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MICROTUBULAR NANOMEMBRANE DEVICES: FROM NANOPHOTONICS TO NANOROBOTICS

Oliver G Schmidt

¹Institute for Integrative Nanosciences, Leibniz IFW Dresden, Germany

²Material Systems for Nanoelectronics, TU Chemnitz, Germany



Microtubular nanomembrane devices (MNDs) with outstanding properties are self-assembled into fully functional and integrative three-dimensional architectures. This makes them attractive for a broad range of applications and scientific research fields ranging from nanoelectronics and photonics to nanorobotics and medicine. MNDs are used to construct ultra-compact and ultra-sensitive advanced electronic circuitry, nanophotonic cavities, sensors and optofluidic components around fluidic channels towards the implementation of a lab-in-a-tube system. They are also useful to study basic mechanisms of single cancer and stem cell migration, growth and mitosis in realistic 3D confined environments. Off-chip applications include biomimetic microelectronics for regenerative cuff implants and the development of hybrid microbiorobotic motors for paradigm shifting reproduction technologies. Cellular cyborg machinery is put forth for novel schemes in targeted drug delivery and cancer treatment

Biography

Prof. Dr. 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: the Otto-Hahn Medal from the Max-Planck-Society in 2000, the Philip-Morris Research Award in 2002, the Carus-Medal from the German Academy of Natural Scientists Leopoldina in 2005, and the 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 Germany's most important research award and recognizes his outstanding work in the investigation, manufacturing and innovative application of functional nanostructures.

o.schmidt@ifw-dresden.de