



**CLARK UNIVERSITY  
DEPARTMENT OF PHYSICS  
COLLOQUIUM**



**Professor Jörn Dunkel  
Department of Mathematics  
Massachusetts Institute of Technology**

**“Wrinkles and spaghetti”**

**Abstract:** Buckling and fracture are ubiquitous phenomena that, despite having been studied for centuries, still pose many interesting conceptual and practical challenges. In this talk, I will summarize recent experimental and theoretical work that aims to understand the role of curvature and torsion in wrinkling and fragmentation processes. First, we will show how changes in curvature can induce phase transitions [1] and topological defects [2] in the wrinkling patterns on curved elastic surfaces. In the second part, we will revisit an observation by Feynman who noted that spaghetti appears to fragment into at least three (but hardly ever two) pieces when placed under large bending stresses. Using a combination of experiments, simulations and analytical scaling arguments, we will demonstrate how twist can be used to control binary fracture of brittle elastic rods [3].

[1] N Stoop, et al. Nature Materials 14, 337 (2015)

[2] F Lopez Jimenez, et al. PRL 116: 104301 (2016)

[3] R H Heisser, et al. PNAS 115: 8665 (2018)

**Wednesday, January 30, 2019**

**12:00 pm - Room S-122, Sackler Sciences Center**