

Annual Highlights

The IDUN research activities in 2023 have resulted in 27 peer reviewed journal articles, 4 journal covers (see images on former page), 11 conference contributions and 4 invited talks. Thirteen of our papers in 2023 have impact factors of 10 or above (see publication list).

Approximately 50 people were working in relation to the IDUN Center in 2023 and together, they supervised 26 master and bachelor students and taught several courses. We successfully ran our PhD summer school program for the eighth time and hosted our annual IDUN Industry Day for our invited contacts and collaborators from industry.

The collaboration with SSI has been strengthened and a PhD student affiliated to SSI was hired. The PhD student, as well as senior people (co PIs) from SSI have participated in events like IDUN Days and Industry Day, and new collaborators have been introduced to the Centre through the network of SSI.

The synergy between activities in the Centre of Excellence and activities in other large grants received by Anja Boisen such as an ERC Advanced Grant and Novo Nordisk Foundation Challenge Grant has been consolidated in 2023.

Associate Professor and Group leader Line Hagner Nielsen received a DFF-Sapere Aude grant that will start in 2024, as well as funding from Hørslev Fonden for investment in equipment. Additionally, researchers in IDUN, including Associate Professor Edwin Hwu, Associate Professor Fatemeh Ajalloueian, Postdoc Elodie Dumont, Postdoc Gohar Soufi, Postdoc Mahdi Ghavami, Postdoc Hau Van Hguyen, Assistant Professor Zhongyang Zhang have received grants within research and innovation.

IDUN continues to be deeply engaged in outreach. As a new initiative IDUN, together with other Centers of Excellence at DTU, arranged an exhibition, including tours in laboratories, at 'Forskningens Døgn 2023'.

IDUN Drug. In IDUN Drug we have significantly improved our self-unfolding foil devices such that we now have a 2 % bioavailability of insulin and a remarkable 380 % increase in absorption of nisin in pigs. The foils have moreover been functionalized with magnetic and radiopaque materials facilitating imaging as well as actuation of the devices. Micromotors have been coated with drug and loaded into some of our larger drug delivery devices. Hereby the micromotors are released in a unidirectional manner and can travel through the last part of the intestinal mucus layer. Also, light activated nanomotors have been developed and used for mechanical/drug mediated disruption/eradication of bacterial biofilm.

IDUN Sensor is mainly focusing on our Surface Enhanced Raman Scattering (SERS) based sensors for applications in therapeutic drug monitoring (TDM) and centrifugal microfluidics for cell growth. We have performed TDM studies on patient samples. These patients are being treated for leukemia and we can detect the drug concentration as well as the drug metabolites. Additionally, we have published first work on monitoring antiepileptic drugs. We have demonstrated implementation of human cell growth in perfusion and drug transport studies in a centrifugal microfluidic system.