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

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.

Hotel Forrás Szeged
Szeged, Szent-Györgyi Albert u. 16-24, 6726 Hungary
+36 62 566 466

Funded by the European Union

cost EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY

COST (European Cooperation in Science and Technology) is a funding agency for research and innovation networks. Our Actions help connect research initiatives across Europe and enable scientists to grow their ideas by sharing them with their peers. This boosts their research, career and innovation.
www.cost.eu

COST ACTION
PurpleGain

Program

Time	Type	Title	Speakers
8:30 – 9:00		**Registration**	
8:50 – 9:00		Welcome from the Local Organizer	Prof. **Péter Maróti**
SESSION I: BIOPHYSICS OF THE LIGHT REACTIONS OF PURPLE PHOTOTROPHIC BACTERIA: CAPTURE OF LIGHT, ENERGY TRANSFER AND CHARGE SEPARATION IN THE REACTION CENTER.			
9:00 – 10:00	Keynote	**The mighty power of photosynthesis. The legacy of Pinocchio**	Prof. **Massimo Trotta** (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. **Petar Lambrev** (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. **Kvetoslava Burda** (Department of Physics and Applied Computer Science, University of Science and Technology, Kraków, Poland)
11:00 – 11:20		*COFFEE BREAK*	
11:20 – 11:35	Platform	Phototrophic bacterium harvests light energy using both bacteriochlorophyll-containing photosyntems as well as proton-pumping rhodopsins	**M. Koblížek**, K. Kopejtka, 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	**S. Chacón-Aparicio**, 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	**M. Pudlák**, R. Pinčák
12:05 – 12:20	Platform	Unveiling the Dynamics of Energy Dissipation in LH2 Antenna Complexes of Rhodoblastus acidophilus: A Study of Soret Band Excitation and Carotenoid Response	**V. Kuznetsova**, 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	**M. Kis**, T. Szabó, J. Tandori, P. Maróti
12:30 – 12:40	Short	Importance of modelling the metabolic switch mechanisms to predict PPB growth	**A. Moradvandi**, A. Alloul, D. Weissbrodt, R.E.F. Lindeboom
12:40 – 14:00		*LUNCH BREAK*	
SESSION II: BIOPHYSICS AND METABOLIC MECHANISMS OF THE ELECTRON-BACTERIA INTERACTION IN BIO(ELECTRO)CHEMICAL SYSTEMS. DEVELOPMENT OF SPECIFIC MATERIALS.			
14:00 – 15:00	Keynote	**Purple phototrophs, electricity, and the circular economy**	Prof. **Arpita Bose** (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. **Abraham Esteve-Núñez** (Bioe Group, Department of Analytical Chemistry, Physical Chemistry and Chemical Engineering, Universidad de Alcala de Henares, Spain)
15:30 – 15:45	Platform	Surface characteristics impact bacterial adhesion	**K. Bohinc**
15:45 – 16:00	Platform	Photoelectroheterotrophic production of polyhydroxybutyrate (PHB) in purple phototrophic bacteria	**F. Muniesa-Merino**, 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	**A. Prado**, 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 Rhodobacter capsulatus	**E. Hoşafcı**, H. Koku, T. Hande Ergüder
16:25 – 17:00		*COFFEE BREAK*	
ROUND TABLE			
17:00 – 18:30	**Application of PPB-based Technology to the Protection of the Environment**		Moderators: Dr. **Daniel Puyol**, Chair of the COST action and Prof. **Baptiste Leroy**, WG1 leader.

Hotel Forrás Szeged
Szeged, Szent-Györgyi Albert u. 16-24, 6726 Hungary
+36 62 566 466

Funded by the European Union

cost EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY

COST (European Cooperation in Science and Technology) is a funding agency for research and innovation networks. Our Actions help connect research initiatives across Europe and enable scientists to grow their ideas by sharing them with their peers. This boosts their research, career and innovation.
www.cost.eu

COST ACTION
PurpleGain