Eleonora Tubaldi

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Education

McGill University
PhD, Mechanical Engineering, October 2017
Thesis: Nonlinear Dynamics of Shells and Plates subjected to Pulsatile Flow

Politecnico di Milano
MSc, Aeronautical Engineering, July 2013

École Polytechnique de Montreal
MSc, Aerospace Engineering, June 2013

Politecnico di Milano
BSc, Aerospace Engineering, September 2010

Research and Professional Experience

University of Maryland, College Park
2020-now Assistant Professor, Department of Mechanical Engineering
2020-now Member of the Maryland Robotics Center
2021-now Member of The UMD Institute for Systems Research
2021-now Member of Fischell Institute for Biomedical Devices

University of Maryland, Baltimore
2021-now Adjunct Appointment, School of Medicine,
Department of Cardiovascular Medicine

University of Arizona
2018-2019 Assistant Professor of Aerospace and Mechanical Engineering

Awards and Honors

ASME Rising Star of Mechanical Engineering (2024)
Italian Cultural Society (ICS) Young Scientist Award (2024)
ASME Henry Hess Early Career Publication Award (2024)
NSF CAREER Award (2023)
NSF and USNC/TAM Early Career Presenter Fellowship to ICTAM 2020+1 (2021)
ASME SB3C Young Faculty Diversity Participation Award (2021)
ASME Haythornthwaite Young Investigator Award, Applied Mechanics Division (2020)
Graduate Research Enhancement and Travel Awards (GREAT Awards) (2015-2017)
Doctoral Merit Scholarship for Foreign Students FRQNT (2015-2017)
MEDA Award (McGill Engineering Doctoral Awards) (2014-2017)
Werner Graupe International Fellowship in Engineering (2014-2017)

Additional Appointments Held

Visiting Professor, Bertoldi Group, Harvard University, USA (Summer 2018, Summer 2019)

Selected Journal Publications

[1] K. Barvenik, Z. Coogan, G. Librandi, M. Pezzulla, and E. Tubaldi, "Tactile sensing and grasping through thin-shell buckling," *Advanced Intelligent Systems*, p. 2 300 855, 2024. DOI: 10.1002/aisy.202300855.

[2] J. C. Messou, K. Yeung, E. Sudbrook, J. Zhang, S. Toursavadkohi, A. A. Ucuzian, and E. Tubaldi, "Investigating the role of thrombosis, fenestration, and false lumen orbital orientation in the hemodynamics of type b aortic dissection," *Nature Scientific Reports, Under Review*, 2024. DOI: 10.21203/rs.3.rs-3997160/v1.

[3] S. Shrestha, K. J. Barvenik, T. Chen, H. Yang, Y. Li, M. M. Kesavan, J. M. Little, H. C. Whitley, Z. Teng, Y. Luo, E. Tubaldi, and P.-Y. Chen, "Machine intelligence accelerated design of conductive mxene aerogels with programmable properties," *Nature Communications*, vol. 15, no. 1, p. 4685, 2024. DOI: 10.1038/s41467-024-49011-8.

[4] M. Bonthron and E. Tubaldi, "Dynamic Behavior of Bistable Shallow Arches: From Intrawell to Chaotic Motion," *Journal of Applied Mechanics*, vol. 91, no. 2, p. 021 010, 2023. DOI: 10.1115/1.4064208.

[5] S. Sarker, A. Colton, Z. Wen, X. Xu, M. Erdi, A. Jones, P. Kofinas, E. Tubaldi, P. Walczak, M. Janowski, Y. Liang, and R. D. Sochol, "3d-printed microinjection needle arrays via a hybrid dlp-direct laser writing strategy," *Advanced Materials Technologies*, vol. 8, no. 5, p. 2 201 641, 2023. DOI: 10.1002/admt.202201641.

[6] J. A. Rosado-Toro, R. C. Philip, S. T. Dunn, D. Celdran-Bonafonte, Y. He, S. A. Berceli, P. Roy-Chaudhury, and E. Tubaldi, "Functional analysis of arteriovenous fistulae in non-contrast magnetic resonance images," *Computer Methods and Programs in Biomedicine*, vol. 222, p. 106 938, 2022. DOI: 10.1016/j.cmpb.2022.106938.

[7] G. Librandi, E. Tubaldi, and K. Bertoldi, "Programming nonreciprocity and reversibility in multistable mechanical metamaterials," *Nature Communications*, vol. 12, no. 1, pp. 1–9, 2021. DOI: 10.1038/s41467-021-23690-z.

[8] M. Amabili, P. Balasubramanian, G. Ferrari, G. Franchini, F. Giovanniello, and E. Tubaldi, "Identification of viscoelastic properties of dacron aortic grafts subjected to physiological pulsatile flow," *Journal of the Mechanical Behavior of Biomedical Materials*, vol. 110, p. 103 804, 2020. DOI: 10.1016/j.jmbbm.2020.103804.

[9] G. Librandi, E. Tubaldi, and K. Bertoldi, "Snapping of hinged arches under displacement control: Strength loss and nonreciprocity," *Physical Review E*, vol. 101, no. 5, p. 053 004, 2020. DOI: 10.1103/PhysRevE.101.053004.

[10] G. Ferrari, P. Balasubramanian, E. Tubaldi, F. Giovanniello, and M. Amabili, "Experiments on dynamic behaviour of a dacron aortic graft in a mock circulatory loop," *Journal of biomechanics*, vol. 86, pp. 132–140, 2019. DOI: 10.1016/j.jbiomech.2019.01.053.

[11] M. Amabili, P. Balasubramanian, I. Breslavsky, G. Ferrari, and E. Tubaldi, "Viscoelastic characterization of woven dacron for aortic grafts by using direction-dependent quasi-linear viscoelasticity," *Journal of the mechanical behavior of biomedical materials*, vol. 82, pp. 282–290, 2018. DOI: 10.1016/j.jmbbm.2018.03.038.

[12] E. Tubaldi, M. P. Païdoussis, and M. Amabili, "Nonlinear dynamics of dacron aortic prostheses conveying pulsatile flow," *Journal of Biomechanical Engineering*, vol. 140, no. 6, p. 061 004, 2018. DOI: 10.1115/1.4039284.

[13] E. Tubaldi, M. Amabili, and M. P. Païdoussis, "Nonlinear dynamics of shells conveying pulsatile flow with pulse-wave propagation. theory and numerical results for a single harmonic pulsation," *Journal of Sound and Vibration*, vol. 396, pp. 217–245, 2017. DOI: 10.1016/j.jsv.2017.01.044.

[14] E. Tubaldi, M. Amabili, and M. P. Païdoussis, "Fluid–structure interaction for nonlinear response of shells conveying pulsatile flow," *Journal of Sound and Vibration*, vol. 371, pp. 252–276, 2016. DOI: 10.1016/j.jsv.2016.01.024.

[15] E Tubaldi, M Amabili, and F. Alijani, "Nonlinear vibrations of plates in axial pulsating flow," *Journal of Fluids and Structures*, vol. 56, pp. 33–55, 2015. DOI: 10.1016/j.jfluidstructs.2015.03.021.

[16] E Tubaldi, F Alijani, and M Amabili, "Non-linear vibrations and stability of a periodically supported rectangular plate in axial flow," *International Journal of Non-Linear Mechanics*, vol. 66, pp. 54–65, 2014. DOI: 10.1016/j.ijnonlinmec.2013.12.004.

[17] E Tubaldi and M Amabili, "Vibrations and stability of a periodically supported rectangular plate immersed in axial flow," *Journal of Fluids and Structures*, vol. 39, pp. 391–407, 2013. DOI: 10.1016/j.jfluidstructs.2013.03.003.

Invited Speaker

1. **Invited Seminar**, *KU Leuven (Belgium)*, School of Engineering, Gorissen Lab Group Meeting, "Thin Shell Buckling: New Avenues for Soft Intelligent Materials ", July 25th 2024
2. **Invited Seminar**, *King's College London*, School of Engineering, Seminar Series, "Thin Shell Buckling: New Avenues for Soft Intelligent Materials", July 19th 2024
3. **Invited Seminar**, *University of Naples Federico II (Italy)*, Department of Chemical Engineering, Seminar Series, "New Perspectives on Intelligent Materials based on Mechanical Instabilities", May 29th 2024
4. **Invited Seminar**, *University of Trieste (Italy)*, Department of Mechanical Engineering, Seminar Series, "New Perspectives on Intelligent Materials based on Mechanical Instabilities", May 20th 2024
5. **Invited Seminar**, *University of Maryland Baltimore County (UMBC)*, Department of Mechanical Engineering, Seminar Series, "New Perspectives on Intelligent Materials based on Mechanical Instabilities", March 29th 2024
6. **Invited Keynote Speaker**, *23rd Mid-Atlantic Soft Matter Workshop*, Georgetown University, "Soft Intelligent Materials based on Mechanical Instabilities", February 16th, 2024
7. **Invited Seminar**, *University of Maryland*, Department of Chemical Engineering, "From Snapping to Buckling: A Path for New Multifunctional Materials", October 13th 2023
8. **Invited Panelist**, *Smart Materials for a Better World at the Italian Embassy*, Washington DC, April 21st 2023
9. **Invited Seminar**, *New York University Tandon School of Engineering (NYU-Tandon)*, "From Snapping to Buckling: A Path for New Multifunctional Materials", Feb 13th 2023
10. **Invited Seminar**, *Princeton University*, Mechanical and Aerospace Engineering (MAE) Departmental Seminars, "From Snapping to Buckling: A Path for New Multifunctional Materials", November 11th 2022
11. **Invited Seminar**, *Universita' Politecnica delle Marche (Italy)*, Mechanical Engineering Department, "Mechanical Reconfigurations in Artificial and Natural Systems", October 26th 2022
12. **Invited Speaker**, *15th World Congress on Computational Mechanics (WCCM)* - Computational Fluid-Structure Interaction and Moving Boundaries and Interfaces, July 2022, Yokohama, Japan (Declined invitation)

13. **Invited Seminar**, *King's College London*, Department of Engineering, Seminar Series, "Harnessing Mechanical Instabilities in Multifunctional Materials", December 10th 2021
14. **Invited Speaker**, *METAMAT 2021 Global Summit on Metamaterials, Nanophotonics and Plasmonics*, "Programming Nonreciprocity and Reversibility in Multistable Mechanical Metamaterials", December 9th 2021
15. **Invited Seminar**, *Johns Hopkins University*, Department of Civil Engineering, Seminar Series, "Harnessing Mechanical Instabilities in Multifunctional Materials", November 18th 2021
16. **Invited Seminar**, *TII Advanced Materials Seminar*, Advanced Materials Research Centre of the Technology Innovation Institute (TII), "Multifunctional Properties of Smart Materials", November 1st 2021
17. **Invited Speaker**, *Northrop Grumman, UMD University Research Symposium*, 2021, "Mimetic Inflatable Sponge for Marine Surveillance and Sensing", October 19th 2021
18. **Invited Seminar**, *University of Buffalo*, Department of Aerospace and Mechanical Engineering, Seminar Series, "Harnessing Mechanical Instabilities in Multifunctional Materials", October 21st 2021
19. **Invited Speaker**, *Maryland Robotics Center Research Symposium*, "Harnessing Mechanical Instabilities for Robotics Applications", May 25th 2021
20. **Invited Seminar**, *Georgia Tech*, Department of Aerospace Engineering, Seminar Series, October 24th 2019
21. **Invited Lecture**, *Phononics 2019 - Fifth International Conference of Phononic Crystals, Metamaterials, Phonon Transport and Topological Phononics*, June 2-7, 2019, Tucson, AZ, USA (Declined Invitation)
22. **Invited Seminar**, *Yale University*, Department of Mechanical Engineering and Materials Science, Seminar Series, "Soft Dynamics: from Understanding Nature to Design New Mechanical Systems", February 27th 2019
23. **Invited Seminar**, *University of Massachusetts (UMass) Amherst*, Department of Civil and Environmental Engineering, Seminar Series, Fall 2018
24. **Invited Seminar**, *Harvard University*, Invited to the Bertoldi Group Seminar Series, Summer 2018
25. **Invited Seminar**, *University College Dublin (UCD)*, Seminar Series, Fall 2017

Service to the Scientific Community (selected)

Associate Editor, *Mechanics Based Design of Structures and Machines: An International Journal* (2018-now).

Guest Editor, *JOVE Methods Collection*, Imaging methodologies for studying aortic diseases (2020-2022)

ASME Member of the Dynamics & Control System & Structures Technical Committee (2017-now), Secretary (2021-2023), Vice-Chair (2023-now).

Track Co-Organizer ASME IMECE, *Track 7: Dynamics, Vibration, and Control*, Track Co-Chair (2021, 2022, 2024), Track Chair (2023).

Track Chair ASME IMECE International Undergraduate Research and Design Expo (2018-2022).

Symposium Co-Organizer ASME IMECE, Fluid-Structure Interactions (2017-now).

Symposium Co-Organizer, International Conference on Nonlinear Solid Mechanics (ICoNSoM), Fluid-Structure Interaction, Rome, 16-19 June 2019

Paper reviewer: *Nature, Nature Communications, Advanced Science, Acta Biomaterialia, Journal of Fluids and Structures, Experiments in Fluids, International Journal of Non-linear Mechanics*

News and Media

Invited Speaker, Inauguration of the Academic Year UNIPER, Recanati, Italy (October 2023)
Meritorious Citizen Award, Recanati, Italy (June 2023)
Michael Bonthron Wins NDSEG Fellowship (June 2023)
Viral Tweet on "Tubaldi Lab wins NSF CAREER", 39.9k visualizations (March 2023)
UMD's Tubaldi Wins NSF CAREER Award (March 2023)
Prosthetics:A Better Fit (January 2023)
Dorico Prize, Marche Region Award, Italy (October 2022)
UMD Engineer Developing 'Super-Eye' to Investigate Marijuana's Effects on Heart (April 2022)
Using Machine Learning to Shed Light on Cannabis Effects (March 2022)
Reversible, Programmable Mechanical metamaterials (June 2021)
Tubaldi Receives Haythornthwaite Research Initiation Grant (May 2021)
BIO5 Institute Funds UA Multidisciplinary Effort to Improve Vascular Remodeling Imaging in Dialysis (June 2018)