

ISOCS Winter School 2024

“Chemical Sensing for Biomedical Applications: from a proof of concept to a medical device”

DAY 0 (Sun, 14 Jan 2024)

AFTER DINNER: 21:00

Saverio De Vito (ENEA, President of ISOCS, ITALY)

Welcome to participants and presentation of ISOCS

Laura Capelli (Politecnico di Milano, ITALY)

Outline and organization of the school

DAY 1 (Mon, 15 Jan 2024): Translating technologies to biomedical applications

MORNING SESSION: 8:30-12:30

8:30-9:00: Corrado Di Natale (Università di Roma Tor Vergata, ITALY)

Chemical sensing for biomedical applications for the development of innovative and non-invasive diagnostic methods

9:00-11:00: Raffaele Dellaca' and Chiara Veneroni (Politecnico di Milano, ITALY)

Translating technologies to biomedical applications

11:00-11:30: BREAK

11:30-12:30: Alessandro Gobbi (Restech, ITALY):

Regulatory aspects of medical devices – Part 1

12:30-13:30: LUNCH

AFTERNOON SESSION: 17:30-19:30

17:30-18:00: Alessandro Gobbi (Restech, ITALY)

Regulatory aspects of medical devices – Part 2

18:00-19:00: Raffaele Dellaca', Chiara Veneroni, Carmen Bax, Stefano Robbiani (Politecnico di Milano, Restech, ITALY), Fabio Di Francesco, Federico Vivaldi (Università di Pisa, ITALY)

Presentation of the group project activities: introduction; description of the different clinical applications, definition of the groups

19:00-19:30: Raffaele Dellaca', Chiara Veneroni, (Politecnico di Milano, Restech, ITALY), ALL

Start of group projects work

DAY 2 (Tue, 16 Jan 2024): Sampling, storage and analysis of biological fluids: what you should take care of

MORNING SESSION: 8:30-12:30

8:30-9:00: Fabio Di Francesco (Università di Pisa, ITALY)

Challenges in chemical sensing: filling the gap between research and clinical applications

9:00-10:15: Jonathan Beauchamp (Fraunhofer Institute for Process Engineering and Packaging, GERMANY)

Analysing volatiles in exhaled breath: challenges and considerations

10:15-10:45: BREAK

10:45-12:00: Tommaso Lomonaco (Università di Pisa, ITALY)

Specific challenges associated to urine headspace analysis:

12:30-13:30: LUNCH

AFTERNOON SESSION: 17:30-20:00

17:30-19:30: Fabio Di Francesco (Università di Pisa, ITALY)

Multivariate calibration: brief theory and practice

DAY 3 (Wed, 17 Jan 2024): Calibration of high order chemical sensor systems

MORNING SESSION: 8:30-12:30

8:30-9:00: Santiago Marco (Inst. for Bioengineering of Catalonia - IBEC, Univ. of Barcelona – UB, SPAIN)

The importance of calibration development and maintenance in the deployment of higher-order chemical sensor systems

9:00-10:00: Fengchun Tian (Chongqing University, CHINA):

Optimal selection of calibrants and calibration of electronic nose

10:00-10:30: BREAK

10:30-11:30 Jordi Fonollosa (Polytechnical University of Catalonia – UPC, SPAIN)

Approaches to improve sensor systems reliability and Classical Methods in Calibration Transfer

11:30-12:30: Lei Zhang (Chongqing University, CHINA)

Transfer learning algorithms for chemical sensor arrays

12:30-13:30: LUNCH

AFTERNOON SESSION: 17:30-20:00

17:30-19:30: Luis Fernández (Inst. for Bioengineering of Catalonia - IBEC, Univ. of Barcelona – UB, SPAIN)

Computational Exercise on Data processing & calibration transfer

DAY 4 (Thu, 18 Jan 2024): Examples of high-TRL projects of chemical sensing systems for healthcare applications

MORNING SESSION: 8:30-12:30

8:30-9:00: Marcis Leja (University of Latvia, LATVIA)

Introducing new approaches for cancer screening. The example of colorectal cancer

9:00-10:00: Sascha Kreuer (Saarland University Medical Center and Saarland University Faculty of Medicine, GERMANY)

Measuring Exhaled Propofol from the Lab to a Medical Device - A long and expensive Journey

10:00-10:20: Christian Bur (Saarland University, GERMANY)

Measuring Propofol in an ex vivo lung model with MOS gas sensors

10:20-10:50: BREAK

10:50-11:50: Marcis Leja (University of Latvia, LATVIA)

Lessons learned from clinical studies in breath analysis for cancer detection

12:30-13:30: LUNCH

AFTERNOON SESSION: 17:30-20:00

17:30-18:15: Carmen Bax (Politecnico di Milano, ITALY)

Challenges in the development of an e-nose for the diagnosis of prostate cancer: focus on the management of interferences, drift and calibration transfer

18:15-19:00: Anne-Claude Romain (University of Liège, BELGIUM)

From Environmental Monitoring to Breath Analysis: Leveraging Sensor Networks for Healthcare - Lessons from the PATHACOV project

19:00-19:45: Jan Mitrovics (JLM Innovation, GERMANY)

From LCAOS to VOGAS, experiences of 12 years, 5 research projects and clinical studies on 3 continents with breath analysis devices.

DAY 5 (Fri, 19 Jan 2024): Group projects presentation

MORNING SESSION: 9:00-12:30

9:00-9:15: Raffaele Dellaca' (Politecnico di Milano, ITALY)

Introduction to the group project works

9:15-9:45: GROUP 1

Presentation of 1st clinical application

9:45-10:15: GROUP 2

Presentation of 2nd clinical application

10:15-10:45: BREAK

10:45-11:15: GROUP 3

Presentation of 1st clinical application

11:15-11:45: GROUP 4

Presentation of 2nd clinical application

11:45-12:30: Raffaele Dellaca', Saverio De Vito, Laura Capelli

Final discussion and closing