whispers

5th Workshop on Hyperspectral Image and Signal Processing : Evolution in Remote Sensing

25-28 June 2013, Gainesville, Florida, USA

Workshop Program

IEEE GRSS Geoscience and Remote Sensing Society

UF College of Engineering UNIVERSITY of FLORIDA

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2013

Gainesville, Florida, USA

1. Foreword

It gives me great pleasure that the University of Florida is hosting the 5th Annual IEEE WHISPERS. I have been to every WHISPERS: Grenoble, Reykjavík, Lisbon, and Shanghai and they have all been very interesting and focused workshops.

We had a record number of submissions, 182, with outstanding contributions coming from around the world. Alina Zare and Jocelyn Chanussot, the program chairs, labored greatly to get reviews and assemble the technical program. All submissions were peer-reviewed by at least two reviewers. There are 3 full days of technical talks. I thank all those who carefully reviewed manuscripts and, in many cases, improved them!

The workshop is enhanced by several session organizers: Planetary Exploration, Bethany Ehlmann, CalTech, and Sylvain Douté, IPAG, France; Thermal Hyperspectral Imaging Michal Shimoni, SIC-RMA, Belgium and Xavier Briottet, ONERA – DOTA, France; Detection of Difficult Targets, James Theiler, Al Schaum; and Spectral Unmixing, Mario Parente, University of Massachusetts, and Qian (Jenny) Du, Mississippi State University

We are privileged to welcome plenary speakers presenting a wide range of topics, from new concepts in imaging by David Brady, Duke University; space-based systems by Betsy Middleton, Biospheric Sciences Laboratory; and spectral unmixing by Antonio Plaza, University of Extremadura, Spain.

Very special thanks go to Jeremy Bolton of the University of Florida for the local arrangements. He worked tirelessly and dealt with at least a countably infinite number of details! The Florida Museum of Natural History ice-breaker gives our guests an introduction to the natural side of Florida, which differs greatly from the usual Theme Parks! Our banquet will include swing music from the Gainesville Community Jazz Band and swing dancers to help you move your feet!

So welcome to Gainesville! Enjoy the sessions, the interactions with your colleagues, and relish in the warmth and moisture. Finally, no matter how cute they look, please don't feed the Gators!

Photo taken by Rob Heylen in Gainesville, March 2013.

Paul Gader

University of Florida

On behalf of the IEEE Geoscience and Remote Sensing Society, I am delighted to welcome you to WHISPERS 2013, the 5th Workshop on Hyperspectral Image and Spectral Processing: Evolution in Remote Sensing. WHISPERS has developed into a premier international workshop for our community, both because of the quality of the research presented in hyperspectral remote sensing and image analysis, and the bridge between analysis and broad based applications in spectroscopy. As President of the GRSS for 2013, I want to express our appreciation to Paul Gader (University of Florida), general chair, for hosting WHISPERS 2013 in Gainesville, and to program co-chairs Alina Zare (University of Missouri) and Jocelyn Chanussot (Grenoble Institute of Technology) and Jeremy Bolton (University of Florida), chair of the organizing committee, whose contributions were essential to the success of the workshop

Interest in hyperspectral sensing and data analysis continues to grow in the international remote sensing community, as evidenced by both the submissions of papers to conferences and journals, and the increased interest in airborne and space-based hyperspectral sensing for new applications. We anticipate the next generation of spaceborne missions, which will advance the international remote sensing spectral imaging community in many directions, and continue to be excited about opportunities for airborne sensing, including the recent focus on UAV technology. Parallel advances in spectral technology in food science, biomedical imaging, and environmental applications, to name a few, and methodology for analyzing hyperspectral data will also have a significant impact. These are exciting times!

All the best from GRSS for a very successful WHISPERS 2013.

Melba Crawford

President, IEEE GRSS

2. Sponsors

http://www.hyspex.no/

HySpex, NEO's line of hyperspectral cameras, aims to offer compact, high performance and versatile instruments for a multitude of applications, ranging from airborne to laboratory and industrial use of imaging spectroscopy. Norsk Elektro Optikk AS (NEO) was established in 1985 as a privately owned research oriented company within the field of electro optics. NEO has grown to be the largest independent research and development organization in electro optics in Norway, and has in addition established itself as a manufacturer of advanced electro optical products for an international market.

http://www.HeadwallPhotonics.com

Headwall Photonics is the leading designer and manufacturer of hyperspectral imaging spectrometers and spectral instrumentation for remote sensing research, military/defense, and industrial applications and markets. Hyperspec® imaging spectrometer solutions are available for satellite, airborne, handheld and process control deployment. With exceptional optical efficiency, Headwall's high performance spectrometers and spectral engines have been selected by OEM and end-user customers around the world for use in critical application environments. Headwall designs and manufactures patented aberration-corrected, spectral instrumentation that is customized for application-specific performance. Headwall Photonics was formed in 2003 as the result of a management buy-out from Agilent Technologies.

http://www.spectralevolution.com

SPECTRAL EVOLUTION is a leading manufacturer of field portable and laboratory spectroradiometers, spectrometers, and spectrophotometers for applications including geological remote sensing, ground truthing, spectral remote sensing, environmental and climate research, crop and soil research, vegetative studies, water body research including water quality and pollution studies, forestry and canopy studies, calibration transfer, upwelling and downwelling measurement, and more. With the PSR-Series, the company offers the standard in portable spectroradiometers with a 350-2500nm spectral range.

www.asdi.com

ASD Inc., a PANalytical company, is the global leader in remote sensing and hyperspectral measurement solutions, providing unparalleled ground truthing results. Our rugged, portable FieldSpec® 4 line of spectroradiometers provides the freedom to rapidly collect high-quality spectra in the field. Trusted by top research experts at thousands of universities and research institutions, ASD's full-range spectrometers are used in more than 70 countries. For more information, please visit www.asdi.com.

http://www.itres.com

ITRES (1979) is an airborne hyperspectral remote sensing imager manufacturer and worldwide mapping survey provider.

Our performance-designed custom hyperspectral imagers are lidar-ready and feature unmatched precision, focus, and resolution. VNIR, SWIR, MWIR, & thermal IR spectral regions covered for infrastructure and environmental applications. Also offered: multiple sensor operation, remote control.

Recent product announcements: Wide-array thermal TABI-1800. Halve survey costs with a mapping swath twice as wide as the closest competitor. Applications include mapping heat loss, effluent, aquatic habitat, search and rescue, and thermal anomaly detection.

IPS (In-Flight Processing System): Rapid response mapping & data turnaround through in-flight geocorrection, mosaicking, target/thermal anomaly detection.

3. Technical sponsors

4. Committees

General Chair
Paul Gader, University of Florida, USA

Program Chairs
Jocelyn Chanussot, Grenoble Institute of Technology, France
Alina Zare, University of Missouri, USA

Organizing Committee
Jeremy Bolton, University of Florida, USA

Technical Committee
Peter Bajorski, Rochester Institute of Technology, USA
Jon Atli Benediktsson, University of Iceland, Iceland
Jose Bioucas Dias, Technical University of Lisbon, Portugal
Jeremy Bolton, University of Florida, USA
Xavier Briottet, ONERA, Toulouse, France
Lorenzo Bruzzone, University of Trento, Italy
Jocelyn Chanussot, Grenoble Institute of Technology, France
Melba Crawford, Purdue University, USA
Sylvain Douté, Laboratoire de Planètologie de Grenoble, France
Jenny Q. Du, Mississippi State University, USA
Peijun Du, Nanjing University, P.R. China
Bethany L. Ehlmann, Caltech, USA
Paul Gader, University of Florida, USA
Paolo Gamba, University of Pavia, Italy
Jerome Gilles, UCLA, USA
Taylor Glenn, University of Florida, USA
David Goodenough, University of Victoria, Canada
Xiuping Jia, Australian Defence Force Academy, Canberra, Australia
John Kerekes, Rochester Institute of Technology, USA
Alan M. Lefcourt, Environmental Microbial and Food Safety Laboratory, USDA, USA
Sebastian Lopez, University of Las Palmas de Gran Canaria, Spain
Muhammad Murtaza Khan, NUST-SEECS University, Pakistan
Nasser Nasrabadi, U.S. Army Research Laboratory, USA
Mario Parente, Brown University, USA
Antonio Plaza, University of Extremadura, Spain
Ils Reusen, VITO, Belgium
John Richards, The Australian National University, Australia
Stanley Rotman, Ben-Gurion University of the Negev, Israel
Alan Schaum, Naval Research Laboratory, Washington, D.C, USA
Sebastiano Serpico, University of Genoa, Italy
Anita Simic, University of Toronto, Canada
James Theiler, Space and Remote Sensing Sciences, Los Alamos National Laboratory, USA
Jean-Yves Tourneret, IRIT Laboratory, Toulouse, France
Miguel Velez-Reyes, University of Texas at El Paso, USA
Alina Zare, University of Missouri, USA
Bing Zhang, Center for Earth Observation and Digital Earth, China

Webmaster
Vincent Couturier-Doux

5. Conference Information

Arrival to the Conference Venue -- University of Florida Physics Building:

- Many hotels have shuttles that will drop you off at or near the physics building (the Southeast corner of Museum Rd. and Gale Lemerand Dr.)
- Buses. Coins or 1 dollar bills may be required. For detailed bus route information, see the website: core.ieee-whispers.com. Follow menu to Venue >> Travel Information. Click the bus icons near your hotel and the venue for schedule information.
- Parking (If you are driving). The labeled parking lot to the Southwest of the venue is free parking. The parking lot to the north east is a paid garage. There is more free parking on the North side of Museum Rd just west of the venue. DO NOT park in a row labeled "Orange" or labeled "tow-away". You may park in rows labeled Red or Green (commuter). parking.ufl.edu
- Enter the physics building through the North entrance.

Registration desk :

- Location: Main Foyer area at the conference venue.
- Hours:

  Tuesday, 25th. 12h30 - 18h30

  Wednesday 26th - Friday 25th. 7h30 - 18h00
- Onsite registration and/or extra banquet ticket : cash only.

Internet :

- Wifi instructions (2 options):

Option 1 : (US residents): The network name is ufvisitor. You must supply a US phone number and follow the prompts to gain internet access.

Option 2 : Log-in instructions will be provided on-site.

Speaker Preparation:

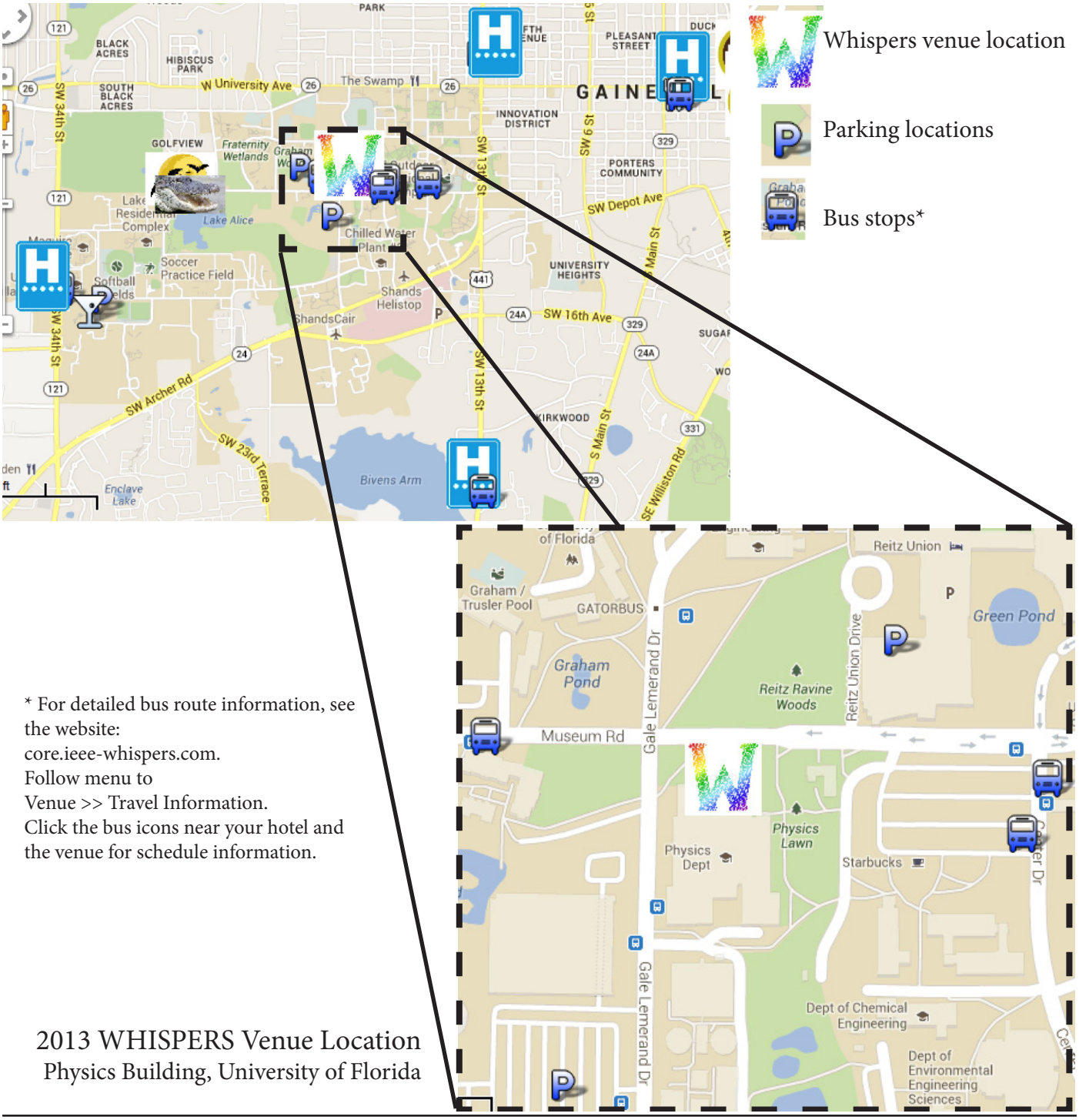
- Software: Each lecture hall is equipped with Office 2010 and acrobat reader.
- File types: We recommend .ppt, .pptx or .pdf formats.
- Loading your presentation: Please go to the appropriate lecture hall (A or B) to upload your presentation BEFORE the start of your session. A whisperer will be there to assist you as needed.

Poster sessions:

- Set-up : Please arrive each day before your session to set-up your poster.
- Break-down : Please remove your poster between
- Presentation : You should be alongside your poster for the duration of each the coffee breaks and during some portion of lunch.
- Size : Posters should be not much larger than 91cm x 106cm
- The posters sessions will be held in the foyer area and/or in the adjoining Lecture Hall C.

Social Events:

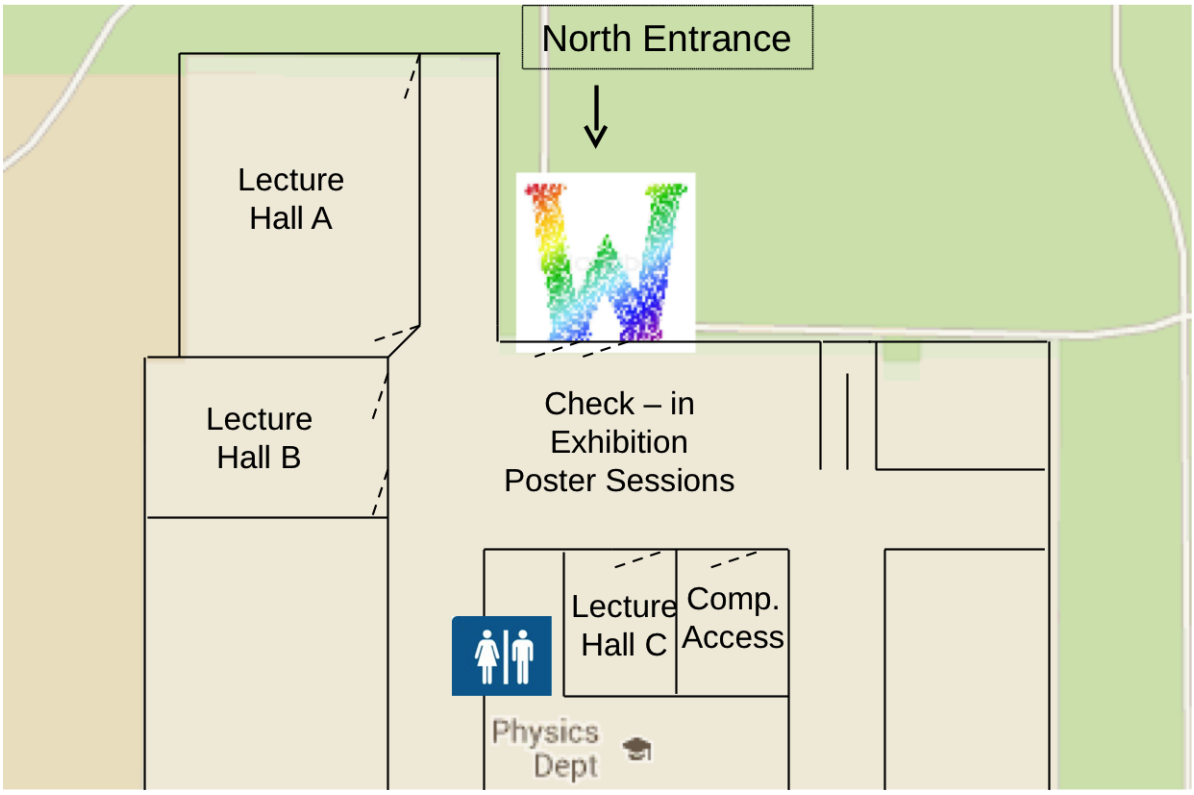
- Icebreaker: Bring a camera as you will be visiting the butterfly rainforest. Please arrive at the CONFERENCE venue on Tuesday June 25th by 18h30 to be bused to the icebreaker Venue -- The Florida Museum of Natural History (http://www.flmnh.ufl.edu/). If you will be arriving late, you can bypass the buses and meet at the icebreaker venue. For travel instructions, see the website: http://core.ieee-whispers.com/. Follow the links to the map located at Venue >> Travel Information. The "martini glass" is the icebreaker venue icon. The buses will return guests to their hotels.
- Banquet: We will take you back in time to the "big band" and swing era of the 50's. We will have a live, 17-piece "big band" and dance instructors -- bring your dancing shoes! Please arrive at the CONFERENCE venue on Thursday June 27th by 18h30 to be bused to the Banquet Venue -- Cellar 12. Buses will return attendees to their hotels. If you miss the buses, you can find Cellar 12: see the website: http://core.ieee-whispers.com/ . Follow the links to the map located at Venue >> Travel Information. The "fork and knife" is the banquet venue icon.



* For detailed bus route information, see the website:
core.ieee-whispers.com.
Follow menu to
Venue >> Travel Information.
Click the bus icons near your hotel and the venue for schedule information.

2013 WHISPERS Venue Location
Physics Building, University of Florida

2013 WHISPERS Venue Floor Plan Physics Building, University of Florida



6. Technical Program

WHISPERS at a glance

	Tuesday, 25	Wednesday, 26		Thursday, 27		Friday, 28	
8:00		Opening of the conference		Presentation of the IEEE Geoscience and Remote Sensing Society		Opening of the conference	
8:30 9:30		Plenary 1		Plenary 2		Plenary 3	
9:30 11:00	Posters sessions & coffee break	wed-p-1-a Unmixing	wed-p-2-a Applications	thu-p-1-a Unmixing: methods & app.	thu-p-1-b Classification(1)	fri-p-1-a Noise & spectral variability	fri-p-1-b Classification(2)
11:00 12:40		wed-o-1-a Coastal regions and water bodies	wed-o-1-b Unmixing (1)	thu-o-1-a Models, sensors, hardware	thu-o-1-b A diversity of applications	fri-o-1-a Thermal hyperspectral imaging (2)	fri-o-1-b Classification(2)
12:40 14:00	13:30			Lunch			
14:00 15:40	Tutorial 1 / Tutorial 2 / Tutorial 3	wed-o-2-a Classification (1)	wed-o-2-b Planetary exploration	thu-o-2-a Detection of difficult targets	thu-o-2-b Agricultural and ecological systems (1)	fri-o-2-a Missions, sensors	fri-o-2-b Unmixing (3)
15:40 16:10				Coffee break			
16:10 17:50	17:30	wed-o-3-a Thermal hyperspectral imaging (1)	wed-o-3-b Multimodality and data fusion	thu-o-3-a Sensor design and calibration	thu-o-3-b Unmixing (2)	fri-o-3-a Advanced concepts and methods	fri-o-3-b Agricultural and ecological systems (2)
19:00 23:00	Icebreaker Florida History Museum			Banquet Cellar12 downtown			

Tuesday, 25, June

13:30

Tutorial 1
Spectral Unmixing of Hyperspectral Data

Prof. Antonio J. Plaza, Department of Technology of Computers and Communications, University of Extremadura, Spain

Tutorial 2
Feature Mining from Hyperspectral Data

Dr. Xiuping Jia, School of Engineering and Information Technology, UC, The University of New South Wales, Australia

Prof. Mingyi He, School of Electronics and Information, Northwestern Polytechnical University, China

Tutorial3
Hyperspectral Target and Anomaly Detection

Dr. Qian Du, Mississippi State University, USA

17:30

19:00 Icebreaker, Florida History Museum

23:00

Wednesday, 26, June
Overview

8:00 Opening of the conference

8:30 **Plenary 1**
Compressive Spectral Imaging
David J. Brady, Duke University, Durham, USA
Session chair: Paul Gader, University of Florida, USA

9:30

9:30 Posters / coffee break

Session wed-p-1-a
Unmixing
Session chairs :
Rob Heylen, University of Florida, USA
Véronique Achard, ONERA, France

Session wed-p-1-b
Applications
Session chairs :
Juha Suomalainen, Wageningen University, Netherlands
Kuniaki Uto, Tokyo Institute of Technology, Japan

11:00

11:00 **Session wed-o-1-a**
Coastal regions and water bodies
Session chairs :
Dar Roberts, University of California Santa Barbara, USA
Jeremy Bolton, University of Florida, USA

Session wed-o-1-b
Unmixing (1)
Session chairs :
Mario Parente, Univ. of Massachusetts, Amherst, USA
Paul Gader, University of Florida, USA

12:40

12:40 Lunch

14:00 **Session wed-o-2-a**
Classification (1)
Session chairs :
John Kerekes, Rochester Institute of Technology, USA
Saurabh Prasad, University of Houston, USA

Session wed-o-2-b
Planetary exploration
Session chairs :
Bethany Ehlmann, Caltech & JPL, USA
Sylvain Douté, IPAG, France

15:40

15:40 Coffee

16:10 **Session wed-o-3-a**
Thermal hyperspectral imaging (1)
Session chairs :
Michal Shimoni, Signal and Image Centre, SIC-RMA, Belgium
Xavier Briottet, ONERA, France

Session wed-o-3-b
Multimodality and data fusion
Session chairs :
Lori Bruce, Mississippi State University, USA
Paul Scheunders, University of Antwerp, Belgium

17:50

Wednesday, 26, June

8:00 Opening of the conference

8:30

Plenary 1
Compressive Spectral Imaging
David J. Brady, Duke University, Durham, USA
Session chair: Paul Gader, University of Florida, USA

9:30

9:30 Posters / coffee break

Poster until 11:00

Session wed-p-1-a
Unmixing
Session chairs :
Rob Heylen, University of Florida, USA
Véronique Achard, ONERA, France

1 ROBUST NONNEGATIVE MATRIX FACTORIZATION FOR NONLINEAR UNMIXING OF HYPERSPECTRAL IMAGES
Nicolas Dobigeon and Cédric Févotte

2 HANDLING SPECTRAL VARIABILITY WITH ALTERNATING ANGLE MINIMIZATION
Rob Heylen, Paul Gader and Paul Scheunders

3 SMOOTH AND SPARSE HYPERSPECTRAL UNMIXING USING AN L0 PENALTY
Jakob Sigurdsson, Magnus Ulfarsson and Johannes R. Sveinsson

4 ON THE APPLICATION OF SPECTRAL UNMIXING FOR NOISE REDUCTION
Daniele Cerra, Rupert Müller, Jakub Bieniarz and Peter Reinartz

5 VALIDATION OF SPECTRAL UNMIXING METHODS USING PHOTOMETRY AND TOPOGRAPHY INFORMATION
Rubén Marrero, Sylvain Douté, Antonio Plaza and Jocelyn Chanussot

6 DETERMINATION OF VNIR OPTICAL CONSTANTS OF SYNTHETIC POSTASSIUM JAROSITE USING THE HAPKE TREATMENT OF RADIATIVE TRANSFER THEORY
Elizabeth Sklute, Timothy Glotch and William Woerner

Session wed-p-1-b
Applications
Session chairs :
Juha Suomalainen, Wageningen University, Netherlands
Kuniaki Uto, Tokyo Institute of Technology, Japan

1 MAPPING TILLAGE PRACTICES OVER A PERI-URBAN REGION USING ARTIFICIAL NEURAL NETWORKS APPLIED TO COMBINED SPOT AND ASAR/ENVISAT IMAGES
Emmanuelle Vaudour, Nicolas Baghdadi and Jean-Marc Gilliot

2 DETERMINING OPTIMAL STORAGE OF FIELD SAMPLED COTTON LEAVES FOR HYPERSPECTRAL ANALYSIS
Matthew Lee, Yanbo Huang and Haibo Yao

3 INVESTIGATION OF EPIFAUNA COVERAGE ON SEAGRASS BLADES USING SPATIAL AND SPECTRAL ANSLYSIS OF HYPERSPECTRAL IMAGES
Ming Yang Teng, Mehrube Mehrubeoglu, Scott King, Kirk Cammarata and James Simons

4 APPLICATION OF PORTABLE HYPER-SPECTRAL CAMERA IN ANDISOLS SOIL NITROGEN ASSESSMENT
Tiejun Zhao, Kenshi Sakai, Tatsuya Higashi, Masakazu Komatsuzaki and Xujun Ye

5 ESTIMATION OF PLANT BIOMASS AND CARBON STOCK FOR A JUVENILE REFORESTED MANGROVE STAND USING HIGH RESOLUTION IMAGING SPECTROMETER
Affendi Suhaili and Jayneeca Lawen

6 HYPERSPECTRAL APPROACH TO A NON-INVASIVE SURVEY OF CULTURAL HERITAGE OBJECTS
Eva Matouskova and Karel Pavelka

7	EFFICIENT AND ACCURATE LINEAR SPECTRAL UNMIXING Björn Labitzke and Andreas Kolb	ESTIMATION AND VISUALIZAION OF NITROGEN CONTENT IN CITRUS CANOPY USING HYPERSPECTRAL IMAGERY Xujun Ye, Jinmeng Li, Kenshi Sakai and Tiejun Zhao
8	CONSTRAINED REFLECT-THEN-COMBINE METHODS FOR UNMIXING HYPERSPECTRAL DATA Paul Honeine and Henri Lantéri	A PRACTICAL ATMOSPHERIC RADIATIVE TRANSFER MODEL FOR OCEAN COLOR REMOTE SENSING MODIFIED FROM 6S-V Hao Zhang, Bing Zhang, Junsheng Li, Zhengchao Chen and Qian Shen
9	A UNIFIED SUB-PIXEL MAPPING MODEL INTEGRATING SPECTRAL UNMIXING FOR HYPERSPECTRAL IMAGERY Xiong Xu, Yanfei Zhong, Liangpei Zhang, Hongyan Zhang and Ruyi Feng	CLASSIFICATION OF THE ELECTROMAGNETIC SPECTRA OF METAMORPHIC ROCKS BASED ON THE CORRESPONDENCE ANALYSIS Lei Fan, Wenji Zhao and Zhaoning Gong
10	SPECTRAL MIXTURE ANALYSIS BASED CITRUS GREENING DISEASE DETECTION USING SATELLITE IMAGE OF FLORIDA Han Li, Won Suk Lee and Ku Wang	INVESTIGATION OF A PAINTING DATING THE FRENCH REVOLUTION USING VISIBLE AND NEAR INFRARED HYPERSPECTRAL IMAGERY Stéphane Le Mouélic, François Chauvet, Manuel Giraud, Erwan Le Menn, Caroline Leynia and Olivier Barbet
11	GRAPH-BASED IDENTIFICATION OF BOUNDARY POINTS FOR UNMIXING AND ANOMALY DETECTION Neda Rohani and Mario Parente	FEASIBILITY OF HIGH ALTITUDES LUMINOUS EVENTS STUDY BY INFRARED SPECTRO-IMAGERY EMBEDDED IN A STRATOSPHERIC BALLOON. Laurence Croizé, Sébastien Payan, Jérôme Bureau, Fabrice Duruisseau and Nathalie Huret
12		ONLINE OIL PRESENCE DETECTION AND THICKNESS MEASUREMENTS ON STEEL COILS Morgan Ferté, Cédric Carteret and David Glijer
13		ASSESSMENT OF ESTIMATION METHODS FOR CHLOROPHYLL-A THROUGH HYPERSPECTRAL INSITU DATA AND MULTISPECTRAL LANDSAT FOR TAIHU LAKE Muhammad Hasan Ali Baig, Lifu Zhang, Ying Bao, Shaojie Sun, Yi Cen, Gaozhen Jiang, Shunshi Hu, Tong Shuai and Qingxi Tong
11:00		

11:00 *Oral until 12:40*	**Session wed-o-1-a** **Coastal regions and water bodies** Session chairs : Dar Roberts, University of California Santa Barbara, USA Jeremy Bolton, University of Florida, USA	**Session wed-o-1-b** **Unmixing (1)** Session chairs : Mario Parente, Univ. of Massachusetts, Amherst, USA Paul Gader, University of Florida, USA
11:00	HYPERSPECTRAL REMOTE SENSING IN COASTAL REGIONS: PRISM FIELD VALIDATION IN ELKHORN SLOUGH Eric E. Heupel, Heidi M. Dierssen, Bo-Cai Gao, Robert O. Green and Patanzis Mouroulis	HYPERSPECTRAL IMAGE UNMIXING BY NON-NEGATIVE MATRIX FACTORIZATION INITIALIZED WITH MODIFIED INDEPENDENT COMPONENT ANALYSIS Djaouad Benachir, Yannick Deville, Shahram Hosseini, Moussa Sofiane Karoui and Abdelkader Hameurlain
11:20	HYPERSPECTRAL SIGNAL BANDS TO HICO IMAGE DATA BANDS FOR SEAGRASS MAPPING Hyun Jung Cho, Deepak Mishra, Christopher Clarke and Andrew Kamerosky	ENDMEMBER EXTRACTION ANALYSIS CONSIDERING ENDMEMBER VARIABILITY Mingming Xu, Liangpei Zhang and Bo Du

11:40	CANOPY WATER CONTENT ESTIMATION FOR TYPICAL EMERGED PLANT COMMUNITY FROM SIMULATION WORLDVIEW-2 DATA: A CASE STUDY IN WILD DUCK LAKE WETLAND, BEIJING Chuan Lin, Zhao Ning Gong, Wen Ji Zhao and Tian Xiang Cui	CONVEX GEOMETRY BASED OUTLIER-INSENSITIVE ESTIMATION OF NUMBER OF ENDMEMBERS IN HYPERSPECTRAL IMAGES Arulmurugan Ambikapathi, Tsung-Han Chan, Chia-Hsiang Lin and Chong-Yung Chi
12:00	EVALUATION OF TWO BAND REFLECTANCE RATIOS FOR PREDICTING CONCENTRATIONS OF CHLOROPHYL-A IN THE RIVER SAVA Mak Kisevic, Roko Andricevic, Amer Smailbegovic and Mira Morovic	SPARSE SPECTRAL UNMIXING WITH ENDMEMBER GROUPS PRE-SELECTION Jakub Bieniarz, Xiao Xiang Zhu, Rupert Müller and Peter Reinartz
12:20	CORRELATIONS BETWEEN WATER REFLECTANCE SPECTRA AND CHLOROPHYLL CONCENTRATION IN QINGHAI LAKE Yi Cen, Jinnian Wang, Lifu Zhang and Hengqian Zhao	NONLINEAR HYPERSPECTRAL UNMIXING USING GAUSSIAN PROCESSES Yoann Altmann, Nicolas Dobigeon, Steve McLaughlin and Jean-Yves Tourneret
12:40		
12:40	Lunch	
14:00		
14:00 *Oral until 15:40*	**Session wed-o-2-a** **Classification (1)** Session chairs : John Kerekes, Rochester Institute of Technology, USA Saurabh Prasad, University of Houston, USA	**Session wed-o-2-b** **Planetary exploration** Session chairs : Bethany Ehlmann, Caltech & JPL, USA Sylvain Douté, IPAG, France
14:00	ENSEMBLE CLASSIFICATION OF HYPERSPECTRAL IMAGES BASED ON ORDERED WEIGHTED AVERAGING OPERATORS Yakoub Bazi, Naif Alajlan and Ronald R Yager	NIR HYPERSPECTRAL MICROSCOPY FOR PLANETARY SCIENCE : THE MICROMEGA INSTRUMENT AND ITS CAPABILITY TO IDENTIFY GRAINS OF SPECIFIC COMPOSITION WITHIN SAMPLES THROUGH AUTOMATED ALGORITHMS Cedric Pilorget and Jean-Pierre Bibring
14:20	ROBUST SUB-PIXEL HYPERSPECTRAL CLASSIFICATION USING INFINITE GAUSSIAN MIXTURE MODELS Hao Wu, Saurabh Prasad and Minshan Cui	POST-PROJECTION REMOVAL OF ROW- AND COLUMN-CORRELATED NOISE IN LINE-SCANNING DATA: APPLICATION TO THEMIS INFRARED DATA Keith J. Nowicki, Christopher S. Edwards and Philip R. Christensen
14:40	NONLINEAR CLASSIFICATION OF HYPERSPECTRAL SIGNATURES IN HIGH NOISE Mark Schmalz, Eric Hayden and Gerhard Ritter	THERMAL ANALYSIS OF UNUSUAL LOCAL-SCALE FEATURES ON THE SURFACE OF VESTA Federico Tosi, Maria Teresa Capria, Maria Cristina De Sanctis, Fabrizio Capaccioni, Ernesto Palomba, Eleonora Ammannito, David Blewett, Jean-Philippe Combe, Brett Denevi, Jian-Yang Li, David Mittlefehldt, Eric Palmer, Jessica Sunshine, Timothy Titus, Carol Raymond and Christopher Russell
15:00	DECISION FUSION BASED ON EXTENDED MULTI-ATTRIBUTE PROFILES FOR HYPERSPECTRAL IMAGE CLASSIFICATION Benqin Song, Jun Li, Peijun Li and Antonio Plaza	PARTIALLY-OBSERVED MODELS FOR CLASSIFYING MINERALS ON MARS Murat Dundar, Bartek Rajwa and Lin Li

15:20	MULTISCALE SPECTRAL-SPATIAL HYPERSPECTRAL CLASSIFICATION USING MULTILINEAR PCA AND CONTOURLET TRANSFORM Zhiling Long, Qian Du and Nicolas Younan	REMOVAL OF SALT-AND-PEPPER NOISE IN THEMIS INFRARED RADIANCE AND EMISSIVITY SPECTRAL DATA OF THE MARTIAN SURFACE Keith J. Nowicki, Christopher S. Edwards and Philip R. Christensen
15:40		
15:40 16:10	coffee break	
16:10 *Oral until 17:50*	**Session wed-o-3-a** **Thermal hyperspectral imaging (1)** Session chairs : Michal Shimoni, Signal and Image Centre, SIC-RMA, Belgium Xavier Briottet, ONERA, France	**Session wed-o-3-b** **Multimodality and data fusion** Session chairs : Lori Bruce, Mississippi State University, USA Paul Scheunders, University of Antwerp, Belgium
16:10	STANDOFF THERMAL HYPERSPECTRAL IMAGING FOR FLARE AND SMOKESTACK CHARACTERIZATION IN INDUSTRIAL ENVIRONMENTS Marc-André Gagnon, Pierre Tremblay, Simon Savary, Martin Chamberland and Philippe Lagueux	GRAPH CONSTRAINED MULTI-MODEL UNMIXING USING LIDAR INFORMATION Hamdi Jenzri, Hichem Frigui and Paul Gader
16:30	MEASUREMENTS AND MODELING OF LWIR SPECTRAL EMISSIVITY OF CONTAMINATED QUARTZ SAND John Kerekes, Michael Gartley, Christopher De Angelis, Carl Salvaggio, Christopher Gittins, Michael Costolo and Bogdan Cosofret	DETECTING OBJECTS UNDER SHADOWS BY FUSION OF HYPERSPECTRAL AND LIDAR DATA: A PHYSICAL MODEL APPROACH Qiang Zhang, V. Paul Pauca, Robert J. Plemmons and Dejan Nikic
16:50	HYPERSPECTRAL GAS AND POLARIZATION SENSING IN THE LWIR: RECENT RESULTS WITH MODDIFS Jean-Marc Theriault, Gilles Fortin, Francois Bouffard, Hugo Lavoie, Paul Lacasse and Josee Levesque	FOREST SPECIES AND BIOMASS ESTIMATION USING AIRBORNE LASER SCANNING AND HYPERSPECTRAL IMAGES Jonathan Chan, Michele Dalponte, Liviu Ene, Lorenzo Frizzera, Franco Miglietta and Damiano Gianelle
17:10	INTERFEROMETRIC THERMAL HYPERSPECTRAL IMAGERS FOR AIR AND SPACE APPLICATIONS Paul Lucey	FUSION OF HYPERSPECTRAL IMAGES AND HEIGHT MODELS USING EDGE PROBABILITY Janja Avbelj, Rupert Müller and Reinartz Peter
17:30	PERFORMANCE OF TES METHOD OVER URBAN AREAS AT A HIGH SPATIAL RESOLUTION SCALE Rosa Oltra-Carrió, Manuel Cubero-Castan, Xavier Briottet and José A. Sobrino	JOINT NONNEGATIVE MATRIX FACTORIZATION FOR HYPERSPECTRAL AND MULTISPECTRAL REMOTE SENSING DATA FUSION Moussa Sofiane Karoui and Yannick Deville
17:50		

Thursday, 27, June
Overview

8:00 Presentation of the IEEE Geoscience and Remote Sensing Society

8:30 – 9:30

Plenary 2
The Hyperion Imaging Spectrometer on the Earth Observing One (EO-1) Satellite: Over a Dozen Years in Space
Elizabeth M. Middleton, Biospheric Sciences Laboratory, USA
Session chair: Alina Zare, University of Missouri, USA

9:30 – 11:00

Session thu-p-1-a
Unmixing: methods and applications
Session chairs :
Konstantinos Themelis, IAASARS, National Observatory of Athens, Greece
Federico Frassy, L@RS Politecnico di Milano, Italy

Session thu-p-1-b
Classification (1)
Session chairs :
Yanfeng Gu, Harbin Institute of Technology, China
Paul Honeine, Université de Technologie de Troyes, France

11:00 – 12:40

Session thu-o-1-a
Models, sensors, hardware
Session chairs :
Grégoire Kerr, German Aerospace Center (DLR), Germany
Liangpei Zhang, Wuhan University, China

Session thu-o-1-b
A diversity of applications
Session chairs :
Michael Sears, University of the Witwatersrand, South Africa
Laurence Guinet, LATMOS (UPMC, UVSQ, CNRS), France

12:40 Lunch

14:00 – 15:40

Session thu-o-2-a
Detection of difficult targets
Session chairs :
James Theiler, Los Alamos National Laboratory ,USA
Qian Du, Mississippi State University, USA

Session thu-o-2-b
Application of hyperspectral imaging on agricultural and ecological systems (1)
Session chairs :
Pieter Kempeneers, VITO (Teledetection unit), Belgium
Miguel Velez-Reyes, University of Texas at El Paso, USA

15:40 Coffee

16:10 – 17:50

Session thu-o-3-a
Sensor design and calibration
Session chairs :
Josée Lévesque, Defense R&D Canada, Canada
Stéphane May, CNES, France

Session thu-o-3-b
Unmixing (2)
Session chairs :
Mario Parente, University of Massachusetts, Amherst, USA
Qian Du, Mississippi State University, USA

19:00 – 23:00 Banquet, Cellar12 downtown

8:00 Presentation of the IEEE Geoscience and Remote Sensing Society

8:30 – 9:30

Plenary 2
The Hyperion Imaging Spectrometer on the Earth Observing One (EO-1) Satellite: Over a Dozen Years in Space
Elizabeth M. Middleton, Biospheric Sciences Laboratory, USA
Session chair: Alina Zare, University of Missouri, USA

9:30 Posters / coffee break

Poster until 11:00

Session thu-p-1-a
Unmixing: methods and applications
Session chairs :
Konstantinos Themelis, IAASARS, National Observatory of Athens, Greece
Federico Frassy, L@RS Politecnico di Milano, Italy

Session thu-p-1-b
Classification (1)
Session chairs :
Yanfeng Gu, Harbin Institute of Technology, China
Paul Honeine, Université de Technologie de Troyes, France

1	SPECTRAL UNMXING-BASED POST-PROCESSING FOR HYPERSPECTRAL IMAGE CLASSIFICATION Inmaculada Dopido, Paolo Gamba and Antonio Plaza	USING VARIANCE ANALYSIS TO DIFFERENTIATE SIMILAR CLASSES IN HYPERSPECTRAL IMAGERY John Lunzer and Shawn Hunt
2	IMPROVING THE PERFORMANCE OF SPARSE UNMIXING Qian Du, Ben Ma, Nareenart Raksuntorn	A DATA-NOISE TOLERANT METHOD FOR MULTI-TEMPORAL HYPERSPECTRAL IMAGES CLASSIFICATION Selim Hemissi and Imed Riadh Farah
3	A NOVEL METHOD TO ESTIMATE THE NUMBER OF ENDMEMBERS IN HYPERSPECTRAL IMAGES BASED ON THE VIRTUAL DIMENSIONALITY CONCEPT Jose Melian, Sebastian Lopez, Gustavo Callico, Jose Lopez and Roberto Sarmiento	AN IMPROVED EXPECTATION MAXIMIZATION ALGORITHM FOR HYPERSPECTRAL IMAGE CLASSIFICATION Lina Zhuang, Lianru Gao, Li Ni and Bing Zhang
4	TOWARDS THE ACCELERATION OF SEQUENTIAL ENDMEMBER EXTRACTION ALGORITHMS FOR TIME CRITICAL APPLICATIONS Raul Guerra, Sebastian Lopez, Gustavo Callico, Jose Lopez and Roberto Sarmiento	SKIN-BASED HYPERSPECTRAL DISMOUNT DETECTION USING SPARSE REPRESENTATION Asif Mehmood, Jeffrey Clark and Wesam Sakla
5	SUBMODULAR MAXIMUM VOLUME SIMPLEX ANALYSIS Seong Ho Lee, Sildomar Monteiro and Steven Scheding	2D^{2}PCA-BASED HYPERSPECTRAL IMAGE CLASSIFICATION WITH UTILIZATION OF SPATIAL INFORMATION M. Said Aydemir and Gokhan Bilgin
6	SPECTRAL MIXTURE DECOMPOSITION USING PRINCIPAL COMPONENT ANALYSIS APPLIED TO PYROXENE MIXTURES Joseph Makarewicz and Heather Makarewicz	RANDOM SUBSPACE ENSEMBLE FOR HYPERSPECTRAL IMAGERY CLASSIFICATION BASED ON DICTIONARY LEARNED SPARSE REPRESENTATION Zhaohui Xue, Peijun Du and Hongjun Su

7	THE COMPARABILITY OF AGGREGATED EMISSIVITY AND TEMPERATURE OF HETEROGENEOUS PIXEL TO CONVENTIONAL TES METHODS Manuel Cubero-Castan, Xavier Briottet, Veronique Achard, Michal Shimoni and Jocelyn Chanussot	A NOVEL CLASSIFICATION TECHNIQUE FOR HYPERSPECTRAL IMAGERY BASED ON HARMONIC ANALYSIS, SVM AND PSO Zhaohui Xue, Peijun Du and Hongjun Su
8	GUNSHOT RESIDUES ANALYSIS BY ENDMEMBERS EXTRACTION METHOD ON HYPERSPECTRAL IMAGES Céline Meillier, Véronique Achard, Philippe Déliot, Thibault Dartidalongue, André Desmarais and Christine Giacometti	A NEW SPARSE MULTIPLE-KERNEL LEARNING METHOD FOR CLASSIFICATION OF HYPERSPECTRAL IMAGERY Yanfeng Gu, Kai Feng and Hong Wang
9	ENDMEMBER EXTRACTION AND CLASSIFICATION OF TROPICAL TREES (INDIA) USING SFF & SAM ALGORITHM Binal Christian, Manjit Saini, Nikita Joshi and N.S.R. Krishnayya	REGION GROWING BASED JOINT SPARSITY MODEL FOR HYPERSPECTRAL IMAGE ANALYSIS Minshan Cui and Saurabh Prasad
10	SPECTRAL UNMIXING ALGORITHM FOR ESTIMATING ECOLOGICAL INDICATORS OF KARST ROCKY DESERTIFICAION Xia Zhang, Haitao Zhu and Suxin Yang	CLASSIFICATION OF HYPERSPECTRAL IMAGES WITH SELF ORGANIZING MAP Stéphane May
11	HYPERSPECTRAL IMAGE SUBPIXEL MAPPING USING GETIS INDEX Muhammad Awais Akhter, Zahid Mahmood and Paul Scheunders	HYPERSPECTRAL IMAGE VISUALIZATION WITH A 3-D SELF-ORGANIZING MAP Johannes Jordan and Elli Angelopoulou
12		CLASSIFICATION OF VEGETATION SCENES WITH HYPERSPECTRAL AND POLARIMETRIC SAR REMOTE SENSING Alexandre Alakian

11:00

11:00 *Oral until 12:40*	**Session thu-o-1-a** **Models, sensors, hardware** Session chairs : Grégoire Kerr, German Aerospace Center (DLR), Germany Liangpei Zhang, Wuhan University, China	**Session thu-o-1-b** **A diversity of applications** Session chairs : Michael Sears, University of the Witwatersrand, South Africa Laurence Guinet, LATMOS (UPMC, UVSQ, CNRS), France
11:00	SPECTRAL EMISSIVITY CHANGES FROM WEATHERING J Michael Cathcart, Sarah E. Lane and Edward M. Burdette	AUTOMATIC WASTE SORTING USING SHORTWAVE INFRARED HYPERSPECTRAL IMAGING SYSTEM Ali Can Karaca, Alp Ertürk, M. Kemal Güllü, Muharrem Elmas and Sarp Ertürk
11:20	MODELING SENSITIVITY OF IMAGING SPECTROMETER DATA TO CARBON DIOXIDE AND METHANE PLUMES Philip Dennison, Andrew Thorpe, Dar Roberts and Robert Green	APPLICATION OF HYPERSPECTRAL REMOTE SENSING IN ESTIMATION OF OILSANDS TAILINGS WATER CONTENT Iman Entezari and Benoit Rivard
11:40	MONTE-CARLO BASED DETERMINATION OF MEASUREMENT UNCERTAINTY FOR IMAGING SPECTROMETERS Karim Lenhard	NMF-BASED SPECTRAL UNMIXING OF HERSCHEL OBSERVATIONS OF THE HORSEHEAD NEBULA Olivier Berné, Boulais Axel, Yannick Deville, Christine Joblin, Jerome Pety, David Teyssier and Maryvonne Gerin

12:00	SPECTRAL MIXTURE AND CHEMOMETRIC ALGORITHMS APPLIED TO THE IDENTIFICATION OF BIOSIGNATURES ON PLANETARY SURFACES Kyle Uckert, Nancy Chanover, David Voelz, David Glenar, William Brinckerhoff, Stephanie Getty, Nancy McMillan, Penelope Boston, Xifeng Xiao, Rula Tawalbeh and Xiang Li	ITERATIVE ESTIMATION OF THE NUMBER OF AUTOFLUORESCENCE COMPONENTS IN A BIOLOGICAL SAMPLE Omar Gutierrez-Navarro, Daniel Ulises Campos-Delgado, Edgar Arce-Santana, Martin Mendez and Javier A. Jo
12:20	HIGH LEVEL MODULAR IMPLEMENTATION OF A LOSSY HYPERSPECTRAL IMAGE COMPRESSION ALGORITHM ON A FPGA Aday Garcia, Lucana Santos, Sebastian Lopez, Gustavo Marrero, Jose Francisco Lopez and Roberto Sarmiento	MIXTURE ANALYSIS BASED ON SPECTRAL SUMMARIZATION Ouiem Bchir, Mohamed Maher Ben Ismail and Hichem Frigui
12:40		
12:40	Lunch	
14:00		
14:00 *Oral until 15:40*	**Session thu-o-2-a** **Detection of difficult targets** Session chairs : James Theiler, Los Alamos National Laboratory, USA Qian Du, Mississippi State University, USA	**Session thu-o-2-b** **Application of hyperspectral imaging on agricultural and ecological systems (1)** Session chairs : Pieter Kempeneers, VITO (Teledetection unit), Belgium Miguel Velez-Reyes, University of Texas at El Paso, USA
14:00	REGRESSION FRAMEWORK FOR BACKGROUND ESTIMATION IN REMOTE SENSING IMAGERY James Theiler and Brendt Wohlberg	RELATIONSHIPS BETWEEN SPECIES COMPOSITION, FRACTIONAL COVER AND LAND SURFACE TEMPERATURE IN A MEDITERRANEAN ECOSYSTEM Dar Roberts, Philip Dennison, Keely Roth and Glynn Hulley
14:20	TARGET DETECTION IN INHOMOGENOUS NON-GAUSSIAN HYPERSPECTRAL DATA, BASED ON NON-PARAMETRIC DENSITY ESTIMATION Gil Tidhar and Stanley Rotman	ESTIMATION OF SOIL MOISTURE FROM AIRBORNE HYPERSPECTRAL IMAGERY WITH SUPPORT VECTOR REGRESSION Jelena Stamenkovic, Devis Tuia, Frank De Morsier, Maurice Borgeaud and Jean-Philippe Thiran
14:40	CONTINUUM FUSION VERSIONS OF THE FINITE TARGET MATCHED FILTER FOR SUB-PIXEL DETECTION Alan Schaum	LEAF PARAMETER ESTIMATION BASED ON SHADING DISTRIBUTION IN LEAF SCALE HYPERSPECTRAL IMAGES Kuniaki Uto and Yukio Kosugi
15:00	URBAN FEATURES CLASSIFICATION USING 3D HYPERSPECTRAL DATA Michal Shimoni, Mahamadou Idrissa, Dirk Borghys, Trym Haavardsholm, Thomas-Olsvik Opsahl and Christiaan Perneel	SUPPORT VECTOR MACHINES CLASSIFICATION OF FLUORESCENCE HYPERSPECTRAL IMAGE FOR DETECTION OF AFLATOXIN IN CORN KERNELS Sathishkumar Samiappan, Lori Mann Bruce, Haibo Yao, Zuzana Hruska, Robert Brown, Deepak Bhatnagar and Thomas Cleveland

15:20	OPTIMAL SPARSE KERNEL LEARNING FOR HYPERSPECTRAL ANOMALY DETECTION Zhimin Peng, Prudhvi Gurram, Heesung Kwon and Wotao Yin	SPECTRAL-SPATIAL PRE-PROCESSING USING MULTI-RESOLUTION 3D WAVELETS FOR HYPER-SPECTRAL IMAGE CLASSIFICATION Xavier Hadoux, Nathalie Gorretta, Gilles Rabatel, Jean-Michel Roger and Olivier Strauss
15:40		
15:40 16:10	Coffee	
16:10 *Oral until 17:50*	**Session thu-o-3-a** **Sensor design and calibration** Session chairs : Josée Lévesque, Defense R&D Canada, Canada Stéphane May, CNES, France	**Session thu-o-3-b** **Unmixing (2)** Session chairs : Mario Parente, University of Massachusetts, Amherst, USA Qian Du, Mississippi State University, USA
16:10	THE MIXEL CAMERA - KEYSTONE-FREE HYPER-SPECTRAL IMAGES Gudrun Høye and Andrei Fridman	SPECTRAL UNMIXING USING THE BETA COMPOSITIONAL MODEL Alina Zare, Paul Gader, Dmitri Dranishnikov and Taylor Glenn
16:30	LASER-BASED SPECTRAL AND RADIOMETRIC CALIBRATION OF THE CLARREO IMAGING SPECTROMETER Joel McCorkel, Brendan McAndrew and Kurtis Thome	ESTIMATING ABUNDANCE FRACTIONS OF MATERIALS IN HYPERSPECTRAL IMAGES BY FITTING A POST-NONLINEAR MIXING MODEL Jie Chen, Cédric Richard and Paul Honeine
16:50	DESIGN OF COMBINED OPTICAL IMAGERS USING UNMIXING-BASED HYPERSPECTRAL DATA FUSION Naoto Yokoya and Akira Iwasaki	AN APPROACH FOR UNMIXING OF HYPERSPECTRAL IMAGERY BASED ON SCALE-SPACE REPRESENTATION Maria Torres-Madronero and Miguel Velez-Reyes
17:10	CHARACTERIZATION OF INTEGRATING SPHERE HOMOGENEITY WITH AN UNCALIBRATED IMAGING SPECTROMETER Andreas Baumgartner	UNSUPERVISED NONLINEAR UNMIXING OF HYPERSPECTRAL IMAGES USING SPARSITY CONSTRAINED PROBABILISTIC LATENT SEMANTIC ANALYSIS Wei Wang and Hairong Qi
17:30	CALIBRATION AND VALIDATION OF HYPER-SPECTRAL IMAGERY USING A PERMANENT TEST FIELD Lauri Markelin, Eija Honkavaara, Tuure Takala and Petri Pellikka	LOW RANK REPRESENTATION FOR BILINEAR ABUNDANCE ESTIMATION PROBLEM Qing Qu, Xiaoxia Sun, Nasser Nasrabadi and Trac Tran
17:50		

whispers

Friday, 28, June
Overview

8:00 Opening of the conference

8:30 – 9:30

Plenary 3
Recent advances in spectral unmixing of hyperspectral data
Prof. Antonio Plaza, University of Extremadura, Spain
Session chair: Jeremy Bolton, University of Florida, USA

9:30 Posters / coffee break

9:30 – 11:00

Session fri-p-1-a
Noise & spectral variability
Session chairs :
Mireille Guillaume, Ecole Centrale Marseille, France
Daniele Cerra, DLR, Germany

Session fri-p-1-b
Classification (2)
Session chairs :
Hichem Frigui , CECS, University of Louisville, USA
Lauri Markelin, Finnish Geodetic Institute, Finland

11:00 – 12:40

Session fri-o-1-a
Thermal hyperspectral imaging (2)
Session chairs :
Xavier Briottet, ONERA, France
Michal Shimoni, Signal and Image Centre, SIC-RMA, Belgium

Session fri-o-1-b
Classification (2)
Session chairs :
Xiuping Jia, The University of New South Wales, Australia
Sebastian Lopez, University of Las Palmas de Gran Canaria, Spain

12:40 lunch

14:00 – 15:40

Session fri-o-2-a
Missions, sensors
Session chairs :
Robert Sundberg, Spectral Sciences, Inc., USA
Bin Luo, Wuhan University, China

Session fri-o-2-b
Unmixing (3)
Session chairs :
Mario Parente, Univ. of Massachusetts, Amherst, USA
Qian Du, Mississippi State University, USA

15:40 coffee

16:10 – 17:50

Session fri-o-3-a
Advanced concepts and methods
Session chairs :
Manuel Grana, University of the Basque Country, Spain
Naoto Yokoya, University of Tokyo, Japan

Session fri-o-3-b
Application of hyperspectral imaging on agricultural and ecological systems (2)
Session chairs :
Alina Zare, University of Missouri, USA
Emmanuelle Vaudour, INRA/AgroParisTech, France

8:00 Opening of the conference

8:30

Plenary 3
Recent advances in spectral unmixing of hyperspectral data
Prof. Antonio Plaza, University of Extremadura, Spain
Session chair: Jeremy Bolton, University of Florida, USA

9:30

9:30 Posters / coffee break

Poster until 11:00

Session fri-p-1-a
Noise & spectral variability
Session chairs :
Mireille Guillaume, Ecole Centrale Marseille, France
Daniele Cerra, DLR, Germany

1 HYPSPECTRAL IMAGE DENOISING VIA MULTI-DIMENSIONAL NONLOCAL MODEL
Jie Li, Huanfeng Shen, Qiangqiang Yuan, Liangpei Zhang and Wei Gong

2 CORRESPONDING PIXEL AUTOMATED MATCHER (CPAM) AND APPLICATION TO ANALYSIS OF HYPERSPECTRAL DATA VARIABILITY
Grégoire Kerr and Christian Fischer

3 WAVELET BASED SPARSE PRINCIPAL COMPONENT ANALYSIS FOR HYPERSPECTRAL DENOISING
Behnood Rasti, Johannes R. Sveinsson, Magnus O. Ulfarsson and Jakob Sigurdsson

4 FIRST ORDER ROUGHNESS PENALTY FOR HYPERSPECTRAL IMAGE DENOISING
Behnood Rasti, Johannes R. Sveinsson, Magnus O. Ulfarsson and Jakob Sigurdsson

5 MULTIVARIATE DIFFUSION TENSOR AND INDUCED MORPHOLOGICAL SEGMENTATION
Maider Marin-Mcgee and Santiago Velasco-Forero

6 EVALUATION OF BANDS CONTAINING SPECTRALLY CORRELATED NOISE IN HYPERSPECTRAL IMAGERY
Kerry Cawse-Nicholson, Michael Sears and Amandine Robin

Session fri-p-1-b
Classification (2)
Session chairs :
Hichem Frigui , CECS, University of Louisville, USA
Lauri Markelin, Finnish Geodetic Institute, Finland

1 A HYBRID SEGMENTATION TECHNIQUE FOR OBJECTED-BASED HYPERSPECTRAL DATA CLASSIFICATION OVER COMPLEX SUB-URBAN LANDSCAPE
Zhi Huang and Xiuping Jia

2 IMAGES FUSION BASED ON A COUPLED NON-NEGATIVE TENSORS FACTORIZATION APPROACH (CNTF), APPLICATION TO OLCI AND ETM SENSORS
Diogone Sylla, Jean-Philip Royer, Audrey Minghelli-Roman, Nadège Thirion-Moreau and Antoine Mangin

3 IMPROVEMENTS ON HYPERSPECTRAL CLASSIFICATION ALGORITHMS
Okan Bilge Ozdemir and Yasemin Yardımcı Çetin

4 ON THE USE OF THE HOTELLING'S T^2 STATISTIC FOR THE HIERARCHICAL CLUSTERING OF HYPERSPECTRAL DATA
Miguel Ángel Veganzones, Joana Frontera-Pons, Jocelyn Chanussot and Jean Philippe Ovarlez

5 ASSESSING THE IMPACT OF THE EDGE-WEIGHTING FUNCTION IN A GRAPH-BASED APPROACH TO ANOMALY DETECTION
James Albano, Amanda Ziemann and David Messinger

6 HYPERSPECTRAL ANOMALY DETECTION BASED ON A GENERALIZATION OF THE MAXIMIZED SUBSPACE MODEL
Edisanter Lo

7	HYPERSPECTRAL IMAGE DEBLURRING WITH PCA AND TOTAL VARIATION Wenzhi Liao, Bart Goossens, Jan Aelterman, Hiep Quang Luong, Aleksandra Pizurica, Niels Wouters, Wouter Saeys and Wilfried Philips	CONTEXT-DEPENDENT DETECTION VIA ALARM-SET FUSION AND SEGMENTATION Taylor Glenn, Paul Gader, Brandon Smock and Joseph Wilson
8	HYPERSPECTRAL CHANGE CLASSIFICATION BASED ON DIRECTION PURSUIT DETECTION Godefroy Brisebarre, Mireille Guillaume and Leonard Denise	A COMPARATIVE STUDY OF DIFFERENT ICA ALGORITHMS FOR HYPERSPECTRAL IMAGE ANALYSIS Nicola Falco, Lorenzo Bruzzone and Jon Atli Benediktsson
9	AN OPTIMIZED BAND SELECTION SCHEME FOR HYPERSPECTRAL IMAGERY ANALYSIS Hongjun Su, Qian Du and Peijun Du	COOPERATIVE AND ADAPTIVE APPROACH FOR HYPERSPECTRAL IMAGE SEGMENTATION Akar Hawree Taher
10	A SPATIAL FILTER BASED FRAMEWORK FOR TARGET DETECTION IN HYPERSPECTRAL IMAGERY Yuxiang Zhang, Bo Du and Liangpei Zhang	MULTISCALE LOCAL COVARIANCE BASED FEATURE EXTRACTION FOR SEGMANTATION OF HYPERSPECTRAL IMAGES Ugur Ergul and Gokhan Bilgin
11	THRESHOLD BASED SEGMENTATION METHOD FOR HYPERSPECTRAL IMAGES Arun Saranathan and Mario Parente	INFORMATION CONTENT VS. CLASS SEPARABILITY AT OPTIMAL SPECTRAL REGIONS Seyed Enayat Hosseini Aria, Massimo Menenti and Ben Gorte
12	COMPARISON OF TWO MULTIBAND CAMERAS FOR USE ON SMALL UAVS IN AGRICULTURE Sindhuja Sankaran, Lav R. Khot, Joe Mari Maja, Reza Ehsani	NONNEGATIVE DISCRIMINATIVE MANIFOLD LEARNING FOR HYPERSPECTRAL DATA DIMENSION REDUCTION Lefei Zhang, Liangpei Zhang, Dacheng Tao, Xin Huang and Guisong Xia
11:00		

11:00 *Oral until 12:40*	**Session fri-o-1-a** **Thermal hyperspectral imaging (2)** Session chairs : Xavier Briottet, ONERA, France Michal Shimoni, Signal and Image Centre, SIC-RMA, Belgium	**Session fri-o-1-b** **Classification (2)** Session chairs : Xiuping Jia, The University of New South Wales, Australia Sebastian Lopez, University of Las Palmas de Gran Canaria, Spain
11:00	SYSIPHE, AIRBORNE HYPERSPECTRAL SYSTEM: FOCUS ON THE SIELETERS THERMAL HYPERSPECTRAL IMAGING INSTRUMENT Laurent Rousset-Rouviere, Christophe Coudrain, Sophie Thetas, Jérôme Primot, Yann Ferrec, Didier Henry, Michel Tauvy, Sylvie Bernhardt, Roland Domel, Philippe Perrault, Rémi Gouyon, Alain Kattnig, Marcel Caes, Marc Jacquart, Gilles Le Coadou, Nicolas Guérineau and Xavier Briottet	SPATIAL-SPECTRAL MULTIPLE KERNEL LEARNING FOR HYPERSPECTRAL IMAGE CLASSIFICATION Yanfeng Gu, Kai Feng and Hong Wang
11:20	CALIBRATION ISSUES AND PRE-PROCESSING CHAIN OF THE TASI-600 AIRBORNE LWIR HYPERSPECTRAL SCANNER Federico Santini, Umberto Amato, Maria Daraio, Stefano Pignatti, Angelo Palombo and Simone Pascucci	MINIMUM NOISE FRACTION TRANSFORM FOR IMPROVING THE CLASSIFICATION OF AIRBORNE HYPERSPECTRAL DATA: TWO CASE STUDIES Federico Frassy, Giorgio Dalla Via, Pieralberto Maianti, Andrea Marchesi, Francesco Rota Nodari and Marco Gianinetto

11:40	LAND COVER MAPPING CAPABILITY OF MULTI-SPECTRAL THERMAL DATA: THE TASI-600 CASE STUDY Maria Francesca Carfora, Angelo Palombo, Simone Pascucci, Stefano Pignatti and Federico Santini	A NEW SEMANTIC WAVELET-BASED SPECTRAL REPRESENTATION Mario Parente and Marco Duarte
12:00	A THERMAL INFRARED IMAGING SPECTROMETER FOR NATURAL RESOURCES APPLICATIONS – FIRST RESULTS Martin Schlerf, Gilles Rock, Chris Hecker, Philippe Lagueux, Franz Ronellenfitsch, Lucien Hoffmann and Thomas Udelhoven	MULTICLASS DOMAIN ADAPTATION WITH ITERATIVE MANIFOLD ALIGNMENT Brian Bue and Chris Jermaine
12:20	A COMPREHENSIVE EVALUATION OF THE PERFORMANCE OF TEMPERATURE AND EMISSIVITY SEPARATION METHOD WITH SIMULATED THERMAL INFRARED HYPERSPECTRAL DATA Ning Wang, Yonggang Qian, Lingling Ma, Lingli Tang and Chuanrong Li	ON SPATIAL REGULARIZATION FOR SEMISUPERVISED HYPERSPECTRAL IMAGE SEGMENTATION USING HYBRID EXTREME ROTATION FOREST Borja Ayerdi and Manuel Grana
12:40		
12:40	Lunch	
14:00		
14:00 *Oral until 15:40*	**Session fri-o-2-a** **Missions, sensors** Session chairs : Robert Sundberg, Spectral Sciences, Inc., USA Bin Luo, Wuhan University, China	**Session fri-o-2-b** **Unmixing (3)** Session chairs : Mario Parente, Univ. of Massachusetts, Amherst, USA Qian Du, Mississippi State University, USA
14:00	HYPXIM: A SECOND GENERATION HIGH SPATIAL RESOLUTION HYPERSPECTRAL SATELLITE FOR DUAL APPLICATIONS Véronique Carrere, Xavier Briottet and Stéphane Jacquemoud	MULTI-DIMENSIONAL PIXEL PURITY INDEX Rob Heylen and Paul Scheunders
14:20	SHALOM – SPACE-BORNE HYPERSPECTRAL APPLICATIVE LAND AND OCEAN MISSION Gil Tidhar, Elad Sagi, Meir Chen, Avia Kafri, Ron Nadler, Arie Leizer, Varacalli Giancarlo Natale, Andrea Cisbani, Marco Baroni, Demetrio Labate, Stefano Signorile, Maria Lucia Magliozzi, Claudio Catallo, Andrea Pietropaolo and Tal Feingersh	A NON-NEGATIVE MATRIX FACTORIZATION METHOD FOR BILINEAR-BILINEAR UNMIXING OF HYPERSPECTRAL IMAGES Olivier Eches and Mireille Guillaume
14:40	A LIGHT-WEIGHT HYPERSPECTRAL MAPPING SYSTEM FOR UNMANNED AERIAL VEHICLES – THE FIRST RESULTS Juha Suomalainen, Niels Anders, Shahzad Iqbal, Jappe Franke, Philip Wenting, Harm Bartholomeus, Rolf Becker and Lammert Kooistra	AN AUTONOMOUS ENDMEMBER DETECTION BASED ON LATTICE ALGEBRA AND DATA CLUSTERING Gerhard Ritter, Jose Nieves Vazquez and Gonzalo Urcid

15:00	THE SPECTRAL IMAGING (SPIM) FACILITY IN SUPPORT OF HYPERSPECTRAL OBSERVATIONS OF SOLAR SYSTEM BODIES Eleonora Ammannito, Paolo Baldetti, Alessandro Bini, Angelo Boccaccini, Simone De Angelis, Maria Cristina De Sanctis, Tatiana Di Iorio, Fabrizio Liberati, David W. Mittelfehldt, Monica Olivieri, Carlo Pompei, Giampaolo Preti and Fabio Tarchi	PARALLEL IMPLEMENTATION OF A PRIMAL-DUAL INTERIOR-POINT OPTIMIZATION METHOD FOR FAST ABUNDANCE MAPS ESTIMATION Maxime Legendre, Saïd Moussaoui, Frédéric Schmidt and Jérôme Idier
15:20	A GEOMETRIC DISTORTION MODEL FOR MULTI-ELEMENT SCANNING IMAGING SPECTROMETER: SOME PRIMARY EXPERIMENTAL RESULTS Yini Duan, Lifu Zhang, Taixia Wu and Xuejian Sun	A FAST VARIATIONAL BAYES ALGORITHM FOR SPARSE SEMI-SUPERVISED UNMIXING OF OMEGA/MARS EXPRESS DATA Athanasios Rontogiannis, Kostantinos Themelis, Olga Sykioti and Konstantinos Koutroumbas
15:40		
15:40 16:10	Coffee	
16:10 *Oral until 17:50*	**Session fri-o-3-a** **Advanced concepts and methods** Session chairs : Manuel Grana, University of the Basque Country, Spain Naoto Yokoya, University of Tokyo, Japan	**Session fri-o-3-b** **Application of hyperspectral imaging on agricultural and ecological systems (2)** Session chairs : Alina Zare, University of Missouri, USA Emmanuelle Vaudour, INRA/AgroParisTech, France
16:10	ANALYSIS AND UTILITY OF ATMOSPHERIC COMPENSATION OF SIMULATED COMPRESSIVE SENSING (CS) MEASUREMENTS Maria Busuioceanu, David Messinger, John Greer and Christopher Flake	PLANT PRODUCTION SYSTEM MONITORING VIA MULTIPLE SIGNAL CLASSIFICATION AND SPARSE REGRESSION Marian-Daniel Iordache, Ben Somers, Laurent Tits, José Bioucas-Dias, Antonio Plaza and Pol Coppin
16:30	ANT COLONY OPTIMIZATION FOR SUPERVISED AND UNSUPERVISED HYPERSPECTRAL BAND SELECTION Jianwei Gao, Qian Du, Lianru Gao, Xu Sun, Yuanfeng Wu and Bing Zhang	DETECTION OF BASAL STEM ROT (BSR) DISEASE AT OIL PALM PLANTATION USING HYPERSPECTRAL IMAGING Alias Mohd Sood, Ismail Adnan Abdul Malik and Jugah Kadir
16:50	SUBSPACE DETECTION BASED ON THE COMBINATION OF NONLINEAR FEATURE EXTRACTION AND FEATURE SELECTION Md. Ali Hossain, Xiuping Jia and Mark Pickering	HYPERSPECTRAL BAND SELECTION USING KULLBACK-LEIBLER DIVERGENCE FOR BLUEBERRY FRUIT DETECTION Ce Yang, Won Suk Lee, Gader Paul and Han Li
17:10	SEMANTIC ANALYSIS OF EO-1 HYPERION HYPERSPECTRAL DATA Teodor Costachioiu, Rodica Constantinescu, Vasile Lazarescu and Mihai Datcu	PROPAGATION OF SHADOW EFFECTS ON TYPICAL REMOTE SENSING APPLICATIONS IN FORESTRY Pieter Kempeneers, Flore Devriendt, Frieke Van Coillie and Kris Vandekerkhove
17:30	EMBEDDING MULTIPLE INSTANCES: APPLICATIONS TO HYPERSPECTRAL IMAGE ANALYSIS Jeremy Bolton, Paul Gader and Ami Gates	BIODIVERSITY ASSESSMENT USING HIERARCHICAL CLUSTERING OVER HYPERSPECTRAL IMAGES Ollantay Medina, Vidya Manian and Jesus Chinea
17:50		

7. Plenary speakers

PLENARY 1 (Wednesday, 26, June, 8:30)

COMPRESSIVE SPECTRAL IMAGING

David J. Brady, *Department of Electrical and Computer Engineering, Box 90291, Duke University, Durham, NC 27708, 919 660 5394*

Abstract:

Optical data streams for wide field, high resolution spectral images may exceed terapixels per second. This talk reviews sensor-level compression strategies that may enable full resolution object detection and reconstruction. Management of forward model conditioning to obtain compact kernel support and object specific conditioning is essential to compressive coding. We review coded aperture design and implementation strategies and describe example spectral, polarimetric and video compression systems.

Biography :

David Brady is the Michael J. Fitzpatrick Endowed Professor of Photonics at Duke University, where he leads the Duke Imaging and Spectroscopy Program. Brady's contributions to computational imaging system development include lensless white light imaging, optical projection tomography, compressive holography, reference structure tomography, coded aperture snapshot spectral imaging and coded aperture x-ray scatter imaging. He is currently the principal investigator for the DARPA AWARE Wide Field of View project, which aims to build compact streaming gigapixel scale imagers and the DARPA Knowledge Enhanced Exapixel Photography project, which focuses on code design for high pixel count spectral imagers. He is the author of Optical Imaging and Spectroscopy (Wiley-OSA, 2009) and is a Fellow of IEEE, SPIE and OSA.

PLENARY 2 (Thursday, 27, June, 8:30)

THE HYPERION IMAGING SPECTROMETER ON THE EARTH OBSERVING ONE (EO-1) SATELLITE: OVER A DOZEN YEARS IN SPACE

Elizabeth M. Middleton, *BiosphericSciencesLaboratory(Code618),NASA/Goddard Space Flight Center, Greenbelt, MD 20771, USA*

co-authors :
Petya E. Campbell, *University of Maryland Baltimore County, Baltimore, MD 21228, USA*
K. Fred Huemmrich, *University of Maryland Baltimore County, Baltimore, MD 21228, USA*
Lawrence Ong, *Systems Science and Applications, Inc., Lanham, MD 20706, USA*
Stuart Frye, *SGT, Greenbelt, MD 20770, USA*
David R. Landis, *Sigma Space Corp., Inc., Lanham, MD 20706, USA*

Abstract:

The Earth Observing One (EO-1) satellite was launched in November 2000, and has successfully completed more than 12 years of high spatial resolution (30 m) imaging operations from a low Earth orbit. The EO-1 imaging spectrometer, Hyperion, is a unique space-borne instrument (10 nm spectral resolution between 400-2500 nm, 2 week revisits). It is co-manifested with the multi-spectral Advanced Land Imager (ALI) which has provided the heritage and direct prototype for the recently launched Landsat-8 (February 2013). Hyperion serves as the heritage orbital spectrometer for future global imaging spectrometer missions, including the proposed NASA Hyperspectral Infrared Imager (HyspIRI). This paper provides an overview of the EO-1 mission, including the several phases which characterize its lifetime, with a focus on the use of Hyperion data for science and applications,

including calibration and validation and spin-off technologies such an Intelligent Payload Module (IPM), and Web-based tools. This infrastructure, developed for and prototyped onboard EO-1, can be readily adapted for use by future missions to enable more effective delivery and use of multi-satellite data.

Keywords: Remote Sensing, Imaging Spectroscopy, Environmental Studies.

Biography :

Elizabeth M. Middleton is a Senior Scientist with the Laboratory for Biospheric Sciences (Code 618) at NASA/Goddard Space Flight Center, Greenbelt, MD. She is currently the Mission Scientist for the Earth Exploring One (EO-1) satellite and the GSFC lead for the NASA HyspIRI satellite concept development. Dr. Middleton recently received the 2012 William Nordberg Award in Earth Science at NASA/GSFC. In 2011, she received a Career Achievement Award from the Hydrospheric and Biospheric Sciences Laboratory at GSFC. She also received NASA Group Achievement Awards in 1983, 1994, 1995 and 2003, respectively, in addition to numerous Performance Awards. She has previously served, and is currently serving, as the Outside Observer on the Mission Advisory Group (2007-2009, 2011+) for a European Space Agency's Phase A/B1 satellite mission concept-- the FLuorescence Explorer (FLEX). Dr. Middleton was a PI in the Boreal Ecosystem-Atmosphere Study (BOREAS, 1993-1997) in Saskatchewan, Canada to study foliage biochemical and spectral properties, and a Co-I in the First International Satellite Land Surface Climatology Project's (ISLSCP) Field Experiment (FIFE) in Kansas (1983-1988) to study bidirectional reflectance properties of grasslands. In addition, she was a member of NASA/GSFC Carbon Cycle Science Working Group (2000-2007) and the NASA representative to the US Federal Geographic Data Committee's Vegetation Subcommittee for many years. Dr. Middleton leads a research team that studies vegetation spectral bio-indicators of plant stress and photosynthetic function, including plant fluorescence. She is Associate Editor of J. Appl. Remote Sensing and is serving as Guest Editor for a Special Issue of J. Special Topics in Applied Earth Remote Sensing (JSTARS) devoted to EO-1. She received the B.S. degree in Zoology from the University of Maryland (1967), the M.S. degree in Ecology from the University of Maryland (1976), and the Ph.D. degree in Botany from the University of Maryland (1993).

PLENARY 3 (Friday, 28, June, 8:30)

RECENT ADVANCES IN SPECTRAL UNMIXING OF HYPERSPECTRAL DATA

Prof. Antonio Plaza, *Head of the Hyperspectral Computing Laboratory, Department of Technology of Computers and Communications, University of Extremadura, Escuela Politécnica de Cáceres, Spain*

Abstract:

Spectral unmixing is an important task for remotely sensed hyperspectral data exploitation. It amounts at finding the spectrally pure constituents in the scene (called endmembers in hyperspectral imaging terminology) and their fractional abundances on a sub-pixel level. Spectral unmixing allows for a detailed analysis of hyperspectral images with sub-pixel precision. Research in spectral unmixing has evolved significantly in the last few years, from the first efforts focused on linear spectral unmixing (assuming linear interactions between the endmembers) in which techniques assumed the presence of pure spectral endmembers in the data, to a current scenario in which most unmixing techniques assume that pure spectral signatures may not be present in the image scene due to spatial resolution and other phenomena.

In this talk, the state of the art for spectral unmixing will be reviewed and recent advances in this area will be described, including solutions based on using spectral libraries for sparse unmixing, or nonlinear spectral unmixing solutions able to account for more complex endmember distributions and spectral variability present in natural scenes. Synergies between spectral unmixing and hyperspectral image classification will also be addressed.

Biography :

Antonio Plaza was born in Cáceres, Spain, in 1975. He received the M.S. and Ph.D. degrees in computer engineering from the University of Extremadura, Spain. He has been a Visiting Researcher with the Remote Sensing Signal and Image Processing Laboratory (RSSIPL), University of Maryland Baltimore County; with the Applied Information Sciences Branch, NASA Goddard Space Flight Center (GSFC), Greenbelt, MD; with the Airborne Visible Infrared Imaging Spectrometer Data Facility, NASA Jet Propulsion Laboratory (JPL), Pasadena, CA; with the Telecommunications and Remote Sensing Laboratory, University of Pavia, Italy; and with the GIPSA-lab, Grenoble Images Parole Signal Automatique, France. He is currently an Associate Professor (with accreditation for Full Professor) with the Department of Technology of Computers and Communications, University of Extremadura, where he is the Head of the Hyperspectral Computing Laboratory (HyperComp). He was the Coordinator of the Hyperspectral Imaging Network, a European project designed to build an interdisciplinary research community focused on hyperspectral imaging activities. He is the author or coauthor of more than 350 publications on remotely sensed hyperspectral imaging, including more than 90 journal citation report papers (45 since January 2011), around 20 book chapters, and over 230 conference proceeding papers. His research interests include remotely sensed hyperspectral imaging, pattern recognition, signal and image processing, and efficient implementation of large-scale scientific problems on parallel and distributed computer architectures. Dr. Plaza has guest edited seven special issues on scientific journals on the topic of remotely sensed hyperspectral imaging. He has been a Chair for the IEEE Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote Sensing (Whispers 2011). He has also been serving as a Chair for the SPIE Conference on Satellite Data Compression, Communications, and Processing, since 2009, and for the SPIE Europe Conference on High-Performance Computing in Remote Sensing, since 2011. He has been a recipient of the recognition of Best Reviewers of the IEEE Geoscience and Remote Sensing Letters in 2009 and a recipient of the recognition of Best Reviewers of the IEEE Transactions on Geoscience and Remote Sensing in 2010, a journal for which he has served as Associate Editor since 2007 and for which he has reviewed more than 260 manuscripts. He also served as the Director of Education Activities for the IEEE Geoscience and Remote Sensing Society (GRSS) in 2011-2012, and is currently serving as President of the Spanish Chapter of IEEE GRSS. In January 2013, he started a three-year term as Editor of the IEEE Transactions on Geoscience and Remote Sensing journal. Additional information is available at: http://www.umbc.edu/rssipl/people/aplaza

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