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A virtual lab tour of the Flexible Structures Laboratory at EPFL

ABSTRACT:

It used to be that academic seminars involved a researcher visiting a host institution to deliver a talk and meet with colleagues (do you remember those days?!). Times have changed, at least temporarily, but this situation is also opening opportunities. In this 'talk', we will be inviting you for a virtual tour of our Flexible Structures Laboratory (fleXLab) at EPFL in Switzerland. We will show you some of our experimental facilities and share some of our recent research activities, focusing on the mechanics of magneto-active structures. Multiple members of our team will be involved in this tour. Research at our fleXLab focuses is centered in the general area of the mechanics of slender structures, which leverage their post-buckling regime for novel modes of functionality. Methodologically, we recognize scaled high-precision model experiments as a powerful tool for discovery in mechanics, supported by theory and computation, in a vision of science-enable engineering and engineering-motivated science. Recently, we have become fascinated with active structures made out of magneto-rheological elastomers that can be actuated in the presence of an external magnetic field. After introducing some recent advances in experimentation, modeling, and computational for this class of systems, we will present a series of concrete examples. Specifically, we will discuss (i) (re)programmable mechanical metamaterials with programmable memory; (ii) magneto-active beams and Kirchhoff-like rods; and (iii) magnetic shells with tunable buckling properties. This virtual lab will involve the participation of several members from our fleXLab. We are looking forward to 'e-hosting' you at our fleXLab at EPFL!



Pedro Reis

*Professor of Mechanical Engineering,
École Polytechnique Fédérale
de Lausanne (EPFL),
Lausanne, Switzerland*

BIOGRAPHY:

Pedro Miguel Reis is a Professor of Mechanical Engineering at the École Polytechnique Fédérale de Lausanne (EPFL) in Switzerland, where he is the Director of the Institute of Mechanical Engineering. 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 was a postdoc at the City College of New York (2004-2005) and at the CNRS/ESPCI in Paris (2005-2007). He joined MIT in 2007 as an Instructor in Applied 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 GSOFTE Early Career Award for Soft Matter Research (APS), he is a Fellow of the APS, and he is the 2021 President of the Society of Engineering Science (SES).