

NEAR INFRARED HYPERSPECTRAL IMAGING

This course is organized into 4 sessions (2 hours each):

Hyperspectral image acquisition, pre-processing and data selection - Standard approaches and configurations for obtaining hyperspectral imaging data, spatial and spectral pre-processing methods and methods of data selection for further development of chemometric models will be introduced and compared.

Basic chemometrics applied to Hyperspectral images - The extension of traditional chemometric tools (e.g. PCA, PLS, MCR) to hyperspectral data will be presented.

Hands on hyperspectral image analysis using R/Matlab - The participants will be given a set of hyperspectral data to explore using chemometric tools developed in Matlab or R.

Advanced topics – Recently, a number of novel HSI classification methods have been presented that take the spatial information into account. We will discuss the relative benefits and potential pitfalls of integrating spatial information into classification models in classification of NIR chemical images through presentation of several exemplary cases.

Integration of NIR-HSI in real-time frameworks. Study of the feasibility of wavelengths selection methods to narrow down the useful wavelength range in continuous hyperspectral devices. Adaptation of continuous spectral measurements to filter-based or LED-based hyperspectral machines. Implementation of tailored statistic parameters to assess the fulfilment of the quality standards required by the industry. Automation to real-time industrial framework.

Requirements: Basic knowledge of chemometrics: PCA and PLS. Basic knowledge of Matlab or R software. Attendees are required to bring laptop with Matlab or R installed.

**Schedule: 8 am – 12 am
13:30 pm – 17:30 pm
(October 18, 2015)**

TRAINER PROFILE



José Manuel Amigo (born 1978) obtained his Ph.D. (Cum Laude) in Chemistry from the Autonomous University of Barcelona, Spain. Since 2007 he has been employed at the Department of Food Science, Spectroscopy and Chemometrics group of the University of Copenhagen, Denmark as associated professor. Current research interests include hyperspectral analysis, process analytical technologies and Chemometrics.

He has authored more than 70 publications (57 peer-reviewed papers, books, book chapters, proceedings, etc.) and given more than 40 conferences in international meetings. José has supervised or is currently supervising 7 masters, post docs and Ph.D. students and he is an editorial board member of four scientific journals within chemometrics, pharmaceutical sciences and analytical chemistry. He has recently received the “2014 Chemometrics and Intelligent Laboratory Systems Award”.

Aoife Gowen is a senior lecturer in the UCD School of Biosystems Engineering. Her research area is multidisciplinary, involving applications of sensor technology and chemometrics to biological systems, including food quality monitoring. Since 2007, she has published over 30 peer-reviewed papers in the field of hyperspectral imaging. These include new techniques to apply variable selection and optimize predictive model performance in hyperspectral image analysis. She has been the imaging editor for NIRNews since 2010.

