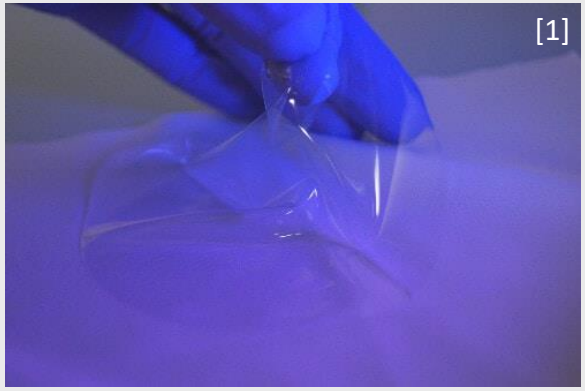
Technische Universität Braunschweig

Student- / Master thesis

pvz Zentrum für Pharmaverfahrenstechnik

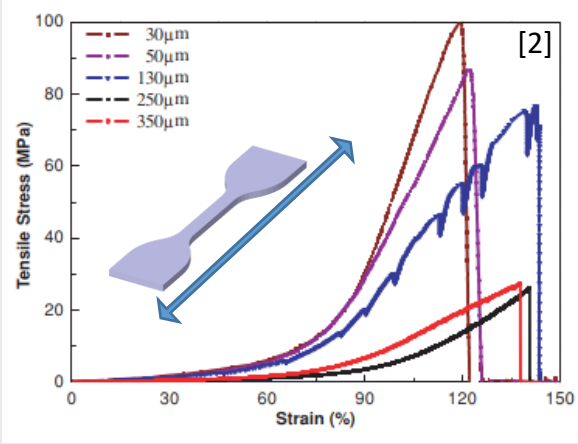
Institut für Mikrotechnik

Mechanical characterization of thin elastic films by DMA and AFM



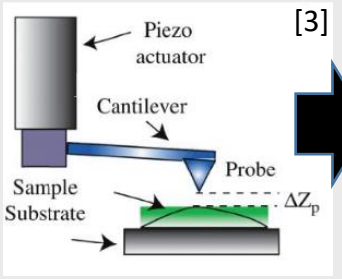
Description

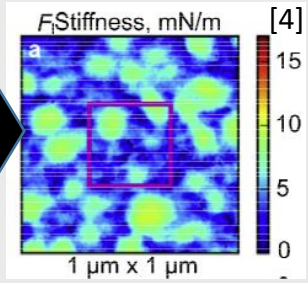
Thin elastic films out of transparent silicone material (e. g. PDMS, [1]) are widely used in organ-on-chip systems. It is important to have control over the elastic properties of these thin films, as biological cells sense and react to substrate stiffness. A study from 2009 suggests that spin coating, the fabrication process for such thin films, has an impact on the microstructure and thus also on the stiffness of the PDMS when very thin films (below 200 µm thickness) are manufactured [2]. On top of that, the PDMS film could increase its stiffness dependent on its storage duration. **The goal of this study is to experimentally investigate the dependence of mechanical PDMS film properties as a function of aging, load cycles and thickness.**



You will

- be part of the IMT research team and directly contribute to recent scientific investigations
- manufacture your own PDMS thin film specimens with different formulations
  - Processes: spin coating and xurography / laser cutting
- perform mechanical characterization experiments to study the viscoelastic and surface-stiffness properties of PDMS thin films
  - Methods: dynamic mechanical Analysis (DMA), atomic force microscopy (AFM) [3,4], Laser Scanning Microscopy (LSM)





Requirements

- Structured and disciplined way of working, able to precisely follow lab protocols
- Lab work experience is of advantage
- Basic knowledge about (experimental) mechanics

Start: as of now
Contact: **David Jaworski**
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[1] elveflow.com
[2] Miao Liu *et al* 2009 *J. Micromech. Microeng.* **19** 035028
[3] K.-S. Kim et al., Ultramicroscopy 108 (2008) p. 911
[4] H. Huang et al., Compos. Sci. Technol. 150 (2017) p. 111