



Birgit Stiller awarded grant by the European Research Council for her research project “Sound-Computing”

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Using optoacoustic neural networks to take artificial intelligence (AI) to the next level. This is the ambitious goal of the “SOUND-PC” research project for which Prof. Birgit Stiller, Leader of the Research Group “Quantum Optoacoustics” at the Max Planck Institute for the Science of Light (MPL) and W3 Professor at Leibniz Universität Hannover, has been awarded the ERC Consolidator Grant. With the three-million-euro funding prize, the scientist wants to create alternative computing architectures for neuromorphic computing to enhance future approaches to machine learning and AI.

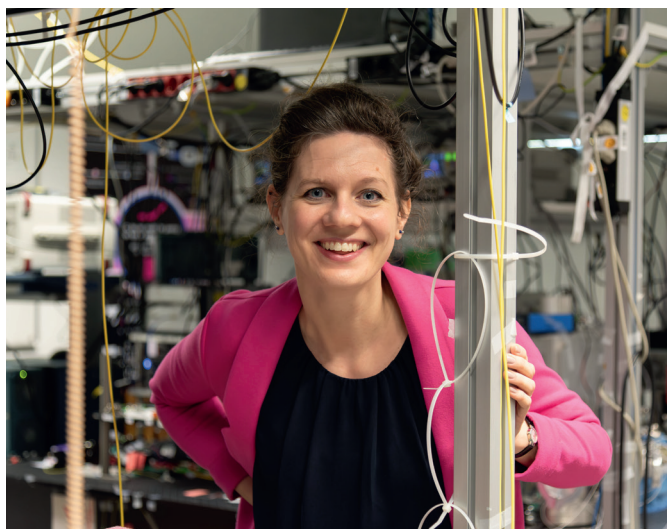
Using light and sound waves to create new computing architectures for AI

Artificial intelligences process data, make decisions and predictions and have become an integral part of almost every aspect of our lives – from text-based dialogue systems such as ChatGPT to innovation drivers at the interface between data and life sciences. The success of AIs is leading to a huge

increase in the energy demand for computing facilities and data centers worldwide. Birgit Stiller aims to counteract this with her research project “SOUND-PC” by developing alternative computer architectures and new neural network structures. To do this, the team around the physicist is using light-sound interactions in optical fibres and photonic chips.

Optical neural networks use light for computing and are capable of performing challenging parallel computation at enormous speeds. In “SOUND-PC”, Birgit Stiller combines the potential of photonics with that of acoustics, thereby pursuing a completely new scientific approach. She will expand optical neural networks and include flexible and reconfigurable building blocks which will ultimately provide new functionalities. The opportunity for doing so in optical fibers or photonic chips is of fundamental significance: both platforms are highly developed and, in the case of optical fibers, omnipresent. With the expansion of fibre-optic networks for telecommunications, optical fibers are in many countries present in almost every street. A scientific breakthrough in the field of photonic machine learning would be of immense benefit for intelligent systems, and photonics has the advantage of high bandwidth, the possibility of parallelization and low optical losses. In addition, the research team cross-over to the quantum domain and realize several strategies targeted towards quantum neural networks.

“The ERC Consolidator Grant, with its generous funding, gives me and my team the opportunity to realize the idea of neuromorphic structures with light-sound interactions,” says Birgit Stiller. “The ERC projects will also undergo a thorough evaluation by international panels, which makes me all the more pleased to be among the lucky recipients of one of these grants.”



Prof. Birgit Stiller, research group leader “Quantum Optoacoustics” at the MPL.

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About the ERC Consolidator Grant

The European Research Council (ERC) is a European funding organization for outstanding pioneering research. It was established by the EU in 2007 as part of the Horizon Europe programme. The ERC offers four central funding programmes. These include the Consolidator Grant, which is endowed with up to two million euros plus an additional one million for larger purchases, and is designed to support scientists in Europe in their innovative research. The funding is paid out over a period of five years.

About Birgit Stiller

Birgit Stiller is leader of the independent Max Planck Research Group “Quantum Optoacoustics” at the MPL in Erlangen and W3 professor at the Leibniz Universität Hannover. Her group’s current aim is to use light-sound interactions for quantum technologies and photonic neuromorphic computing.

From 2015 to 2019, she held a position as a Postdoctoral Research Fellow at the University of Sydney, Australia, working on integrated photonic circuits. Prior to that, she was a Postdoctoral Researcher in the field of quantum communication, specifically quantum key distribution and quantum hacking. She received her PhD from the CNRS Institute FEMTO-ST in Besançon, France.

Birgit Stiller is a Henriette Herz Scout of the Humboldt Foundation and a member of the board of the German Excellence Cluster PhoenixD. She is a Fellow of the Max Planck School of Photonics and the Elisabeth Schiemann Kolleg. She was recently named amongst the Photonics100 for 2025, as innovator in the field of Photonics.

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Research at the Max Planck Institute for the Science of Light (MPL) covers a wide range of topics, including nonlinear optics, quantum optics, nanophotonics, photonic crystal fibres, optomechanics, quantum technologies, biophysics, and – in collaboration with the Max-Planck-Zentrum für Physik und Medizin – links between physics and medicine. MPL was founded in 2009 and is one of the over 80 institutes that make up the Max Planck Society, whose mission is to conduct basic research in the service of the general public in the natural sciences, life sciences, social sciences and the humanities.