

Annual Highlights

The IDUN center consists of two main activities; IDUN Drug (DNRF) and IDUN Sensor (Velux Foundations). The joined center was inaugurated on April 10th with the official opening ceremony (see picture). Our first annual meeting was held on September 1st and 2nd, where scientific topics as well center organization (e.g. how do we ensure a great working environment?) were discussed.



Figure 1: Left: Group picture taken at the kick-off meeting in September 2015. Right: Inauguration of the IDUN Center in April 2015.

Since then the center has been established with new laboratory facilities and new office spaces at DTU Nanotech in Lyngby. These new facilities are adding further to the collaboration and synergy between the research in IDUN Sensor and IDUN Drug, as we now have a physical environment that support informal meetings and visualization of planned activities for next year. The research activities in IDUN have resulted in nine peer reviewed journal articles and over 20 conference contributions (papers and posters) in 2015. More than 40 people are now working in relation to the IDUN Center, and we have experienced a high level of scientific as well as organizational activity in this first 'built-up' year of IDUN. Associate Professor, Stephan Keller was awarded the prestigious Microelectronic Engineering Young Investigator Award and we received funding from the Carlsberg Foundation to purchase a fast scanning Raman microscope which is crucial for our sensor development as well as drug characterization.

IDUN Sensor

In IDUN Sensor we explore nanomechanical sensors and combine these into strong and generic research tools and systems, for example for fundamental studies of molecular actions, cell behavior and structural properties. We have studied the copper binding properties of the diabetes drug Metformin, using our realized electrochemical as well as agglutination based sensors and we have used resonating micrometer sized strings to measure α and β -relaxation in nanograms of material. Our cantilever-based sensors have been used to analyze enzymatic degradation of biopolymers and we are currently realizing a system based on optics and mechanics from a Blu-ray player to facilitate degradation measurements in flowing liquid media (e.g. intestinal fluids).

IDUN Drug

In IDUN Drug we design, realize and characterize micrometer sized containers for oral administration of drug. We have succeeded to realize containers in FDA approved materials using a developed method named 'hot punching'. This method we now also explore as a way to load containers with drug. Alternative loading methods like supercritical impregnation and powder filling are being explored and we have established own supercritical impregnation facilities. We have realized pH sensitive lids and have demonstrated pH triggered release of drugs. In collaboration with a Japanese We have performed a first round of animal studies and are making the first steps towards loading containers with drugs for vaccination and inflammatory bowel diseases.