

BIOGRAPHICAL SKETCH

Massimo Ruzzene

Slade Professor of Mechanical Engineering
University of Colorado Boulder

Professional Preparation

Ph.D., 1999, Mechanical Engineering, Politecnico di Torino, Torino Italy
Laurea, 1995, Mechanical Engineering, Politecnico di Torino, Torino Italy

Appointments

2019-Present	University of Colorado Boulder, Slade Professor
2016-2019	Georgia Institute of Technology, Pratt and Whitney Professor
2014-2016	National Science Foundation, Program Director – Dynamics, Control and System Diagnostics CMMI Division
2011-2016	Georgia Institute of Technology, Professor
2011	Visiting Professor, ETH Zurich, Zurich Switzerland
2009-2011	Georgia Institute of Technology, Associate Professor
2007	Politecnico di Milano, Milano Italy, Visiting Engineering

Selected Publications

1. R.K. Pal, J. Vila and **M. Ruzzene**, “Topologically Protected Edge States in Mechanical Metamaterials”, in *Advances in Applied Mechanics: Elastic Metamaterials* 52, 147 - 2019.
2. J. Vila, R. K. Pal, and **M. Ruzzene**. Observation of topological valley modes in an elastic hexagonal lattice. *Phys. Rev. B*, 96:134307, Oct 2017.
3. M. Miniaci, R.K. Pal, B Morvan, and **M. Ruzzene**. Experimental observation of topologically protected helical edge modes in patterned elastic plates. *Physical Review X*, 8(3):031074, 2018.
4. R. K. Pal, J. Vila, M. Leamy, and **M. Ruzzene**. Amplitude-dependent topological edge states in nonlinear phononic lattices. *Physical Review E*, 97(3):032209, 2018.
5. R.K. Pal and **M. Ruzzene**. Edge waves in plates with resonators: an elastic analogue of the quantum valley hall effect. *New Journal of Physics*, 19(2):025001, 2017.
6. M.IN Rosa, Yuning Guo, and **M. Ruzzene**. Exploring topology of 1d quasiperiodic metastructures through modulated Lego resonators. *Applied Physics Letters*, 118(13):131901, 2021.
7. M. Gupta and **M. Ruzzene**. Dynamics of quasiperiodic beams. *Crystals*, 10(12):1144, 2020.
8. Y. Xia, A. Erturk, and **M. Ruzzene**. Topological edge states in quasiperiodic locally resonant metastructures. *Physical Review Applied*, 13(1):014023, 2020.
9. R.K.Pal, Matheus IN Rosa, and **M. Ruzzene**. Topological bands and localized vibration modes in quasiperiodic beams. *New Journal of Physics*, 21(9):093017, 2019.
10. M. I Hussein, M. Leamy, and **M. Ruzzene**. Dynamics of phononic materials and structures: Historical origins, recent progress, and future outlook. *Applied Mechanics Reviews*, 66(4):040802, 2014.

Research Interests and Expertise

Professor Ruzzene has worked in wave propagation, structural dynamics and vibration control since the mid-nineties. He has studied techniques for the control of vibrations resulting from fluid-structure interaction through both passive structural design and active control strategies. He is also recognized for his work on elastic metamaterials, phononic materials, and topological mechanics, which is an area of current focus, and of direct relevance to the current proposal. Professor Ruzzene directs the Wave Propagation Laboratory in the Department of Mechanical Engineering at CU Boulder. The lab is equipped with state-of-the-art ultrasonic and vibration testing equipment including a high frequency scanning laser vibrometer (Polytec PSV500M2), and one fiber optic-based scanning laser vibrometer. In addition, accelerometers, strain gauges, a vibrating table and four shakers cover a broad range of load amplitudes and frequencies available for dynamic testing.

Synergistic Activities

- Member and Fellow: Society for Engineering Science (SES)
- Member and Fellow: American Society of Mechanical Engineering (ASME)
- Associate Fellow American Institute for Aeronautics and Astronautics (AIAA)
- Chair of the Vibration and Sound Committee of ASME (2018-present)
- Elected Member of the Vibration and Sound Committee of ASME (2008-present)
- Selected Keynotes:
- “Dynamics of Topological Metastructures: Nonlinearities and Quasi-periodicity”, Keynote, Symposium on Metamaterials, SPIE Smart Materials and Structures Conference, Denver CO, March 2019.
- “The Search For Edge States (Boundary Modes) in Mechanical Metamaterials”, Plenary Speaker, Asian Pacific Conference on Structural Health Monitoring, Hong Kong, November 2018.
- “Co-existing Topological Helical and Valley Edge States for Frequency Selective Waveguiding”, Keynote - Society of Engineering Science Conference, Madrid Spain, October 2018.
- “Dynamics of Quasi-Periodic and Time-Dependent Metamaterials”, Keynote, World Congress of Computational Mechanics, New York, NY, July 2018.
- “Time and Reciprocity Breaking in Electromechanical Metamaterials and Structural Lattices”, Keynote, ASME IMECE Conference, Tampa FL - November 2017.
- “Guided Acoustic Wavefields for Damage Detection/Characterization and Novel Transducer Designs”, Plenary, Smart 2017 Conference, Madrid Spain - June 2017.