

## Report for cost summer school

COST action TD1102 entitled as Photosynthetic proteins for technological applications: biosensors and biochips (PHOTOTECH) began in November 2011 and will run until November 2015. The PHOTOTECH Action is aimed at European scientists that work towards the design and production of biosensors based on immobilised photosynthetic proteins. The first training school of this cost action was organized by Greece and held in Athens, Greece, at 21-25 October. The title of the training school was: “Phototech for Biosensors and Energy”, the program can be seen below:

### Monday October 21<sup>st</sup>

19:00 – 20:00	Reception	
20:00 – 21:00	Round Table	Introduction-Discussion
21:00-21:30	Cost Project description	Giuseppina Rea (invited)

### Tuesday October 22<sup>nd</sup>

#### *Energy production- Photosynthesis based photovoltaics and biomediators selection*

9:00-11:00	“Leaf-like materials capable of solar energy conversion by photosynthesis”	Bao Lian Su (invited)
11:00-11:30 Coffee break		
11:30-13:30	"Molecular biotechnologies improving the bioreceptorial properties of Photosystem II"	Giuseppina Rea (invited)
13:30-15:30 Lunch Break		
15:30-17:30	“Biosensors based on aptamers detection”	Giorgos Tsekenis (invited)
17:30- 17:50	“Bio-photovoltaics based on hybrid systems of reaction centers and diamond”	Roberta Caterino
17:50-18:10	“Construction of photovoltaic cells based on Rhodobacter sphaeroides reaction centers”	Rafal Bialek
18:10-18:30	“Screening of electricity producing profile of various photosynthetic microorganisms.”	Bilge Hilal Cadirci

### Wednesday October 23<sup>rd</sup>

#### *Biosensor manufacture*

9:00-11:00	“Introduction and overview of biosensors”	Ismael Hakki (invited)
11:00-11:30 Coffee break		
11:30-13:30	“Photosynthesis based biosensor”	E. Touloupakis (invited)
13:30-15:30 Lunch Break		

<b>15:30-16:30</b>	“Monolithic silicon interferometric optoelectronic platform for label-free multi-analyte biosensing applications”	<b>Ioannis Raptis (invited)</b>
<b>16:30-16:50</b>	“Photocurrent generated by photosynthetic reaction center/carbon nanotube/ITO bio-nanocomposite”	<b>Tibor Szabó</b>
<b>16:50-17:10</b>	“A new thiol-coated interface for the development of an aptasensor for lysozyme”	<b>Iuliana Mihai</b>
<b>17:10-17:30</b>	“Challenges in the development of an electrochemical (bio)sensor for allergen proteins detection”	<b>Alis Vezeanu</b>
<b>17:30-18:30</b> <b>Poster Session</b>		

**Thursday October 24<sup>th</sup>**  
***Biosensors characterisation***

<b>9:00-11:00</b>	“Characterising biosensors and biosolar cells as photovoltaic devices”	<b>Raoul Frese (invited)</b>
<b>11:00-11:30</b> <b>Coffee break</b>		
<b>11:30-13:30</b>	“Electron transfer in biophotovoltaic devices”	<b>Nicolas Plumere (invited)</b>

<b>13:30-15:30</b> <b>Lunch Break</b>		
<b>15:30-15:50</b>	“Full automation of a rapid screening test for early warning measurement of phytotoxicity in water samples based on photosynthetic algae”	<b>Annalisa Tortelli</b>
<b>15:50-16:10</b>	“Detection of harmful residues in honey using terahertz time-domain spectroscopy”	<b>Maria Massaouti</b>
<b>16:10-16:30</b>	“Sensitivity of a new 1,8-naphthalimide cation sensor as function of PET blocking and complex binding constant”	<b>Stanislava Yordanova</b>
<b>16:30-16:50</b>	“A polyphenol biosensor realized by laser printing technology”	<b>Marianneza Chatzipetrou</b>

**Friday October 25<sup>th</sup>**  
***Biomediators immobilisation processes for biosensors***

<b>9:00-10:00</b>	“Laser printing and immobilization of biomolecules”	<b>Ioanna Zergioti</b>
<b>10:00-10:30</b>	Marie Curie IAPP action “Laser Digital Micro-Nano fabrication for Organic Electronics and Sensor applications”	<b>Ioanna Zergioti</b>
<b>10:30-11:00</b> <b>Coffee Break</b>		
<b>11:00-12:00</b>	“Efficient immobilization of biomolecules on chemically and topographically modified substrates”	<b>Aggeliki Tserepi (invited)</b>

The first training school had 10 trainers, from which 9 oral presentations were invited and 21 trainees. 27 Scholarships were given for both trainers and trainees. The program of the training school was divided in three main sections, |

- *Energy production, photosynthesis based photovoltaics & biomediators selection*

The trainees had the chance to learn from experts in the photosynthesis field of science, how biomaterials that can perform the photosynthesis, like proteins or bacteria, can be used for photovoltaic devices or as biomediators for sensing devices. Photosynthesis is a procedure of changing solar energy to chemical energy. The activity of biomaterials that perform photosynthesis when integrated with non-biological electronic components can be monitored through their highly distinctive absorbance and fluorescence properties. This ability of some biomaterials to perform photosynthesis, has increased the scientific interest of using these biomaterials in biochips.

- *Biosensors characterization*

The trainees had the chance to learn about the different type of transducers and biorecognition elements that can be used for the manufacture of a biosensor. This section was not only focused on photosynthetic materials, but also on novel biomaterials like aptamers.

- *Biomediators immobilisation processes for biosensors*

The trainees in this section learned about novel immobilization of biomaterials, techniques. The immobilization of biomaterials is a matter of high importance, for the development of biosensors, since it is one of the main aspects related to the stability of the biosensor.

The above aspects that describe the program of the first training school, covered most of the part that a trainee should know about the biosensing devices. The trainees were satisfied by the lecture of this training school and also had the chance to present their scientific expertise through oral or poster presentations.

Below, some pictures of the oral and poster sessions can be seen.



*Figure 1: Dr. Ioanna Zergioti, Organizer of the first training school*



*Figure 2: Dr. Giuseppina Rea, coordinator of this COST action*



*Figure 3: Dr. Bao Lian Su, invited speaker*



*Figure 4: Dr. Eleftherios Touloupakis, invited speaker*



*Figure 5: Dr. Nicolas Plumere, invited speaker*



*Figure 6: Dr. George Tsekenis, invited speaker*



*Figure 7: Picture of poster session*