

# 1st Workshop

## APPLIED PHYSICS TO PPB-BASED ENVIRONMENTAL BIOTECHNOLOGY

25 APR, 2023 | SZEGED – HUNGARY

Resource recovery in the circular economy requires a complete waste treatment reorganization, mainly based on resource dissipation (denitrification, combustion, landfilling, etc.).

The **photosystem of PPB** has been used for biochemical applications, including enzyme-mediated photo-catalysis or photo-bioelectrochemical devices. It has been proved that PPB can be active as electron donors (microbial fuel cells) and electron acceptors (microbial electrosynthesis).

**The workshop is focused on two main topics:**

1. Biophysics of the light reactions of PPB: the capture of light, energy transfer and charge separation in the reaction centre.
2. Biophysics and metabolic mechanisms of the electron-bacteria interaction in bioelectrochemical systems. Development of specific conductive or semiconductive materials.



[purplegain.eu/1st-workshop](https://purplegain.eu/1st-workshop)

The workshop is organized by Prof. Péter Maróti (head of the local organizing committee), Dr. Ioanna Vasiliadou (Training Schools Coordinator), Dr. Baptiste Leroy (Working Group 1 Leader), Dr. Joana Fradinho (Vice Chair) and Dr. Daniel Puyol (Chair), in the frame of WG 1: Metabolic, biochemical, and biophysical mechanisms of PPB and mathematical models of the COST action (CA21146) – PURPLEGAIN.

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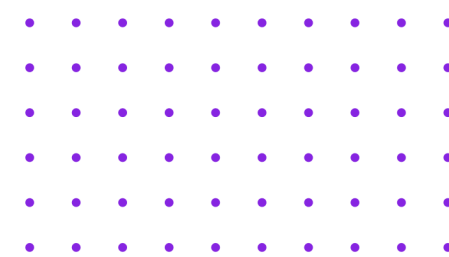
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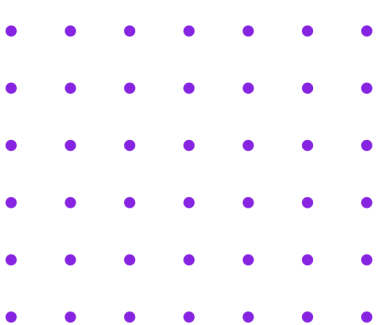
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# Program



Time	Type	Title	Speakers
8:30 – 9:00		<b>Registration</b>	
8:50 – 9:00		Welcome from the Local Organizer	Prof. <b>Péter Maróti</b>
<b>SESSION I: BIOPHYSICS OF THE LIGHT REACTIONS OF PURPLE PHOTOTROPHIC BACTERIA: CAPTURE OF LIGHT, ENERGY TRANSFER AND CHARGE SEPARATION IN THE REACTION CENTER.</b>			
9:00 – 10:00	Keynote	<b>The mighty power of photosynthesis. The legacy of Pinocchio</b>	Prof. <b>Massimo Trotta</b> (Istituto per i Processi Chimico Fisici – Consiglio Nazionale delle Ricerche, Bari, Italy)
10:00 – 10:30	Invited	Ultrafast optical spectroscopy techniques to study excitation energy and electron transfer in bacterial photosynthesis	Dr. <b>Petar Lambrev</b> (Institute of Plant Biology, Biological Research Center, Szeged, Hungary)
10:30 – 11:00	Invited	Application of advanced physical techniques to study short- and long-range dynamic properties of selected biological systems and local structural properties of nanomaterials.	Prof. <b>Kvetoslava Burda</b> (Department of Physics and Applied Computer Science, University of Science and Technology, Kraków, Poland)
11:00 – 11:20		<i>COFFEE BREAK</i>	
11:20 – 11:35	Platform	Phototrophic bacterium harvests light energy using both bacteriochlorophyll-containing photosystems as well as proton-pumping rhodopsins	<b>M. Koblížek</b> , K. Kopejtká, J. Tomasch, A. Gardiner, D. Kaftan, D. Bína, Z. Gardian
11:35 – 11:50	Platform	Implications of light-harvesting complexes structure loss by oxygen (bleaching) and their recovery (purpling) in purple phototrophic bacteria mixed cultures	<b>S. Chacón-Aparicio</b> , J. Villamil, D. García, M. Krupka, M. Velez, R. Molina & D. Puyol
11:50 – 12:05	Platform	Exciton transfer between LH1 antenna complex and photosynthetic reaction center dimer	<b>M. Pudlák</b> , R. Pinčák
12:05 – 12:20	Platform	Unveiling the Dynamics of Energy Dissipation in LH2 Antenna Complexes of Rhodospirillum rubrum: A Study of Soret Band Excitation and Carotenoid Response	<b>V. Kuznetsova</b> , I. Šímová, A.T. Gardiner, V. Šebelík, M. Koblížek, M. Fuciman, T. Polívka
12:20 – 12:30	Short	Donor side mutations reduce the turnover rate of the reaction center of photosynthetic purple bacteria	<b>M. Kis</b> , T. Szabó, J. Tandori, P. Maróti
12:30 – 12:40	Short	Importance of modelling the metabolic switch mechanisms to predict PPB growth	<b>A. Moradvandi</b> , A. Alloul, D. Weissbrodt, R.E.F. Lindeboom
12:40 – 14:00		<i>LUNCH BREAK</i>	
<b>SESSION II: BIOPHYSICS AND METABOLIC MECHANISMS OF THE ELECTRON-BACTERIA INTERACTION IN BIO(ELECTRO)CHEMICAL SYSTEMS. DEVELOPMENT OF SPECIFIC MATERIALS.</b>			
14:00 – 15:00	Keynote	<b>Purple phototrophs, electricity, and the circular economy</b>	Prof. <b>Arpita Bose</b> (Department of Biology, Washington, University of St Louis, USA)
15:00 – 15:30	Invited	Fine tuning the metabolism in Purple Phototrophic Bacteria: the use of planktonic electrochemistry	Prof. <b>Abraham Esteve-Núñez</b> (Bioe Group, Department of Analytical Chemistry, Physical Chemistry and Chemical Engineering, Universidad de Alcalá de Henares, Spain)
15:30 – 15:45	Platform	Surface characteristics impact bacterial adhesion	<b>K. Bohinc</b>
15:45 – 16:00	Platform	Photoelectroheterotrophic production of polyhydroxybutyrate (PHB) in purple phototrophic bacteria	<b>F. Muniesa-Merino</b> , C. Manchon, L. Generelo, and A. Esteve-Nuñez
16:00 – 16:15	Platform	Domesticating Purple Phototrophic Bacteria for Sustainable and Secure Protein Production Through the Photo-electro-biorefinery of Pig Manure	<b>A. Prado</b> , A. Ventura, Y. Segura, I. Pariente, M. Ventura, J. A. Melero, F. Martínez, D. Puyol
16:15 – 16:25	Short	Effect of Sodium Concentration and pH on Photofermentative Poly-hydroxybutyrate and Hydrogen Production via Rhodospirillum rubrum	<b>E. Hoşafcı</b> , H. Koku, T. Hande Ergüder
16:25 – 17:00		<i>COFFEE BREAK</i>	
<b>ROUND TABLE</b>			
17:00 – 18:30		<b>Application of PPB-based Technology to the Protection of the Environment</b>	Moderators: Dr. <b>Daniel Puyol</b> , Chair of the COST action and Prof. <b>Baptiste Leroy</b> , WG1 leader.



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