



ETTORE MAJORANA FOUNDATION AND CENTRE FOR SCIENTIFIC CULTURE

1963–2023

60th ANNIVERSARY OF ACTIVITIES



INTERNATIONAL SCHOOL OF BIOPHYSICS

48th Course: MEMOS FOR BIOPHYSICS INTO THE FUTURE: LIGHTNESS, QUICKNESS, EXACTITUDE, VISIBILITY, MULTIPLICITY, AND CONSISTENCY

ERICE-SICILY: 16 – 22 OCTOBER 2023

Sponsored by the: • Italian Ministry of Education, University and Scientific Research • Sicilian Regional Government

PROGRAMME AND LECTURERS

Structural basis of scrambling by TMEM16 proteins

• A. ACCARDI, Weill Cornell Medicine, New York, NY, US

Accessing nanoscale structure and dynamics with light

• F. BALZAROTTI, Research Institute of Molecular Pathology (IMP), Wien, AT

Viscosity exposed: the role of fluorescent molecular rotors.

• A. BATTISTI, NEST, Scuola Normale Superiore, Pisa, IT

Converging multimodal microscopy methods as biophysics tools for nanoscale studies

• P. BIANCHINI, Istituto Italiano di Tecnologia, Genoa, IT

Is the cell really a machine?

“The fair switch project”: How single molecules reveal the nanoscale of the cell

• R. BIZZARRI, University of Pisa, IT

The future of structural biology is shaped by electrons and X-ray photons

• M. BOLOGNESI, University of Milan, IT

Division of labor and mechanism of translocation in a ring ATPase

• C. BUSTAMANTE, University of California, Berkeley, CA, US

The Makapansgat pebble

• A. DIASPRO, Italian Institute of Technology, IBF-CNR, Genoa, IT

Cryo electron microscopy informing of the continuous flexibility of biological macromolecules

• J. M. CARAZO, National Center for Biotechnology CNB-CSIC, Madrid, ES

Protein assemblies: multiple pathways and structures

• R. CARROTTA, National Research Council, Palermo, IT

Biophysical aspects governing the uptake of extra cellular vesicles by cells.

• L. CASALIS, Elettra – Sincrotrone Trieste, IT

The continued usefulness of useless knowledge

• M. CHALFIE, Columbia University, New York, NY, US

Collaboration Academia – Industry and career step

• D. CIEPIELEWSKI, General Manager at Nikon Europe B.V., Amsterdam, NL

Drilling holes into cell membranes: the amazing world of pore forming toxins

• M. DALLA SERRA, CNR – Istituto di Biofisica, Genova, IT

Lifetime-multiplexed image-scanning single-molecule localization microscopy

• J. ENDERLEIN, Georg August University, Göttingen, DE

DNA torsional state affects transcription and is influenced by macromolecular crowding

• L. FINZI, Emory College, Atlanta, GA, US

Some biophysical aspects of Photosynthesis

• G. GIACOMETTI, Istituto Veneto di Scienze, Venezia, IT

Lifetime-based super-resolution microscopy and its application to a model of oncogene activation

• L. LANZANO, Istituto Italiano di Tecnologia, Genoa, IT

Biophysics consistency in the landscape of biogenic nanoparticles

• M. MANNO, National Research Council, Palermo, IT

Exactitude, visibility, and consistency of biophysical models of neurons and brain circuits

• M. MIGLIORE, National Research Council, Palermo, IT

Simulations meet experiments

• V. MINICOZZI, University of Rome “Tor Vergata”, IT

The unexpected diagnostic potential of 3D nano-disorder: Epigenetic effects and cancer alterations

• V. MUSSI, National Research Council, IMM-CNR, Rome, IT

Observing the not-visible biological details: a challenge between quickness, and consistency

• M. G. ORTORE, Università Politecnica delle Marche, Ancona, IT

The neurobiology of number cognition

• G. VALLORTIGARA, University of Trento, IT

Investigating cellular mechanosensing with fluidic force microscopy

• M. VASSALLI, University of Glasgow, Scotland, UK

... and now for something completely different: Is AI coming of age?

• A. VERRI, Università degli Studi di Genova, IT

Multiplicity and visibility in the study of amyloid superstructures

• V. VETRI, Università di Palermo, IT

Light-triggers visualize quick biomolecular processes

• C. VIAPPIANI, University of Parma, IT

The importance of water in membrane receptor function – Implications for optogenetics

• A. WATTS, University of Oxford, South Parks Road, UK

PURPOSE OF THE COURSE

This Course aims to present the state-of-the-art in pure and applied Biophysics and discuss future research directions linking current knowledge with the most recent ideas and methods. It is an ambitious course having its roots in the history of the Italian Biophysical Society of Pure and Applied Biophysics, SIBPA, established 50 years ago in Italy in a network of scholars between the Universities and the National Research Council, CNR. SIBPA was founded 50 years ago in Parma, and its inaugural congress was carried out in the same year in Camogli, electing Antonio Borsellino as its first President. The ambition of this Course is to reflect the fact that Biophysics is a scientific discipline without boundaries, a boundless territory of knowledge where the critical question of biology, "What is life?" is addressed and studied with the methodological and conceptual framework of physics. The beauty of Biophysics lies in the natural propensity to seek those regularities descending from physical laws that make the living unique in a kind of succession of "chance" and "necessity". The power of Biophysics lies in its temporal and spatial scalability. From these considerations, we decided to build a program linked by six keywords that, in the centennial of the National Research Council, also recall the one of the birth of Italo Calvino, one of the most beloved Italian writers, namely: lightness, quickness, exactitude, visibility, multiplicity, and consistency.

APPLICATIONS

Persons wishing to attend the School are requested to write to:

Professor Alberto DIASPRO
Department of Physics, University of Genoa
16152 Genoa, Italy
e-mail: diaspro@fisica.unige.it

PLEASE NOTE

Participants must arrive in Erice no later than 12 a.m. on 16th October 2023.

POETIC TOUCH

According to legend, Erice, son of Venus and Neptune, founded a small town on top of a mountain (750 metres above sea level) more than three thousand years ago. The founder of modern history — i.e. the recording of events in a methodic and chronological sequence as they really happened without reference to mythical causes — the great Thucydides (~500 B.C.), writing about events connected with the conquest of Troy (1183 B.C.) said: «After the fall of Troy some Trojans on their escape from the Achaei arrived in Sicily by boat and as they settled near the border with the Sicilians all together they were named Elymi: their towns were Segesta and Erice.»

This inspired Virgil to describe the arrival of the Trojan royal family in Erice and the burial of Anchises, by his son Aeneas, on the coast below Erice. Homer (~1000 B.C.), Theocritus (~300 B.C.), Polybius (~200 B.C.), Virgil (~50 B.C.), Horace (~20 B.C.), and others have celebrated this magnificent spot in Sicily in their poems. During seven centuries (XIII-XIX) the town of Erice was under the leadership of a local oligarchy, whose wisdom assured a long period of cultural development and economic prosperity which in turn gave rise to the many churches, monasteries and private palaces which you see today.

In Erice you can admire the Castle of Venus, the Cyclopean Walls (~800 B.C.) and the Gothic Cathedral (~1300 A.D.). Erice is at present a mixture of ancient and medieval architecture. Other masterpieces of ancient civilization are to be found in the neighbourhood: at Motya (Phoenician), Segesta (Elymian), and Selinunte (Greek). On the Aegadian Islands — theatre of the decisive naval battle of the first Punic War (264-241 B.C.) — suggestive neolithic and paleolithic vestiges are still visible: the grottoes of Favignana, the carvings and murals of Levanzo.

Splendid beaches are to be found at San Vito Lo Capo, Scopello, and Cornino, and a wild and rocky coast around Monte Cofano: all at less than one hour's drive from Erice.

More information about the «Ettore Majorana» Foundation and Centre for Scientific Culture can be found on the WWW at the following address:

<http://www.csem.infn.it>