

IASIM 6th conference in spectral imaging

Chamonix-Mont-Blanc, France

July 3-6, 2016



SUNDAY JULY 3		MONDAY JULY 4	TUESDAY JULY 5	WEDNESDAY JULY 6
13:00	REGISTRATION	08:30 PLENARY 1 Y. Garini Bar Ilan University	08:30 PLENARY 3 G. A. Licciardi GIPSA-lab, Grenoble INP	
13:45	Topic 1: Spatial data for curve resolution, clustering and imaging A. de Juan University of Barcelona	09:10 O1: R. Riesenberg Leibniz Inst. of Photonic Tech.	09:10 O12: J. Fortuna Norwegian Univ. of Sc. and Tech.	09:20 PLENARY 5 L. Ashton Lancaster University
	Topic 2: Replacing lab imaging by field imaging: standards, spatial and spectral resolution P. Geladi	09:30 O2: D. Eyllenhosh Gembloux Agro-Bio Tech	09:30 O13: S. Hugelier Université de Lille	10:00 Sponsor presentation Coffee Break
16:45	Swedish Agric. Univ., Umeå	09:50 Sponsor presentation Coffee Break	09:50 Sponsor presentation Coffee Break	11:00 Session 5. Spectral and multicolor imaging in biology
17:00	OPENING	10:40 O3: S. Mukherjee University College Dublin	10:40 O14: S. Kucheryavskiy Aalborg University	10:30 O22: T. Bocklitz Abbe Center of Photonics, Jena
	TOPICAL TALK B. Leblon Univ. New Brunswick	11:00 O4: J. Romann Norwegian Univ. of Sc. and Tech.	11:00 O15: F. Marini University of Rome, La Sapienza"	10:50 O23: W. Vandenberg University of Leuven
18:00	WO1: R. Calvini University of Modena	11:20 O5: N. Al Makdessi IRSTEA, ITAP, Montpellier	11:20 O16: J. Jacques Université de Lyon	11:10 O24: M. Marro ICFO, Barcelona
18:20	WO2: T-L. Kammies Stellenbosch University	11:40 Sponsor Presentation Lunch	11:40 Sponsor Presentation Poster Session	11:30 O25: M-F. Devaux BIA, INRA Nantes
18:40	WO3: R. Vitale Universitat Politècnica de València	13:20 PLENARY 2 F. Jamme Synchrotron SOLEIL	13:20 PLENARY 4 J. M. Amigo University of Copenhagen	11:50 O26: B. Park U. S. Dpt. of Agriculture, Athens
19:00	Get together Savoyard buffet	14:00 O6: F.G. France Library of Congress, Washington	14:00 PLENARY 4 J. M. Amigo University of Copenhagen	12:10 Closing Lunch
		14:20 O7: R. Le Penglau LAPA-IRAMAT, Paris-Saclay	14:40 O17: J-L. Xu University College Dublin	13:30
		14:40 Sponsor presentation Coffe break at Planpraz (2000m)	15:00 O18: T. Scherzer Leibniz Institut. of Surface Modif.	IASIM AT THE TOP Post-Conference Excursion
		17:00 O8: A. Polak University of Strathclyde	15:20 Sponsor Presentation Coffee break	Aiguille du midi Montenvers
		17:20 O9: D. Vincke Walloon Agric. Res. Centre	16:00 O19: N. Caporaso University of Nottingham	
		17:40 O10: A. Mendys National Museum Cracow	16:20 O20: I. Burud Norwegian Univ. of Life Sciences	
		18:00 O11: J. Linderholm Umeå University	16:40 O21: N.B. Gallagher Eigenvector Research	17:00
		18:30 Cristal Museum	17:00 DATA SHOOT OUT SESSION N.B. Gallagher	
			18:00	
			20:00 Gala Dinner at "La Télécabine"	





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CONFERENCE PROGRAM



6th Conference in spectral imaging
July 3-6, 2016

Sunday July 3, 2016 (Afternoon)

13:00 - 17:00 Registration

Pre-conference Workshop (Chair: S. Kucheryavskiy)

Topic 1: Spatial data for curve resolution, clustering and imaging

A.de Juan

Department of Analytical Chemistry, University of Barcelona, Spain

14:00 - 17:00

**Topic 2: Replacing lab imaging by field imaging:
standards, spatial and spectral resolution**

P. Geladi

Biomass Technology and Chemistry, Swedish Agricultural Univ., Umeå, Sweden

Opening and topical talk

17:00 - 17:10 Opening

[TT] **Topical Talk : overview on sensing technologies for real-time monitoring of wood properties**

17:10 - 18:00

B. Leblon

Faculty of Forestry & Environmental Management, Univ. New Brunswick, Canada

Student award session from Groupe Français de Chimométrie (GFC) (Chair: L. Duponchel)

[WO1] **Sparse-based exploration of hyperspectral images**

18:00 - 18:20 R. Calvini, J.M. Amigo, A. Ulrici

Department of Life Sciences, University of Modena and Reggio Emilia, Italy

[WO2] **Using NIR hyperspectral imaging for the detection and differentiation of pathogenic bacteria**

18:20 - 18:40 T-L. Kammies, M. Manley, P.A. Gouws, P.J. Williams

Department of Food Science, Stellenbosch University, South Africa

[WO3] **A comprehensive comparison of different RGB image segmentation techniques**

18:40 - 19:00

R. Vitale, J.M. Prats-Montalbán, F. López-García, J. Blasco, A. Ferrer

Dept. de Estadística e Investigación Operativa Aplicadas..., Univ. València, Spain

19:00

Get together Savoyard Buffet (Majestic Congress Centre)



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Monday July 4, 2016 (Morning)

Plenary 1

08:30 - 09:10 [PL1] **Rapid microscopy measurement of very large spectral images**
Y. Garini
Physics Department and Institute of Nanotechnology, Bar Ilan University, Israel

Session 1: Instrumentation and Methods (Chair C. Ruckebusch)

09:10 - 09:30 [O1] **Compact hyperspectral imager**
R. Riesenberger, A. Wuttig, A. Grjasnow, M. Kanka, M. Nimmer, U. Hübner
Leibniz Institute of Photonic Technology, Jena, Germany

09:30 - 09:50 [O2] **Lifetime stability study of a NIR hyperspectral imaging system**
D. Eylenbosch, J.A. Fernández Pierna, V. Baeten, B. Bodson
AgroBioChem Department, Gembloux Agro-Bio Tech, Liège University, Belgium

09:50 - 10:10 *Sponsor presentation by Agilent and Bruker*

10:10 - 10:40 *Coffee break*

10:40 - 11:00 [O3] **Can ATR-FTIR be used to understand the interaction between HDMSO coated silicon wafers and water? A hyperspectral imaging study**
S. Mukherjee, J.A. Martinez-Gonzalez, A. Gowen
School of Biosystems and Food Engineering, University College Dublin, Ireland

11:00 - 11:20 [O4] **Hyperspectral analysis of optical effects generated by diatom frustules**
J. Romann, J.-C. Valmalette, Matilde Skogen Chauton, Olav Vadstein, M.A. Einarsrud
Norwegian University of Science and Technology (NTNU), Trondheim, Norway

11:20 - 11:40 [O5] **A simulation study of light propagation in 3D virtual wheat scenes at the plant scale**
N. Al Makdessi, G. Rabatel, N. Gorretta, E. Martin, P. Roumet
IRSTEA, UMR ITAP, Montpellier, France

11:40 - 12:00 *Sponsor Presentation by Specim and Hypspec*

12:00 - 13:20 *Lunch break*

Monday July 4, 2016 (Afternoon)

Plenary 2

13:20 - 14:00 [PL2] **Synchrotron light for spectral imaging**
F. Jamme
Synchrotron SOLEIL, Gif-sur-Yvette, France

Session 2: Art and Cultural heritage (Chair P. Oliveri)

14:00 - 14:20 [O6] **Spectral imaging and processing for cultural heritage**
F.G. France
Preservation Research and Testing Division, Library of Congress, Washington, USA

14:20 - 14:40 [O7] **Description of archaeological corrosion layers thanks to multivariate analysis**
R. Le Penglau, M. Bouhier, D. Neff
LAPA-IRAMAT, CEA, CNRS, Université Paris-Saclay, France

14:40 - 15:00 *Presentation by Bimrose and Headwall*

15:00 - 17:00 *Coffee break at La Bergerie de Planpraz (2000 m)*

17:00 - 17:20 [O8] **Use of hyperspectral imaging for artwork authentication**
A. Polak, T. Kelman, P. Murray, S. Marshall, D. J. M. Stothard, N. Eastaugh, F. Eastaugh
Centre for Signal & Image Processing, University of Strathclyde, United Kingdom

17:20 - 17:40 [O9] **Sorting of archaeological bones and characterisation of collagen content using NIR Hyperspectral Imaging and Chemometrics**
D. Vincke, R. Miller, E. Stassart, M. Otte, P. Dardenne, M. Collins, K. Wilkinson, J. Stewart, V. A. Fernández Pierna
Dept. of Valorisation of Agricultural Products, Walloon Agric. Res. Centre, Belgium

17:40 - 18:00 [O10] **Hyperspectral imaging in the investigations of the pastel drawings on a paper substrate**
A. Mendys, A. Marecka, J. Sobczyk
Lab. of Analysis & Investi. of Heritage Objects, National Museum Cracow, Poland

18:00 - 18:20 [O11] **Field NIR imaging in archaeology and related topics (geology, forensics etc) - Challenges and solutions**
J. Linderholm, P. Geladi, C. Sciuto
Environmental Archaeology Laboratory, Umeå University, Sweden

18:30 *Cocktail at the Cristal Museum*



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Tuesday July 5, 2016 (Morning)

Plenary 3

08:30 - 09:10 [PL3] **NLPCA applications for the spectral compression and denoising of multivariate images**
G. A. Licciardi
GIPSA-lab, Grenoble INP, France

Session 3: Chemometrics, Data & Image Processing (Chair: A. De Juan)

09:10 - 09:30 [O12] **Multivariate data modelling for de-shadowing of airborne hyperspectral imaging**
J. Fortuna, H. Martens
Centre for Autonomous Marine Operations and Systems, NTNU, Norway

09:30 - 09:50 [O13] **Implementation of image processing as spatial constraints in MCR-ALS of hyperspectral images**
S. Hugelier, O. Devos, C. Ruckebusch, A. De Juan
LASIR, Université de Lille - Sciences et Technologies, France

09:50 - 10:10 *Sponsor Presentation by Videometer and Silios*

10:10 - 10:40 *Coffee break*

10:40 - 11:00 [O14] **Classification of objects on hyperspectral images — further method development**
S. Kucheryavskiy, P. William
Section for Chemistry and Bioscience, Aalborg University, Esbjerg, Denmark

11:00 - 11:20 [O15] **Chemometrics under a new light: using hyperspectral imaging for model and hypotheses validation**
F. Marini
Department of Chemistry, University of Rome, La Sapienza, Italy

11:20 - 11:40 [O16] **Coclustering for hyperspectral images**
J. Jacques, C. Ruckebusch
ERIC, Université de Lyon, Lumière, Bron, France

11:40 - 12:00 *Sponsor Presentation by Acal BFI and Eigenvector*

12:00 - 14:00 *Poster Session Lunch*

Tuesday July 5, 2016 (Afternoon)

Plenary 4

14:00 - 14:40 [PL4] **Hyperspectral imaging in industrial setups. Adaptation and implementation**
J. M. Amigo
Department of Food Sciences, University of Copenhagen, Denmark

Session 4: Hyperspectral imaging in characterization and quality control (Chair F. Marini)

14:40 - 15:00 [O17] **Automatic differentiation of organically and conventionally farmed salmon using hyperspectral imaging**
J.-L. Xu, D-W. Sun
School of Biosystems and Food Engineering, University College Dublin, Ireland

15:00 - 15:20 [O18] **Hyperspectral imaging used for in-line monitoring in textile technology**
G. Mirschel, O. Daikos, T. Scherzer, C. Steckert
Leibniz Institute of Surface Modification, Chemical Department, Leipzig, Germany

15:20 - 15:40 *Sponsor Presentation by Polytec and LLA Instruments*

15:40 - 16:00 *Coffee break*

16:00 - 16:20 [O19] **Application of calibrations to hyperspectral images of food grains: example for wheat falling number**
N. Caporaso, M.B. Whitworth, I.D. Fisk
Division of Food Sciences, The University of Nottingham, United Kingdom

16:20 - 16:40 [O20] **Hyperspectral photoluminescence imaging of defects in solar cells**
I. Burud, T. mehl, E. Olsen
Dept. of Mathematical Sc. & Tech., Norwegian University of Life Sciences, Norway

16:40 - 17:00 [O21] **Depth profile characterization of layered materials using ToFSIMS hyperspectral imaging coupled with sputtering**
D. Graham, N.B. Gallagher, M. Linford
Eigenvector Research, Manson, WA, USA

17:00 - 18:00 **Data Shoot Out Session** (Chair N. Gallagher)

20:00 *Gala Dinner at "La Télécabine"*



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Wednesday July 6, 2016 (Morning)

Plenary 5

09:20 - 10:00 [PL5] **Making colourful sense of Raman images of single cells**
L. Ashton
Department of Chemistry, Lancaster University, United Kingdom

10:00 - 10:10 *Sponsor Presentation by Bonsai Advanced*

10:10 - 10:30 *Coffee break*

Session 5: Spectral and multicolor imaging in biology (Chair: B. Park)

10:30 - 10:50 [O22] **Computational methods for combining Raman-spectroscopic and MALDI-MS-spectrometric imaging**
T. Bocklitz, K. Bräutigam, G. Ernst, F. von Eggeling, O. Guntinas-Lichius, J. Popp
Institute of Physical Chemistry and Abbe Center of Photonics, Jena, Germany

10:50 - 11:10 [O23] **Multi-label super-resolution imaging without chromatic aberrations**
W. Vandenberg, S. Duwé, V. Gielen, P. Dedecker
Department of Chemistry, University of Leuven, Belgium

11:10 - 11:30 [O24] **Molecular monitoring of biomedical samples by Raman imaging and chemometrics**
M. Marro, P. Loza-Alvarez
ICFO-Institut de Ciències Fotoniques, Barcelona, Spain

11:30 - 11:50 [O25] **A time lapse localization of enzyme and modifications of plant cell walls by synchrotron autofluorescence imaging and infrared microspectroscopy**
M-F. Devaux, F. Jamme, W. André, E. Bonnin, B. Bouchet, C. Alvarado, S. Durand, P. Robert, L. Saulnier, F. Guillon
UR1268 BIA, INRA Nantes, France

11:50 - 12:10 [O26] **Hyperspectral microscope imaging for pathogenic bacteria identification with morphological and scattering features**
B. Park, M. Eady, Y.W. Seo, S.C. Yoon, K.C. Lawrence, G.R. Gamble
U. S. Dept. of Agriculture, U.S. National Poultry Research Center, Athens, USA

12:10 *Conference Closing + Lunch*

13:30 - 17:00 **IASIM AT THE TOP: POST-CONFERENCE EXCURSION**

Poster List

- P1** **Mapping pixel dissimilarity in super-resolution imaging**
R. Bernex, F. Allegrini, M. Sliwa, P. Dedecker, C. Ruckebusch
LASIR, Université de Lille - Sciences et Technologies, France
-
- P2** **Hyperspectral transmittance imaging for ripeness determination of nectarine**
S. Munera, J. Blasco, S. Cubero, P. Talens, N. Aleixos
Centro de Agroingeniería. Instituto Valenciano de Investigaciones Agrarias (IVIA), Spain
-
- P3** **Hyperspectral EELS image unmixing**
Y. Altmann, N. Brun, N. Dobegeon, K. March, S. Moussaoui, O. Schneegans
Laboratoire de Physique des Solides, Univ. Paris-Sud, Univ. Paris-Saclay, France
-
- P4** **Integrated survey with aerial and in-situ spectral imaging of materials and vegetation in the urban context**
N. Gaitani, T. Thiis, J. Burud
Dept. of Mathematical Sc. & Tech., Norwegian University of Life Sciences, Norway
-
- P5** **The use of hyperspectral imaging to predict and map the distribution of internal constituents of edible fennels**
M.M.A. Chaudhry, I. Capotorto, M.L. Amodio, G. Colelli
Dept. of Science of Agriculture, Food and Environment (SAFE), University of Foggia, Italy
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- P6** **Multi-scale k-means clustering of multispectral images**
M. Corcel, C. Barron, F. Guillon, M-F.Devaux
UR1268 BIA. INRA Nantes, France
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- P7** **Method for the analysis and comparison surface and bulk properties of biomaterial cements**
R.M. Dorrepaal, A.A. Gowen
UCD School of Biosystems and Food Engineering, University College Dublin, Ireland
-
- P8** **Hyperspectral imaging for detection of lactic acid bacteria: a preliminary study**
G. Foca, A. Ulrici, R. Calvini, S. Morandi, M. Brasca, P. Oliveri
Department of Life Sciences, University of Modena and Reggio Emilia, Reggio Emilia, Italy
-
- P9** **Application of NIR hyperspectral imaging combined to chemometrics to assess the impact of tillage on the root system development of a winter wheat crop**
G. Fraipont, D. Eylenbosch, J.A. Fernández Pierna, V. Baeten, B. Dumont, B. Bodson
Crop Science Unit, Gembloux Agro-Bio Tech, University of Liège, Belgium
-
- P10** **Prediction of signal-to-noise ratio for ultra-fast Raman microscopy studies of pharmaceutical proteins**
J. X. Wu, S. B. Juul-Mortensen, A. Friderichsen
Oral Drug Product, Protein Engineering, Global Research, Novo Nordisk A/S, Denmark

Poster List

- P11** **Quantification of the microstructure of natural fibre composite by confocal Raman imaging and image analysis**
A. Gallos, G. Paës, D. Legland, F. Allais, J. Beaugrand
Chaire ABI – AgroParisTech, UMR614 FARE, INRA, Reims, France
-
- P12** **Characterization of the conversion in UV-cured coatings by large-scale hyperspectral imaging**
K. Heymann, O. Daikos, T. Scherzer
Leibniz Institute of Surface Modification, Chemical Department, Leipzig, Germany
-
- P13** **Large-scale monitoring of the layer thickness of UV-curable coatings by NIR chemical imaging**
K. Heymann, O. Daikos, T. Scherzer
Leibniz Institute of Surface Modification, Chemical Department, Leipzig, Germany
-
- P14** **Fuzzy clustering for (fuzzy) constraints in MCR-ALS of hyperspectral images**
S. Hugelier, O. Devos, C. Ruckebusch, P. Firmani, F. Marini
LASIR, Université de Lille - Sciences et Technologies, France
-
- P15** **Deconvolution of 2D+t images with spatial and temporal penalties**
S. Hugelier, P. H. C. Eilers, O. Devos, C. Ruckebusch
LASIR, Université de Lille - Sciences et Technologies, France
-
- P16** **Examination of multiproduct calibration approaches for quantitative analysis of food with near-infrared spectroscopy**
M. C. Kopf, R. Gruna
Sichtprüfsysteme, Fraunhofer IOSB, Karlsruhe, Germany
-
- P17** **Raman imaging of spectrally non-well-behaved species**
F. Ada, V. Larat
HORIBA Scientific, Villeneuve d'Ascq, France
-
- P18** **High-speed tip-enhanced Raman imaging of nanomaterials**
M. Chaigneau, A. V. Krayev, O. Lancry, V. Larat, S. A. Saunin
HORIBA Scientific, Villeneuve d'Ascq, France
-
- P19** **Analysis of the composition of the dried blood spot (DBS) and determination of their age using hyperspectral imaging in the VIS-SWIR range**
A. Maida, A. Mendys, A. Wojtowicz, R. Wietecha-Postuszny, B. Łydźba-Kopczynska, P. Koscielniak
Laboratory for Forensic Chemistry, Faculty of Chemistry, Jagiellonian University, Poland
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- P20** **Hyperspectral NIR imaging for vitamin C mapping in acerola (*Malpighia emarginata*)**
C. Malegori, S. Grassi, E. Marquez, S. Tonetto de Freitas, E. Casiraghi
Dept of Food, Environmental and Nutritional Sciences, Università degli Studi di Milano, Italy

Poster List

- P21** **Response surface methodology to optimize the cement paste mix design: time-dependent contribution of fly ash and grinding agent**
N.H. Mtarfi, Z. Rais, M. Taleb, M.K. Kada, S. Naamane
Lab. of Electrochemistry, Engineering, Modeling and Environment, USMBA, Fes, Morocco
-
- P22** **Enhancing spatial resolution of XRF hyperspectral maps via data fusion and PLS regression - when overfitting can be good**
P. Oliveri, G. Sciotto, E. Catelli, R. Mazzeo, S. Prati, R. Leardi
Department of Pharmacy, Univ. of Genoa, Via Brigata Salerno, Italy
-
- P23** **Assessment of the effect of different doses of chlorpyrifos-oxon on zebrafish by hyperspectral imaging and chemometric methods**
V. Olmos, M. Marro, B. Piña, P. Loza-Alvarez, R. Tauler, A. de Juan
Department of Analytical Chemistry, University of Barcelona, Spain
-
- P24** **Identification and quantification of maize defects by multivariate image analysis**
G. Orlandi, R. Calvini, G. Foca, A. Ulrici
Department of Life Sciences, University of Modena and Reggio Emilia, Italy
-
- P25** **MCR-ALS strategies for mass spectrometry image analysis**
S. Pigueras, C. Ruckebusch, S. Hugelier, C. Bedia, J. Jaumot, R. Tauler, A. de Juan
Department of Analytical Chemistry, University of Barcelona, Spain
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- P26** **Hyperspectral imaging in visualizing the non-uniform drying of mango slices during hot-air and microwave-vacuum drying**
Y-Y. Pu, D-W. Sun
School of Biosystems and Food Engineering, University College Dublin, Ireland
-
- P27** **Hyperspectral imaging used for in-line characterization of surface finishes on textiles**
G. Mirschel, O. Daikos, Carsten Steckert, T. Scherzer
Leibniz Institute of Surface Modification, Chemical Department, Leipzig, Germany
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- P28** **In-line analysis of inside adhesive layers in textile laminates by nir chemical imaging**
G. Mirschel, O. Daikos, Carsten Steckert, T. Scherzer
Leibniz Institute of Surface Modification, Chemical Department, Leipzig, Germany
-
- P29** **White maize grading using multispectral and NIR hyperspectral imaging with objectwise multivariate data analysis**
K. Sendin, P.J. Williams, M. Manley
Department of Food Science, Stellenbosch University, South Africa
-
- P30** **Raman hyperspectral imaging and analysis of food emulsions**
G. van Dalen, E.J. van Velzen, P.C.M. Heussen, M. Sovago, K.F. van Malssen, J.P.M. van Duynhoven
Imaging & Spectroscopy, Unilever R&D, Vlaardingen, The Netherlands
-
- P31** **Assessment of pesticide coating on cereal seeds by near infrared hyperspectral imaging**
P. Vermeulen, P. Flémal, O. Pigeon, J.A. Fernández Pierna, P. Dardenne, V. Baeten
Food and Feed Quality Unit, CRA-W, Gembloux, Belgium