Roberto Alesii

✉ roberto.alesii@univaq.it

Roberto Alesii graduated in 2002 in Electronic Engineering from the University of L'Aquila by discussing his thesis with the title 'Development of design methodologies for wireless sensor networks' and in 2007 he obtained his PhD in Electrical and Electronic Engineering from the University of L'Aquila defending his dissertation with the title 'Development of design methodologies for wireless sensor networks'. Since 2004, he has been a co-founder and board member of the spin-off WEST Aquila srl. Since 2002, he has collaborated with the Centre of Excellence DEWS (University of L'Aquila) and has been working as a permanent technical staff member there since 2008. Before his permanent position, at the DEWS Centre of Excellence (University of L'Aquila) he worked as a project manager for WEST Aquila Srl for projects focused on software defined radio, wireless system embedded and smart water monitoring, in the meanwhile he obtained a a professional contract with the Centre of Excellence DEWS for the design of RFiD tags with WSN integration. During the same period, he held some lectures for a refresher course at Technolabs (L'Aquila) and Thales (Chieti site) on the WiMax standard and in the Master's course in Heterogeneous Radio Technologies, Applications and Services, with RFiD and NFC topics. From 2016 to 2024 he is a lecturer in the 'Laboratory of SDR, SDN and IoT' course (ING INF/03), from 2021 named 'Laboratory of SDR, SDN and IoT', at the Department of Engineering and Information and Mathematical Sciences of the University of L'Aquila (Course of Study in Telecommunications Engineering). From 2022 to 2024 he is lecturer of the course 'Physical and Chemical Bases, Applied Physics Module' SSD FIS/07 at the Sapienza University of Rome for the courses 'Biomedical Laboratory Techniques' and 'Medical Radiology, Imaging and Radiotherapy Techniques'. Since 2002 he has been tutor for the degree theses of 46 students divided between Bachelor's and Master's degree, as well as co-advisor for 2 PhD students. Research and R&D activities, including consultancy, where mainly carried out in the field of wireless communications for the following topics (non-exhaustive list): Backscattering communication, Radio Frequency Identification; Anti-collision Protocols for Internet of Things, Software Defined Radio, WideBand Signals, mmWave Channel model, Synchronisation and GNSS. He is the author of 39 published articles of which 3 are in scientific journals, 36 conference contributions and 3 book chapters and has been a reviewer for several scientific journals. He is a member of the National Interuniversity Consortium for Telecommunications (CNIT) in Italy.

Education

2003-2007	**PhD, University of L'Aquila** Electrical and Information Engineering Title: *Development of design methodologies for wireless sensor networks*
1995-2002	**Degree in Electronic Engineering** University of L'Aquila (110/110 with laude) Title: *Design of communication protocols for a short-to-medium range radio interconnection system*

Teaching

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2024-25	**Laboratory of SDR and IoT** - SSD ING-INF/03 Degree course in Telecommunications Engineering - CFU 6, 60H University of L'Aquila (DISIM)
	Basics of Physics and Chemistry - Applied Physics module - SSD FIS/07 Sapienza University - Faculty of Medicine and Dentisty Degree course in Biomedica Laboratory Techniques - CFU 2, 20H
	Laboratory of SDR and IoT - SSD ING-INF/03 Degree course in Telecommunications Engineering - CFU 6, 60H University of L'Aquila (DISIM)

Teaching (continued)

2023-24   🔖 **Basics of Physics and Chemistry - Applied Physics module** - SSD FIS/07
Sapienza University - Faculty of Medicine and Dentisty
Degree course in Biomedica Laboratory Techniques - CFU 2, 20H

🔖 **Basics of Physics and Chemistry - Applied Physics module** - SSD FIS/07
Sapienza University - Faculty of Medicine and Dentisty
Degree course in Medical radiology, imaging and radiotherapy techniques - CFU 2, 20H

2022-23   🔖 **Laboratory of SDR and IoT** - SSD ING-INF/03
Degree course in Telecommunications Engineering - CFU 6, 60H
University of L'Aquila (DISIM)

🔖 **Basics of Physics and Chemistry - Applied Physics module** - SSD FIS/07
Sapienza University - Faculty of Medicine and Dentisty
Degree course in Biomedica Laboratory Techniques - CFU 2, 20H

🔖 **Basics of Physics and Chemistry - Applied Physics module** - SSD FIS/07
Sapienza University - Faculty of Medicine and Dentisty,
Degree course in Medical radiology, imaging and radiotherapy techniques - CFU 2, 20H

2021-22   🔖 **Laboratory of SDR and IoT** - SSD ING-INF/03
Degree course in Telecommunications Engineering - CFU 6, 60H
University of L'Aquila (DISIM)

2020-21   🔖 **Laboratory of SDR, SDN and IoT** - SSD ING-INF/03
Degree course in Telecommunications Engineering - CFU 6, 60H
University of L'Aquila (DISIM)

2019-20   🔖 **Laboratory of SDR, SDN and IoT** - SSD ING-INF/03
Degree course in Telecommunications Engineering - CFU 6, 60H
University of L'Aquila (DISIM)

2018-19   🔖 **Laboratory of SDR, SDN and IoT** - SSD ING-INF/03
Degree course in Telecommunications Engineering - CFU 6, 60H
University of L'Aquila (DISIM)

2017-18   🔖 **Laboratory of SDR, SDN and IoT** - SSD ING-INF/03
Degree course in Telecommunications Engineering - CFU 6, 60H
University of L'Aquila (DISIM)

2016-17   🔖 **Laboratory of SDR, SDN and IoT** - SSD ING-INF/03
Degree course in Telecommunications Engineering - CFU 6, 60H
University of L'Aquila (DISIM)

2008   🔖 **Master in technologies, applications and services in heterogeneous radio networks (RFiD and NFC Systems module)**
University of L'Aquila

🔖 **Fundamentals of data transmission and telematic networks - Geographical networks**
S.G.I. Società Generale di Informatica s.a.s

Research Publications

Journal Articles

1   A. Piccioni, R. Alesii, F. Santucci, and F. Graziosi, "A testing framework for joint communication and sensing in synthetic aperture radars," *IEEE Access*, vol. 13, pp. 13 088–13 100, 2025, ISSN: 2169-3536. 🔗 DOI: 10.1109/ACCESS.2025.3531328.

2 A. L. Zuriarrain Sosa, V. Ioannucci, M. Pratesi, *et al.,* "**OBU for Accurate Navigation through Sensor Fusion in the Framework of the EMERGE Project**," *Applied Sciences,* vol. 14, no. 11, 2024, ISSN: 2076-3417. 🔗 DOI: 10.3390/app14114401.

3 R. Valentini, P. D. Marco, R. Alesii, and F. Santucci, "**Cross-Layer Analysis of Multi-Static RFID Systems Exploiting Capture Diversity**," *IEEE Transactions on Communications,* vol. 69, no. 10, pp. 6620–6632, Oct. 2021, ISSN: 1558-0857. 🔗 DOI: 10.1109/TCOMM.2021.3096541.

4 R. Alesii, P. D. Marco, F. Santucci, P. Savazzi, R. Valentini, and A. Vizziello, "**Backscattering UWB/UHF hybrid solutions for multi-reader multi-tag passive RFID systems**," *EURASIP Journal on Embedded Systems,* vol. 2016, no. 1, p. 10, 2016. 🔗 DOI: 10.1186/s13639-016-0031-0.

Conference Proceedings

1 R. Alesii, D. Cassioli, and A. Molish, "**A mmWaves Channel Sounding Technique to Capture Human-induced Dynamic Multipaths**," in *2024 4rd URSI Atlantic and Asia Pacific Radio Science Meeting (AT-RASC),* 2024.

2 D. Cassioli, R. Alesii, A. Piccioni, and A. F. Molisch, "A new statistical model of human-induced multipath dynamics in mmwaves channels," in *European Wireless 2024; 29th European Wireless Conference,* 2024, pp. 157–162.

3 M. L. Mura, P. Lamberti, A. S. Savoia, R. Alesii, D. Cassioli, and V. Tucci, "Joint sensing and communication with graphene fets targeting terahertz band," in *2024 14th International Symposium on Communication Systems, Networks and Digital Signal Processing (CSNDSP),* 2024, pp. 406–409. 🔗 DOI: 10.1109/CSNDSP60683.2024.10636634.

4 C. D. Natale, R. Alesii, and S. Tennina, "Liquid identification through sdr: System design and performance analysis," in *2024 IEEE Workshop on Complexity in Engineering (COMPENG),* 2024, pp. 1–5. 🔗 DOI: 10.1109/COMPENG60905.2024.10741505.

5 A. Piccioni, A. Sosa, R. Alesii, and F. Graziosi, "**SDR-Based Supporting System for Multimedia Services in Mobile Communication Networks** (to appear)," in *2024 IEEE Symposium on Computers and Communications (ISCC),* 2024.

6 A. Piccioni, R. Alesii, F. Santucci, and F. Graziosi, "**Satellite SAR Testing Framework for Integrated Sensing and Communication**," in *2024 4rd URSI Atlantic and Asia Pacific Radio Science Meeting (AT-RASC),* 2024.

7 A. L. Z. Sosa, R. Alesii, and F. Santucci, "**Opportunistic RSS-based localisation using SDR and ADS-B system**," in *2024 4th URSI Atlantic Radio Science Meeting (AT-RASC),* 2024, pp. 1–4. 🔗 DOI: 10.46620/URSIATRASC24/JTMJ9870.

8 G. Pettanice, F. Loreto, P. Di Marco, *et al.,* "**Time-domain Characterization of Reconfigurable Intelligent Surfaces for Wireless Communications**," in *2022 International Symposium on Electromagnetic Compatibility – EMC Europe,* 2022, pp. 566–571. 🔗 DOI: 10.1109/EMCEurope51680.2022.9901291.

9 A. Piccioni, R. Alesii, F. Santucci, and F. Graziosi, "**SDR SAR Target: Corner Reflector and Communication**," in *2022 3rd URSI Atlantic and Asia Pacific Radio Science Meeting (AT-AP-RASC),* 2022, pp. 1–4. 🔗 DOI: 10.23919/AT-AP-RASC54737.2022.9814344.

10 A. Piccioni, R. Alesii, F. Santucci, and F. Graziosi, "**Software-defined Corner Reflector for Satellite SAR Systems**," in *2022 IEEE Aerospace Conference (AERO),* 2022, pp. 1–7. 🔗 DOI: 10.1109/AERO53065.2022.9843608.

11 Á. L. Z. Sosa, R. Alesii, and F. Santucci, "**Cross-platform evaluation for Software Defined Radio GNSS receiver**," in *2022 3rd URSI Atlantic and Asia Pacific Radio Science Meeting (AT-AP-RASC),* 2022, pp. 1–4. 🔗 DOI: 10.23919/AT-AP-RASC54737.2022.9814436.

12 A. Piccioni, R. Alesii, F. Santucci, and F. Graziosi, "**SDR-Based Ground Target for Identification and Tracking through Satellite SAR Systems**," in *2021 IEEE Aerospace Conference (50100)*, 2021, pp. 1–10. 🔗 DOI: 10.1109/AERO50100.2021.9438499.

13 A. L. Zuriarraín Sosa, R. Alesii, G. G. Battisti, and R. Quiza, "**Captura, análisis y simulación de un sistema RFID en banda UHF**," in *CIUM 2021 - VII Taller Internacional de Ingenierías - Matanzas, CUBA.*, 2021, pp. 149–159, ISBN: 9789591645470. 🔗 URL: http://www.umcc.cu/wp-content/uploads/2021/09/quiza-CIUM-7-1.pdf.

14 A. L. Zuriarraín Sosa, R. Alesii, G. G. Battisti, and R. Quiza, "**Incremento del rango operativo en sistemas RFID mediante el empleo de señales multitonos**," in *CIUM 2021 - VII Taller Internacional de Ingenierías - Matanzas, CUBA.*, 2021, pp. 160–168, ISBN: 9789591645470. 🔗 URL: http://www.umcc.cu/wp-content/uploads/2021/09/quiza-CIUM-7-1.pdf.

15 R. Valentini, P. di Marco, R. Alesii, and F. Santucci, "**Exploiting Capture Diversity in Distributed Passive RFID Systems**," in *2020 IEEE 10th Annual Computing and Communication Workshop and Conference (CCWC)*, 2020, pp. 0996–1000. 🔗 DOI: 10.1109/CCWC47524.2020.9031268.

16 R. Valentini, P. D. Marco, R. Alesii, and F. Santucci, "**Cross-Layer Analysis of Distributed Passive RFID Systems Over Faded Backscattering Links**," in *2020 IEEE Wireless Communications and Networking Conference (WCNC)*, 2020, pp. 1–6. 🔗 DOI: 10.1109/WCNC45663.2020.9120771.

17 R. Valentini, R. Alesii, M. Levorato, and F. Santucci, "**Cross-Layer Analysis of RFID Systems with Correlated Shadowing and Random Radiation Efficiency**," in *ICC 2019 - 2019 IEEE International Conference on Communications (ICC)*, 2019, pp. 1–7. 🔗 DOI: 10.1109/ICC.2019.8761060.

18 S. Tennina, R. Alesii, F. Tarquini, and F. Graziosi, "**Indoor localization solutions to support independent daily life of impaired people at home**," in *2016 IEEE International Conference on Communications Workshops (ICC)*, 2016, pp. 45–50. 🔗 DOI: 10.1109/ICCW.2016.7503762.

19 R. Alesii, P. D. Marco, F. Santucci, P. Savazzi, R. Valentini, and A. Vizziello, "**Multi-reader multi-tag architecture for UWB/UHF radio frequency identification systems**," in *2015 International EURASIP Workshop on RFID Technology (EURFID)*, 2015, pp. 28–35. 🔗 DOI: 10.1109/EURFID.2015.7332381.

20 N. Decarli, A. Guerra, F. Guidi, *et al.*, "**The GRETA architecture for energy efficient radio identification and localization**," in *2015 International EURASIP Workshop on RFID Technology (EURFID)*, 2015, pp. 1–8. 🔗 DOI: 10.1109/EURFID.2015.7332377.

21 F. Federici, R. Alesii, A. Colarieti, M. Faccio, F. Graziosi, and V. Gattulli, "**Analysis and Implementation of Distributed Data Processing in a Wireless Sensor Network for Structural Health Monitoring**," in *Sensors*, D. Compagnone, F. Baldini, C. Di Natale, G. Betta, and P. Siciliano, Eds., Cham: Springer International Publishing, 2015, pp. 315–319, ISBN: 978-3-319-09617-9.

22 R. Alesii, R. Congiu, F. Santucci, P. Di Marco, and C. Fischione, "**Architectures and protocols for fast identification in large-scale RFID systems**," in *2014 IEEE 6th International Symposium on Communications, Control and Signal Processing (ISCCSP)*, 2014, pp. 243–247. 🔗 DOI: 10.1109/ISCCSP.2014.6877860.

23 P. Di Marco, R. Alesii, F. Santucci, and C. Fischione, "**An UWB-enhanced identification procedure for large-scale passive RFID systems**," in *2014 IEEE International Conference on Ultra-WideBand (ICUWB)*, 2014, pp. 421–426. 🔗 DOI: 10.1109/ICUWB.2014.6959019.

24 M. Faraone, R. Alesii, S. Tennina, and F. Graziosi, "**Device free patients localization in controlled indoor environments**," in *2014 IEEE 19th International Workshop on Computer Aided Modeling and Design of Communication Links and Networks (CAMAD)*, 2014, pp. 149–153. 🔗 DOI: 10.1109/CAMAD.2014.7033224.

25 F. Federici, R. Alesii, A. Colarieti, F. Graziosi, and M. Faccio, "**An accelerometer digital front end for efficient seismic event detection support in a wireless sensor node**," in *SENSORS, 2014 IEEE*, 2014, pp. 265–268. 🔗 DOI: 10.1109/ICSENS.2014.6984984.

26 F. Federici, R. Alesii, A. Colarieti, *et al.*, "**Design of Wireless Sensor Nodes for Structural Health Monitoring Applications**," in *EUROSENSORS 2014, the 28th European Conference on Solid-State Transducers*, 2014. 🔗 DOI: https://doi.org/10.1016/j.proeng.2014.11.685.

27 R. Alesii, F. Graziosi, S. Marchesani, C. Rinaldi, M. Santic, and F. Tarquini, "**Short range wireless solutions enabling ambient assisted living to support people affected by the Down syndrome**," in *IEEE Eurocon 2013*, 2013, pp. 340–346. 🔗 DOI: 10.1109/EUROCON.2013.6625006.

28 F. Federici, R. Alesii, A. Colarieti, F. Graziosi, and M. Faccio, "**Design and validation of a wireless sensor node for long term structural health monitoring**," in *SENSORS, 2013 IEEE*, 2013, pp. 1–4. 🔗 DOI: 10.1109/ICSENS.2013.6688429.

29 S. Tennina, R. Alesii, M. Di Renzo, F. Santucci, L. Pomante, and F. Graziosi, "**Demo: Automatic Personal Identification System for Security in Critical Services: A Case Study**," in *Proceedings of the 9th ACM Conference on Embedded Networked Sensor Systems*, ser. SenSys '11, Seattle, Washington: Association for Computing Machinery, 2011, pp. 421–422, ISBN: 9781450307185. 🔗 DOI: 10.1145/2070942.2071019.

30 C. Rinaldi, L. Pomante, R. Alesii, and F. Graziosi, "**RF Sounding**," in *Proceedings of the 8th ACM Conference on Embedded Networked Sensor Systems*, ser. SenSys '10, Zürich, Switzerland: Association for Computing Machinery, 2010, pp. 363–364, ISBN: 9781450303446. 🔗 DOI: 10.1145/1869983.1870024.

31 R. Alesii, G. Gargano, F. Graziosi, L. Pomante, and C. Rinaldi, "**WSN-Based Audio Surveillance Systems**," in *Proceedings of the European Computing Conference*, N. Mastorakis, V. Mladenov, and V. T. Kontargyri, Eds., Boston, MA: Springer US, 2009, pp. 675–681, ISBN: 978-0-387-84814-3.

32 S. Tennina, L. Pomante, F. Graziosi, M. Di Renzo, R. Alesii, and F. Santucci, "**Integrated GPS-Denied Localization, Tracking and Automatic Personal Identification**," in *Proceedings of the 7th ACM Conference on Embedded Networked Sensor Systems*, ser. SenSys '09, Berkeley, California: Association for Computing Machinery, 2009, pp. 355–356, ISBN: 9781605585192. 🔗 DOI: 10.1145/1644038.1644098.

33 S. Tennina, L. Pomante, F. Graziosi, M. Di Renzo, R. Alesii, and F. Santucci, "**Distributed Localization, Tracking, and Automatic Personal Identification: A Solution Based on a Wireless Biometric Badge**," in *Proceedings of the 4th ACM International Workshop on Experimental Evaluation and Characterization*, ser. WINTECH '09, Beijing, China: Association for Computing Machinery, 2009, pp. 97–98, ISBN: 9781605587400. 🔗 DOI: 10.1145/1614293.1614318.

34 S. Tennina, L. Pomante, F. Graziosi, M. Di Renzo, R. Alesii, and F. Santucci, "**Localization, tracking, and automatic personal identification in GPS-denied environments: A solution based on a wireless biometric badge**," in *2009 5th International Conference on Testbeds and Research Infrastructures for the Development of Networks and Communities and Workshops*, 2009, pp. 1–3. 🔗 DOI: 10.1109/TRIDENTCOM.2009.4976219.

35 R. Alesii, F. Graziosi, L. Pomante, and C. Rinaldi, "**Exploiting WSN for Audio Surveillance Applications: The VoWSN Approach**," in *2008 11th EUROMICRO Conference on Digital System Design Architectures, Methods and Tools*, Sep. 2008, pp. 520–524. 🔗 DOI: 10.1109/DSD.2008.68.

36 R. Alesii, F. Antonini, M. Di Renzo, F. Graziosi, and F. Santucci, "**Performance of a Chip-Time Analog Differential Receiver for UWB Systems in a Log-Normal Frequency Selective Fading Channel**," in *Proceedings of the Wireless Personal Multimedia Communications WPMC04, Abano Terme, Italy, September 12-15*, 2004.

37 R. Alesii, M. Di Renzo, F. Graziosi, and F. Santucci, "**A low-complexity receiver for ultra wide band communications**," 2004.

Books and Chapters

(1) R. Alesii, F. Graziosi, S. Marchesani, C. Rinaldi, M. Santic, and F. Tarquini, "*Advanced solutions to support daily life of people affected by the down syndrome*," in *Ambient Assisted Living: Italian Forum 2014*, B. Andò, P. Siciliano, V. Marletta, and A. Monteriù, Eds. Cham: Springer International Publishing, 2015, pp. 233–244, ISBN: 978-3-319-18374-9. 🔗 DOI: 10.1007/978-3-319-18374-9_22.

(2) M. Di Renzo, F. Graziosi, F. Santucci, R. Alesii, and P. Tognolatti, "*A low-complexity receiver for ultra-wideband communications*," in *Ultra-Wideband, Short-Pulse Electromagnetics 7*, F. Sabath, E. L. Mokole, U. Schenk, and D. Nitsch, Eds. New York, NY: Springer New York, 2007, pp. 753–764, ISBN: 978-0-387-37731-5. 🔗 DOI: 10.1007/978-0-387-37731-5_80.

Work Experience *(Contracts with at least a one-year term)*

2024-   **Fixed-term researcher**
University of L'Aquila, Department of Information Engineering, Computer Science and Mathematics (disim.univaq.it)

2008-24   **Permanent Technical-Scientific and Data Processing Area staff member**
University of L'Aquila, Center of Excellence DEWS (dews.univaq.it)

2007-08   **Scholarship for research and transfer of R&D results, Project title: Development of mobile gateways, in collaboration with Selex Communications S.p.A., Chieti Scalo - University of L'Aquila, Center of Excellence DEWS**

2004-07   **Research and transfer of R&D results, Project Manager and project development in the field of Wireless Sensor Networks, Embedded Systems, Software Defined Radio**
WEST Aquila S.r.l., Spin-Off University of L'Aquila, www.westaquila.com

2005-06   **Research fellowship in the research project "Study, design and synthesis of procedures and systems for aeronautical surveillance"**
University of L'Aquila, DIEI

2004   **Co-Founder Spin-Off University WEST Aquila S.r.l. (Wireless Embedded Systems Technologies L'Aquila)**
WEST Aquila S.r.l., Spin-Off University of L'Aquila
Member of the Board of Directors until 2024

2003-04   **Research activity "description and high-level modeling of radio network functionality and development and integration of high-level functionality with bottom-up circuit systems"**
University of L'Aquila, Center of Excellence DEWS

Consultant for research, development and innovation *(short-term/prof.)*

2024   **Study on the requirements and architecture of a generic Tactical Data Link with low observability and high throughput for avionic communications**
RadioLabs - Consorzio Università Industria

2022   **Analysis of synchronisation issues in a mixed hardware/software context; Setup of a Software Defined Radio architecture for GNSS signal generation; Support for the realisation of the output collection system from the mixed hardware/software system.**
RadioLabs - Consorzio Università Industria

2021   **Research Activities for the Integration of Communication Links in Synthetic Aperture Radar Satellite Systems Processes**
National Inter-University Consortium for Telecommunications

2015 ◼ **CARE-me: innovative smart living system that detects the presence of the child in the car seat, monitors the condition of the car and sends alarms to guardians if the child is in danger.**
University of L'Aquila, DISIM (www.disim.univaq.it)

2011 ◼ **Research and development of system in support of the daily life of children with Down syndrome**
Associazione Italiana Persone Down, L'Aquila (aipd.csvaq.it)

2010 ◼ **Research and transfer of R&D results, Project Manager and project development in the field of Wireless Sensor Networks, Embedded Systems, Software Defined Radio**
WEST Aquila S.r.l. (www.westaquila.com)

2009 ◼ **Research and transfer of R&D results, Project Manager and project development in the field of Wireless Sensor Networks, Embedded Systems, Software Defined Radio**
WEST Aquila S.r.l. (www.westaquila.com)

2008 ◼ **Development of a wireless delocalized sensor network**
Polytechnic of Bari, Dep. of Civil and Environmental Engineering;

◼ **Study and development of architectures for the use of RFID technologies in monitoring systems and their integration in ad-hoc radio networks**
University of L'Aquila, Center of Excellence DEWS (http://dews.univaq.it)

Research Experience

2024-25 ◼ **TWIN MODEL: Terahertz WIreless seNsing and coMmunication through cOmprehensive channel analysis and harDwarE modeLing for Graphene-Based Devices**
Project Role: WP Leader for WP "THz wireless channel measurements - Channel Modeling"
Paper contribution: (2024) 1
Research team: University of L'Aquila, University of Salerno.
Abstract: THz communications offer ultra-high throughput and enhanced sensing capabilities with high resolution antennas arrays, enabling advanced applications and integrated sensing, localization, mapping. The potential of wireless THz communication can be unlocked by relying on novel models for high-mobility THz wireless channels and exploiting the innovative graphene technology, for which reliable simulation tools for components' design accounting for fabrication-related uncertainties are still missing. The TWIN-MODEL project addresses these topics covering the tasks listed in the call issued by Spoke 2 within the RESTART program, originated from specific needs of the ARCADIA project under the Spoke 2 supervision. TWIN-MODEL stands for the twin nature of the models to be delivered, i.e., at the HW and propagation channel levels. The main expected outcome is an integrated simulation tool enabling the design of future innovative components, materials, channels and waveforms for THz communications and sensing in the 6G era, ready to be integrated in the ARCADIA simulation framework. The optimization of graphene-based components will provide significant energy savings, making the THz technology green and sustainable.

Research Experience (continued)

🔖 **UPWARD: Modeling and SimUlation of comPonents and propagation channel for THz WiReless CommunicAtions gRaphene-baseD**

Role in the project: member of the research team. *Paper contribution*: (2024) 2

Research team: University of L'Aquila, University of Salerno.

Abstract: UPWARD is a curiosity driven project that addresses "Circular Economy" strategic emerging topics. The rationale of the proposal belong to CLUSTER 4 "Digital, Industry and Space", mainly in the area of Sovereignty in digital technologies and in future emerging enabling technologies. Recent advances in wireless communications and IoT open huge and promising perspectives for new applications, such as digital healthcare services, ubiquitous robotics, industrial automation, autonomous systems. These applications require high data-rate and bandwidth, capabilities offered by 6G in unlicensed bands at THz. THz wireless systems are an emerging technology that opens new perspectives towards the integration of communications and sensing into portable devices for the pervasive upgrade from the Internet of Things to the Internet of Everything. The latest electronics and material science improvements represent the enabling technological advancements for the engineering of high-performing, energy saving, small footprint devices. In this rich and articulated scenario for IoT applications in industrial automation, healthcare, and ambient intelligence, it is very important to deeply analyze the propagation mechanisms of THz signals and to develop new materials and components to make feasible and reliable the integration of communications and sensing at THz. The multipath characterization is very important for Industrial applications, where UWB communications in THz unlicensed bands enable the development of joint sensing-communications-localization services by the same THz system acting as a "distributed" radar-like system. However, THz technology is not yet mature enough to be commercially viable. This project aims at investigating the possibilities of end-to-end THz communication systems, as enabled by the novel graphene-based technologies, by developing a robust simulation framework for the integrated THz communication system. Because of excellent electrical, thermal, and mechanical properties, as well as its tunable electromagnetic (EM) behaviour, graphene has been regarded as the most valuable material for the interaction with THz frequency EM radiation since its discovery. The project's overall objective is to investigate the ultimate performance of graphene-based electronic components to support integrated THz communications and sensing for future 6G networks.

2023-25   🔖 **E-adaptive: ADAtActive SyStEmS for composite machining centres based on CNC milling machines and robots and predictive analysis of maintenance and downtime**

Role in the project: Member of the research team..

Abstract: The E-ADAPTIVE project aims to bring to the market a new large hybrid machining centre that combines in a single system the speed and creative potential of additive manufacturing processes of 3D printing technologies with the precision and reliability of a CNC milling centre. The new product, in effect a Protek machining centre, will fit into the technological framework of the company's advanced manufacturing systems. The E-ADAPTIVE project aims to fit into all the main sectors involved in CNC milling machining. To name but a few, we have Metalmechanics, Building, Pharmaceuticals, Furniture, Displays, Visual Communication and so on. The project only envisages the use of completely recyclable materials for the construction of the machine so as to limit the environmental impact of the entire product life cycle. This perspective is also pursued in the design choices of the machine's structural elements so as to optimise weight, consequently reducing the power required to drive the axes and thus reduce energy consumption. Finite element structural analyses were also used to verify the design solutions undertaken. The project was named E-ADAPTIVE in order to adapt to the requirements of the various sectors of use, both from the point of view of the size of the machine and from the point of view of its use on various types of materials, as well as for the availability of numerous loading and unloading systems and service systems for the project itself.

Research Experience (continued)

2023- 🔖 **DEWS Reaserch line: Wireless technologies applications - Medical applications**
Role in the project: Responsable of research line. *Paper contribution*: (2024) 1

Abstract: Wireless techniques and technologies are making significant improvements in a variety of application fields. The rapid development of radio frequency solutions, both standard and non-standard, enables the exploration of new interdisciplinary challenges including those related to medical and artistic contexts. In particular, the new Software Defined Network paradigm opens innovative approaches to research applications because it separates the application from previous constraints due to specific devices or technological advancements. The methodological approach to be followed when dealing with SDR is based on the exploitation and analysis of data coming from the wireless scenario, considering impairments of the wireless link as path loss, fading and interference as well as emitting power limitations. The choice of solutions to the analysis issues of the application must consider the use of sensorless monitoring, passive sensors or active sensors. In this context telecommunication and digital signal processing components can exploit the absence of constraints in terms of hardware and market availability offered by the SDR technology. With regard to IoMT (Internet of Medical Things), the availability of easy and sufficiently inexpensive diagnostic tools makes it possible to move patient monitoring, at least in the initial phase, from the hospital to the home, thus allowing resource savings and a less invasive approach. In this specific context, the line of research to be developed aims in the first instance to investigate solutions for the detection of the patient's health status through the analysis of body fluids (e.g., saliva) by exploiting radio signals. Such analysis favors the identification of requirements for the development of sensors for wireless monitoring, such as sensors for the oral cavity in order to analyze the habits and thus the health of the patient.

2023-24 🔖 **PNT Center for Automated Road-Transport" P-CAR - SUB-CONTRACT ESA Contract No. 4000134153/21/NL/CS, Coordinated by Radiolabs (Prime Contractor)**
Role in the project: WP Leader of WP4 and WP6.

Abstract:**WP4** Activities: Investigate the issues related to clock synchronisation when the player as to reproduce the signals in real time. Complete the assessment and analysis of the available assets and facilities and the identification of mission ones (e.g., for GNSS and CAN BUS simulator) in order to have a clear interface definition. Preliminary integration and testing of the hardware and software components inside the EX-EMERGE facilities. **WP6**; Activities: Contribute to the the final integration of the P-CAR laboratory with the EX-EMERGE facilities. Contribute to the P-CAR Test Plan, Test Specification and Procedures. Contribute to the verification of the P-CAR system according to the test specification and procedures defined.

Research Experience (continued)

2019-22 ◧ **COMP4DRONES**

Role in the project: Member of the research team.

Abstract: Drones can perform air operations that manned aircrafts struggle with, and their use brings significant economic savings and environmental benefits whilst reducing the risk to human life. Drone-based service and product innovation, as driven by increased levels of connectivity and automation, is limited by the growing dependence on poorly interoperable proprietary technologies and the risks posed to people, to other vehicles and to property. SESAR JU identified that issue has a high impact on European innovation, which demands R&D investments and incentives for the convergence of shared technologies and markets as a remedy. Actions creating globally harmonized, commercially exploitable yet widely accessible R&D ecosystems should be publicly performed. The COMP4DRONES project complements SESAR JU efforts with a particular focus on safe software and hardware drone architectures. COMP4DRONES will bear a holistically designed ecosystem ranging from application to electronic components, realized as a tightly integrated multi-vendor and compositional drone embedded architecture solution and a tool chain complementing the compositional architecture principles. The ecosystem aims at supporting (1) efficient customization and incremental assurance of drone embedded platforms, (2) safe autonomous decision making concerning individual or cooperative missions, (3) trustworthy drone-to-drone and drone-toground communications even in presence of malicious attackers and under the intrinsic platform constraints, and (4) agile and cost-effective compositional design and assurance of drone modules and systems. COMP4DRONES will also build an open sustainable ecosystem around public, royalty-free and goal-driven software platform standards that will ease the development of new drone functionalities for multiple application domains. Lead applications driving ecosystem development and benchmarking on the fields of transport, inspection, logistic, precision agriculture, parcel delivery.

2018-21 ◧ **AFARCLOUD: Aggregate Farming in the Cloud**

Role in the project: Member of the research team.

Abstract: Farming is facing many economic challenges in terms of productivity and cost-effectiveness, as well as an increasing labour shortage partly due to depopulation of rural areas. Furthermore, reliable detection, accurate identification and proper quantification of pathogens and other factors affecting both plant and animal health, are critical to be kept under control in order to reduce economic expenditures, trade disruptions and even human health risks. AFarCloud will provide a distributed platform for autonomous farming that will allow the integration and cooperation of agriculture Cyber Physical Systems in real-time in order to increase efficiency, productivity, animal health, food quality and reduce farm labour costs. This platform will be integrated with farm management software and will support monitoring and decision-making solutions based on big data and real time data mining techniques. The AFarCloud project also aims to make farming robots accessible to more users by enabling farming vehicles to work in a cooperative mesh, thus opening up new applications and ensuring re-usability, as heterogeneous standard vehicles can combine their capabilities in order to lift farmer revenue and reduce labour costs. The achievements from AFarCloud will be demonstrated in 3 holistic demonstrators (Finland, Spain and Italy), including cropping and livestock management scenarios and 8 local demonstrators (Latvia, Sweden, Spain and Czech Republic) in order to test specific functionalities and validate project results in relevant environments located in different European regions. AFarCloud outcomes will strengthen partners' market position boosting their innovation capacity and addressing industrial needs both at EU and international levels. The consortium represents the whole ICT-based farming solutions' value chain, including all key actors needed for the development, demonstration and future market uptake of the precision farming framework targeted in the project

Research Experience (continued)

2017-20 **MEGAM@RT2: MegaModelling at Runtime - scalable model-based framework for continuous development and runtime validation of complex systems**
Role in the project: Member of the research team.

Abstract:European industry faces stiff competition on the global arena. Electronic Components and Systems become more and more complex, thus calling for modern engineering practices to be applied in order to better tackle both productivity and quality. Model-based technologies promise significant productivity gains, which have already been proven in several studies and applications. However, these technologies still need more enhancements to scale up for real- life industrial projects and to provide more benefits in different contexts. The ultimate objective of improving productivity, while reducing costs and ensuring quality in development, integration and maintenance, can be achieved by using techniques integrating seamlessly design time and runtime aspects. Industrial scale system models, which are usually multi-disciplinary, multi-teams and serving to several product lines have to be be exploited at runtime, e.g. by advanced tracing and monitoring, thus boosting the overall quality of the final system and providing lessons-learnt for future product generations. MegaM@Rt2 brings model-based engineering to the next level in order to help European industry reducing development and maintenance costs while reinforcing both productivity and quality. To achieve that, MegaM@Rt2 will create a framework incorporating methods and tools for continuous development and runtime validation to significantly improve productivity, quality and predictability of large and complex industrial systems. MegaM@Rt2 addresses the scalability challenges with advanced megamodelling and traceability approaches, while runtime aspects will be tackled via so-called "models@runtime", online testing and execution traces analysis.

2019-20 **Radio monitoring into the underground Laboratori Nazionali del Gran Sasso**
Role in the project: Member of the research team.
Research team: University of L'Aquila, Istituto Nazionale di Fisica Nucleare (INFN), Laboratori Nazionali del Gran Sasso (LNGS) .

2015-18 **INCIPICT**
Role in the project: Member of the research team. *Paper contribution*: (2016) 1

Abstract: INCIPICT represents the context for testing advanced and pervasive wireless technologies, necessary to prepare the support layer for innovative applications and provides research on techniques solutions for reduction of energy consumption and increase of transmission speed (and bandwidth). Our research program starts from the recent proposal to harness the random behavior of the wireless channel for communication. This paradigm has been called Space Modulation (SM). Another research work is focused on Network Coding (NC). The Network Coding is based on the following assumption: the nodes must recombine different incoming packets in one or more outgoing packets instead of simply retransmitting what they receive. An important application of the research in wireless technologies is the real time tracking and localization. The localization of the people allows the creation of health care systems with the ability to offer outpatient services. The technologies for the localization using network or satellite may be used to quickly and accurately locate the position of a user in case of emergency and communicate the information. Proximity location services can direct the users at the nearest place for the first assistance.

2016-17 **RAISS: Remote-sensing Atmo-hydrological Integrated Surveillance System**Integrated system for atmo-hydrological surveillance and remote sensing on a local scale
Role in the project: Member of the research team.

Research Experience (continued)

2013-16 **GRETA: GREen TAgs with ultrawideband identification and localization capabilities**
Role in the project: Member of the research team. *Paper contribution*: (2016) 4
Abstract: his project is concerned with innovative solutions and disruptive technologies aimed at the realization of a distributed system for identification, localization, tracking and monitoring in indoor scenarios, based on ecofriendly materials, where the tags must be: i) localizable with sub-meter precision even in indoor scenarios and in the presence of obstacles, ii) small-sized (flat, with an area in the order of a few square centimeters) and working without cumbersome batteries, iii) made with recyclable materials, to be integrated in goods, clothes and packings. Ultra-wideband (UWB) localization techniques are fundamental enablers and rely on environmental energy gathering, together with passive transmission techniques based on backscattering modulation and tag circuitry based on "green electronics".

KHESTO - Know-How Enhancement for Sustainable Transportation Organization
Role in the project: Member of the research team.
Abstract:KHE-STO has been financed by IPA Program which is focused on the cooperation in the Adriatic area. A good transportation system is the fundamental basis for the attractiveness of a territory for investments and competitiveness. Moreover, the improvement of accessibility between and towards peripheral areas will surely reduce the depopulation of these areas. KHE-STO intends to contribute to Priority 3, measure 3.2, "Sustainable mobility systems" since its main goal is the improvement of the links among the Adriatic territories by promoting a better use of travelling time of commuters and students stimulating the use of public lines and reducing traffic jam and pollution. KHE-STO, by the installation of innovative ICT tools on buses and trains used by commuters, will experiment a new type of e-work, with the following main features: 1) worker delocalization; 2) availability of suitable tools; 3) direct connection with company/school. KHE-STO aims to consider the travelling in the computation of the daily working/studying hours, providing the traveller more free time for the social life.

2013-15 **Sensor networks and distributed architectures for control and wireless communications**
Role in the project: Member of the research team.
Abstract: A research project funded by MIUR and led by Thales Italia; it also involves the DISIM department and the spin-off companies WEST Aquila and Beep Innovation of the University of L'Aquila. It is a large R&D project that aims at supporting the development of novel technological assets at Thales Italia in the field of heterogeneous wireless networks and advanced platforms for computation and communications in support of various applications. The activities are concerned with a hierarchical wireless communications network that include RFiD, WSNs, MANETS and wireless backbone segments. The project also includes a smart middleware that embeds advanced algorithms for supporting distributed coding at source and network level, positioning and security. Advanced HW/SW architectures represent the main target on the implementation side.

2014-15 **DAHMS**
Role in the project: Member of the research team.
Abstract: Distributed Architecture Home Modular Multifunctional Systems: DEWS participates to the project through the Associated Lab of Radiolabs Consortium, that is in part hosted by DEWS Lab. The project aims at developing a modular architecture and related services for Home Automation and Remote Healthcare delivery. The project will provide tools for appropriate resources allocation (infrastructure, services, data processing etc.). DEWS is mainly involved in defining and developing protocol architectures for WSNs in home environment, their exploitation for indoor localizazione and their integration with typical electrical power bus.

Research Experience (continued)

2012-14 ■ **Bando Riditt - Ricostruire**
Role in the project: Member of the research team.
Abstract: Trasferimento tecnologico e creazione di nuove imprese nell'ambito delle tecnologie ICT avanzate applicate allo sviluppo economico e territoriale post-sisma. Bando RIDITT 2009, 2012-2014 (21 months). The project aims at developing laboratories for knowledge and technology transfer on the following topics: Open Source SW, Smart heterogeneous networks, ICT services for smart and secure buildings.

■ **DAHMS**
Role in the project: Member of the research team.
Abstract: Distributed Architecture Home Modular Multifunctional Systems: DEWS participates to the project through the Associated Lab of Radiolabs Consortium, that is in part hosted by DEWS Lab. The project aims at developing a modular architecture and related services for Home Automation and Remote Healthcare delivery. The project will provide tools for appropriate resources allocation (infrastructure, services, data processing etc.). DEWS is mainly involved in defining and developing protocol architectures for WSNs in home environment, their exploitation for indoor localizazione and their integration with typical electrical power bus.

2012-15 ■ **Bando Riditt 2009 – SMILING : SMart In home LIviNG: Innovative sensor and automation technologies dedicated to Home Automation (RIDITT 2009)**
Role in the project: Member of the research team.
Abstract: The project aims at the creation of a 'laboratory' for the transfer from research to the business world of advanced automation and sensor technologies for application in the field of home automation. They will make it possible to develop innovative products and provide new services to improve the quality of living and the energy efficiency of homes. The 'laboratory' will perform three main functions: it will serve as a demonstrator of the innovative technologies proposed by the research centres, it will stimulate and support, both at a technical and organisational-managerial level, the creation of new high-tech companies, and finally it will serve the new companies to carry out experimental tests and as a meeting and technology comparison point.

2009-12 ■ **VISION: Video-oriented UWB-based Intelligent Ubiquitous Sensing** (FP7 "Ideas" Specific Programme - European Research Council Staring Grant Agreement, no.: 240555
Role in the project: Member of the research team.
Abstract: VISION will develop an innovative infrastructure aiming at strengthening future wireless sensor networks (WSN) with the capability of supporting intelligent services for ubiquitous sensing, with particular emphasis on real-time 3D video sensing

2010-12 ■ **CASA+ Integrated domotic platform for enabling autonomy of disabled people**
Role in the project: Member of the research team.
Abstract: The project started in 2010 and it is funded by AIPD (No profit association for disabilities) and Vodafone Foundation (2010-2012). The research is focused on developing smart and non-intrusive solutions for networking, tracking and user interfaces to help people with disabilities to carry out basic daily life operations. A test bed has been developed in cooperation with WEST Aquila srl.

Research Experience (continued)

Wireless sensor monitoring of the Basilica di Collemaggio, L'Aquila
Role in the project: Member of the research team.
Abstract:Structural health monitoring systems have a key role in building maintenance and their post-disaster assessment. Traditional systems are made up of grids of sensors deployed along the building and communicating with a central processing unit via a cable connection. In the last years, Wireless Sensor Networks (WSN) emerged as a possible attractive alternative solution. In facts, the replacement of cables with wireless connections along with the use of modern sensors allows to obtain significant benefits in terms of cost, size, ease of installation and invasivity (key issue in the case of historical buildings).

2010-11 **Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise**
Role in the project: Member of the research team.
Abstract: Evaluation of advanced solutions for solving problems in RFID tag management for animal tracking and permanent RFID kill

DISTRETTO ABRUZZO: Wireless Networks and Advanced Platform for Smart Agriculture. Funded by Ministry of Research
Role in the project: Member of the research team.
Research team: University of L'Aquila, Selex Communications.
*Abstract*The aim of this project is to define and develop a platform relying on wireless sensor networks for constant and energy efficient environment monitoring oriented to support advanced practices in the food chain. The project has already led to a test-bed development.

Supervisor of Thesis

Doctor of Philosophy degree (PhD)

1. A. L. Zuriarraín Sosa, "**Accurate and reliable positioning solutions through multi-constellation and multi-sensor approaches**," Information and Communication Technology - DISIM - University of L'Aquila, Supervisor : F. Santucci, R. Alesii, PhD thesis, 2024.

2. A. Piccioni, "**Software-Defined Radio for Spectral Analysis and Integrated Sensing and Communications**," Information and Communication Technology - DISIM - University of L'Aquila, Supervisor : F. Graziosi, R. Alesii, PhDthesis, Jul. 2023.

Bachelor's and Master's degree

1. V. Giuseppe, "**Localizzazione opportunistica non cooperativa: SDR per il caso ADS-B**," Master's degree, Telecommunications Engineering - University of L'Aquila, Supervisor: R. Alesii, Co-Supervisor: A. Zurrian, 2023.

2. P. Capanna, "**Study and experimentation of the communication and sensing integration**," Master's degree, Telecommunications Engineering - University of L'Aquila, Supervisor: R. Alesii, Co-Supervisor: A. Piccioni, 2022.

3. M. Passaretti, "**Backscattering communication and synthetic aperture radar**," Master's degree, Telecommunications Engineering - University of L'Aquila, Supervisor: R. Alesii, Co-Supervisor: A. Piccioni, 2021.

4. M. Paris, "**Vulnerabilities in mobile networks power analysis technique test on USIM**," Bachelor's Degree, Information Engineering - University of L'Aquila, Supervisor: R. Alesii, Co-Supervisor: T. Walter, 2020.

5 G. Ciaglia, "**Experimental validation of RF energy harvesting devices**," Bachelor's Degree, Information Engineering - University of L'Aquila, Supervisor: F. Santucci, Co-Supervisor: R. Alesii, 2019.

6 A. Piccioni, "**Study, analysis and experimentation of techniques for the recognition of wireless transmissions in the Software Defined Radio environment**," Master's degree, Telecommunications Engineering - University of L'Aquila, Supervisor: R. Alesii, 2019.

7 S. Rapisarda, "**Simulation of medium access control algorithms for RFID systems**," Bachelor's Degree, Information Engineering - University of L'Aquila, Supervisor: F. Santucci, R. Alesii, Co-Supervisor: R. Valentini, 2019.

8 M. D. Cristorafo, "**Study and experimental validation of RFID systems based on the Gen2 standard**," Bachelor's Degree, Information Engineering - University of L'Aquila, Supervisor: R. Alesii, 2018.

9 A. L. Z. Sosa, "**Study and development of UHF RFiD Reader in Software Defined Radio**," Master's degree, Telecommunications Engineering - University of L'Aquila, Supervisor: R. Alesii, 2018.

10 F. Adinolfi, "**Study and evaluation of solution for wireless energy harvesting for IoT**," Bachelor's Degree, Information Engineering - University of L'Aquila, Supervisor: R. Alesii, , Co-Supervisor: F. Santucci, 2017.

11 A. Piccioni, "**Study and performance analysis of Q-Algorithm in radio identification systems**," Bachelor's Degree, Telecommunications Engineering - University of L'Aquila, Supervisor: F. Santucci, , Co-Supervisor: R. Alesii, 2017.

12 M. Graziosi, "**Radio frequency identification systems and their development on programmable platforms**," Bachelor's Degree, Information Engineering - University of L'Aquila, Supervisor: F. Santucci, , Co-Supervisor: R. Alesii, 2016.

13 N. Torto, "**Study, analysis and simulation of an rfid system with uwb backscattering communication technique**," Master's degree, Telecommunications Engineering - University of L'Aquila, Supervisor: F. Santucci, , Co-Supervisor: R. Alesii, 2016.

14 M. Roselli, "**Analysis and testing of a system for geographic position delimitation**," Master's degree, Telecommunications Engineering - University of L'Aquila, Supervisor: L. Pomante, , Co-Supervisor: R. Alesii, 2015.

15 L. Giordani, "**Study, design and evaluation of a node with rfid interface for a wireless sensor network**," Master's degree, Telecommunications Engineering - University of L'Aquila, Supervisor: F.Graziosi , Co-Supervisor: R. Alesii, 2014.

16 A. Persia, "**Performance analysis of radio systems for indoor moving object detection**," Master's degree, Telecommunications Engineering - University of L'Aquila, Supervisor: F. Santucci F.Graziosi , Co-Supervisor: R. Alesii, 2014.

17 A. D'Alessio, "**Analysis, design and testing of a mixed RFID- Barcode product tracking system**," Master's degree, Information and Automation Engineering - University of L'Aquila, Supervisor: L. Pomante , Co-Supervisor: R. Alesii, 2013.

18 M. Faraone, "**Study and testing of systems for the detection of moving objects based on radio channel analysis in the area of interest**," Bachelor's Degree, Information Engineering - University of L'Aquila, Supervisor: F. Santucci, , Co-Supervisor: R. Alesii, 2013.

19 M. Boschi, "**Study and implementation of a service for access to environmental monitoring systems**," Bachelor's Degree, Telecommunications Engineering - University of L'Aquila, Supervisor: F. Santucci, Co-Supervisor: R. Alesii, 2011.

20 O. D. Braccio, "**Wireless Sensor Network for Precision Agriculture**," Bachelor's Degree, Telecommunications Engineering - University of L'Aquila, Supervisor: F. Santucci, Co-Supervisor: R. Alesii, 2011.

21 G. Carnevale, "**Development of a remote camera management system**," Master's degree, Master's Degree in Computer and Automatic Engineering - University of L'Aquila, Supervisor: L. Pomante, , Co-Supervisor: R. Alesii, 2011.

22 R. D'Ignazio, "**Studying and testing wireless sensor networks for precision agriculture**," Bachelor's Degree, Telecommunications Engineering - University of L'Aquila, Supervisor: F. Santucci, Co-Supervisor: R. Alesii, 2011.

23 V. Forte, "**Software development for radio communication within a body area network**," Bachelor's Degree, Telecommunications Engineering - University of L'Aquila, Supervisor: F. Graziosi, Co-Supervisor: R. Alesii, 2011.

24 G. Valente, "**Ultra-wideband radio identification systems**," Bachelor's Degree, Electronics Engineering - University of L'Aquila, Supervisor: F. Santucci, , Co-Supervisor: R. Alesii, 2011.

25 S. Amoroso, "**Study and design of a communication protocol for short-range radio networks in geotechnical applications**," Master's degree, Master's Degree in Telecomunication Engineering - University of L'Aquila, Supervisor: F. Santucci, Co-Supervisor: R. Alesii, 2010.

26 A. Giancola, "**Study and design of a monitoring system using wireless sensor networks**," Master's degree, Telecommunications Engineering - University of L'Aquila, Supervisor: F. Santucci, Co-Supervisor: R. Alesii, 2010.

27 G. D. Luca, "**Design of a monitoring network for large spaces in the absence locally of other communication networks**," Bachelor's Degree, Telecommunications Engineering - University of L'Aquila, Supervisor: F. Graziosi, Co-Supervisor: R. Alesii, 2010.

28 P. Mantenuto, "**analysis and design development of a distributed network for locating individuals in confined environments**," Master's degree, Master's Degree in Elettronics Engineering - University of L'Aquila, Supervisor: M. Faccio, Co-Supervisor: R. Alesii, 2010.

29 A. Moro, "**Study and simulation of RFID technology in combination with wireless sensor networks**," Bachelor's Degree, Telecommunications Engineering - University of L'Aquila, Supervisor: F. Graziosi, Co-Supervisor: R. Alesii, 2010.

30 U. Mosca, "**Application of the Particle Filter in a sensor network to improve the tracking of a mobile node, within the BEM framework**," Master's degree, Master's Degree in Computer and Automation Engineering - University of L'Aquila, Supervisor: F. Graziosi, Co-Supervisor: R. Alesii, 2010.

31 A. Pisegna, "**Study and simulation of communication protocols for Body Area Networks**," Master's degree, Master's Degree in Telecomunication Engineering - University of L'Aquila, Supervisor: F. Santucci, Co-Supervisor: R. Alesii, 2010.

32 A. Villa, "**Automatic optimisation of MAC protocol parameters**," Master's degree, Master's Degree in Telecomunication Engineering - University of L'Aquila, Supervisor: F. Graziosi, Co-Supervisor: R. Alesii, 2010.

33 T. Zamaretti, "**Design of a low-power communication protocol for a body area network**," Bachelor's Degree, Telecommunications Engineering - University of L'Aquila, Supervisor: F. Santucci, Co-Supervisor: R. Alesii, 2010.

34 S. Beccaceci, "**Study and specification of a Radio Frequency Identification System (RFID)**," Bachelor's Degree, Degree in Telecommunications Engineering - University of L'Aquila, Supervisor: F. Santucci, Co-Supervisor: R. Alesii, 2009.

35   S. Fattori, "**Development of a sensor node for monitoring applications via wireless sensor networks**," Bachelor's Degree, Degree in Telecommunications Engineering - University of L'Aquila, Supervisor: F. Graziosi, Co-Supervisor: R. Alesii, 2009.

36   L. Giordani, "**Application of WSNs in geophysical surveys**," Bachelor's Degree, Degree in Telecommunications Engineering - University of L'Aquila, Supervisor: F. Graziosi, Co-Supervisor: R. Alesii, 2009.

37   T. Cicciarelli, "**Localisation algorithms based on rssi measurements on sensor networks**," Bachelor's Degree, Degree in Telecommunications Engineering - University of L'Aquila, Supervisor: F. Santucci, Co-Supervisor: R. Alesii, 2007.

38   G. D. Iorio, "**Study and realisation of solutions for light intensity control based on wireless sensor networks**," Bachelor's Degree, Degree in Electronic Engineering - University of L'Aquila, Supervisor: F. Graziosi, Co-Supervisor: R. Alesii, 2007.

39   S. Micheletti, "**Study and realisation of a system for controlling ambient light intensity based on wireless sensor networks**," Bachelor's Degree, Degree in Telecommunications Engineering - University of L'Aquila, Supervisor: F. Graziosi, Co-Supervisor: R. Alesii, 2007.

40   M. Novelli, "**Study, realisation and characterisation of planar antenna for floor-immersed sensors**," Bachelor's Degree, Degree in Telecommunications Engineering - University of L'Aquila, Supervisor: Piero Tognolatti, Co-Supervisor: R. Alesii, 2007.

41   F. Pecchia, "**Study and design of an RJ45 connector for high bit-rate data transmission**," Bachelor's Degree, Degree in Telecommunications Engineering - University of L'Aquila, Supervisor: F. Graziosi, Co-Supervisor: R. Alesii, 2007.

42   A. Ponziani, "**Localisation in sensor networks: cricket system analysis**," Bachelor's Degree, Degree in Electronic Engineering - University of L'Aquila, Supervisor: F. Graziosi, Co-Supervisor: R. Alesii, 2007.

43   L. Pucci, "**Study and realisation of the basic elements for controlling light intensity based on wireless sensor networks**," Bachelor's Degree, Degree in Telecommunications Engineering - University of L'Aquila, Supervisor: F. Graziosi, Co-Supervisor: R. Alesii, 2007.

44   P. Bagaglini, "**Study and Simulation of Synchronism Acquisition Techniques for UW Systems**," Master's degree, Master's Degree in Electronic Engineering - University of L'Aquila, Supervisor: F. Graziosi, Co-Supervisor: R. Alesii, 2006.

45   C. Bonaventura, "**Transporting Information with Time Transparency Requirements in Wireless Sensor Networks**," Bachelor's Degree, Degree in Telecomunication Engineering - University of L'Aquila, Supervisor: F. Santucci, Co-Supervisor: R. Alesii, 2006.

46   D. De Leonardis, "**Detecting the motion of a body on flat surfaces using Wireless Sensor Networks**," Bachelor's Degree, Degree in Telecomunication Engineering - University of L'Aquila, Supervisor: F. Graziosi, Co-Supervisor: R. Alesii, 2006.

L'Aquila, 18/06/2025