

Postdoc

Ecole/Institution/Société:
IMEC Belgium, Belgium / Heverlee

Discipline:
Computational Engineering

Type d'emploi::
Full-time

Date de publication:
2022-03-01

Personne à contacter:
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Postdoc Neural data processing for intra-cortical brain-computer interfaces

What you will do

At imec, we craft state-of-the-art neurotechnology products that aim to advance neuroscience research. As we continue to develop new generation of CMOS neural probes (www.neuropixels.org) with higher channel densities and with the capability of recording from over 10,000 neurons, signal data processing and data transmission are becoming important hardware bottlenecks.

In the project "ERC-Intranet of Neurons," our research team aims to develop an energy-efficient minimally-invasive wireless telemetry system capable of transferring the recording data from up to 10,000 recording channels, while keeping high fidelity. Direct transmission of this raw data will require a telemetry system with up to Gbps of speed, which will consume high energy and dissipate excessive heating. Hence, hardware efficient data-encoding and compression methods will be the key to reduce the transmission energy and efficiently utilize limited communication channel capacity.

In this postdoc project, novel neuro-inspired neural signal sampling/encoding methodologies will be investigated and developed. The balance between compression ratio and signal quality, and the impact on the advanced spike processing ([e.g.](#) principal component analysis) will be evaluated. These developed methodologies will be co-implemented and integrated into an ASIC and hardware system in collaboration with other researchers. Finally, this system will be validated in an in-vitro or ex-vivo setup.

What we do for you

We offer you the opportunity to join one of the world's premier research centers in nanotechnology at its headquarters in Leuven, Belgium. With your talent, passion and expertise, you'll become part of a team that makes the impossible possible. Together, we shape the technology that will determine the society of tomorrow.

We are committed to being an inclusive employer and proud of our open, multicultural, and informal working environment with ample possibilities to take initiative and show responsibility. We commit to supporting and guiding you in this process; not only with words but also with tangible actions. Through imec.academy, 'our corporate university', we actively invest in your development to further your technical and personal growth.

We are aware that your valuable contribution makes imec a top player in its field. Your energy and commitment are therefore appreciated by means of a competitive 2-year scholarship.

Who you are

We are looking for a passionate, forward-thinking and experienced researcher who is passionate about translating microelectronics to biomedical applications to create societal impact. You will be part of the ground-breaking research project “Intranet of Neurons” and a team of talented researchers, under the ERC (European Research Council) Consolidator grant. The position will be based in imec Leuven, in close collaboration with international labs and imec’s Neuropixels team.

You have:

- PhD degree in electrical, computer science/systems or biomedical engineering
- PhD research relevant to the field of information theory and signal processing, focusing on neural signals (e.g., principal component analysis, spike sorting, etc), and has at least 1 high-impact journal publication in the fields of neuroscience, neuroinformatic, or neurotechnology
- Experience with data analysis from intra-cortical neural recording (e.g., spike sorting, decoding)
- Knowledge in information theory and digital signal processing (e.g., Nyquist sampling, Shannon capacity limit, etc.)
- Knowledge in neuronal dynamics (e.g., Hodgkin-Huxley neuron model, neuron adaptation, lateral inhibition, etc.)
- Familiar with numerical analysis tools (e.g., MATLAB, Python, C, etc.)
- Knowledge in neuromorphic engineering is a plus (e.g., event-based vision sensor)
- Knowledge in neural recording analog front-end circuits (e.g., amplifier, analog-to-digital converter, etc.) is a plus
- Be able to work on your own, but at the same time an excellent team player
- This postdoctoral position is funded by imec through KU Leuven. Because of the specific financing statute which targets international mobility for postdocs, only candidates who did not stay or work/study in Belgium for more than 24 months in the past 3 years can be considered for the position (short stays such as holiday, participation in conferences, etc. are not taken into account).

Job details

Title: Postdoc Neural data processing for intra-cortical brain-computer interfaces

Employer: imec

Location: Kapeldreef 75 Heverlee, Belgium

Job type: Postdoc

Field: Algorithms, Artificial Neural Network, Biomedical Engineering, Electrical Engineering, Electronics

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