

Curriculum vitae di *Valentina Zega*

Sottosettori ERC primari: *PE8*

Eventuali sottosettori ERC secondari: *PE8_7, PE8_4, PE8_3*

PERSONAL DETAILS

Family name, First name: Zega Valentina

Birthdate: 05/11/1988

Researcher unique identifier: <https://orcid.org/0000-0003-1607-5827>

URL for web site: <https://zega.faculty.polimi.it/>

• **Education and key qualifications**

23/02/2017 PhD in structural seismic and geotechnical engineering (cum laude)
Civil and Environmental Engineering Department, Politecnico di Milano, Italy
Scholarship funded by STMicroelectronics

2013 Master in Mathematical Engineering
Politecnico di Milano, Italy

• **Current position(s)**

2024 - now Associate Professor (Scienza delle Costruzioni)
Civil and Environmental Engineering Department, Politecnico di Milano, Italy

2023 – now Deputy director for Talent Development
We aim at monitoring and coordinating the actions taken to support young researchers, i.e. the university Post-Doc and Researchers with a professional experience of maximum seven years since their PhD (according to the requirements to benefit from the ERC Starting Grants)
Civil and Environmental Engineering Department, Politecnico di Milano, Italy

• **Previous position(s)**

2019 – 2024 Assistant Professor (Scienza delle Costruzioni)
Civil and Environmental Engineering Department, Politecnico di Milano, Italy

06/2018 – 11/2018 Post-Doctoral Researcher
Mechanical Engineering Department, Eindhoven University of Technology (TU/e),
The Netherlands - Mechanics of Materials Group (prof. Marc Geers)

10/2015 – 12/2015 Visiting Researcher
Mechanical and Aerospace Engineering Department, University of California Davis,
Davis, USA - MicroElectroMechanical Systems (MEMS) Laboratory (prof. D. Horsley)

02/2014 – 05/2014 Visiting Researcher
Mechanical and Aerospace Engineering Department, University of California Davis,
Davis, USA - MicroElectroMechanical Systems (MEMS) Laboratory (prof. D. Horsley)

06/2013 – 10/2013 Internship at STMicroelectronics
STMicroelectronics, Cornaredo, Italy

RESEARCH ACHIEVEMENTS AND PEER RECOGNITION

Research achievements

Co-author of 47 publications in peer-reviewed journals of national and international levels, of 55 contributions in international conferences, 3 chapters in book and 9 patents (3 deposited, 3 published and 3 granted). Among publications in peer-reviewed journals, 17 are without PhD supervisors (proff. Corigliano, Comi, Horsley) and 8 are without senior co-authors from the Civil and Environmental Department of Politecnico di Milano. I am first author in 13 papers, second author in 12 papers and last name, as project coordinator, in 6 papers.

From Scopus (September 3rd, 2025): h-index 22, total citations 1213.

Here below a list of the most significant papers:

- [1] S. H. Nitzan, V. Zega, M. Li, C. H. Ahn, A. Corigliano, T. W. Kenny, D. A. Horsley ‘*Self-induced parametric amplification arising from nonlinear elastic coupling in a micromechanical resonating disk gyroscope*’ Scientific Rep. 5 (2015) DOI:10.1038/srep09036
- [2] V. Zega, S. H. Nitzan, M. Li, C. H. Ahn, E. Ng, V. Hong, Y. Yang, T. Kenny, A. Corigliano, and D. A. Horsley ‘*Predicting the closed-loop stability and oscillation amplitude of nonlinear parametrically amplified oscillators*’ Applied Physics Letters 106, 233111 (2015) doi: 10.1063/1.4922533
- [3] L. D’Alessandro, V. Zega, R. Ardito, A. Corigliano ‘*3D auxetic single material periodic structure with ultra-wide tunable bandgap*’ Scientific Reports 8:2262 (2018)
- [4] V. Zega, C. Comi, P. Minotti, G. Langfelder, L. Falorni, A. Corigliano ‘*A new MEMS three-axial frequency-modulated (FM) gyroscope: a mechanical perspective*’ European Journal of Mechanics/A Solids, 70 (2018) 203-212.
- [5] V. Zega, G. Langfelder, L.G. Falorni, C. Comi ‘*Hardening, softening and linear behavior of elastic beams in MEMS: an analytical approach*’ J. Microelectromech. Syst., 28(2) (2019) 189-198.
- [6] V. Zega, P. B. Silva, M. G. D. Geers, V. G. Kouznetsova ‘*Experimental proof of emergent subharmonic attenuation zones in a nonlinear locally resonant metamaterial*’ Scientific Reports, 10 (1), (2020) 12041.
- [7] V. Zega, G. Gattere, S. Koppaka, A. Alter, G.D. Vukasin, A. Frangi, T.W. Kenny ‘*Numerical modelling of Non-Linearities in MEMS resonators*’ J. Microelectromech. Syst., 26(6), (2020), 1443-1453.
- [8] G. Gobat, V. Zega, P. Fedeli, L. Guerinoni, C. Touzé, A. Frangi ‘*Reduced order modelling and experimental validation of a MEMS gyroscope test-structure exhibiting 1:2 internal resonance*’ Scientific Rep., 11 (1), (2021), 16390.
- [9] M. Antonacci, E. Riva, A. Frangi, A. Corigliano, V. Zega ‘*Planar GRIN lenses: numerical modelling and experimental validation*’ J. Sound and Vibr. 537, (2022) 117217.
- [10] E. Panahi, A. Hosseinkhani, A. Frangi, D. Younesian, V. Zega ‘*A novel low-frequency multi-bandgaps metaplate: Genetic algorithm based optimization and experimental validation*’ Mech. Syst. Signal Processing 181, (2022) 109495.
- [11] G. Gobat, V. Zega, P. Fedeli, C. Touzé, A. Frangi ‘*Frequency combs in a MEMS resonator featuring 1:2 internal resonance: ab-initio reduced order modelling and experimental validation*’ Nonlinear Dynamics 111, (2023) 2991–3017.
- [12] V. Zega, C. Gazzola, A. Buffoli, L. G. Falorni, G. Langfelder, A. Frangi ‘*A defect-based MEMS phononic crystal slab waveguide in electronic circuits*’ J. Microelectromech. Syst. 32(5), (2023) 494-504.
- [13] C. Gazzola, V. Zega, F. Cerini, S. Adorno, A. Corigliano ‘*On the design and modelling of a full-range piezoelectric MEMS loudspeaker for in-ear applications*’ J. Microelectromech. Syst. 32(6), (2023) 626-637.
- [14] C. Gazzola, A. Corigliano, V. Zega ‘*Total harmonic distortion estimation in piezoelectric micro-electro-mechanical-system loudspeakers via a FEM-assisted reduced-order-model*’ Mech. Syst. and Signal Processing, 222, (2025), 111762.
- [15] Y. Banani, A. Buffoli, F.D. Mauri, A. Openi, A. Frangi, G. Gattere, G. Langfelder, V. Zega ‘*A long-stroke MEMS actuator based on cascaded stages of innovative pass-through comb fingers*’ Sensors and Actuators A: physical, 382, (2025), 116146.

Peer recognition

Awards:

- 2024 IEEE Sensors Council Technical Achievement Award in the area of Sensors (early career) - The award (<https://ieee-sensors.org/awards/>) honors a person with outstanding technical contributions within the scope of the IEEE Sensors Council, as documented by publications and patents. It is based on the general quality and originality of contributions. Early Career awards are for individuals within 15 years of receiving the first degree. The award citation is: for her contributions to MEMS inertial sensors.
- Associazione Italiana Meccanica Teorica e Applicata (AIMETA) junior award 2024 in the field of Mechanics of Materials and Structures - Recognition of a significant scientific result obtained by the candidate in the field of Mechanics of Materials and Structures. The award is for individuals under 38 (<https://www.dica.polimi.it/valentina-zega-receives-the-2024-aimeta-junior-award/?lang=en>). The award citation is: for the innovative nature of her scientific contributions, characterized by a high level of methodological rigor, and for her mastery of modern analytical and experimental investigative tools applied to the field of metamaterials, a sector with highly promising prospects and potential interdisciplinary synergies.
- Italian Intellectual Property (IP) Women 2023 – Licensing Executives Society (LES) Italy and Politecnico di Milano - Award to Women of Italian excellence that with their fundamental role in driving innovation, creativity, business growth, sustainable development and pursuing and protecting the Intellectual Property (IP) values improve the quality of life for all of us [<https://www.youtube.com/watch?v=TeHIgu95bkc>].
- 2018 Arnaldo Rancati award from Istituto Lombardo Accademia di Scienze e Lettere, Milano - Award for an unpublished work to the advantage of the aeronautics or technical industry in general

Invited presentations:

- ‘*A new out-of-plane resonant accelerometer*’ (December 2015) – TDK- Invensense, San Jose, CA
- ‘*MEMS sensors for the measurements of angular velocity: mechanical and structural issues*’ (May 2017) – University of Trento, Department of Civil, Environmental and Mechanical Engineering (prof. Pugno)
- ‘*Frequency-modulated gyroscopes*’ (July 2017) – STMicroelectronics, Cornaredo, Italy

- ‘*Nonlinear Dynamics in MEMS: from simulation to experiments*’ (September 7, 2021) – Eurosensors 2021 Virtual Meeting
- ‘*A mechanical perspective on MEMS gyroscopes: from new working principles to simulation challenges*’ (April 2022)– Invited tutorial Speaker at the IEEE EFTF-IFCS 2022 conference, Paris, France
- ‘*3D-printing and wet-metallization for sensors: a Coriolis mass flowmeter operating in the mode-split conditions*’ (June 28, 2022) – Invited speaker at the CIMTEC 2022 conference, Perugia, Italy
- ‘*MicroElectroMechanical Systems: a mechanical perspective*’ (September 13, 2024) – Invited lecture at the LIMNI School ‘NanoFabMat 2024: Exploring Novel Materials and Advanced Fabrication Techniques for Micro-and Nanosystems’ KU Leuven, Belgium.
- ‘*Applications of mechanical metamaterials in microsystems: challenges and perspectives*’ (July 2025) - Invited talk at the META2025 conference, Malaga, Spain

ADDITIONAL INFORMATION

Other contributions to the research community

Consolidated experience in **project management** and **scientific coordination** of research activities:

- from Dec. 2024, scientific coordinator, with proff. Comi and Langfelder, of the project ‘Sviluppo di un microgiroscopio mono-assiale ad alte prestazioni’ [Politecnico di Milano - Northrop Grumman Italia S.p.A.] - 139k€
- from Feb. 2024, scientist in charge for Politecnico di Milano and WP3 leader of the HORIZON-MSCA-2022-DN-01-01 — MSCA Doctoral Networks 2022 project METRAMAT (<https://metramat.eu/>) - 2.7M€
- Dec. 2023 – Feb. 2025: scientific consultant for the Proof of Concept (PoC) project ‘MetaBlock’ funded through D.R.748 of 18/07/2023 (principal investigator: prof. Milena Martarelli, UniVPM, Italy)
- from Jan. 2021, scientific coordinator of the research line ‘Innovative MEMS design for new fabrication processes "New-Thelma" within the Joint Research Platform Politecnico di Milano – STMicroelectronics - 30M€
- from Jan. 2022, scientific and management committee member of the MEMS&3D Lab of PoliMi ([link](#)). The MEMS&3D lab represents a first example of the use of 3D manufacturing for the fabrication and customization of a new generation of sensors and actuators.
- Oct. 2022 – Dec. 2023: scientific coordinator with prof. Comi of the project ‘MEMS resonators and capacitive sensors’ between PoliMi and the Beijing Institute of Aerospace Control Device- 100k€

Organization of **international conference** and **PhD summer schools**:

- 2025: Technical Program Committee (TPC) co-chair of the IEEE INERTIAL 2026, Destin, USA
- 2025: Technical Program Committee (TPC) Member and Group 4 ‘Sensors and Transducers’ vice-chair for the IEEE EFTF-IFCS 2025, Querétaro, Mexico
- 2025: Co-Director of the Summer School ‘*MEMS TRANSDUCERS AFTER 2025: APPLICATION REQUIREMENTS, THEORETICAL ASPECTS, DESIGN APPROACHES*’ 3-6 June 2025, Villa Grumello, Como, Italy (<https://mems.lakecomoschool.org/>)
- 2024: Treasurer for the IEEE INERTIAL 2024, Hiroshima, Japan
- 2023: TPC Member for the IEEE EFTF-IFCS 2023, Toyama, Japan
- 2023: Director of the Summer School ‘*MEMS BEFORE AND AFTER 2025: FROM APPLICATION REQUIREMENTS AND THEORETICAL ASPECTS TO PRACTICAL DESIGN APPROACH*’ May 29th – June 1st 2023, Villa Grumello, Como, Italy
- 2022: Chair of the European Mechanics Society (EUROMECH) colloquium n° 616 – ‘Unification of microsystems and metamaterials for new generation engineering solutions’, Milan, Italy
- 2022: TPC Member for the IEEE EFTF-IFCS 2022, Paris, France
- 2021: TPC Member for the IEEE EFTF-IFCS 2021, online
- 2021: TPC Member for the IEEE MEMS2021, online
- 2021: Local Organizing Committee member of ICTAM2020+1 conference, Milan, Italy
- 2020: TPC Member for the IEEE MEMS2020, Vancouver, Canada.

Editorial roles:

- 2024-now: Associate Editor for the IEEE Journal of Microelectromechanical Systems (JMEMS)
- 2022: co-editor of the Special Issue ‘Nonlinear Dynamics of Micro-and Nanosystems’ of Applied Sciences

Supervision and mentoring:

- 2015-now: co-supervision of 14 master thesis students at Politecnico di Milano,
- 2022-now: supervision of 5 master thesis students at Politecnico di Milano
- 2016-2020: co-supervision of 2 visiting PhD students from the Nanjing University of Science and Technology, Nanjing, China

2021: co-supervision of 1 visiting (online for Covid) PhD student from the Iran University of Science and Technology, School of Railway Engineering, Iran
2019-now: co-supervision of 3 PhD students of Politecnico di Milano
2021-now: supervision of 6 PhD students (two already graduated) of the structural seismic and geotechnical engineering program at Politecnico di Milano,
2022-2023: co-supervision of a PostDoctoral researcher at Politecnico di Milano

Third mission responsibilities:

- 2025: active participation to the 'DICA4School' program of the Civil and Environmental Engineering department of Politecnico di Milano. Born in 2017, the DICA4Schools project is a tool for technical and scientific dissemination in schools, through the free offer of interactive laboratories and seminars for students of various ages. DICA4Schools adopts a teaching approach based on interactive activities and aimed at stimulating students' curiosity. We bring students closer to an engineering and scientific approach to address fundamental challenges for the development of our society.
In particular, I am responsible for the activity (in Italian) entitled: *L'internet delle cose: cosa sono i MEMS e come si possono utilizzare* ([link](#)).
- 2024 and 2025: '*L'internet delle cose: cosa sono i MEMS e come si possono utilizzare*' (September) – presentation during the 'Meet Me Tonight' (research night) and the 'Festival dell'Ingegneria', two dissemination events organized in Milano and Politecnico di Milano, respectively and open to the general public to raise awareness towards STEM subjects.
- 2019: '*MEMS: microsensori al servizio dell'uomo*' (September 2019) – presentation during the event called MeetMeTonight, Notte dei ricercatori ([link](#)). The event has the purpose to share research results with the general public and raise awareness to STEM subjects.

Consolidated academic and industrial collaborations:

- STMicroelectronics ([link](#)), Italy – leader company in the field of MEMS – joint research projects + joint papers and patents
- Phononic Vibes ([link](#)), Italy - company focused on vibration and acoustic control exploiting the metamaterial technology – scientific consultant for metamaterials based acoustic panels homologation + collaboration in the framework of the PON “Ricerca e Innovazione” 2014- 2020 “PhD on Green topics” on the topic 'Metamaterials as underwater acoustic barriers'
- Northrop Grumman Italia ([link](#)), Italy – company specialized in integrated navigation systems – joint research projects + joint papers
- Università di Brescia, Italy – Department of Information Engineering (prof. M. Ferrari and prof. V. Ferrari) – tests of MEMS devices integrated with metamaterials (metaMEMS) + joint papers
- Technical University of Eindhoven, The Netherlands – Mechanics of Materials Group (prof. Geers, prof. Kouznetsova) – nonlinear metamaterials – postdoctoral period + European project MSCA Doctoral Networks 2022 project METRAMAT + joint papers
- KU Leuven, Belgium – Department of Mechanical Engineering (prof. E. Deckers, prof. B. Van Hooreweder, dr. C. Claeys) - European project MSCA Doctoral Networks 2022 project METRAMAT
- Norwegian University of Science and Technology (NTNU) – Department of Mechanical and Industrial Engineering (prof. N. Razavi) - European project MSCA Doctoral Networks 2022 project METRAMAT
- Stanford University, USA – Micro Structures & Sensors Lab (prof. Kenny) – fabrication of MEMS devices + joint papers
- Nanjing University of Science and Technology, China (prof. Su) – modelling of MEMS devices and metaMEMS – co-supervision of two PhD students + joint papers
- Iran University of Science and Technology, Iran – School of Railway Eng. (prof. Younesian) – optimization of metamaterials – co-supervision of one PhD student + joint paper
- Università Politecnica delle Marche, IT – Industrial Eng. and Mathematical Sciences Dep. (prof. Martarelli, prof. Castellini) – design and characterization of metamaterials + joint patent and papers
- National Tsing Hua University, Taiwan – RF Microsystems Lab (prof. Li) – invited to join the 2025 multi-project-wafer run with some innovative piezoelectric devices

Membership of scientific societies:

from 2022: AIMETA ([link](#)) and EUROMECH ([link](#)) member
from 2023: IEEE, IEEE Young professionals and IEEE Micro electro mechanical systems community member
from 2025: Technical Committee on Inertial Sensors and Systems (TCISS) member ([link](#))
from 2025: ITATEC junior member

Career breaks, diverse career paths and major life events

Maternity leave: 13/02/2024 - 03/08/2024