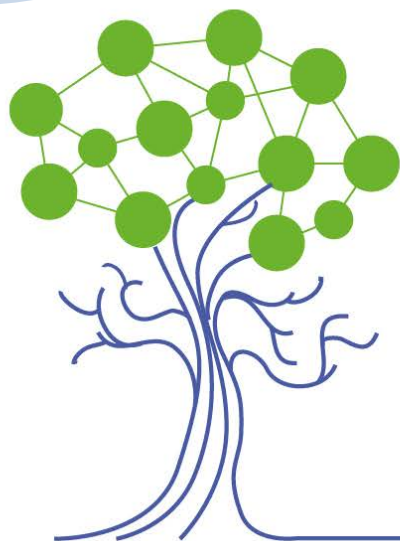




Università
di Genova **D**ibris

JUNE 10-14, 2024



School of Neuroengineering Massimo Grattarola

Neuroengineering for health and disease: a multi-scale approach

Organized by

Gabriele Arnulfo, Michela Chiappalone, Marco Fato

Sergio Martinoia, Paolo Massobrio

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Egidio D'Angelo

University of Pavia, Pavia, Italy

Alberto Mazzoni

Scuola Superiore Sant'Anna, Pisa, Italy

Lino Nobili

IRCCS Istituto Giannina Gaslini & University of Genova & Genova, Italy

PhD Bioengineering
and Robotics



14:00 -15:00 *Registration & Welcome Coffee*

School kick-off

15:00 -15:45 *Welcome from the Organizers and the Principal*

Gabriele Arnulfo, Michela Chiappalone, Marco Fato, Sergio Martinoia, Paolo Massobrio (Chairs 9th International School Massimo Grattarola - University of Genova, Genova, Italy)
Giorgio Roth (Principal, Scuola Politecnica, University of Genova, Genova, Italy)

The MNESYS project

15:45 – 16:00 *A multiscale integrated approach to the study of the nervous system in health and disease*

Sergio Martinoia (University of Genova, Genova, Italy)

Chair: Michela Chiappalone (University of Genova, Genova, Italy)

Opening Plenary Lecture I

16:00 – 17:15 *Engineering the brain across scales*

Viktor Jirsa (Aix-Marseille University, Marseille, France)

Egidio D'Angelo (University of Pavia, Pavia, Italy)

Chair: Sergio Martinoia (University of Genova, Genova, Italy)

Opening Plenary Lecture II

17:15 – 18:30 *Integrated CMOS microsystems for multifunctional characterization across scales*

Andreas Hierlemann (ETH, Basel, Switzerland)

Chair: Sergio Martinoia (University of Genova, Genova, Italy)

18:30 -20:00 *Welcome Aperitif*

Plenary Lecture of the Day

08:45 -10:00 Virtual Brain Twins for Medicine

Viktor Jirsa (Aix-Marseille University, Marseille, France)

Chair: Michela Chiappalone (University of Genova, Genova, Italy)

10:00 -10:30 Morning Coffee Break

Neuroengineering for Epilepsy

10:30 – 11:15 Distinguishing health and disease in epilepsy

Maeike Zijlmans (UMC Brain Center and Stichting Epilepsie Instellingen Ned, Utrecht, The Netherlands)

11:15 – 12:00 A low-dimensional assessment of seizure risk dynamics

Sheng Wang (Aalto University, Helsinki, Finland)

Chair: Gabriele Arnulfo (University of Genova, Genova, Italy))

12:00 -13:30 Lunch & Poster Session

Clinical Neuroscience

13:30 – 14:15 Neural control of hematopoiesis

Antonio Uccelli (University of Genova & IRCCS Ospedale Policlinico San Martino, Genova, Italy)

Chair: Sergio Martinoia (University of Genova, Genova, Italy)

Computational Modelling

14:15 – 15:00 Multiscale brain modelling: from neurons to virtual brain and robotic controllers

Egidio D'Angelo (University of Pavia, Pavia, Italy)

15:00 – 15:45 RNNs as digital twins of brain activity at rest and during the decision to move

Maurizio Mattia (Istituto Superiore di Sanità, Roma, Italy)

15:45 – 16:30 Cellular Level Modeling in the EBRAINS Research Infrastructure: an overview

Luca Leonardo Bologna (CNR, Palermo, Italy)

Chair: Paolo Massobrio (University of Genova, Genova, Italy)

16:30 -17:00 Afternoon Coffee Break & Poster Session

Novel Devices and Technologies

17:00 – 17:45 Advanced optical approaches to reveal the neural code underlying sensory perception

Tommaso Fellin (Istituto Italiano di Tecnologia, Genova, Italy)

17:45 – 18:30 Brain-inspired Implants: Chip Design Perspective

Farshad Moradi (Aarhus University, Aarhus, Denmark)

Chair: Martina Brofiga (University of Genova, Genova, Italy)

Plenary Lecture of the Day

08:45 -10:00 Novel neuroengineering tools to monitor and modulate human sleep and arousal

Yuval Nir (Tel Aviv University, Tel Aviv, Israel)

Chair: Lino Nobili (IRCCS Istituto Giannina Gaslini & University of Genova, Genova, Italy)

10:00 -10:30 *Morning Coffee Break*

Consciousness and Sleep

10:30 – 11:15 Pre-clinical approaches to investigate sleep and circadian clock

Valter Tucci (Istituto Italiano di Tecnologia, Genova, Italy)

11:15 – 12:00 Hibernation: exploiting hypometabolism for space and medical applications

Matteo Cerri (University of Bologna, Bologna, Italy)

12:00 – 12:45 Fluid boundaries between sleep and wake

Lino Nobili (IRCCS Istituto Giannina Gaslini & University of Genova, Genova, Italy)

Chair: Vinicius R. Cota (Istituto Italiano di Tecnologia, Genova, Italy)

12:45 -14:15 *Lunch & Poster Session*

Imaging and Connectivity

14:15 – 15:00 Advances in functional connectivity mapping

Jean-Charles Mariani (Istituto Italiano di Tecnologia, Rovereto, Italy)

15:00 – 15:45 Brain decoding and structural graph learning as a window into neural representations of perception

Nicola Toschi (Università di Roma 'Tor Vergata', Roma, Italy)

Chair: Egidio D'Angelo (University of Pavia, Pavia, Italy)

15:45 -16:30 *Afternoon Coffee Break & Poster Session*

Hands-on Session for students

16:30 – 19:30 1 Crash Course on Artificial Intelligence and Machine Learning: principles, foundations, best practices

Marco Chierici (Fondazione Bruno Kessler, Trento, Italy)

Plenary Lecture of the Day

08:45 -10:00 An overview of Research and Robotics at Google DeepMind

Francesco Nori (DeepMind, London, UK)

Chair: Alberto Mazzoni (Scuola Superiore Sant'Anna, Pisa, Italy)

10:00 -10:30 *Morning Coffee Break*

Neuroscience of Stroke

10:30 – 11:15 From bench to bedside: in vitro experimental models to identify novel therapeutic targets for stroke

Domenico Pellegrini-Giampietro (University of Firenze, Firenze, Italy)

11:15 – 12:00 Shaping Neural Connections After Acquired Brain Injury

David J. Guggenmos (University of Kansas Medical Center, Kansas City, KS, USA)

12:00 – 13:00 Noninvasive Brain Stimulation for Neurorehabilitation in Post-Stroke Patients: from theory to practice

Cristina Tassorelli (University of Pavia, Pavia, Italy)

Giuseppe Cosentino (IRCCS Fondazione Casimiro Mondino, Pavia, Italy)

Chair: Michela Chiappalone (University of Genova, Genova, Italy)

13:00 -14:30 *Lunch & Poster Session*

AI for Neuroscience

14:30 – 15:15 Deep Brain Stimulation: from serendipity to knowledge-driven neuromodulation

Alberto Mazzoni (Scuola Superiore Sant'Anna, Pisa, Italy)

15:15 – 16:00 Computation for neurodegenerative diseases: chasing a balance between data and equations

Michele Piana (University of Genova, Genova, Italy)

Chair: Federico Barban (University of Genova, Genova, Italy)

16:00 -16:30 *Afternoon Coffee Break & Poster Session*

Hands-on Session for students

16:30 – 19:30 Crash Course on Practical machine learning with Python

Marco Chierici (Fondazione Bruno Kessler, Trento, Italy)

20:00 -23:30 *Gala Dinner at Palazzo della Meridiana*

Novel Biomarkers and Technologies

08:45 – 09:30 Neuromorphic Technology for Enabling Neural Interaction

Elisa Donati (University of Zurich, Zurich, Switzerland)

09:30 – 10:15 Emerging Trends on Technology-based Neurorehabilitation

Marianna Semprini (Istituto Italiano di Tecnologia, Genova, Italy)

Chair: Vittorio Sanguineti (University of Genova, Genova, Italy)

10:15 -10:45 *Morning Coffee Break*

Best Poster Award

10:45 – 11:00 Introduction & Winner Announcement

Michela Chiappalone (University of Genova, Genova, Italy)

11:00 – 11:15 Student Award 3rd Place

11:15 – 11:30 Student Award 2nd Place

11:30 – 11:45 Student Award 1st Place

Chairs: Gabriele Arnulfo, Paolo Massobrio, Michela Chiappalone (University of Genova, Genova, Italy)

Closing Plenary Lecture

11:45 – 13:00 Implantable Modular Neuroprostheses to Restore Neural Functions

Silvestro Micera (Scuola Superiore Sant'Anna, Pisa Italy & EPFL, Lausanne, Switzerland)

Chair: Sergio Martinoia (University of Genova, Genova, Italy)

Final Remarks

13:00 – 13:15 Greetings and Acknowledgments

Gabriele Arnulfo, Michela Chiappalone, Marco Fato, Sergio Martinoia, Paolo Massobrio (Chairs 9th International School Massimo Grattarola - University of Genova, Genova, Italy)

13:15 -14:30 *Farewell Lunch*

