



**Gaetano Marrocco**  
**IEEE Fellow**

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Sex Male | Date of birth 29.08.1969 |

Nationality Italian

**CURRENT POSITION**

**Full professor**  
ING-INF/02 Electromagnetic Fields

**President**  
RADIO6ENSE Srl

**SCIENTIFIC INDICATORS**

Scopus: h-Index: 42, Cit. >7500

Google: h-Index: 50, Cit. >10000

**BIBLIOMETRICS**

ANVUR: 3/3 medians

VQR 2004-2010: 3/3

VQR 2011-2014: 2/2

VQR 2020 - 2024 XXX

**POSITIONS**

2018: Full Prof. of Electromagnetics, Univ. Roma TV

2015: Guest Professor in the University of Paris-Est Marne La Vallée

2014: Abilitazione Nazionale 2012 full professor.

2013: Founder and president of the University Spin-off RADIO6ENSE

2010: Associate Prof. of Electromagnetics.

1999: Visiting Researcher at the Imperial College in London, U.K.

1997: Assistant Prof. at the University of Rome Tor Vergata

1998: PhD In Electromagnetics Univ. L'Aquila

1994: internship at the University of Illinois at Urbana.

1994: Laurea in Electronic Engineering (Laude and Honors)

**VISITING ACADEMIC POSITIONS**

2017 - Visiting Professor, University of Kent, Canterbury, United Kingdom.

Research activity on wireless systems, novel materials and antennas for biomedical and body-centric applications, including implanted medical devices, polymer-battery-powered wireless systems and multi-service antennas.

2015 - Visiting Professor, Université Paris-Est Marne-la-Vallée, France.

Research activity on RFID systems and epidermal antennas, including the exchange of graduate and PhD students and collaboration with Prof. Jean-Marc Laheurte.

1999 - Visiting Researcher at the Imperial College in London, U.K.

**MEMBERSHIP OF SCIENTIFIC SOCIETIES**

2025 IEEE Fellow

2021 IEEE Senior Member

IEEE Antennas and Propagation Society

IEEE Council on RFID

Union Radio-Scientifique Internationale (URSI), Italian chair Commission D Electronics and Photonics

## TEACHING

Teaching activity covers electromagnetics, RFID, wireless technologies, flexible electronics, wearable systems, medical telemetry and security of connected devices.

Current courses include:

- Radiofrequency Identification Lab — BSc Computer Eng.
- Hardware, Electromagnetic and Localization Security — MSc Internet Eng.
- Wearable Systems and Medical Telemetry — MSc Medical Eng.;
- Wireless Electromagnetics Technology — MSc on Electronic/Medical Eng.
- Flexible Electronics for Wireless Applications in the PhD in Electronics and in Computer Science, Control and Geoinformation
- Connected Care: Digital Transition in Healthcare Services and Wireless Devices for Tactile Internet in Healthcare-oriented Advanced programmes.

## PhD ADVISING

Member of the Computer Science, Control and Geoinformation PhD Programme.

Advisor of the following PhD Thesis:

1. Ciattaglia Matteo (now in Leonardo)
2. Mattioni Lorenzo (Bank of Italy)
3. Occhiuzzi Cecilia (Ass Prof. Univ Roma Tor Vergata)
4. Manzari Sabina (SAFE agile, The Netherlands)
5. Caizzone Stefano (German Space Agency – DLR, Munich)
6. Lodato Rossella (freelance engineer)
7. Amendola Sara (CEO and Partner of RADIO6ENSE spinoff)
8. Caccami Cristina (Bridgestone Research EMEA)
9. Milici Stefano (Roche, Swiss)
10. Longhi Michela (Post doc at Unicusano)
11. Miozzi Carolina (partner at RADIO6ENSE)
12. Nappi Simone (AiSight, Germany)
13. Bianco G. Maria (Researcher at INAIL)
14. Panunzio Nicoletta (RADIO6ENSE srl)
15. Naccarata Federica (Leonardo)
16. Mostaccio Alessio (post-doc at the University of Rome tor Vergata )
17. Vivarelli Cecilia (post-doc at Istituto Superiore di Sanità)
18. Nanni Francesca (Leonardo)

## RESEARCH

At the beginning of my career I developed computational electromagnetic models based on the Finite Difference Time Domain method for the modelling and design of ultra-wideband antennas and avionics, aerospace and naval systems in the framework of collaboration with ASI, ESA and Leonardo (previously Finmeccanica group). I then moved toward pioneering research on sensor-oriented antennas for the Internet of Things.

Then, for over the last 20 years, I have focused on innovative, low-impact RFID-based wireless sensors, contributing to the evolution of RFID from object identification to battery-less and low-power sensing platforms. My activity has mainly addressed miniaturized and conformal antennas, RFID sensor tags and passive sensing architectures for temperature, humidity, deformation, gases and material-state monitoring. These devices have been experimentally validated in environmental, structural, biomedical and industrial scenarios, with the aim of transforming objects, surfaces and materials into distributed electromagnetic sensing nodes.

In recent years, I have opened and consolidated a research line on Flexible Electromagnetic Skins: ultra-thin, flexible and bio-integrated wireless systems able to collect biophysical parameters directly from the human body. Within this framework, My team has developed and tested prototypes for skin temperature, respiration, wound-healing assessment and restoration or augmentation of tactile perception. Some of these devices have been evaluated in pre-clinical contexts, demonstrating the potential of epidermal RFID and flexible wireless electronics for unobtrusive healthcare monitoring.

More recently, my research has extended to radio-enabled medical prostheses and implantable or semi-implantable devices. I have investigated orthopedic and cardiovascular prostheses with wireless sensing capabilities for detecting infections, deformation, mechanical stress and micro-fractures, aiming to transform passive biomedical implants into identifiable, monitorable and safer cyber-physical medical devices.

Current emerging research lines include laser-based manufacturing of eco-friendly wireless devices, with particular attention to Laser-Induced Graphene and natural or recyclable substrates, and electromagnetic security technologies based on physical unclonable functions, RFID fingerprints and programmable shielding or scattering surfaces. These activities converge toward pervasive electromagnetics, where antennas, materials, sensors and wireless links are co-designed to enable sustainable, secure and autonomous sensing systems for healthcare, industry and the environment.

## **MAIN RESEARCH IMPACT**

### **Impact 1 – RFID-enabled sensing and pervasive IoT**

My research has contributed to transforming RFID from a technology for object identification into a platform for battery-less sensing and pervasive IoT. By introducing the “antenna-as-a-sensor” paradigm, smart-material RFID sensors, auto-tuning IC-based sensing, RFID grids and RFID-UAV systems, I enabled the distributed monitoring of physical, chemical and environmental parameters in industrial, biomedical and environmental scenarios. This work also supported technology transfer toward companies and applications in tyres, engines, pharmaceutical packaging and structural monitoring.

The impact of this research is documented by strong bibliometric indicators, including over 7500 Scopus citations, h-index 42, and ten papers exceeding 100 citations, including more than 1000 citations for “The Art of UHF RFID Antenna Design: Impedance Matching and Size-reduction Techniques” DOI: 10.1109/MAP.2008.4494504. Further evidence is provided by top global rankings in RFID-related research, including first worldwide for “RFID” publications and third in lifetime impact according to ScholarGPS. This activity has also generated more than 15 filed patents and concrete technology-transfer outcomes through Radio6ense, with more than 50 R&D projects and collaborations with major industrial actors including NXP, AMS/Axzon, Ferrari, Bridgestone EMEA and BERCO-Thyssen. Additional recognition is provided by my appointment as IEEE C-RFID Distinguished Lecturer and by my continuous inclusion in the Stanford/PLOS Top 2% Scientists Worldwide ranking since 2021. Moreover, I am currently the most prolific Scopus-indexed author on RFID, RFID+Sensor and Laser-Induced-Graphene + Antenna.

### **Impact 2 – Bio-integrated and wearable wireless systems**

My work has pioneered bio-integrated wireless sensors based on flexible, epidermal and implantable electromagnetic devices. I introduced ultra-thin RFID skins for monitoring temperature, respiration and biochemical parameters, and extended this concept to cyber-prostheses, where passive medical implants become wireless sensing platforms for detecting infection, deformation and micro-fractures. These results have generated patents, clinical validations, national projects and industrial transfer in healthcare, pharmaceutical stability testing and tactile Internet applications.

The impact of this research is evidenced by more than 70 journal papers on wearable and bio-integrated wireless systems, patents on wireless epidermal sensors and sensorized orthopedic components, clinical validations of smart-plaster technologies, and collaborations with hospitals and industrial partners. Additional evidence includes applications in tactile Internet, cyber-prosthetics, pharmaceutical stability testing and food monitoring, together with IEEE dissemination activities and editorial roles in flexible electronics.

## **SELECTED RESEARCH PROGRAMS**

2026 – Technology Transfer in Space, ASI, Task Leader, 2 PM. 2023–2026 – PNRR Rome Technopole – Research Infrastructure, PNRR, Flagship Local Leader, 7.5 PM. 2023–2026 – Pre-clinical evaluation of medical devices before clinical trials, Italian Ministry of Health, Principal Investigator, 4 PM.

2026 – Joint Lab for Wireless Health Security, Competence Center Cyber 4.0, Task Leader, 1.5 PM.

2021 – Dual Skin: wireless dual-sensor skin thermometer for fever detection, FISIR 2020 IP – COVID, MUR, Principal Investigator, 3 PM.

2018–2019 Second Skin: bio-integrated wireless epidermal sensors, Regione Lazio, Principal Investigator, 6 PM.

2009–2010 PRIN 2008: electromagnetic technologies for active/passive RFID systems, MUR, Principal Investigator, 6 PM.

2009-2010 Miniaturized Multi-Function Antenna System for Micro/Nano-Satellites, funded by European Space Agency

2007 Automatic design of broad-band and miniaturized antennas, funded by IDS Ingegneria dei Sistemi

2007 Electromagnetic Analysis of antenna co-location over vehicular platforms, funded by Selex Communications

2006 New Multi-band antenna systems for hand-held Galileo receivers, Funded by Alcatel Alenia Space.

2005 Electromagnetic software for the modeling of periodic structures, funded by ESA (via IDS)

2005 Multi-function structural antenna systems for naval Software-Defined Radio, funded by Selex Communications, Finmeccanica Group

2001-2002 Electromagnetic coupling for HF antennas on aircraft, funded by MARCONI MOBILE, Finmeccanica Group

2001 Evaluation of numerical models for the electromagnetic compliance of base station antennas, funded by the Town of Roma, (Italy)

1998-99 Hybrid electromagnetic simulation tool for the design of corrugated horn antennas with integrated feed, funded by European Space Agency

## EDITORIAL ACTIVITY

2025 – 2026	Guest Editor IEEE Sensors Journal
2021 – present	Associate Editor of IEEE Journal of Flexible Electronics
2022 – 2023	Guest Editor: Special Issue: "Augmented RFID sensing systems for environment healthcare and safety", IEEE Journal of Radiofrequency Identification
2018 – 2023	Associate Editor of IEEE Journal of Radiofrequency Identification
2015 – 2015	Guest Editor Special Cluster on "Antennas for Wireless Body Area Networks", IEEE Antennas and Wireless Propagation Letters
2006 – 2012	Associate Editor of IEEE Antennas and Wireless Propagation Letters

## SCIENTIFIC ORGANISATIONS/COORDINATION OF ACADEMIC ACTIVITIES

2026 – present	Member of the IEEE Fellowship Jury
2024 – present	Distinguished Lecturer, IEEE Council on RFID (IEEE C-RFID)
2024 – 2024	General Co-chair IEEE FLEPS, Tampere
2018 – 2018	TPC Track Chair: IEEE RFID Conference, Orlando (US) 2018
2017 – present	Chair of the Italian Section of Union Radio Science International (URSI) Commission D, Electronics and Photonics
2015 – 2017	Member of the Jury of the IEEE Antennas and Propagation Society Awards
2012 – 2012	TPC Chair of the 2012 IEEE RFID –TA, Nice, France
2011 – 2011	Local Organizing Chair of EUCAP-2011 (European Conference on Antennas and Propagation) in Rome, Italy
2008 – 2008	General Chair of the RFIDays-2008: Emerging technology in Radiofrequency Identification, Rome May 12-13, 2008

## NATIONAL AND INTERNATIONAL COLLABORATIONS AND NETWORKS

I have developed a consolidated international network in RFID systems, flexible and wearable electronics, wireless sensing, biomedical antennas and emerging materials for electromagnetic devices. These collaborations directly support REGENERA, especially in material-enabled wireless readout, flexible substrates, laser-induced conductive patterns, multifunctional sensing and device validation.

My long-standing collaborations include Tampere University, Finland, with Prof. Leena Ukkonen, on RFID systems, wearable, implantable and self-healing antennas, and wireless sensing for health applications, also through MSc and PhD student exchanges. I collaborated with Prof. John C. Batchelor at the University of Kent, UK, on wireless systems for medical devices, polymer-battery-assisted platforms and multiservice antennas for biomedical and 5G applications.

I have also collaborated with Prof. John A. Rogers' group, now at Northwestern University, on flexible epidermal wireless systems for skin deformation, sweat analysis and respiration monitoring, providing a strong background for soft and bio-integrated sensing platforms. Collaborations with Prof. Anja K. Skrivervik at EPFL, Switzerland, addressed miniaturized antennas and in-body wireless devices. As Visiting Professor with Prof. Jean-Marc Laheurte at Université Paris-Est / Gustave Eiffel University, France, I worked on RFID systems and epidermal antennas fabricated through different technological routes. More recent links extend this network toward materials and circular electronics: Dr. Sergio López-Soriano, Universitat Politècnica de Catalunya, Spain, on IoT and wearable antennas based on advanced materials; Prof. Elvira Fortunato's group, NOVA University Lisbon / CENIMAT-i3N, Portugal, on advanced material processing, oxide electronics and sustainable substrates; and Prof. Mohammad H. Zarifi, University of British Columbia Okanagan, Canada, on MXenes, laser-induced graphene and microwave devices.

## ADMINISTRATIVE ROLES AND POSITION RESPONSIBILITY

2026 – present	Member of the University Committee for Academic Career Advancement Evaluation, University of Rome Tor Vergata
2025 – present	Member of the University Electoral Committee, University of Rome Tor Vergata
2025 - present	Member of the Scientific and Technical Committee, University of Rome Tor Vergata
2022 - present	Deputy Director Department Civile and Informatics Engineering, University of Rome Tor Vergata
2019 - 2024	Coordinator, Bachelor and MSc Degree in Medical Engineering, University of Rome Tor Vergata

2000 - present Founder and Chair, Pervasive Electromagnetics Lab, University of Rome Tor Vergata

## TECHNOLOGY TRANSFER AND OTHER WORK EXPERIENCE

I have given care to the social and technological impact and valorisation of the research through patents , the continuous collaborations with major Italian and European technology Stakeholders and in particular as founder and president of a University spin-off Radio6ense (www.radio6ense.com) working in Internet of Things.

2025 – present Member of the Working Group on the Register of Implanted Medical Devices, Italian Ministry of Health

2019 – present Chair of the Committee for Preclinical Evaluation of Medical Devices, Italian Ministry of Health, at Univ.Roma Tor Vergata

2019 - 2024 Member of the Advisory Board of EURAC Research Center, Bolzano (IT)

2013 - present Founder and President of the university spinoff RADIO6ENSE srl (www.radio6ense.com)

Over the years, consultant of

- Leonardo, Elettronica, Larimart
- Pfizer, Orthofix, InTraumna (by the way of Radio6ense R6E)
- Ferrari, Bridgestone, Lamborghini (btw R6E)
- ILIP (smart packaging)
- Internal Affair Ministry (Italian Police)

## GRANTED PATENTS

1. Antenna multi-funzione a larga banda operante nella gamma HF, particolarmente per installazioni navali, TO2005A000344
2. Antenna strutturale a larga banda operante nella gamma HF, particolarmente per installazioni navali, TO2005A000417
3. Wideband structural antenna operating in the HF range, particularly for naval installations, WO 2006/134543 A1
4. Wideband multifunction antenna operating in the HF range, particularly for naval installations, WO 2006/123311 A2
5. RFID a porta multipla e relativo metodo di realizzazione e utilizzo, RM2007A000466
6. Multiple-port RFID and method of manufacturing and using thereof, 8445PTWO
7. Dispositivo a Radiofrequenza per la sensoristica termica e/o meccanica, RM1033114611
8. 2016, Radio6ense, DISPOSITIVO SENSORE WIRELESS A RADIOFREQUENZA CONFIGURABILE E REGOLABILE - ITUB20160292A1
9. METODO DI REALIZZAZIONE DI GIUNZIONI DI NASTRI TRASPORTATORI IN GOMMA ED APPLICAZIONE DI PROFILI MEDIANTE VULCANIZZAZIONE A CALDO, file number 102018000004542
10. Dispositivo RFID per il monitoraggio del grado di maturazione della frutta, procedimento e contenitore che utilizzano tale dispositivo . N.102018000010038
11. Dispositivo RFID per il monitoraggio del grado di maturazione della frutta, procedimento e sistema che utilizza tale dispositivo (2018) IT201800010038A1
12. Sigillo di sicurezza autobloccante. N. 102016000023352
13. "DISPOSITIVO RFID PERFEZIONATO PER PNEUMATICI" - "IMPROVED RFID DEVICE
14. Method and System for Reading/Writing Data From/On RFID Tags Integrated/Applied In/On Tires Conveyed on Conveyor Belt,CN113195266A-2021-07-30
15. 2021, Bridgestone, IMPROVED RFID SENSOR DEVICE WITH PATCH-TYPE ANTENNA FOR TIRES, WO2021239645A1, BRIDGESTONE EUROPE NV/SA, CACCAMI MARIA CRISTINA; OCCHIUZZI CECILIA; AMENDOLA SARA; MARROCCO GAETANO; D'UVA NICOLA
16. 2021, Radio6ense, SENSORE WIRELESS EPIDERMICO, IN PARTICOLARE PER LA MISURA DELLA TEMPERATURA CORPOREA, IT202000001492A1
17. 2023, BERCO, SENSING SYSTEM AND A PROCESS FOR DETECTING ONE OR MORE PHYSICAL PARAMETERS OF AN UNDERCARRIAGE AND/OR A VEHICLE, AND UNDERCARRIAGE AND VEHICLE PROVIDED WITH SAID SENSING SYSTEM
18. "Componente sensorizzato per vite endossea, complessivo di vite comprendente detto componente e sistema di monitoraggio comprendente detto componente", ORTHOFIX United States application or PCT international application number 17/974, 324, 26th October 2022

## SELECTED PRIZES AND AWARDS

2026 IEEE AP-S Edward E. Altshuler Prize Paper Award

2025 IEEE Fellow, for contributions to RFID-enabled sensing and bio-integrated wireless systems

2025 Best Student Paper Award, IEEE International Conference on RFID Technology and Applications (IEEERFID-TA)

2024 IEEE Journal of Microwaves Best Paper Award

2023 Best Paper Award, IEEE RFID-TA  
2023 Best Student Paper Award, IEEE RFID-TA  
2020 Latmiral Award at Riunione Nazionale di Elettromagnetismo (RINEM)  
2022 Best Student Paper Award, IEEE RFID-TA  
2022 Best Paper Award, 7th SpliTech Conference  
2021 Best Paper Award, IEEE RFID-TA  
2020 Latmiral Award at Riunione Nazionale di Elettromagnetismo (RINEM)  
2018 Best Paper Award (CNIT Prize) at Riunione Nazionale di Elettromagnetismo (RINEM),  
2017 Best Paper Award, IEEE International Conference on Wearable and Implantable Body Sensor Networks (BSN)  
2017 Best Student Paper Award, European Conference on Antennas and Propagation (EuCAP)  
2012 Best Student Paper Award, IEEE RFID-TA.  
2004 Mario Sannino Award al XV Riunione Nazionale di Elettromagnetismo (RINEM)  
Complete list at <http://www.pervasive.ing.uniroma2.it/AWARDS.htm>

## **SELECTED PAPERS**

List at <http://www.pervasive.ing.uniroma2.it/Papers.htm>