



w h i s p e r s

3rd Workshop on  
Hyperspectral Image and Signal Processing :  
Evolution in Remote Sensing

6 - 9 June 2011, Lisbon, Portugal

## Workshop Program



IEEE



MARIE CURIE ACTIONS



**Monday, June 6**

Morning	Public PhD dissertation of Alberto Villa
Afternoon	Public PhD dissertation of Jun LI
All day	Registration
18:00 – 20:00	Icebreaker

**Tuesday, June 7**

07:30 - 08:30	Registration
08:30 - 09:00	Opening of the workshop
09:00 - 10:00	Plenary 1 - Nonlinear Manifolds for Feature Extraction: Opportunities and Challenge
10:00 - 11:40	
<b>tue-o-1-a</b>	Recent advances in Spectral Unmixing of Hyperspectral Data (1)
<b>tue-o-1-b</b>	Application of Hyperspectral imaging on Agricultural and Ecological Systems
11:40 - 12:10	Coffee break
12:10 - 13:10	Panel discussion
13:10 - 14:30	Lunch break
14:30 - 16:10	
<b>tue-o-2-a</b>	Astrophysics
<b>tue-o-2-b</b>	Machine Learning for Analysis of Hyperspectral Data (1)
16:10 - 16:40	Coffee break
16:40 - 18:40	
<b>tue-o-3-a</b>	Hyperspectral Data Processing for Defense and Security
<b>tue-o-3-b</b>	High performance computing and compression

**Wednesday, June 8**

09:00 - 10:00	Plenary 2 - Coordination of International Spaceborne Imaging Spectroscopy Missions
10:00 - 11:40	
<b>wed-o-1-a</b>	Applications: industry and environment
<b>wed-o-1-b</b>	Hyperspectral image processing
11:40 - 12:10	Coffee break
12:10 - 13:30	
<b>wed-p</b>	Hyperspectral data processing, sensor design, calibration
13:30 - 14:30	Lunch break
14:30 - 16:10	
<b>wed-o-2-a</b>	Classification
<b>wed-o-2-b</b>	Applications: forestry and oceans
16:10 - 16:40	Coffee break
16:40 - 18:20	
<b>wed-o-3-a</b>	Physical modeling
<b>wed-o-3-b</b>	Machine Learning for Analysis of Hyperspectral Data
20:00 – 23:00	Conference Banquet

**Thursday, June 9**

09:00 - 10:00	Plenary 3 - The Interplay of Chemometrics and Hyperspectral Chemical Imaging
10:00 - 11:40	
<b>thu-o-1-a</b>	Sensor Design and Calibration
<b>thu-o-1-b</b>	Recent advances in Spectral Unmixing of Hyperspectral Data
11:40 - 12:10	Coffee break
12:10 - 13:30	
<b>thu-p</b>	Applications
13:30 - 14:30	Lunch break
14:30 - 16:10	
<b>thu-o-2-a</b>	Hyperspectral methods for difficult target detection (1)
<b>thu-o-2-b</b>	Physical and Statistical Approaches Bridging the Gap
16:10 - 16:40	Coffee break
16:40 - 18:20	
<b>thu-o-3-a</b>	Hyperspectral methods for difficult target detection (2)
<b>thu-o-3-b</b>	Unmixing and dimension reduction

07:30 - 08:30 Registration

08:30 - 09:00 Opening of the workshop

**09:00 - 10:00 Plenary 1**

**Nonlinear Manifolds for Feature Extraction: Opportunities and Challenge**

Dr Melba Crawford, Purdue University, USA

Session chair: Jon Atli Benediktsson, University of Iceland, Iceland

**10:00 - 11:40 Session tue-o-1-a**

**Recent advances in Spectral Unmixing of Hyperspectral Data (1)**

Session Chairs: Antonio Plaza, University of Extremadura, Spain

Mario Parente, Brown University, USA

**Session tue-o-1-b**

**Application of Hyperspectral imaging on Agricultural and Ecological Systems**

Session Chairs: Xujun Ye, Zhejiang University, China

Josée Levesque, Defence Research & Development Canada

11:40 - 12:10 Coffee break

**12:10 - 13:10 Panel discussion**

Session chair: Paul Gader, University of Florida, USA

13:10 - 14:30 Lunch break

**14:30 - 16:10 Session tue-o-2-a**

**Astrophysics**

Session Chairs: Sylvain Douté, IPAG, France

Sébastien Bourguignon, Observatoire de la Côte d'Azur, France

**Session tue-o-2-b**

**Machine Learning for Analysis of Hyperspectral Data (1)**

Session Chairs: Michael J. Mendenhall, Air Force Institute of Technology, USA

Erzsébet Merényi, Rice University, USA

16:10 - 16:40 Coffee break

**16:40 - 18:40 Session tue-o-3-a**

**Hyperspectral Data Processing for Defense and Security**

Session Chairs: Dirk Borghys, SIC-RMA, Belgium

Nasser M Nasrabadi, US Army Research Lab, USA

**Session tue-o-3-b**

**High performance computing and compression**

Session Chairs: Benoit Rivard, University of Alberta, Canada

Daniele Cerra, DLR, Germany

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**09:00 - 10:00 Plenary 1****Nonlinear Manifolds for Feature Extraction: Opportunities and Challenge**

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Session chair: Jon Atli Benediktsson, University of Iceland, Iceland

**10:00 - 11:40 Session tue-o-1-a****Recent advances in Spectral Unmixing of Hyperspectral Data (1)**

Session Chairs: Antonio Plaza, University of Extremadura, Spain

Mario Parente, Brown University, USA

10:00–10:20 SPECTRAL UNMIXING USING DISTANCE GEOMETRY

Rob Heylen and Paul Scheunders

10:20–10:40 JOINT SPECTRAL CLASSIFICATION AND UNMIXING USING ADAPTIVE PIXEL NEIGHBORHOODS

Olivier Eches, Jon Atli Benediktsson, Nicolas Dobigeon and Jean-Yves Tournet

10:40–11:00 ON THE INTEREST OF REGULARIZED NMF ALGORITHMS VERSUS GEOMETRICAL ALGORITHMS

Mireille Guillaume, Alexis Huck, Weishi Chen, Guillaume Oller and Manuel Grizonnet

11:00–11:20 BILINEAR MODELS FOR NONLINEAR UNMIXING OF HYPERSPECTRAL IMAGES

Yoann Altmann, Nicolas Dobigeon and Jean-Yves Tournet

11:20–11:40 INTERCOMPARISON AND VALIDATION OF TECHNIQUES FOR SPECTRAL UNMIXING OF HYPERSPECTRAL IMAGES: A PLANETARY CASE STUDY

Sylvain Doute, Xavier Ceamanos, Bin Luo, Frédéric Schmidt, Gwenaël, Jouannic and Jocelyn Chanussot

**Session tue-o-1-b****Application of Hyperspectral imaging on Agricultural and Ecological Systems**

Session Chairs: Xujun Ye, Zhejiang University, China

Josée Levesque, Defence Research &amp; Development Canada

10:00–10:20 USING HYPERSPECTRAL REMOTE SENSING DATA FOR RETRIEVING TOTAL CANOPY CHLOROPHYLL AND NITROGEN CONTENT

Jan Clevers and Lammert Kooistra

10:20–10:40 REGULARIZATION OF DISCRIMINANT ANALYSIS FOR THE STUDY OF BIODIVERSITY IN HUMID TROPICAL FORESTS

Jean-Baptiste Feret, Gregory P. Asner and Stephane Jacquemoud

10:40–11:00 ESTIMATION OF WATER COLUMN PARAMETERS WITH A MAXIMUM LIKELIHOOD APPROACH

Sylvain Jay and Mireille Guillaume

11:00–11:20 NARROWBAND SPECTRAL INDICES FOR THE ESTIMATION OF CHLOROPHYLL ALONG A PRECIPITATION GRADIENT

Reza Amiri, Jason Beringer and Peter Isaac

11:20–11:40 APPLICATION OF AIRBORNE HYPERSPECTRAL IMAGERY TO ESTIMATING FRUIT YIELD IN CITRUS

Xujun Ye and Kenshi Sakai



11:40 - 12:10 Coffee break

**12:10 - 13:10 Panel discussion**

Session chair: Paul Gader, University of Florida, USA

13:10 - 14:30 Lunch break

**14:30 - 16:10 Session tue-o-2-a  
Astrophysics**

Session Chairs: Sylvain Douté, IPAG, France  
Sébastien Bourguignon, Observatoire de la Côte d'Azur, France

14:30-14:50 RESTORATION OF HYPERSPECTRAL ASTRONOMICAL DATA FROM INTEGRAL FIELD SPECTROGRAPH

Ferréol Soulez, Eric Thiébaud, Sébastien Bongard and Roland Bacon

14:50-15:10 SPARSITY-BASED SPATIAL-SPECTRAL RESTORATION OF MUSE ASTROPHYSICAL HYPERSPECTRAL DATA CUBES

Sébastien Bourguignon, Hervé Carfantan, Eric Slezak and David Mary

15:10-15:30 EXTRACTION OF STELLAR SPECTRA FROM DENSE FIELDS IN HYPERSPECTRAL MUSE DATA CUBES USING NON-NEGATIVE MATRIX FACTORIZATION

Inès Meganem, Yannick Deville, Shahram Hosseini, Hervé Carfantan and Moussa Sofiane Karoui

15:30-15:50 PSF ESTIMATION OF HYPERSPECTRAL DATA ACQUISITION SYSTEM FOR GROUND-BASED ASTROPHYSICAL OBSERVATIONS

Emma Villeneuve, Hervé Carfantan and Denis Serre

15:50-16:10 EXPLAINING MID-INFRARED ASTRONOMICAL SPECTRA: NONNEGATIVE MATRIX FACTORIZATION VS THEORETICAL SPECTROSCOPIC DATABASE

Olivier Berné

**Session tue-o-2-b**

**Machine Learning for Analysis of Hyperspectral Data (1)**

Session Chairs: Michael J. Mendenhall, Air Force Institute of Technology, USA  
Erzsébet Merényi, Rice University, USA

14:30-14:50 SEMI-SUPERVISED HYPERSPECTRAL IMAGE CLASSIFICATION USING A NEW (SOFT) SPARSE MULTINOMIAL LOGISTIC REGRESSION MODEL

Jun Li, Jose Bioucas-Dias and Antonio Plaza

14:50-15:10 ROBUST CLASSIFICATION OF THE NUTRITION STATE IN CROP PLANTS BY HYPERSPECTRAL IMAGING AND ARTIFICIAL NEURAL NETWORKS

Andreas Backhaus, Felix Bollenbeck and Udo Seiffert

15:10-15:30 ON THE VALIDATION OF A SPECTRAL/SPATIAL CBIR SYSTEM FOR HYPERSPECTRAL IMAGES

Miguel Ángel Vezanzones and Manuel Grana

15:30-15:50 EXTENDED MORPHOLOGICAL PROFILES USING AUTO-ASSOCIATIVE NEURAL NETWORKS FOR HYPERSPECTRAL DATA CLASSIFICATION

Giorgio Licciardi, Prashanth Reddy Marpu, Jon Atli Benediktsson and Jocelyn Chanussot

15:50-16:10 RAPID ESTIMATION OF POINT SOURCE CHEMICAL POLLUTANT COVERAGE IN CATASTROPHE SITUATION USING HIERARCHICAL BINARY DECISION TREE ENSEMBLE AND PROBABILITY MEMBERSHIP VALUE BASED ENSEMBLE APPROACHES

Karoly Livius Bakos, Paolo Gamba and Peter Burai



16:10 - 16:40 Coffee break

**16:40 - 18:40 Session tue-o-3-a**

**Hyperspectral Data Processing for Defense and Security**

Session Chairs: Dirk Borghys, SIC-RMA, Belgium  
Nasser M Nasrabadi, US Army Research Lab, USA

16:40-17:00 AN ANOMALY DETECTION ARCHITECTURE BASED ON A DATA-ADAPTIVE DENSITY ESTIMATION  
Tiziana Veracini, Stefania Matteoli, Marco Diani and Giovanni Corsini

17:00-17:20 SUB-PIXEL TARGET SPECTRA ESTIMATION AND DETECTION USING FUNCTIONS OF MULTIPLE INSTANCES  
Alina Zare, Paul Gader, Jeremy Bolton, Seniha Yuksel, Thierry Dubroca, Ryan Close and Rolf Hummel

17:20-17:40 DIRECTIONAL SEGMENTED MATCHED FILTER FOR HYPERSPECTRAL IMAGES  
Peter Bajorski

17:40-18:00 A GRAPH THEORETIC APPROACH TO ANOMALY DETECTION IN HYPERSPECTRAL IMAGERY  
David Messinger and James Albano

18:00-18:20 EVALUATION OF THE SUB-PIXEL PERFORMANCE OF ANOMALY DETECTOR  
Dirk Borghys, Christiaan Perneel, Véronique Achard and Ingebjørg Kasen

18:20-18:40 JOINT ESTIMATION OF OBJECTS GEOMETRY AND MATERIAL LABELS FROM SINGLE VIEW POLARIZED HYPERSPECTRAL IMAGERY  
Firooz Sadjadi and Farzad Sadjadi

**Session tue-o-3-b**

**High performance computing and compression**

Session Chairs: Benoit Rivard, University of Alberta, Canada  
Daniele Cerra, DLR, Germany

16:40-17:00 COMPRESSION-BASED UNSUPERVISED CLUSTERING OF SPECTRAL SIGNATURES  
Daniele Cerra, Jakub Bieniarz, Janja Avbelj, Peter Reinartz and Rupert Mueller

17:00-17:20 FAST DECONVOLUTION OF LARGE FLUORESCENCE HYPERSPECTRAL IMAGES  
Simon Henrot, Charles Soussen and David Brie

17:20-17:40 NOVEL ARCHITECTURES FOR REAL-TIME MATCHING IN HYPERSPECTRAL IMAGES  
Pablo Horstrand, Sebastian Lopez, Gustavo Callico, Jose Lopez and Roberto Sarmiento

17:40-18:00 HYPERSPECTRAL IMAGE COMPRESSION BASED ON TUCKER DECOMPOSITION AND WAVELET TRANSFORM  
Azam Karami, Mehran Yazdi and Grégoire Mercier

18:00-18:20 EFFICIENT SPECTRAL ENDMEMBER DETECTION ONBOARD THE EO-1 SPACECRAFT  
Ben Bornstein, David Thompson, D. Tran, Steve Chien, Rebecca Castaño and Brian Bue

18:20-18:40 FAST ALGORITHM FOR EXPLORING AND COMPRESSING OF LARGE HYPERSPECTRAL IMAGES  
Sergey Kucheryavskiy





- 09:00 - 10:00 Plenary 2**  
**Coordination of International Spaceborne Imaging Spectroscopy Missions**  
Dr. Alex Held, CSIRO Division of Marine and Atmospheric Research, Australia  
Session Chair: David Goodenough, University of Victoria, Canada
- 10:00 - 11:40 Session wed-o-1-a**  
**Applications: industry and environment**  
Session Chairs: Marie Lefevre-Fonollosa, CNES, France  
Michael Sears, University of the Witwatersrand, South Africa
- Session wed-o-1-b**  
**Hyperspectral image processing**  
Session Chairs: Lori Bruce, Mississippi State University, USA  
Miguel Velez-Reyes, University of Puerto Rico, Puerto Rico
- 11:40 - 12:10 Coffee break
- 12:10 - 13:30 Session wed-p**  
**Hyperspectral data processing, sensor design, calibration**  
Session Chairs: Sylvain Michel, CNES, France  
Alina Zare, University of Missouri, USA
- 13:30 - 14:30 Lunch break
- 14:30 - 16:10 Session wed-o-2-a**  
**Classification**  
Session Chairs: David Messinger, Rochester Institute of Technology, USA  
Vincent Mazet, Université de Strasbourg, France
- Session wed-o-2-b**  
**Applications: forestry and oceans**  
Session Chairs: Olaf Niemann, University of Victoria, Canada  
Jerzy Cierniewski, Adam Mickiewicz University, Poland
- 16:10 - 16:40 Coffee break
- 16:40 - 18:20 Session wed-o-3-a**  
**Physical modeling**  
Session Chairs: Jeremy Bolton, University of Florida, USA  
Michal Shimoni, SIC-RMA, Belgium
- Session wed-o-3-b**  
**Machine Learning for Analysis of Hyperspectral Data**  
Session Chairs: Erzsébet Merényi, Rice University, USA  
Michael J. Mendenhall, Air Force Institute of Technology, USA



- 09:00 - 10:00 Plenary 2**  
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**Applications: industry and environment**  
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Michael Sears, University of the Witwatersrand, South Africa
- 10:00–10:20 HYPERSPECTRAL IMAGING BASED PLATFORMS FOR PARTICULATE SOLIDS CHARACTERIZATION, INSPECTION AND QUALITY CONTROL. CASE STUDIES: APPLICATION TO POLYOLEFINS RECYCLING  
Silvia Serranti, Aldo Gargiulo and Giuseppe Bonifazi
- 10:20–10:40 INFRARED REFLECTANCE HYPERSPECTRAL FEATURES OF ATHABASCA OIL SAND ORE AND FROTH  
Benoit Rivard, Jilu Feng, Vivek Bhushan and Michael Lipsett
- 10:40-11:00 COMPARISON OF NEAR INFRARED AND RAMAN HYPERSPECTRAL UNMIXING PERFORMANCES FOR CHEMICAL IDENTIFICATION OF PHARMACEUTICAL TABLETS  
Marta B. Lopes, José Bioucas Dias, Jean-Claude Wolff, Nisha Mistry, John Warrack and Mário Figueiredo
- 11:00-11:20 ITERATIVE SIGNATURE SUPPRESSION FOR DETECTION AND IDENTIFICATION OF GAS PLUME CONSTITUENTS  
Caroline S. Turcotte, François Bouffard and Eldon Puckrin
- 11:20-11:40 MULTI-SENSOR INTEGRATION AND MAPPING STRATEGIES FOR THE DETECTION AND REMEDIATION OF THE RED MUD SPILL IN KOLONTAR, HUNGARY: ESTIMATING THE THICKNESS OF THE SPILL LAYER USING HYPERSPECTRAL IMAGING AND LIDAR  
Csaba Lenart, Peter Burai, Amer Smalbegovic, Tibor Biro, Zsolt Katona and Roko Andricevic
- Session wed-o-1-b**  
**Hyperspectral image processing**  
Session Chairs: Lori Bruce, Mississippi State University, USA  
Miguel Velez-Reyes, University of Puerto Rico, Puerto Rico
- 10:00–10:20 A STRUCTURE TENSOR FOR HYPERSPECTRAL IMAGES  
Maider Marin-Mcgee and Miguel Velez-Reyes
- 10:20–10:40 HYPERSPECTRAL CHANGE DETECTION WITH IR-MAD AND INITIAL CHANGE MASK  
Prashanth Marpu, Paolo Gamba and Jon Atli Benediktsson
- 10:40-11:00 ON THE INCORPORATION OF SPATIAL INFORMATION TO ENDMEMBER IDENTIFICATION ALGORITHMS WITHOUT THE PURE PIXEL ASSUMPTION  
Gabriel Martin, Javier Plaza and Antonio Plaza
- 11:00-11:20 TECHNIQUES FOR THE GRAPH REPRESENTATION OF SPECTRAL IMAGERY  
Ryan Mercovich, James Albano and David Messinger
- 11:20-11:40 DENSE REGISTRATION OF PUSH BROOM HYPERSPECTRAL IMAGERIES  
Dong Guo, Teck Khim Ng and Sze Kim Pang
- 11:40 - 12:10 Coffee break



**12:10 - 13:30 Session wed-p****Hyperspectral data processing, sensor design, calibration**

Session Chairs: Sylvain Michel, CNES, France  
Alina Zare, University of Missouri, USA

- 01 HYPERSPECTRAL, MULTISPECTRAL, AND PANCHROMATIC DATA FUSION BASED ON COUPLED NON-NEGATIVE MATRIX FACTORIZATION  
Naoto Yokoya, Takehisa Yairi and Akira Iwasaki
- 02 THE EFFECT OF NOISE WHITENING ON METHODS FOR DETERMINING THE INTRINSIC DIMENSION OF A HYPERSPECTRAL IMAGE  
Kerry Cawse, Amandine Robin and Michael Sears
- 03 SPECTRAL-SPATIAL CLASSIFICATION OF HYPERSPECTRAL IMAGES USING HIERARCHICAL OPTIMIZATION  
Yuliya Tarabalka and James C. Tilton
- 04 IMPACT OF SPECTRAL CURVATURE ON AT-SURFACE REFLECTANCE ACCURACY AND INFORMATION EXTRACTION TECHNIQUES  
H Peter White
- 05 MULTI-SOURCE IMAGE CLASSIFICATION USING COLOR ATTRIBUTE PROFILES  
Zahid Mahmood, Guy Thoonen, Valerie De Witte and Paul Scheunders
- 06 A COMPARATIVE STUDY OF SPECTRAL DETECTORS  
Karmon Vongsy and Michael Mendenhall
- 07 USING PRINCIPAL COMPONENT ANALYSIS FOR ENDMEMBER EXTRACTION  
Charoula Andreou and Vassilia Karathanassi
- 08 FUZZY CLUSTERING OF HYPERSPECTRAL DATA BASED ON PARTICLE SWARM OPTIMIZATION  
Farhad Samadzadegan and Amin Alizadeh Naeini
- 09 A MULTIVARIATE WAVELET-PCA DENOISING-FILTER FOR HYPERSPECTRAL IMAGES  
Felix Bollenbeck, Andreas Backhaus and Udo Seiffert
- 10 CLASS DEPENDENT COMPRESSIVE-PROJECTION PRINCIPAL COMPONENT ANALYSIS FOR HYPERSPECTRAL IMAGE RECONSTRUCTION  
Wei Li, Saurabh Prasad, James Fowler and Lori Bruce
- 11 RECONSTRUCTING AND SEGMENTING HYPERSPECTRAL IMAGES FROM COMPRESSED MEASUREMENTS  
Qiang Zhang, Robert Plemmons, David Kittle, David Brady and Sudhakar Prasad
- 12 COMPARISON OF LOCAL ANOMALY DETECTION ALGORITHMS BASED ON STATISTICAL HYPOTHESIS TESTS  
Alexis Huck, Mireille Guillaume, Guillaume Oller and Manuel Grizonnet
- 13 UNSUPERVISED JOINT BAYESIAN DECOMPOSITION OF A SEQUENCE OF PHOTOELECTRON SPECTRA  
Vincent Mazet, Sylvain Faisan, Antoine Masson, Marc-André Gaveau and Lionel Poisson
- 14 SPECTRAL QUALITY INDICATORS FOR HYPERSPECTRAL DATA  
Anna Brook and Eyal Ben-Dor



- 15 AN UPGRADE OF THE CNR IMAA EARTH-OBSERVING FACILITIES: OVERVIEW OF THE TASI-600 HYPERSPECTRAL THERMAL SPECTROMETER  
Stefano Pignatti, Vincenzo Lapenna, Angelo Palombo, Simone Pascucci, Nicola Pergola and Vincenzo Cuomo
- 16 HYPXIM – A HYPERSPECTRAL SATELLITE DEFINED FOR SCIENCE, SECURITY AND DEFENCE USERS  
Sylvain Michel, Philippe Gamet and Marie-José Lefevre
- 17 BENEFITS OF SIGNAL-DEPENDENT NOISE REDUCTION FOR SPECTRAL ANALYSIS OF DATA FROM ADVANCED IMAGING SPECTROMETERS  
Bruno Aiazzi, Luciano Alparone, Stefano Baronti, Francesco Butera, Leandro Chiarantini and Massimo Selva
- 18 OPTICAL DESIGN OF A COMPACT DUAL BAND INFRARED IMAGING SPECTROMETER  
Alessio Taiti, Francesco Butera and Mauro Melozzi
- 13:10 - 14:30 Lunch break
- 14:30 - 16:10 Session wed-o-2-a**  
**Classification**  
Session Chairs: David Messinger, Rochester Institute of Technology, USA  
Vincent Mazet, Université de Strasbourg, France
- 14:30-14:50 MANIFOLD ALIGNMENT FOR CLASSIFICATION OF MULTI-TEMPORAL HYPERSPECTRAL DATA  
Hsiuhan Lexie Yang and Melba M. Crawford
- 14:50-15:10 MULTICLASS ORDERING FOR FILTERING AND CLASSIFICATION OF HYPERSPECTRAL IMAGES  
Santiago Velasco-Forero and Jesus Angulo
- 15:10-15:30 SEMI-SUPERVISED HYPERSPECTRAL PIXEL CLASSIFICATION USING INTERACTIVE LABELING  
Olga Rajadell Rojas, Pedro Garcia-Sevilla, Robert P.W. Duin and Viet C.Dinh
- 15:30-15:50 A MULTI-MODAL PATTERN CLASSIFICATION FRAMEWORK FOR HYPERSPECTRAL IMAGE ANALYSIS  
Wei Li, Saurabh Prasad, James Fowler and Lori Bruce
- 15:50-16:10 IMPROVED DETECTION AND CLUSTERING OF HYPERSPECTRAL IMAGE DATA BY PREPROCESSING WITH A EUCLIDEAN DISTANCE TRANSFORM  
Ariel Schlamm and David Messinger
- Session wed-o-2-b**  
**Applications: forestry and oceans**  
Session Chairs: Olaf Niemann, University of Victoria, Canada  
Jerzy Cierniewski, Adam Mickiewicz University, Poland
- 14:30-14:50 HELICOPTER HIGH RESOLUTION IMAGING SPECTROSCOPY: MAPPING SPECIES VARIATION  
David Goodenough, Geoff Quinn, K. Olaf Niemann, Hao Chen and Diana Parton
- 14:50-15:10 TREE SPECIES CLASSIFICATION IN MIXED BALTIC FOREST  
Aivars Lorencs, Ints Mednieks, Juris Sinica - Sinavskis and Gatis Erins



- 15:10-15:30 REMOTE SENSING OF FORESTED ENVIRONMENTS: THE EFFECTS OF A RADIOMETRICALLY POROUS AND STRUCTURALLY COMPLEX SURFACE.  
K. Olaf Niemann, David Goodenough, Rafael Loos, Geoff Quinn and Fabio Visintini
- 15:30-15:50 SPECTRAL RANGE SENSITIVITY ANALYSIS TO IMPROVE HYPERSPECTRAL REMOTE SENSING OF PHYTOPLANKTON BIODIVERSITY IN THE OCEAN  
Elena Torrecilla, Jaume Piera, Astrid Bracher, Bettina B. Taylor and Anja Bernhardt
- 15:50-16:10 CHANGES IN MICRO-ALGAL PIGMENT CONTENT AND OPTICAL ABSORPTION CROSS SECTION WITH GROWTH IRRADIANCE, DETECTED BY HYPERSPECTRAL RADIOMETRIC ANALYSES  
Vona Méléder, Martin Laviale, Bruno Jesus, Jean Luc Mouget, Farzaneh Kazemipour, Patrick Launeau and Laurent Barillé
- 16:10 - 16:40 Coffee break
- 16:40 - 18:20 Session wed-o-3-a  
Physical modeling**  
Session Chairs: Jeremy Bolton, University of Florida, USA  
Michal Shimoni, SIC-RMA, Belgium
- 16:40-17:00 EMISSIVITY RETRIEVALS FROM AIRBORNE INFRARED HYPERSPECTRAL IMAGES COUPLED WITH VISIBLE TO SWIR HYPERSPECTRAL IMAGES  
Veronique Achard, Jean Bourrely and Patrice Carle
- 17:00-17:20 COMPARISON OF RADIATIVE TRANSFER MODEL INVERSIONS TO ESTIMATE VEGETATION PHYSIOLOGICAL STATUS BASED ON HYPERSPECTRAL DATA  
Sebastian Preidl and Daniel Doktor
- 17:20-17:40 FAST MONTE CARLO-ASSISTED SIMULATION OF HYPERSPECTRAL EARTH BACKGROUNDS  
Steven Adler-Golden, Steven Richtsmeier, Alexander Berk and James Duff
- 17:40-18:00 MODEL PERFORMANCE METRICS FOR MULTIVARIATE IMAGE ANALYSIS  
Aoife Gowen and James Burger
- 18:00-18:20 DERIVING OPTICAL CONSTANTS OF VOLCANIC ASH USING MEASUREMENTS FROM THE PLANETARY EMISSIVITY LABORATORY AT DLR  
Joern Helbert, Alessandro Maturilli, Ted Roush and Hermann Mannstein
- 16:40 - 18:20 Session wed-o-3-b  
Machine Learning for Analysis of Hyperspectral Data (2)**  
Session Chairs: Erzsébet Merényi, Rice University, USA  
Michael J. Mendenhall, Air Force Institute of Technology, USA
- 16:40-17:00 AN EVALUATION OF CLASS KNOWLEDGE TRANSFER FROM SYNTHETIC TO REAL HYPERSPECTRAL IMAGERY  
Brian Bue, Erzsébet Merényi and Beata Csatho
- 17:00-17:20 SUPPORT VECTOR MACHINES, IMPORT VECTOR MACHINES AND RELEVANCE VECTOR MACHINES FOR HYPERSPECTRAL CLASSIFICATION - A COMPARISON  
Andreas Christian Braun, Uwe Weidner and Stefan Hinz
- 17:20-17:40 FUNCTIONAL RELEVANCE LEARNING IN LEARNING VECTOR QUANTIZATION FOR HYPERSPECTRAL DATA  
Marika Kästner and Thomas Villmann



- 17:40-18:00 A COMPARATIVE ASSESSMENT OF SEVERAL PROCESSING CHAINS FOR  
HYPER SPECTRAL IMAGE CLASSIFICATION: WHAT FEATURES TO USE ?  
Inmaculada Dopido, Alberto Villa, Antonio Plaza and Paolo Gamba
- 18:00-18:20 METRIC LEARNING FOR HYPER SPECTRAL IMAGE SEGMENTATION  
Brian Bue, David Thompson, Martha Gilmore and Rebecca Castano



- 09:00 - 10:00 Plenary 3**  
**The Interplay of Chemometrics and Hyperspectral Chemical Imaging**  
Dr. James Burger, BurgerMetrics, Latvia  
Session Chair: Sergey Kucheryavskiy, Aalborg University, Denmark
- 10:00 - 11:40 Session thu-o-1-a**  
**Sensor Design and Calibration**  
Session Chairs: Florent Prel, ABB Bomem Inc., Canada  
Ariel Schlamm, The MITRE Corporation, USA
- Session thu-o-1-b**  
**Recent advances in Spectral Unmixing of Hyperspectral Data**  
Session Chairs: Mario Parente, Brown University, USA  
Antonio Plaza, University of Extremadura, Spain
- 11:40 - 12:10 Coffee break
- 12:10 - 13:30 Session thu-p**  
**Applications**  
Session chairs: Mireille Guillaume, Institut Fresnel, France  
Sebastian Preidl, Helmholtz Centre for Envir. Research, Germany
- 13:30 - 14:30 Lunch break
- 14:30 - 16:10 Session thu-o-2-a**  
**Hyperspectral methods for difficult target detection (1)**  
Session Chairs: James Theiler, Los Alamos National Laboratory, USA  
Marco Diani, University of Pisa, Italy
- Session thu-o-2-b**  
**Physical and Statistical Approaches Bridging the Gap**  
Session Chairs: Paul Gader, University of Florida, USA  
Xavier Briottet, ONERA, France
- 16:10 - 16:40 Coffee break
- 16:40 - 18:20 Session thu-o-3-a**  
**Hyperspectral methods for difficult target detection (2)**  
Session Chairs: James Theiler, Los Alamos National Laboratory, USA  
Jenny Du, Mississippi State University, USA
- Session thu-o-3-b**  
**Unmixing and dimension reduction**  
Session Chairs: Emmett Lentilucci, Rochester Institute of Technology, USA  
Paul Scheunders, University of Antwerp, Belgium



- 09:00 - 10:00 Plenary 3**  
**The Interplay of Chemometrics and Hyperspectral Chemical Imaging**  
Dr. James Burger, BurgerMetrics, Latvia  
Session Chair: Sergey Kucheryavskiy, Aalborg University, Denmark
- 10:00 - 11:40 Session thu-o-1-a**  
**Sensor Design and Calibration**  
Session Chairs: Florent Prel, ABB Bomem Inc., Canada  
Ariel Schlamm, The MITRE Corporation, USA
- 10:00–10:20 SUPERVISED VICARIOUS CALIBRATION (SVC) OF HYPERSPECTRAL REMOTE-SENSING DATA  
Anna Brook and Eyal Ben-Dor
- 10:20–10:40 DEVELOPMENT OF COMPACT AND LOW DISTORTION IMAGING SPECTROMETER FOR MARS MISSIONS AND AIRBORNE AERIAL VEHICLE  
Shen-En Qian, Michael Maszkiewicz, Allan Hollinger, Eric Thibeault, Eric Martin, Jean-Pierre Ardouin and Alexandre Jouan
- 10:40-11:00 A FIELD IMAGING SPECTROMETER SYSTEM  
Lifu Zhang, Jinnian Wang, Junyong Fang, Yongqi Xue and Qingxi Tong
- 11:00-11:20 HYPXIM: A NEW HYPERSPECTRAL SENSOR COMBINING SCIENCE/DEFENCE APPLICATIONS  
Xavier Briottet, Rodolphe Marion, Véronique Carrère and Stéphane Jacquemoud
- 11:20-11:40 MR-i – OVERVIEW AND FIRST RESULTS OF THE ABB HIGH SPEED HYPERSPECTRAL IMAGING SPECTRORADIOMETER  
Florent Prel, Louis Moreau, Stephane Lantagne, Christian Vallieres, Claude Roy and Luc Levesque
- Session thu-o-1-b**  
**Recent advances in Spectral Unmixing of Hyperspectral Data (2)**  
Session Chairs: Mario Parente, Brown University, USA  
Antonio Plaza, University of Extremadura, Spain
- 10:00–10:20 A NEW SEMI-SUPERVISED ALGORITHM FOR HYPERSPECTRAL IMAGE CLASSIFICATION BASED ON SPECTRAL UNMIXING CONCEPTS  
Alberto Villa, Jun Li, Antonio Plaza and Jose Bioucas-Dias
- 10:20–10:40 MULTI-TEMPORAL UNMIXING ANALYSIS OF HYPERION IMAGES OVER THE GUANICA DRY FOREST  
Maria C. Torres-Madronero, Miguel Velez-Reyes, Skip J. Van Bloem and Jesus D. Chinae
- 10:40-11:00 ACCURACY AND PERFORMANCE OF LINEAR UNMIXING TECHNIQUES FOR DETECTING MINERALS ON OMEGA/MARS EXPRESS  
Frederic Schmidt, Sebastien Bourguignon, Stephane Le Mouelic, Nicolas Dobigeon, Celine Theys and Erwan Treguier
- 11:00-11:20 IMPROVED SEQUENTIAL ENDMEMBER EXTRACTION ALGORITHMS  
Qian Du, He Yang and Nicolas Younan
- 11:20-11:40 TOTAL VARIATION REGULARIZATION IN SPARSE HYPERSPECTRAL UNMIXING  
Marian-Daniel Iordache, José Bioucas-Dias and Antonio Plaza
- 11:40 - 12:10 Coffee break



**12:10 - 13:30 Session thu-p  
Applications**

Session chairs:

Mireille Guillaume, Institut Fresnel, France

Sebastian Preidl, Helmholtz Centre for Envir. Research, Germany

- 01 IMPLICATION FROM THE EXAMINATION OF SPECTRAL LIBRARY OF HYDROXYLATED AND/OR HYDRATED SILICATE MINERALS AT 1.0 – 2.5 MICRO-M WAVELENGTHS  
Chaojun Fan, Hongjie Xie, Joan Wu and Stuart Birnbaum
- 02 EXPLOITATION OF HYPERSPECTRAL DATA FOR INFRASTRUCTURES STATUS ASSESSMENT: PRELIMINARY RESULTS OF THE ISTIMES TEST BED  
Rosa Maria Cavalli, Cristiana Bassani, Angelo Palombo, Stefano Pignatti, Federico Santini and Simone Pascucci
- 03 SPECTRAL REFLECTANCE PROFILE OF CAULERPA RACEMOSA VAR. CYLINDRACEA AND CAULERPA TAXIFOLIA IN THE ADRIATIC SEA  
Mak Kisevic, Amer Smailbegovic, Roko Andricevic, Kyle T. Gray, Jonathan D. Craft, Vedran Petrov, Dajana Brajčić and Ivana Dragičević
- 04 PORTABLE HYPERSPECTRAL IMAGING SYSTEM FOR MONITORING THE EFFICACY OF SANITATION PROCEDURES IN PRODUCE PROCESSING PLANTS  
Alan Lefcourt, Micheal Wiederoder, Nancy Liu, Moon Kim, Y. Martin Lo and Kevin Chao
- 05 STUDY OF NON-LINEAR MIXING IN HYPERSPECTRAL IMAGERY – A FIRST ATTEMPT IN THE LABORATORY  
Pierre Huard and Rodolphe Marion
- 06 USE OF UNDISTURBED AND ARTIFICIAL SOIL SAMPLES FOR THE BRF LABORATORY MEASUREMENTS OF CULTIVATED SOILS COMPLEMENTING THE MEASUREMENTS ACQUIRED IN THE FIELD  
Jerzy Cierniewski, Jan Piekarczyk, Marcin Guliński, Slawomir Krolewicz and Bogdan Zagajewski
- 07 LANDSLIDE IMAGING AND DETECTION WITH HORIZONTAL-SCANNING ACTIVE AND PASSIVE REMOTE SENSING METHODS: A STUDY OF DATA INTEGRATION IN ASSESSING COMPLEX TARGET ENVIRONMENT  
Amer Smailbegovic, Michael Mendenhall, Jeffrey Clark, Kyle Gray and Richard Wooten
- 08 MAPPING INVASIVE VEGETATION USING AISA EAGLE AIRBORNE HYPERSPECTRAL IMAGERY IN THE MID-IPOLY-VALLEY  
Peter Burai, Reka Laposi, Andras Schmotzer and Veronika Kozma Bogнар
- 09 SELECTIVE PRINCIPAL COMPONENT REGRESSION ANALYSIS OF FLUORESCENCE HYPERSPECTRAL IMAGE TO ASSESS AFLATOXIN CONTAMINATION IN CORN  
Haibo Yao
- 10 TREE SPECIES CLASSIFICATION IN THE SOUTHERN ALPS WITH VERY HIGH GEOMETRICAL RESOLUTION MULTISPECTRAL AND HYPERSPECTRAL DATA  
Michele Dalponte, Lorenzo Bruzzone and Damiano Gianelle
- 11 BAND SELECTION FOR JAPANESE OAK WILT EXTRACTION IN AUTUMNAL TINTS OF FOREST BASED ON NWI  
Kuniaki Uto, Toshihiro Massaki, Yukio Kosugi, Genya Saito and Toshinari Ogata
- 12 ACTIVE VOLCANO MONITORING USING A SPACE-BASED INFRARED IMAGER  
John Cipar, Gail Anderson and Thomas Cooley
- 13 LOW PH DETECTION IN SPECIM EAGLE-HAWK USING FIELD SPECTRA AT S. DOMINGOS MINE, SE PORTUGAL: PRELIMINARY RESULTS  
Lidia Quental, António Jorge Sousa and Stuart Marsh



- 14 OIL SPILL THICKNESS ESTIMATION USING UNMIXING METHODS  
Dimitris Sykas, Vassilia Karathanassi, Charoula Andreou and Polychronis Kolokoussis
- 15 NEAR INFRARED HYPERSPECTRAL TRANSFLECTANCE IMAGING OF THIN LAYER WATER SAMPLES  
Aoife Gowen, Roumiana Tsenkova and Colm O Donnell
- 16 ASSESSMENT OF GOSAT POTENTIAL APPLICATION IN MONITORING REGIONAL VARIATION OF ATMOSPHERIC CO<sub>2</sub> CONCENTRATION  
Liping Lei, Bing Zhang, Shanshan Hou and Zhengchao Chen
- 13:10 - 14:30 Lunch break
- 14:30 - 16:10 Session thu-o-2-a**  
**Hyperspectral methods for difficult target detection (1)**  
Session Chairs: James Theiler, Los Alamos National Laboratory, USA  
Marco Diani, University of Pisa, Italy
- 14:30-14:50 SPARSE NONNEGATIVE MATRIX UNDERAPPROXIMATION AND ITS APPLICATION TO HYPERSPECTRAL IMAGE ANALYSIS  
Nicolas Gillis and Robert Plemmons
- 14:50-15:10 HYPERSPECTRAL ANOMALY DETECTION USING AN OPTIMIZED SUPPORT VECTOR DATA DESCRIPTION  
Prudhvi Gurram and Heesung Kwon
- 15:10-15:30 METHODS TO FIND SUB-PIXEL TARGETS IN HYPERSPECTRAL DATA  
Christoph Borel
- 15:30-15:50 ELLIPSOID-SIMPLEX HYBRID FOR HYPERSPECTRAL ANOMALY DETECTION  
James Theiler
- 15:50-16:10 AUTOMATION OF RARE TARGET DETECTION VIA ADAPTIVE FUSION  
Steven Adler-Golden and Robert Sundberg
- Session thu-o-2-b**  
**Physical and Statistical Approaches Bridging the Gap**  
Session Chairs: Paul Gader, University of Florida, USA  
Xavier Briottet, ONERA, France
- 14:30-14:50 SIMULTANEOUS CO<sub>2</sub> AND AEROSOL RETRIEVAL IN A VEGETATION FIRE PLUME USING AVIRIS HYPERSPECTRAL DATA  
Adrien Deschamps, Rodolphe Marion, Xavier Briottet, Pierre-Yves Foucher and Claire Lavigne
- 14:50-15:10 ENDMEMBER-BASED CONTEXTUAL LEARNING FOR ANOMALY CLASSIFICATION IN HYPERSPECTRAL DATA  
Christopher R. Ratto, Kenneth D. Morton, Leslie M. Collins and Peter A. Torrione
- 15:10-15:30 VALIDATION OF PHYSICAL UNMIXING MODEL IN THE RADIATIVE DOMAIN  
Michal Shimoni, Xavier Briottet, Christiaan Perneel, Bernard Tanguy, Yves-Michel Frederic and Eyal Ben-Dor
- 15:30-15:50 PHYSICAL MODELLING AND NON-LINEAR UNMIXING METHOD FOR URBAN HYPERSPECTRAL IMAGES  
Inès Meganem, Philippe Déliot, Xavier Briottet, Yannick Deville and Shahram Hosseini



- 15:50-16:10    MAPPING INTIMATE MIXTURES USING AN ADAPTIVE KERNEL-BASED TECHNIQUE  
Joshua Broadwater and Amit Banerjee
- 16:10 - 16:40    Coffee break
- 16:40 - 18:20    Session thu-o-3-a**  
**Hyperspectral methods for difficult target detection (2)**  
Session Chairs:        James Theiler, Los Alamos National Laboratory, USA  
                                 Jenny Du, Mississippi State University, USA
- 16:40-17:00    MIN-MAX DETECTION FUSION FOR HYPERSPECTRAL IMAGES  
Peter Bajorski
- 17:00-17:20    A KURTOSIS-BASED TEST TO EFFICIENTLY DETECT TARGETS PLACED IN CLOSE  
                                 PROMIXITY BY MEANS OF LOCAL COVARIANCE-BASED HYPERSPECTRAL  
                                 ANOMALY DETECTORS  
Stefania Matteoli, Marco Diani and Giovanni Corsini
- 17:20-17:40    DETECTION OF VEHICLES IN SHADOW AREAS  
Michal Shimoni, Gustav Tolt, Jorgen Ahlberg and Christiaan Perneel
- 17:40-18:00    A DETECTION-IDENTIFICATION PROCESS WITH GEOMETRIC TARGET  
                                 DETECTION AND SUBPIXEL SPECTRAL VISUALIZATION  
William Basener, Ariel Schlamm, David Messinger and Emmett Ientilucci
- 18:00-18:20    RANDOM PROJECTION AS DIMENSIONALITY REDUCTION AND ITS EFFECT  
                                 ON CLASSICAL TARGET RECOGNITION AND ANOMALY DETECTION TECHNIQUES  
Yi Chen, Nasser Nasrabadi and Trac Tan
- Session thu-o-3-b**  
**Unmixing and dimension reduction**  
Session Chairs:        Emmett Ientilucci, Rochester Institute of Technology, USA  
                                 Paul Scheunders, University of Antwerp, Belgium
- 16:40-17:00    APPLICABILITY OF ROBUST UNCONSTRAINED LINEAR UNMIXING (RULU) TO  
                                 ENDMEMBER EXTRACTION TECHNIQUES  
Olga Duran and Maria Petrou
- 17:00-17:20    CONCURRENT SPATIAL-SPECTRAL BAND GROUPING: PROVIDING A SPATIAL  
                                 CONTEXT FOR SPECTRAL DIMENSIONALITY REDUCTION  
Matthew Lee, Lori Bruce and Saurabh Prasad
- 17:20-17:40    ROBUST HYPERSPECTRAL SIGNAL SUBSPACE IDENTIFICATION IN THE  
                                 PRESENCE OF SIGNAL DEPENDENT NOISE  
Nicola Acito, Marco Diani and Giovanni Corsini
- 17:40-18:00    STUDY ON THE ISSUE OF NOISE ESTIMATION IN DIMENSION REDUCTION OF  
                                 HYPERSPECTRAL IMAGES  
Lianru Gao, Bing Zhang, Zhengchao Chen and Liping Lei
- 18:00-18:20    ROBUST ENDMEMBER EXTRACTION USING WORST-CASE SIMPLEX VOLUME  
                                 MAXIMIZATION  
Tsung-Han Chan, Wing-Kin Ma, Arulmurugan Ambikapathi and Chong-Yung Chi