Professor Arnaud Lazarus

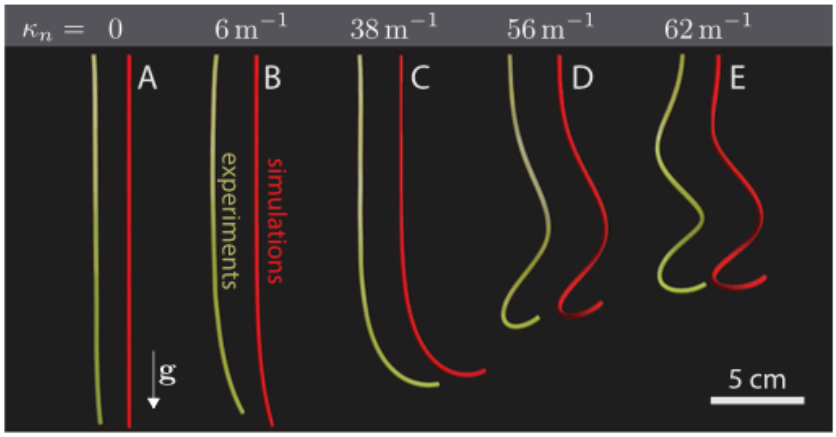

FIG. 1 (color online). Equilibrium shapes of rods suspended under their own weight: comparison of experiments and simulations. The natural curvature κ_n is varied, while the length $L = 20$ cm, radius $r = 1.55$ mm, elasticity parameters ($E = 1290$ kPa, $\nu = 0.5$), and volumetric mass $\rho = 1200$ kg/m^3 are kept constant.

From: J.T. Miller, A. Lazarus, B. Audoly and P.M. Reis, "Shapes of a Suspended Curly Hair", Physical Review Letters 112, 068103 (2014).

See:
https://scholar.google.com/citations?user=2P2y-ScAAAAJ&hl=fr
http://www.ida.upmc.fr/~alazarus/
http://web.mit.edu/preis/www/people/Alazarus_CV.pdf
https://www.researchgate.net/profile/Arnaud_Lazarus

Faculty of Sciences and Engineering, Institut Jean le Rond d'Alembert
Sorbonne University, Paris, France

Autobiography:
I am working for a better understanding of the stability of structures. Whether they are large or small, rigid or flexible, in a gravitational or electrostatic field, periodically repeating in space or in time, why is it they sometimes collapse and sometimes not? And do we want to prevent this loss of stability or make the best of it? With the help of students and colleagues, math, computers and model experiments when possible, I strive to answer practical problems like the dynamics of imperfect rotating machineries or the large vibrations of electromechanical systems at the nano-scale, or more fundamental ones such as the relation between geometry and mechanics in slender elastic structures, or the stability of periodic mechanical states in time or space.

Education:
2005-2008 Ph.D. Mechanical Engineering, Ecole Polytechnique, France.
2004-2005 Master of Science (TACS), ENS Cachan, France.
2000-2004 Undergraduate Studies, Bordeaux 1, France. Major: Civil Engineering. Minor: Mechanical Engineering.

Research Interests:
Statics and dynamics of slender structures; Model experiments; Bifurcation analysis; Stability of stationary states.

Selected Publications:
(19) A. Lazarus, "Discrete dynamical stabilization of a naturally diverging mass in a harmonically time-varying potential", Physica D: Nonlinear phenomena, 386-387, 1-7 (2019).
(18) F. Bertails-Descoubes, A. Derouet-Jourdan, V. Romero and A. Lazarus, "Inverse design of an isotropic suspended Kirchhoff rod: theoretical and numerical results on the uniqueness of the natural shape", Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences, 474, 2212, 20170837 (2018).
(17) N. Algarra, P.G. Karagiannopoulos, A. Lazarus, D. Vandembroucq and E. Kolb, "Bending transition in the penetration of a flexible intruder in a 2D dense granular medium", Physical Review E, 97, 022901 (2018).
(16) B. Bentvelsen and A. Lazarus, "Modal and stability analysis of structures in periodic elastic states: application to the Ziegler column", Nonlinear Dynamics, 91, 1349-1370 (2018).
(15) C. Lestringant, C. Maurini, A. Lazarus and B. Audoly, "Buckling of an elastic ridge: competition between wrinkles and creases", Physical Review Letters, 118, 165501 (2017).
(14) A. Lazarus and P.M. Reis, "Soft Actuation of Structured Cylinders through Auxetic Behavior", Advanced Engineering Materials, 17, 815-820 (2015).
(13) J.T. Miller, A. Lazarus, B. Audoly and P.M. Reis, "Shapes of a Suspended Curly Hair", Physical Review Letters 112, 068103 (2014).
(12) A. Lazarus, J.T. Miller, M. M. Metlitz and P.M. Reis, "Contorting a heavy and naturally curved elastic rod", Soft Matter, 9, 8274-8281 (2013).
(11) A. Nasto, A. Ajdari, A. Lazarus, A. Vaziri and P.M. Reis, "Localized deformation in thin shells under indentation", Soft Matter, 9, 6796-6803 (2013).
(10) A. Lazarus, J.T. Miller and P.M. Reis, "Continuation of equilibria and stability of slender elastic rods using an asymptotic numerical method", Journal of the Mechanics and Physics of Solids, 61(8), 1712-1736 (2013).
(9) A. Lazarus, H.C.B. Florijn and P.M. Reis, "Geometry-induced rigidity in non-spherical pressurized elastic shells", Physical Review Letters 109, 144301 (2012).
(8) A. Lazarus, O. Thomas and J.-F. Deü, "Finite element reduced order models for nonlinear vibrations of piezoelectric layered beams with applications to NEMS", Finite Elements in Analysis and Design, 49(1), 35-51 (2012).
(7) P. Vincent, P. Poncharal, , T. Barois, S. Perisanu, V. Gouttenoire, H. Frachon, A. Lazarus, E. de Langre, E. Minoux, M. Charles, A. Ziaei, D. Guillot, M. choueib, A. Ayari and S. T. Purcell, "Performance of field-emitting resonating carbon nanotubes as radio-frequency demodulators", Physical Review B, 83, 155446 (2011).
(6) S. Guillon, D. Saya, L. Mazenq, S. Perisanu, P. Vincent, A. Lazarus, O. Thomas and L. Nicu, "Effect of non-ideal clamping shape on the resonance frequencies of silicon cantilevers", Nanotechnology, 22, 245501 (2011).
(5) A. Lazarus and O. Thomas, "A harmonic-based method for computing the stability of periodic solutions of dynamical systems", Comptes Rendus Mécanique, 338, 510-517 (2010).
(4) A. Lazarus, T. Barois, S. Perisanu, P. Poncharal, P. Manneville, E. de Langre, S. T. Purcell, P. Vincent and A. Ayari, "Simple modeling of self-oscillation in NEMS", Applied Physics Letters, 96, 193114 (2010).
(3) A. Lazarus, D. Combescure and B. Prabel, "A 3D Finite Element Model for the Vibration Analysis of Asymmetric Rotating Machines", Journal of Sound and Vibration, 329, 3780- 3797 (2010).
(2) A. Lazarus, E. de Langre, P. Manneville, P. Vincent, S. Perisanu, A. Ayari and S. Purcell, "Statics and Dynamics of a Nanowire in Field Emission", International Journal of Mechanical Science, 52, 1396-1406 (2010).

(1) D. Combescure and A. Lazarus, “Refined Finite Element Modeling for the Vibration Analysis of Large Rotating Machines. Application to the Gas Turbine Modular Helium Reactor Power Conversion Unit”, Journal of Sound and Vibration, 318, 1262-1280 (2008).
Karkar, S., Arquier, R., Cochelin, B., Vergez, C., Lazarus, A., Thomas, O., 2010. MANLAB 2.0, An Interactive continuation software.
Karkar, S., Cochelin, B., Vergez, C., Thomas, O., Lazarus, A.: User guide Manlab 2.0. Technical report, Laboratoire de Mécanique et d’Acoustique (LMA), CNRS UPR 7051 (2012).