

**Smart Circuits, Systems and Micro-technologies for
Chemical and Biological Sensing**

Technical Programme

Overview

The School explores the area of Smart Circuits, Systems and Microtechnologies for Chemical and Biological Sensing. We have put together an exciting program which will provide attendees with both theoretical background and practical experience in the above areas.

The School will cover basic concepts of microelectronics and micromachining fabrication techniques necessary for successful realisation of Smart Sensors and Sensor Systems in general, moving onto the specific Smart Chemical Sensor Systems and Smart Biosensors. The examples are ranging from CMOS-based chemical sensors and integrated biosensors to Lab-on-a-chip and organism based biosensors.

The School consists of lectures in the morning and the laboratories/demonstrations in the evening during which attendees will be shown some applications of smart sensors and will be taken through some design and simulation examples.

The School is ideal for anyone with an interest in smart sensors & systems and is new to the field; for example, PhD students, researchers, technologists and industrialists. The computing laboratories do not need a high performance computer and can be carried out on a basic laptop or personal computer running the windows operating system.

School Directors:	Prof Florin Udrea Dr Marina Cole	University of Cambridge, UK University of Warwick, UK
Additional Lecturers:	Prof Krishna Persaud Prof Julian Gardner Dr Jan Mitrovics	University of Manchester, UK University of Warwick, UK JLM Innovation, Germany
Laboratory supervisors:	Dr Mohamed Chowdhury Dr Zoltan Racz	University of Cambridge, UK University of Warwick, UK
School organizer:	Mrs Vicki Flower	University of Warwick, UK

For further information visit: www.olfactionsociety.org/

Schedule

Thursday 25th March

16:00 – 18:00	Registration and laptop preparation
18:00 – 20:00	Welcome Reception
20:00	Dinner

Friday 26th March

1. Introduction to sensors and data handling

Morning Session: Theory

08:30 – 09:30	Introduction to Smart sensors and State-of-the-art	Marina Cole
09:30 – 09:50	Coffee break	
09:50 – 10:50	Interface circuitry and signal processing	Marina Cole
10:50 – 11:50	Smart sensor data processing	Jan Mitrovics
12:00	Lunch	

Evening Session: Computer Lab

17:30 – 19:30	Design and simulation examples (Jan Mitrovics and Foyzol Chowdhury)
20:00	Dinner

Saturday 27th March

2. Microelectronics and Sensing Technologies

Morning Session: Theory

08:30 – 09:30	Introduction to microelectronics	Florin Udrea
09:30 – 09:50	Coffee break	
09:50 – 10:50	Micromachining fabrication techniques	Florin Udrea
10:50 – 11:50	Sensing materials technologies	Julian Gardner
12:00	Lunch	

Evening Session: Computer Lab

17:30 – 19:30	Fabrication examples of smart sensor microsystems and modelling of smart sensors (Foyzol Chowdhury and Zoltan Racz)
20:00	Dinner

Sunday 28th March

3. Smart chemical sensor systems

Morning Session: Theory

08:30 – 09:30	CMOS based chemical sensors	Florin Udrea
09:30 – 09:50	Coffee break	
09:50 – 10:50	Electronic nose and Electronic tongue technologies	Marina Cole
10:50 – 11:50	Sensors networks and IEEE 1451 standard	Jan Mitrovics
12:00	Lunch	

Evening Session: Computer Lab

17:30 – 19:30	E-nose and E-tongue examples (Foysoyl Chowdhury and Zoltan Racz)
20:00	Dinner

Monday 29th March

4. Smart biosensors and biomimetics

Morning Session: Theory

08:30 – 09:30	Integrated biosensors and bioelectronic Microsystems in CMOS	Julian Gardner
09:30 – 09:50	Coffee break	
09:50 – 10:50	Lab-on-a-chip	Julian Gardner
10:50 – 11:50	Organisms and cell based biosensors	Krishna Persaud
12:00	Lunch	

Evening Session: Computer Lab

17:30 – 19:30	Examples of biological Microsystems (Krishna Persaud and Zoltan Racz)
20:00	Social Dinner

Tuesday 30th March

5. Future trends, commercial opportunities and case studies

Morning Session: Theory

08:30 – 09:30	Future trends and market opportunities	Krishna Persaud
09:30 – 09:50	Coffee break	
09:50 – 10:50	Industrial case study I	Jan Mitrovics
10:50 – 11:50	Industrial case study II	Krishna Persaud
11:50 – 12:00	Concluding remarks and farewell	Marina Cole
12:00	Lunch and end of ISOCS School	

School organiser: Mrs Vicki Flower, V.Flower@warwick.ac.uk