

Postdoctoral Researcher Photoacoustics

What you will do

OptoAcoustics investigates the interaction between light and mechanical vibrations. While this field used to be driven by fundamental research [1], it benefited from the development of micro-nano fabrication techniques so that it has nowadays reached a degree of maturity that allows to use cavity optomechanical systems for real-life applications [2].

One example are the Optomechanical Ultrasound Sensors (OMUS) developed at imec [3]. These optomechanical microphones exhibit record sensitivities for the measurement of acoustic waves, paving the way for deeper and higher resolution photoacoustic imaging for biomedical applications.

One of the key challenges to translate these structures into a final medical imaging system is to be able to read signals coming from large arrays of OMUS.

The aim of this postdoctoral position is to enable the interrogation of many optomechanical structures [4] by using advanced multiplexing schemes for photoacoustic imaging applications. Eventually, the number of addressed sensors could scale up to hundreds/thousands of microphones. This should be achieved without degrading the performances of the OMUS, while keeping the readout scheme realistic in terms of readout time, optical power and so on. In the framework of this project, you will investigate experimentally and numerically the performances of multiplexed OMUS arrays. To this end, you will use optomechanical systems fabricated in imec's state of the art cleanroom facilities, as well as the different characterization setups available in the lab.

You will also be involved in exploring the OMUS platform for other applications such as force, chemical, mass, biological, or acceleration sensing. To this end, resonant detection through electrostatic and optical forces will be considered. The nonlinear behavior of these structures could also be investigated.

What we do for you

We offer you a post doc position at the KULeuven in collaboration with imec, in Leuven, Belgium. The postdoc will mainly take place at imec facilities. The imec team is specialized in Multiphysics, Photonics and in the development of optomechanical devices. The group at KULeuven has a strong expertise in the application of Cardiovascular Imaging and Dynamics. The promoters for this topic are both, Prof. J. D'hooge (KUL) and Prof. X. Rottenberg (imec). The synergies within the teams will provide you a very rich and multidisciplinary working environment.

We are committed to being an inclusive employer (<http://www.imec-int.com/en/careers#diversity>) and proud of our open, multicultural, and informal working environment with ample possibilities to take initiative and show responsibility. In everything we do, your future colleagues are guided by the imec values of passion, excellence, connectedness, and integrity. 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 market appropriate scholarship.

Who you are

- A highly motivated researcher, holding a PhD degree in photonics, optics, electrical engineering, physics or equivalent.
- You are a team player and have good communication skills as you will work in a multidisciplinary and multicultural team spanning several imec departments.
- Given the international character of the position, an excellent knowledge of English is a must.
- A prior experience in photoacoustics with optical/optomechanical sensors is a plus.

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).

Contact

To apply, please search for the “Postdoctoral Researcher Photoacoustics” on imec’s website (<https://www.imec-int.com/en>).

You can also find it by using the following link:

<https://www.imec-int.com/en/work-at-imec/job-opportunities/postdoctoral-researcher-photoacoustics>

Bibliography

- [1] M. Aspelmeyer, T. J. Kippenberg, and F. Marquardt, “Cavity Optomechanics,” *Rev. Mod. Phys.*, vol. 86, no. 4, pp. 1391–1452, 2014.
- [2] B. B. Li, L. Ou, Y. Lei, and Y. C. Liu, “Cavity optomechanical sensing,” *Nanophotonics*, vol. 10, no. 11, pp. 2799–2832, 2021, doi: 10.1515/nanoph-2021-0256.
- [3] W. J. Westerveld et al., “Sensitive, small, broadband and scalable optomechanical ultrasound sensor in silicon photonics,” *Nat Photonics*, vol. 15, no. 5, pp. 341–345, May 2021, doi: 10.1038/s41566-021-00776-0.
- [4] F. R. Lamberti et al., “Real-Time Sensing with Multiplexed Optomechanical Resonators,” *Nano Lett*, vol. 22, no. 5, pp. 1866–1873, 2022, doi: 10.1021/acs.nanolett.1c04017.