**Professor Pedro Miguel Reis**

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http://www.journalogy.net/Author/4292698/pedro-m-reis

Flexible Structures Laboratory (FLEXLAB)
École Polytechnique Fédérale de Lausanne (EPFL)

Formerly:
Esther and Harold E. Edgerton Assistant Professor
Mechanical Engineering and Civil and Environmental Engineering
Massachusetts Institute of Technology, Cambridge, Massachusetts

**Biography** (from https://flexlab.epfl.ch/people/ ):
Pedro Miguel Reis is a Full Professor of Mechanical Engineering at the École Polytechnique Fédérale de Lausanne (EPFL), where he moved to on November 1st, 2017. His research group, the Flexible Structures Laboratory, is dedicated to the fundamental understanding of the mechanics of slender structures and their intrinsic geometric nonlinearities.
Prof. Reis received a B.Sc. in Physics from the University of Manchester, UK (1999), a Certificate of Advanced Studies in Mathematics (Part III Maths) from St. John's College and DAMTP, University of Cambridge (2000) and a Ph.D. in physics from the University of Manchester (2004). He then moved as a Post-Doc at the City College of New York (2004-2005). Between 2005 and 2007 he was a CNRS Post-Doc at the ESPCI in Paris. He joined MIT in 2007 as an Instructor in Applied Mathematics in the Department of Mathematics. In 2010 he moved to MIT's School of Engineering, with dual appointments in Mechanical Engineering and Civil & Environmental Engineering, first as the Esther and Harold E. Edgerton Assistant Professor and, since the summer of 2014 as Gilbert W. Winslow Associate Professor. In October 2013, the Popular Science magazine named Prof. Reis to its 2013 "Brilliant 10" list of young stars in Science and Technology. He has also received the 2014 CAREER Award (NSF), the 2016 Thomas J.R. Hughes Young Investigator Award (Applied Mechanics Division of the ASME), the 2016 GSOFT Early Career Award for Soft Matter Research (APS) and he is a Fellow of the APS

**Professor Reis writes in 2016:**
In the EGS.Lab (**E**lasticity, **G**eometry & **S**tatistics laboratory) we are dedicated to the fundamental understanding of the mechanics of thin objects and structures; including rods, plates and shells. The large displacements permissible in such configurations can give rise to non-negligible geometric nonlinearities, even if its material properties remain linear. Of interest is also the coupling of the elasticity of thin objects with other phenomena such as fracture, adhesion, fluid forces at liquid interfaces and flow.

Examples of relevant applications range from thin elements in stretchable electronics and micro-actuators to large civil engineering contexts such as domes, hypar roofs and borewell drilling.

The starting point of the investigations is often through well controlled experiments of desktop-scale model systems for which we take advantage of advanced digital fabrication techniques. The final goal is often the predictive understanding of the large deformations of thin structures. Once a theoretical framework has been developed and the underlying mechanics rationalized, we then aim at implementing it at scale of the original problem (small or large scale) towards practical applications.

Some of the questions involving thin structures that interest us can be found in the Journal Club of iMechanica (June 2010) and in the Research Group profile @ the Engineering Mechanics Institute (September 2011).

For more info, pics and videos on what we do, please visit our research pages.

**Education:**
2004: Ph.D. in Physics: University of Manchester, UK; Thesis advisor: Tom Mullin
2000: CSAM: University of Cambridge, St. John's College, Department of Applied Mathematics and Theoretical Physics Certificate of Advanced Studies in Mathematics (Part III Maths)
1999: B.Sc.: University of Manchester, UK (First Class, Honours) Physics

**Professional Employment:**
2010-present: Esther and Harold E. Edgerton Assistant Professor Departments of Mechanical Engineering and Civil & Environmental Engineering Massachusetts Institute of Technology
2007-2010: Instructor in Applied Mathematics, Department of Mathematics, Massachusetts Institute of Technology
2005-2007: Post-Doc CNRS and ESPCI (École Supérieure de Physique et de Chimie Industrielles), Paris
2004-2005: Post-Doc Levich Institute City College of New York

**Awards:**
July 2010: Esther and Harold E. Edgerton Career Development Chair
November 2008: Gallery of Fluid Motion, DFD-APS, Winner (poster category)
March 2008: Image Gallery, GSNP- APS, Winner (video category)
March 2006: Carl Storm International Diversity Fellowship Gordon Research Conferences
September 2002: Skinner Prize, Royal Society of Chemistry (best poster at Faraday Discussion 123)
June 2002: John Bink Prize, University of Manchester, UK
August 2000: Benefactor's Scholarship, St. John's College, Cambridge, UK
June 1999: Platt Prize, University of Manchester, UK
July 1998: "PPARC Award for the Best Physics Student in the UK", The Science, Technology and Engineering Awards, UK
June 1998: Hatfield Scholarship, University of Manchester, UK
June 1997: Delta Prize, University of Manchester, UK

**Publications:**

1. P.M. Reis "Folded in hierarchy" News & Views, Nature Materials 10, 907 (2011).
2. H. Vandeparre, M. Pineirua, F. Brau, B. Roman, J. Bico, C. Gay, W. Bao, C.N. Lau, P.M. Reis and P. Damman "Wrinkling Hierarchy in Constrained Thin Sheets from Suspended Graphene to Curtains" Phys. Rev. Lett, 106 224301 (2011). Cover Story.
3. A-T. Akono, P.M. Reis, and F-J. Ulm "Scratching as a Fracture Process: From Butter to Steel" Phys. Rev. Lett, 106 204302 (2011).
4. R. Stocker, S. Jung, J. Aristoff and P.M. Reis, Response to Comment on "How Cats Lap: Water Uptake by Felis catus", Science 334, 331-c (2011)(original Comment by M. Nauenberg).
5. J.M. Aristoff, R. Stocker, P.M. Reis and S. Jung "On the water-lapping of felines and the water-running of lizards: a unifying physical perspective"Communicative & Integrative Biology 4(2), 1 (2010).
6. P.M. Reis, S. Jung, J. Aristoff and R. Stocker "How Cats Lap: Water uptake by Felis catus" Science 330 , 1231 (2010).
7. P.M. Reis, J. Hure, S. Jung, J.W.M. Bush and C. Clanet, "Grabbing Water" Soft Matter 6, 5705 (2010). (selected as a 'hot article').

8. P. Buchak, C. Eloy and P.M. Reis, "The Clapping Book: wind-driven oscillations in a stack of elastic sheets" Phys. Rev. Lett., 105 194301(2010).
9. P.S. Raux, P.M. Reis, J.W.M. Bush, and C. Clanet, "Rolling ribbons" *Phys. Rev. Lett.* **105**, 044301 (2010).
10. D. Sen, K. Novoselov, P. M. Reis and M.J. Buehler, "Tearing of graphene sheets from adhesive substrates produces tapered nanoribbons", *Small* **6**, 1108 (2010).
11. K. Bertoldi, P.M. Reis, S. Willshaw and T. Mullin, "Negative Poisson's ratio behavior induced by an elastic instability", *Adv. Mater.* **21**, 1 (2009).
12. M. D. Shattuck, R. A. Ingale, and P.M. Reis, "Granular Thermodynamics", *AIP Conf. Proc.* **1145**, 43 (2009)
13. P.M. Reis, F. Corson, A. Boudaoud and B. Roman, "Localization through surface folding in solid foams under compression", *Phys. Rev. Lett.* **103**, 045501 (2009).
14. D. Vella, J. Bico, A. Boudadoud, B. Roman and P.M. Reis, "Delamination of thin elastic sheets adhered to an elastic substrate", *Proc. Natl. Acad. Sci. U.S.A.* **106**, 10901 (2009).
15. S. Jung, P.M. Reis, J. James. C. Clanet and J.W. Bush, "Capillary Origami in Nature", *Phys. Fluids* **21** 091110 (2009).
16. P.M. Reis, B. Audoly, B. Roman, "Cracking sheets: Oscillatory fracture paths in thin elastic sheets ", *Chaos* **18** 041108 (2008).
17. E. Hamm, P.M. Reis, M. LeBlanc, B. Roman, E. Certa, "Tearing as a test for mechanical characterization of thin adhesive films", *Nature Materials*, **96**, 386 (2008).
18. P.M. Reis, A. Kumar, M.D. Shattuck and B. Roman, "Unizip Instabilities: straight to oscillatory transitions in the cutting of thin elastic sheets", *Europhys. Lett.* **82**, 64002 (2008).
19. P.M. Reis, R.A. Ingale and M.D. Shattuck, "Forcing independent velocity distributions in an experimental granular fluid", *Phys. Rev. E* **74**, 051311 (2007).
20. P.M. Reis, R.A. Ingale and M.D. Shattuck, "Caging dynamics in a granular fluid", *Phys. Rev. Lett.* **98**, 188301 (2007).
21. P.M. Reis, T. Sykes and T. Mullin, "Phases of granular segregation in a binary mixture", *Phys. Rev. E* **74**, 051306 (2006).
22. P.M. Reis, R.A. Ingale and M.D. Shattuck, "Crystallization of a quasi-two-dimensional granular fluid", *Phys. Rev. Lett.* **96**, 258001 (2006).
23. P.M. Reis, B. Roman and B. Audoly "Oscillating fracture paths in thin elastic sheets: when geometry rules the fracture path", Proceedings of the 16th European Conference on Fracture, Alexandroupolis, Greece, "Fracture of Nano and Engineering Materials and Structures", page 119 (Springer 2006).
24. B. Audoly, B. Roman and P.M. Reis, "Cracks in Brittle thin Sheets: When Geometry Rules the Fracture Path", *Phys. Rev. Lett.* **95**, 025502 (2005).
25. B. Audoly, B. Roman and P.M. Reis, "Comment on The Cycloidal Wake of a cylinder Tearing Through a Thin Sheet", *Phys, Rev. Lett.* **94**, 129601 (2005).
26. G. Ehrhardt, A. Stephenson and P.M. Reis, "Segregation Mechanisms in a Numerical Model of a Binary Granular Mixture", *Phys. Rev. E* **71**, 041301 (2005).
27. B. Audoly, P.M. Reis and B. Roman, "Oscillating fracture paths in thin brittle sheets: when geometry rules the fracture path", Proceedings of the XI International Conference on Fracture, Turin, Italy, ed. A. Carpinteri (2005).
28. B. Roman, B. Audoly and P.M. Reis, "La déchirure en fermeture éclair", *Pour la Science* **323** (September 2004).
29. P.M. Reis, G. Ehrhardt, A. Stephenson and T. Mullin, "Gases, Liquids and Crystals in Granular Segregation", *Europhys. Lett.* **66**, 357 (2004).
30. B. Roman, P.M. Reis, B. Audoly, S. de Villiers, V. Vignie and D. Vallet, "Oscillatory fracture paths in thin elastic sheets", *C.R. de Mecanique* **331**, 881 (2003).

31. P.M. Reis, G. Ehrhardt and T. Mullin, "Segregation phases in a vibrated binary granular layer", Unifying concepts in the Physics of Glasses and Granular media, Capri, Italy, eds. A. Coniglio, A. Fierro, H.J. Herrmann and M. Nicodemi, page 99 (Elsevier Science 2003).
32. P.M. Reis and T. Mullin, "Granular Segregation as a Critical Phenomenon", *Phys. Rev. Lett.* **89**, 244301 (2002).