



# Physics Colloquium

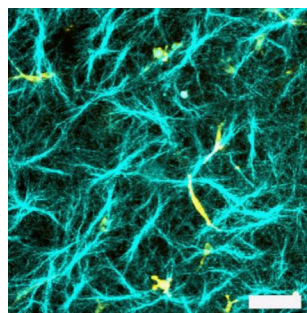
Tuesday, 15 December 2020 at 17:15

**Prof. Dr. Gijsje Koenderink**

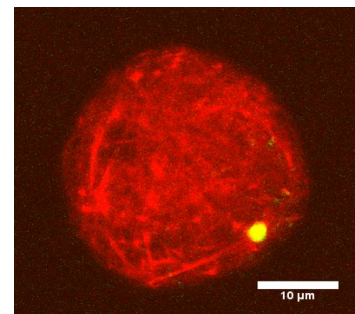
Kavli Institute of Nanoscience Delft

## The material properties of soft living matter

Cells and tissues are highly dynamic but at the same time need to withstand large mechanical loads. This paradoxical mechanical behavior is governed by fibrous protein scaffolds known as the cytoskeleton and the extracellular matrix. Fibrous networks have many advantageous mechanical properties: fibers can form space-filling elastic networks at low volume fractions and they reversibly stress-stiffen, which provides protection from damage. However, it is still poorly understood how biopolymer networks can combine these features with the ability to dynamically adapt their structure and mechanics. I will summarize recent insights in this question obtained via quantitative measurements on reconstituted cytoskeletal and extracellular matrix networks. We perform these measurements from the macroscopic scale (using rheology) all the way down to the molecular scale (using optical tweezers, in situ small-angle-X-ray scattering, and atomic force microscopy). I will furthermore mention connections to applications in bottom-up synthetic biology and for tissue (re)generation.



*synthetic tissues*



*synthetic cells*

