

Title: Circuits and Technologies for Neural Interfaces

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Abstract: Large-scale neural interfacing is needed to provide better understanding of the brain at the cellular level and to develop more advanced prosthetic devices and brain-machine interfaces. However, interfacing with biological tissues poses many challenges such as biocompatibility, the size scale of cellular features, the stability and longevity of the materials in a moist environment at body temperature, and the tiny signal amplitudes to be captured. Therefore, the devices and circuits designed for these interfaces need fulfil a series of requirements to tackle these challenges. This talk will provide a general overview of existing techniques and requirements to perform neural recording, as well as an in-depth review of CMOS neural probes: technology requirements, materials, circuit techniques, design problems and possible solutions. A discussion on future trends and remaining challenges will also be included.

Author / Presenter BIO:

- Received her Ph.D. degree in Electrical Engineering in 2012 from the KU Leuven, Belgium, in collaboration with imec, Belgium.
- From 2012 to 2018, she worked at imec as a researcher and analog designer focused on interfaces for neural-sensing applications.
- She is currently the principal scientist and team leader of the Circuits & Systems for Neural Interfaces team at imec, which develops circuits and technologies for electrophysiology, neuroprosthetics and BMI.
- Her research interests include analog and mixed-signal circuit design for sensor, bioelectronic and neural interfaces.
- Carolina is a senior IEEE member and serves on the technical program committee of the ISSC conference, ISSCC SRP, VLSI circuits symposium, and ESSCIRC conference.