FEDERICA ZONZINI

Fixed-Term Assistant Professor (RTDA)
Alma Mater Studiorum – University of Bologna

- Engineering and Information Technology for Structural and Environmental Monitoring and Risk Management (EIT4SEMM) programme
- Advanced Research Centre on Electronic Systems "Ercole de Castro" (ARCES)
- Department of Electrical, Electronic and Information Engineering "Guglielmo Marconi" (DEI)

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PERSONAL INFORMATION

Date of birth:	07/01/1994 (Cesena, Italy)
Nationality:	Italian
Address:	Via Villagrappa 1850/2 47039 Savignano sul Rubicone (FC), Italy
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PROFESSIONAL EXPERIENCE

10/02/2023-09/02/2026
Alma Mater Studiorum – University of Bologna
Department of Electrical, Electronic and Information Engineering (DEI)
Junior (Fixed-term) Assistant professor-Teaching courses
"Laboratory of Electronics P-IM" (appreciation rate 98.0%) **(Bachelor in Mechatronics Engineering)**
"Project of Analog Circuits and Systems M" (appreciation rate 98.5%) **(Master in Electronics Engineering)**

15/09/2022-30/09/2023
Alma Mater Studiorum – University of Bologna
Department of Electrical, Electronic and Information Engineering (DEI)
Adjunct professor of the course "Laboratory of Electronics P-IM" – Bachelor in Mechatronics Engineering

01/01/2021–09/02/2023
Research fellow at Advanced Research Center on Electronic Systems "Ercole De Castro" – University of Bologna
Research topic: "Tiny Machine Learning and Low-power Maintenance of the Railway Infrastructure"

27/07/2022-27/08/2022
Visiting Researcher at University College of Dublin (UCD)
Dynamical Systems and Risk Laboratory (DSRL) group
Academic stay focused on the chip implementation of eigenperturbative approaches for real-time vibration-based diagnostics

21/02/2022-30/09/2022
22/02/2021-30/09/2021
Alma Mater Studiorum – University of Bologna
Department of Electrical, Electronic and Information Engineering (DEI)
Tutor for the Master course "Project of Analog Circuits and Systems M" – Master in Electronics Engineering

01/11/2017-24/08/2018
Alma Mater Studiorum – University of Bologna
Department of Electrical, Electronic and Information Engineering (DEI)

EDUCATION

20/09/2020-28/03/2021	**Visiting Scholar at ETH, Zürich** **Structural Mechanics and Monitoring Group** **Winner of Ermenegildo Zegna Scholarship for internship abroad** Internship abroad under the supervision of Prof. Eleni Chatzi working on the implementation of system identification at the extreme edge for network load reduction on vibration monitoring
01/01/2018-15/03/2022	**Ph.D. candidate (XXXIV cycle) - EQFL 8** Program Structural and Environmental Health Monitoring and Management ($SEHM^2$) Score: Excellent cum laude University of Bologna, Italy Thesis title: Intelligent Sensor Systems for Structural Health Monitoring Applications
15/09/2016-24/07/2018	**Collegio Superiore Alumna - Supplementary license** Institute of Advanced Studies (ISA) - Centre of excellence Collegio Superiore interdisciplinary programme to selected students enrolled on a degree programme at the University of Bologna, Italy
15/09/2016-24/07/2018	**Master of Science - EQFL 7** Score: 110/110 cum laude **Electronics Engineering** Thesis title: "Signal processing techniques for SHM applications" University of Bologna, Italy
15/09/2013-14/07/2018	**Bachelor of Science - EQFL 6** Score: 110/110 cum laude **Electronics Engineering for Energy and Information** Thesis title: "Experimental characterization of a localization system based on Ultra-Wide Band technology" University of Bologna, Italy

POST-GRADUATE STUDIES

14-16/06/2022	**Summer School: The Era of AI and digitalization for structural applications** Summer school on the application of Artificial Intelligence solutions and methods to enhance the structural integrity of ageing infrastructures and industrial assets TU Delft, The Netherlands
12-16/07/2021	**Summer School of Information Engineering** Summer school on Machine Learning, Energy Efficient Electronics Science and ICT Applications University of Padova, Italy
05-07/07/2021	**SIE Ph.D. school** Summer school on Electronics for IoT University of Trieste, Italy
14/07/2019-04/08/2019	**12th Asia-Pacific-Euro Summer School on Smart Structures** Summer school on Structural Health Monitoring Sapienza University of Rome, Italy
14/07/2018-10/09/2018	**2nd Summer School on Integrated Mobility Systems Engineering** Summer school about ICT, Big Data, Signalling, Infrastructures and Project Management University of Bologna, Italy

ACTIVITY WITHIN THE SCIENTIFIC COMMUNITY

Reviewer for:

- IEEE: Transaction on Instrumentation and Measurement (TIM): 13 manuscripts (since 2019), Transactions on Ultrasonics, Ferroelectrics, and Frequency Control (TUFFC): 4 manuscripts (since 2020), Transactions on Industrial Informatics (TII): 2 manuscripts (since 2021), Access: 2 manuscript (since 2021), Internet of Things Journal: 1 manuscript (since 2023), Sensors: 2 manuscripts (since 2022)
- Elsevier Mechanical Systems and Signal Processing (MSSP): 4 manuscript (since 2022), Journal of Building Engineering: 3 manuscripts (since 2021), Engineering Applications of Artificial Intelligence: 5 manuscripts (since 2022), Journal of Sound and Vibration: 1 manuscript (since 2023)
- Springer Nature Scientific Reports: 1 manuscript (since 2022)
- Structural Health Monitoring: 5 manuscripts (since 2022)
- MDPI: Sensors: 3 manuscripts (since 2022), Computations: 1 manuscript (since 2022)
- Hindawi Journal of Sensors: 1 manuscript (since 2023)

Conference participation
Student Volunteer for the conference *IEEE International Symposium on Circuits and Systems (ISCAS)*, Florence, 27-30 May 2018.
Registration Chair for the *IEEE COINS* 2024 Conference
Special Session Chair for the *IEEE SAS* 2024 and *IEEE COINS* 2024 Conferences

PERSONAL SKILLS & COMPETENCES

Languages

	READING	SPEAKING	WRITING	LISTENING
Italian	Mother tongue			
English * IELTS	C2	C1	C1	C1
French	B1	A2	B1	A2

Digital competences

Text Processing: MS Office, LaTex, Libre Office
Programming languages: C, C++, VHDL, Python,
Software applications: Matlab, Atollic, LT Spice

DISTINCTIONS & AWARDS

26/07/2024 Best Poster Award at the 2024 IEEE Sensors Applications Symposium
10/06/2024 Best Young Author paper award at the 2024 European Workshop on Structural Health Monitoring
11/04/2024 Seal of Excellence, European Commission, for the project 101149203 — NEuroStruct scoring 95.0% in the HORIZON-MSCA-2023-PF-01 call
05/04/2023 Seal of Excellence, European Commission, for the project 101105754 — NEuroStruct scoring 94.8% in the HORIZON-MSCA-2022-PF-01-01 call (Reserve list assigned)
29/11/2022 "Claudio Bonivento" award for "Ricerca & Innovazione Tecnologia" for the best Ph.D. Thesis in the field Innovation and Technology
04/10/2022 "IEEE Italy Section 2022 Ph.D. Thesis Award in Smart and Sustainable Power and Industry– Technology section" sponsored by IEEE Italy Section, ABB e WIE Affinity Group
10/06/2020 Research Fellowship "Ermenegildo Zegna Founders' scholarship"
07/07/2019 Best Paper Young Author Award "Nicola Pitrone" at the 2019 IEEE International Symposium on Measurements and Networking
10/06/2019 Best Student for the Master program in Electronics Engineering "Guido Paulucci", XXIX edition (year 2019), awarded by Rotary Club, Bologna division
05/07/2016 Academic scholarship for excellence among the best students at the University of Bologna, A.Y. 2015-2016
06/07/2015 Academic scholarship for excellence among the best students at the University of Bologna, A.Y. 2014-2015
12/06/2014 "Gino Vendemini" scholarship sponsored every year by the Rubiconia Accademia of Filopatridi" (Italy) to the best graduated student from secondary school

RESEARCH TOPICS

Data Compression
- Compressed sensing

Analysis, application and development of Signal processing techniques for data compression applied to vibration-based structural assessment	▪ Adapted CS: Model Assisted Rakeness-based Compressed Sensing ▪ Wavelet Packet Transform ▪ Autoregressive models
System Identification Analysis, application and development of strategies for the reconstruction of structural properties for structures in dynamic regime	▪ Time-domain analysis ▪ Frequency-domain analysis: parametric and non-parametric methods ▪ Operational Modal Analysis ▪ Modal features reconstruction
Graph Signal Processing Adoption of graph-based signal representation for mode shapes retrieval in multiple, non-simultaneous measurements in vibration-based monitoring	▪ Mode shape pairing
Edge Computing Implementation of machine learning models, CS techniques and autoregressive models at the extreme edge for sensor-near data inference	▪ Tiny Machine Learning ▪ Parametric system identification @edge ▪ Compressed Sensing @edge
Guided Wave-based Data Communication Application of standard communication schemes to acoustic data communication exploiting the mechanical wave as a form of communication content and the mechanical channel as a form of communication medium	▪ CDMA modulation scheme ▪ FDM and OFDM modulation scheme ▪ Time Reversal, Pulse Position Modulation ▪ Frequency Steerable Acoustic Transducers
Acoustic Emission-based Monitoring Application of artificial intelligence model to the estimation of acoustic features for the damage detection and localization of cracking phenomena	▪ Time of Arrival localization with ML/DL architectures

PUBLICATIONS

JOURNALS

[22] Zauli, M, Zonzini, F., Pirazzi, M., De Marchi, L. **Structural Health Monitoring Flies on Drones: Transforming Nano-drones into a Wireless Sensor Network for Vibration Inspection**. *Submitted to IEEE Transactions on Instrumentation and Measurement.*

[21] Kiamarzi, A., Moallemi, A., Zonzini, F., Brunelli, D., Rossi, D., Tagliavini, G. **Parallelization is All System Identification Needs: End-to-end Vibration Diagnostics on a multi-core RISC-V edge device**. *Submitted to IEEE Internet of Things Journal.*

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

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

[18] Zonzini, F.[‡], Ragusa, E.[‡], Gastaldo, P., De Marchi, L. **Combining Compressed Sensing and Neural Architecture Search for Sensor-near Vibration Diagnostics**. *IEEE Transactions on Industrial Informatics,* 2024. [‡co-first].

[17] Gigli, L., Zyrianoff, I.D., Zonzini, F., Bogomolov, D., Di Felice, M., De Marchi, L., Testoni, N., Augugliaro, G., Mennuti, C., Marzani, A. **Next Generation Edge-Cloud Continuum Architecture for Structural Health Monitoring**. *IEEE Transactions on Industrial Informatics*, 2023.

[16] Selleri, G., Gino, M.E., Fabiani, D., Zonzini, F., De Marchi, L., Focarete, M.L., Zucchelli, A. **Piezoelectric ceramic nanofibers for impact localization in self-sensing composite laminates**. *Submitted to Composites Part B.*

[15] Mohammadgholiha, M., Zonzini. F., Moll, J., De Marchi. L. **Directional Multi-Frequency Guided Waves Communications Using Discrete Frequency-Steerable Acoustic Transducers**. *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, August 2023.
A novel ultrasonic transducer based on the frequency steering concept, which uniquely allows for spatial multiplexing and in hardware MIMO functionalities for guided waves-based acoustic communication.

[14] Ragusa, E.[ŀ], Zonzini, F.[ŀ], De Marchi, L., Gastaldo, P. **Vibration Monitoring in the Compressed Domain with Energy-Efficient Sensor Networks**. *IEEE Sensors Letters*, August 2023. [[ŀ]co-first].
A novel vibration-based monitoring framework combining data compression and feature extraction at the extreme edge with a machine learning classifier hosted by a central aggregating unit as suitable means to extend sensor life cycle (up to 1510x) while preserving classification accuracy (more than 94%).

[13] Moallemi, A., Gaspari, R., Zonzini, F., De Marchi, L., Brunelli, D., Benini, L. **Speeding up System Identification Algorithms on a Parallel RISC-V MCU for Fast Near-Sensor Vibration Diagnostic.** *IEEE Sensors Letters*, August 2023.
Parallelization of embedded System Identification models at the extreme edge by deployment on a octa-core Parallel Ultra-Low-Power GAP9 microprocessor achieving 64x computation time speed up.

[12] Donati, G., Zonzini, F., De Marchi, L. **Tiny Deep Learning Architectures Enabling Sensor-Near Acoustic Data Processing and Defect Localization**, *Computers*, 12(7), 129, June 2023.
Novel tiny deep learning models based on dilated convolutional neural networks and capsule modules for more accurate estimation of the time of arrival in acoustic emission signals under relevant noise levels. Deployment of the architectures on low-end microprocessors.

[11] Montori, F., Zyrianoff, I.D., Gigli, I., Venanzi, R., Sindaco, S., Sciullo, L., Zonzini, F., *et al*. **An IoT Toolchain Architecture for Planning, Running and Managing a Complete Condition Monitoring Scenario**, *IEEE Access*, January 2023.
An architecture for condition monitoring based on both abstraction layers and four different toolchains aimed at supporting the engineering process at different tasks (e.g., energy tracking).

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

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

[8] Zonzini, F., Carbone, A., Romano, F., Zauli, M., De Marchi, L. **Machine Learning Meets Compressed Sensing in Vibration-based Structural Health Monitoring**. *Sensors,* 22(6), March 2022.

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

[6] Zonzini, F., Girolami, A., De Marchi, L., Brunelli, D., and Marzani, A. **Cluster-based Vibration Analysis of Structures with Graph Signal Processing**. *IEEE Transactions in Industrial Electronics*, 2020.

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

[4] Zonzini, F., Malatesta, M. M., Bogomolov, D., Testoni, N., Marzani, A., and L. De Marchi. **Vibration-based SHM with up-scalable and low-cost Sensor Networks**. *IEEE Transactions on Instrumentation and Measurement*, IEEE 2019.

[3] Kexel, C, Testoni, N., Zonzini, F., Moll, J., and De Marchi, L. **Low-power MIMO guided-wave communication**. *IEEE Access*, 2020.

[2] Testoni, N., Zonzini, F., Marzani, A., Scarponi, V., and De Marchi, L. **A tilt sensor node embedding a data-fusion algorithm for vibration-based SHM**. *Electronics*, 8:1-14, 2019.

[1] Testoni, N., Aguzzi, C., Arditi, V., Zonzini, F., De Marchi, L., Marzani, A., and Salmon Cinotti, T. **A sensor network with embedded data processing and data-to-cloud capabilities for vibration-based real-time SHM**. *Journal of Sensors*, 2018:1-12, 2018.

CONFERENCE PROCEEDINGS

[45] Zauli, M., Zonzini, F., Sciullo, G., Marzani, A., De Marchi, L. **Evaluating Unmanned Aerial Vehicles for Vibrational Analysis: Exploiting Integrated Capabilities of Nano-Drones as Nodes in a WSN**. In *11th European Workshop on Structural Health Monitoring (EWSHM)*, Berlin, 2024.

[44] Donati, G., Zonzini, F., Stefano, M., Bogomolov, D., De Marchi, L. **Deep Learning-Aided Acoustic Source Localization in Thin-Walled Waveguides**. In *11th European Workshop on Structural Health Monitoring (EWSHM)*, Berlin, 2024.

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

[42] Zauli, M., Pirazzi, M., Zonzini, F., De Marchi, L. **Exploiting Nano Aerial Vehicles as Sensor Nodes for Wireless Vibration Monitoring**. In *IEEE Sensors Applications Symposium*, Naples, July, 2024.

[41] Zonzini, F., Peppi, L. M., De Renzis, L., Vignati, G., Manfrini, L., De Marchi, L. **High Precision Photosynthetically Active Radiation Estimation via a Sensor-near AI Architecture and Low-cost Sensors**. In *IEEE Sensors Applications Symposium*, Naples, July, 2024.

[40] Zonzini, F., Testoni, N., Palermo, A., De Marchi, L., Mennuti, C., Augugliaro, G., Marzani, A. **Green Wireless Sensing Network for Structural Health Monitoring: a Vertical Approach**. In *IEEE International Symposium on Measurement and Networking*, Rome, July, 2024.

[39] Ragusa, E.[‡], Zonzini, F.[‡], Gastaldo, P., Zunino, R., De Marchi, L. **Towards Energy-efficient Smart Sensing Nodes for Automatic Structural Health Monitoring**. In *LV Annual Meeting of Italian Electronics Society*, Genoa, June, 2024. [‡co-first].

[38] Zonzini, F., Zavalloni, F., Martinelli, D., Antolini, A., Franchi Scarselli, E., Pasotti, M., De Marchi, L. **Enhancing Vibration Inspection via Compressed Sensing based on Embedded Phase Change Memories**. In *LV Annual Meeting of Italian Electronics Society*, Genoa, June, 2024.

[37] Zonzini, F., Ragusa, E., De Marchi, L., Gastaldo, P. **Evaluating the effect of intrinsic sensor noise for vibration diagnostic in the compressed domain using Convolutional Neural Networks**. In *International Conference on Applications in Electronics Pervading Industry, Environment and Society,* Genoa, September, 2023.

[36] Zonzini, F., Castaldi, P., De Marchi, L. **Dealing with Significant Noise Levels in Vibration-based Bridge Health Monitoring? A Novel ARMA+Noise Algorithm in the Frisch Scheme Context**. *To be presented at EUROSTRUCT 2023 – 2nd conference of the European association on quality control of bridges and structures, Wien, September, 2023.*

[35] Zonzini, F., Burioli, L., Gashi, A., Mancini, N.F., De Marchi, L. **A Tiny Convolutional Neural Network driven by System Identification for Vibration Anomaly Detection at the Extreme Edge**. In *2023 IEEE International Conference on Omni-layer Intelligent Systems (COINS),* Berlin, July, 2023.

[34] Donati, G., Zonzini, F., De Marchi, L. **Enhanced Global Convolution Networks for Defect Detection in Full Wavefield Imaging**. In *15th International AIVELA Conference & Short course*, Ancona, June, 2023.

[33] Taccetti, S., Peppi, L.M., Zonzini, F., Mohammadgholiha, M., Zauli, M., De Marchi, L. **Design of a Novel Pulser for Frequency Selective-based Power and Data Transmission**. In *IEEE International Workshop on Metrology for Automotive*, Modena, June, 2023.

[32] Zonzini, F., Zauli, M., De Marchi, L., **eSysId: Embedded System Identification for Vibration Monitoring at the Extreme Edge**. In *International Conference on Applications in Electronics Pervading Industry, Environment and Society,* Genoa, September, 2022.

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

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

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

[28] Zonzini, F., Donati, G., De Marchi, L. **A Tiny Machine Learning Approach to the Edge Localization of Acoustic Sources via Convolutional Neural Networks.** In *6th International Conference on System-Integrated intelligence, Intelligent, flexible and connected systems in products and production,* Genoa, September, 2022.

[27] Marzani, A., Testoni, N., Bogomolov, D., Zonzini, F., De Marchi, L., Mennuti, C., Augugliaro, C., Roselli, I., Saitta, F., Tati, A. **Acoustic Emissions and Modal Analysis on a reinforced concrete two storey-frame structure subjected to shaking table test: measurements, correlations and observations.** In *XIV National Conference on Non-Destructive Testing, Monitoring and Diagnostics, AIPnD, Biennale PND-MD,* Verona, October, 2022.

[26] Marzani, A., Testoni, N., Bogomolov, D., Zonzini, F., De Marchi, L., Mennuti, C., Augugliaro, C. **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.** In *XIV National Conference on Non-Destructive Testing, Monitoring and Diagnostics, AIPnD, Biennale PND-MD*, Verona, October, 2022.

[25] Zauli, M., Zonzini, F., Coppola, V., Dertimanis, V., Chatzi, E., Testoni. N., De Marchi, L. **A Novel Smart Sensor Node with Embedded Signal Processing Functionalities Addressing Vibration-based Monitoring**. *10th European Workshop on Structural Health Monitoring (EWSHM), Palermo 2022.*

[24] Zonzini, F., Castaldi, P., De Marchi, L. **Frequency Domain System Identification of Error-in-Variables Systems for Vibration-based Monitoring**. *10th European Workshop on Structural Health Monitoring (EWSHM),* Palermo, July, 2022.

[23] Zonzini, F., Bogomolov, D., Dhamija, T., De Marchi, L., Marzani, A. **Artificial Intelligence Algorithms for Time of Arrival Estimation in Acoustic Emission Signals**. In *Sicurezza ed affidabilità degli impianti ed attrezzature a pressione*, INAIL, November 2021.

[22] Zonzini, F., Zauli, M., Testoni, N., De Marchi, L. **Reti eterogenee di sensori intelligenti per il monitoraggio di attrezzature e impianti**. In *Sicurezza ed affidabilità degli impianti ed attrezzature a pressione*, INAIL, November 2021.

[21] Zonzini F., Zauli, M., Mangia, M., Testoni, N., De Marchi, L. **HW-Oriented Compressed Sensing for Operational Modal Analysis: the Impact of Noise in MEMS Accelerometer Networks**, *IEEE Sensor Application Symposium*, Online, 2021.

[20] 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. **A Toolchain Architecture for Condition Monitoring Using the Eclipse Arrowhead Framework**, In *IEEE IECON* 2021.

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

[18] Zonzini, F., Romano, F., Carbone, A., Zauli, M., De Marchi, L. **Enhancing Vibration-based Structural Health Monitoring via Edge Computing: a TinyML perspective**. 48th Annual Review of Progress in Quantitative Nondestructive Evaluation, 2021.

[17] Bogomolov, D., Testoni, N., Zonzini, F., Malatesta, M.M., De Marchi, L., Marzani, A. **Acoustic emission structural monitoring through low-cost sensor nodes**. *SHM10 – 10th International Conference on Structural Health Monitoring of Intelligent Structures*, June-July, 2021.

[16] Aguzzi, C., Gigli, L., Sciullo, L., Trotta, A., Zonzini, F., De Marchi, L., Di Felice, M., Marzani, A., Salmon Cinotti, T. **MODRON: A Scalable and Interoperable Web of Things Platform for Structural Health Monitoring.** *2021 IEEE 18th Annual Consumer Communications & Networking Conference,* January, 2021.

[15] Zonzini, F., Zauli, M., Carbone, A., Romano, F., Testoni, N., De Marci, L. **Hardware–oriented data recovery algorithms for compressed sensing–based vibration diagnostics.** *International Conference on Applications in Electronics Pervading Industry, Environment and Society,* November, 2020.

[14] Zonzini, F., Testoni, N., Marzani, A., De Marchi, L. **Low Depth Time Reversal Modulation Technique for Ultrasonic Guided Waves-based Communications.** In *2020 IEEE International Ultrasonics Symposium (IUS)*, September, 2020.

[13] Zonzini, F., De Marchi, L., Kexel, C., Moll, J**. Guided-wave MIMO communication on a composite panel for SHM applications.** Proceeding of *SPIE Smart Structures + Nondestructive Evaluation, 2020,* Online Only, California, United States, July, 2020.

[12] Zonzini, F., Zauli, M., Testoni, N., Marzani, A., De Marchi, L. **A Structural-aware Frequency Division Multiplexing Technique for Acoustic Data Communication in SHM applications.** In *Proceedings of the 10th European Workshop on Structural Health Monitoring (EWSHM)*, 2020.

[11] Zauli, M., Zonzini, F., Testoni, N., L. De Marchi and Marzani, A. **Compressive Sensing and On-board Data Recovery for Vibration-based SHM**. In *Proceedings of the 10th European Workshop on Structural Health Monitoring (EWSHM)*, 2020.

[10] Malatesta, M. M., Zonzini, F., Bogomolov, D., Testoni, N., Marzani, A., and De Marchi, L. **Structural Health Monitoring reliability enhancement by an automated sensor tuning procedure.** In *ESREL 2020/PSAM 15*, June 21-26, 2020, Venice.

[9] Zonzini, F., Girolami, A., Brunelli, D., Testoni, N., Marzani, A and De Marchi, L. **A graph signal processing technique for vibration analysis with clustered sensor networks**. In *International Conference on Applications in Electronics Pervading Industry, Environment and Society* (pp. 355-361). Springer, Cham, 2020.

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

[7] Malatesta, M. M., Zonzini, F., Bogomolov, D., Tarozzi, M, Testoni, N., Agugliaro, G, Mennuti, C., Marzani, A., De Marchi, L., and Benedetti, A. **Structural Health Monitoring of a reinforced concrete beam by means of a miniaturized heterogeneous sensor network**. In *XVIII National Conference on Non-Destructive Testing, Monitoring and Diagnostics, AIPnD, Biennale PND-MD*, Milan, 2019.

[6] Zonzini, F., Malatesta, M. M., Bogomolov, D., Testoni, N., De Marchi, L., and Marzani, A. **A spectral peak-picking method for on-board operational modal analysis of multi-type vibration-based SHM**. In *ANCRiSST 2019 Procedia*. Sapienza University of Rome, 2019.

[5] Zonzini, F., Malatesta, M. M., Bogomolov, D., Testoni, N., L. De Marchi and Marzani, A. **Heterogeneous sensor-network for vibration-based SHM**. In *2019 IEEE International Symposium on Measurements & Networking (M&N)*, pages 1-5. IEEE, 2019.

[4] Testoni, N., Aguzzi, C., Zonzini, F., De Marchi, L., Agugliaro, G., Salmon Cinotti, T, and Marzani, A. **Low-weight sensor networks based on a multi-function sensor node**. In *Sicurezza ed affidabilità delle attrezzature a pressione (SAFAP)*. Bologna, pages 1-10, 2018.

[3] Zonzini, F., Malatesta, M. M., Aguzzi, C., Testoni, N., Verardi, M., and Scarponi, V. **A sensor network targeted on a novel identification of cracks**. In *FRUCT Oy*, Finland, 2018.

[2] Girolami, A., Zonzini, F., De Marchi, L., Brunelli, D., and Benini, L. **Modal analysis of structures with low-cost embedded systems**. In *IEEE International Symposium on Circuits and Systems (ISCAS)*, pages 1-4. IEEE, 2018.

[1] Zonzini, F., De Marchi, L., and Testoni, N. **A small footprint, low power, and light weight sensor node and dedicated processing for modal analysis**. In *Lecture Notes in Electrical Engineering*, volume 539, pages 361-370. Springer Verlag, 2019.