



## Seminar/Talk

# Squish and squeeze: Nuclear mechanics in physiology and disease

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Host: Michael Sixt

The nucleus is the characteristic feature of eukaryotic cells and houses the genomic information of the cell. The Lammerding laboratory is combining cell and molecular biology approaches with tissue engineering and microfabrication techniques, live-cell microscopy, and in vivo models to investigate the interplay between nuclear structure, mechanics, and function. In particular, the research is addressing how physical forces acting on the nucleus, for example, in contracting muscle cells or during migration of cells through tight interstitial spaces, can challenge the integrity of the nucleus, alter its structure, and cause genomic and transcriptional changes. I will present recent findings that demonstrate the importance of nuclear mechanics during cell migration in confined environments in vitro and in vivo, as well as the functional consequences of cells having to squeeze their large nuclei through tight interstitial spaces and small pores in the extracellular matrix network. In addition, I will discuss recent findings that highlight the importance of the nuclear envelope proteins lamins A/C in mediating nuclear stability and mechanotransduction in mechanically stressed cells and tissues, including how lamin mutations result in reduced nuclear stability, increased nuclear damage in striated muscle cells, and DNA damage and activation of DNA damage response pathways, which may explain the tissue-specific defects in diseases caused by lamin mutations. Insights gained from these studies could improve prognostic approaches and motivate novel therapeutic approaches for these diseases.

**Monday, June 17, 2019 01:00pm - 02:00pm**

Mondi Seminar Room 3, Central Building



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