Title: Wearable Magnetic Skins and Sensors

Date: 22nd Aug 2021

Time: 11.30 AM to 1.30 PM (IST)

Abstract:

IEEE Hyderabad Section Sensors Council Chapter is organizing a Distinguished Lecture titled "Wearable Magnetic Skins and Sensors" on 22nd Aug 2021 as magnetic sensors are one of the most pervasive sensors in industry and consumer devices.

They have a very long history starting with the compass more than 2000 years ago. Many different magnetic sensors have been developed, exploiting various physical principles, to obtain optimized performance for specific applications with respect to sensitivity, power consumption, size, field range or resolution. In the era of ubiquitous sensing, wearable devices and smart things, the unique features of magnetic sensing systems put them at the forefront of novel applications and new features. This presentation provides insights into latest developments on flexible magnetic skins and sensors, which feature high performance, biocompatibility and conformability. Such devices are employed in biomedical instruments, marine monitoring, or machine-user interfaces, enhancing functionalities and capabilities. Flexible and wearable magnetic sensor systems can extend our senses, provide contactless control or steering and add intriguing new functionalities to our natural capabilities. Examples are flexible magnetic tunnel junction sensors, which are employed for 3-axes orientation monitoring on biomedical instruments. On the other end of the spectrum are printed graphene Hall effect sensors with less sensitivity but high temperature and corrosion resistance. Magnetic composites made of polymers with magnetic materials as fillers combine mechanical flexibility with magnetic functionality. Such materials have been integrated with magnetic sensors to form bio-inspired artificial cilia sensors, resulting in low-power tactile sensors with multifunctional capabilities as artificial skins, for flow sensing or brail reading. Ultra-flexible magnetic skins can be worn like tattoos or camouflaged with the color of the skin tone and enable wireless operations, ranging from tracking of eye movements to hands-off machine control. Modern fabrication processes combined with the advantages of magnetic sensor systems are a strong combination, which can lead to a myriad of new sensor solutions and benefit smart things, robotics, medical devices and much more.

Speaker: Dr. Jürgen Kosel, Associate Professor, Computer Electrical and Mathematical Science and Engineering Division, Biological and Environmental Science and Engineering Division, King Abdullah University of Science and Technology, Saudia Arabia.

Speaker Profile:

Dr.Jürgen Kosel is Associate Professor of Electrical Engineering at the Division of Computer Electrical and Mathematical Sciences and Engineering at the King Abdullah University of Science and Technology (KAUST) since 2015. Since 2019, he also is Associate Professor of Bioengineering. He is Principle Investigator of the Sensing Magnetism and Microsystems Research Group and Head of the Advanced Micro and Nano systems Lab. He joined KAUST as Assistant Professor of Electrical Engineering in 2009 after a postdoctoral position at the University of Stellenbosch in South Africa, which started in 2008.

He has been CSO of Solutions for Nanotechnology in 2015 and 2016. He was project manager in the automotive industry at MAGNA Power train in Austria from 2006 to 2008. He has been appointed as

IEEE Sensors Council Distinguished Lecturer for the years 2020- 2022. He has authored over 150 journal articles, over 130 conference proceedings and 10 book chapters. He filed 40 patents or patent applications. He gave more than 25 invited/plenary talks at international conferences. His papers have been highlighted and recognized by various media, were covers on 5 journals and received awards at conferences.

He has served on the program committee and technical program committee of 10 conferences. He has been Associate Editor of the IEEE Sensors Journal since 2015, and received the Best Associate Editor runner up award in 2017. He is a Senior Member of the IEEE, AdCom member of the IEEE Sensors Council and AdCom member of the IEEE Magnetics Society. His research interests are in the area of sensors and sensor applications with focuses on micro fabrication and magnetic materials.

Agenda:

1. Welcome Address
2. Talk by Dr.Jürgen Kosel, King Abdullah University of Science and Technology, Saudia Arabia.
3. Vote of Thanks by Dr. Amit Kumar, Chair, IEEE Hyderabad Section Sensors Council Chapter

Panelists:

1. Dr.Amit Kumar- amitkr@ieee.org
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3. Ms. Sangeeta Singh- sangeeta.singh@ieee.org