ABSTRACT
The optics and mechanics from a DVD player can be used to realize compact and sensitive sensor systems. By rotating a polymer disc with integrated microfluidic channels it is possible to manipulate liquid samples such as blood - performing crucial operations like separation, valving and mixing. We integrate sensor elements such as cantilevers, nanoparticles, resonating strings and surface enhanced Raman scattering (SERS) substrates with centrifugal microfluidics. The sensors are read out by a DVD pick-up head which can perform transmission/absorption measurements and which can detect nm deflections. Also, electrodes are integrated on a disc platform, facilitating electrochemical measurements. Examples of applications include rapid diagnostics, prognostics and studies of thermal properties and degradation of polymers.

Micrometer sized containers can be used for oral drug delivery. The hypothesis is that oral drug delivery can be improved significantly by utilizing micrometer sized containers loaded with drug(s) and sealed by intelligent lids that open at specific locations in the body. The containers will protect active pharmaceutical ingredients during the passage through the stomach and facilitate adhesion to the wall of the intestine for controlled and unidirectional release, followed by absorption through the intestine. The containers were initially fabricated in the polymer SU-8. Recently, we have also succeeded in realizing similar structures in biodegradable polymers such as PLLA. We will show our recent findings and results in the areas of microfabrication of containers in a simple and rapid manner, loading of drugs, pH sensitive lids and in vitro/in vivo testing.

ABOUT THE SPEAKER
Anja Boisen is professor and head of Nanoprobes research group at department of Micro and Nanotechnology, Technical University of Denmark. Also, she is heading a DNRF and Villum Centre of Excellence named ‘IDUN - Intelligent Drug Delivery and Sensing Using Microcontainers and Nanomechanics’. She has thorough knowledge on micromechanics and nanotechnology. Her research group focuses on development and application of micro and nano mechanical sensors and microfabricated systems for oral drug delivery. Anja is cofounder of companies Cantion, Silmeco and BluSense. She is among others member of the board of the Danish Innovation Foundation, the board of Villum Foundation, the Danish Academy of the Technical Sciences and the Royal Danish Academy of Sciences. In 2008 she was awarded the largest research prize in Denmark, the Villum Kann Rasmussen award and in 2012 she was awarded the EliteForsk Award from the Danish ministry of Research, Innovation and Higher Education. In 2013 she received the ‘Sapere Aude - top researcher award’ from the Danish Council for Independent Research.

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