

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

- 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.
- 2020 [Towards Fluid-Shells 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. Pezzulla](#). [Passive viscous flow selection via fluid-induced buckling](#). *Submitted*. Available at [arXiv:2402.11966](#).
- 2024 K. Barvenik, Z. Coogan, G. Librandi, [M. Pezzulla](#), and E. Tubaldi. [Tactile Sensing and Grasping Through Thin-Shell Buckling](#). *Adv. Intell. Syst.* 2300855 (2024).
- 2023 Y. L. Lin, [M. Pezzulla](#), 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. Pezzulla](#), 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 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- Hemanshu 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 <i>Giovani Ricercatori</i> , 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 58 th 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: <i>Slender Structures</i> , <i>Theory of Elasticity</i> 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 <i>Mechanics of Slender Structures</i> 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, \LaTeX .
- ★ Experience with FE software such as COMSOL Multiphysics, ADINA, Nastran.
- ★ Experience with Adobe Illustrator, Blender, MeshLab, Paraview and ImageJ.



June, 2024