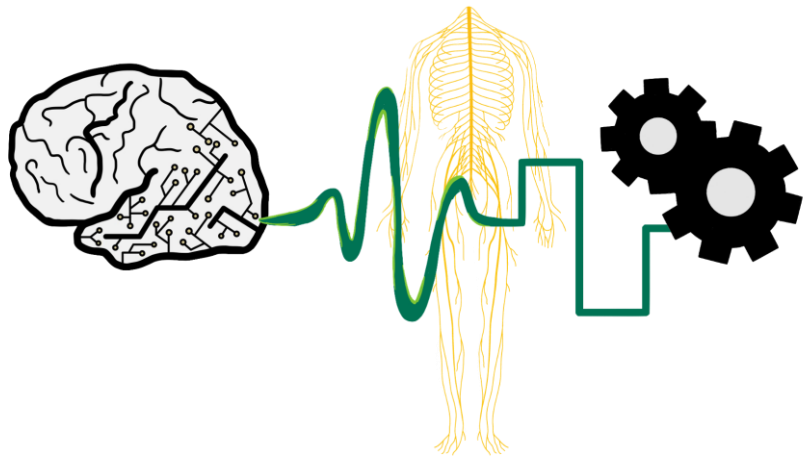
THE BIOROBOTICS INSTITUTE

Sant'Anna
School of Advanced Studies – Pisa

Bioelectronics Area



Bioelectronics & Neuroengineering Seminar Series

- **How natural hand usage shapes behavior and intrinsic and task-evoked brain activity**
- **Gait quality assessment through wearable technology: are we able to support mobility assessment neurorehabilitation?**

Scuola Superiore Sant'Anna | Pisa,
Aula 3 (Polo Sant'Anna Valdera)
January 24, 2023 – 11:00 AM

Prof. Viviana Betti
(Sapienza University of Rome)
Prof. Giuseppe Vannozzi
(University of Rome "Foro Italico")

How natural hand usage shapes behavior and intrinsic and task-evoked brain activity
Prof. Viviana Betti
Recent studies suggest that spontaneous activity, *i.e.,* ongoing activity in the absence of an active task (rest), not only replays at rest task activation patterns but also maintains a model of the statistical regularities (priors) of the body and environment. These internal models may be used to predict upcoming behavior. Based on this idea, we aim to test the resilience of these internal models to extreme manipulations of the body. To do so, we replace the hand with everyday tools. Through a combination of behavioral approaches, methods, and techniques ranging from functional neuroimaging to virtual reality, our aim is to provide insights into how the synergic activity of the body and environment shapes behavior and neural activity. This approach might open novel opportunities for future robotic-assisted technology and neuroprosthesis developments.

Gait quality assessment through wearable technology: are we able to support mobility assessment neurorehabilitation?
Prof. Giuseppe Vannozzi
Gait quality refers to a number of domains, such as variability, smoothness, stability, and symmetry, determining how the individual freely moves in the environments. In this talk, I will briefly overview the state of the art about the use of magneto-inertial sensors to quantify gait quality indicators in the neurorehabilitation field. Sensor limitations (drift, sensors-to-body movements) will be taken into account, highlighting the need to follow good practice rules for a better exploitation of their potential. Furthermore, wearable solutions such as fNIRS and mobile EEG can interestingly be added to quantify motor-cognitive interference during locomotion tasks. This quantitative approach can be fruitfully integrated with the current clinical evaluation tests, joining objectivity with field applicability

Contacts:
andrea.bandini@santannapisa.it
tommaso.proietti@santannapisa.it

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