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**Title: Next-Generation Smart Intelligent Sensors based on Advanced Materials**

**Abstract:** The integration of advanced materials in Nanoelectronic Devices has opened new horizons of innovation for next-generation Intelligent Sensors during last decade. In this research work will present the application of 2D materials in emerging Neuromorphic Vision Sensors and biosensors for Smart Glucose Diagnostic applications. We will focus on distinct sensor architectures achieved through the complex integration of 2D materials, high-k dielectrics, and piezoelectric materials. We will discuss how the smart, thin, and accurate performance can be achieved using 2D materials for Intelligent Chip manufacturing. We will demonstrate our experimental work for the development of high performance neuromorphic vision sensors capable of mimicking human eye and neural functions across a broadband optical spectrum. We will also discuss our recent research on the Graphene Biochip and its application for rapid blood glucose diagnostic tests. Additionally, we will explore its potential to scale for multiple blood diagnostic tests simultaneously by developing reusable Lab-on-a-Chip systems.

**Biography:** Dr. Ali Imran is Director of Research & Development at National Nanotech Innovation Center, Guangzhou, China. He is a renowned expert in Intelligent Sensing Devices designed for Artificial Intelligence and Robotic Applications, with a focus on replicating human sensory functions such as vision system. His pioneering work includes the development of Neuromorphic Vision Sensors and highly sensitive Glucose Sensor based on Graphene. Dr. Imran has been recognized with the prestigious Distinguished International Researcher Award from the Beijing Institute of Technology during his Ph.D in 2018 . He has deep experience in handling growth of nitride materials by Molecular Beam Epitaxy at State Key Laboratory of Micro and Mesoscopic Physics at Peking University from 2018-2020. He later joined the College of Integrated Circuits at Zhejiang University and jointly worked with State Key Laboratory of Silicon and Advanced Semiconductor Materials from 2021 to 2024. He also worked in collaboration with the Hangzhou Global Innovation and Technology Center, where he introduced the groundbreaking concept of the Gateless Image Sensor, capable of capturing images across a wide spectrum, including X-rays, Deep Ultraviolet, Visible, Near Infrared, and Far Infrared radiations. In addition to his technical achievements, Dr. Imran maintains strong collaborations with top Universities worldwide, including institutions in China, South Korea, Japan, Canada, Australia, United Kingdom and the United States of America. His global network enhances the reach and impact of his research across international boundaries. He has published 47 research articles, 8 patent, 1 book with overall Citations=701, h-index = 14 and i10-index = 17. His work has been featured in prestigious journals such as Advanced Functional Materials, Advanced Materials Interfaces, Surfaces and Interfaces, Advanced Optical Materials, Materials Today, Materials Today Nano, Applied Physics Letters, Small, Applied Sciences, and the Journal of Semiconductor Physics.