ISOCS Winter Short Course
March 15-20, 2013 – Sporthotel, Kuhtai, Austria

Biosensors and Biomimetics - Inspired by Nature

Technical Programme

Overview

One of the first examples of biomimetics is invention of velcro. Swiss engineer George de Mestral was inspired by examining burs plucked from his dog's coat. With their spikes tipped with tiny hooks they were sticking so firmly to the dog's fur – inspiring the invention of velcro. His invention found applications in the first artificial heart surgery and on trips into space.

The ISOCS Short Course will explore the area of Biomimetics – the science of adapting designs from nature to solve technological problems. The applications of biomimetic can range from aotomotive research, robotics, material science, biomedical and molecular engineering. During the course we will focus on applications in biosenssing and bioengineering. Special attention will be given to biosensors and their role within biomimetics. We have put together an exciting program which will provide attendees with both theoretical background and practical experience in the areas of biomimetics and biosensors.

The Short Course consists of lectures in the morning and the demonstrations and case studies in the evening during which attendees will be shown some applications of biosensors and biomimetic systems and will be taken through some design examples.

The Short Course is ideal for anyone with an interest in biosensors & biomimetic systems and is new to the field; for example, PhD students, researchers, technologists and industrialists.

School Directors:	Dr Marina Cole Prof Krishna Persaud	University of Warwick, UK Manchester University, UK
Additional Lecturers:	Dr Zoltan Racz Dr Shannon Olsson	University of Warwick, UK Max Planck Institute for Chemical Ecology, Germany
Demo supervisors:	Dr Zoltan Racz	University of Warwick, UK
School organizer:	Dr Marina Cole	University of Warwick, UK

For further information visit: **www.olfactionsociety.org/** or contact course organiser Dr Marina Cole (Marina.Cole@warwick.ac.uk)

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Schedule

Friday 15 March

17:00 – 18:30	Registration and Welcome reception	
19:30	Dinner	

Saturday 16 March

1. Introduction to biomimetics

Morning Session: ***Theory***

08:30 – 09:30	Introduction to Biomimetics	**Marina Cole**
09:30 – 10:00	Coffee break	
10:00 – 11:00	Inspiration from nature: Invertebrates	**Shannon Olsson**
11:00 – 12:00	Inspiration from nature: Vertebrates	**Krishna Persaud**
12:00	Lunch	

Evening Session: ***Demos (Zoltan and Shannon)***

17:30 – 19:30	iCHEM demo with bombyx mori and robots (possibly just video)	
20:00	Dinner	

Sunday 17 March

2. Biosensors I – Transduction

Morning Session: ***Theory***

08:30 – 09:30	Electrochemical biosensors	**Krishna Persaud**
09:30 – 09:50	Coffee break	
09:50 – 10:50	Optical biosensors	**Zoltan Racz**
10:50 – 11:50	Resonant biosensors	**Marina Cole**
12:00	Lunch	

Evening Session: ***Demos (Zoltan+Krishna)***

17:30 – 19:30	Examples of SAW and Electrochemical biosensors	
20:00	Dinner	

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Monday 18 March

3. Biosensors II – whole cell based biosensors

Morning Session: ***Theory***

08:30 – 09:30	Cell Based Biosensors and Systems	**Marina Cole**
09:30 – 09:50	Coffee break	
09:50 – 10:50	Immobilization techniques and cells viability monitoring	**Krishna Persaud**
10:50 – 11:50	Practical applications of cell based systems (environmental monitoring)	**Krishna Persaud**
12:00	Lunch	

Evening Session: ***Biomimetics practical examples (Krishna Persaud)***

17:30 – 19:30	Mimicking nature's noses – olfactory biosensing
20:00	Social Dinner

Tuesday 19 March

4. Biosensors signals and data processing

Morning Session: ***Theory***

08:30 – 09:30	Biosensors Interface Circuits and Signal Processing	**Zoltan Racz**
09:30 – 09:50	Coffee break	
09:50 – 10:50	Introduction to Data Processing	**Zoltan Racz**
10:50 – 11:50	Modelling of Biological Systems (could include some models such as Tim's for iCHEM)	**Shannon Olsson**
12:00	Lunch	

Evening Session: ***Biomimetics Case Studies (Shannon Olsson)***

17:30 – 19:30	What can biology and engineering teach each other?
20:00	Dinner

Wednesday 20 March

5. Open Discussion

09:30 – 11:30	Future trends and challenges in Biosensors and Biomimetics
12:00	Lunch and end of ISOCS School