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ABSTRACT

Organic Electronics for Neuromorphic Computing

Neuromorphic computing could address the inherent limitations of conventional silicon technology in dedicated machine learning applications. Recent work on large crossbar arrays of two-terminal memristive devices has led to the development of promising neuromorphic systems. However, delivering a compact and efficient parallel computing technology that is capable of embedding artificial neural networks in hardware remains a significant challenge.

Organic electronic materials have shown potential to overcome some of these limitations. This talk describes state-of-the-art organic neuromorphic devices and provides an overview of the current challenges in the field and attempts to address them. I demonstrate a novel concept based on an organic electrochemical transistor and show how crucial challenges in the field such as stability, variability and linearity can be overcome.

Next to that, organic electronic materials have the potential to operate at the interface with biology. This can pave the way for novel architectures with bio-inspired features, offering promising solutions for the manipulation and the processing of biological signals and potential applications ranging from brain-computer-interfaces and robotics to bioinformatics. I will highlight our recent efforts for such hybrid biological memory devices.

BIO

Yoeri obtained his PhD at Eindhoven University of Technology in 2014. Then he briefly worked at Holst Centre in Eindhoven and in Switzerland at a high-tech startup, after which he obtained a postdoctoral fellowship at Stanford University (USA) in the group of Alberto Salleo. At the end of 2016 he returned to Eindhoven as an assistant professor where he leads the Neuromorphic Engineering group. He has also been a visiting professor at the University of Cambridge (UK) and was recently awarded an ERC starting grant.