



Contribution ID: 26

Type: **not specified**

Soft matter physics for the rheology of a cell

Thursday 19 September 2024 09:00 (50 minutes)

The mechanical properties of a cell are determined primarily by an interpenetrating network of biopolymers. This talk will revisit several features of the mechanical properties of a cell. By using magnetic tweezers to pull a magnetic particle through the cytoplasm of a cell, we show that the particle exhibits unusual behavior: Its velocity is independent of the force pulling the particle. This velocity can be used as a probe of the mechanics within the cell and the contribution of the different filament networks. We suggest that this behavior requires a different constitutive equation to describe the rheology of the cell. We also reexamine the properties of vimentin intermediate filaments and suggest that their behavior is reminiscent of a self-assembled structure, a worm-like micelle, formed by surfactants. This perspective accounts for many properties that are observed for vimentin intermediate filament networks. Vimentin also forms phase-separated liquid droplets that are a precursor to formation of the filament network. These properties demonstrate how soft-matter physics can be used to describe the mechanical properties of a cell.

Presenter: WEITZ, David (Harvard University)