

## Annual Highlights

The IDUN research activities in 2021 have resulted in 33 peer reviewed journal articles, 2 journal covers, 12 conference contributions and 10 invited talks. Three of our 2021 papers have impact factors of around 10 or above.

2021 has been a year of transition from the first to the second phase of our DNRF Center. In total 7 PhD students graduated and 4 new PhDs and postdocs have been hired. Additionally, we have welcomed new partners from SSI, University of Copenhagen and DTU Food. In 2021, approximately 50 people were working in relation to the IDUN center and together, they supervised 17 master and bachelor students and taught several courses. We successfully ran our PhD summer school program for the sixth time - this time enjoying that we could again have physical presence. We also hosted our annual "IDUN Industry Day" for our invited members from industry.

We are proud to share that two of our PhD students, Juliane Fjelrad Christfort and Nikolaj Kofoed Mandsberg received competitive internationalization postdoc awards from the Danish Independent Research Council and the Carlsberg Foundation. They will soon start positions at Université Côte d'Azur, Nice, France and Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany.

Associate prof. Line Hagner Nielsen has received a grant for a Eurotech PhD to study cellulose particles for drug delivery. Prof. Anja Boisen was awarded Novo Nordisk Foundation 'Distinguished Innovator' award to continue the centers work on cell growth in a centrifugal microfluidics platform. Researcher Oleksii Ilchenko and Prof. Anja Boisen received a project grant from Novo Nordisk Foundation regarding advanced Raman instrumentation. Associate Prof. En Te Hwu received support from the Innovation Fund Denmark to explore commercialization of our high resolution 3D printer.

We are also very happy to announce that PhD Nikolaj Kofoed Mandsberg was honored with the 'Best PhD thesis of the year award' from DTU. Prof. Anja Boisen was awarded the MNE Fellow Award 2021. She received the recognition at the annual MNE conference in Turin for her outstanding contributions to the field of micro and nano engineering. She also became a fellow of ECS (the Electrochemical Society).

In terms of outreach we have, among others, contributed with a popular science article in the journal 'KVANT', have been featured in the Advent calendar on TV2, provided events at 'Forskningens Døgen', and participated in the radio show 'Stafetten'.

### **IDUN Drug**

In IDUN Drug we have for the first time been able to image our discrete  $\mu\text{m}$  sized drug delivery devices *in vivo* using Computed Tomography (CT). This is a very important step in order to understand the overall behavior of our devices. We also, for the first time, reported on our high-resolution homemade 3D printer that we use for realizing advanced drug carrier geometries. We have made our first publication on the delivery of probiotics and have treated biofilm with a variety of antibiotics-loaded micro-devices.

### **IDUN Sensor**

In IDUN Sensor we are mainly focusing on our Surface Enhanced Raman Scattering (SERS) based sensors for applications in therapeutic drug monitoring. Here, we have had our first promising results on the detection of the anti-cancer drug MTX in blood samples from patients. We have also published our work on intestinal tissue-based biosensor for monitoring the antioxidant effect of orally administered drugs.