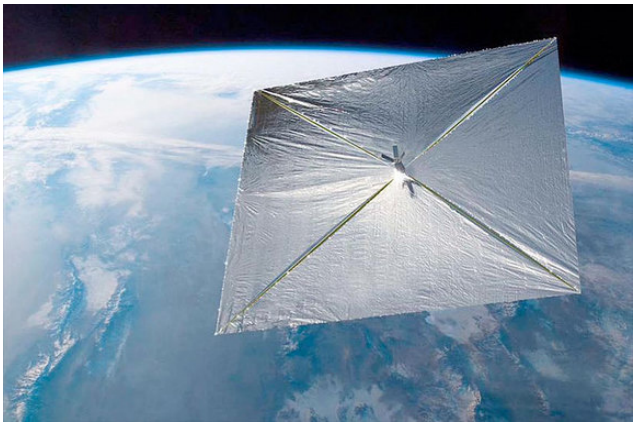

Professor Fan Xu Wrinkles in a solar sail. From: http://homepage.fudan.edu.cn/fanxu/?lang=en

See:
http://homepage.fudan.edu.cn/fanxu/?lang=en
https://scholar.google.com/citations?user=-myb0E0AAAAJ&hl=en

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Research of the Xu Group at Fudan University:
Buckling of solids and structures made of traditional hard materials, such as steel, is usually a feature to be avoided in engineering, and has been under investigation for over a century. In contrast, over the past few years, extreme materials and structures such as soft matters, thin films, hyperelastic membranes and slender rods, are often at the heart of modern technologies, and their studies have implications and applications in many areas ranging from biology, electronics manufacturing, aerospace engineering to civil engineering. A basic characteristic of such extreme materials is their ability to experience large displacement, rotation and deformation under multiple fields, which inevitably leads to formation of patterns that are much more varied and complicated than those in traditional materials. Such pattern formation is often the result of multiple bifurcations or loss of stability. Knowledge on how such instabilities arise and evolve is essential to describe, understand, predict, and ultimately to design complex materials and structures in modern industry, for example the fabrication of stretchable electronic devices and micro/nano-scale surface patterning control. This requires advanced theories and computational approaches. Our research aims at investigating fundamental mechanics of extreme materials and structures in this vibrant research field. We are also interested in exploring diverse engineering applications of soft materials and structures.

Selected Publications:
[8] Fan Xu*, Michel Potier-Ferry. On axisymmetric/diamond-like mode transitions in axially compressed core-shell cylinders. Journal of the Mechanics and Physics of Solids, 94: 68-87, 2016.
[7] Fan Xu*, Michel Potier-Ferry. A multi-scale modeling framework for instabilities of film/substrate systems. Journal of the Mechanics and Physics of Solids, 86: 150-172, 2016.
[6] Michel Potier-Ferry, Foudil Mohri, Fan Xu, Noureddine Damil, Bouazza Braikat, Khadija Mhada, Heng Hu, Qun Huang, Saeid Nezamabadi. Cellular instabilities analyzed by multi-scale Fourier series: A review. Discrete and Continuous Dynamical Systems – Series S, 9(2): 585-597, 2016. (Invited review)
[5] Fan Xu*, Yao Koustawa, Michel Potier-Ferry, Salim Belouettar. Instabilities in thin films on hyperelastic

substrates by 3D finite elements. International Journal of Solids and Structures, 69-70: 71-85, 2015.
[4] Fan Xu*, Michel Potier-Ferry, Salim Belouettar, Heng Hu. Multiple bifurcations in wrinkling analysis of thin films on compliant substrates. International Journal of Non-Linear Mechanics, 76: 203-222, 2015.
[3] Fan Xu*, Michel Potier-Ferry, Salim Belouettar, Yu Cong. 3D finite element modeling for instabilities in thin films on soft substrates. International Journal of Solids and Structures, 51(21-22): 3619-3632, 2014.
[2] Fan Xu*, Heng Hu, Michel Potier-Ferry, Salim Belouettar. Bridging techniques in a multi-scale modeling of pattern formation. International Journal of Solids and Structures, 51(18): 3119-3134, 2014.
[1] Fan Xu*, Xin Li, Gilles Régnier, Denis Defauchy. Coalescence modeling and experimental validation of sintering of thermoplastic polyamide fibers. Polymer Materials Science and Engineering, 29(3): 177-181, 2013.