

## PhD thesis

[0] **V. Zega** '*MEMS sensors for the measurement of the angular velocity: mechanical and structural issues*', 2017.

## Publications in peer reviewed journals

- [1] **V. Zega**, C. Comi, A. Corigliano, C. Valzasina '*Integrated structure for a resonant micro-gyroscope and accelerometer*' *Frattura e integrità strutturale*, 29 (2014) 334-342
- [2] Caspani, C. Comi, A. Corigliano, G. Langfelder, **V. Zega** and S. Zerbini '*A differential resonant micro accelerometer for out-of-plane measurements*' *Procedia Engineering*, 87 (2014) 640-643
- [3] Caspani, C. Comi, A. Corigliano, G. Langfelder, **V. Zega** and S. Zerbini '*Dynamic nonlinear behaviour of torsional resonators in MEMS*' *Journal of Micromechanics and Microengineering*, 24 (2014) 095025
- [4] 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 Reports* 5 (2015) DOI:10.1038/srep09036
- [5] **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
- [6] C. Comi, A. Corigliano, M. Doti, A. Garatti, G. Langfelder, **V. Zega** '*Torsional microresonator in the nonlinear regime: experimental, numerical and analytical characterization*' *Procedia Engineering*, 168 (2016), 933-936
- [7] C. Comi, A. Corigliano, G. Langfelder, **V. Zega**, S. Zerbini '*Sensitivity and temperature behaviour of a novel z-axis differential resonant micro accelerometer*' *Journal of Micromechanics and Microengineering* 26 (2016) 1-11
- [8] C. Comi, A. Corigliano, **V. Zega** and S. Zerbini '*Non linear response and optimization of a new z-axis resonant micro-accelerometer*' *Mechatronics* 40 (2016) 235-243
- [9] M. Bruggi, **V. Zega** and A. Corigliano '*Synthesis of auxetic structures using optimization of compliant mechanisms and a micropolar material model*' *Structural and Multidisciplinary Optimization* 55 (2017) 1-12
- [10] **V. Zega**, C. Credi, R. Bernasconi, G. Langfelder, L. Magagnin, M. Levi and A. Corigliano '*The first 3D-printed z-axis accelerometers with differential capacitive sensing*' *IEEE Sensors J.* 18 (2018) 53- 60
- [11] P. Minotti, S. Dellea, G. Mussi, A. Bonfanti, S. Facchinetti, A. Tocchio, **V. Zega**, C. Comi, A. Lacaita, G. Langfelder '*High scale-factor stability frequency-modulated MEMS gyroscope: 3-axis sensor and integrated electronics design*' *IEEE Transaction on Industrial Electronics*, 65(6) (2018) 5040-5050
- [12] 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)
- [13] **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.
- [14] J. Zhang, Y. Wang, **V. Zega**, Y. Su, A. Corigliano '*Nonlinear dynamics under varying temperature conditions of the resonating beams of a differential resonant accelerometer*' *Journal of Micromechanics and Microengineering*, 28 (2018) 075004.
- [15] **V. Zega**, A. Frangi, A. Guercilena, G. Gattere '*Analysis of frequency stability and thermoelastic effects for slotted tuning fork MEMS resonators*' *MDPI Sensors*, 18(7) (2018) 2157.
- [16] **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.

- [17] **V. Zega**, A. Nastro, M. Ferrari, R. Ardito, V. Ferrari, A. Corigliano ‘*Design, fabrication and experimental validation of a MEMS periodic auxetic structure*’ *Smart Mater. Struct.* 28 (2019) 095011.
- [18] **V. Zega**, M. Invernizzi, R. Bernasconi, F. Cuneo, G. Langfelder, L. Magagnin, M. Levi, A. Corigliano ‘*The first 3D-printed and wet-metallized three-axis accelerometer with differential capacitive sensing*’ *IEEE Sensors Journal*, 19 (20) (2019) 9131-9138.
- [19] G. Mussi, M. Bestetti, **V. Zega**, A. Frangi, G. Gattere, G. Langfelder ‘*An Outlook on potentialities and limits in using epitaxial polysilicon for MEMS real-time clocks*’ *IEEE Transaction on Industrial Electronics*, 67(8) (2020) 6996-7004.
- [20] C. Comi, **V. Zega**, A. Corigliano, ‘*Non-linear mechanics in resonant inertial micro sensors*’ *Int. J. Nonlinear Mech.* 120 (2020) 103386.
- [21] L. Gaffuri Pagani, P. Carulli, **V. Zega**, R. Suriano, R. Bernasconi, A. Frangi, M. Levi, L. Magagnin, G. Langfelder ‘*The First Three-Dimensional Printed and Wet-Metallized Coriolis Mass Flowmeter*’ *IEEE Sensors Lett.* 4 (6) (2020) 2500604.
- [22] Z. Yao, R. Zhao, **V. Zega**, A. Corigliano, ‘*A metaplate for complete 3D vibration isolation*’, *European J. Solid Mech. A/Solids*, 84, (2020) 104016.
- [23] **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.
- [24] Z. Yao, **V. Zega**, Y. Su, J. Ren, J. Zhang, A. Corigliano ‘*Design, fabrication and experimental validation of a metaplate for vibration isolation in MEMS*’ *J. Microelectromech. Syst.*, 29(5), (2020), 1401-1410.
- [25] **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.
- [26] L. Pertoldi, **V. Zega**, C. Comi, R. Osellame ‘*Dynamic mechanical characterization of two-photon-polymerized SZ2080 photoresist*’ *J. Applied Physics*, 128, (2020), 175102.
- [27] **V. Zega**, L. Martinelli, R. Casati, E. Zappa, G. Langfelder, A. Cigada, A. Corigliano ‘*A 3D Printed Ti6Al4V Alloy Uniaxial Capacitive Accelerometer*’ *IEEE Sensors Journal*, 21 (18), (2021) 19640–19646.
- [28] 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 Reports*, 11 (1), (2021), 16390.
- [29] **V. Zega**, L. Pertoldi, T. Zandrini, R. Osellame, C. Comi, A. Corigliano ‘*Microstructured phononic crystal isolates from ultrasonic mechanical vibrations*’ *Appl. Sci.* 12, (2022) 2499.
- [30] 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.
- [31] 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.
- [32] A. Annessi, **V. Zega**, P. Chiariotti, M. Martarelli, P. Castellini ‘*An innovative wide and low-frequency bandgap metastructure for vibration isolation*’ *J. Applied Physics* 132, (2022) 084903.
- [33] R. Bernasconi, D. Hatami, H. Nouri Hosseinabadi, **V. Zega**, A. Corigliano, R. Suriano, M. Levi, G. Langfelder, L. Magagnin ‘*Hybrid Additive Manufacturing of a Piezopolymer-Based Inertial Sensor*’ *Additive Manufacturing* 59, (2022) 103091.
- [34] D. Faraci, **V. Zega**, A. Nastro, C. Comi ‘*Identification of MEMS Geometric Uncertainties through Homogenization*’, *Micro* 2, (2022) 564-574.

- [35] 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.
- [36] C. Galimberti, G. Gattere, M. Riani, **V. Zega** ‘*A new design strategy for innovative MEMS xz-biaxial accelerometer*’ *IEEE Sensors Letters* 7 (10), (2023) 2503504.
- [37] **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.
- [38] 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.
- [39] R. Nastri, C. Padovani, **V. Zega**, L. G. Falorni, G. Langfelder ‘*Low-motion amplitude operation of Lissajous frequency modulated MEMS gyroscopes for spurious harmonics reduction*’ *IEEE Sensors Letters* 7(11), (2023) 2504104.
- [40] M. De Pace, P. Frigerio, C. Valzasina, L. G. Falorni, P. Peliti, **V. Zega**, G. Langfelder ‘*Split is not dead: a case study (and review) of the performance gap between MEMS automotive-grade gyroscopes and high-end applications*’ *IEEE Sensors Letters*, 7(12), (2023), 2504904.
- [41] C. Gazzola, **V. Zega**, A. Corigliano, M. Melon, P. Lotton ‘*A reduced-order-model-based equivalent circuit for piezoelectric MEMS loudspeaker modeling*’ *J. Acoust. Soc. Am.* 155, (2024), 1503–1514.
- [42] P. Frigerio, A. Fagnani, **V. Zega**, G. Gattere, G. Langfelder ‘*Epitaxial polysilicon MEMS temperature sensor with 50-mK resolution at 4-Hz data rate*’ *IEEE Sensors Journal*, 24(6), (2024), 8123-8131.
- [43] C. Viola, D. Pavesi, L. Weng, G. Gobat, F. Maspero, **V. Zega** ‘*Microelectromechanical System Resonant Devices: a guide for design, modeling and testing*’ *Micromachines*, 15(12), (2024), 1461.
- [44] C. Gazzola, A. Corigliano, **V. Zega** ‘*Total harmonic distortion estimation in piezoelectric micro-electro-mechanical-system loudspeakers via a FEM-assisted reduced-order-model*’ *Mechanical Systems and Signal Processing*, 222, (2025), 111762.
- [45] Y. Banani, A. Buffoli, F.D. Mauri, A. Opreni, 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.
- [46] G. Mecca, R. Bernasconi, **V. Zega**, R. Suriano, M. Menegazzo, G. Bussetti, A. Corigliano, L. Magagnin ‘*Inkjet-Printed Flexible Piezoelectric Sensor for Large Deformation Applications*’ *Technologies*, 13(5), (2025), 206.
- [47] A. Annessi, **V. Zega**, P. Chiariotti, M. Martarelli, P. Castellini ‘*A compact 3D bandgap multi-material metamaterial design for vibration testing*’ *Mechanical Systems and Signal Processing*, 238, (2025), 113156.

## Chapter in a Book

- [1] A. Corigliano, A. Ghisi, S. Mariani, **V. Zega** ‘*Mechanics of Microsystems: a recent journey in a fascinating branch of mechanics*’ in G. Rega (eds) *50+ Years of AIMETA*. Springer, Cham. (2022) 419-435.
- [2] C. Comi, A. Corigliano, A. Frangi, **V. Zega** ‘*Linear and Nonlinear Mechanics in MEMS*’ in B. Vigna, P. Ferrari, F.F. Villa, E. Lasalandra, S. Zerbini (eds) *Silicon Sensors and Actuators*. Springer, Cham (2022) 389-437.
- [3] A. Annessi, **V. Zega**, P. Chiariotti, M. Martarelli, P. Castellini ‘*Static and Dynamic Characterization of a Vibration Decoupling Element Based on a Metamaterial Structure*’ In: Platz, R., Flynn, G., Neal, K., Ouellette, S. (eds) *Model Validation and Uncertainty Quantification, Vol. 3. SEM 2023. Conference Proceedings of the Society for Experimental Mechanics Series*. Springer, Cham. (2024) 45-55.

## Publications in non-peer reviewed journals

- [1] P. B. Silva, T. van Nuland, T. S. van Loon, **V. Zega**, M. J. Leamy, M. G. D. Geers, V. G. Kouznetsova ‘*Acoustic metamaterials: metamaterials for wave control and manipulation by exploring nonlinearities*’ in *Innovative Materials*, 4 (2018) 30-35.

## International conferences contributions (presented)

- [1] C. Comi, A. Corigliano, M. Doti, A. Garatti, G. Langfelder, **V. Zega** ‘*Torsional microresonator in the nonlinear regime: experimental, numerical and analytical characterization*’ Eurosensors16, Budapest, Hungary, September 4-7, 2016
- [2] C. Credi, **V. Zega**, R. Bernasconi, G. Langfelder, A. Cigada, L. Magagnin, M. Levi, A. Corigliano ‘*Design, fabrication and testing of the first 3D-printed and wet metallized z-axis accelerometer*’ Proceedings, 1, 614, doi: 10.3390/proceedings1040614 (2017) 1-5
- [3] **V. Zega**, P. Minotti, G. Mussi, A. Tocchio, L. Falorni, S. Facchinetti, A. Bonfanti, A.L. Lacaíta, C. Comi, G. Langfelder, A. Corigliano ‘*The first frequency-modulated (FM) pitch gyroscope*’ Proceedings, 1, 393, doi: 10.3390/proceedings1040393 (2017) 1-5
- [4] **V. Zega**, M. Bruggi, A. Corigliano ‘*Optimization of auxetic structures*’ IV ECCOMAS young investigator conference, Milan, Italy, September 13-15, 2017
- [5] **V. Zega**, C. Comi, P. Fedeli, A. Frangi, A. Corigliano, P. Minotti, G. Langfelder, L. Falorni, A. Tocchio ‘*A dual-mass frequency-modulated (FM) pitch gyroscope: mechanical design and modelling*’ Inertial ’18, Lake Como, Italy, March 26-29, 2018
- [6] **V. Zega**, A. Frangi, A. Guercilena, G. Gattere ‘*Numerical modelling of MEMS resonators*’ ESMC 2018, Bologna, Italy, July 2-6, 2018
- [7] **V. Zega**, C. Comi, G. Langfelder, L. Falorni ‘*A strategy to widen the linear range of elastic micro-springs*’ ESMC 2018, Bologna, Italy, July 2-6, 2018
- [8] **V. Zega**, P. B. Silva, V. Kouznetsova, M. G. D. Geers ‘*Towards an emergent metamaterial design*’ Engineering Mechanics (EM) Symposium 2018, Arnhem, the Netherlands, October 23-24, 2018
- [9] **V. Zega**, A. Frangi, G. Gattere ‘*Numerical modelling of nonlinearities in MEMS resonators for real-time clocks*’ IcoNsoM 2019, Rome, Italy, June 16-19, 2019
- [10] **V. Zega**, P. B. Silva, V. G. Kouznetsova, M. G. D. Geers ‘*Nonlinear locally resonant metamaterials with emergent attenuation zone: a new design*’ IcoNsoM 2019, Rome, Italy, June 16-19, 2019
- [11] **V. Zega**, C. Comi, E. Bordiga, G. Langfelder, L. Falorni, A. Corigliano ‘*Towards 3-axis FM MEMS gyroscopes: mechanical design and experimental validation*’ Transducers 2019 – Eurosensors XXXIII, Berlin, Germany, June 23-27, 2019
- [12] **V. Zega**, A. Frangi, G. Gattere, ‘*Nonlinear Dynamics of MEMS resonators: numerical modelling and experiments*’ IEEE Sensors 2019, Montreal, Canada, October 27-30, 2019.
- [13] **V. Zega**, A. Opreni, G. Mussi, H.-K. Kwon, G. Vukasin, G. Gattere, G. Langfelder, A. Frangi, T. W. Kenny, ‘*Thermal stability of DETF MEMS resonators: numerical modelling and experimental validation*’ Proc. IEEE MEMS2020, Vancouver, Canada, January 23-28, 2020, 9056338,1207-1210.
- [14] Z. Yao, **V. Zega**, Y. Su, A. Corigliano, ‘*A metaplate in MEMS for innovative applications: vibration isolation and tunable mechanical filters*’ IEEE SENSORS 2020, online conference, October 25-28, 2020.
- [15] **V. Zega**, C. Gazzola, A. Buffoli, M. Conti, L.G. Falorni, G. Langfelder, A. Frangi, ‘*A defect-based MEMS phononic crystal slab waveguide*’, IEEE MEMS 2022, Tokyo, Japan, January 9-13, 2022.
- [16] **V. Zega**, L. Gaffuri Pagani, M. Invernizzi, C. Credi, R. Suriano, R. Bernasconi, P. Carulli, A. Frangi, M. Levi, L. Magagnin, G. Langfelder, A. Corigliano, ‘*3D-printed and wet-metallization for sensors: a Coriolis mass flowmeter operating in the mode-split conditions*’, CIMTEC 2022, Perugia, Italy, June 20-29, 2022. [Invited presentation]
- [17] **V. Zega**, G. Gattere, M. Riani, F. Rizzini, A. Frangi, ‘*High sensitivity MEMS z-axis accelerometer with in-plane differential readout*’ IEEE MEMS 2023, Monaco, Germany, January 15-19, 2023.
- [18] **V. Zega**, A. Opreni, Y. Banani, A. Buffoli, F. D. Mauri, G. Gattere, M. Riani, G. Langfelder, A. Frangi ‘*Design and experimental validation of new MEMS long-stroke actuator based on tunnel-comb fingers*’ Transducers 2023, Kyoto, Japan, June 25-29, 2023.

- [19] **V. Zega**, A. Frangi, G. Gattere, M. Riani, R. Natri, G. Langfelder ‘*A new high-sensitivity differential z-axis FM accelerometer*’ IEEE IFCS-EFTF 2023, Toyama, Japan, May 11-15, 2023.
- [20] **V. Zega**, P.B. Silva, M.G.D. Geers, V. Kouznetsova ‘*Applications of mechanical metamaterials in microsystems: challenges and perspectives*’ AIVELA 2025, Ancona, Italy, June 24-26, 2025.
- [21] D. Pavesi, R. Natri, S. Zoia, A. Colombo, P. Peliti, G. Gattere, G. Langfelder, **V. Zega** ‘*Understanding the Dual Foucault Pendulum MEMS gyroscope nonlinear dynamics*’ NODYCON 2025, online, June 23-25, 2025.
- [22] **V. Zega** ‘*Applications of mechanical metamaterials in microsystems: challenges and perspectives*’ META 2025, Malaga, Spain, July 22-25, 2025.  
[Invited presentation]

### **Further international conferences contributions**

- [1] C. Comi, A. Corigliano, **V. Zega** and S. Zerbinì ‘*Optimal design and nonlinearities in a z-axis resonant accelerometer*’ Eurosime 2015, Budapest, Hungary, April 19-22, 2015
- [2] M. Bruggi, **V. Zega**, A. Corigliano ‘*Optimization of auxetic structures for MEMS applications*’ Eurosime 2016, Montpellier, France, April 17-20, 2016
- [3] P. Minotti, G. Mussi, S. Dellea, A. Bonfanti, A.L. Lacaita, G. Langfelder, **V. Zega**, C. Comi, S. Facchinetti, A. Tocchio ‘*A 160  $\mu$ A, 8 mdps/Hz<sup>1/2</sup> frequency-modulated MEMS gyroscope*’ Inertial ’17, Kauai, Hawaii, USA, March 27-30, 2017
- [4] G. Mussi, M. Bestetti, **V. Zega**, A. Frangi, G. Gattere, G. Langfelder ‘*Resonators for real-time clocks based on epitaxial polysilicon process: a feasibility study on system-level compensation of temperature drifts*’ MEMS 2018, Belfast, Northern Ireland, January 21-25, 2018
- [5] P. Minotti, G. Mussi, G. Langfelder, **V. Zega**, S. Facchinetti, A. Tocchio ‘*A system-level comparison of amplitude- vs frequency- modulation approaches exploited in low-power MEMS vibratory gyroscopes*’ Inertial ’18, Lake Como, Italy, March 26-29, 2018
- [6] **V. Zega**, C. Credi, M. Invernizzi, R. Bernasconi, G. Langfelder, A. Cigada, L. Magagnin, M. Levi and A. Corigliano ‘*3D-printing and wet metallization for uniaxial and multi-axial accelerometers*’ Eurosime 2018, Toulouse, France, April 15-18, 2018
- [7] **V. Zega**, A. Nastro, L. D’Alessandro, M. Ferrari, R. Ardito, C. Valzasina, V. Ferrari and A. Corigliano ‘*Design and experimental validation of an auxetic phononic crystal for industrial micro-systems*’ ESMC 2018, Bologna, Italy, July 2-6, 2018
- [8] G. Langfelder, P. Minotti, **V. Zega**, C. Comi, C. R. Marra, M. Leoncini, M. Bestetti ‘*Frequency Modulated MEMS gyroscopes: recent developments, challenges and outlook*’ Transducers 2019 – Eurosensors XXXIII, Berlin, Germany, June 23-27, 2019
- [9] A. Bonanomi, E. Zappa, A. Cigada, **V. Zega**, A. Corigliano ‘*High speed vision system for the dynamic characterization of 3D printed sensors*’ Journal of Physics: Conference Series 1249(1), 012001, 2019
- [10] M. Bestetti, **V. Zega**, G. Langfelder, ‘*Modeling and first characterization of broad-spectrum vibration rejection of frequency modulated gyroscopes*’, Proc. IEEE MEMS2020, Vancouver, Canada, January 23-28, 2020, 9056265, 259-262.
- [11] G. Gobat, A. Frangi, **V. Zega**, ‘*Interpolation based reduced order modelling for non-linearities in MEMS*’, IEEE SENSORS 2020, online conference, October 25-28, 2020.
- [12] G. Gobat, **V. Zega**, P. Fedeli, L. G. Falorni, L. Guerinoni, C. Touzè, A. Frangi, ‘*Experimental evidence of mechanical frequency comb in a quad-mass MEMS structure*’, IEEE MEMS 2021, online conference, January 25-29, 2021.
- [13] M. Gianollo, V. Mastri, **V. Zega**, M. Bestetti, L. Falorni, G. Langfelder, ‘*Miniaturized Quadruple Mass Gyroscopes: Challenges and Implementation*’, IEEE SENSORS 2021, online conference, October 31<sup>st</sup> – November 4<sup>th</sup>, 2021.

- [14] **V. Zega**, A. Nastro, M. Ferrari, R. Ardito, V. Ferrari, A. Corigliano, ‘*An innovative auxetic electrically-tunable MEMS mechanical filter*’, IEEE MEMS 2022, Tokyo, Japan, January 9-13, 2022.
- [15] **V. Zega**, G. Gobat, P. Fedeli, P. Carulli, A. Frangi, ‘*Reduced order modelling in a MEMS arch resonator exhibiting 1:2 internal resonance*’, IEEE MEMS 2022, Tokyo, Japan, January 9-13, 2022.
- [16] G. Massimino, C. Gazzola, **V. Zega**, S. Adorno, A. Corigliano, ‘*Ultrasonic piezoelectric MEMS speakers for in-ear applications: bubbles-like and pistons-like innovative designs*’, EUROSIME22, Malta, April 25-27, 2022.
- [17] **V. Zega**, M. Antonacci, A. Frangi, A. Corigliano, E. Riva ‘*Planar GRIN lenses for MEMS energy harvesters: a macroscale proof of concept*’ IEEE EFTF IFCS 2022, Paris, France, April 24-28, 2022.  
**[Finalist for the best student poster award]**
- [18] D. Faraci, A. Nastro, **V. Zega**, C. Comi ‘*Two-scale asymptotic homogenization in a MEMS auxetic structure for over etch identification*’ ECCOMAS 2022, Oslo, Norway, June 5-9, 2022.
- [19] C. Gazzola, **V. Zega**, G. Massimino, F. Cerini, S. Adorno, A. Frangi, A. Corigliano ‘*Innovative Designs of Piezoelectric MEMS Speakers for In-Ear Applications*’ ESCM 2022, Galway, Ireland, July 4-8, 2022.
- [20] V. Kouznetsova, P. Silva, **V. Zega**, M. Leamy, M. Geers ‘*Emergent phenomena in locally resonant acoustic metamaterials due to subharmonic energy exchange*’ META2022, Torremolinos, Spain, July 19-22, 2022.
- [21] P. Frigerio, A. Fagnani, **V. Zega**, G. Gattere, A. Frangi, G. Langfelder ‘*On-MEMS-chip compact temperature sensor for large-volume, low-cost sensor calibration*’ IEEE MEMS 2023, Monaco, Germany, January 15-19, 2023.
- [22] G. Gattere, **V. Zega**, M. Riani, F. Rizzini, F. Maspero, ‘*Design and validation of the first z-axis MEMS accelerometer with in-plane readout*’ Transducers 2023, Kyoto, Japan, June 25-29, 2023.
- [23] C. Gazzola, **V. Zega**, F. Cerini, S. Adorno, A. Corigliano, ‘*A mechanically-open and acoustically-closed piezoMEMS speaker for in-ear applications*’ Transducers 2023, Kyoto, Japan, June 25-29, 2023.
- [24] C. Gazzola, **V. Zega**, A. Corigliano, P. Lotton, M. Melon ‘*Lumped-Parameters Equivalent Circuit for Piezoelectric MEMS Speakers Modeling*’, Forum Acusticum 2023, Torino, Italy, September 11-15, 2023.
- [25] R. Ardito, C. Comi, **V. Zega**, A. Corigliano ‘*Metamaterials and MEMS (MetaMEMS): a promising trend in Microsystems technology*’, 24<sup>th</sup> International Conference on Thermal, Mechanical and Multi-Physics Simulation and Experiments in Microelectronics and Microsystems, EuroSimE 2023, Graz, Austria, April 16-19, 2023.
- [26] O. M. O. Abdalla, R. Ardito, **V. Zega**, A. Corigliano ‘*Smart materials and metamaterials for MEMS: a growing trend in microsystems technology*’ SMART 2023, Eccomas Procedia, 1586-1591, 2023.
- [27] M. Antonacci, M. Cremonesi, V. Kouznetsova, O. Rokos, L. Sangiuliano, **V. Zega** ‘*Locally Resonant Acoustic Metamaterials for Underwater Pile Driving noise mitigation*’ Eccomas 2024, Lisboa, Portugal, June 3-8, 2024.
- [28] D. Faraci, **V. Zega**, G. Gattere, C. Comi ‘*A MEMS device integrating a metaplate for vibration absorption*’ Eccomas 2024, Lisboa, Portugal, June 3-8, 2024.
- [29] C. Viola, C. Comi, **V. Zega**, P. Peliti, F. Berton, G. Gattere, L. Falorni, A. Corigliano ‘*High-end MEMS Gyroscopes: Challenges on Mechanical Design*’ DGON-ISA 2024, Braunschweig, Germany, October 22-23, 2024.
- [30] G. Mecca, R. Bernasconi, **V. Zega**, A. Corigliano, L. Magagnin ‘*Inkjet printed flexible piezoelectric sensor for large strain applications*’ Eurosensors 2024, Drebecen, Hungary, September 1-4, 2024.
- [31] R. Nastri, S. Zoia, D. Pavese, P. Peliti, **V. Zega**, G. Gattere, G. Langfelder ‘*Characterization of Damping and Stiffness Mismatch on a Dual-Foucault Pendulum Structure Manufactured in a 20- $\mu$ m Epitaxial Polysilicon*’ IEEE Sensors 2024, Kobe, Japan, October 20-23, 2024.

- [32] D. Pavesi, C. Viola, C. Comi, A. Corigliano, P. Peliti, F. Berton, L. G. Falorni, G. Gattere, R. Nistri, S. Zoia, P. Frigerio, G. Langfelder, **V. Zega** ‘*Whole-angle gyroscopes on mass-production process: dual foucault pendulum vs disk resonant gyroscope*’ IEEE INERTIAL 2025, Lindau, Germany, May 4-7, 2025.
- [33] D. Pavesi, L. Meira, E. Sangenis, **V. Zega**, A. M. Shkel ‘*Design, fabrication and characterization of a high quality factor fused silica toroidal ring gyroscope*’ IEEE INERTIAL 2025, Lindau, Germany, May 4-7, 2025.

## PATENTS

- [1] A. Tocchio, L. Falorni, C. Comi, **V. Zega** ‘*Frequency modulation MEMS triaxial gyroscope*’ Patent n. US010520315B2 (December, 31<sup>st</sup> 2019)
- [2] L. D’Alessandro, **V. Zega**, E. Riva, R. Ardito, F. Braghin, A. Corigliano ‘*Low-frequency and broad-spectrum vibro-acoustic insulating module device*’ Published patent WO 2019/141794A1.
- [3] Z. Yao, **V. Zega**, Y. Su, J. Zhang, A. Corigliano ‘*MEMS device with vibration-insulating plate*’ Deposited patent PCT/EP2021/063865 (May 2021), published patent WO 2021/239715 (December, 2<sup>nd</sup> 2021).
- [4] **V. Zega**, G. Gattere, A. Frangi, A. Opreni, M. Riani ‘*Accelerometro risonante ad asse z con struttura di rilevamento avente prestazioni migliorate*’ Deposited patent n. 102021000023795 (September, 15<sup>th</sup> 2021)
- [5] A. Opreni, **V. Zega**, A. Frangi, G. Gattere, M. Riani ‘*Long stroke MEMS actuator resilient to the pull-in and electronic system including the same*’ Patent n. EP4223691A1.
- [6] P. Chiariotti, **V. Zega**, A. Annessi, M. Martarelli, P. Castellini ‘*Metastructure with vibration insulation properties*’ Published patent n. WO2024/018345.
- [7] T. Verdoot, A. Buffoli, G. Langfelder, **V. Zega** ‘*Inertial sensor architecture with balanced sense mode and improved immunity to quadrature effects*’ Patent n. EP4382861A1.
- [8] **V. Zega**, G. Gattere, Y. Banani, L. Falorni, M. Riani, P. Carulli ‘*Giroscopio microelettromeccanico con attuazione e rilevamento di beccheggio/rollio in piano*’ Deposited patent 102024000014977 (June, 28<sup>th</sup> 2024).
- [9] F. Cerini, F. Cuneo, C. Gazzola, **V. Zega**, A. Corigliano ‘*Attuatore elettroacustico avente migliorate prestazioni di livello di pressione sonora*’ Deposited patent 102024000021615 (September, 30<sup>th</sup> 2024)