

# MATTEO PEZZULLA

AU

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DATE OF BIRTH: August 3, 1988  
CITIZENSHIP: Italian

## SUMMARY OF QUALIFICATIONS & ASSETS

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I am an Associate Professor in the Department of Mechanical Engineering at Aarhus University.

My current research involves aspects of fluid-structure interactions and the theoretical and applied mechanics of thin shells. I work among solid mechanics, fluid mechanics, and differential geometry and I am interested in analytical, numerical, and experimental methods.

I am a member of the American Physical Society (APS).

## EXPERIENCE

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| June 2025 – currently | ASSOCIATE PROFESSOR at Aarhus University  |
| Nov 2020 – May 2025   | TENURE TRACK ASSISTANT PROFESSOR at Aarhus University   |
| Nov 2017 – Oct 2020   | POSTDOCTORAL ASSOCIATE at École Polytechnique Fédérale de Lausanne<br>Supervisor: Prof. Pedro M. REIS |
| Nov 2015 – Oct 2017   | POSTDOCTORAL ASSOCIATE at Boston University<br>Supervisor: Prof. Douglas P. HOLMES                    |

## EDUCATION

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| FEBRUARY 2016  | Ph.D. in THEORETICAL AND APPLIED MECHANICS,<br>Sapienza - Università di Roma<br>with honors<br>Focus: Morphing of Thin Soft Structures Driven by Geometry and Swelling<br>Advisor: Prof. Paola NARDINOCCHI                                  |
| Aug – Dec 2014 | Visiting Scholar at Boston University<br>Advisor: Prof. Douglas P. HOLMES   |
| OCTOBER 2012   | M.Sc. in SPACE ENGINEERING, Sapienza - Università di Roma<br>110/110 cum laude<br>Thesis: “On the control of the large deformations occurring in IPMCs”<br>Advisor: Prof. Paola NARDINOCCHI   |
| OCTOBER 2010   | B.Sc. in AEROSPACE ENGINEERING, Sapienza - Università di Roma<br>110/110 cum laude<br>Thesis: “Bending deformations in ionic polymer metal composites induced by mechano-electro-chemical interactions”<br>Advisor: Prof. Paola NARDINOCCHI |

## INVITED SEMINARS

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- 2026 [Elastic Instabilities in Soft Hydraulics](#). MechE Colloquium, EPFL, Switzerland, March.
- 2025 [Taming Fluid-Induced Instabilities in Slender Structures for Passive Valve Design](#). IUTAM Symposium, Manchester, UK, June.
- 2024 [Taming Fluid-Induced Instabilities in Slender Structures for Passive Valve Design](#). University of Oslo, Oslo, Norway, November.
- 2024 [Taming Fluid-Induced Instabilities in Slender Structures for Passive Valve Design](#). DTU, Copenhagen, Denmark, October.
- 2022 [Morphing of slender structures via elastic instabilities](#). CITA, Copenhagen, Denmark, March.
- 2021 [A Geometrically Exact Model for Thin Magneto-elastic Shells](#). Sapienza University of Rome, Rome, Italy, September.
- 2021 [Natural curvature, pressure, and magnetic fields in shell buckling](#). Harvard University, Cambridge, USA, February.
- 2020 [Towards Fluid-Shell Interactions](#). Aarhus University, Aarhus, Denmark, April.
- 2016 [Geometry and Instabilities in Growing Shells](#). Sapienza - Università di Roma, Rome, Italy, December.
- 2016 [Geometry and Instabilities in Growing Shells](#). Physical Mathematics Seminar, MIT, Cambridge, MA, October
- 2015 [Morphing of geometric composites](#). Form Finding Workshop, Roma Tre University, Rome, Italy, April.
- 2014 [Morphing of Geometric Composites via Residual Swelling](#). Bertoldi Group Meeting, Harvard University, Cambridge, MA, December.

## JOURNALS & CONFERENCE PROCEEDINGS

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- 2026 Morten Opstrup Andersen, Nikolaj Tønner Osvald Olsen, Diksha Bhola, Aleca Borsuk, Craig Brodersen, Anja Geitmann, and [Matteo Pezulla](#). [Self-Buckling of Pressurized Cylindrical Tubes](#). Available at arXiv:2602.23836. Submitted (2026)
- 2025 S. Gennis, [M. Pezulla](#), and K. H. Jensen. Mechanical limits shape the eccentric form of rose prickles. Submitted (2025)
- 2025 M. Taffetani and [M. Pezulla](#). [Nonlinear morphoelastic energy based theory for stimuli responsive elastic shells](#). Available at arXiv:2511.10324. Submitted (2025)
- 2025 P. G. Ledda, H. Garg, V. Østergaard-Clausen, L. Krumenacker Rudzki, A. Madary, and [M. Pezulla](#). [Fluid-induced snap-through instability of spherical shells](#). *Phys. Rev. Lett.* 135, 234002 (2025)
- 2024 H. Garg, P. G. Ledda, J. S. Pedersen, and [M. Pezulla](#). [Passive Viscous Flow Selection via Fluid-Induced Buckling](#). *Phys. Rev. Lett.* 133, 084001 (2024)
- 2024 K. Barvenik, Z. Coogan, G. Librandi, [M. Pezulla](#), and E. Tubaldi. [Tactile Sensing and Grasping Through Thin-Shell Buckling](#). *Adv. Intell. Syst.* 2300855 (2024)
- 2023 Y. L. Lin, [M. Pezulla](#), and P. M. Reis. [Fluid-structure interactions of bristled wings: The trade-off between weight and drag](#). *J. R. Soc. Interface* 20, 20230266 (2023)
- 2022 P. G. Ledda, [M. Pezulla](#), E. Jambon-Puillet, P.-T. Brun, and F. Gallaire. [Gravity-driven coatings on curved substrates: a differential geometry approach](#). *J. Fluid Mech.* 949, A38 (2022)

- 2022 P. Leroy-Calatayud, **M. Pezzulla**, A. Keiser, K. Mulleners, and P. M. Reis. [Tapered foils favor traveling-wave kinematics to enhance the performance of flapping propulsion.](#) *Phys. Rev. Fluids* 7, 074403 (2022)
- 2022 **M. Pezzulla**, D. Yan, and P. M. Reis. [A geometrically exact model for thin magneto-elastic shells.](#) *J. Mech. Phys. Solids* 166, 104916 (2022)
- 2022 T. G. Sano, **M. Pezzulla**, and P. M. Reis. [A Kirchhoff-like theory for hard magnetic rods under three-dimensional geometrically nonlinear deformation.](#) *J. Mech. Phys. Solids* 160, 104739 (2022)
- 2021 B. Shrimali, **M. Pezzulla**, S. Poincloux, P. M. Reis, and O. Lopez-Pamies. [The remarkable bending properties of perforated plates.](#) *J. Mech. Phys. Solids* 154, 104514 (2021)
- 2021 D. Yan, **M. Pezzulla**, L. Cruveiller, A. Abbasi, and P. M. Reis. [Magneto-active elastic shells with tunable buckling strength.](#) *Nat. Commun.* 12, 2831 (2021)
- 2020 **M. Pezzulla**, E. F. Strong, F. Gallaire, and P. M. Reis. [Deformation of porous flexible strip in low and moderate Reynolds number flows.](#) *Phys. Rev. Fluids* 5, 084103 (2020)
- 2020 D. P. Holmes, J.-H. Lee, H. S. Park, and **M. Pezzulla**. [The nonlinear buckling behavior of a complete spherical shell under uniform external pressure and homogenous natural curvature.](#) *Phys. Rev. E* 102, 023003 (2020)
- 2020 D. Yan, **M. Pezzulla**, and P. M. Reis. [Buckling of pressurized spherical shells containing a through-thickness defect.](#) *J. Mech. Phys. Solids* 138, 103923 (2020)
- 2019 **M. Pezzulla** and P. M. Reis. [A Weak Form Implementation of Nonlinear Axisymmetric Shell Equations with Examples.](#) *ASME. J. Appl. Mech.* 86(12): 124502, (2019)
- 2019 E. F. Strong, **M. Pezzulla**, F. Gallaire, P. M. Reis, and L. Siconolfi. [Hydrodynamic loading of perforated disks in creeping flows.](#) *Phys. Rev. Fluids* 4, 084101, (2019)
- 2019 A. Lee, D. Yan, **M. Pezzulla**, D. P. Holmes, and P. M. Reis. [Evolution of critical buckling conditions in imperfect bilayer shells through residual swelling.](#) *Soft Matter* 15, 6134-6144, (2019)
- 2019 L. Stein-Montalvo, P. Costa, **M. Pezzulla** and D. P. Holmes. [Buckling of Geometrically Confined Shells.](#) *Soft Matter* 15, 1215-1222, (2019)
- 2018 X. Jiang, **M. Pezzulla**, S. Wei, T. K. Ghosh, and D. P. Holmes. [Snapping of Bistable, Prestressed Cylindrical Shells.](#) *Europhys. Lett.* 122, 64003, (2018)
- 2018 **M. Pezzulla**, N. Stoop, M. P. Steranka, A. J. Bade, and D. P. Holmes. [Curvature-Induced Instabilities of Shells.](#) *Phys. Rev. Lett.* 120, 048002, (2018)
- 2017 **M. Pezzulla**, N. Stoop, X. Jiang, and D. P. Holmes. [Curvature-Driven Morphing of Non-Euclidean Shells.](#) *Proc. R. Soc. A* 473(2201), 20170087, (2017)
- 2016 **M. Pezzulla**, G. P. Smith, P. Nardinocchi, and D. P. Holmes. [Geometry and Mechanics of Thin Growing Bilayers.](#) *Soft Matter* 12, 4435-4442, (2016)
- 2015 P. Nardinocchi, **M. Pezzulla**, and L. Teresi. [Steady and transient analysis of anisotropic swelling in fibered gels.](#) *J. Appl. Phys.* 118, 244904, (2015)
- 2015 **M. Pezzulla**, S. A. Shillig, P. Nardinocchi, and D. P. Holmes. [Morphing of geometric composites via residual swelling.](#) *Soft Matter* 11, 5812-5820, (2015) **[Inside Front Cover]**
- 2015 P. Nardinocchi, **M. Pezzulla**, and L. Teresi, [Mechanics of bio-hybrid systems.](#) *Procedia IUTAM* 12, pp. 145-153, (2015)
- 2015 P. Nardinocchi, **M. Pezzulla**, and L. Teresi, [Anisotropic swelling of thin gel sheets.](#) *Soft Matter* 11, 1492-1499, (2015)
- 2014 A. Lucantonio, P. Nardinocchi, and **M. Pezzulla**. [Swelling-induced and controlled curving in layered gel beams.](#) *Proc. R. Soc. A* 470(2171), 20140467, (2014)
- 2014 A. Lucantonio, P. Nardinocchi, **M. Pezzulla**, and L. Teresi. [Multiphysics of bio-hybrid systems: shape control and electro-induced motion.](#) *Smart Mater. Struct.* 23(4), 045043, (2014)

- 2014 P. Nardinocchi, M. Pezzulla, B.J. Akle, M. Guenther, and T. Wallmersperger. [Actuation and buckling effects in IPMCs](#). *Proc. SPIE* 9056, (2014)
- 2013 Y. Cha, P. Nardinocchi, M. Pezzulla, and M. Porfiri. [Giant displacements in IPMC-based structures: a preliminary study](#). *Adv. Mat. Res.* 745, 119–128, (2013)
- 2013 P. Nardinocchi and M. Pezzulla. [Curled actuated shapes of ionic polymer metal composites](#). *J. Appl. Phys.* 113, 224906, (2013)
- 2011 P. Nardinocchi, M. Pezzulla, and L. Placidi. [Thermodynamically based multiphysics modeling of ionic polymer metal composites](#). *J. Intel. Mat. Syst. Str.* 22(16), 1887–1897, (2011)

## CURRENT GROUP MEMBERS

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- 2024- Morten Opstrup Andersen, PhD Student (HFSP project)

## HONORS & GRANTS

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- 2025 DFF, Independent Research Fund Denmark, Research project 1, PI (DKK 3.2M)
- 2023 HFSP, Research grant - Program, co-PI (USD 1.5M)
- 2023 The Royal Society, International Exchanges, co-PI (GBP 5k)
- 2022 VILLUM Experiment, VILLUM Fonden, PI (DKK 2M)
- 2022 Thomas B. Thriges Fond, PI (DKK 40k)
- 2016 PHASME 2016 Travel Grant, ICAM (USD 1k)
- 2014 Research Project Grant *Giovani Ricercatori*, INdAM (€ 1.6k)
- 2014 Research Project Young Investigator Grant, Sapienza University (€ 2k)
- 2013–2015 Graduate Research Fellowship, Italian Ministry of Education
- 2007–2012 ADISU scholarship

## TEACHING, TEACHING QUALIFICATIONS, AND SERVICE

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- 2024 Co-organizer of the 58<sup>th</sup> meeting of the Society for Natural Philosophy, Aarhus
- 2024 Co-organizer of the Symposium: Mechanics of Soft Materials and Structures, at EMMC19, Madrid
- 2024 Foundational course in PhD Supervision, Diploma
- 2021- Courses: *Slender Structures*, *Theory of Elasticity*, *Finite Element Method*  
AU, Instructor
- 2021 University Pedagogical Programme at AU, Diploma
- 2021- Member of the Education Committee at AU

## LANGUAGE & PROGRAMMING SKILLS

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- ★ Mother tongue: Italian. Fluent in English and French. B2 in Spanish and Danish.
- ★ Extensive experience in C, Fortran, Python, Matlab, Mathematica, LabView, L<sup>A</sup>T<sub>E</sub>X, Blender.
- ★ Extensive experience with FE software such as COMSOL Multiphysics, ADINA, Nastran.