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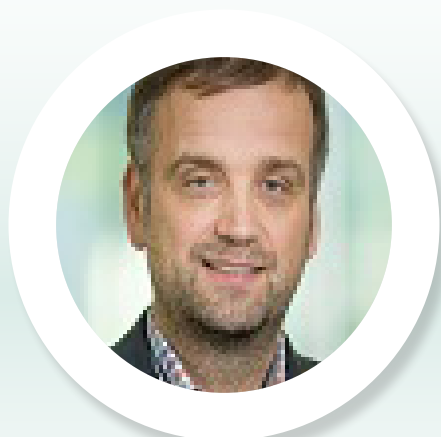
Nanomembrane microtubular devices for on- and off-chip biomedical research and development

Nanomembranes are thin, flexible, and transferable and can be shaped into 3D microtubular devices. This makes them attractive for a broad range of applications and scientific research fields ranging from novel hybrid heterostructure devices to ultra-compact 3D systems both on and off the chip. If nanomembranes are differentially strained they deform themselves and roll-up into microtubular structures upon release from their mother substrate. Rolled-up nanomembranes can be exploited to rigorously compact electronic circuitry into microtubular systems. As rolled-up microtubes can be easily tuned into the size range of single cells, they are perfectly suited to study single cell behaviour in sensitive yet fully integrative lab-in-a-tube systems. As off-chip components they address exciting environmental and biomedical applications. For instance, if magnetic tubes or helices are combined with spermatozoa, such biomagnetic cellular organisms offer new perspectives towards assisted reproduction technologies and drug delivery protocols. However, while such micrometer sized robots show great potential for medical applications they face equally big challenges when considering *in-vivo* operation.

Biography

Oliver G Schmidt is the Director of the Institute for Integrative Nanosciences at the Leibniz IFW Dresden, Germany. His interests bridge across several disciplines, ranging from nanomaterials and nanoelectronics to microfluidics, microrobotics and biomedical applications. He has received several awards: Otto-Hahn Medal from the Max-Planck-Society in 2000, Philip-Morris Research Award in 2002, Carus-Medal from the German Academy of Natural Scientists Leopoldina in 2005, and International Dresden Barkhausen Award in 2013. Most recently, he was awarded the Gottfried Wilhelm Leibniz-Prize 2018 of the German Research Foundation. The Leibniz-Prize is the most important research award in Germany for his outstanding work in the investigation, manufacturing and innovative application of functional nanostructures.

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