

## Keynote Speech 5

**Time: Thursday, 28 October 2021 18:00-18:50**

**Title: Rolled-up microtube ring resonators for optofluidic sensing applications**

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**Abstract:** A novel platform for optofluidic applications is realized by monolithic integration of an array of ultra-compact three-dimensional (3D) vertically rolled-up microtube ring resonators (VRU-MRRs) with polymer waveguides. The on-chip integrated system is realized by rolling up 2D differentially strained TiO<sub>2</sub> nanomembranes into 3D microtubular cavities on a nanophotonic chip and seamlessly overlaid over several integrated waveguides. Whispering-gallery modes are observed in the telecom wavelength range, and their spectral peak positions shift significantly when measurements are performed while immersing the tubes or filling their hollow cores with water, thus manifesting a compact, robust all-integrated optofluidic microtube ring resonator with a high functionality, and well suited for dense multiplexing of sensors. The achievement of this work opens up fascinating opportunities to realize massively parallel optofluidic microsystems with exceptional multi-functionality and flexibility for analysis of biomaterials in lab-in-a-tube systems on a single chip.



**Dr. Abbas Madani** is a senior scientist at the Advanced Micro-Electronic Centre Aachen, Aachen, Germany and also is an adjunct/invited professor at the physic department of the Shahid Beheshti university, Tehran, Iran. He received Ph.D. degree in Rolled-up Photonics from Germany in 2016. His research is focused on the areas of graphene photonics, photonic sensors, optofluidic, and also nonlinear optics. He has supervised 6 master students and 4 Ph.D. students and published more than 20 research papers in various international journals. He visited as the invited speaker in several countries e.g., UK, Poland, Iran, Belgium, Spain, Nederland, EPFL in Switzerland etc. and presented his research work at various international conferences/workshops. Dr. Madani has been awarded seven years scholarship from ‘Institute for Integrative Nanosciences, IFW Dresden, Germany and also awarded two years scholarship from Cambridge University, UK to do his second postdoctoral there. He is an expert in Nanophotonic, Si Photonic, fiber optics, Laser, Optofluidics, Sensors, and Integrated Photonics, VCSELs.