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