



w h i s p e r s

**First Workshop on  
Hyperspectral Image and Signal Processing :  
Evolution in Remote Sensing**

26 - 28 August 2009, Grenoble, France

**Workshop Program**





# WHISPERS at a glance

w h i s p e r s

## Wednesday, August 26, 2009

---

|               |  |        |
|---------------|--|--------|
| 07:30 - 09:00 | Arrival and registration   |        |
| 09:00 - 09:30 | Opening of the workshop  |        |
| 09:30 - 10h30 | Plenary 1 - Hyperspectral imaging and food safety                          |        |
| 10:30 - 12h10 |  |        |
| wed-o-1-a     | Recent Advances in Spectral Mixture Analysis of Hyperspectral Data (1/3)   | oral   |
| wed-o-1-b     | Exploring matter and physical processes in the Solar System and galaxies   |        |
| 12:10 - 13:10 |  |        |
| wed-p-a       | Feature selection, band selection & dimension reduction                    | poster |
| 13:10 - 14:30 | Lunch break  |        |
| 14:30 - 16:10 |  |        |
| wed-o-2-a     | Hyperspectral methods for difficult target detection (1/2)                 | oral   |
| wed-o-2-b     | Recent advances in multi-dimensional optical spectroscopic data processing |        |
| 16:10 - 16:40 | Coffee break   |        |
| 16:40 - 18:40 |  |        |
| wed-o-3-a     | Contextual analysis for segmentation and classification                    | oral   |
| wed-o-3-b     | Monitoring and management of the environment                               |        |

## Thursday, August 27, 2009

---

|               |   |        |
|---------------|---|--------|
| 08:30 - 09:30 | Plenary 2 - Planetary exploration with VIS-NIR imaging spectrometers: the VIRTIS case |        |
| 09:30 - 11h10 |   |        |
| thu-o-1-a     | Recent Advances in Spectral Mixture Analysis of Hyperspectral Data (2/3)              | oral   |
| thu-o-1-b     | Applications in forestry  |        |
| 11:10 - 11:40 | Coffee break  |        |
| 11:40 - 13h00 |   |        |
| thu-p-a       | Image classification and segmentation   |        |
| thu-p-b       | Applications in forestry and agriculture  | poster |
| thu-p-c       | High performance computing, efficient implementation, software                        |        |
| 13:00 - 14:30 | Lunch break   |        |
| 14:30 - 16:10 |   |        |
| thu-o-2-a     | Hyperspectral data for planetary exploration (1/2)                                    | oral   |
| thu-o-2-b     | Applications of hyperspectral sensing   |        |
| 16:10 - 16:40 | Coffee break  |        |
| 16:40 - 18:40 |   |        |
| thu-o-3-a     | Calibration, atmospheric corrections and instruments                                  | oral   |
| thu-o-3-b     | Hyperspectral methods for difficult target detection (2/2)                            |        |

## Friday, August 28, 2009

---

|               |   |        |
|---------------|---|--------|
| 08:30 - 09:30 | Plenary 3 - Hyperspectral remote sensing for forestry applications        |        |
| 09:30 - 11h10 |   |        |
| fri-o-1-a     | Recent Advances in Spectral Mixture Analysis of Hyperspectral Data (3/3)  | oral   |
| fri-o-1-b     | Exploitation Algorithms Using Synthetic Hyperspectral Data                |        |
| 11:10 - 11:40 | Coffee break  |        |
| 11:40 - 13h00 |   |        |
| fri-p-a       | Data processing: advanced algorithms                                      | poster |
| fri-p-b       | Measurements, instruments and calibrations                                |        |
| 13:00 - 14:30 | Lunch break   |        |
| 14:30 - 16:30 |   |        |
| fri-o-2-a     | Context, ensemble & multiple instance based methods for HS image analysis | oral   |
| fri-o-2-b     | Hyperspectral data for planetary exploration (2/2)                        |        |
| 16:30 - 16:45 | Concluding remarks, Closing of the workshop                               |        |



w h i s p e r s

## Wednesday, August 26, 2009 Overview

07:30 - 09:00 Arrival and registration

09:00 - 09:30 Opening of the workshop

09:30 - 10h30 **Plenary 1 - Hyperspectral imaging and food safety**

10:30 - 12h10 **Session wed-o-1-a**

**Recent Advances in Spectral Mixture Analysis of Hyperspectral Data (1/3)**

Session Chairs: Antonio Plaza, Uni. Extremadura – Caceres – Spain  
Christian Jutten, GIPSA-Lab – Grenoble – France

**Session wed-o-1-b**

**Exploring matter and physical processes in the Solar System and galaxies**

Session Chairs: Olivier Forni, CESR – Univ. Toulouse – France  
Olivier Berné, Centro de Astrobiologia – Madrid – Spain

12:10 - 13:10 **Session wed-p-a**

**Feature selection, band selection & dimension reduction**

Session Chairs: Lori Bruce, Mississippi State Univ. – USA  
Bin Luo, GIPSA-lab – Grenoble – France

13:10 - 14:30 Lunch break

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

**Hyperspectral methods for difficult target detection (1/2)**

Session Chairs: Al Schaum, Naval Research Lab. – Washington – USA  
James Theiler, Space & RemoteSens.Sc. – LosAlamos – USA

**Session wed-o-2-b**

**Recent advances in multi-dimensional optical spectroscopic data processing**

Session Chairs: Valeriu Vrabie, Univ. Reims – Reims – France  
Cyril Gobinet, Univ. Reims – Reims – France

16:10 - 16:40 Coffee break

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

**Contextual analysis for segmentation and classification**

Session Chairs: Melba Crawford, Purdue Univ. – West Lafayette, IN – USA  
Mark Berman, CSIRO – North Ryde NSW – Australia

**Session wed-o-3-b**

**Monitoring and management of the environment**

Session Chairs: Anita Simic, Univ. of Toronto – Canada  
Shinya Odagawa, ERSDAC – Tokyo – Japan



Wednesday, August 26, 2009

w h i s p e r s

07:30 - 09:00 Arrival and registration

09:00 - 09:30 Opening of the workshop

09:30 - 10h30 **Plenary 1 - Hyperspectral imaging and food safety**

Alan M. Lefcourt, Ph.D. Research Biomedical Engineer  
USDA Agricultural Research Service, Beltsville, USA

10:30 - 12h10 **Session wed-o-1-a**

**Recent Advances in Spectral Mixture Analysis of Hyperspectral Data (1/3)**

Session Chairs: Antonio Plaza, Uni. Extremadura – Caceres – Spain  
Christian Jutten, GIPSA-Lab – Grenoble – France

10:30 - 10:50 Variable splitting augmented lagrangian approach to linear spectral unmixing  
Jose Bioucas-Dias

10:50 - 11:10 Spatial constraints on endmember extraction and optimization of per-pixel endmember sets for spectral unmixing.  
Benoit Rivard, Derek Rogge, Jilu Feng and Jinkai Zhang

11:10 - 11:30 An NCM-based Bayesian algorithm for hyperspectral unmixing  
Olivier Eches, Nicolas Dobigeon and Jean-Yves Tourneret

11:30 - 11:50 A comparison of kernel functions for intimate mixture models  
Joshua Broadwater and Amit Banerjee

11:50 - 12:10 Kernel-based linear spectral mixture analysis for hyperspectral image classification  
Keng-Hao Liu, Englin Wong and Chein-I Chang

10:30 - 12h10 **Session wed-o-1-b**

**Exploring matter and physical processes in the Solar System and galaxies**

Session Chairs: Olivier Forni, CESR – Univ. Toulouse – France  
Olivier Berné, Centro de Astrobiología – Madrid – Spain

10:30 - 10:50 Data inversion for hyperspectral objects in astronomy  
Thomas Rodet, François Orioux, Jean-François Giovannelli and Alain Abergel

10:50 - 11:10 Multispectral imaging the Sun in the ultraviolet  
Thierry Dudok de Wit, Saïd Moussaoui, Pierre-Olivier Amblard, Jean Abouardham, Frédéric Auchère, Matthieu Kretschmar and Jean Liliensten

11:10 - 11:30 Source separation algorithms for the analysis of hyperspectral observations of very small interstellar dust particles  
Olivier Berné, Christine Joblin, Alexander Tielens, Yannick Deville, Matthieu Puigt, Rima Guidara, Giacomo Mulas, Jan Cami and Shahram Hosseini

11:30 - 11:50 Independent component analysis of the gamma ray spectrometer data of Selene (Kaguya)  
O. Forni, O. Gasnault, B. Diez, L. D'uston, S. Maurice, N. Hasebe, O. Okudaira, N. Yamashita, S. Kobayashi, Y. Karouji, M. Hareyama, M. Kobayashi, R. C. Reedy and K. J. Kim



w h i s p e r s

Wednesday, August 26, 2009

11:50 - 12:10 Fast forward modeling of Titan's infrared spectra to invert Vims/Cassini hyperspectral images

Sebastien Rodriguez, Stephane Le Mouelic, Pascal Rannou, Jean-Philippe Combe, Lucille Le Corre, Gabriel Tobie, Jason W. Barnes, Christophe Sotin, Robert H. Brown, Kevin H. Baines, Bonnie J. Buratti, Roger N. Clark and Phil D. Nicholson

12:10 - 13:10 **Session wed-p-a**

**Feature selection, band selection & dimension reduction**

Session Chairs: Lori Bruce, Mississippi State Univ. – USA  
Bin Luo, GIPSA-lab – Grenoble – France

- 01 Preliminary hyperspectral band selection for difficult object detection  
Lukasz Paluchowski and Piotr Walczykowski.
- 02 Feature selection and broad band bitumen content estimation of Athabasca oil sand from infrared reflectance spectra  
Jilu Feng, Benoit Rivard, Ann Gallie and Ed Cloutis.
- 03 Algorithms for robust signal subspace identification in hyperspectral images: a comparative analysis  
Nicola Acito, Marco Diani and Giovanni Corsini.
- 04 Minimum surface bhattacharyya feature selection  
Jose Gonzalez, Michael Mendenhall and Erzsebet Merenyi.
- 05 Dimensionality reduction of hyperspectral data: a fractal based approach  
Dr. Jayanta Kumar Ghosh and Kriti Mukherjee.
- 06 Optimal band selection for future satellite sensor dedicated to soil science  
Sivasathivel Kandasamy, Audrey Roman, François Tavin, Sandrine Mathieu, Frédéric Baret and Pierre Gouton.
- 07 Autoassociative neural networks for features reduction of hyperspectral data  
Fabio Del Frate, Giorgio Licciardi and Riccardo Duca.
- 08 Optimal individual supervised hyperspectral band selection distinguishing savannah trees at leaf level  
Pravesh Debba, Moses Cho and Renaud Mathieu.
- 09 Spectral band discrimination for species observed from hyperspectral remote sensing  
Nontembeko Dudeni, Pravesh Debba, Moses Cho and Renaud Mathieu.
- 10 Adaptive nonparametric weighed feature extraction for hyperspectral image classification  
Bor-Chen Kuo, Shih-Syun Lin, Hsin-Hua Ho and Jinn-Min Yang.

13:10 - 14:30 Lunch break



w h i s p e r s

Wednesday, August 26, 2009

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

**Hyperspectral methods for difficult target detection (1/2)**

Session Chairs: Al Schaum, Naval Research Lab. – Washington – USA  
James Theiler, Space & RemoteSens.Sc.– LosAlamos – USA

14:30 - 14:50 Spectroscopic and hyperspectral evaluation of possible hydrocarbon occurrences in estuarine sediments, North Charleston, South Carolina, USA  
Amer Smailbegovic

14:50 - 15:10 Kernel subspace-based anomaly detection for hyperspectral imagery  
Nasser Nasrabadi

15:10 - 15:30 Improved hyperspectral anomaly detection in heavy-tailed backgrounds  
Steven Adler-Golden

15:30 - 15:50 Weak signal detection in hyperspectral imagery using sparse matrix transform (SMT) covariance estimation  
Guangzhi Cao, Charles A. Bouman and James Theiler

15:50 - 16:10 Multiple endmember spectral-angle-mapper (sam) analysis improves discrimination of savanna tree species  
Moses Azong Cho, Renaud Mathieu and Pravesh Debba

14:30 - 16:10 **Session wed-o-2-b**

**Recent advances in multi-dimensional optical spectroscopic data processing**

Session Chairs: Valeriu Vrabie, Univ. Reims – Reims – France  
Cyril Gobinet, Univ. Reims – Reims – France

14:30 - 14:50 Non-negative Matrix Factorization: a blind sources separation method to unmix fluorescence spectra  
Anne-Sophie Montcuquet, Lionel Hervé, Laurent Guyon, Jean-Marc Dinten and Jérôme I. Mars

14:50 - 15:10 Evaluation of unmixing methods for the separation of quantum dot sources  
Paul Fogel, Cyril Gobinet, S. Stanley Young and Didier Zugaj

15:10 - 15:30 From preprocessing to fuzzy classification of IR images of paraffin embedded cancerous skin samples  
David Sebiskveradze, Elodie Ly, Cyril Gobinet, Olivier Piot, Michel Manfait, Pierre Jeannesson and Valeriu Vrabie.

15:30 - 15:50 Functional and pathological analysis of biological systems using vibrational spectroscopy with chemometric and heuristic approaches  
Aidan Meade

15:50 - 16:10 On the modeling and processing of polarization in Raman spectroscopy  
Sebastian Miron, David Brie, Manuel Dossot and Bernard Humbert

16:10 - 16:40 Coffee break



w h i s p e r s

Wednesday, August 26, 2009

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

**Contextual analysis for segmentation and classification**

Session Chairs: Melba Crawford, Purdue Univ. – West Lafayette, IN – USA  
Mark Berman, CSIRO – North Ryde NSW – Australia

16:40 - 17:00 A novel adaptive classification method for hyperspectral data using manifold regularization kernel machines  
Wonkook Kim and Melba Crawford

17:00 - 17:20 Morphological scale-space for hyperspectral images and dimensionality exploration using tensor modeling  
Santiago Velasco-Forero and Jesús Angulo

17:20 - 17:40 Hyperspectral image segmentation: the butterfly approach  
Nathalie Gorretta, Jean-Michel Roger, Gilles Rabatel, Bellon-Maurel Véronique, Christophe Fiorio and Camille Lelong

17:40 - 18:00 Classification of hyperspectral images using automatic marker selection and minimum spanning forest  
Yuliya Tarabalka, Jocelyn Chanussot and Jon Atli Benediktsson

18:00 - 18:20 A nonparametric contextual classification based on markov random fields  
Bor-Chen Kuo, Chun-Hsiang Chuang, Chih-Sheng Huang and Chih-Cheng Hung

18:20 - 18:40 Impact of different morphological profiles on the classification accuracy of urban hyperspectral data  
Björn Waske, Sebastian van der Linden, Jón Atli Benediktsson, Andreas Rabe and Patrick Hostert

16:40 - 18:40 **Session wed-o-3-b**

**Monitoring and management of the environment**

Session Chairs: Anita Simic, Univ. of Toronto – Canada  
Shinya Odagawa, ERSDAC – Tokyo – Japan

16:40 - 17:00 Independent component analysis for coastal water mapping using hyperspectral datasets  
Vassilia Karathanassi, Polychronis Kolokoussis and Styliani Ioannidou

17:00 - 17:20 Hyperspectral remote sensing data to map hazardous materials in rural and industrial district: the Podgorica dwellings case studies  
Rosa Maria Cavalli, Simone Pascucci and Stefano Pignatti

17:20 - 17:40 Using airborne hyperspectral data to characterize the surface pH of pyrite mine tailings  
Natalie Zabcic, Benoit Rivard, Cindy Ong and Andreas Mueller

17:40 - 18:00 Discrimination of fungal disease infestation in oil-palm canopy hyperspectral reflectance data  
Camille Lelong, Jean-Michel Roger, Simon Brégand, Fabrice Dubertret, Mathieu Lanore, Nurul Sitorus, Doni Raharjo and Jean-Pierre Caliman

18:00 - 18:20 Field reflectance spectroscopy of sparse vegetation cover on the Antarctic Peninsula  
Christian Haselwimmer and Peter Fretwell

18:20 - 18:40 Onboard svm analysis of Hyperion data to detect sulfur deposits in Arctic regions  
Lukas Mandrake, Kiri Wagstaff, Damhnait Gleeson, Umaa Rebbapragada, Daniel Tran, Rebecca Castano, Steve Chien and Robert Pappalardo



w h i s p e r s

Thursday, August 27, 2009  
Overview

08:30 - 09:30 **Plenary 2 - Hyperspectral imaging and spectroscopy in astrophysics** (tbc)

09:30 - 11h10 **Session thu-o-1-a**

**Recent Advances in Spectral Mixture Analysis of Hyperspectral Data (2/3)**

Session Chairs: Jose M. Bioucas Dias, Tech. Univ. Lisbon – Portugal  
Qian Du, Mississippi State University – USA

**Session thu-o-1-b**

**Applications in forestry**

Session Chairs: David Goodenough, Univ. of Victoria – Victoria, BC – Canada  
Ils Reusen, VITO – Belgium

11:10 - 11:40 Coffee break

11:40 - 13h00 **Session thu-p-a**

**Image classification and segmentation**

Session Chairs: Björn Wäske, Univ. of Iceland – Reykjavik – Iceland  
Massimo Selva, Univ. of Florence – Italy

**Session thu-p-b**

**Applications in forestry and agriculture**

Session Chairs: Wonkook Kim, Purdue Univ. – West Lafayette IN, – USA  
Armando Apan, Univ. of Southern Queensland – Australia

**Session thu-p-c**

**High performance computing, efficient implementation, software**

Session Chairs: Wee-Chin Goh, DSO – Singapore  
Yuliya Tarabalka, GIPSA-lab – Grenoble – France

13:00 - 14:30 Lunch break

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

**Hyperspectral data for planetary exploration (1/2)**

Session Chairs: Eric Slezak, Observatoire de la Côte d'Azur – Nice – France  
David Ray Thompson, NASA JPL – Pasadena, CA – USA

**Session thu-o-2-b**

**Applications of hyperspectral sensing**

Session Chairs: Steven Adler-Golden, Spectral Sciences Inc. – Burlington, MA – USA  
Gilles Rabatel, CEMAGREF – Montpellier – France

16:10 - 16:40 Coffee break

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

**Calibration and atmospheric corrections**

Session Chairs: Stanley Rotman, Ben-Gurion Univ. of the Negev – Israël  
Robert Sundberg, Spectral Sciences Inc. – Burlington, MA – USA

**Session thu-o-3-b**

**Hyperspectral methods for difficult target detection (2/2)**

Session Chairs: Al Schaum, Naval Research Lab. – Washington – USA  
James Theiler, Space & RemoteSens.Sc. – LosAlamos – USA





w h i s p e r s

Thursday, August 27, 2009

08:30 - 09:30 **Plenary 2 - Hyperspectral imaging and spectroscopy in astrophysics** (tbc)

09:30 - 11h10 **Session thu-o-1-a**

**Recent Advances in Spectral Mixture Analysis of Hyperspectral Data (2/3)**

Session Chairs: Jose M. Bioucas Dias, Tech. Univ. Lisbon – Portugal  
Qian Du, Mississippi State University – USA

09:30 - 09:50 Reducing Noise in Hyperspectral Data – A Nonlinear Data Series Analysis Approach  
David Goodenough and Tian Han

09:50 - 10:10 On the incorporation of spatial information to endmember extraction: survey and algorithm comparison  
Antonio Plaza, Gabriel Martin and Maciel Zortea

10:10 - 10:30 Hyperspectral unmixing from a convex analysis and optimization perspective  
Tsung-Han Chan, Wing-Kin Ma, Chong-Yung Chi and ArulMurugan Ambikapathi

10:30 - 10:50 Component Analysis-Based Unsupervised Linear Spectral Mixture Analysis for Hyperspectral Imagery  
Xiaoli Jiao, Yingzi (Eliza) Du and Chein-I Chang

10:50 - 11:10 Applying linear spectral unmixing to airborne hyperspectral imagery for mapping crop yield variability  
Chenghai Yang, James Everitt and Joe Bradford

09:30 - 11h10 **Session thu-o-1-b**

**Applications in forestry**

Session Chairs: David Goodenough, Univ. of Victoria – Victoria, BC – Canada  
Ils Reusen, VITO – Belgium

09:30 - 09:50 LiDAR-Guided Analysis of Airborne Hyperspectral Data  
Olaf Niemann, Gordon Frazer, Rafael Loos and Fabio Visintini

09:50 - 10:10 Fusing minnaert-k with spectral unmixing for forest heterogeneity mapping using chris-proba data  
Jochem Verrelst, Michael Schaepman and Jan Clevers

10:10 - 10:30 Mapping spatio-temporal variation in Douglas-fir (*pseudotsuga menziesii*) foliar biochemistry  
David Goodenough, K. Olaf Niemann, Geoffrey Quinn and Jessie Liu

10:30 - 10:50 Estimating foliar biochemistry from reflectance and the detection of *phellinus sulphurascens* induced stress  
Geoffrey Quinn, Olaf Niemann and David Goodenough

10:50 - 11:10 Discrimination of remnant tree species and regeneration stages in queensland, australia using hyperspectral imagery  
Armando Apan, Stuart Phinn and Tek Maraseni

11:10 - 11:40 Coffee break



Thursday, August 27, 2009

w h i s p e r s

11:40 - 13h00 **Session thu-p-a**

**Image classification and segmentation**

Session Chairs: Björn Wäske, Univ. of Iceland – Reykjavik – Iceland  
Massimo Selva, Univ. of Florence – Italy

- 01 Subspace selection based multiple classifier systems for hyperspectral image classification  
Bor-Chen Kuo, Chun-Hsiang Chuang, Cheng-Hsuan Li and Chin-Teng Lin.
- 02 Semi-supervised hyperspectral image segmentation  
Jun Li, José Bioucas-Dias and Antonio Plaza.
- 03 A svms-based hyperspectral data classification algorithm in a similarity space  
Reza Shah Hosseini and Saeid Homayouni.
- 04 Accurate svm classification using border training patterns  
Begüm Demir and Sarp Ertürk.
- 05 Improvement of remote sensing multispectral image classification by using independent component analysis  
Moussa Sofiane Karoui, Yannick Deville, Shahram Hosseini, Abdelaziz Ouamri and Danielle Ducrot.
- 06 Automated Labeling of Segmented Hyperspectral Imagery via Spectral Matching  
Brian Bue, Erzsebet Merenyi and Beata Csatho.
- 07 Sensitivity of hyperspectral classification algorithms to training sample size  
Matthew Lee, Saurabh Prasad, Terrance West, Hemanth Kalluri and Lori Bruce.
- 08 Local covariance matrices for improved target detection performance  
Stanley Rotman and Charlene Caefer.

11:40 - 13h00 **Session thu-p-b**

**Applications in forestry and agriculture**

Session Chairs: Wonkook Kim, Purdue Univ. – West Lafayette IN, – USA  
Armando Apan, Univ. of Southern Queensland – Australia

- 09 Tree species discrimination using continuum removed airborne hyperspectral data  
Shinya Odagawa and Kinya Okada.
- 10 Using hyperspectral remote sensing data for retrieving canopy water content  
Jan Clevers and Lammert Kooistra.
- 11 Canopy spectral invariants for remote sensing of canopy structure  
Yuri Knyazikhin, Mitchell Schull, Liang Xu, Ranga Myneni and Pedro Latorre Carmona.
- 12 Hyperspectral data analysis of nitrogen fertilization effects on winter wheat using spectrometer in north China plain  
Martin Leon Gnyp and Georg Bareth.



Thursday, August 27, 2009

w h i s p e r s

- 13 Hyperspectral imaging for mushroom (*agaricus bisporus*) quality monitoring  
Aoife Gowen and Colm O'Donnell.
- 14 Development of a broad landscape monitoring system using hyperspectral imagery to detect pest infestation  
John Glaser, Joseph Casas, Kenneth Copenhaver and Steffen Mueller.
- 15 Evaluation of oak wilt index based on genetic programming  
Kuniaki Uto, Yukio Kosugi and Toshinari Ogata.
- 16 Mapping agricultural crops with EO-1 Hyperion data  
Konstantinos Ntouros, Ioannis Gitas and Georgios Silleos.

11:40 - 13h00 **Session thu-p-c**

**High performance computing, efficient implementation, software**

Session Chairs: Wee-Chin Goh, DSO – Singapore  
Yuliya Tarabalka, GIPSA-lab – Grenoble – France

- 17 Efficient implementation of morphological opening and closing by reconstruction on multi-core parallel systems  
David Valencia and Antonio Plaza
- 18 Onboard classification of hyperspectral data on the earth observing one mission  
Steve Chien, Daniel Tran and steve schaffer.
- 19 A novel scheme for the compression and classification of hyperspectral images  
Bei Xie, Tamal Bose and Erzsebet Merenyi.
- 20 Speeding up the MATLAB Hyperspectral Image Analysis Toolbox using GPUs and the Jacket Toolbox  
Samuel Rosario-Torres and Miguel Velez-Reyes.
- 21 Abstracting GIS layers from hyperspectral imagery  
Torsten Howard, Michael Mendenhall and Gilbert Peterson
- 22 The cost of time – implications of hyperspectral data volume and feature selection routines for conservation science  
Margaret Kalacska and Pablo Arroyo

13:00 - 14:30 Lunch break



w h i s p e r s

Thursday, August 27, 2009

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

**Hyperspectral data for planetary exploration (1/2)**

Session Chairs: Eric Slezak, Observatoire de la Côte d'Azur – Nice – France  
David Ray Thompson, NASA JPL – Pasadena, CA – USA

- 14:30 - 14:50 Sparse Superpixel Unmixing for Exploratory Analysis of CRISM Hyperspectral Images  
David Ray Thompson, Rebecca Castano and Martha Gilmore
- 14:50 - 15:10 Deconvolution of vnir spectra using modified gaussian modeling (MGM) with automatic parameter initialization (API) applied to crism  
Heather Makarewicz, Mario Parente and Janice Bishop
- 15:10 - 15:30 Hyperspectral and Luminescence Observer (HALO) Mars mission concept - innovative data triage, compression, processing and analysis for the hyperspectral imager  
Edward Cloutis, Begona Vila, Andrew Bell and Michel Lamothe
- 15:30 - 15:50 Influence of mineral (preferred) orientation on composition mapping: observed in ir range of transmission spectra.  
Ekaterina Carmina and Véronique Carrère
- 15:50 - 16:10 Earth-Atmosphere radiative transfer in DART model  
Grau Eloi, Gastellu-Etchegorry Jean-Philippe, Gascon Ferran, Rubio Jeremy and Brut Aurore
- 14:30 - 16:10 **Session thu-o-2-b**
- Applications of hyperspectral sensing**
- Session Chairs: Steven Adler-Golden, Spectral Sciences Inc. – Burlington, MA – USA  
Gilles Rabatel, CEMAGREF – Montpellier – France
- 14:30 - 14:50 Melanosome level estimation in human skin from hyperspectral imagery  
Abel Nunez and Michael Mendenhall
- 14:50 - 15:10 Hyperspectral characterization of microphytobenthic biofilms  
Farzaneh Kazemipour, Patrick Launeau and Vona Méléder
- 15:10 - 15:30 Hyper-spectral imaging of biofilm growth dynamics  
Lubos Polerecky, Judith M Klatt, Mohammad Al-Najjar and Dirk de Beer
- 15:30 - 15:50 Wheat straw composition and spectral reflectance changes during decomposition  
C.S.T. Daughtry, Guy Serbin, J.B. Reeves III, P.C. Doraiswamy and E.R. Hunt Jr.
- 15:50 - 16:10 Progress in retrieving canopy structural parameters and chlorophyll content using the refined hyperspectral and multi-angle measurement concept and casi data  
A. Simic and J. M. Chen
- 16:10 - 16:40 Coffee break



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

**Calibration and atmospheric corrections**

Session Chairs: Stanley Rotman, Ben-Gurion Univ. of the Negev – Israël  
Robert Sundberg, Spectral Sciences Inc. – Burlington, MA – USA

16:40 - 17:00 Forward modeling and atmospheric compensation in hyperspectral data: experimental analysis from a target detection perspective  
Stefania Matteoli, Emmett Ientilucci and John Kerekes

17:00 - 17:20 Calibration pipeline of vis-nir imaging spectrometers for planetary exploration: the rosetta virtis-m case  
Gianrico Filacchione, Fabrizio Capaccioni, Eleonora Ammannito, Angioletta Coradini, Maria Cristina De Sanctis and Giuseppe Piccioni

17:20 - 17:40 Atmospheric and topographic corrections for hyperspectral imagery  
Veronique Achard and Xavier Lenot

17:40 - 18:00 The Comparison of Pixel Size and Atmospheric Correction Method on a Matched Filter Detection for a Hyperspectral Image  
Patrick Conforti and Robert Sundberg

18:00 - 18:20 IDC-Improved Direct Calibration: a new direct calibration method applied to hyperspectral image analysis  
Jean-Claude Boulet, Nathalie Gorretta and Jean-Michel Roger

18:20 - 18:40 Signal-Dependent Noise Modelling and Estimation of New-Generation Imaging Spectrometers  
Luciano Alparone, Massimo Selva, Bruno Aiazzi, Stefano Baronti, Leandro Chiarantini and Francesco Butera

16:40 - 18:40 **Session thu-o-3-b**

**Hyperspectral methods for difficult target detection (2/2)**

Session Chairs: Al Schaum, Naval Research Lab. – Washington – USA  
James Theiler, Space & RemoteSens.Sc.– LosAlamos – USA

16:40 - 17:00 Local-global background modeling for anomaly detection in hyperspectral images  
Eyal Madar, Oleg Kuybeda, David Malah and Meir Bar Zohar

17:00 - 17:20 Remote spectral detection using a laboratory signature  
Alan Schaum

17:20 - 17:40 Simplifying support vector machines for regression analysis of hyperspectral imagery  
Andreas Rabe, Sebastian van der Linden and Patrick Hostert

17:40 - 18:00 On the reliability of pca for complex hyperspectral data  
Peter Bajorski

18:00 - 18:20 Comparison of radiative transfer in physics-based models for an improved understanding of empirical hyperspectral data  
Stefania Matteoli, Emmett Ientilucci and John Kerekes

18:20 - 18:40 Local approach to orthogonal subspace-based target detection in hyperspectral images  
Stefania Matteoli, Nicola Acito, Marco Diani and Giovanni Corsini



w h i s p e r s

Friday, August 28, 2009  
Overview

08:30 - 09:30 **Plenary 3 - Hyperspectral remote sensing for forestry applications**

09:30 - 11h10 **Session fri-o-1-a**

**Recent Advances in Spectral Mixture Analysis of Hyperspectral Data (3/3)**

Session chairs: Ryuei Nishii, Kyushu Univ. – Fukuoka – Japan  
Nicolas Dobigeon, TESA – Toulouse – France

**Session fri-o-1-b**

**Exploitation Algorithms Using Synthetic Hyperspectral Data**

Session chairs: Michael Mendenhall, Air Force Inst.of Tech. – USA  
John Kerekes, Rochester Institute of Technology – USA

11:10 - 11:40 Coffee break

11:40 - 13h00 **Session fri-p-a**

**Data processing: advanced algorithms**

Session chairs: Olaf Niemann, Univ. of Victoria – Victoria, BC – Canada  
Saurabh Prasad, Mississippi State Univ. – USA

**Session fri-p-b**

**Measurements, instruments and calibrations**

Session chairs: Didier Zugaj, Galderma – Sophia Antipolis – France  
Benoit Rivard, Univ. of Alberta – Edmonton – Canada

13:00 - 14:30 Lunch break

14:30 - 16:30 **Session fri-o-2-a**

**Context, ensemble & multiple instance based methods for HS image analysis**

Session chairs: Jeremy Bolton, Univ. Florida – Gainesville – USA  
Bor-Chen Kuo, National Taichung Univ. – Taiwan – ROC

**Session fri-o-2-b**

**Hyperspectral data for planetary exploration (2/2)**

Session chairs: Sylvain Douté, Lab. Planetology Grenoble – France  
Mathieu Fauvel, INRIA – Montbonnot – France

16:30 - 16:45 Concluding remarks, Closing of the workshop



w h i s p e r s

Friday, August 28, 2009

08:30 - 09:30 **Plenary 3 - Hyperspectral remote sensing for forestry applications**

Kamaruzaman Jusoff, Professor of Forest Engineering Survey  
Department of Forest Production, Universiti Putra Malaysia (UPM), Malaysia

09:30 - 11h10 **Session fri-o-1-a**

**Recent Advances in Spectral Mixture Analysis of Hyperspectral Data (3/3)**

Session chairs: Ryuei Nishii, Kyushu Univ. – Fukuoka – Japan  
Nicolas Dobigeon, TESA – Toulouse – France

09:30 - 09:50 Learning Dependent Sources using Mixtures of Dirichlet: Applications on Hyperspectral Unmixing  
Jose Nascimento and Jose Bioucas-Dias

09:50 - 10:10 Subpixel roughness effects in spectral thermal infrared emissivity images  
Iryna Danilina, Alan Gillespie, Lee Balick, Amit Mushkin, Matthew Smith and Michael O'Neal

10:10 - 10:30 4D deconvolution and demixing for supernova follow-up  
Sébastien Bongard, Eric Thiebaut, Ferréol Soulez and Emmanuel Pécontal

10:30 - 10:50 Hyperspectral pansharpening using qnr optimization constraint  
Muhammad Murtaza Khan, Jocelyn Chanussot and Luciano Alparone

10:50 - 11:10 Improving the quality of extracted endmembers  
Qian Du, Liangpei Zhang and Nareenart Raksuntorn

09:30 - 11h10 **Session fri-o-1-b**

**Exploitation Algorithms Using Synthetic Hyperspectral Data**

Session chairs: Michael Mendenhall, Air Force Inst.of Tech. – USA  
John Kerekes, Rochester Institute of Technology – USA

09:30 - 09:50 Simulation of the image generation process for CRISM spectrometer data  
Mario Parente, James Clark, Adrian Brown and Janice Bishop

09:50 - 10:10 Hyperspectral Target Detection Using Multiple Platform Cuing  
John Kerekes, David Pogorzala, John Parkes, Arnab Shaw and Daniel Rahn

10:10 - 10:30 Feature-Aided Tracking via Synthetic Hyperspectral Imagery  
Juan Vasquez, Andrew Rice, Michael Mendenhall and John Kerekes

10:30 - 10:50 On the evaluation of synthetic hyperspectral imagery  
Michael Mendenhall and Erzsebet Merenyi

10:50 - 11:10 building an integumentary system hyperspectral model for avatars  
Abel Nunez, Michael Mendenhall and Heidi Bertram

11:10 - 11:40 Coffee break



Friday, August 28, 2009

w h i s p e r s

11:40 - 13h00 **Session fri-p-a**

**Data processing: advanced algorithms**

Session chairs: Olaf Niemann, Univ. of Victoria – Victoria, BC – Canada  
Saurabh Prasad, Mississippi State Univ. – USA

- 01 Spectral unmixing via minimum volume simplices: application to near infrared spectra of counterfeit tablets  
Marta B. Lopes, José M. Bioucas-Dias, Jean-Claude Wolff and Mário A. T. Figueiredo.
- 02 An iterative least squares approach to decorrelate minerals and ices contributions in hyperspectral images : application to cuprite (Earth) and Mars  
Stéphane Le Mouélic, Jean-Philippe Combe, Vincent Sarago, Nicolas Mangold, Marion Massé, Jean-Pierre Bibring, Brigitte gondet, Yves Langevin and Christophe Sotin.
- 03 Improved change detection with local co-registration adjustments  
Brendt Wohlberg and James Theiler.
- 04 Change detection using synthetic hyperspectral imagery  
Michael Mendenhall, Karmon Vongsy, Philip Hanna and Jason Kaufman.
- 05 Spatial resolution enhancement of Hyperion hyperspectral data  
Konstantinos Nikolakopoulos.
- 06 Anomaly detection in complex environments: Evaluation of the inter- and intra-method consistency  
Dirk Borghys, Elie Truyen, Michal Shimoni and Christiaan Perneel.
- 07 Edge detection on hyperspectral imagery via manifold techniques  
Yuan Zhou, Bo Wu, Deren Li and Rongxing Li.
- 08 Funtional vector quantization by neural maps  
Thomas Villmann and Frank-Michael Schleif.
- 09 Uncertainty propagation analysis of the airborne hyperspectral data processing chain  
Johan Beekhuizen, Gerard Heuvelink, IIs Reusen and Jan Biesemans.
- 10 EUFAR goes hyperspectral in FP7  
IIs Reusen.
- 11 Applications for a hyperspectral video camera  
Amit Banerjee, Philippe Burlina and Joshua Broadwater.
- 12 Contextual unmixing of geospatial data based on  $[2mm]$  Markov random fields and conditional random fields  
Ryuei Nishii and Tomohiko Ozaki.





w h i s p e r s

Friday, August 28, 2009

11:40 - 13h00 **Session fri-p-b**

**Measurements, instruments and calibrations**

Session chairs: Didier Zugaj, Galderma – Sophia Antipolis – France  
Benoit Rivard, Univ. of Alberta – Edmonton – Canada

- 13 Airborne measurements in the infrared using FTIR-based imaging hyperspectral sensors  
P. Lagueux, V. Farley, M. Rolland, M. Chamberland, E. Puckrin, C.S. Turcotte, P. Lahaie and D. Dubé.
- 14 Sensitivity of the ground-based downwelling irradiance recorded by the fodis sensor in respect of different angular positions  
Lucie Homolova, Katja Alanko-Huotari and Michael Schaepman
- 15 Variation and sensitivity in spectral thermal ir emissivity measurements  
Lee Balick, Michael Howard, Heather Gledhill, Alan Klawitter and Alan Gillespie.
- 16 Furrow microrelief influence on the directional hiperspectral reflectance of soil at various illumination and observation conditions  
Jerzy Cierniewski and Marcin Guliński.
- 17 Calibration pipeline of virtis-m onboard Venus express  
Alejandro Cardesín Moineo, Giuseppe Piccioni and Eleonora Ammannito.
- 18 The structure of the apex (airborne prism experiment) processing and archiving facility  
Andreas Hueni, Jan Bieseman, Francesco Dell'Endice, Edoardo Alberti, Koen Meuleman and Michael Schaepman.
- 19 Close range hyperspectral and lidar data integration for geological outcrop analysis  
Tobias Kurz, Simon Buckley, John Howell and Danilo Schneider.

13:00 - 14:30 Lunch break



w h i s p e r s

Friday, August 28, 2009

14:30 - 16:30 **Session fri-o-2-a**

**Context, ensemble & multiple instance based methods for HS image analysis**

Session chairs: Jeremy Bolton, Univ. Florida – Gainesville – USA  
Bor-Chen Kuo, National Taichung Univ. – Taiwan – ROC

- 14:30 - 14:50 Context-dependent fusion for mine detection using airborne hyperspectral imagery  
Lijun Zhang, Hichem Frigui, Paul Gader and jeremy Bolton
- 14:50 - 15:10 Hyperspectral data classification using an ensemble of class-dependent neural networks  
Prashanth Reddy Marpu, Paolo Gamba and Irmgard Niemeyer.
- 15:10 - 15:30 Context-Based Endmember Detection for Hyperspectral Imagery  
Alina Zare and Paul Gader
- 15:30 - 15:50 Multiple Instance and Context Dependent Learning in Hyperspectral Data  
Peter Torrione, Christopher Ratto and Leslie Collins
- 15:50 - 16:10 A Random Measure Approach for Context Estimation in Hyperspectral Imagery  
Jeremy Bolton and Paul Gader
- 16:10 - 16:30 Fusion of spectral reflectance and derivative information for robust hyperspectral land cover classification  
Hemanth Kalluri, Saurabh Prasad and Lori Bruce

14:30 - 16:30 **Session fri-o-2-b**

**Hyperspectral data for planetary exploration (2/2)**

Session chairs: Sylvain Douté, Lab. Planetology Grenoble – France  
Mathieu Fauvel, INRIA – Montbonnot – France

- 14:30 - 14:50 VIS-NIR imaging spectroscopy of the Mercury's surface: simbio-sys/vihi experiment onboard the Bepi Colombo mission  
Fabrizio Capaccioni, Maria Cristina De Sanctis, Gianrico Filacchione, Giuseppe Piccioni, Eleonora Ammannito, Leonardo Tommasi, Iacopo Fikai Veltroni, Massimo Cosi, Stefano Debei, Alessandro Mazzoni and Enrico Flamini
- 14:50 - 15:10 Retrieving mars surface reflectance from omega/mex imagery  
Sylvain Douté.
- 15:10 - 15:30 Unsupervised Endmember Extraction of Marsian Hyperspectral Images  
Bin Luo, Jocelyn Chanussot, Sylvain Doute and Xavier Ceamanos
- 15:30 - 15:50 Spectral smile correction in crism hyperspectral images  
Xavier Ceamanos and Sylvain Douté
- 15:50 - 16:10 Machine learning techniques for the inversion of planetary hyperspectral images  
Mathieu Fauvel, Caroline Bernard Michel, Sylvain Doute, Stephane Girard and Laurent Gardes
- 16:10 - 16:30 Material identification on martian hyperspectral images using bayesian source separation  
Frederic Schmidt, Moussaoui Saïd and Dobigeon Nicolas
- 16:30 - 16:45 Concluding remarks, Closing of the workshop