

# INTERNATIONAL SCHOOL OF BIOPHYSICS «ANTONIO BORSELLINO»

48<sup>th</sup> Course:

**Memos for biophysics into the future: Lightness, quickness, exactitude,  
visibility, multiplicity, and consistency**

*Erice - Sicily: 16 – 22 October 2023*

DIRECTORS OF THE COURSE:

**A. DIASPRO, M. DALLA SERRA, C. VIAPPIANI**



## 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.

## 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 Sicanians 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 Anchise, by his son Enea, 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 at the following web addresses:

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

<https://www.sibpa.it/>

<https://www.eric2023.it/>

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Mon 16	Arrival									<b>Welcome remarks</b> A. Diaspro, M. Dalla Serra, C. Viappiani, G. Giacometti	Dinner + Marsala room
Tue 17	<b>C. Bustamante</b> exactitude consistency	<b>L. Finzi</b> lightness multiplicity	<i>coffee break</i>	<b>M. Bognesi</b> visibility exactitude	<b>J.M. Carazo</b> multiplicity consistency	<i>lunch</i>	<b>R. Bizzarri 1</b> quickness, consistency	<b>G. Vallortigara</b> exactitude visibility	<i>Coffee break</i>	flash talks Leica Microsystems <b>C. Dallacosta</b> Leica Stellaris and latest news	Dinner + Marsala room
Wed 18	<b>C. Viappiani</b> lightness quickness	<b>L. Casalis</b> lightness consistency	<i>coffee break</i>	<b>A. Battisti</b> lightness multiplicity	<b>M. Vassalli</b> lightness visibility	<i>lunch</i>	<b>M. Dalla Serra</b> multiplicity consistency	<b>V. Mussi</b> quickness visibility	<i>Coffee break</i>	<b>Martin Chalfie</b> The Continued Usefulness of Useless Knowledge consistency, multiplicity flash talks	Dinner + Marsala room
Thur 19	<b>A. Watts</b> quickness, exactitude	<b>G. Giacometti</b> lightness quickness	<i>coffee break</i>	<b>A. Accardi</b> exactitude consistency	<b>A. Verri</b> exactitude visibility	<i>Lunch (13-14)</i>	EXCURSION + DINNER				
Frid 20	<b>F. Balzarotti</b> visibility exactitude	<b>R. Bizzarri 2</b> quickness consistency	<i>coffee break</i>	<b>J. Enderlein</b> lightness exactitude	<b>L. Lanzaò</b> visibility quickness	<i>lunch</i>	<b>P. Bianchini</b> visibility multiplicity	<b>M. Migliore</b> exactitude visibility	<i>Coffee break</i>	Nikon Instruments <b>D. Ciepielewski</b> Round table on career step in Industry visibility exactitude flash talks	Dinner + Marsala room
Sat 21	<b>V. Vetri</b> visibility exactitude	<b>R. Carrotta</b> multiplicity exactitude	<i>coffee break</i>	<b>M.G. Ortore</b> quickness, consistency	<b>M. Manno</b> multiplicity consistency	<i>lunch</i>	<b>V. Minicozzi</b> exactitude consistency	<b>A. Diaspro</b> consistency multiplicity	<i>Coffee break</i>	flash talks SEELIFE Nikon Imaging Center@IIT NSPARC and latest news <b>Closing remarks</b>	Dinner + Marsala room
Sun 22	Departure										



Società Italiana di Biofisica Pura e Applicata  
fondata nel 1973



## LECTURERS AND LECTURES

**Alessio Accardi**, Dept. of Anesthesiology, Weill Cornell Medicine, New York, USA  
*Structural basis of scrambling by TMEM16 proteins*

**Francisco Balzarotti**, Research Institute of Molecular Pathology (IMP), Wien, Austria  
*Accessing Nanoscale Structure and Dynamics with Light*

**Antonella Battisti**, NEST, Istituto Nanoscienze-CNR and SNS, Pisa, Italy  
*Viscosity exposed: the role of fluorescent molecular rotors*

**Paolo Bianchini**, Istituto Italiano di Tecnologia (IIT), Genoa, Italy  
*Converging multimodal microscopy methods as biophysics tools for nanoscale studies*

**Ranieri Bizzarri**, Dept. of Surgical, Medical, Molecular Pathology and Critical Care Medicine, University of Pisa, Italy  
*Is the cell really a machine? (1)*  
*"The fair switch project": how single molecules reveal the nanoscale of the cell. (2)*

**Martino Bolognesi**, University of Milan, Italy  
*The future of structural biology is shaped by electrons and X-ray photons*

**Carlos Bustamante**, University of California, Berkeley, USA  
*Division of Labor and Mechanism of Translocation in a Ring ATPase*

**Josè-Maria Carazo**, National Center for Biotechnology CNB-CSIC, Madrid, Spain  
*Cryo Electron Microscopy informing of the continuous flexibility of biological macromolecules*

**Rita Carrotta**, CNR - Istituto di Biofisica, Palermo, Italy  
*Protein assemblies: multiple pathways and structures*

**Loredana Casalis**, Elettra – Sincrotrone, Trieste, Italy  
*Biophysical aspects governing the uptake of extra cellular vesicles by cells.*

**Martin Chalfie**, Dept. of Biological Sciences, Columbia University, New York, USA  
*The Continued Usefulness of Useless Knowledge*

**Daniel Ciepielewski**, Nikon Europe B.V., Amsterdam, NL  
*Collaboration Academia – Industry & career step*

**Corrado Dallacosta**, Leica Microsystems, Mannheim, Germany  
*Leica Stellaris and latest portfolio news*

**Mauro Dalla Serra**, CNR - Istituto di Biofisica, Genova, Italy  
*Drilling holes into cell membranes: the amazing world of pore forming toxins.*

**Alberto Diaspro**, University of Genoa, IIT, IBF-CNR, Genoa, Italy

*The Makapansgat pebble.*

**Jörg Enderlein**, Third Institute of Physics – Biophysics, Georg August University, Göttingen, Germany

*Lifetime-Multiplexed Image-Scanning Single-Molecule Localization Microscopy*

**Laura Finzi**, Department of Physics, Emory College, Atlanta, GA, USA

*DNA torsional state affects transcription and is influenced by macromolecular crowding*

**Giorgio Giacometti**, Dept. of Biology, University of Padova, IVSLA, Venezia, Italy

*A touch on biophysical aspects of Photosynthesis*

**Luca Lanzanò**, Dept. of Physics and Astronomy “Ettore Majorana”, University of Catania, Catania, Italy, IIT, Genoa, Italy

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

**Mauro Manno**, CNR - Istituto di Biofisica, Palermo, Italy

*Biophysics consistency in the landscape of biogenic nanoparticles*

**Michele Migliore**, CNR - Istituto di Biofisica, Palermo, Italy

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

**Velia Minicozzi**, Dept. of Physics and INFN – Univ. of Rome "Tor Vergata", Italy

*Simulations meet experiments in Biophysics*

**Valentina Mussi**, CNR - Institute of Microelectronics and Microsystems, Rome, Italy

*The unexpected diagnostic potential of 3D nano-disorder: epigenetic effects and cancer alterations.*

**Maria Grazia Ortore**, Università Politecnica delle Marche, Ancona, Italy

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

**Giorgio Vallortigara**, Centre for Mind/Brain Sciences, University of Trento, Italy

*The neurobiology of number cognition*

**Massimo Vassalli**, University of Glasgow, Scotland, UK

*Investigating cellular mechanosensing with fluidic force microscopy*

**Alessandro Verri**, University of Genoa, Italy

*“... and now for something completely different: is AI coming of age?”*

**Valeria Vetri**, Dip. di Fisica e Chimica & ATeN Center, Università di Palermo, Italy  
*Multiplicity and visibility in the study of amyloid superstructures.*

**Cristiano Viappiani**, University of Parma, Parma Italy  
*Light-triggers visualize quick biomolecular processes*

**Anthony Watts**, Biochemistry Dept., University of Oxford, UK  
*The importance of water in membrane receptor function – Implications for optogenetics*

### Selected participants

Elena Angeli, Francesca Baldini, Virginia Bazzurro, Fabio Callegari, Simone Civita, Lisa Cuneo, Giuseppe De Luca, Elisabetta Di Franco, Eleonora Mari, Alessandro Esposito, Nicola Galvanetto, Elena Gatta, Samuele Ghignoli, Sajedah Kerdegari, Elisa Longo, Matteo Mariangeli, Davide Odino, Kimiya Pakravanan, Licia Anna Pugliese, Giorgia Puleo, Yessica Roque Diaz, Mohammadmehdi Roushenas, Marco Salerno, , Lama Zeaiter, Fillot Tom

### Logistic, secretariat, and website

Manuela Salvatori (IIT), Marina Marengo (Double EM srl), Francesco Impallari (CNR-IBF)

### Next events

8th NIC@IIT school,  
27 November-1 December 2023, Istituto Italiano di Tecnologia, Genova, Italy. <http://www.nic.iit.it>

FOM2024 Focus on Microscopy,  
24-27 March 2024, Genova, Italy. <http://www.focusonmicroscopy.org>

SIBPA 2024  
16-20 June, Genova, Italy

EBSA2025  
30 June - 4 July, Rome, Italy

11<sup>th</sup> International Weber Symposium 2025  
Genova, Italy

IUPAP-ICBP 2026  
29 June - 5 July, Genova, Italy

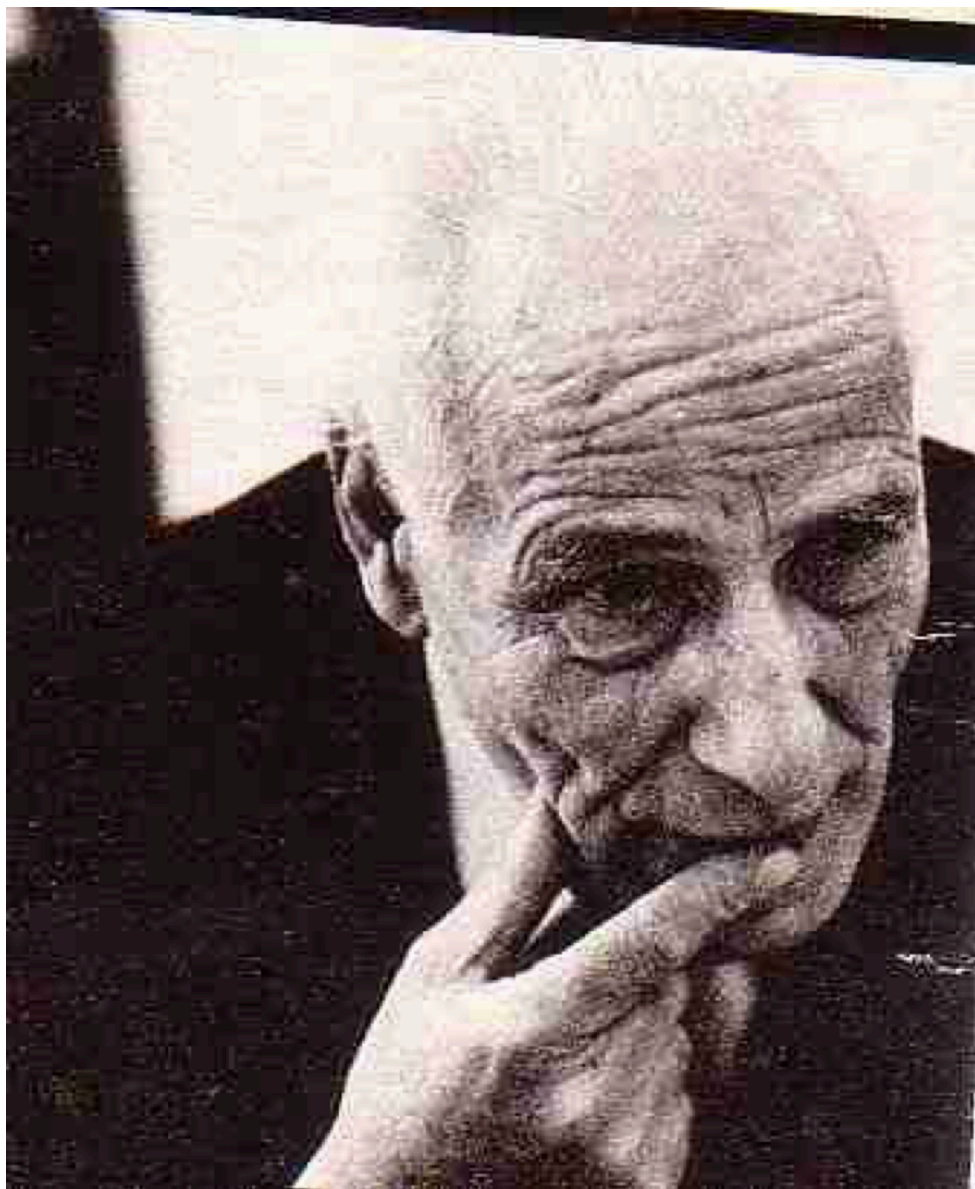
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**DIRECTORS OF THE COURSE: A. DIASPRO, M. DALLA SERRA, C. VIAPPANI**  
**DIRECTOR OF THE SCHOOL: A. ZICHICHI - EMFCS PRESIDENT A. ZICHICHI**



**Antonio Borsellino (Reggio Calabria, 11/6/1915 – Trieste, 23/11/1992)**