

# **2011 3rd Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote Sensing**

**(WHISPERS 2011)**

**Lisbon, Portugal  
6-9 June 2011**



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**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

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 Tourneret

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 Tourneret

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 & 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 SPECTROGRAPHY <sup>XXXX H</sup>  
 Ferréol Soulez, Eric Thiébaud, Sébastien Bongard and Roland Bacon
- 14:50-15:10 SPARSITY-BASED SPATIAL-SPECTRAL RESTORATION OF MUSE ASTROPHYSICAL HYPERSPECTRAL DATA CUBES <sup>XXXX I</sup>  
 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 <sup>XXXX F</sup>  
 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 <sup>XXXX I</sup>  
 Emma Villeneuve, Hervé Carfantan and Denis Serre
- 15:50-16:10 EXPLAINING MID-INFRARED ASTRONOMICAL SPECTRA: NONNEGATIVE MATRIX FACTORIZATION VS THEORETICAL SPECTROSCOPIC DATABASE <sup>XXXX J</sup>  
 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 <sup>XXXX H</sup>  
 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 <sup>XXXX I</sup>  
 Andreas Backhaus, Felix Bollenbeck and Udo Seiffert
- 15:10-15:30 ON THE VALIDATION OF A SPECTRAL/SPATIAL CBIR SYSTEM FOR HYPERSPECTRAL IMAGES <sup>XXXX F</sup>  
 Miguel Ángel Veganzones and Manuel Grana
- 15:30-15:50 EXTENDED MORPHOLOGICAL PROFILES USING AUTO-ASSOCIATIVE NEURAL NETWORKS FOR HYPERSPECTRAL DATA CLASSIFICATION <sup>XXXX I</sup>  
 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 <sup>XXXX J</sup>  
 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 ~~XXXXH~~  
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 ~~XXXXI~~  
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 ~~XXXXJF~~  
Peter Bajorski

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

18:00-18:20 EVALUATION OF THE SUB-PIXEL PERFORMANCE OF ANOMALY DETECTOR ~~XXXXJ~~  
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 ~~XXXXFH~~  
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 ~~XXXXEi~~  
Daniele Cerra, Jakub Bieniarz, Janja Avbelj, Peter Reinartz and Rupert Mueller

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

17:20-17:40 NOVEL ARCHITECTURES FOR REAL-TIME MATCHING IN HYPERSPECTRAL IMAGES ~~XXXXFi~~  
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 ~~XXXXFJ~~  
Azam Karami, Mehran Yazdi and Grégoire Mercier

18:00-18:20 EFFICIENT SPECTRAL ENDMEMBER DETECTION ONBOARD THE EO-1 SPACECRAFT ~~XXXXGH~~  
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 ~~XXXXG~~  
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
- 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 Smailbegovic, 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 //////i H  
Naoto Yokoya, Takehisa Yairi and Akira Iwasaki
- 02 THE EFFECT OF NOISE WHITENING ON METHODS FOR DETERMINING THE INTRINSIC DIMENSION OF A HYPERSPECTRAL IMAGE //////i i  
Kerry Cawse, Amandine Robin and Michael Sears
- 03 SPECTRAL-SPATIAL CLASSIFICATION OF HYPERSPECTRAL IMAGES USING HIERARCHICAL OPTIMIZATION //////i F  
Yuliya Tarabalka and James C. Tilton
- 04 IMPACT OF SPECTRAL CURVATURE ON AT-SURFACE REFLECTANCE ACCURACY AND INFORMATION EXTRACTION TECHNIQUES //////i i  
H Peter White
- 05 MULTI-SOURCE IMAGE CLASSIFICATION USING COLOR ATTRIBUTE PROFILES //////i J  
Zahid Mahmood, Guy Thoonen, Valerie De Witte and Paul Scheunders
- 06 A COMPARATIVE STUDY OF SPECTRAL DETECTORS //////i JH  
Karmon Vongsoy and Michael Mendenhall
- 07 USING PRINCIPAL COMPONENT ANALYSIS FOR ENDMEMBER EXTRACTION //////i Jj  
Charoula Andreou and Vassilia Karathanassi
- 08 FUZZY CLUSTERING OF HYPERSPECTRAL DATA BASED ON PARTICLE SWARM OPTIMIZATION //////i CF  
Farhad Samadzadegan and Amin Alizadeh Naeini
- 09 A MULTIVARIATE WAVELET-PCA DENOISING-FILTER FOR HYPERSPECTRAL IMAGES //////i Cj  
Felix Bollenbeck, Andreas Backhaus and Udo Seiffert
- 10 CLASS DEPENDENT COMPRESSIVE-PROJECTION PRINCIPAL COMPONENT ANALYSIS FOR HYPERSPECTRAL IMAGE RECONSTRUCTION //////i Cj  
Wei Li, Saurabh Prasad, James Fowler and Lori Bruce
- 11 RECONSTRUCTING AND SEGMENTING HYPERSPECTRAL IMAGES FROM COMPRESSED MEASUREMENTS //////i FH  
Qiang Zhang, Robert Plemmons, David Kittle, David Brady and Sudhakar Prasad
- 12 COMPARISON OF LOCAL ANOMALY DETECTION ALGORITHMS BASED ON STATISTICAL HYPOTHESIS TESTS //////i i  
Alexis Huck, Mireille Guillaume, Guillaume Oller and Manuel Grizonnet
- 13 UNSUPERVISED JOINT BAYESIAN DECOMPOSITION OF A SEQUENCE OF PHOTOELECTRON SPECTRA //////i CF  
Vincent Mazet, Sylvain Faisan, Antoine Masson, Marc-André Gaveau and Lionel Poisson
- 14 SPECTRAL QUALITY INDICATORS FOR HYPERSPECTRAL DATA //////i G  
Anna Brook and Eyal Ben-Dor

- 15 AN UPGRADE OF THE CNR IMAA EARTH-OBSERVING FACILITIES: OVERVIEW OF THE TASI-600 HYPERSPECTRAL THERMAL SPECTROMETER ~~XXXXGJ~~  
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 ~~XXXXGH~~  
Sylvain Michel, Philippe Gamet and Marie-José Lefevre
- 17 BENEFITS OF SIGNAL-DEPENDENT NOISE REDUCTION FOR SPECTRAL ANALYSIS OF DATA FROM ADVANCED IMAGING SPECTROMETERS ~~XXXXHI~~  
Bruno Aiazzi, Luciano Alparone, Stefano Baronti, Francesco Butera, Leandro Chiarantini and Massimo Selva
- 18 OPTICAL DESIGN OF A COMPACT DUAL BAND INFRARED IMAGING SPECTROMETER ~~XXXXIF~~  
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 ~~XXXXI~~  
Hsiuhan Lexie Yang and Melba M. Crawford
- 14:50-15:10 MULTICLASS ORDERING FOR FILTERING AND CLASSIFICATION OF HYPERSPECTRAL IMAGES ~~XXXXJ~~  
Santiago Velasco-Forero and Jesus Angulo
- 15:10-15:30 SEMI-SUPERVISED HYPERSPECTRAL PIXEL CLASSIFICATION USING INTERACTIVE LABELING ~~XXXXH~~  
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 ~~XXXXI~~  
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 ~~XXXXF~~  
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 ~~XXXXI~~  
David Goodenough, Geoff Quinn, K. Olaf Niemann, Hao Chen and Diana Parton
- 14:50-15:10 TREE SPECIES CLASSIFICATION IN MIXED BALTIC FOREST ~~XXXXJ~~  
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. ~~WGGH~~  
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. ~~WGGI~~  
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. ~~WGGF~~  
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. ~~WGGI~~  
Veronique Achard, Jean Bourrelly and Patrice Carle
- 17:00-17:20 COMPARISON OF RADIATIVE TRANSFER MODEL INVERSIONS TO ESTIMATE VEGETATION PHYSIOLOGICAL STATUS BASED ON HYPERSPECTRAL DATA. ~~WGGJ~~  
Sebastian Preidl and Daniel Doktor
- 17:20-17:40 FAST MONTE CARLO-ASSISTED SIMULATION OF HYPERSPECTRAL EARTH BACKGROUNDS. ~~WGGH~~  
Steven Adler-Golden, Steven Richtsmeier, Alexander Berk and James Duff
- 17:40-18:00 MODEL PERFORMANCE METRICS FOR MULTIVARIATE IMAGE ANALYSIS. ~~WGGI~~  
Aoife Gowen and James Burger
- 18:00-18:20 DERIVING OPTICAL CONSTANTS OF VOLCANIC ASH USING MEASUREMENTS FROM THE PLANETARY EMISSIVITY LABORATORY AT DLR. ~~WGGH~~  
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. ~~WGGI~~  
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. ~~WGGF~~  
Andreas Christian Braun, Uwe Weidner and Stefan Hinz
- 17:20-17:40 FUNCTIONAL RELEVANCE LEARNING IN LEARNING VECTOR QUANTIZATION FOR HYPERSPECTRAL DATA. ~~WGGF~~  
Marika Kästner and Thomas Villmann





w h i s p e r s

Wednesday, June 8, 2011

- 17:40-18:00 A COMPARATIVE ASSESSMENT OF SEVERAL PROCESSING CHAINS FOR  
HYPERSPETRAL IMAGE CLASSIFICATION: WHAT FEATURES TO USE ? ~~WWW.FJ~~  
Inmaculada Dopido, Alberto Villa, Antonio Plaza and Paolo Gamba
- 18:00-18:20 METRIC LEARNING FOR HYPERSPETRAL IMAGE SEGMENTATION ~~WWW.H~~  
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
- 10:00-10:20 SUPERVISED VICARIOUS CALIBRATION (SVC) OF HYPERSPECTRAL  
 REMOTE-SENSING DATA **11**  
 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 **11**  
 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 **11** F  
 Lifu Zhang, Jinnian Wang, Junyong Fang, Yongqi Xue and Qingxi Tong
- 11:00-11:20 HYPXIM: A NEW HYPERSPECTRAL SENSOR COMBINING SCIENCE/DEFENCE  
 APPLICATIONS **11** I  
 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 **11** J  
 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 **11** H  
 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 **11** I  
 Maria C. Torres-Madronero, Miguel Velez-Reyes, Skip J. Van Bloem and Jesus D. Chinea
- 10:40-11:00 ACCURACY AND PERFORMANCE OF LINEAR UNMIXING TECHNIQUES FOR  
 DETECTING MINERALS ON OMEGA/MARS EXPRESS **11** F  
 Frederic Schmidt, Sebastien Bourguignon, Stephane Le Mouelic, Nicolas Dobigeon, Celine  
 Theys and Erwan Treguier
- 11:00-11:20 IMPROVED SEQUENTIAL ENDMEMBER EXTRACTION ALGORITHMS **11** I  
 Qian Du, He Yang and Nicolas Younan
- 11:20-11:40 TOTAL VARIATION REGULARIZATION IN SPARSE HYPERSPECTRAL UNMIXING **11** J  
 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 ~~XXXX~~ H  
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 ~~XXXX~~ I  
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 ~~XXXX~~ F  
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 ~~XXXX~~ I  
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 ~~XXXX~~ J  
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 ~~XXXX~~ UH  
Jerzy Cierniewski, Jan Piekarczyk, Marcin Guliński, Sławomir 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 ~~XXXX~~ UJ  
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 ~~XXXX~~ EF  
Peter Burai, Reka Laposi, Andras Schmotzer and Veronika Kozma Bognar
- 09 SELECTIVE PRINCIPAL COMPONENT REGRESSION ANALYSIS OF FLUORESCENCE HYPERSPECTRAL IMAGE TO ASSESS AFLATOXIN CONTAMINATION IN CORN ~~XXXX~~ EI  
Haibo Yao
- 10 TREE SPECIES CLASSIFICATION IN THE SOUTHERN ALPS WITH VERY HIGH GEOMETRICAL RESOLUTION MULTISPECTRAL AND HYPERSPECTRAL DATA ~~XXXX~~ EJ  
Michele Dalponte, Lorenzo Bruzzone and Damiano Gianelle
- 11 BAND SELECTION FOR JAPANESE OAK WILT EXTRACTION IN AUTUMNAL TINTS OF FOREST BASED ON NWI ~~XXXX~~ FH  
Kuniaki Uto, Toshihiro Massaki, Yukio Kosugi, Genya Saito and Toshinari Ogata
- 12 ACTIVE VOLCANO MONITORING USING A SPACE-BASED INFRARED IMAGER ~~XXXX~~ FI  
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 ~~XXXX~~ GF  
Lídia Quental, António Jorge Sousa and Stuart Marsh



- 14 OIL SPILL THICKNESS ESTIMATION USING UNMIXING METHODS <sup>GH</sup>  
Dimitris Sykas, Vassilia Karathanassi, Charoula Andreou and Polychronis Kolokoussis
- 15 NEAR INFRARED HYPERSPECTRAL TRANSFLECTANCE IMAGING OF THIN LAYER  
WATER SAMPLES <sup>GJ</sup>  
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 <sup>HH</sup>  
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 <sup>HI</sup>  
Nicolas Gillis and Robert Plemmons
- 14:50-15:10 HYPERSPECTRAL ANOMALY DETECTION USING AN OPTIMIZED  
SUPPORT VECTOR DATA DESCRIPTION <sup>IF</sup>  
Prudhvi Gurram and Heesung Kwon
- 15:10-15:30 METHODS TO FIND SUB-PIXEL TARGETS IN HYPERSPECTRAL DATA <sup>II</sup>  
Christoph Borel
- 15:30-15:50 ELLIPSOID-SIMPLEX HYBRID FOR HYPERSPECTRAL ANOMALY DETECTION <sup>IJ</sup>  
James Theiler
- 15:50-16:10 AUTOMATION OF RARE TARGET DETECTION VIA ADAPTIVE FUSION <sup>IH</sup>  
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 <sup>IJ</sup>  
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 <sup>IF</sup>  
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 <sup>IJ</sup>  
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 <sup>IJ</sup>  
Inès Meganem, Philippe Déliot, Xavier Briottet, Yannick Deville and Shahram Hosseini


15:50-16:10 MAPPING INTIMATE MIXTURES USING AN ADAPTIVE KERNEL-BASED TECHNIQUE  H  
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  I I  
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  I F  
Stefania Matteoli, Marco Diani and Giovanni Corsini

17:20-17:40 DETECTION OF VEHICLES IN SHADOW AREAS  I I  
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  I J  
William Basener, Ariel Schlamm, David Messenger and Emmett Ientilucci


18:00-18:20 RANDOM PROJECTION AS DIMENSIONALITY REDUCTION AND ITS EFFECT  
ON CLASSICAL TARGET RECOGNITION AND ANOMALY DETECTION TECHNIQUES  JH  
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  J I  
Olga Duran and Maria Petrou

17:00-17:20 CONCURRENT SPATIAL-SPECTRAL BAND GROUPING: PROVIDING A SPATIAL  
CONTEXT FOR SPECTRAL DIMENSIONALITY REDUCTION  E F  
Matthew Lee, Lori Bruce and Saurabh Prasad

17:20-17:40 ROBUST HYPERSPECTRAL SIGNAL SUBSPACE IDENTIFICATION IN THE  
PRESENCE OF SIGNAL DEPENDENT NOISE  E I  
Nicola Acito, Marco Diani and Giovanni Corsini

17:40-18:00 STUDY ON THE ISSUE OF NOISE ESTIMATION IN DIMENSION REDUCTION OF  
HYPERSPECTRAL IMAGES  E J  
Lianru Gao, Bing Zhang, Zhengchao Chen and Liping Lei

18:00-18:20 ROBUST ENDMEMBER EXTRACTION USING WORST-CASE SIMPLEX VOLUME  
MAXIMIZATION  F H  
Tsong-Han Chan, Wing-Kin Ma, Arulmurugan Ambikapathi and Chong-Yung Chi



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