alrawashdeh, Electronic Engineering, 11/04/2011.

Analisi e misure di compatibilità elettromagnetica per lo studio di cablaggi avionici, Besiana Bajraktari, Electronic Engineering, 21/09/2011.

System design of novel navigation radar demonstrator back-end, Gabriel Guerrero Guerra, Electronic Engineering, 11/04/2011.

Time Domain Reflectometry for permittivity determination, Die Hu, Electronic Engineering, 09/11/2011.

Analysis of electromagnetic shielding effectiveness of composite materials (in particular carbon fiber layers and using cst simulation software), Yang Liu, Electronic Engineering, 11/04/2011.

De-embedding techniques for the complex dielectric permittivity determination, Umid Niyazov Sokhibovich, Electronic Engineering, 05/07/2011.

Ray tracing: emulating the real world in the lab, Marek Rohr, Electronic Engineering, 05/07/2011.

Characterization of a capacitive sensor for permittivity determination, Wei Yan, Electronic Engineering, 09/11/2011.

2010

Metodi di misura nel dominio del tempo e della frequenza per la determinazione della permittività dielettrica, Mohammed Alamoush, Electronic Engineering, 19/04/2010.

Valutazione dei rischi dovuti a radiazioni non ionizzanti in ambito sanitario. misure di prevenzione e protezione, Alessandro Dho, Electronic Engineering, 19/04/2010.

Realization of experimental set-up for EMC educational applications, Maen Ishtaiwi, Electronic Engineering, 09/11/2010.

Conception d'offres de conseil et de déploiement d'équipements telecom et gestion de projet/ telecom project management, Michele Marina Lemessom Bosie, Electronic Engineering, 22/04/2010.

Time domain reflectometry for the determination of the permittivity of dielectric materials, Lijuan Peng, Electronic Engineering, 22/09/2010.

2009

Dimostratori per lo studio della diafonia e delle emissioni irradiate e condotte, Ja'afar Metib Wesawies Al Zaben, Electronic Engineering, 14/07/2009.

Dimostratori per lo studio della diafonia e delle emissioni irradiate e condotte, Mohammad Ahmad Ghadeer Alsariera, Electronic Engineering, 14/07/2009.

Interazione tra ipc e processore infineon xc167 su can bus, Antonio Fazari, Electronic Engineering, 04/11/2009.

Combination of adaptive and non-adaptive multiuser of DMA transmission schemes in the presence of imperfect channel knowledge, Jose' Ignacio Lorenzatti, Electronic Engineering, 04/11/2009.

Télécommunications sans fils par retournement temporel, Jean Serge Manga Nkene, Electronic Engineering, 14/07/2009.

Metodi di misura nel dominio della frequenza per il calcolo delle proprietà dielettriche dei materiali, Roberto Pasquale Terracciano, Electronic Engineering, 14/07/2009.

2008

Riflettometria nel dominio del tempo per la caratterizzazione di liquidi e dielettrici omogenei, Marcelo Satoru Nakano, Electronic Engineering, 08/07/2008.

Corso di laurea - Ord. previgente il D.M. 509/99 (Master Thesis)

2010

Applicazione della metodologia low level direct drive (lidd) e simulazioni 3d per la certificazione di compatibilità elettromagnetica di velivoli, Eliana Parpaglione, Electronic Engineering, 19/04/2010, co-tutor.

2007

Determinazione delle caratteristiche dielettriche di mezzi materiali mediante misure e analisi nel dominio della frequenza, Riccardo Bruscajin, Electronic Engineering, 09/07/2007.

2006

Riflettometria nel dominio del tempo per l'analisi delle caratteristiche dielettriche del suolo, Vincenzo Castaldo, Electronic Engineering, 15/11/2006.

2004

Analisi e simulazione di modelli di canale per la propagazione indoor, Francesco Ferrando, Electronic Engineering, 06/07/2004 (co-tutor: F. Dovis).

Multipath wave propagation and coverage planning of single-frequency radio networks in the HF-band, Maria Antonietta Tunno, Electronic Engineering , 28/01/2004.

2003

Analisi e modelli di propagazione del canale indoor, Francesca Bormida, Electronic Engineering, 15/04/2003, (co-tutors: M. Mondin, F. Dovis).

Progetto e costruzione di un applicatore a microonde a modo evanescente per ipertermia, Alessandro Troyse, Electronic Engineering, 16/09/2003.

2002

Sensori di campo elettromagnetico. analisi, caratterizzazione e loro impiego per misure di campo a bordo di elettrotreni, Martino Ciardulli, Electronic Engineering , 28/01/2002.

Antenne "active phased array" e loro applicazioni aeronautiche, Giuseppe Cirino, Electronic Engineering , 28/01/2002.

Riflettometria nel dominio del tempo per la determinazione delle caratteristiche dielettriche del suolo, Salvatore Cucchiara, Electronic Engineering, 23/04/2002.

Modelli di propagazione su canale wireless, Alessandro Francone, Electronic Engineering, 18/09/2002.

Modelli di propagazione su canale wireless, Gianfranco Marsico, Electronic Engineering, 19/09/2002, (co-tutors: M. Mondin, F. Dovis).

2001

Radio channel modeling and simulation for a stratospheric platform link, Roberto Fantini, Electronic Engineering, 21/03/2001, (co-tutors: M. Mondin, F. Dovis).

Link-adaptation and channel prediction for the fixed mimo wireless channel, Antonio Forenza, Electronic Engineering, 27/07/2001, (co-tutor: G. Vecchi).

Determinazione delle caratteristiche dielettriche del suolo mediante tecniche nel dominio del tempo e della frequenza, Celestino Lucio Fornuto, Electronic Engineering, 20/11/2001.

Misura della permittività complessa del suolo mediante sensori TDR, Antonio Manco, Electronic Engineering, 21/03/2001.

2000

Progetto e realizzazione di componenti passivi in microstriscia, Teodoro Perrone, Electronic Engineering, 23/05/2000, , (co-tutor: G. Perrone).

1997

Analisi e progetto di filtri a microonde in guida d'onda rettangolare, Alessandro Cossu, Electronic Engineering, 15/07/1997, co-tutor.

Corso di laurea di 1°livello (Bachelor Thesis)

2015

Analisi della riflessione di un'onda piana su mezzi dielettrici, Daniele Cerutti, Electronic Engineering, 27/07/2015.

2013

Caratterizzazione di una linea Spacewire in ambito Aerospaziale, Marco Nicoletto, Electronic Engineering, 09/10/2013.