Unconventional sensing and perception: using event-driven technologies for robots

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Speaker Bio

Dr Chiara Bartolozzi is Senior Tenured Researcher at the Italian Institute of Technology. She earned a degree in Engineering at University of Genova (Italy) and a Ph.D. in Neuroinformatics at ETH Zurich.

She is currently leading the <u>Event-Driven Perception for Robotics</u> group, with the aim of applying the <u>"neuromorphic"</u> engineering approach to the design of robotic platforms as enabling technology towards the design of autonomous machines.

She is in the scientific board of the <u>Capocaccia Workshop on Neuromorphic Intelligence</u>. She is Senior Editor for NPJ Robotics, IOP Neuromorphic Computing and Engineering, IEEE JETCAS and editor in Frontiers in Neuroscience and IEEE TCASI.

She is an IEEE member, actively supporting the CAS and RAS societies, previous chair of WiCAS committee, and NSA Technical Committee. In 2020, she was general chair of "AICAS2020", on Circuits and systems for efficient embedded AI.
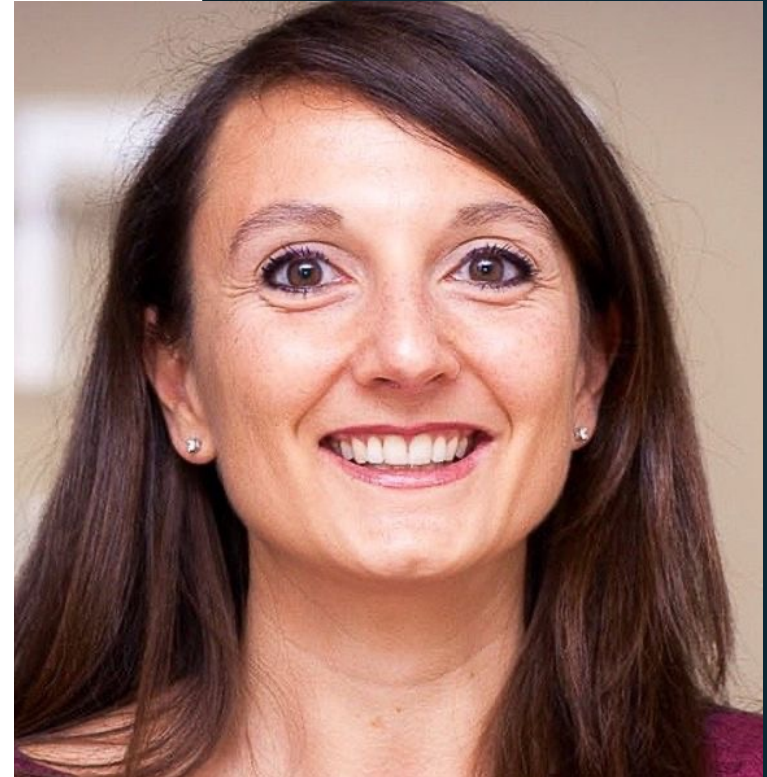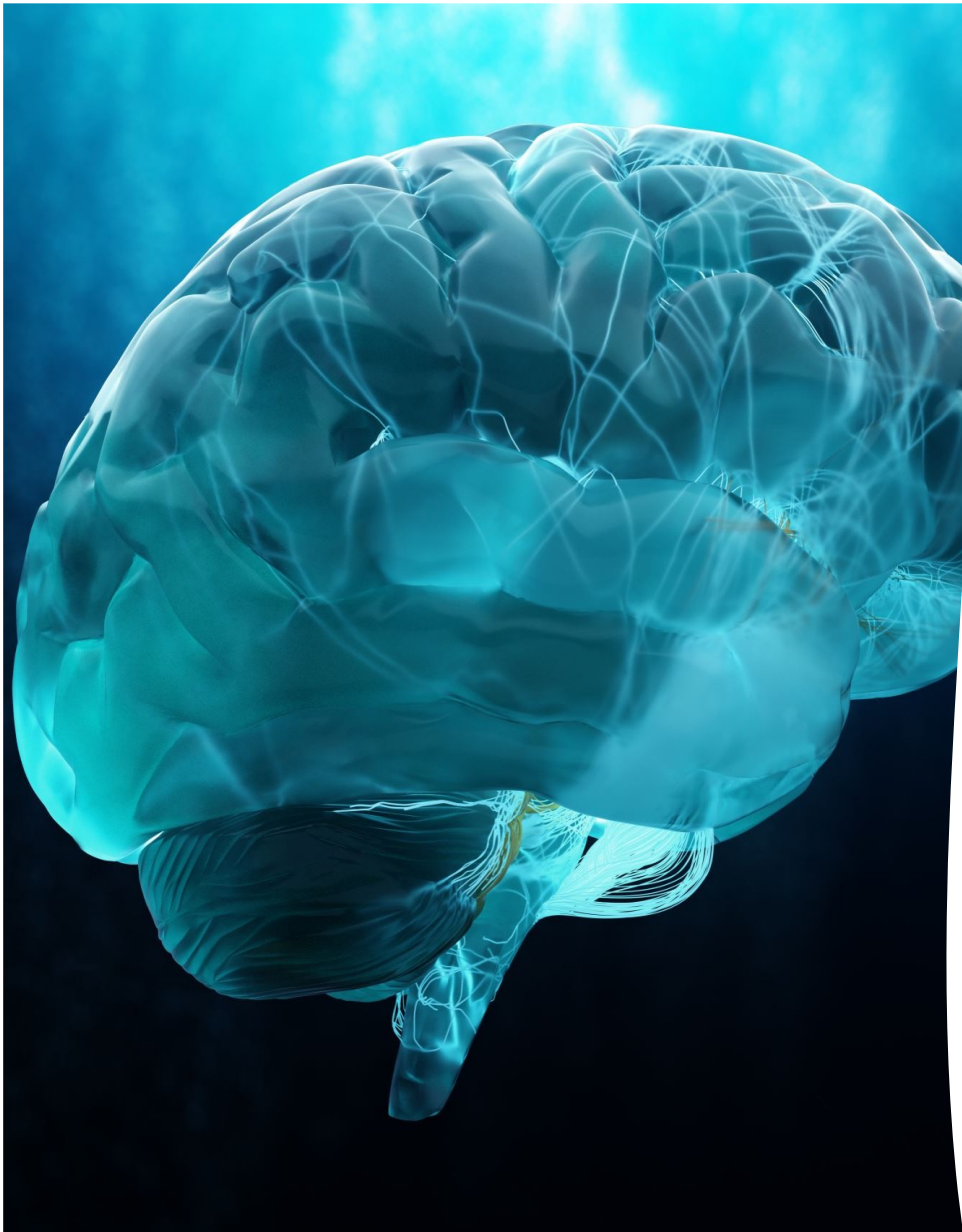
Abstract

- Biological sensory systems have developed to best capture the properties of surrounding objects and environment that are useful for acting in the world. The physical properties of tactile, visual and auditory sensory organs, and the way neurons encode the characteristics of each stimulus allow our brain to make sense of the world and take appropriate decisions on how to behave.

- This is done by a very efficient system that spares the slightest bit of information, to avoid consuming too much energy for each single action. As such, artificial systems have much to learn from biology, to develop cheap solutions that can run in a very small device and at minimum energy cost.

- Since the first prototypes of neuromorphic vision sensors and computing devices, part of the community focused its efforts in deploying neuromorphic devices in practical applications, to exploit their intrinsic compression, low latency, high temporal resolution, high dynamic range.

- The quest to find the best strategy to exploit neuromorphic engineering is still open, but a lot of progress has been made. In this talk, I'll describe possible approaches towards the development of neuromorphic perception for robots and discuss the relevance of the development of neuromorphic sensing for touch and other modalities.