whispers

7th Workshop on Hyperspectral Image and Signal Processing : Evolution in Remote Sensing

2-5 JUNE 2015, TOKYO, JAPAN

Workshop Program

IEEE GRSS Geoscience and Remote Sensing Society

伊藤国際学術研究センター
ITO INTERNATIONAL RESEARCH CENTER

東京大学
THE UNIVERSITY OF TOKYO

PROJET FINANCÉ PAR L'ANR · PROJECT FUNDED BY THE ANR

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whispers

2015
Tokyo, Japan

1. Foreword

It is with great pleasure that the University of Tokyo is hosting the 7th Annual IEEE WHISPERS in Japan.

More than 150 papers are submitted from all over the world. We wish to appreciate Jocelyn Chanussot and Naoto Yokoya, the program chairs, for the arrangement of all the peer reviews and completion of an excellent technical program. We also would like to thank all the reviewers, who carefully dedicated their efforts and time to improve the manuscripts, although we have an earlier schedule in this year to avoid the rainy season in Japan.

As is the tradition with WHISPERS, prior to the technical program, we have a tutorial on the rapidly growing topics in hyperspectral community. We would like to express our deepest gratitude to José Manuel Bioucas Dias for lecturing inverse problems in hyperspectral imaging.

The three days of technical program with two parallel sessions follows the tutorial. We are grateful to three plenary speakers, Yoshio Inoue, Lori M. Bruce and Bing Zhang, who show us the outstanding works in the hyperspectral research. In addition to the traditional hyperspectral topics, such as unmixing, classification, sensor design, planetary exploration, target detection and atmospheric correction, new topics on hyperspectral pansharpening, big data and various applications further enlarge a diversity of the hyperspectral community. Since several hyperspectral missions are going in space in the coming five years, the application studies of spaceborne hyperspectral imaging will direct you to the evolution of global contribution. We would like to thanks for the organizer of the special sessions.

This workshop is held by the back up of Ito International Research Center Conference. WHISPERS are also supported by the industry of hyperspectral instruments and software as well as public organizations. Please visit the exhibitors to feel the latest technologies that will lead to new scientific findings.

During your stay, we hope you will find and enjoy the various faces of Tokyo, historical and traditional places, Japanese culture (subculture) and modern attractions.

Thanks again for participating in WHISPERS 2015.

Akira Iwasaki

東京大学
THE UNIVERSITY OF TOKYO

2. Exhibitors

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.hyspex.no

Headwall is a global manufacturer of multispectral and hyperspectral imaging sensors for use in a wide range of remote sensing applications. Mounted aboard earth-orbiting satellites, fixed-wing aircraft, or UAVs, Headwall's sensors are small, light, and highly precise. Outstanding hyperspectral imaging performance is achieved thanks to aberration-corrected optics, which deliver high spatial and spectral resolution within a very wide field of view.

New for 2015 are three sensors designed for remote sensing applications. Nano-Hyperspec® is a lightweight and compact VNIR (400-1000nm) sensor suitable for small, hand-launched UAVs that combines integrated data storage and direct-attached GPS. Second is Headwall's wideband VNIR-SWIR sensor that covers the 400-2500nm spectral range and features co-registered pixels for outstanding image clarity and resolution. Third, Headwall offers a new high-resolution fluorescence sensor for precise environmental monitoring research that specifically targets the 754-775nm range in a small and lightweight package. Headwall is ISO-9001:2008-certified and operates from manufacturing facilities in the United States and Europe.

http://www.HeadwallPhotonics.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.

http://www.asdi.com

ImageONE is a distributor of ASD products in Japan.

http://www.imageone.co.jp

EXELIS

Visual Information Solutions

Exelis VIS K.K., a business unit of Exelis Inc. offers world-wide academic, commercial and government customers in Defense, Intelligence, Earth and Space Science and Aerospace areas with one of the widest ranges of capabilities in the image capture, and remote sensing industry. Exelis Inc. even offer image sensor of IKONOS, QuickBird, GeoEye-1/2, WorldView-1/2/3, MTSAT-2, and Himawari 8 as well.

We started to offer enterprise solution products such as ENVI Services Engine (ENVI in Cloud) and Jagwire.

ENVI leading and standard hyperspectral image processing software with atmospheric correction option module for hyperspectral/multispectral images. Equipped wide range of spectral libraries with sophisticated function such as Linear Spectral Unmixing and Spectral Angle Mapper.

SARscape developed by sarmap SA. Option module of ENVI, processing SAR data which is easy to use GUI based software with Workflow function.

ENVI Services Engine Cloud-based image analysis solution lets your organization create, publish, and deploy advanced ENVI image and data analytics to virtually any existing enterprise infrastructure.

Jagwire Not just geospatial data management, Data management plus DECISIONS.

Cloud-based solution that enhances situational awareness by providing geographically spread teams with on-demand access to critical geospatial (intelligence) data. Jagwire reduces the time from data collection to decision making through a flexible platform that can be accessed from the cloud, mobile devices, and desktops

http://www.exelisvis.com

J-spacesystems

Japan Space System (J-spacesystems) is a total solution provider in the space activities to promote the space utilization such as development of space systems from space segment to ground segment and research & development of application for the remote sensing satellite. J-spacesystems promotes HISUI project is a spaceborne hyperspectral imager mission.

http://www.jspacesystems.or.jp/en_/

ARGO 株式会社アルゴ

ARGO is a distributor of hyperspectral and multispectral imaging sensors for Japan.

First New for 2015 are three sensors designed from HeadWall Photonics for remote sensing applications. Nano-Hyperspec is a lightweight and compact VNIR (400-1000nm) sensor suitable for small, hand-launched UAVs that combines integrated data storage and direct-attached GPS. Second is Headwall's wideband VNIR-SWIR sensor that covers the 400-2500nm spectral range and features co-registered pixels for outstanding image clarity and resolution. Third, Headwall offers a new high-resolution fluorescence sensor for precise environmental monitoring research that specifically targets the 754-775nm range in a small and lightweight package.

Second new is a real time hyperspectral solution from IMEC. The newly developed mosaic sensors feature one spectral filter per pixel, arranged in mosaics of 4x4 (16 spectral bands) or 5x5 (25 spectral bands) deposited onto a full array of 2 Million pixels 5.5 micron size CMOSIS CMV2000 sensor. Two versions of the mosaic hyperspectral image sensors have been developed:

one 4x4 mosaic with 16 bands in the 470-630nm (visible range)
one 5x5 mosaic with 25 bands in the 600-1000nm range (Visible-NIR range)

Imec's hyperspectral imaging sensors (100bands linescan, 32bands tiled and 16/25bands mosaic designs) are off-the-shelf, commercially available now.

http://www.argocorp.com/comp_en.html

KLV CO., LTD.

KLV has known as one of the top maker of light sources, optical parts and optical products. We also have supported and developed many optical fields such as medical, bioscience, agriculture, environment, and food for past 30 years in Japan. Now, we are going to new direction as “solution for optical system demands”. We provide the best optical solutions to customers. KLV is a dealer of Norsk Elektro Optikk AS (NEO) products in Japan.

http://www.klv.co.jp/eng/eng.html

北海道衛星株式会社
Hokkaido Satellite Co., Ltd.

Hokkaido Satellite Corp. Ltd. was established to create a new space business of agricultural remote sensing for precision farming from Japan. Hyperspectral sensor is the key technology for advanced sensing because of its analytical ability. We also developed spin-off products such as “Hyperspectral Camera”. We serve to promote the space industry and related businesses for global prosperity.

http://www.hokkaido-sat.co.jp/

TELOPS

Telops, located in Quebec City, Canada, specializes in the design and production of sophisticated opto-electronic systems for the defence & security, environmental and scientific research markets. Telops advanced optical systems allow the detection and identification of remote substances which are often invisible to the naked eye.

In addition to providing specialized opto-electronic engineering services, Telops has also developed the Hyper-Cam, an infrared hyperspectral imager which allows standoff chemical detection at a distance of up to five kilometers. This advanced instrument enables its user to measure different spectrum and then compare the measured spectrum with the signatures of known gases and solids. The constituents and properties of a target can then be easily identified. As well Telops has developed a high performance line of infrared cameras which includes unique cameras, custom designed for specific applications. This line includes the FAST-IR comprised of two different rapid frame rate infrared cameras, the HD-IR which includes high-definition infrared cameras, the MS-IR which offers unique, multispectral capabilities, the HDR-IR, a high dynamic range camera which allows users to resolve scenes up to 2500°C and finally the TS-IR, a versatile, easy to use infrared camera which comes in an IP67 sealed enclosure making it ideal for use in harsh environments.

Telops also offers R&D services for optical system technology development. Telops experts deliver significant expertise in the fields of opto-electronic systems engineering with full disciplinary specialist in optical, mechanical, electronics, thermal, software and system engineering. Telops works closely with its clients/scientists to develop customized optical solutions in the area of infrared remote sensing, spectrometry, cryogenic and ruggedized optical systems as well as dedicated imaging and calibration systems.

http://www.telops.com

CORNES Technologies

Cornes Technologies is a leading specialist importer and distributor of electronic devices, systems and equipment, scientific equipment, and industrial machinery, with unrivalled experience in the promotion, marketing and selling of new products and technology sourced from overseas to a broad range of customers in Japan.

http://www.cornestech.co.jp/en/

3. Sponsors

Support Center for Advanced Telecommunications Technology Research

SCAT

Since its establishment in October 1988, the Support Center for Advanced Telecommunications Technology Research (SCAT) has been engaged in the development of info-communications technology by reviewing and surveying advanced technologies, funding for R&D projects, and providing information on advanced technologies. SCAT intends to continue its active supports for further promotion of R&D in the info-communications technology areas.

http://www.scat.or.jp/english/

4. Technical sponsors

http://www.ieee.org

http://www.grss-ieee.org

http://www.u-tokyo.ac.jp

http://www.agence-nationale-recherche.fr

http://www.u-tokyo.ac.jp/ext01/iirc/en/

http://www.gipsa-lab.grenoble-inp.fr

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Webmaster & Graphic Designer
Vincent Couturier-Doux

6. Conference Information

Arrival to the Conference Venue - IIRC, University of Tokyo :

- **By public transportation**
  The easiest way to reach the venue from the city is the Tokyo Metro Marunouchi Line or the Toei Oedo Line (see the access map). For detailed transportation information, see the website: http://www.ieee-whispers.com. Follow menu to 2015 INFOS >> Transportation. The Ito International Research Center (IIRC) is 500m from the metro stop "Hongo-sanchome" (see map of the venue location).
- **Once there**
  The IIRC is located next to Akamon (the Red Gate). Enter the IIRC by the Ito Hall's entrance with the WHISPERS signboard, descend two levels to the ground floor and you're there.

Registration desk :

- Location: Main Foyer area at the Ito International Research Center, on the second basement level (see map of the IIRC). Exception: 12h30-18h on Tuesday 2nd, the desk is on the third floor.
- Hours :
  Tuesday 2nd : 12h30 – 18h30
  Wednesday 3rd – Friday 5th : 9h – 18h.
- Onsite registration and/or extra banquet ticket: cash only

Internet :

- Free Wi-Fi is available in the whole building and its password will be provided on-site.

Speaker Preparation :

- Software: Each lecture hall (Ito Hall and Gallery 1, see map of the IIRC) is equipped with Office and Acrobat reader.
- File types: We accept .ppt, .pptx or .pdf formats.
- Loading your presentation: Please go to the appropriate lecture hall (Ito Hall and Gallery 1) 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. Whisperers will be there to assist you.
- Break-down: Please remove your poster at the end of the day, to free the spot for the next day's posters.
- Presentation: speaker should be alongside the poster during the poster session and the coffee breaks.
- Size: max posters size is A0 (841 × 1189 mm).
- The posters sessions will be held in the Event Space in front of the Ito Hall (see map of the IIRC).

Tutorial :

- Location: Seminar Room at the Ito International Research Center, on the third floor (see map of the IIRC).
- Hours:
  Tuesday 2nd, 13h30 – 17h

Social Events:

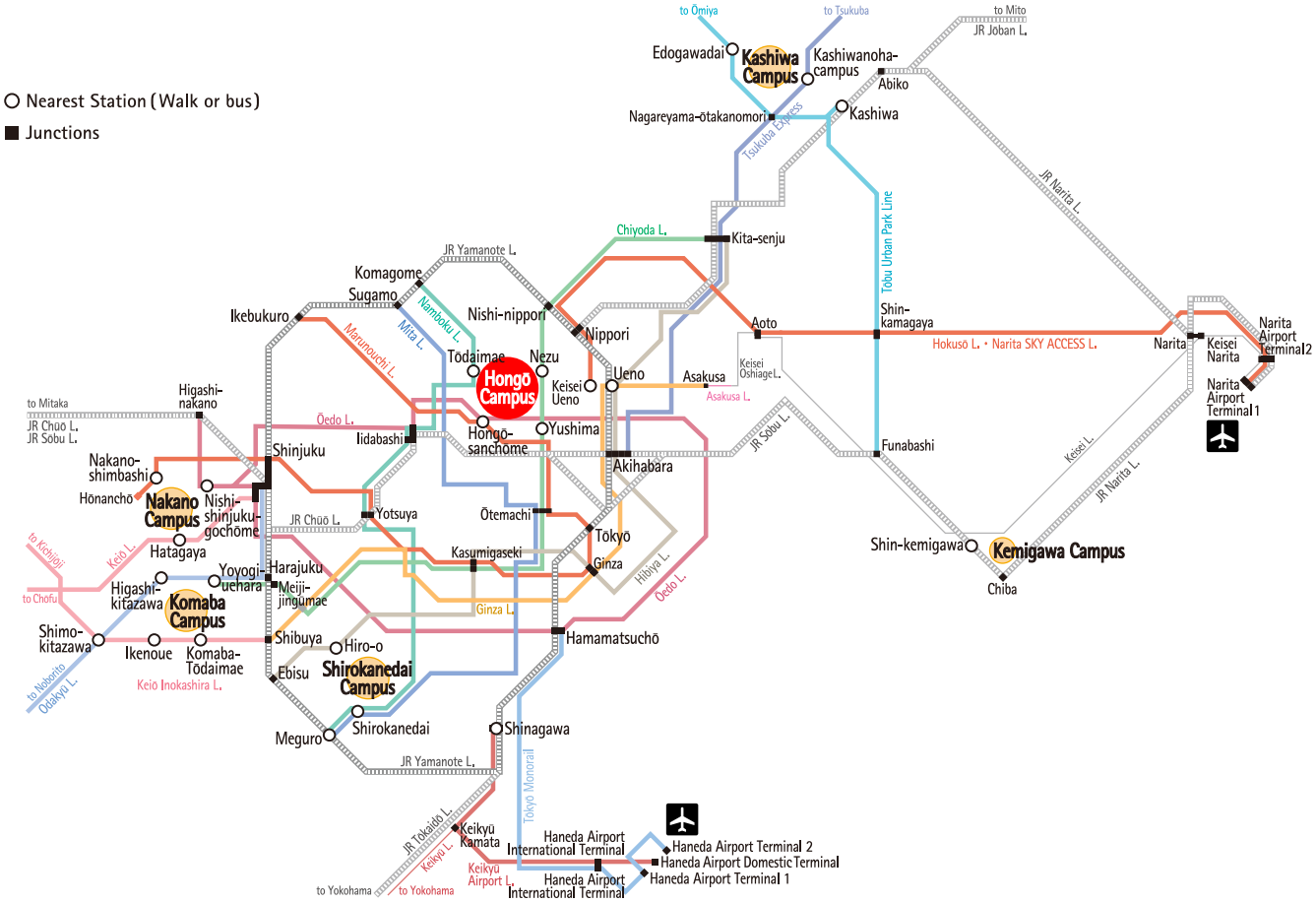
Tuesday 2nd, from 19h: Ice breaker @ Ito International Research Center (IIRC)

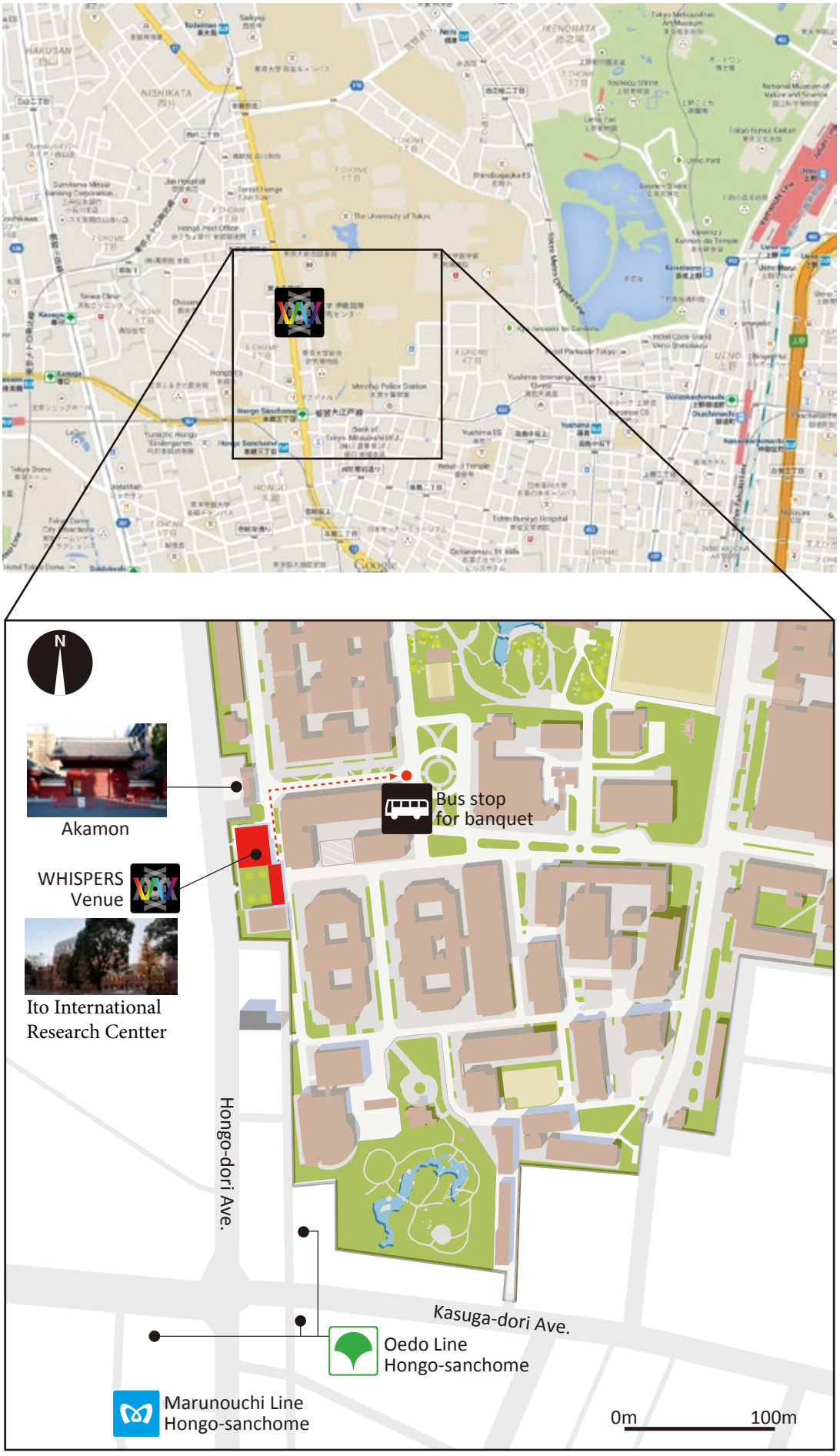
- The ice breaker will take place at the Event Space of the Ito International Research Center, the conference venue (see map of the IIRC).
- The event will feature Japanese and Western harmonized cuisines and live music.
- The participation to the ice breaker is included in the registration cost.

Thursday 4th, from 18h30: Banquet @ Hotel Chinzanso Tokyo

- The banquet will take place at Hotel Chinzanso Tokyo, the five-stars hotel with a luxury garden oasis in the heart of Tokyo. The gardens were formally established in 1861, in what we called the Meiji era, but it is said this area was already appreciated as beautiful camellia hills with a long history dating back some 700 years. The banquet place will be the Orion Banquet Hall overlooking the vast Japanese garden.
- The event will start with an aperitif followed by a special buffet dinner with traditional Japanese music.
- The participation to the banquet is included in the registration cost.
- We will move by bus to reach Hotel Chinzanso Tokyo from the conference venue. Buses will leave from the nearest rotary at 18:00 pm (see map of the venue location), and come back to Akamon at 22:15 pm from the parking area of the hotel. Whisperers will be along the way to guide you.

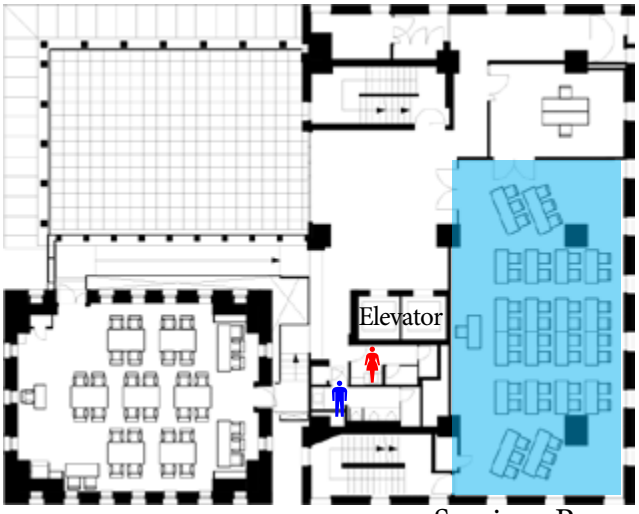
Access Map to University of Tokyo
WHISPERS 2015 Venue is at Hongo Campus



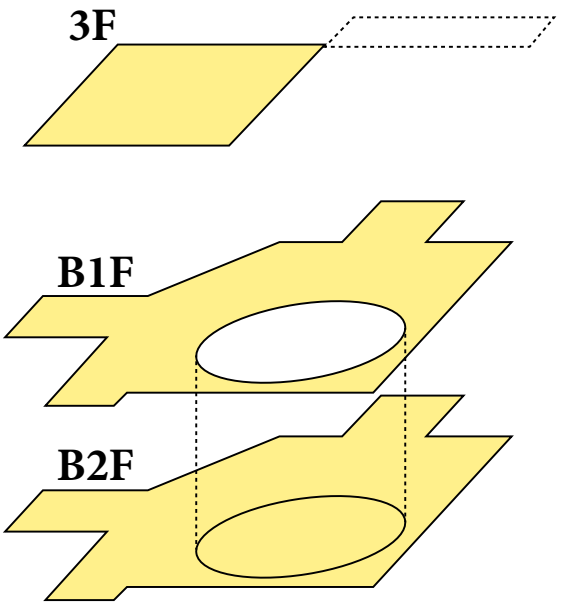


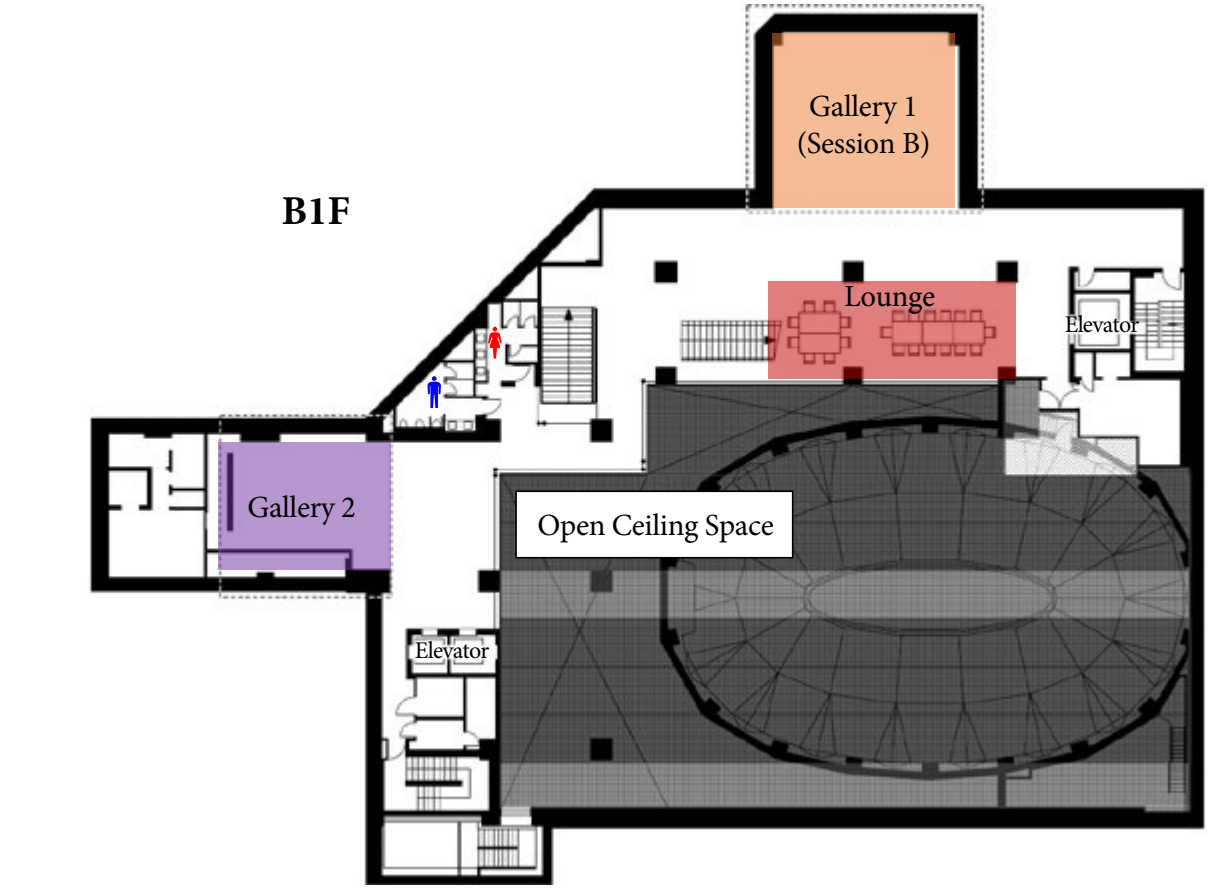
WHISPERS 2015 Venue Location: Itoh International Research Center, University of Tokyo

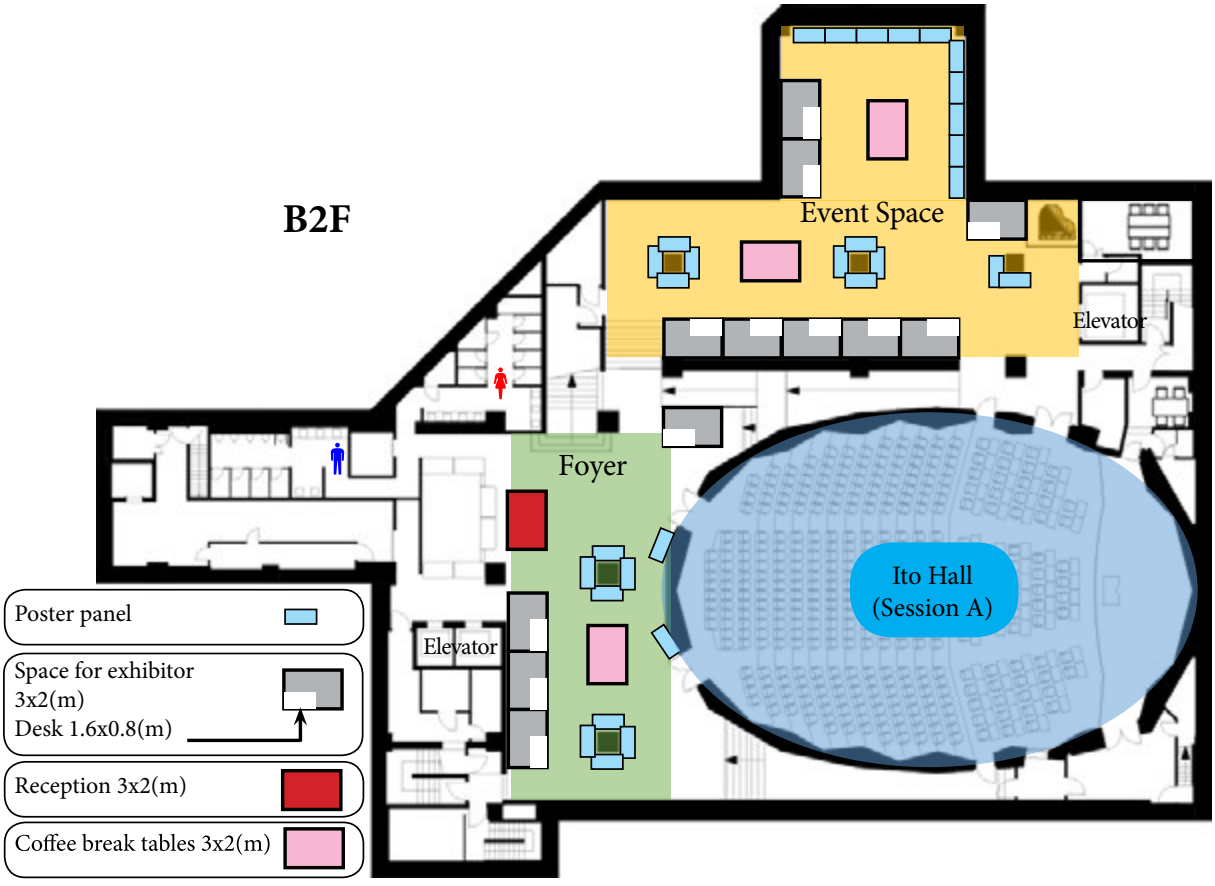
3F



WHISPERS 2015 Floor Map




B1F
Gallery 1
(Session B)
Lounge
Elevator
Gallery 2
Open Ceiling Space
Elevator


B2F
Event Space
Elevator
Foyer
Ito Hall
(Session A)
Elevator
Poster panel
Space for exhibitor
3x2(m)
Desk 1.6x0.8(m)
Reception 3x2(m)
Coffee break tables 3x2(m)

7. Technical Program

WHISPERS at a glance

Tuesday, 2

13:30

Tutorial

17:00

19:00
Icebreaker Ito International Research Center

Wednesday, 3

9:00 **Opening ceremony**

9:20 **Plenary 1**

10:20 Posters & coffee break
wed-p-(a & b)
Spectral unmixing
Sensor design, noise reduction, and data compression

11:30 Oral sessions
wed-o-1-a
Classification (1)
wed-o-1-b
Urban analysis

13:10 **Lunch**

14:20 Oral sessions
wed-o-2-a
Detecting difficult targets
wed-o-2-b
Big Data

16:00 **Coffee break**

16:30 Oral sessions
wed-o-3-a
Spectral unmixing (1)
wed-o-3-b
A diversity of applications

18:10

20:00

23:00

Thursday, 4

9:00 **Plenary 2**

10:00 Posters & coffee break
thu-p-(a & b)
Planetary exploration
A diversity of applications

11:00 Oral sessions
thu-o-1-a
Agricultural and ecological systems
thu-o-1-b
Classification (2)

12:40 **Lunch**

13:40 Oral sessions
thu-o-2-a
Hyperspectral pansharpening and fusion (1)
thu-o-2-b
Forward modeling and atmospheric compensation

15:20 **Coffee break**

15:50 Oral sessions
thu-o-3-a
Spectral unmixing (2)
thu-o-3-b
Thermal hyper-spectral imaging

17:30

18:30 **Banquet**
Hotel Chinzanso Tokyo

22:00

Friday, 5

9:00 **Plenary 3**

10:00 Posters & coffee break
fri-p-(a & b)
Classification
Anomaly and target detection

11:10 Oral sessions
fri-o-1-a
Hyperspectral pansharpening and fusion (2)
fri-o-1-b
Spectral unmixing (3)

12:50 **Lunch**

14:00 Oral sessions
fri-o-2-a
Sparse reconstruc-tion and compressive sensing
fri-o-2-b
Machine learning

15:40 **Coffee break**

16:10 Oral sessions
fri-o-3-a
Spectral unmixing (4)
fri-o-3-b
Spaceborne hyperspectral imager

17:50

13:30 **Tutorial**
Inverse Problems in Hyperspectral Imaging
José Manuel Bioucas Dias, *Instituto de Telecomunicações, Instituto Superior Técnico, Universidade de Lisboa*

17:00

19:00 Icebreaker Ito International Research Center

21:00

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Wednesday, 3, June Overview

9:00 Opening of the conference

9:20 – 10:20

Plenary 1
Applying Game Theory to Hyperspectral Image Analysis with Applications to Vegetative Ground Cover Mapping
Lori M. Bruce, *Mississipi State University, USA*
Session chair: Akira Iwasaki, *University of Tokyo, Japan*

10:20 – 11:30 Posters / coffee break

Session wed-p-1-a
Spectral unmixing
Session chairs :
Yifan Zhang, *Northwestern Polytechnical University, China*
Charoula Andreou, *DLR, Germany*

Session wed-p-1-b
Sensor design, noise reduction, and data compression
Session chairs :
Wenzhi Liao, *Ghent University, Belgium*
Angshul Majumdar, *Indraprastha Institute of Information Technology, India*

11:30 – 13:10

Session wed-o-1-a
Classification (1)
Session chairs :
Qian Du, *Mississippi State University, USA*
Yanfei Zhang, *Wuhan University, China*

Session wed-o-1-b
Urban analysis
Session chairs :
Mingyi He, *Northwestern Polytechnical University, China*
Yoann Altmann, *Heriot-Watt University, UK*

13:10 Lunch

14:20 – 16:00

Session wed-o-2-a
Detecting difficult targets
Session chairs :
Alan Schaum, *Naval Research Laboratory, USA*
Nicolas Younan, *Mississippi State University, USA*

Session wed-o-2-b
Big remote sensing data
Session chairs :
Mingmin Chi, *Fudan University, China*
Antonio Plaza, *University of Extremadura, Spain*

16:00 Coffee

16:30 – 18:10

Session wed-o-3-a
Spectral unmixing (1)
Session chairs :
Jean-Yves Tourneret, *University of Toulouse, France*
Rob Heylen, *University of Antwerp, Belgium*

Session wed-o-3-b
A diversity of applications
Session chairs :
Michael Sears, *University of the Witwatersrand, South Africa*
Kuniaki Uto, *Tokyo Institute of Technology, Japan*

9:00 Opening of the conference : opening ceremony

9:20

Plenary 1
Applying Game Theory to Hyperspectral Image Analysis with Applications to Vegetative Ground Cover Mapping
Lori M. Bruce, *Mississipi State University, USA*
Session chair: Akira Iwasaki, *University of Tokyo, Japan*

10:20

10:20 Posters / coffee break : 2 parallel sessions

Poster until 11:30

Session wed-p-a
Spectral unmixing
Session chairs :
Yifan Zhang, *Northwestern Polytechnical University, China*
Charoula Andreou, *DLR, Germany*

GRAPH REGULARIZED COUPLED SPECTRAL UNMIXING FOR CHANGE DETECTION
Naoto Yokoya and Xiaoxiang Zhu

IMPACT OF SPARSE REPRESENTATION ON THE ADMISSIBLE SOLUTIONS OF SPECTRAL UNMIXING BY NON-NEGATIVE MATRIX FACTORIZATION
Neeraj Kumar, Said Moussaoui, Jerome Idier and David Brie

SUB-PIXEL LAND-COVER CHANGE DETECTION BASED ON PIXEL UNMIXING AND EM ALGORITHM
Ke Wu, Yue Ma and Liangpei Zhang

AN MULTI-AGENT COMBINED ARTIFICIAL BEE COLONY ALGORITHM TO HYPERSPECTRAL IMAGE ENDMEMBER EXTRACTION
Lina Yang, Xu Sun, Bing Zhang and Tianhe Chi

A BAND PRIORITIZATION METHOD BASED ON KERNEL WEIGHTS FOR PROGRESSIVE BAND UMIXNING OF HYPERSPECTRAL IMAGERY
Chih-Hung Lai and Keng-Hao Liu

BAND DETECTION IN HYPERSPECTRAL IMAGERY BY PIXEL PURITY INDEX
Chein-I Chang, Yao Li and Chao-Cheng Wu

ENDMEMBER EXTRACTION BY L_{2,0} CONSTRAINED SPARSE DICTIONARY SELECTION
Shaohui Mei, Qian Du and Mingyi He

LINEAR SPECTRAL UNMIXING USING LEAST SQUARES ERROR, ORTHOGONAL PROJECTION AND SIMPLEX VOLUME FOR HYPERSPECTRAL IMAGES
Hsiao-Chi Li and Chein-I Chang

PROGRESSIVE ENDMEMBER FINDING BY FULLY CONSTRAINED LEAST SQUARES METHOD
Shih-Yu Chen, Yen-Chieh Ouyang, Chinsu Lin, Cheng Gao, Chein-I Chang and Hsian-Min Chen

A HYPERSPECTRAL IMAGE SPECTRAL UNMIXING METHOD INTEGRATING SLIC SUPERPIXEL SEGMENTATION
Xu Sun, Feifei Zhang, Lina Yang, Bing Zhang and Lianru Gao

FULLY ABUNDANCE-CONSTRAINED ENDMEMBER FINDING FOR HYPERSPECTRAL IMAGES
Cheng Gao, Shih-Yu Chen, Hsian-Min Chen, Chao-Cheng Wu, Chia-Hsien Wen and Chein-I Chang

UNCERTAINTIES IN TIR HYPERSPECTRAL IMAGE CUBE UNMIXING
Keshav Dev Singh and Ramakrishnan Desikan

Session wed-p-b
Sensor design, noise reduction, and data compression
Session chairs :
Wenzhi Liao, *Ghent University, Belgium*
Angshul Majumdar, *Indraprastha Institute of Information Technology, India*

REQUIREMENTS AND OPTIMIZATION OF SENSOR PARAMETERS FOR MINERAL EXTRACTION
Qingting Li, Lianru Gao, Wenjuan Zhang and Bing Zhang

DEVELOPMENT OF HYPERSPECTRAL IMAGING SYSTEM USING OPTICAL FIBER BUNDLE AND SWING MIRROR
Kuniaki Uto, Haruyuki Seki, Genya Saito, Yukio Kosugi and Teruhisa Komatsu

Poster until 11:30

MODIFIED RESIDUAL METHOD FOR ESTIMATION OF NOISE STATISTICS IN HYPERSPECTRAL IMAGES
Asad Mahmood, Amandine Robin and Michael Sears

HYPERSPECTRAL IMPULSE DENOISING WITH SPARSE AND LOW-RANK PENALTIES
Snigdha Tariyal, Hemant Kumar Aggarwal and Angshul Majumdar

HYPERSPECTRAL IMAGE COMPRESSION USING LEARNED CLASSIFIED DICTIONARY
Dawei Xu, Rong Zhang and Qian Wu

A GRADIENT AND LAPLACIAN BASED REACTION-DIFFUSION FILTER FOR HYPERSPECTRAL IMAGE DENOSING
Yi Wang, Ke Wu and Tao Chen

COMPRESSIVE HYPER-SPECTRAL IMAGING IN THE PRESENCE OF IMPULSE NOISE
Hemant Kumar Aggarwal, Snigdha Tariyal and Angshul Majumdar

11:30

11:30 *Oral until 13:10*

Session wed-o-1-a
Classification (1)

Session chairs :
Qian Du, *Mississippi State University, USA*
Yanfei Zhang, *Wuhan University, China*

Session wed-o-1-b
Urban analysis

Session chairs :
Mingyi He, *Northwestern Polytechnical University, China*
Yoann Altmann, *Heriot-Watt University, UK*

11:30 COMBINING ROTATION FOREST AND MULTI-SCALE SEGMENTATION FOR THE CLASSIFICATION OF HYPERSPECTRAL DATA
Jike Chen, Junshi Xia, Peijun Du and Jocelyn Chanussot

11:30 AN EMPIRICAL STUDY OF URBAN MAPPING IN A CHAIN APPROACH
Li Liwei, Zhang Bing and Gao Lianru

11:50 ON THE SAMPLING STRATEGIES FOR EVALUATION OF JOINT SPECTRAL-SPATIAL INFORMATION BASED CLASSIFIERS
Jun Zhou, Jie Liang, Yuntao Qian and Yongsheng Gao

11:50 SPLITTING THE HYPERSPECTRAL-MULTISPECTRAL IMAGE FUSION PROBLEM AUTONOMOUSLY INTO WEIGHTED PAN-SHARPENING TASKS - THE SPECTRAL GROUPING CONCEPT -
Claas Grohnfeldt, Xiao Xiang Zhu and Richard Bamler

12:10 SEGSALSA-STR: A CONVEX FORMULATION TO SUPERVISED HYPERSPECTRAL IMAGE SEGMENTATION USING HIDDEN FIELDS AND STRUCTURE TENSOR REGULARIZATION
Filipe Condessa, Jose Bioucas-Dias and Jelena Kovacevic

12:10 COMPARISON OF TG-1 AND EO-1 HYPERION IN URBAN LAND COVER CLASSIFICATION
Xueke Li, Kai Liu, Taixia Wu and Hongbo Su

12:30 TRANSFORMATION OF HYPERSPECTRAL DATA TO IMPROVE CLASSIFICATION BY MITIGATING NONLINEAR EFFECTS
Wolfgang Gross, Sebastian Wuttke and Wolfgang Middelmann

12:30 URBANIZATION ANALYSIS IN WUHAN AREA FROM 1991 TO 2013 BASED ON SMA
Anchang Sun and Tao Chen

12:50 A SPARSE SELF-REPRESENTATION METHOD FOR BAND SELECTION IN HYPERSPECTRAL IMAGERY CLASSIFICATION
Weiwei Sun, Liangpei Zhang, Xiaohui Chen and Shunli Chen

12:50 ORDER-∞ NONLINEAR HYPERSPECTRAL UNMIXING BY SINUSOIDAL POLYTOPE DECOMPOSITION
Andrea Marinoni and Paolo Gamba

13:10

13:10 Lunch

14:20

	Session wed-o-2-a Detecting difficult targets	Session wed-o-2-b Big remote sensing data
14:20 *Oral until 16:00*	Session chairs : Alan Schaum, *Naval Research Laboratory, USA* Nicolas Younan, *Mississippi State University, USA*	Session chairs : Mingmin Chi, *Fudan University, China* Antonio Plaza, *University of Extremadura, Spain*
14:20	ENHANCED DETECTION OF CHEMICAL PLUMES IN HYPERSPECTRAL IMAGES AND MOVIES THROUGH IMPROVED BACKGROUND MODELING Yi Wang, Mauro Maggioni and Guangliang Chen	SUPERPIXEL-BASED ACTIVE LEARNING FOR THE CLASSIFICATION OF HYPERSPECTRAL IMAGES Zhongyi Sun and Mingmin Chi
14:40	DETECTION OF SPECTRALLY VARYING BRDF MATERIALS IN HYPERSPECTRAL REFLECTANCE IMAGERY Robert Sundberg, Steven Adler-Golden, Timothy Perkins and Karmon Vongsy	FPGA IMPLEMENTATION OF A MAXIMUM VOLUME ALGORITHM FOR ENDMEMBER EXTRACTION FROM HYPERSPECTRAL IMAGERY Cong Li, Lianru Gao, Antonio Plaza and Bing Zhang
15:00	DECONSTRUCTING OPTIMAL DETECTION ALGORITHMS Alan Schaum	BENCHMARKING SERVER-SIDE SOFTWARE MODULES FOR HANDLING AND PROCESSING REMOTE SENSING DATA THROUGH RASDAMAN Athanasios Karmas and Konstantinos Karantzalos
15:20	ESTIMATING TARGET SIGNATURES WITH DIVERSE DENSITY Taylor Glenn and Alina Zare	BIG DATA CHALLENGES IN CHINA CENTRE FOR RESOURCES SATELLITE DATA AND APPLICATION Jun Shao, Daqi Xu, Chun Feng and Mingmin Chi
15:40	SPARSITY-BASED OPTIMAL TARGETS SPECTRA GENERATION METHOD Ting Wang and Hui Lin	MULTIPLE STRATIFIED SAMPLING STRATEGY FOR ASSESSING THE BIG REMOTE SENSING PRODUCTS Huan Xie, Xiaohua Tong, Wen Meng, Fang Wang and Xiong Xu
16:00		

16:00 16:30	coffee break

	Session wed-o-3-a Spectral unmixing (1) - Sparse Regression	Session wed-o-3-b A diversity of applications
16:30 *Oral until 18:10*	Session chairs : Jean-Yves Tourneret, *University of Toulouse, France* Rob Heylen, *University of Antwerp, Belgium*	Session chairs : Michael Sears, *University of the Witwatersrand, South Africa* Kuniaki Uto, *Tokyo Institute of Technology, Japan*
16:30	LINEAR SPECTRAL UNMIXING USING COLLABORATIVE SPARSE REGRESSION AND CORRELATED SUPPORTS Yoann Altmann, Marcelo Pereyra and Jose M. Bioucas Dias	DETECTION OF BLACK MOLD INFECTED FIGS BY USING TRANSMITTANCE SPECTROSCOPY Efkan Durmuş, Ahmet Seçkin Bilgi, Gizem Ortaç, Habil Kalkan and Kadim Taşdemir
16:50	PERFORMANCE GUARANTEES FOR SPARSE REGRESSION-BASED UNMIXING Yuki Itoh, Marco F. Duarte and Mario Parente	JOINT ESTIMATION OF WATER COLUMN PARAMETERS AND SEABED REFLECTANCE COMBINING MAXIMUM LIKELIHOOD AND UNMIXING ALGORITHM Mireille Guillaume, Yves Michels and Sylvain Jay
17:10	POTENTIAL AND LIMITATIONS OF BAND SELECTION AND LIBRARY PRUNING IN SPARSE HYPERSPECTRAL UNMIXING Marian-Daniel Iordache, Jose Bioucas-Dias and Antonio Plaza	MULTIPLE OBJECT TRACKING WITH BACKGROUND ESTIMATION IN HYPERSPECTRAL VIDEO SEQUENCES Zacharias Kandylakis, Konstantinos Karantzalos, Anastasios Doulamis and Nikos Doulamis
17:30	HYPERSPECTRAL IMAGE UNMIXING VIA SIMULTANEOUSLY SPARSE AND LOW RANK ABUNDANCE MATRIX ESTIMATION Paris Giampouras, Kostantinos Themelis, Athanasios Rontogiannis and Konstantinos Koutroumbas	CHARACTERIZATION OF FINE METAL PARTICLES USING HYPERSPECTRAL IMAGING IN AUTOMATIC WEEE RECYCLING SYSTEMS Gabriele Candiani, Nicoletta Picone, Loredana Pompilio, Monica Pepe and Marcello Colledani
17:50	HYPERSPECTRAL CHANGE DETECTION BY SPARSE UNMIXING WITH DICTIONARY PRUNING Alp Ertürk, Marian-Daniel Iordache and Antonio Plaza	PROSPECTING FOR HYDROTHERMAL MINERAL DEPOSITS IN THE HIMALAYA USING SHORT-WAVE INFRARED SPECTROSCOPY Himanshu Govil
18:10		

whispers

Thursday, 4, June
Overview

9:00 Opening of the conference

9:00 – 10:00

Plenary 2
Hyperspectral Remote Sensing for Agro-Environmental Information
Yoshio Inoue, *Ecosystem Informatics Division, National Institute for Agro-Environmental Sciences, Japan*
Session chair: Kuniaki Uto, *Tokyo Institute of Technology, Japan*

10:00 – 11:00

Session thu-p-a
Planetary exploration
Session chairs :
Lianru Gao, *RADI, Chinese Academy of Sciences*
Akira Iwasaki, *University of Tokyo, Japan*

Session thu-p-b
A diversity of applications
Session chairs :
Gabriele Candiani, *IREA - National Research Council, Italy*
Naoto Yokoya, *University of Tokyo, Japan*

11:00 – 12:40

Session thu-o-1-a
Agricultural and ecological systems
Session chairs :
Bing Zhang, *RADI, Chinese Academy of Sciences*
Mireille Guillaume, *Institut Fresnel, France*

Session thu-o-1-b
Classification (2)
Session chairs :
Peijun Du, *Nanjing University, China*
Daniele Cerra, *DLR, Germany*

12:40 Lunch

13:40 – 15:20

Session thu-o-2-a
Hyperspectral pansharpening and fusion (1)
Session chairs :
José M. Bioucas-Dias, *Instituto Superior Tecnico, Portugal*
Nicolas Dobigeon, *University of Toulouse, France*

Session thu-o-2-b
Forward modeling and atmospheric compensation
Session chairs :
Robert Sundberg, *Spectral Sciences, Inc., USA*
Yi Cen, *RADI, Chinese Academy of Sciences*

15:20 Coffee

15:50 – 17:30

Session thu-o-3-a
Spectral unmixing (2)
Session chairs :
Wing-Kin Ma, *The Chinese University of Hong Kong, Hong Kong SAR*
Rob Heylen, *University of Antwerp, Belgium*

Session thu-o-3-b
Thermal hyperspectral imaging
Session chairs :
Lifu Zhang, *Institute of Remote Sensing and Digital Earth, CAS*
Manuel Cubero-Castan, *EPFL, Switzerland*

18:30 Banquet, Hotel Chinzanso Tokyo

22:00

9:00 Opening of the conference

9:00

Plenary 2
Hyperspectral Remote Sensing for Agro-Environmental Information
Yoshio Inoue, *Ecosystem Informatics Division, National Institute for Agro-Environmental Sciences, Japan*
Session chair: Kuniaki Uto, *Tokyo Institute of Technology, Japan*

10:00

10:00 Posters / coffee break : 2 parallel sessions

Poster until 11:00

Session thu-p-a
Planetary exploration
Session chairs :
Lianru Gao, *RADI, Chinese Academy of Sciences*
Akira Iwasaki, *University of Tokyo, Japan*

SPIN-FORBIDDEN PYROXENE ABSORPTIONS IN THE VIR-SPECTRA OF 4VESTA
Katrin Stephan, Ralf Jaumann, Maria Cristina De Sanctis, Eleonora Ammannito, Thomas Roatsch, Klaus-Dieter Matz, Lucy A. McFadden, Rachel Klima, Carol A. Raymond and Chris T. Russell

ABUNDANCE RETRIEVAL OF HYDROUS MINERALS AROUND THE MARS SCIENCE LABORATORY LANDING SITE
Xia Zhang, Tong Shuai and Honglei Lin

IDENTIFICATION OF CRATERS ON LUNAR SURFACE USING HYPERSPECTRAL CHANDRAYAN DATA
Vishal Saini and Ajay Kumar Patel

IDENTIFY ANOMALY COMPONENT BY SPARSITY AND LOW RANK
Wei Wang, Shuangjiang Li, Hairong Qi, Bulent Ayhan, Chiman Kwan and Steven Vance

CHARACTERIZING DARK SPECTRA IN MERCURY SURFACE OBSERVATIONS BY NONLINEAR HYPERSPECTRAL MODELING
Andrea Marinoni, Rachel Klima and Paolo Gamba

NON-LINEAR SPECTRAL UNMIXING OF MOON MINERALOGY MAPPER (M3) DATA
Keshav Dev Singh and Ramakrishnan Desikan

Session thu-p-b
A diversity of applications
Session chairs :
Gabriele Candiani, *IREA - National Research Council, Italy*
Naoto Yokoya, *University of Tokyo, Japan*

IMPROVEMENT OF LINEAR SPECTRAL EMISSIVITY CONSTRAINT METHOD FOR TEMPERATURE AND EMISSIVITY SEPARATION OF HYPERSPECTRAL THERMAL INFRARED DATA
Li Ni, Hua Wu, Bing Zhang, Wenjuan Zhang and Lianru Gao

NONDESTRUCTIVE MONITORING OF CHICKEN MEAT FRESHNESS USING HYPERSPECTRAL IMAGING TECHNOLOGY
Xujun Ye, Kanako Iino, Shuhuai Zhang and Seiichi Oshita

COMPARATIVE ANALYSIS OF THE HYPERSPECTRAL VEGETATATION INDEX AND RADAR VEGETATION INDEX: A NOVEL FUSION VEGETATION INDEX
Yong-Hyun Kim, Jae-Hong Oh, Jae-Wan Choi and Yong-Il Kim

EVALUATING DIFFERENT VEGETATION INDEX FOR ESTIMATING LAI OF WINTER WHEAT USING HYPERSPECTRAL REMOTE SENSING DATA
Jingguo Tian, Shudong Wang and Lifu Zhang

HYPERSPECTRAL IMAGING SYSTEM FOR DETECTION OF DRIED FIGSWITH BLACK MOLD
Gizem Ortaç, Kadim Taşdemir, Ahmet Seçkin Bilgi, Efkan Durmuş and Habil Kalkan

IMPACT OF HYBRID PANSHARPENING APPROACHES APPLIED TO HYPERSPECTRAL IMAGES
Giorgio Licciardi, Miguel Ángel Veganzones, Gemine Vivone, Laetitia Loncan and Jocelyn Chanussot

Poster until 11:00

METHOD FOR TIME SERIES EXTRACTION OF CHARACTERISTIC PARAMETERS FROM MULTI-DIMENSIONAL REMOTE SENSING DATASETS
Lifu Zhang, Hao Chen, Dongjie Fu, Taixia Wu, Jia Liu and Changping Huang

CHESRE: A COMPREHENSIVE PUBLIC HYPERSPECTRAL EXPERIMENTAL SITE AND DATA SET FOR RESOURCES EXPLORATION
Fuping Gan, Shuneng Liang, Peijun Du, Fuxing Dang, Kun Tan, Hongjun Su and Zhaohui Xue

A NOVEL DYNAMIC CLASSIFIER ENSEMBLE ALGORITHM FOR HYPERSPECTRAL IMAGE CLASSIFICATION
Hongjun Su and Peijun Du

SPATIAL–TEMPORAL INFORMATION EXTRACTION FOR VEGETATION PHENOLOGY VARIATION BASED ON MODIS NDVI DATASETS IN THE TIBETAN PLATEAU
Yi Cen, Guibin Hao, Lifu Zhang, Bo Wu, Dongjie Fu, Xuejian Sun and Changping Huang

SPECIFIC BAND RATIO FOR VEGETATION INDICES CALCULATION IN HYPERSPECTRAL IMAGES
Büşra Özbay, Yunus Emre Esin and Furkan Çengel

DECOMPOSING THE CONTRIBUTION OF FOLIAR NITROGEN CONTENT AND CANOPY STRUCTURAL PROPERTIES IN THE REFLECTANCE SPECTRA OF CEREAL CROPS
Tao Cheng, Dong Li, Siyao Chen, Xia Yao, Yongchao Tian, Yan Zhu, Weixing Cao

11:00

11:00 *Oral until 12:40*

Session thu-o-1-a
Application of hyperspectral imaging on agricultural and ecological systems

Session chairs :
Bing Zhang, *RADI, Chinese Academy of Sciences*
Mireille Guillaume, *Institut Fresnel, France*

11:00 CROP AND FOREST ACREAGE ESTIMATION USING EXPERT SYSTEM BASED KNOWLEDGE CLASSIFIER APPROACH
Sandip Thorat, Yogesh Rajendra, K. V. Kale and Suresh Mehrotra

11:20 OPTIMIZED FEATURE FUSION OF LIDAR AND HYPERSPECTRAL DATA FOR TREE SPECIES MAPPING IN CLOSED FOREST CANOPIES
Frieke Van Coillie, Wenzhi Liao, Pieter Kempeneers, Kris Vandekerkhove, Sidharta Gautama, Wilfried Philips and Robert De Wulf

11:40 SEMI-BLIND SOURCE SEPARATION FOR ESTIMATION OF CLAY CONTENT OVER SEMI-VEGETATED AREAS, FROM VNIR/SWIR HYPERSPECTRAL AIRBORNE DATA
Walid Ouerghemmi, Cécile Gomez, Mohamed Saber Naceur and Philippe Lagacherie

12:00 OPTIMAL HYPERSPECTRAL CLASSIFICATION FOR PADDY FIELD WITH SEMISUPERVISED SELF-LEARNING
Taichi Takayama, Naoto Yokoya and Akira Iwasaki

12:20 AN ANALYSIS OF SHADOW EFFECTS ON SPECTRAL VEGETATION INDICES USING A GROUND-BASED IMAGING SPECTROMETER
Taixia Wu, Lifu Zhang and Changping Huang

12:40

Session thu-o-1-b
Classification (2)

Session chairs :
Peijun Du, *Nanjing University, China*
Daniele Cerra, *DLR, Germany*

EXTENDED MORPHOLOGICAL PROFILES WITH DUALITY FOR HYPERSPECTRAL IMAGE CLASSIFICATION
Farid Imran and Mingyi He

ROBUST HYPERSPECTRAL IMAGE CLASSIFICATION WITH REJECTION FIELDS
Filipe Condessa, Jelena Kovacevic and Jose Bioucas-Dias

SPECTRAL-SPATIAL CLUSTERING OF HYPERSPECTRAL REMOTE SENSING IMAGE WITH SPARSE SUBSPACE CLUSTERING MODEL
Han Zhai, Hongyan Zhang, Liangpei Zhang, Pingxiang Li and Xiong Xu

NON-LOCAL SUB-PIXEL MAPPING FOR HYPERSPECTRAL IMAGERY
Yanfei Zhong, Yunyun Wu, Ruyi Feng, Xiong Xu and Liangpei Zhang

REPRESENTATION-BASED CLASSIFICATION FOR HYPERSPECTRAL IMAGERY: AN ELASTIC NET REGULARIZATION APPROACH
Wei Li, Lan Chang and Qian Du

12:40 Lunch

13:40

13:40 *Oral until 15:20*

Session thu-o-2-a
Hyperspectral pansharpening and fusion (1)

Session chairs :
José M. Bioucas-Dias, *Instituto Superior Tecnico, Portugal*
Nicolas Dobigeon, *University of Toulouse, France*

13:40 HYPERSPECTRAL AND MULTISPECTRAL IMAGE FUSION BASED ON CONSTRAINED CNMF UNMIXING
Yifan Zhang, Yang Liu, Yan Gao and Mingyi He

14:00 DYNAMIC DICTIONARY LEARNING STRATEGIES FOR SPARSE REPRESENTATION BASED HYPERSPECTRAL IMAGE ENHANCEMENT
Claas Grohnfeldt, Tristan Michael Burns and Xiao Xiang Zhu

14:20 BAYESIAN FUSION OF MULTISPECTRAL AND HYPERSPECTRAL IMAGES USING A BLOCK COORDINATE DESCENT METHOD
Qi Wei, Nicolas Dobigeon and Jean-Yves Tourneret

14:40 HYPERSPECTRAL PANSHARPENING BASED ON UNMIXING TECHNIQUES
Laëtitia Loncan, Jocelyn Chanussot, Sophie Fabre and Xavier Briottet

15:00 IMPROVING THE SPATIAL RESOLUTION OF HYPERSPECTRAL IMAGE USING PANCHROMATIC AND MULTISPECTRAL IMAGES: AN INTEGRATED METHOD
Xiangchao Meng, Huanfeng Shen, Huifang Li & Liangpei Zhang

15:20

Session thu-o-2-b
Forward modeling and atmospheric compensation

Session chairs :
Robert Sundberg, *Spectral Sciences, Inc., USA*
Yi Cen, *RADI, Chinese Academy of Sciences*

INVESTIGATING FRAUNHOFER LINE BASED FLUORESCENCE RETRIEVAL IN O2-B BAND WITH HYPERSPECTRAL RADIATIVE TRANSFER SIMULATIONS
Changping Huang, Lifu Zhang, Yi Cen and Qingxi Ton

A NEW SMOOTHNESS BASED STRATEGY FOR SEMI-SUPERVISED ATMOSPHERIC CORRECTION: APPLICATION TO THE LÉMAN-BAÏKAL CAMPAIGN
Manuel Cubero-Castan, Dragos Constantin, Kevin Barbieux, Vincent Nouchi, Yosef Akhtman and Bertrand Merminod

HT-FRTC: A FAST RADIATIVE TRANSFER CODE USING KERNEL REGRESSION
Jean-Claude Thelen and Stephan Havemann

A METHOD FOR ATMOSPHERIC PARAMETERS AND SURFACE REFLECTANCE RETRIEVAL FROM HYPERSPECTRAL REMOTE SENSING DATA
Yaokai Liu, Ning Wang, Lingling Ma, Chuanrong Li and Lingli Tang

A SPECTRAL-CORREALTION-BASED EMISSIVITY IMAGE SIMULATION METHOD FOR THE 2.7 MICRON ABSORPTION BANDS
Yao Liu, Wenjuan Zhang, Bing Zhang and Li Ni

15:20 Coffee
15:50

15:50 *Oral until 17:30*

Session thu-o-3-a
Spectral unmixing (2) - Data driven approach -

Session chairs :
Wing-Kin Ma, *The Chinese Univ. of Hong Kong, Hong Kong SAR*
Rob Heylen, *University of Antwerp, Belgium*

15:50 SWARM INTELLIGENCE: A RELIABLE SOLUTION FOR EXTRACTING ENDMEMBERS FROM HYPERSPECTRAL IMAGERY
Bing Zhang, Lianru Gao, Xu Sun and Lina Zhuang

16:10 HYPERSPECTRAL IMAGE UNMIXING USING CASCADED AUTOENCODER
Rui Guo, Wei Wang and Hairong Qi

16:30 ROBUST COLLABORATIVE NONNEGATIVE MATRIX FACTORIZATION FOR HYPERSPECTRA UNMIXING (R-CONMF)
Jun Li, Jose Bioucas Dias, Antonio Plaza and Lin Liu

16:50 WHEN CAN THE MINIMUM VOLUME ENCLOSING SIMPLEX IDENTIFY THE ENDMEMBERS CORRECTLY WHEN THERE IS NO PURE PIXEL?
Wing-Kin Ma, Chia-Hsiang Lin, Wei-Chiang Li and Chong-Yung Chi

17:10 GEOMETRIC SIMPLEX GROWING ALGORITHM
Hsiao-Chi Li and Chein-I Chang

17:30

Session thu-o-3-b
Thermal hyperspectral imaging

Session chairs :
Lifu Zhang, *Institute of Remote Sensing and Digital Earth, CAS*
Manuel Cubero-Castan, *EPFL, Switzerland*

COMPARISON OF RX-BASED ANOMALY DETECTORS ON SYNTHETIC AND REAL HYPERSPECTRAL DATA
Seniha Esen Yuksel and Sefa Kucuk

WATER STRESS DETECTION USING HYPERSPECTRAL THERMAL INFRARED REMOTE SENSING
Max Gerhards, Gilles Rock, Martin Schlerf, Thomas Udelhoven and Willy Werner

STANDOFF MIDWAVE INFRARED HYPERSPECTRAL IMAGING OF SHIP PLUMES
Marc-André Gagnon, Jean-Philippe Gagnon, Pierre Tremblay, Simon Savary, Vincent Farley, Philippe Lagueux, Éric Guyot and Martin Chamberland

HIGHLY REFLECTIVE PLATE DETECTION FROM LWIR GROUND IMAGES
Poyraz Umut Hatipoglu and Levent Özparlak

EVALUATION OF TEMPERATURE AND EMISSIVITY SEPARATION METHOD USING THE HYPERSPECTRAL DATA FOR CONTRAST EMISSIVITY SURFACES
Qian Yonggang, Ning Wang, Gao Caixia and Ma Lingling

whispers

Friday, 5, June
Overview

9:00 Opening of the conference

9:00 – 10:00

Plenary 3
Intelligent Hyperspectral Remote Sensing Satellite (IHRS): A New Perspective
Bing Zhang, *Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, Beijing, China*
Session chair: Naoto Yokoya, *University of Tokyo, Japan*

10:00 – 11:10 Posters / coffee break

Session fri-p-a
Classification
Session chairs :
Alp Ertürk, *Kocaeli University, Turkey*
Guangliang Chen, *San Jose State University, USA*

Session fri-p-b
Anomaly and target detection
Session chairs :
Taichi Takayama, *University of Tokyo, Japan*
Ronny Hänsch, *Technische Universität Berlin, Germany*

11:10 – 12:50

Session fri-o-1-a
Hyperspectral pansharpening and fusion (2)
Session chairs :
José M. Bioucas-Dias, *Instituto Superior Tecnico, Portugal*
Nicolas Dobigeon, *University of Toulouse, France*

Session fri-o-1-b
Spectral unmixing (3) - Consideration of spatial information and nonlinearity -
Session chairs :
Sen Jia, *Shenzhen University, China*
Alina Zare, *University of Missouri, USA*

12:50 lunch

14:00 – 15:40

Session fri-o-2-a
Sparse reconstruction and compressive sensing
Session chairs :
Antonio Plaza, *University of Extremadura, Spain*
Xiaoxiang Zhu, *DLR & TU Munich, Germany*

Session fri-o-2-b
Machine learning
Session chairs :
Paul Scheunders, *University of Antwerp, Belgium*
Hairong Qi, *University of Tennessee, USA*

15:40 coffee

16:10 – 17:50

Session fri-o-3-a
Spectral unmixing (4) - Beyond endmember variability -
Session chairs :
Rob Heylen, *University of Antwerp, Belgium*
Jun Li, *Sun Yat-Sen University, China*

Session fri-o-3-b
Spaceborne hyperspectral imager
Session chairs :
Tetsushi Tachikawa, *Japan Space Systems, Japan*
Osamu Kashimura, *Japan Space Systems, Japan*

8:00 Opening of the conference

8:00

Plenary 3
Intelligent Hyperspectral Remote Sensing Satellite (IHRS): A New Perspective
Bing Zhang, *Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, Beijing, China*
Session chair: Naoto Yokoya, *University of Tokyo, Japan*

9:00

9:00 Posters / coffee break : 2 parallel sessions

Poster until 11:10

Session fri-p-a
Classification
Session chairs :
Alp Ertürk, *Kocaeli University, Turkey*
Guangliang Chen, *San Jose State University, USA*

HYPERSPECTRAL IMAGE ANALYSIS USING MULTIFRACTAL ATTRIBUTES
Sébastien Combrexelle, Herwig Wendt, Jean-Yves Tourneret, Stephen McLaughlin and Patrice Abry

COMPARING INFERENCE METHODS FOR CONDITIONAL RANDOM FIELDS FOR HYPERSPECTRAL IMAGE CLASSIFICATION
Yang Hu, Sildomar Monteiro and Eli Saber

DIMENSION REDUCTION OF HYPERSPECTRAL IMAGE WITH RARE EVENT PRESERVING
Jihan Khoder and Rafic Younes

AN ISOMAP-BASED KERNERL-KNN CLASSIFIER FOR HYPERSPECTRAL DATA ANALYSIS
Yuan Zhou, Chun Liu and Nan Li

CHROMATIC DISCRIMINATION OF IMPERVIOUS SURFACES USING ARTIFICIAL COLORS FOR HYPER SPECTRAL DATA
Shailesh Deshpande, Arun Inamdar and Harrick Vin

OBJECT-BASED FUSION OF HYPERSPECTRAL AND LIDAR DATA FOR CLASSIFICATION OF URBAN AREAS
Prashanth Marpu and Sergio Sanchez Martinez

ANISOTROPICALLY FOVEATED NONLOCAL WEIGHTS FOR JOINT SPARSE REPRESENTATION-BASED HYPERSPECTRAL CLASSIFICATION
Zhi He and Lin Liu

AUTOMATIC FRAMEWORK FOR SEMI-SUPERVISED HYPERSPECTRAL IMAGE CLASSIFICATION USING SELF-TRAINING WITH DATA EDITING
Junshu Wang, Nan Jiang, Guoming Zhang, Bin Hu and Yang Li

DISCRIMINATING MULTIPLE KERNEL LEARNING FOR JOINT CLASSIFICATION OF OPTICAL AND LIDAR DATA IN URBAN AREA
Qingwang Wang, Huan Liu and Yanfeng Gu

HYPERSPECTRAL IMAGE CLASSIFICATION USING MULTIPLE FEATURES AND NEAREST REGULARIZED SUBSPACE
Bing Peng, Xiaoming Xie, Wei Li and Qian Du

AN ACTIVE LEARNING METHOD BASED ON SVM CLASSIFIER FOR HYPERSPECTRAL IMAGES CLASSIFICATION
Shujin Sun, Ping Zhong, Huaitie Xiao, Fang Liu and Runsheng Wang

SPATIAL-SPECTRAL CLASSIFICATION WITH LOCAL REGIONAL FILTER AND MARKOV RANDOM FIELD
Qiong Ran, Wei Li and Qian Du

Poster until 11:10

Session fri-p-b
Anomaly and target detection

Session chairs :
Taichi Takayama, *University of Tokyo, Japan*
Ronny Hänsch, *Technische Universität Berlin, Germany*

ANOMALY DISCRIMINATION AND CLASSIFICATION FOR HYPERSPECTRAL IMAGERY
Li-Chien Lee, Drew Paylor and Chein-I Chang

A COMPARATIVE STUDY OF HYPERSPECTRAL ANOMALY AND SIGNATURE BASED TARGET DETECTION METHODS FOR OIL SPILLS
Hilal Soydan, Alper Koz, H. Şebnem Düzgün and Aydın Alatan

DTW BASED SIGNAL ALIGNMENT FOR ENHANCING CO2 DETECTION IN MWIR HYPERSPECTRAL IMAGERY
Fatih Omruuzun, Didem Ozisik Baskurt and Yasemin Yardimci Cetin

A METHOD FOR BAND REGISTRATION OF SMALL MOVING TARGET BASED ON STARING IMAGING SPECTROMETER
Hao Ding and Huijie Zhao

PESTICIDE RESIDUE DETECTION BY HYPERSPECTRAL IMAGING SENSORS
Shih-Yu Chen, Yuan-Hsun Liao, Wei-Sheng Lo, Horng-Yuh Guo, Tau-Meu Chou, Chia-Hisen Wen, Chinsu Lin, Hsian-Min Chen, Yen-Chieh Ouyang, Chao-Cheng Wu and Chein-I Chang

PROGRESSIVE BAND PROCESSING OF AUTOMATIC TARGET GENERATION PROCESS
Yao Li, Cheng Gao and Chein-I Chang

11:10

11:10 *Oral until 12:50*

Session fri-o-1-a
Hyperspectral pansharpening and fusion (2)

Session chairs :
José M. Bioucas-Dias, *Instituto Superior Tecnico, Portugal*
Nicolas Dobigeon, *University of Toulouse, France*

Session fri-o-1-b
Spectral unmixing (3) - Consideration of spatial information and nonlinearity -

Session chairs :
Sen Jia, *Shenzhen University, China*
Alina Zare, *University of Missouri, USA*

11:10 JOINTLY SPATIAL-SPECTRAL RESOLUTION ENHANCEMENT OF HYPERSPECTRAL IMAGERY
Yongqiang Zhao, Chen Yi and Jingxiang Yang

MULTIPLE GRAPH REGULARIZED NMF FOR HYPERSPECTRAL UNMIXING
Lei Tong, Jun Zhou, Yuntao Qian and Yongsheng Gao

11:30 HYPERSPECTRAL RESOLUTION ENHANCEMENT USING MULTISENSOR IMAGE DATA
Jakub Bieniarz, Daniele Cerra, Xiaoxiang Zhu, Rupert Müller and Peter Reinartz

A SPATIAL COMPOSITIONAL MODEL FOR LINEAR UNMIXING
Yuan Zhou, Anand Rangarajan and Paul Gader

11:50 TWO-STAGE FUSION OF THERMAL HYPERSPECTRAL AND VISIBLE RGB IMAGE BY PCA AND GUIDED FILTER
Wenzhi Liao, Xin Huang, Frieke Van Coillie, Thoonen Guy, Aleksandra Pizurica, Scheunders Paul and Wilfried Philips

HYPERSPECTRAL DATA UNMIXING WITH GRAPH-BASED REGULARIZATION
Rita Ammanouil, André Ferrari and Cédric Richard

12:10 THE ESTIMATION OF HIGH RESOLUTION URBAN SURFACE TEMPERATURE USING HYPERSPECTRAL SPECTRAL MIXTURE ANALYSIS
Kai Liu, Hongbo Su, Weimin Wang and Xueke Li

NONLINEAR UNMIXING WITH A MULTILINEAR MIXING MODEL
Rob Heylen and Paul Scheunders

12:30 A MAP-BASED APPROACH TO RESOLUTION ENHANCEMENT OF HYPERSPECTRAL IMAGES
Hasan Irmak, Gozde Bozdagi Akar and Seniha Esen Yuksel

SPATIALLY INFORMED SPECTRAL UNMIXING
Daniel Bongiorno, Adam Fairley and Stefan Williams

12:50

12:50 Lunch

14:00

14:00 *Oral until 15:40*

Session fri-o-2-a
Sparse reconstruction and compressive sensing
Session chairs :
Antonio Plaza, *University of Extremadura, Spain*
Xiaoxiang Zhu, *DLR & TU Munich, Germany*

Session fri-o-2-b
Machine learning
Session chairs :
Paul Scheunders, *University of Antwerp, Belgium*
Hairong Qi, *University of Tennessee, USA*

14:00 NONSEPARABLE SPARSITY BASED HYPERSPECTRAL COMPRESSIVE SENSING
Lei Zhang, Wei Wei, Yanning Zhang, Fei Li and Hangqi Yan

AN ACTIVE LEARNING METHOD BASED ON MARKOV RANDOM FIELDS FOR HYPERSPECTRAL IMAGES CLASSIFICATION
Shujin Sun, Ping Zhong, Huaitie Xiao, Fang Liu and Runsheng Wang

14:20 HYPERSPECTRAL COMPRESSIVE AQUISITION IN THE SPATIAL DOMAIN VIA BLIND FACTORIZATION
Gabriel Martin and José M. Bioucas-Dias

FEATURE-INDEPENDENT CLASSIFICATION OF HYPERSPECTRAL IMAGES BY PROJECTION-BASED RANDOM FORESTS
Ronny Hänsch and Olaf Hellwich

14:40 RESTORATION OF ENMAP DATA THROUGH SPARSE RECONSTRUCTION
Daniele Cerra, Jakub Bieniarz, Tobias Storch, Rupert Müller and Peter Reinartz

ACTIVE LEARNING FOR HYPERSPECTRAL IMAGE CLASSIFICATION WITH A STACKED AUTOENCODERS BASED NEURAL NETWORK
Jiming Li and Sen Jia

15:00 GPU IMPLEMENTATION OF A CONSTRAINED HYPERSPECTRAL CODED APERTURE ALGORITHM FOR COMPRESSIVE SENSING
Sergio Bernabe, Gabriel Martin, Jose Nascimento, Jose Bioucas-Dias, Antonio Plaza and Vitor Silva

GABOR CUBE SELECTION-BASED MULTI-TASK JOINT SPARSE REPRESENTATION FOR HYPERSPECTRAL IMAGERY CLASSIFICATION
Sen Jia, Yao Xie, Linlin Shen and Lin Deng

15:20 HYPERSEPCTRAL DATA COMPRESSION USING DOUBLE SPARSITY MODEL
Qian Wu, Rong Zhang and Fan Wang

HYPERSPECTRAL IMAGE SEGMENTATION WITH LOW-RANK REPRESENTATION AND SPECTRAL CLUSTERING
Alex Sumarsono, Qian Du and Nicolas Younan

15:40

15:40 Coffee
16:10

16:10 *Oral until 17:50*

Session fri-o-3-a
Spectral unmixing (4) - Beyond endmember variability -
Session chairs :
Rob Heylen, *University of Antwerp, Belgium*
Jun Li, *Sun Yat-Sen University, China*

Session fri-o-3-b
Application study of spaceborne hyperspectral imager
Session chairs :
Tetsushi Tachikawa, *Japan Space Systems, Japan*
Osamu Kashimura, *Japan Space Systems, Japan*

16:10 A NOVEL APPROACH FOR ENDMEMBER BUNDLE EXTRACTION USING SPECTRAL SPACE SPLITTING
Charoula Andreou, Derek Rogge, Benoit Rivard and Rupert Müller

DETECTION OF LARGE POINT SOURCES OF CARBON DIOXIDE BY A SATELLITE HYPERSPECTRAL CAMERA
Tsuneo Matsunaga, Satoru Yamamoto and Tetsushi Tachikawa

16:30	HYPERSPECTRAL UNMIXING ACCOUNTING FOR SPATIAL CORRELATIONS AND ENDMEMBER VARIABILITY Abderrahim Halimi, Nicolas Dobigeon, Jean-Yves Tourneret and Paul Honeine	HYPERSPECTRAL DATA SIMULATION DATA AND IMAGE CLASSIFICATION IN THE FUTURE EARTH OBSERVATION ASI MISSION FRAMEWORK Malvina Silvestri, Massimo Musacchio, Maria Fabrizia Buongiorno and Cristina Ananasso
16:50	A METHOD BASED ON NONNEGATIVE MATRIX FACTORIZATION DEALING WITH INTRA-CLASS VARIABILITY FOR UNSUPERVISED HYPERSPECTRAL UNMIXING Charlotte Revel, Yannick Deville, Veronique Achard and Xavier Briottet	DISCRIMINATION OF PEAT SWAMP FOREST TYPES WITH HYPERSPECTRAL DATA Taichi Takayama, Takashi Ohki and Tomomi Takeda
17:10	SPECTRAL SHAPE-BASED ENDMEMBER EXTRACTION METHOD Tatsumi Uezato, Richard J. Murphy, Arman Melkumyan and Anna Chlingaryan	BOTTOM-TYPE CLASSIFICATION IN CORAL REEF AREA USING HYPERSPECTRAL BOTTOM INDEX IMAGERY Shinya Odagawa and Tomomi Takeda
17:30	BLIND HYPERSPECTRAL UNMIXING USING AN EXTENDED LINEAR MIXING MODEL TO ADDRESS SPECTRAL VARIABILITY Lucas Drumetz, Simon Henrot, Miguel Ángel Veganzones, Jocelyn Chanussot and Christian Jutten	CONSTRUCTION OF HIGH SPECTRAL RESOLUTION REFLECTANCE DATABASE Toru Maruyama, Tomoji Sanga and Masaru Fujita
17:50		

8. Plenary speakers

PLENARY 1 (Wednesday, 3, June, 9:20)

APPLYING GAME THEORY TO HYPERSPECTRAL IMAGE ANALYSIS WITH APPLICATIONS TO VEGETATIVE GROUND COVER MAPPING

Lori M. Bruce, *Mississipi State University, USA*

Abstract:

In the discipline of information analysis and decision making, game theory is one of the most mature fields, with well-defined and proven mathematical models. As a mathematical tool, game theory has mostly been used to support decision-making in the field of economics. Game theory describes how players accumulate benefits for themselves by employing appropriate strategies in a competitive or cooperative activity where many players participate. Game theory, and its mathematical models, can be applied to many areas of decision making in hyperspectral remote sensing. These include campaign planning, routing/mapping sensors, data fusion, feature selection, and classification.

This talk will introduce the basic concepts of game theory and outline the mechanisms for applying game theory models to hyperspectral image analysis, with special emphasis on data reduction, automated pixel classification, and ground cover mapping. General strategies will be outlined and details of practical implementations will be provided. The talk will include the demonstration of applying game theory methods to hyperspectral imagery for a variety of agricultural and environmental applications, including vegetative species mapping and vegetative stress characterization. Details will also be provided regarding the field campaigns and airborne image collection for the imagery used in these studies.

Biography :

Lori Mann Bruce received the B.S.E., Masters, and Ph.D. degrees in electrical and computer engineering from the University of Alabama, Huntsville, and the Georgia Institute of Technology in 1991, 1992, and 1996, respectively. Dr. Bruce is currently a Giles Distinguished Professor of electrical and computer engineering and the Associate Vice President for Academic Affairs and Dean of the Graduate School at Mississippi State University. As Dean, she is responsible for providing leadership and academic oversight for the approximately 3500 graduate students enrolled in more than 160 graduate programs.

Prior to her current position, Dr. Bruce has served as Associate Dean for Research and Graduate Studies in the Bagley College of Engineering, Associate Director of the Geosystems Research Institute and Professor of Electrical and Computer Engineering. As a faculty member, her research endeavors have been focused on advanced digital signal processing methodologies for exploitation of high-dimensional datasets, with particular emphasis on hyperspectral remote sensing. She has served as the Principal Investigator (PI) or Co-PI on more than 20 funded research grants and contracts, totaling approximately $20 million from federal agencies. As a faculty member, she has taught 45 sections of 17 different engineering courses and has successfully advised, as major professor or thesis/dissertation committee member, 75 Ph.D. and Master's students. Her research has resulted in over 130 refereed publications.

Dr. Bruce is originally from Flintville, TN. She is married to Dr. J.W. Bruce and has one son, Walker Bruce.

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PLENARY 2 (Thursday, 4, June, 9:00)

HYPERSPECTRAL REMOTE SENSING FOR AGRO-ENVIRONMENTAL INFORMATION

Yoshio Inoue, *Ecosystem Informatics Division, National Institute for Agro-Environmental Sciences, Japan*

Abstract:

Timely and geospatial information on agro-ecosystems is critical for diagnosis and decision making for precision crop management as well as for food and environmental security. Remote sensing using optical, thermal and microwave sensors has a vital role for non-destructive, geospatial and systematic assessment of agro-ecosystem dynamics. However, under open-field and/or ecosystem conditions, it is a challenging task to extract accurate biophysical and ecophysiological information of ecosystems consisting of mixed soil and plant elements such as leaves, stems and ears under the changing environment (illumination, etc.). Therefore, advanced sensors as well as accurate, robust, and simple algorithms are strongly required for such applications. In this paper, results of comprehensive spectral analysis and case studies will be presented. Spectral datasets obtained by ground-based hyperspectral sensors, airborne hyperspectral sensors, high-resolution satellite optical sensors are analyzed using several methods; 1) simple spectral index approaches, 2) multivariable statistical regression models, and 3) physically-based reflectance models. Methodologies for utilization of hyperspectral data as well as several robust algorithms for hyperspectral assessment of key ecophysiological variables will be presented. Some general insights on the advantage, disadvantage, and desirable specifications of sensors for such applications will also be discussed. Information-based smart agriculture is one of the major operational applications for hyperspectral remote sensing.

Biography :

Dr. Yoshio Inoue is a senior research scientist in the National Institute for Agro-Environmental Sciences, Japan. He received the Doctoral Degree in plant ecophysiology from the Kyoto University in 1988. The major part of present research is related to remote sensing and geospatial information for agricultural and natural resource managements, especially from biophysical and physiological points of view at the scales from a leaf to region. He has made a wide range of basic and applied studies for estimation of key variables in soil-plant-atmosphere systems such as stomatal conductance, chlorophyll and water contents, transpiration and CO2 fluxes, plant growth. These works are mostly based on experimental investigations using optical, thermal and microwave remote sensing sensors on ground-based, airborne and space-borne platforms, as well as using micrometeorological and physiological instruments. The synergistic linkage of remotely-sensed data with process-based models such as growth and biophysical models is also employed for prediction of ecosystem dynamics. One of major operational applications of these studies is information-based smart agriculture. He served as a Professor at the Graduate School of Life & Environmental Sciences, University of Tsukuba from 1995 to 2015. He has been contributing to both domestic and international research communities as editor-in-chief, editor and/or reviewer of more than 60 journals.

His scientific activities and achievements are summarized at http://cse.niaes.affrc.go.jp/yinoue/.

PLENARY 3 (Friday, 5, June, 9:00)

INTELLIGENT HYPERSPECTRAL REMOTE SENSING SATELLITE (IHRS): A NEW PERSPECTIVE

Bing Zhang, *Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, Beijing, China*

Abstract:

The intelligent hyperspectral remote sensing (IHRS) is a new perspective for an Earth Observation (EO) satellite system.This plenary talk will review the main characteristics of the IHRS system that is currently in the early stages of development. The technical design of the system will include the following characteristics: 1) a fore-field pre-judgment sensor for regional background information acquisition, which will enforce the capacity of the system to adapt to different scenarios and problems; 2) an advanced and adjustable hyperspectral sensor, which will be able to provide detailed surface observations using optimum data acquisition parameters; and 3) an onboard real-time data processing and analysis subsystem, with the capacity to provide real-time remote sensing products. These characteristics, which will be discussed in detail in the plenary talk, are completely innovative with regards to the specifications of available hyperspectral imaging systems. The IHRS calls for cutting-edge research on frontier scientific theories and key technologies in order to realize a leap-forward development in the field of hyperspectral remote sensing.

Biography :

Prof. Bing Zhang is a Full Professor and the Deputy Director of the Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, where he has been leading key scientific projects in the area of hyperspectral remote sensing for more than 20 years. His research interests include the development of Mathematical and Physical models and image processing software for the analysis of hyperspectral remote sensing data in many different areas, such as geology, hydrology, ecology and botany. Prof. Zhang has authored or co-authored around 150 publications, including more than 100 journal citation reports (JCR) papers and more than 50 peer-reviewed international conference papers. Prof. Zhang is the author of 4 books on hyperspectral remote sensing, including Hyperspectral Remote Sensing, Hyperspectral Image Classification and Target Detection, Hyperspectral Remote Sensing for Inland Water, and Hyperspectral Remote Sensing and its Multidisciplinary Applications, which serve as the main materials for education and research in hyperspectral remote sensing in China. He is currently focused on the development of the intelligent hyperspectral remote sensing (IHRS) satellite, which is a new Earth Observation (EO) system aiming at providing adaptive real-time EO and monitoring. Prof. Zhang is a Senior Member of IEEE and an Associate Editor of the IEEE Journal of Selected Topics in Applied Earth Observations in Remote Sensing (JSTARS). He has been guest editor of several special issues, including a JSTARS special issue on Hyperspectral Remote Sensing: Theory, Methods, and Applications, or a JSTARS special issue on Big Data in Remote Sensing, among others.

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