

Federica Zonzini

Tenure-Track Researcher (RTT) in Electronics
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Google Scholar ORCID Scopus Web of Science LinkedIn University of Bologna

Highlights

2026 – 2027 **Technical Program Chair** of IEEE COINS 2026 in Bologna and IEEE COINS 2027 in Stavanger

2025 **National Scientific Habilitation** as Associate Professor in Electronics (ASN, 09/E3)

2022 Two **Ph.D. thesis awards**: IEEE Italy Section and “Claudio Bonivento”

2026 **Winner** of the TinyML COINS Contest at the 2026 IEEE COINS Conference

2023 – 2025 Three European Commission **Seals of Excellence** for MSCA fellowship proposals, scoring up to 95.4%

Since 2022 **Project leadership**: Principal Investigator of NEuroStruct, task and work package leader in EdgeAI, task leader in SHIELD

About

I am a tenure-track researcher in Electronics at the University of Bologna and a senior researcher in the Intelligent Sensor Systems Laboratory (ISS Lab). I study, prototype and implement high-performance electronic systems with built-in local computing, optimizing the whole design process of microcontroller-based systems, from sampling to data delivery.

My work connects signal processing, tiny machine learning and emerging computing approaches such as analog in-memory computing. Applications include structural, environmental and railway monitoring, non-destructive testing with vibrations, acoustic emissions and guided waves, and precision agriculture.

Intelligent Sensor Systems Laboratory (ISS Lab)
The lab, led by Prof. Luca De Marchi, develops intelligent sensor systems for civil and industrial monitoring, biomedical applications and precision agriculture. I am responsible for its scientific activities on microcontroller-based systems for on-sensor processing, from signal conditioning to artificial intelligence.

Academic timeline

2026 – present **Tenure-Track Researcher (RTT)**
DEI, University of Bologna

2025 **National Scientific Habilitation (ASN), Associate Professor**
Competition sector 09/E3, Electronics. Valid until March 2037

2023 – 2026 **Junior (fixed-term) Assistant Professor (RTD-A)**
DEI, University of Bologna. Intelligent processing of data and signals from sensors, within PNRR FAIR, Spoke 8: Pervasive AI

2022 – 2023 **Adjunct Professor**
DEI, University of Bologna

2022 **Visiting Researcher**
Dynamical Systems and Risk Laboratory, University College Dublin, with Prof. Vikram Pakrashi. On-chip eigenperturbation approaches for real-time vibration analysis

2021 – 2023 **Research Fellow**
ARCES, University of Bologna. Tiny machine learning and low-power maintenance of railway infrastructure

2020 – 2021 **Visiting Scholar**
Structural Mechanics and Monitoring Group, ETH Zürich, with Prof. Eleni Chatzi. System identification at the extreme edge

2018 – 2022 **Ph.D. in Structural and Environmental Health Monitoring and Management (XXXIV cycle)**
University of Bologna. Excellent cum laude. Thesis: Intelligent Sensor Systems for Structural Health Monitoring Applications

2016 – 2018 **M.Sc. in Electronics Engineering, 110/110 cum laude**
University of Bologna. Also Collegio Superiore alumna, Institute of Advanced Studies

2013 – 2016 **B.Sc. in Electronics Engineering for Energy and Information, 110/110 cum laude**
University of Bologna. Thesis on an Ultra-Wide Band localization system

Research

Research themes, funded projects, software and data.

Research themes

Signal processing for efficient embedded systems

Sensor-near processing reduces transmitted data, lowers latency and extends the working life of wireless sensor networks.

- Model-assisted rakeness-based compressed sensing, which adapts the compression matrix to the signal class
- Autoregressive system identification on microcontrollers, with compression above 50x, including the open-source PARSY-VDD solution
- Graph signal processing to cluster accelerometer nodes without redundant measurement points

Artificial intelligence at the extreme edge

Inference models designed around the limits of the hardware that runs them.

- Tiny deep learning for vibration analysis and acoustic emission monitoring, including capsule and spiking neural networks
- Hardware-aware neural architecture search that accounts for sampling, data size and energy budget
- Analog in-memory computing on phase change memory, tested on 28 nm STMicroelectronics prototypes

Intelligent sensor systems for structural and environmental monitoring

Complete low-power systems that combine sensing, distributed processing and IoT communication.

- Wireless vibration monitoring with nano-drones as sensor nodes, for places unsafe for human operators
- Railway catenary monitoring with RFI, demonstrated in an operational environment (TRL 7)
- Heterogeneous networks that measure vibrations, guided waves and acoustic emissions together
- Low-cost environmental sensors for Agriculture 4.0, such as evapotranspiration estimation

Acoustic transducers and guided-wave communication

Using the structure as the channel and the guided wave as the message, where radio propagates poorly.

- Characterization of frequency steerable acoustic transducers (FSATs), which reduce electronics, power and device count
- Frequency, time, code, phase and amplitude modulation schemes, reaching data rates of up to a few hundred kbps

Physics-guided deep learning for device modeling

A newer research direction, with a paper in preparation.

- A physics-guided tandem deep-learning framework that predicts TCAD device parameters from capacitance and conductance curves

Projects

2025 – 2029 **DIAMOND: Decentralized critical Infrastructure Asset Monitoring and coNDition assessment**
Co-supervisor of a doctoral candidate in the Bologna unit
HORIZON-MSCA-2024-DN-01, project 101227338

SHIELD: Long-term Structural Health monItoring of nuclear facilities using embedded acoustic Emission and machine Learning for Degradation detection
Leader of tasks T2.2 and T3.2, and Project Gender Officer
CONNECT-NM, EURATOM Cofund Action, co-funded by the European Union. 36-month project

2023 – 2026 **FAIR: Future Artificial Intelligence Research, Spoke 8 “Pervasive AI”**
Hired researcher and principal contributor to WP8.1, Task 8.1.2
Next Generation EU, PNRR M4C2 Inv. 1.3, PE00000013

2022 – 2026 **EdgeAI: Edge AI Technologies for Optimised Performance Embedded Processing**
Leader of Task T3.4 and co-leader of Work Package 4
HORIZON-KDT-JU-2021-2-RIA, project 101097300

2022 – 2024 **NEuroStruct: Neuromorphic-based Computing Platforms for Integrity Assessment of Critical Infrastructures at the Extreme Edge**
Principal Investigator
ALMArie CURIE 2022, SUpER line, University of Bologna

2021 – 2023 **DS2: Digital Smart Structures**
Task leader for wireless sensor networks based on nano-drones
INAIL, BRIC 2021

2019 – 2022
Arrowhead Tools for Engineering of Digitalisation Solutions
Testing and validation of the Web of Things platform in structural monitoring use cases
H2020-ECSEL-2018-1-IA-two-stage, project 826452

2019 – 2022
MAC4PRO: Smart maintenance of industrial plants and civil works through monitoring 4.0 and prognostic approaches
Development of heterogeneous sensor networks and validation of anomaly detection algorithms
INAIL, BRIC 2018

2017 – 2019
SmartBench: a smart platform for the integrated safety of high-reliability industrial plants
Development and field validation of an inertial sensor node
INAIL, BRIC 2016

2025
Open Innovation Scouting and International Open Innovation Programme, 2nd edition
Scientific lead
ECOSISTER, ART-ER, Emilia-Romagna Region

2020 – 2022
Predictive algorithms for railway catenary wear
Task leader for scenario modeling and sensor-near structural analysis
Rete Ferroviaria Italiana (RFI), CA5/2020

2018 – 2021
Monitoring of storage tanks through acoustic emissions
Testing and validation of anomaly detection and source identification
Eni

2018
A sensor node for monitoring hydraulic systems
Development and data analysis
REIA s.r.l.

Software and data

PARSY-VDD 2025
Open-source parallel end-to-end software framework for vibration diagnostics on multi-core RISC-V edge devices. Code on GitHub

Acoustic Emission dataset for impact localization: numerical and experimental case studies 2024
Public dataset of simulated and experimental acoustic emission signals on Zenodo

TinyML meets vibration-based Structural Health Monitoring 2021
Video of my talk at the tinyML EMEA Technical Forum

Collaborations

Research groups and organizations I work with, and the people I publish with.

Academic partners

University College Dublin, Dynamical Systems and Risk Laboratory 2022 – present
Prof. Vikram Pakrashi. On-chip eigenperturbation methods and new acoustic emission sensors. Member of the academic advisory board of the HarMonI project, and co-supervision of a doctoral candidate in the MSCA network DIAMOND

University of Genoa, Smart Embedded Applications Lab (DITEN) 2022 – present
Prof. Edoardo Ragusa, Prof. Paolo Gastaldo and Prof. Rodolfo Zunino. Joint optimization of sensing, local processing, transmission and accuracy for sensor-near AI

ETH Zürich, Structural Mechanics and Monitoring Group 2020 – present
Prof. Eleni Chatzi. Sensor-near system identification and dedicated hardware for vibration monitoring, starting from a research visit in 2020 and 2021

University of Siegen, previously Goethe University Frankfurt 2018 – present
Prof. Jochen Moll. Sensors and systems for guided-wave wireless communication, acoustic modulation and directional piezoelectric transducers

University of Stavanger, group of Prof. Florenc Demrozi
Anomaly detection on wearable devices with lightweight transformer models for biomedical applications. Joint work on the IEEE COINS conference series, including COINS 2027 in Stavanger

University of Bologna, interdepartmental collaborations
Heterogeneous sensor networks with the Departments of Computer Science and Engineering (DISI) and of Civil, Chemical, Environmental and Materials Engineering (DICAM). Sensors integrated into structures for acoustic emission monitoring with the Department of Industrial Engineering (DIN)

CEA, France
Dr. Arnaud Recoquillay. Project SHIELD, on acoustic emission monitoring of nuclear facilities

SINTEF 2022 – 2026
Partner in Task T3.4 of the EdgeAI project, AI-based electronic system design, which I led

imec 2022 – 2026
Partner in Task T3.4 of the EdgeAI project, AI-based electronic system design, which I led

CEA-Leti 2022 – 2026
Partner in Task T3.4 of the EdgeAI project, AI-based electronic system design, which I led

EDI, Institute of Electronics and Computer Science 2022 – 2026
Partner in Task T3.4 of the EdgeAI project, AI-based electronic system design, which I led

Non-academic partners

Rete Ferroviaria Italiana (RFI) 2020 – 2022
Predictive algorithms for railway catenary wear, with a wireless sensor network tested on the Bologna–Ancona and Bologna–Milan lines

INAIL, Italian National Institute for Insurance against Accidents at Work 2017 – 2023
Projects SmartBench, MAC4PRO and DS2, on sensor networks for structural monitoring, smart maintenance and the safety of industrial plants

STMicroelectronics 2023 – present
Marco Pasotti, Smart Power TR&D. Analog in-memory computing with phase change memory, including a co-supervised doctoral candidate. Also a portable sensing system for viticulture with STMicroelectronics France, within EdgeAI

SCM Group 2022 – 2026
Partner in Task T3.4 of the EdgeAI project

Signify 2022 – 2026
Partner in Task T3.4 of the EdgeAI project

ART-ER, Emilia-Romagna Region 2025
Open Innovation programme within ECOSISTER, connecting companies and research groups on the ecological transition

Eni 2018 – 2021
Acoustic emission monitoring of large fuel storage tanks

REIA s.r.l. 2018
A heterogeneous sensor node for monitoring cavitation in hydraulic pumps

Infineon Technologies Italia
Supervision of student theses on design for testability

Baker Hughes
Acoustic-based condition maintenance of industrial assets with deep learning

TÜV Austria
Maintenance of industrial infrastructures based on acoustic emission

HPE COXA
Anomaly detection on rotating machines with embedded approaches

Publications

Titles link to the DOI when one exists.

Selected publications

A mix of recent work, leading venues and my most cited papers. Citation counts from Google Scholar, November 2026.

Energy-efficient deep learning-based vibration monitoring on parallel ultra-low-power microcontrollers
Kiamarzi A., **Zonzini F.**, Moallemi A., Rossi D., Tagliavini G.. *Engineering Applications of Artificial Intelligence, 185, 116206, 2026*

Bay-Fi: Approximate Bayesian main Frequency Identification for extremely undersampled signals
Nardin C., Zorzi S., **Zonzini F.**, Costa C., Broccardo M.. *Mechanical Systems and Signal Processing, 254, 114339, 2026*

Combining Compressed Sensing and Neural Architecture Search for Sensor-Near Vibration Diagnostics
Ragusa E., **Zonzini F.**, Gastaldo P., De Marchi L.. *IEEE Transactions on Industrial Informatics, 2024* `Co-first author`

Compression-Accuracy Co-optimization Through Hardware-aware Neural Architecture Search for Vibration Damage Detection
Ragusa E., **Zonzini F.**, De Marchi L., Zunino R.. *IEEE Internet of Things Journal, 2024* `Co-first author`

System Identification at the Extreme Edge for Network Load Reduction in Vibration-based Monitoring
Zonzini F., Dertimanis V., Chatzi E., De Marchi L.. *IEEE Internet of Things Journal, 2022*

Model-assisted Compressed Sensing for Vibration-based Structural Health Monitoring
Zonzini F., Zauli M., Mangia M., Testoni N., De Marchi L.. *IEEE Transactions on Industrial Informatics, 2021*

Vibration-Based SHM With Upscalable and Low-Cost Sensor Networks
Zonzini F., Malatesta M.M., Bogomolov D., Testoni N., Marzani A., De Marchi L.. *IEEE Transactions on Instrumentation and Measurement, 2020*

All publications

2026 11

A Design Strategy for Energy-Efficient Smart Sensor Nodes in Vibration Monitoring
Ragusa E., **Zonzini F.**, De Marchi L., Gastaldo P.. *Under review at IEEE Transactions on Consumer Electronics* `Under review` `Co-first author`

Structural Health Monitoring Flies on Drones: Transforming Nano-drones into a Wireless Sensor Network for Vibration Inspection
Zauli M., **Zonzini F.**, Pirazzi M., De Marchi L.. *Submitted to IEEE Internet of Things Journal* `Under review`

Material-Agnostic Acoustic Emission Mapping in a Probabilistic Framework
Baldini B., **Zonzini F.**, De Marchi L.. *Preprint, SSRN, 2026*

Bay-Fi: Approximate Bayesian main Frequency Identification for extremely undersampled signals
Nardin C., Zorzi S., **Zonzini F.**, Costa C., Broccardo M.. *Mechanical Systems and Signal Processing, 254, 114339, 2026*

Energy-efficient deep learning-based vibration monitoring on parallel ultra-low-power microcontrollers
Kiamarzi A., **Zonzini F.**, Moallemi A., Rossi D., Tagliavini G.. *Engineering Applications of Artificial Intelligence, 185, 116206, 2026*

Identification of bridge curvature profiles from dynamic responses induced by moving vehicles using autoregressive models
Quqa S., Siddiqui M.A., **Zonzini F.**, Palermo A.. *Mechanical Systems and Signal Processing, 241, 113553, 2026*

Impact localization in composite laminates by minimally intrusive piezoelectric nanostructured sensor
Ternelli T., Mongioì F., Maccaferri E., Baldini B., Quack J., **Zonzini F.**, Zucchelli A., Brugo T.M.. *Composites Part B: Engineering, 320, 113671, 2026*

Adaptive Compressed Sensing with Masked Sensing Matrices and Support Estimation-Based Decoding for Structural Health Monitoring Applications
Ravaglia G., Quqa S., Enttsel A., Mangia M., Palermo A., **Zonzini F.**. *34th European Signal Processing Conference (EUSIPCO 2026), Bruges, 2026*

An Heterogeneous Multi-Sensor Platform for Structural Health Monitoring
Zauli M., Barrasso I., De Marchi L., **Zonzini F.**. *IEEE International Symposium on Measurement in Networking and Communications (MNC 2026), 2026*

Flexibility Enables Sensitivity: A Multi-sensor Architecture for Structural Monitoring
Zauli M., **Zonzini F.**, De Marchi L.. *e-Journal of Nondestructive Testing, 2026*

Uncovering Invisible Delaminations: A MEMS Sensor Suite and Spectral-Subtraction Pipeline for Multilayer Diagnostics
Zauli M., **Zonzini F.**, Laaraji Y., Mariani F., Caliano G., De Marchi L.. *12th European Workshop on Structural Health Monitoring (EWSHM 2026). e-Journal of Nondestructive Testing, 2026*

2025 12

ARMA Model for Tracking Accelerated Corrosion Damage in a Steel Beam
Zolfagharysaravi S., Bogomolov D., Larocca C.B., **Zonzini F.**, Peppi L.M., Lovecchio M., De Marchi L., Marzani A.. *Sensors, 25, 2384, 2025*

Parallelization is All System Identification Needs: End-to-End Vibration Diagnostics on a Multicore RISC-V Edge Device
Kiamarzi A., Moallemi A., **Zonzini F.**, Brunelli D., Rossi D., Tagliavini G.. *IEEE Internet of Things Journal, 12, 24230–24243, 2025*

PZT piezoceramic nanofibers for impact localization in composite laminates
Selleri G., Gino M.E., **Zonzini F.**, De Marchi L., Focarete M.L., Fabiani D., Zucchelli A., Brugo T.M.. *Thin-Walled Structures, 218, 114104, 2025*

A novel, Low-cost Leaf Sensor Node Prototype for near Real Time Evapotranspiration Estimation
Peppi L.M., **Zonzini F.**, De Marchi L., Manfrini L.. *IEEE Sensors Applications Symposium (SAS 2025), Newcastle, 2025*

Bayesian Approach for Main Frequency Identification on Extremely Under-Sampled Signals
Nardin C., Zorzi S., **Zonzini F.**, Zonta D., Bursi O.S., Broccardo M.. *EVACES 2025, Porto, Springer, 2025*

Demonstration of Single Channel Beamforming with Frequency Steerable Acoustic Transducers Using Low-Cost Hardware
Coppola V., Donati G., Taccetti S., **Zonzini F.**, Mohammadgholiha M., De Marchi L.. *IEEE International Ultrasonics Symposium (IUS 2025), Utrecht, 2025*

Identification of Influence Lines Obtained from Acceleration Measurements
Siddiqui M.A., **Zonzini F.**, Quqa S., Palermo A.. *EVACES 2025, Porto, Springer, 2025*

Improving Damage Localization Through Gaussian Process Regression and Enhanced Acoustic Emissions Time of Arrival Estimation
Baldini B., **Zonzini F.**, De Marchi L.. *IEEE International Ultrasonics Symposium (IUS 2025), Utrecht, 2025*

Minimally Intrusive SHM Systems Using Piezoelectric Nanofibers in Composite Laminates
Mongioì F., Ternelli T., Brugo T.M., **Zonzini F.**, Palazzetti R., Bettini P., De Marchi L., Zucchelli A.. *International Workshop on Structural Health Monitoring (IWSHM 2025), 2025*

Practical Demonstration of a Wireless Sensor Network Based on Nano-Drones for Integrity Assessment
Zauli M., **Zonzini F.**, Pirazzi M., De Marchi L.. *ApplePies 2025, Turin, 2025*

Sensing Parameters Versus Accuracy for Energy-Efficient Accelerometer Sensors
Ragusa E., **Zonzini F.**, Gastaldo P., Zunino R., De Marchi L.. *LVI Annual Meeting of the Italian Electronics Society (SIE 2025), Naples, Springer, 2025* `Co-first author`

The Impact of Sensing Parameters on Vibration Anomaly Detection Using Tiny DNNs
Ragusa E., **Zonzini F.**, De Marchi L., Gastaldo P.. *International Joint Conference on Neural Networks (IJCNN 2025), Rome, 2025* `Co-first author`

2024 16

Combining Compressed Sensing and Neural Architecture Search for Sensor-Near Vibration Diagnostics
Ragusa E., **Zonzini F.**, Gastaldo P., De Marchi L.. *IEEE Transactions on Industrial Informatics, 2024* `Co-first author`

Compression-Accuracy Co-optimization Through Hardware-aware Neural Architecture Search for Vibration Damage Detection
Ragusa E., **Zonzini F.**, De Marchi L., Zunino R.. *IEEE Internet of Things Journal, 2024* `Co-first author`

Next Generation Edge-Cloud Continuum Architecture for Structural Health Monitoring
Gigli L., Zyrianoff I., **Zonzini F.**, Bogomolov D., Testoni N., Di Felice M., De Marchi L., Augugliaro G., Mennuti C., Marzani A.. *IEEE Transactions on Industrial Informatics, 2024*

Spiking Neural Networks for Energy-efficient Acoustic Emission-Based Monitoring
Zonzini F., Xiang W., De Marchi L.. *IEEE Open Journal of Instrumentation and Measurement, 2024*

A Damage Detection Strategy Based on Autoregressive Parameters
Siddiqui M.A., **Zonzini F.**, Quqa S., Palermo A., Landucci M.. *IOMAC 2024, Naples, Springer, 2024*

Deep Learning-Aided Acoustic Source Localization in Thin-Walled Waveguides
Donati G., **Zonzini F.**, Mariani S., Bogomolov D., De Marchi L.. *European Workshop on Structural Health Monitoring (EWSHM 2024), Potsdam. Research and Review Journal of Nondestructive Testing, 2024* `★ Best Young Author Paper Award`

Enhancing Vibration Inspection via Compressed Sensing Based on Embedded Phase Change Memories
Zonzini F., Zavalloni F., Martinelli D., Antolini A., Franchi Scarselli E., Pasotti M., De Marchi L.. *Proceedings of SIE 2024, Genoa, Springer, 2024*

Evaluating Unmanned Aerial Vehicles for Vibrational Analysis: Exploiting Integrated Capabilities of Nano-Drones as Nodes in a WSN
Zauli M., **Zonzini F.**, Sciullo G., Marzani A., De Marchi L.. *European Workshop on Structural Health Monitoring (EWSHM 2024), Potsdam, 2024*

Exploiting Nano Aerial Vehicles as Sensor Nodes for Wireless Vibration Monitoring
Zauli M., Pirazzi M., **Zonzini F.**, De Marchi L.. *IEEE Sensors Applications Symposium (SAS 2024), Naples, 2024* `★ Best Poster Award`

Green Wireless Sensing Network for Structural Health Monitoring: A Vertical Approach
Zonzini F., Testoni N., Palermo A., De Marchi L., Mennuti C., Augugliaro G., Marzani A.. *IEEE International Symposium on Measurements & Networking (M&N 2024), Rome, 2024*

High precision photosynthetically active radiation estimation via a sensor-near AI architecture and low-cost sensors
Zonzini F., Peppi L.M., De Renzis L., Vignati G., Manfrini L., De Marchi L.. *IEEE Sensors Applications Symposium (SAS 2024), Naples, 2024*

Improving Auscultation in Wearable Health Devices Integrating MEMS Microphones and Accelerometers
Celli R., Zauli M., **Zonzini F.**, Arcobelli V.A., Mellone S., Spadotto A., Diemberger I., De Marchi L.. *ApplePies 2024, Turin, Springer Nature, 2024*

Towards Energy-Efficient Smart Sensing Nodes for Automatic Structural Health Monitoring
Ragusa E., **Zonzini F.**, Gastaldo P., Zunino R., De Marchi L.. *Proceedings of SIE 2024, Genoa, Springer, 2024* `Co-first author`

Ultrasonic Wireless Power Transfer in Metal Structures using Frequency-Steerable Acoustic Transducers and Impedance Matching
Taccetti S., **Zonzini F.**, Zauli M., Mohammadgholiha M., Peppi L.M., Romani A., De Marchi L.. *IEEE Sensors Applications Symposium (SAS 2024), Naples, 2024*

Ultrasonic Wireless Power Transfer using Frequency Steerable Acoustic Transducers for Autonomous Guided Waves-based Inspection Systems
Taccetti S., **Zonzini F.**, Zauli M., Mohammadgholiha M., Romani A., De Marchi L.. *IEEE UFFC Joint Symposium (UFFC-JS 2024), Taipei, 2024*

Ultrasonic Wireless Power Transfer with Directional Piezoelectric Transducers and Impedance Matching
Taccetti S., **Zonzini F.**, Zauli M., Romani A., De Marchi L.. *Poster, SIE 2024, Genoa, 2024*

2023 11

An IoT Toolchain Architecture for Planning, Running and Managing a Complete Condition Monitoring Scenario
Montori F., Zyrianoff I., Gigli L., Calvio A., Venanzi R., Sindaco S., Sciullo L., **Zonzini F.**, Zauli M., Testoni N., Bertacchini A., Londero E., Alessi E., Di Felice M., Bononi L., Bellavista P., De Marchi L., Marzani A., Azzoni P., Salmon Cinotti T.. *IEEE Access, 11, 6837–6856, 2023*

Directional Multi-Frequency Guided Waves Communications Using Discrete Frequency-Steerable Acoustic Transducers
Mohammadgholiha M., **Zonzini F.**, Moll J., De Marchi L.. *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control, 70, 1494–1505, 2023*

Speeding up System Identification Algorithms on a Parallel RISC-V MCU for Fast Near-Sensor Vibration Diagnostic
Moallemi A., Gaspari R., **Zonzini F.**, De Marchi L., Brunelli D., Benini L.. *IEEE Sensors Letters, 7, 2023*

Tiny Deep Learning Architectures Enabling Sensor-Near Acoustic Data Processing and Defect Localization
Donati G., **Zonzini F.**, De Marchi L.. *Computers, 12, 129, 2023*

Vibration Monitoring in the Compressed Domain with Energy-Efficient Sensor Networks
Ragusa E., **Zonzini F.**, De Marchi L., Gastaldo P.. *IEEE Sensors Letters, 7, 2023* `Co-first author`

A Tiny Convolutional Neural Network driven by System Identification for Vibration Anomaly Detection at the Extreme Edge
Zonzini F., Burioli L., Gashi A., Mancini N.F., De Marchi L.. *IEEE COINS 2023, Berlin, 2023*

Dealing with Significant Noise Levels in Vibration-based Bridge Health Monitoring? A novel ARMA+Noise algorithm in the Frisch Scheme Context
Zonzini F., Castaldi P., De Marchi L.. *EUROSTRUCT 2023, Vienna, ce/papers, 6, 337–342, 2023*

Design of a Novel Pulser for Frequency Selective-based Power and Data Transmission
Taccetti S., Peppi L.M., **Zonzini F.**, Mohammadgholiha M., Zauli M., De Marchi L.. *IEEE MetroAutomotive 2023, Modena, 2023*

Enhanced Global Convolution Networks for Defect Detection in Full Wavefield Imaging
Donati G., **Zonzini F.**, De Marchi L.. *Journal of Physics: Conference Series, 2698(1), AIVELA 2023, Ancona, 2023*

Evaluating the Effect of Intrinsic Sensor Noise for Vibration Diagnostic in the Compressed Domain Using Convolutional Neural Networks
Zonzini F., Ragusa E., De Marchi L., Gastaldo P.. *ApplePies 2023, Genoa, Lecture Notes in Electrical Engineering 1110, 2023* `Co-first author`

Versatile Sensor Node with Acoustic Data Communication Capabilities for FSAT Networks in Guided Wave-Based Structural Health Monitoring Applications
Márquez Reyes O.A., **Zonzini F.**, Mohammadgholiha M., Moll J., De Marchi L.. *International Workshop on Structural Health Monitoring (IWSHM 2023), California, 2023*

2022 13

Deep Learning Approaches for Robust Time of Arrival Estimation in Acoustic Emission Monitoring
Zonzini F., Bogomolov D., Dhamija T., Testoni N., De Marchi L., Marzani A.. *Sensors, 22(3), 2022*

Machine Learning Meets Compressed Sensing in Vibration-Based Monitoring
Zonzini F., Carbone A., Romano F., Zauli M., De Marchi L.. *Sensors, 22(6), 2022*

System Identification at the Extreme Edge for Network Load Reduction in Vibration-based Monitoring
Zonzini F., Dertimanis V., Chatzi E., De Marchi L.. *IEEE Internet of Things Journal, 2022*

A Combination of Chirp Spread Spectrum and Frequency Hopping for Guided Waves-based Digital Data Communication with Frequency Steerable Acoustic Transducers
Zonzini F., Mohammadgholiha M., De Marchi L.. *IEEE International Ultrasonics Symposium (IUS 2022), Venice, 2022*

A Novel Smart Sensor Node with Embedded Signal Processing Functionalities Addressing Vibration-Based Monitoring
Zauli M., **Zonzini F.**, Coppola V., Dertimanis V., Chatzi E., Testoni N., De Marchi L.. *EWSHM 2022, Palermo, vol. 270, 1000–1008, 2022*

A Tiny Machine Learning Approach to the Edge Localization of Acoustic Sources via Convolutional Neural Networks
Zonzini F., Donati G., De Marchi L.. *SYSINT 2022, Genoa, vol. 546, 340–349, 2022*

Acoustic Emissions and Modal Analysis on a reinforced concrete two storey-frame structure subjected to shaking table test: measurements, correlations and observations
Marzani A., Testoni N., Bogomolov D., **Zonzini F.**, De Marchi L., Mennuti C., Augugliaro G., Roselli I., Saitta F., Tatì A.. *AIPnD 19th National Congress, Verona, 2022*

Development of a self-sensing composite laminate enriched with PZT particles for impact localization
Brugo T.M., Gino M.E., Selleri G., **Zonzini F.**, Testoni N., De Marchi L., Zucchelli A., Focarete M.L., Fabiani D.. *51st AIAS Conference, Padua, 2022*

Enabling Spatial Multiplexing in Guided Waves-based Communication: the case of Quadrature Amplitude Modulation realized via Discrete Frequency Steerable Acoustic Transducers
Mohammadgholiha M., **Zonzini F.**, De Marchi L.. *IEEE International Ultrasonics Symposium (IUS 2022), Venice, 2022*

eSysId: Embedded System Identification for Vibration Monitoring at the Extreme Edge
Zonzini F., Zauli M., De Marchi L.. *ApplePies 2022, Genoa, vol. 1036, 23–29, 2022*

Frequency Domain System Identification of Error-in-Variables Systems for Vibration-Based Monitoring
Zonzini F., Castaldi P., De Marchi L.. *EWSHM 2022, Palermo, vol. 270, 972–981, 2022*

Monitoring the integrity of pressurized pipes and vessels: design and development of a hydraulic circuit and a light monitoring sensor network for the measurement of accelerations and acoustic emissions
Marzani A., Testoni N., Bogomolov D., **Zonzini F.**, De Marchi L., Mennuti C., Augugliaro G.. *AIPnD 19th National Congress, Verona, 2022*

Intelligent Sensor Systems for Structural Health Monitoring Applications
Zonzini F.. *Ph.D. thesis, University of Bologna, 2022* `★ IEEE Italy Section and “Claudio Bonivento” thesis awards`

2021 12

Cluster-based Vibration Analysis of Structures with GSP
Zonzini F., Girolami A., De Marchi L., Brunelli D., Marzani A.. *IEEE Transactions on Industrial Electronics, 2021*

Model-assisted Compressed Sensing for Vibration-based Structural Health Monitoring
Zonzini F., Zauli M., Mangia M., Testoni N., De Marchi L.. *IEEE Transactions on Industrial Informatics, 2021*

A Toolchain Architecture for Condition Monitoring Using the Eclipse Arrowhead Framework
Montori F., Zyrianoff I., Gigli L., Venanzi R., Sindaco S., Aguzzi C., **Zonzini F.**, Zauli M., Testoni N., Alessi E., Di Felice M., Bononi L., Bellavista P., De Marchi L., Salmon Cinotti T.. *IEEE IECON 2021, 2021*

Acoustic emission structural monitoring through low-cost sensor nodes
Bogomolov D., Testoni N., **Zonzini F.**, Malatesta M.M., De Marchi L., Marzani A.. *International Conference on Structural Health Monitoring of Intelligent Infrastructure, online, 2021*

Artificial Intelligence Algorithms for Time of Arrival Estimation in Acoustic Emission Signals
Zonzini F., Bogomolov D., Dhamija T., De Marchi L., Marzani A.. *Safety and Reliability of Pressure Equipment (SAFAP 2021), INAIL, online, 2021*

Enhancing Vibration-Based Structural Health Monitoring via Edge Computing: A Tiny Machine Learning Perspective
Zonzini F., Romano F., Carbone A., Zauli M., De Marchi L.. *48th Annual Review of Progress in Quantitative Nondestructive Evaluation (QNDE), online, 2021*

Heterogeneous Networks of Intelligent Sensors for Monitoring Equipment and Plants
Zonzini F., Zauli M., Testoni N., De Marchi L.. *Safety and Reliability of Pressure Equipment (SAFAP 2021), INAIL, online. Paper in Italian, 2021*

HW-Oriented Compressed Sensing for Operational Modal Analysis: The Impact of Noise in MEMS Accelerometer Networks
Zonzini F., Zauli M., Mangia M., Testoni N., De Marchi L.. *IEEE Sensors Applications Symposium (SAS 2021), online, 2021*

MODRON: A scalable and interoperable web of things platform for structural health monitoring
Aguzzi C., Gigli L., Sciullo L., Trotta A., **Zonzini F.**, De Marchi L., Di Felice M., Marzani A., Salmon Cinotti T.. *IEEE Consumer Communications and Networking Conference (CCNC 2021), 2021*

Quadrature Amplitude Modulation for Acoustic Data Communication in Ultrasonic Structural Health Monitoring Systems
Márquez Reyes O.A., Moll J., **Zonzini F.**, Mohammadgholiha M., De Marchi L.. *48th Annual Review of Progress in Quantitative Nondestructive Evaluation (QNDE), online, 2021*

Vibration Monitoring at the Extreme Edge via Frequency Domain Decompositions
Zonzini F., Romano F., Carbone A., Zauli M., De Marchi L.. *52nd Annual Meeting of the Italian Society of Electronics (SIE), Trieste, 2021*

TinyML meets vibration-based Structural Health Monitoring: solving a binary classification problem at the edge
Zonzini F., Romano F., Carbone A., Zauli M., De Marchi L.. *Abstract, tinyML EMEA Technical Forum, online, 2021*

2020 10

Low-Power MIMO Guided-Wave Communication
Kexel C., Testoni N., **Zonzini F.**, Moll J., De Marchi L.. *IEEE Access, 2020*

Structural Health Monitoring and Prognostic of Industrial Plants and Civil Structures: A Sensor to Cloud Architecture
Zonzini F., Aguzzi C., Gigli L., Sciullo L., Testoni N., De Marchi L., Di Felice M., Salmon Cinotti T., Mennuti C., Marzani A.. *IEEE Instrumentation & Measurement Magazine, 2020*

Vibration-Based SHM With Upscalable and Low-Cost Sensor Networks
Zonzini F., Malatesta M.M., Bogomolov D., Testoni N., Marzani A., De Marchi L.. *IEEE Transactions on Instrumentation and Measurement, 2020*

A Graph Signal Processing Technique for Vibration Analysis with Clustered Sensor Networks
Zonzini F., Girolami A., Brunelli D., Testoni N., Marzani A., De Marchi L.. *ApplePies 2019, Pisa, Springer, 2020*

A Structural-Aware Frequency Division Multiplexing Technique for Acoustic Data Communication in SHM Applications
Zonzini F., Zauli M., Testoni N., Marzani A., De Marchi L.. *EWSHM 2020, online, 2020*

Compressive Sensing and On-Board Data Recovery for Vibration-Based SHM
Zauli M., **Zonzini F.**, Testoni N., De Marchi L., Marzani A.. *EWSHM 2020, online, 2020*

Guided-wave MIMO communication on a composite panel for SHM applications
Zonzini F., De Marchi L., Testoni N., Kexel C., Moll J.. *Proceedings of SPIE 11381, Health Monitoring of Structural and Biological Systems IX, online, 2020*

Hardware-Oriented Data Recovery Algorithms for Compressed Sensing-Based Vibration Diagnostics
Zonzini F., Zauli M., Carbone A., Romano F., Testoni N., De Marchi L.. *ApplePies 2020, online, 2020*

Low depth time reversal modulation technique for ultrasonic guided waves-based communications
Zonzini F., Testoni N., Marzani A., De Marchi L.. *IEEE International Ultrasonics Symposium (IUS 2020), 2020*

Structural Health Monitoring Reliability Enhancement by an Automated Sensor Tuning Procedure
Malatesta M.M., **Zonzini F.**, Bogomolov D., Testoni N., De Marchi L., Marzani A.. *ESREL 2020 PSAM 15, Venice, 2020*

2019 6

A Tilt Sensor Node Embedding a Data-Fusion Algorithm for Vibration-Based SHM
Testoni N., **Zonzini F.**, Marzani A., Scarponi V., De Marchi L.. *Electronics, 8, 45, 2019*

A small footprint, low power, and light weight sensor node and dedicated processing for modal analysis
Zonzini F., De Marchi L., Testoni N.. *Lecture Notes in Electrical Engineering, vol. 539, Springer, 2019*

A Spectral Peak-Picking Method for On-board Operational Modal Analysis of Multi-type Vibration-based SHM
Zonzini F., Malatesta M.M., Bogomolov D., Testoni N., De Marchi L., Marzani A.. *ANCRiSST 2019, Rome, 61–64, 2019*

Direct Spread Spectrum Modulation and Dispersion Compensation for Guided Wave-based Communication Systems
Zonzini F., De Marchi L., Testoni N., Marzani A.. *IEEE International Ultrasonics Symposium (IUS 2019), Glasgow, 2500–2503, 2019*

Heterogeneous Sensor-network for Vibration-based SHM
Zonzini F., Malatesta M.M., Bogomolov D., Testoni N., De Marchi L., Marzani A.. *IEEE International Symposium on Measurements and Networking (M&N 2019), Catania, 2019* `★ "Nicola Pitrone" Best Young Author Award`

Structural Health Monitoring of a Reinforced Concrete Beam by Means of a Miniaturized Heterogeneous Sensor Network
Malatesta M.M., **Zonzini F.**, Bogomolov D., Tarozzi M., Testoni N., Augugliaro G., Mennuti C., Marzani A., De Marchi L., Benedetti A.. *18th AIPnD Congress on Non-Destructive Testing, Monitoring and Diagnostics, Milan. Paper in Italian, 2019*

2018 4

A Sensor Network with Embedded Data Processing and Data-to-Cloud Capabilities for Vibration-Based Real-Time SHM
Testoni N., Aguzzi C., Arditi V., **Zonzini F.**, De Marchi L., Marzani A., Salmon Cinotti T.. *Journal of Sensors, 2107679, 2018*

Low-Weight Sensor Networks Based on a Multi-Function Sensor Node
Testoni N., Aguzzi C., **Zonzini F.**, De Marchi L., Augugliaro G., Salmon Cinotti T., Marzani A.. *Safety and Reliability of Pressure Equipment (SAFAP 2018), Bologna. Paper in Italian, 2018*

Modal Analysis of Structures with Low-cost Embedded Systems
Girolami A., **Zonzini F.**, De Marchi L., Brunelli D., Benini L.. *IEEE International Symposium on Circuits and Systems (ISCAS 2018), 2018*

A sensor network targeted on a novel identification of cracks
Zonzini F., Malatesta M.M., Aguzzi C., Testoni N., Verardi M., Scarponi V.. *Poster, FRUCT 23, Bologna, 2018*

Teaching and Supervision

Courses at the University of Bologna, doctoral candidates in EIT4SEMM, master's and bachelor's theses, and research fellows.

Courses

Project of Analog Circuits and Systems M, Module 1
Master in Electronics Engineering. Lecturer of Module 1 from 2026/2027, previously of Module 2 since 2022/2023
A 9-CFU course on analog circuit modeling, LTSpice simulation, voltage and current references, operational amplifiers, active filters, noise, and analog-to-digital and digital-to-analog converters.
98.5% appreciation rate

Laboratory of Electronics P-IM
Professional Bachelor in Mechatronics. Lecturer since 2022/2023
30 hours, 3 CFU. Basic electronics, and designing and validating circuits for industry and automation in the lab.
98.0% appreciation rate

Vibration-Based Structural Identification and Health Monitoring
Ph.D. programme EIT4SEMM. Lecturer since 2023/2024
10 of the course's 24 hours: sensors and the measurement chain, basics of signal processing, and a hands-on module from data acquisition to damage identification.

Current Ph.D. candidates

Candidate	Cycle	Role	Thesis	Expected completion
Milena Mazza	XLII	Main supervisor	Edge AI for Monitoring Applications	03/2030
Alessandro Lombardini	XLII	Co-supervisor	Electronics and ICT for Monitoring Applications	03/2030
Ibad Ullah Azam	XLII, MSCA DN	Co-supervisor	Confidence-Gated TinyML for Vibration-based Condition Monitoring at the Extreme Edge	03/2030
Daniele Martinelli	XL	Co-supervisor	Applications of In-Memory Computing in Structural Monitoring	03/2028
Benedetta Baldini	XXXIX	Co-supervisor	Empowering Predictive Maintenance in a SHM Digital Twin Framework	03/2027
Giacomo Donati	XXXIX	Co-supervisor	Development of Edge AI Solutions for Continuous and Real-Time Structural Health Monitoring	03/2027
Stefano Taccetti	XXXIX	Co-supervisor	Development of Innovative Tools for the Identification and Characterization of Acoustic Emissions	03/2027

Completed Ph.D. supervision

Mohammed Abdullah Siddiqui, co-supervisor 03/2026
Cycle XXXVIII. Exploiting AR Models and Influence Lines for Vibration-Based SHM of Bridges

Master's and bachelor's theses

34 theses since 2019: 17 as supervisor and 17 as co-supervisor. Titles are in the language of the thesis. Full records on AMS Tesi di Laurea.

Compressed Sensing e Super-Risoluzione per l'Imaging Strutturale basato su Onde Guidate Oct 2026
Riccardo Gattoni · M.Sc. in Electronic Engineering · **Supervisor**

Deep Learning e Metodi di Explainable AI per l'Anomaly Detection Industriale Basata su Segnali Acustici Jul 2026
Yuri D'Intino · M.Sc. in Electronic Engineering · **Supervisor**

Progettazione di un sistema di autoricarica e docking per droni da inserire in PoC per il monitoraggio indoor industriale
Jul 2026
Andrea Castronovo · M.Sc. in Electronic Engineering · **Supervisor**

Progettazione e integrazione di firmware di bordo per la gestione di una piattaforma nanosatellitare CubeSat
Mar 2026
Salvatore Vangone · M.Sc. in Electronic Engineering · **Supervisor**

Progetto e Prototipazione di un Sensore Magnetico Triassiale basato su Doppia Tecnologia Fluxgate e Search Coil Spazializzabile
Mar 2026
Lorenzo Carbone · M.Sc. in Electronic Engineering · **Supervisor**

FFT per Analog In-Memory Computing: dal mapping all'ottimizzazione per dispositivi a cambiamento di fase
Feb 2026
Fabiana Barone Raimondo · M.Sc. in Electronic Engineering · **Supervisor**

Studio e realizzazione di un sistema di attuazione e acquisizione per difetti di distacco in strutture multistrato
Dec 2025
Youness Laaraji · M.Sc. in Electronic Engineering · **Supervisor**

Analisi preliminare della prossima generazione di Battery Management Systems per il monitoraggio dei pacchi batterie per vetture elettriche
Dec 2025
Stefano Maggioreni · M.Sc. in Electronic Engineering · **Supervisor**

Sviluppo e progettazione di una piattaforma eterogenea a microcontrollore per il monitoraggio strutturale Dec 2025
Ivano Barrasso · M.Sc. in Electronic Engineering · **Supervisor**

Analisi sperimentale di segnali biomedici nel contesto di dispositivi wearable per l'healthcare: dall'acquisizione all'elaborazione
Dec 2025
Elisabetta Cammarata · M.Sc. in Electronic Engineering · **Supervisor**

Studio e progettazione di un pre-amplificatore a basso rumore per trasduttori direzionali Oct 2025
Miriam Ridolfo · M.Sc. in Electronic Engineering · **Supervisor**

Spiking Neural Networks per il monitoraggio strutturale basato su emissioni acustiche Oct 2025
Lorena Rizzo · M.Sc. in Electronic Engineering · **Supervisor**

Studio e sviluppo di un dispositivo per la generazione e il rilevamento di micro cortocircuiti in celle Li-ion: verso BMS di nuova generazione
Oct 2025
Andrea Manfroni · M.Sc. in Electronic Engineering · Co-supervisor

Integrating SHAP analysis in deep learning models for structural health monitoring Jul 2025
Reza Sadri · M.Sc. in Electronic Engineering · **Supervisor**

Impact localization and enhanced fracture toughness for CFRP laminate by piezoelectric nanofibers interleaving
Mar 2025
Riccardo Artioli · M.Sc. in Mechanical Engineering · Co-supervisor

Studio e prototipazione di un nodo sensore per la stima dell'evapotraspirazione in agricoltura di precisione Feb 2025
Roberta Di Palma · M.Sc. in Electronic Engineering · **Supervisor**

Artificial Intelligence based vehicle fault analysis Jul 2024
Giacomo Petta · M.Sc. in Electronic Engineering · Co-supervisor

Study and realization of an energy-autonomous WSN for acceleration monitoring based on nano-drones Mar 2024
Marco Pirazzi · M.Sc. in Electronic Engineering · **Supervisor**

Compressed sensing con memorie a cambiamento di fase per monitoraggio di vibrazioni strutturali Mar 2024
Daniele Martinelli · M.Sc. in Electronic Engineering · **Supervisor**

Smart monitoring system for automatic tensioning device through object detection neural network Mar 2024
Andi Gashi · M.Sc. in Electronic Engineering · Co-supervisor

Realizzazione di uno auscultimetro elettronico – dal dispositivo all'elaborazione dati Dec 2023
Roberto Celli · M.Sc. in Electronic Engineering · Co-supervisor

Stime di spostamenti a partire da segnali accelerometrici per applicazioni edge in ambito ferroviario Oct 2023
Linda Morosato · M.Sc. in Electronic Engineering · Co-supervisor

Deployment of Tiny Machine Learning models on a low-end computing platform for vibration-based diagnostics
Oct 2023
Chenguang Li · M.Sc. in Electronic Engineering · **Supervisor**

Spiking Neural Networks per il monitoraggio strutturale basato su vibrazioni Mar 2023
Benedetta Baldini · M.Sc. in Electronic Engineering · Co-supervisor

Implementazione di algoritmi Tiny Machine Learning per il monitoraggio strutturale basato su emissioni acustiche
Dec 2022
Giacomo Donati · M.Sc. in Electronic Engineering · Co-supervisor

Deep Learning Architectures for time of arrival detection in Acoustic Emissions Monitoring Dec 2021
Tanush Dhamija · M.Sc. in Electronic Engineering · Co-supervisor

Analysis and Evaluation of Tiny Machine Learning applications Dec 2021
Muhammad Kashif · M.Sc. in Electronic Engineering · Co-supervisor

Modulazioni "Time-reversal" con codifiche a bassa profondità per comunicazioni ultrasoniche Mar 2021
Filippo Graziani · M.Sc. in Electronic Engineering · Co-supervisor

A Tiny Machine Learning implementation with low-power devices in Structural Health Monitoring Applications
Mar 2021
Chinmay Wadekar · M.Sc. in Electronic Engineering · Co-supervisor

Modulazione “Spread Spectrum” per comunicazioni ad ultrasuoni Mar 2021
Andrea Fato · M.Sc. in Electronic Engineering · Co-supervisor

Tecniche avanzate di campionamento e classificazione di segnali vibrazionali per la valutazione dell’integrità strutturale
Oct 2020
Francesca Romano · M.Sc. in Electronic Engineering · Co-supervisor

Analisi di protocolli di comunicazione wireless per comunicazioni con onde guidate Jul 2020
Giacomo Pazzaglini · B.Sc. in Electronic Engineering for Energy and Information, Cesena · Co-supervisor

Gestione ad interrupt di una piattaforma inerziale basata su FIFO Jul 2019
Martina Verardi · B.Sc. in Biomedical Engineering, Cesena · Co-supervisor

Analisi dei parametri modali al variare delle condizioni per monitoraggio strutturale Jul 2019
Chiara Testa · B.Sc. in Biomedical Engineering, Cesena · Co-supervisor

Awards to students

Student Travel Grant Award, IEEE SAS 2025 2025
Lorenzo Mistral Peppi, Ph.D. candidate and lead author of a co-authored paper on a leaf sensor node for evapotranspiration estimation

Best Young Author Paper Award, EWSHM 2024 2024
Giacomo Donati, for Deep Learning-Aided Acoustic Source Localization in Thin-Walled Waveguides

dAIEDGE Network of Excellence grant
Giacomo Donati, a €60,000 EU-funded grant for research at the Glasgow Intelligent Computing Laboratory on continual learning for acoustic emission monitoring

Ph.D. defense boards

10/2026 **Sasan Salmani Pour Avval**
TU Delft, Aerospace Engineering. Automated Machine Learning Architecture Design for Industries By Green Industrial Neural Architecture Search

03/2026 **Matteo Fresta**
University of Genoa, DITEN. Enhancing the Measurify IoT data management platform with high performance, edge-optimized deep learning models for time series processing

04/2025 **Hanna Müller**
ETH Zürich, Integrated Systems Laboratory. Exploiting Novel Sensors and Efficient Algorithms to Advance Autonomy of Nano-UAVs. Thesis reviewer and board member

Research fellows

I have also co-supervised the research training of fellows at ARCES: Francesca Romano and Antonio Carbone (2021), Giacomo Donati (2023), Daniele Martinelli (2024) and Alessandro Gallo (2025).

Other teaching

2024 – 2025 **Expert lecturer, PCTO programme**
Liceo Luigi Galvani, Bologna. 15 hours on sensors and environmental data, building an Arduino UNO monitoring station

2021 – 2022 **Teaching tutor, Project of Analog Circuits and Systems M**
With Prof. Guido Masetti. Also 2020 – 2021

2017 – 2018 **Teaching tutor, Master in Electronics Engineering**
With Prof. Cecilia Metra

Post-graduate training

2022 **The Era of AI and Digitalization for Structural Applications**
TU Delft, the Netherlands

2021 **Summer School of Information Engineering**
University of Padova

2021 **SIE Ph.D. School: Electronics for IoT**
University of Trieste

2020 **International Summer School on Ultrasonic and Piezoelectric Sensors**
University of Florence

2019 **12th Asia-Pacific-Euro Summer School on Smart Structures**
Sapienza University of Rome

2018 **2nd Summer School on Integrated Mobility Systems Engineering**
University of Bologna

Service and Awards

Recognition, conference organization, peer review and institutional roles.

Awards and distinctions

2026 **Winner, TinyML COINS Contest**
2026 IEEE COINS Conference

2024 **Best Poster Award**
2024 IEEE Sensors Applications Symposium, for Exploiting Nano Aerial Vehicles as Sensor Nodes for Wireless Vibration Monitoring

2024 **Best Young Author Paper Award**
2024 European Workshop on Structural Health Monitoring, for Deep Learning-Aided Acoustic Source Localization in Thin-Walled Waveguides

2022 **“Claudio Bonivento” Award for Scientific Research and Technological Innovation, 14th edition**
Lions Club Bologna. Best Ph.D. thesis in Innovation and Technology

2022 **IEEE Italy Section Ph.D. Thesis Award on Smart and Sustainable Power and Industry**
Technology section, sponsored by IEEE Italy Section, ABB and the WIE Affinity Group

2019 **“Nicola Pitrone” Best Young Author Award**
2019 IEEE International Symposium on Measurements and Networking, for Heterogeneous Sensor-network for Vibration-based SHM

2019 **“Guido Paulucci” Award, 29th edition**
Rotary Club Bologna. Best graduate of the School of Engineering and Architecture, 2017–2018

Seals of excellence, fellowships and scholarships

2025 **Seal of Excellence, European Commission**
Phoenix, HORIZON-MSCA-2024-PF-01, project 101205492, score 95.4%, reserve list

2024 **Seal of Excellence, European Commission**
NEuroStruct, HORIZON-MSCA-2023-PF-01, project 101149203, score 95.0%, reserve list

2023 **Seal of Excellence, European Commission**
NEuroStruct, HORIZON-MSCA-2022-PF-01-01, project 101105754, score 94.8%, reserve list

2020 **Ermenegildo Zegna Founders’ Scholarship**
Research fellowship for a period abroad at ETH Zürich

2015 – 2016 **Academic scholarships for excellence**
University of Bologna, academic years 2014–2015 and 2015–2016

2014 **“Gino Vendemini” Scholarship**
Rubiconia Accademia dei Filopatridi. Best secondary school graduate

Conference roles

2027 **Technical Program Chair (appointed)**
IEEE COINS 2027, Stavanger

2026 **Technical Program Chair and Track Chair**
IEEE COINS 2026, Bologna

2026 – 2027 **Technical Program Committee**
ApplePies Conference

2025 – 2027 **Technical Program Committee member**
IEEE International Ultrasonics Symposium (IUS), Group 2

2025 **Registration Chair**
IEEE COINS 2025, University of Wisconsin-Madison

2025 **Special Session Chair**
IEEE SAS 2025: Intelligent Sensor Systems as a Pathway to the Next Generation of Maintenance Operations

2025 **Organizing committee**
FAIR Spoke 8 Workshop on Pervasive AI, University of Bologna

2024 **Registration Chair, Track Chair and Special Session Chair**
IEEE COINS 2024, London. Tracks on AI and Machine Intelligence and on Embedded AI

2024 **Special Session Chair**
IEEE SAS 2024: Synergizing Robotics and Field Sensor Technologies for Advancements in Smart Agriculture

2018 **Student Volunteer**
IEEE ISCAS 2018, Florence

Invited talks

2024 **Powering next generation intelligent sensor systems with Tiny Machine Learning**
Invited talk, Technologies for Human Evaluation, Testing, and Assessment (THETA) Workshop, Bologna

Peer review

Journal	Publisher	Since
IEEE Transactions on Instrumentation and Measurement	IEEE	2019
IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control	IEEE	2020
IEEE Transactions on Industrial Informatics	IEEE	2021
IEEE Access	IEEE	2021
IEEE Sensors	IEEE	2022
IEEE Internet of Things Journal	IEEE	2023
IEEE Sensors Letters	IEEE	2023
IEEE Transactions on Reliability	IEEE	2024
Journal of Building Engineering	Elsevier	2021
Mechanical Systems and Signal Processing	Elsevier	2022
Engineering Applications of Artificial Intelligence	Elsevier	2022
Journal of Sound and Vibration	Elsevier	2023
Structural Health Monitoring	SAGE	2022
Scientific Reports	Springer Nature	2022
Sensors	MDPI	2022
Computations	MDPI	2022
Journal of Sensors	Hindawi	2023

Conferences: IEEE M&N (2019), ApplePies (since 2020), SysInt (2022), IEEE SAS (2023, 2024, 2025), IEEE I2MTC (2025), IEEE IJCNN (2025), IEEE IWASI (2025).

Institutional roles

`2024 – present` **Alternate member, Internship Committee**
Master in Electronics Engineering. Approves and assesses internship programmes

`2024 – present` **Member, Teaching Committee**
Professional Bachelor in Mechatronics. Admission test procedures in 2024 and 2025

`2023 – present` **Member, Department Council**
DEI, University of Bologna

`2023 – present` **Exam room supervisor**
CISIA online entrance tests (TOLC)

Memberships

IEEE, since 2019: Women in Engineering, Young Professionals, Sensors Council, and Ultrasonics, Ferroelectrics, and Frequency Control Society

Italian Electronics Society (SIE), since 2023

Advanced Research Center on Electronic Systems “Ercole De Castro” (ARCES)