Nathalia Peixoto, PhD

Associate Professor, Department of Electrical and Computer Engineering
Core Faculty, Center for Adaptive Systems of Brain-Body Interactions (CASBBI)

Education

PhD, Microelectronics, University of Sao Paulo (USP), Brazil

Key Interests

Neural Interfaces | Neural Engineering | Neural Primary Cultures | Sensors | Microelectrode Arrays | Virtual Reality Development | Wearable Devices | Embedded Systems

CONTACT

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SELECT PUBLICATIONS

- C. Vallejo-Giraldo *et al.*, Attenuated glial reactivity on topographically functionalized Poly (3, 4-Ethylenedioxythiophene): P-Toluene Sulfonate (PEDOT: PTS) neuroelectrodes fabricated by microimprint lithography. *Small* 14(28), 1800863 (2018).
- M. L. Gertz *et al.*, Time-dependent increase in the network response to the stimulation of neuronal cell cultures on micro-electrode arrays. *J Vis Exp.* 123, e55726 (2017).
- S. Minnikanti *et al.*, Lifetime assessment of atomic-layer-deposited Al2O3–Parylene C bilayer coating for neural interfaces using accelerated age testing and electrochemical characterization. *Acta Biomaterialia* 10(2), 960-967(2014).

Research Focus

My research interests include wearable devices, embedded systems, implantable electrodes and systems, hybrid systems (cell cultures and electronics), control of assistive technology, bioMEMS (bio-micro-electro-mechanical systems), and experimental models of neuro-pathologies such as epilepsy and spreading depression.

The lab has a long track record of designing technology to control devices with the objective of increasing the quality of life of people with disabilities, for example the control of a wheelchair with humming or the virtual control of a robotic feeding arm. A second thrust of the lab is on experimental models for neuropathologies and for memory. We use cell cultures to study how networks develop, and how they degenerate over time. We record electrical activity (multi-channel electrophysiology) and use imaging tools for these objectives.

Current Projects

- Mixed reality systems with physiological monitoring for investigation of triggers in substance use disorder: in this project we combine wearable devices with virtual reality systems to track user reaction to triggers in addiction. Our expertise in this project is on the design of novel wearable devices and virtual reality scenarios that can record physiological signals.
- Microsensors for in vivo applications with specific interest in brain recordings: we are investigating microelectrode coatings for robust dopamine tracking in the extracellular space. We use electrochemistry techniques and data mining/machine learning tools to leverage multi-sensor platforms.
- Retinal implant safety: we collaborate with the FDA on designing safety standards and testing charge limits for implants. The tools we use range from OCT (optical coherence tomography) to electrical modeling and finite element modeling of retinal circuitry.