

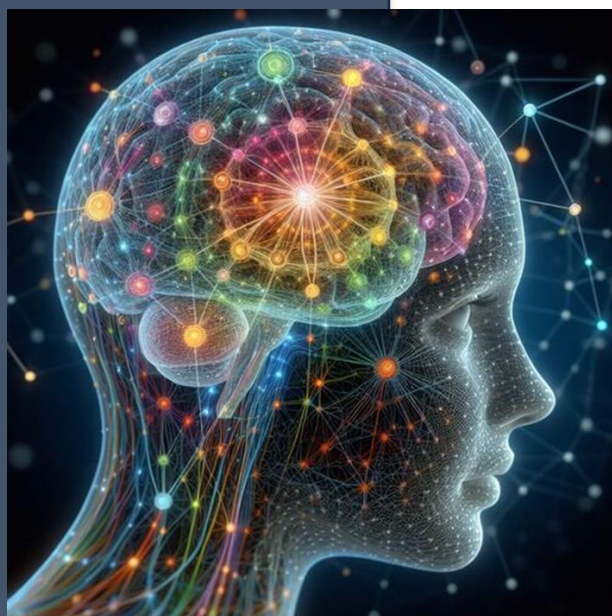


Gruppo Nazionale
di Bioingegneria

XLIII ANNUAL SCHOOL

Aim of the School

Aula Magna (Casa della
Gioventù Universitaria)
Università di Padova
Via Rio Bianco, 12, 39042
Bressanone (Italy)



Neurotechnologies to understand and restore the nervous system

September 16th – 19th, 2024

“Interacting” is a crucial challenge in the field of the neuroengineering. We can exploit it to understand how the nervous system works and to restore its functioning.

How to interact?

1. design implantable devices to read and write in the nervous system;
2. design in silico bioinspired models and machine learning to characterize the electrophysiological activity and to optimize the interaction/stimulation;
3. develop reduced in vitro/organoids experimental models to overcome possible limits when dealing with the in vivo nervous system
4. develop neurotechnologies to restore compromised neural functions and facilitate relearning

Chairs

Paolo Massobrio (Università di Genova)

Silvestro Micera (Scuola Superiore Sant’Anna)

Alessandra Bertoldo (Università di Padova)

Alessandra Pedrocchi (Politecnico di Milano)

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Scientific Organizers

Gabriele Arnulfo (Università di Genova)

Calogero Oddo, Alberto Mazzoni (Scuola Superiore
Sant’Anna)

Alberto Antonietti (Politecnico di Milano)

Local Organizers

Gruppo Nazionale di Bioingegneria (GNB)

Organizing Secretary
Pragma Congressi (Pavia)

Info: [XLIII Annual School 2024 – Announcement](#)
(grupponazionalebioingegneria.it)

Mon
16

Neuronal circuits & dynamics in CNS and PNS

- "*Broadband*" cortical neuronal ensembles (M. Giugliano)
- Electrophysiological and neuroimaging approaches for the investigation of functional brain networks (E. Maggioni)
- Dynamical system reconstruction and functional connectivity in the CNS (E. Russo)
- From the neurophysiology of the spinal cord to artificial sensorimotor control (S. Raspapovic)
- Neural basis and dynamics of touch: insights for biomimetic bionics (G. Valle)

Tue
17

In vitro and *in silico* CNS and PNS models

- The use of *in vitro* murine models for neuroengineering applications (M. Brofiga)
- Human neuronal networks on MEA: a robust tool to study disease phenotype *in vitro* (M. Frega)
- TbD (N. Elvassore)
- Microcircuit modeling: the cerebellar usecase (C. Casellato)
- *In silico* brain models for understanding pathologies (A. Antonietti)
- *In silico* medicine: modeling brain circuits to restore neuronal functions (J. Mapelli)
- Biophysically-accurate and surrogate models for the *in silico* optimization of peripheral and spinal neuromodulation (S. Romeni)
- From touch science to the engineering of neuromorphic tactile sensors for bionic limb prostheses, collaborative robotics and the metaverse (C. Oddo)

Wed
18

Neurotechnologies to interact with the CNS and PNS

- Innovative Microtransducers for Multifunctional Activity Monitoring of Electroactive Cellular Aggregates (A. Bonfiglio)
- Implantable active dense CMOS neuroelectronics for brain activity recordings (L. Berdondini)
- Deep brain stimulation for locomotor network dysfunctions in Parkinson's disease (C. Palmisano)
- Mobile Brain/Body Imaging for rehabilitation: challenges and opportunities (F. Artoni)
- Deep Brain Stimulation: from serendipity to knowledge-driven neuromodulation (A. Mazzoni)
- Deep brain stimulation, the patient and the person - a challenging evolution (M. Pacetti)
- Transcranial brain stimulation: currents, magnets and ultrasounds (G. Foffani)

Thu
19

Neuroprosthesis and clinical applications

- Non-Invasive Brain Stimulation (NIBS): evolving concepts for clinical applications (A. Prioni)
- Bidirectional brain-machine and brain-body interfaces (S. Shokur)
- Functional Electrical Stimulation and robotics devices: two complementary approaches to foster motor re-learning (E. Ambrosini)
- Spinal cord stimulation assisted by motor rehabilitation training for restoring motor function (L. Albano)
- A wearable neuroprosthetics system to restore natural thermal sensations in upper limb amputees (F. Iberite)
- Bioelectronic medicine as a tool for restoring natural bladder function (A. Giannotti)
- Visual prostheses: learned lessons and future perspectives (D. Ghezzi)

One a
day

Cross-road lectures

- Do we need more data or better data? The importance of data quality for research reliability (V. Pasquale)
- Ethics of Neuroengineering and Ethics for Neuroengineering (M. Ienca)
- Trustworthy AI in neuroengineering: from data management to ethics assessment (S. Moccia)
- PRISM: Photon Resolved Image Scanning Microscopy for Spatial and Temporal Imaging of Living Samples (S. Piazza)



Gruppo Nazionale
di Bioingegneria

Speakers

- Albano L. (HSR)
Ambrosini E. (POLIMI)
Antonietti A. (POLIMI)
Artoni F. (UNIGe)
Berdondini L. (IIT)
Bonfiglio A. (IUSS)
Brofiga M. (UNIGE)
Casellato C. (UNIPV)
Elvassore N. (UNIPD)
Foffani G. (Hosp de Paraplégicos)
Frega M. (UNITW)
Gandolfo M. (3Brain)
Ghezzi D. (Hôp. Jules-Gonin)
Giannotti A. (SSSA)
Giugliano M. (UNIMORE)
Iberite F. (SSSA)
Ienca M. (TUM)
Maggioni E. (POLIMI)
Mapelli J. (UNIMORE)
Mazzoni A. (SSSA)
Moccia S. (SSSA)
Oddo C. (SSSA)
Pacetti M. (Ist. G. Gaslini)
Palmisano C. (Wurzburg Univ.)
Pasquale V. (IIT)
Piazza Simonluca (Genoa Instruments)
Priori A. (UNIMI)
Raspapovic S. (ETH)
Romeni S. (EPFL)
Russo E. (SSSA)
Shokur S. (EPFL)
Valle G. (Chicago Univ.)

Sponsors



Registration Fees

▪ GNB members

	Participants	Early bird (up to Jul 31, 2024)	Late (up to Sep 2, 2024)	Onsite*
Physical attendance	Standard	300€	400€	500€
	PhD student	140€	190€	240€
	One day	-	-	150€
Virtual attendance	Standard	110€	160€	-
	PhD student	60€	90€	-

▪ NON-GNB members**

	Participants	Early bird (up to Jul 31, 2024)	Late (up to Sep 2, 2024)	Onsite*
Physical attendance	Standard	490€	650€	780€
	PhD student / Medical resident	200€	290€	435€
	One day	-	-	235€
Virtual attendance	Standard	240€	320€	-
	PhD student / Medical resident	120€	180€	-
	Student	65€	100€	-
	Student - light	25€	60€	-

All registration fees, except for «Student – light», include the school-book (by Patron).

All registrations fees include VAT.

*upon sits availability

**GNB STANDARD MEMBERSHIP 50€; GNB PHD-STUDENT MEMBERSHIP 30€

To register to the school as a GNB member, GNB membership code is required. To become a member, please visit:

<https://soci.grupponazionalebioingegneria.it/utenti/front/accedi>.