Experiments at the Intersection of Geometry, Mechanics, and Microstructure

By

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Climbing cucumbers, popping pollen grains, wrinkled fingers, and curly hair. At heart, the modern revival of mechanics covers a diverse range of subjects at the intersection of function and form. It’s at this point – where geometry, mechanics, and microstructure meet – that we find buckling instabilities, mechanical phase transitions, exotic stress responses, and fracture. These phenomena are widely observed in many inert materials, but remarkably, we also find them being actively employed in biological tissues where they have evolved as essential tools for survival. My research explores this intersection of topics and draws on a wide range of experimental tools to better understand the microscopic origins of material non-linearities as well as their macroscopic consequences for living and non-living systems.