

MATTEO PEZZULLA

AU

ÅRHUS, DK

@matt@mpe.au.dk
mpezzulla.com
Skype ID: matteo.pezzulla

DATE OF BIRTH: August 3, 1988
CITIZENSHIP: Italian

SUMMARY OF QUALIFICATIONS & ASSETS

I am an Assistant 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

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

EDUCATION

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

INVITED SEMINARS

- 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

- 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. Pezulla**, 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. Pezulla**, 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. Pezulla**, 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. Pezulla**, 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. Pezulla**, L. Cruveiller, A. Abbasi, and P. M. Reis. [Magneto-active elastic shells with tunable buckling strength](#). *Nat. Commun.* 12, 2831 (2021)

- 2020 M. Pezulla, 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. Pezulla. 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. Pezulla, and P. M. Reis. Buckling of pressurized spherical shells containing a through-thickness defect. *J. Mech. Phys. Solids* 138, 103923 (2020)
- 2019 M. Pezulla 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. Pezulla, 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. Pezulla, 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. Pezulla and D. P. Holmes. Buckling of Geometrically Confined Shells. *Soft Matter* 15, 1215-1222, (2019)
- 2018 X. Jiang, M. Pezulla, S. Wei, T. K. Ghosh, and D. P. Holmes. Snapping of Bistable, Prestressed Cylindrical Shells. *Europhys. Lett.* 122, 64003, (2018)
- 2018 M. Pezulla, 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. Pezulla, 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. Pezulla, 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. Pezulla, and L. Teresi. Steady and transient analysis of anisotropic swelling in fibered gels. *J. Appl. Phys.* 118, 244904, (2015)
- 2015 M. Pezulla, 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. Pezulla, and L. Teresi, Mechanics of bio-hybrid systems. *Procedia IUTAM* 12, pp. 145-153, (2015)
- 2015 P. Nardinocchi, M. Pezulla, and L. Teresi, Anisotropic swelling of thin gel sheets. *Soft Matter* 11, 1492-1499, (2015)
- 2014 A. Lucantonio, P. Nardinocchi, and M. Pezulla. Swelling-induced and controlled curving in layered gel beams. *Proc. R. Soc. A* 470(2171), 20140467, (2014)
- 2014 A. Lucantonio, P. Nardinocchi, M. Pezulla, 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. Pezulla, B.J. Akle, M. Guenther, and T. Wallmersperger. Actuation and buckling effects in IPMCs. *Proc. SPIE* 9056, (2014)
- 2013 Y. Cha, P. Nardinocchi, M. Pezulla, and M. Porfiri. Giant displacements in IPMC-based structures: a preliminary study. *Adv. Mat. Res.* 745, 119-128, (2013)
- 2013 P. Nardinocchi and M. Pezulla. Curled actuated shapes of ionic polymer metal composites. *J. Appl. Phys.* 113, 224906, (2013)
- 2011 P. Nardinocchi, M. Pezulla, and L. Placidi. Thermodynamically based multiphysic modeling of ionic polymer metal composites. *J. Intel. Mat. Syst. Str.* 22(16), 1887-1897, (2011)

CURRENT GROUP MEMBERS

- 2024- Morten Opstrup Andersen, PhD Student (HFSP project)
2023- Hemanshul Garg, Postdoctoral Researcher (VILLUM Experiment project)

HONORS & GRANTS

- 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),
“Corrugamento di travi bistrato di gel polimerico”
2014 Research Project Young Investigator Grant, Sapienza University (€ 2k),
“Shaping of bio-hybrid systems: reduced models and numerical simulations”
2013–2015 Graduate Research Fellowship, Italian Ministry of Education
2007–2012 ADISU scholarship

TEACHING, TEACHING QUALIFICATIONS, AND SERVICE

- 2024 Co-organizer of the 58th meeting of the Society for Natural Philosophy, Aarhus
2024 Co-organizer of the Symposium: Mechanics of Soft Materials and Structures, at EMMCI9, Madrid
2024 Foundational course in PhD Supervision, Diploma
2021- Courses: *Slender Structures*, *Theory of Elasticity*
AU, Instructor
2021 University Pedagogical Programme at AU, Diploma
2021- Member of the Education Committee at AU
2019 Lectures on shells for the class on *Mechanics of Slender Structures*
EPFL, Instructor: Prof. Pedro M. Reis

LANGUAGE & PROGRAMMING SKILLS

- ★ Mother tongue: Italian. Fluent in English and French. B2 in Spanish and Danish.
- ★ Experience programming in C, Fortran, and Python.
- ★ Experience with mathematical software such as Matlab, Mathematica, LabView, L^AT_EX.
- ★ Experience with FE software such as COMSOL Multiphysics, ADINA, Nastran.
- ★ Experience with Adobe Illustrator, Blender, MeshLab, Paraview and ImageJ.

✍️

September, 2024