



Warsaw-4-PhD
Warsaw Doctoral School
in Natural and Biomedical Sciences



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IChF

Institute of Physical Chemistry PAS

Warsaw Doctoral School in Natural and Biomedical Sciences and the Institute of Physical Chemistry PAS cordially invites you to an **ADVANCED LECTURE SERIES – BIOLOGY-INSPIRED CHEMISTRY** talk.

***Amphiphilic molecular phototransducer
enable living cells photostimulation***

given by

dr. Vito Vurro

Università di Bologna, Dipartimento di Fisica e Astronomia, Bologna, Italy
Istituto Italiano di Tecnologia, Center for Nano Science and Technology,
Milano, Italy

on 27th November 2024, 10:00 at IChF Aula

Duration: 60 min + question time

Highly recommended to all Warsaw-4-Phd students!

Talk abstract:

Interacting with living cells has always been a challenging problem. The biological environment can be associated with an electrolyte in which the commonly used electrical signals tend to spread. Furthermore, contactless and wireless methods are extremely appealing due to their ability to leave unaltered the cell and tissue condition. Following this idea, light represents a clean and spatiotemporal precise tool to achieve effective bio-stimulation.^[1,2] Material-based light-transducers, such as conjugated molecules and macromolecules, have proven their efficacy at the interface with living cells and tissues. The interaction is possible thanks to the photophysics, biocompatibility and versatility in chemical synthesis of the molecular actuators.^[3–5] Exploiting a biomimicking approach a molecular phototransducer will be presented analysing both its photo/chemical properties and its ability to control cell activity. Finally as a case of study its application as a pacing tool will be presented validating this molecular phototransducer as an innovative tool for muscle cells contraction.

[1] Di Maria F, Lodola F, Zucchetti E, Benfenati F and Lanzani G 2018 The evolution of artificial light actuators in living systems: from planar to nanostructured interfaces *Chem. Soc. Rev.* **47** 4757–80

[2] Antognazza M R, Martino N, Ghezzi D, Feyen P, Colombo E, Endeman D, Benfenati F and Lanzani G 2015 Shedding Light on Living Cells *Adv. Mater.* **27** 7662–9

[3] Vurro V, Bondelli G, Sesti V, Lodola F, Paternò G M, Lanzani G and Bertarelli C 2021 Molecular Design of Amphiphilic Plasma Membrane-Targeted Azobenzenes for Nongenetic Optical Stimulation *Front. Mater.* **7** 631567

[4] Vurro V, Scaccabarozzi A D, Lodola F, Storti F, Marangi F, Ross A M, Paternò G M, Scotognella F, Criante L, Caironi M and Lanzani G 2020 A Polymer Blend Substrate for Skeletal Muscle Cells Alignment and Photostimulation *Adv Photo Res* 2000103

[5] Paternò G M, Colombo E, Vurro V, Lodola F, Cimò S, Sesti V, Molotokaite E, Bramini M, Ganzer L, Fazzi D, D'Andrea C, Benfenati F, Bertarelli C and Lanzani G 2020 Membrane Environment Enables Ultrafast Isomerization of Amphiphilic Azobenzene *Adv. Sci.* **7** 1903241

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