Friday, April 26

09:30-10:30 LSSE-8 Room 316

Agri-Photonics

Chair: Sartoshi Wada, *RIKEN*

LSSE-8-01 09:30-10:30 INVITED KEYNOTE

Plant diagnosis robot and precise plant data for greenhouse agricultural production

*Kotaro Takayama[1,2]

1. Ehime University

2. Toyohashi University of Technology

Chlorophyll fluorescence imaging technique is useful to evaluate the photosynthetic functions of plant without touching. An application of the chlorophyll fluorescence imaging robot developed in our previous studies would be introduced.

Coffee Break (10:30-11:00)

11:00-12:00 LSSE-9 Room 316

Agri-Photonics

Chair: Sartoshi Wada, *RIKEN*

LSSE-9-01 11:00-11:30 INVITED

Photoperception and transcriptional signal transduction of Blue light in plant

*Minami Matsui[1], Mika Kawashima[1], Yuko Makita[1], Yukio Kurihara[1]

1. RIKEN Center for Sustainable Resource Science

Light is important for plant not only as an energy source but also as a signal for morphogenesis. Blue-light controls germination and flowering time. Blue-light also controls gene expression and some blue-light-regulated genes have regulatory motif in their transcript. By irradiation with Blue-light this regulation is cancelled by changing start site of mRNAs.

LSSE-9-02 11:30-12:00 INVITED

Novel plant growing lights with designed dark-lines allowing photosynthetic growth controls and noninvasive optical monitoring of physiological parameters in vegetables and algae

*Tomonori Kawano[1,2], Takuya Suzuki[2]

1. RIKEN

2. The University of Kitakyushu

Lighting systems with dark-lines continuously allowing growth control and noninvasive optical monitoring of photosynthetic status, chlorophyll content, pigmentation, fruit maturation, reporter-gene expression, and algal growth and oil production, were designed.

Lunch (12:00-13:30)

13:30-15:10 LSSE-10 Room 316

Agri-Photonics

Chair: Sartoshi Wada, *RIKEN*

LSSE-10-01 13:30-14:00 INVITED

Development of a Plant Factory Using LEDs as a Light Source for Plants

*Hiroyuki Watanabe[1]

1. Tamagawa University

The monochromatic light of LEDs induces various and specific plant physiology. Using this characteristics, 'Sci Tech Farm' of Tamagawa University produces high-quality lettuce with high performance on business.

LSSE-10-02 14:00-14:30 INVITED

Near-infrared sensing for maintaining postharvest quality

*Akifumi Ikehata

1. National Agriculture and Food Research Organization

This presentation will cover recent review of near-infrared (NIR) sensing for postharvest quality, and our approach to an outstanding issue; deficient band assignment of NIR spectrum with the aid of ^{1}H-NMR metabolomics.

LSSE-10-03 14:30-14:50

Depression of Mikania micrantha growth selectively irradiate on the stems by CW and Pulse laser

*Min-Che Chiang[1], Yu-Pin Lan[1]

1. National Chiao Tung University

A method used to depress the mikania micrantha growth by exposing stems on a high power CW and Pulse laser.

LSSE-10-04 14:50-15:10

An approach defining the health of culture pond by absorption of multi-laser irradiation

*Shi-Wei Wang[1], Yen-Chun Chen[1], Bo-Wei Huang[1], Min-Che Chiang[1], Yu-Chun Wang[2], Chi-Yuan Lin[2], Yu- Pin Lan[1]

1. Institute of Lighting and Energy Photonics, College of Photonics, National Chiao Tung University

2. Fisheries Research Institute, Division Planning and information Division

Using a simple optical method and camera to identify the culture ponds to establish the aqueous phase observations, and the further analysis of the algae in the ponds by fluorescence spectrum.

15:10-15:25 Closing Room 316

15:10-15:25 Closing Remarks

Toshikazu Ebisuzaki, Conference Chair of LSSE2019

RIKEN

REGISTRATION

Registration Fees		On/Before April 8, 2019	After April 8, 2019
General	Member	55,000 JPY	60,000 JPY
	Non-member	65,000 JPY	70,000 JPY
Student, Retiree	Member	18,000 JPY	21,000 JPY
	Non-member	21,000 JPY	23,000 JPY

OPTICS&PHOTONICS International Congress 2019 (OPIC2019) *http://opicon.jp/*

Thirteen international conferences held simultaneously. By registering for this conference, you can participate in all international conferences.

- ALPS2019: The 8th Advanced Lasers and Photon Sources
- BISC2019: The 5th Biomedical Imaging and Sensing Conference
- HEDS2019: International Conference on High Energy Density Science
- ICNN2019: International Conference on Nano-photonics and Nano-optoelectronics 2019
- IoT-SNAP2019: IoT Enabling Sensing/Network/AI and Photonics Conference
- IP2019: Information Photonics 2019
- LDC2019: Laser Display and Lighting Conference 2019
- LEDIA2019: The 7th International Conference on Light-Emitting Devices and Their Industrial Applications
- LIC2019: The 7th Laser Ignition and Giant-microphotonics Conference
- LSSE2019: Laser Solutions for Space and the Earth 2019
- OMC2019: The 6th Optical Manipulation and Structured Materials Conference
- OWPT2019: Optical Wireless and Fiber Power Transmission Conference 2019
- XOPT2019: International Conference on X-ray Optics and Applications 2019

Exhibition

OPTICS & PHOTONICS International Exhibition, OPIE2019 will be held simultaneously on April 24-26 at Pacifico Yokohama.

CONFERENCE CHAIR

Toshikazu Ebisuzaki, *RIKEN*

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K. Shigemori, *Osaka University, Japan*
N. Hasegawa, *National Institutes for Quantum and Radiological Science and Technology, Japan*
K. Takayama, *Ehime University, Japan*

OFFICIAL LANGUAGE

The official language of LSSE2019 is English.

LOCATION OF CONFERENCE SITE

The LSSE2019 will take place at Pacifico Yokohama, Yokohama city, Kanagawa prefecture, JAPAN. Yokohama city, the center of Kanagawa prefecture is located south of Tokyo. Pacifico Yokohama is conveniently located about 40 min. by Limousine Bus from Haneda Airport and 90 min. from Narita Airport.

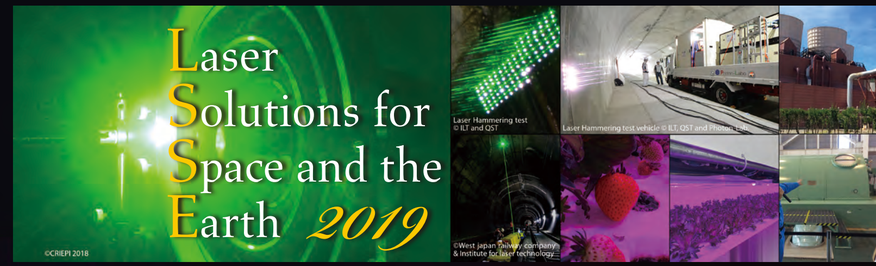
Pacifico Yokohama
1-1-1 Minato Mirai, Nishi-ku, Yokohama 220-0012, Japan
http://www.pacifico.co.jp/english/
Transportation Guide: TEL +81-45-221-2166
Information: TEL +81-45-221-2155
FAX +81-45-221-2136

OPTICS & PHOTONICS International Congress 2019

LSSE 2019

April 24-26, 2019
at Pacifico Yokohama, Japan

The aim of "Laser Solutions for Space and the Earth" is to discuss the application of emerging laser technologies to solve various problems for sustainable developments of space and the earth. We consider "Agri-Photonics (Smart Agriculture, Laser Plant Factory and Laser Sense Organ)", "Infrastructure (Nondestructive Testing and 3-D Imaging)", "Active Remote Sensing (Extreme Condition and Industrial and Atmospheric Applications)" and "Adaptive Optics" as the featured topics of the year 2019.



KEYNOTE SPEECH

09:30-10:30 April 25, 2019

Prof. Jérôme Kasparian
University of Geneva, Switzerland

Multi-wavelength laser control of high-voltage discharges: From the laboratory to Säntis mountain

09:30-10:30 April 26, 2019

Prof. Kotaro Takayama
Ehime University, Japan

Plant diagnosis robot and precise plant data for greenhouseagricultural production

The speakers and the latest information of the conference will be presented on the web site.
http://lsse.opicon.jp/

TOPICS

Agri-Photonics
- Smart Agriculture
- Laser Plant Factory
- Laser Sense Organ

Infrastructure
- Nondestructive Testing
- 3-D Imaging

Active Remote Sensing
- Extreme Condition
- Industrial and Atmospheric Applications

Adaptive Optics

Others such as
- Atomic Energy,
  Energy Production and Transmission,
  Space Debris,
  Laser Ablation...and more

Wednesday, April 24

09:15-09:30 Opening — Room 316

09:15-09:30 Opening Remarks
Toshikazu Ebisuzaki, Conference Chair of LSSE2019
RIKEN

09:30-10:30 LSSE-1 — Room 316

Active Remote Sensing (Extream condition)

Chair: Akihiko Nishimura, *Japan Atomic Energy Agency*

LSSE-1-01 09:30-10:00 INVITED
Radiochemical Analysis of the Accumulated Water at Fukushima Daiichi Nuclear Power Station
*Yoshikazu Koma[1]
1. Japan Atomic Energy Agency
After the accident of Fukushima Daiichi Nuclear Power Station, the contaminated water has been accumulated at basement of buildings. Radiochemical data is reviewed for the accumulated water.

LSSE-1-02 10:00-10:30 INVITED
Evolution and diversity of radioresistant microbes
*Issay Narumi[1]
1. Toyo University
Ionizing radiation may serve as an evolutionary motive force. Many radioresistant microbes have been isolated from various Earth environments. However, the molecular mechanisms of radioresistance maybe not same among them.

Coffee Break (10:30-11:00)

11:00-12:00 LSSE-2 — Room 316

Active Remote Sensing (Extream condition)

Chair: Akihiko Nishimura, *Japan Atomic Energy Agency*

LSSE-2-01 11:00-11:30 INVITED
Integrated Database for Microbes, "MicrobeDB.jp"
Hiroshi Mori[1], *Ken Kurokawa[1]
1. National Institute of Genetics
We are developing an integrated database for microbes based on semantic web technologies, which enables users to speculate on relationships between genomic/metagenomic and environmental information.

LSSE-2-02 11:30-12:00 INVITED
Nuclear Geyser Model of the Origin of Life
*Toshikazu Ebisuzaki[1], Shigenori Maruyama[2]
1. RIKEN
2. Erath-Life Science Institute, Tokyo Institute of Technology
We proposed the new hypothesis called "Nuclear Geyser Model" of the origin of life, in which high energy flux from a natural nuclear reactor drove chemical reactions to produce major biological molecules, such as amino acids, nucleotides, sugars, and fatty acids from the raw molecules (H_2O, N_2, and CO_2).

Lunch (12:00-13:15)

13:15-14:45 LSSE-P — Exhibition Hall A

Poster Session

LSSE-P-01
Characterization of Induced Vibration on Concrete Surface by Pulse Laser Ablation
*Katsuhiro Mikami[1], Toshiyuki Kitamura[1], Noboru Hasegawa[1], Hajime Okada[1], Shuji Kondo[1], Masaharu Nishikino[1], Tetsuya Kawachi[1]
1. National Institutes for Quantum and Radiological Science and Technology
In this study, we evaluated frequencies and its magnitude of the characteristic vibrations on a concrete specimen induced by laser pulse ablation and pendulum impact to optimize the laser hammering method.

LSSE-P-02
Double pulse laser processing for carbon coated SiO_2 target using near IR beam
*Terutake Hayashi[1], Yuki Hirotsu[1], Syuhei Kurokawa[1], Noboru Hasegawa[2], Masaharu Nishikino[2]
1. Kyushu University
2. National Institutes for Quantum and Radiological Science and Technology
A carbon-coated SiO_2 target is processed by using low fluence double pulse beam in order to measure the damage threshold during the photo excitation effect.

LSSE-P-03
Optical mirror adjustment of a large aperture collimator
*Chia-Yen Chan[1], Yi-Kai Huang[2], Zhen-Ting You[3], Yi- Cheng Chen[3]
1. Instrument Technology Research Center, National Applied Research Laboratories
2. National Space Organization, National Applied Research Laboratories
3. Department of Mechanical Engineering, National Central University
The purpose of the study is to explore the optical mirror adjustment mechanism of a collimator with a primary mirror diameter of 620 mm used for a spaceborn telescope.

LSSE-P-04
Observation of the femto second laser ablation dynamics of metals by using the soft x-ray laser
*Noboru Hasegawa[1], Masaharu Nishikino[1], Masahiko Ishino[1], Thanh-Hung Dinh[1], Tetsuya Kawachi[1], Yasuo Minami[2], Motoyoshi Baba[3], Tohru Suemoto[4]
1. National Institutes for Quantum and Radiological Science and Technology
2. Graduate School of Technology, Industrial and Social Sciences, Tokushima University
3. Saitama Medical University
4. Toyota Physical and Chemical Research Institute
In this study, we have succeeded in observation of the transient surface nano-structures in femto-second laser ablation process of metals by using the laser plasma soft x-ray laser probe.

15:30-17:50 LSSE-3 — Room 316

Infrastructure

Chair: Yoshinori Shimada, *Institute for Laser Technology*

LSSE-3-01 15:30-16:00 INVITED
High Power Heat Loading Experiments using JAEA Facility Utilization
*Akihiko Nishimura[1,2], Yoshinari Anoda[2], Akira Yamaguchi[3]
1. Japan Atomic Energy Agency
2. University of Fukui
3. The University of Tokyo
High power heat loading by a fiber laser can be possible for various accidental scenario. A sensor array with heat resistant FBG is designed for remote sensing experiments using JAEA facility utilization.

LSSE-3-02 16:00-16:20
Long-term stability comparison of point-by-point femtosecond-laser-inscribed FBGs and UV-inscribed FBGs at high temperature
*Victor Shishkin[1], Hideaki Murayama[1]
1. The University of Tokyo
In this work we are checking long-term performance of point-by-point femtosecond-laser-inscribed fiber Bragg gratings at temperatures up to 350 °C in comparison with conventional UV-inscribed FBGs.

LSSE-3-03 16:20-16:50 INVITED
Non-destructive inspection for concrete structures by laser remote sensing system

*Naotoshi Yasuda[1]
1. Kyoto University
Laser-based remote sensing system for detecting defects of concrete lining has been developed. This system can move a central passage in Shin-kansen tunnel and detect the concrete defects. We have developed automatic positioning and focusing system of impact and detection lasers. It was confirmed that this system inspected concrete defects with remote and high speed and soundness could be judged.

LSSE-3-04 16:50-17:20 INVITED
Verification Test for the High-Speed Laser Hammering Method in Load Tunnels

*Noboru Hasegawa[1], Masaharu Nishikino[1], Hajime Okada1, Shuji Kondo[1], Katsuhiro Mikami[1], Toshiyuki Kitamura[1], Shinri Kurahashi[2], Yoshinori Shimada[2], Tetsuya Kawachi[1]
1. National Institutes for Quantum and Radiological Science and Technology
2. Institute for Laser Technology
We are developing a new remote sensing system for tunnel inspection, Laser Hammering Method (LHM). In this study, we had demonstration of LHM in road tunnels and succeeded to observe the defect inside lining concrete.

LSSE-3-05 17:20-17:50 INVITED
Advanced efforts of River Measurement made by LiDAR technology in Japan


*Koji Mano[1], *Koichi Sakai[1]
1. PASCO Corporation
For providing geospatial information for river management, we usually use LiDAR technology such as Airborne LiDAR Bathymetry (ALB), Mobile LiDAR System (MLS) and Unmanned aerial vehicle LiDAR System (ULS). In this presentation, as application example of LiDAR technology, we introduce advanced efforts of river measurement made in Japan.

Thursday, April 25

09:30-10:30 LSSE-4 — Room 316

Active Remote Sensing (Industrial and Atmospheric Applications)

Chair: Takashi Fuji, *The University of Tokyo*

LSSE-4-01 09:30-10:30 INVITED KEYNOTE
Multi-wavelength laser control of high-voltage discharges: From the laboratory to Säntis mountain

Thomas Produit[1], Guillaume Schimmel[1], Elise Schubert[1], Denis Mongin[1], Ali Rastegari[2], chengyong feng[2], Ben Kamer[2], Ladan Arissian[2], Jean-Claude Diels[2], Pierre Walch[3], Benoît Mahieu[3], Yves-Bernard André[3], Aurélien Houard[3], Clemens Herkommer[4,5], Robert Jung[4], Thomas Metzger[4], Knut Michel[4], André Mysyrowicz[6], Jean-Pierre Wolf[1], *Jerome Kasparian[1]
1. University of Geneva
2. University of New Mexico
3. ENSTA ParisTech
4. TRUMPF Scientific Lasers GmbH
5. TU Munchen
6. André Mysyrowicz Consultants
We review recent results on multi-wavelength multipulse schemes to control high-voltage discharges with ultrashort pulses, and discuss their implications on lightning control at atmospheric scale.

Coffee Break (10:30-11:00)

11:00-12:00 LSSE-5 — Room 316

Active Remote Sensing (Industrial and Atmospheric Applications)

Chair: Takashi Fuji, *The University of Tokyo*

LSSE-5-01 11:00-11:30 INVITED
Laser-induced plasma and its application for spectrochemical analysis

*Jin Yu[1]
1. Shanghai Jiao Tong University / School of Physics and Astronomy
We will present in this talk, our results on reduction of the matrix effect in LIBS measurements through a suitable and still quite simple sample preparation. Multivariate calibration model based on generalized spectrum and machine learning algorithm is further developed as an efficient data correction method to reduce the matrix effect with satisfactory results. As examples of analyzed materials, results will be presented for viscous liquids, powders and soils.

LSSE-5-02 11:30-12:00 INVITED
Remote LIBS for measurement of salt deposited on porcelain insulators

*Takashi Fujii[1]
1. The University of Tokyo
We will present our recent results on the measurements of salt deposit density on porcelain insulators by remote laser-induced breakdown spectroscopy with a distance up to 20 m.

Lunch (12:00-13:10)

13:10-15:00 LSSE-6 — Room 316

Adaptive Optics

Chair: Toshikazu Ebisuzaki, *RIKEN*

LSSE-6-01 13:10-13:40 INVITED
The Semiconductor Guidestar Laser: A Novel, Affordable, Low SWaP Sodium Guide Star Laser for Adaptive Optics Imaging, Tracking and Manoeuvring of Space Objects

*Celine d'Orgeville[1,2], Gregory Fetzer[3], Steve Rako[3], Luke Hill[3], Steven Floyd[3], S Sandalphon[4], Nathan Woody[3], David Brodrick[1], Gerard Kennedy[1], Mark Blundell[5]
1. Australian National University
2. Space Environment Research Centre
3. Arete Associates
4. Cinnabar Optics
5. EOS Space Systems
A prototype of the novel Semiconductor Guidestar Laser will be tested on the Adaptive Optics (AO)-enhanced EOS laser tracking station 1.8m telescope at Mount Stromlo Observatory in 2019. This will be the first time that a Laser Guide Star (LGS) is created in Australian skies. Two LGS AO systems will be used to image, track, and eventually manoeuvre space debris in earth orbits.

LSSE-6-02 13:40-14:00
Fast adaptive optical system to improve the quality of focusing the space debris destruction system

*Alexis Kudryashov[1,2], Vadim Samarkin[1,2], Aleksey Rukosuev[1], Vladimir Toporovski[2], Julia Sheldakova[1]
1. Institue of Geosphere Dynamics RAS
2. AKAoptics SAS
This paper presents the high-speed adaptive optical system that allows to improve the quality of the focused laser beam, compensating for the negative influence of the atmosphere by the controlled deformable mirror.

LSSE-6-03 14:00-14:30 INVITED
Predictive Adaptive Optics Control for the Long-distance High-intensity Light Beam Transmission to Moving Objects
*Masashi Iwashimizu[1], Shingo Nishikata[1], Hiroyuki Daigo[1], Yoshikatsu Kuroda[1], Toshikazu Ebisuzaki[2], Naoto Sakaki[2], Shinji Motokoshi[3], Masayuki Fujita[3]
1. Mitsubishi Heavy Industries, Co., Ltd.
2. RIKEN
3. Institute for Laser Technology
In order to realize high efficiency laser transmission, we must avoid atmospheric effects. This paper presents predictive adaptive optics control, which utilize backscattering of atmosphere and an absorption coefficient detector.

LSSE-6-04 14:30-15:00 INVITED
Determination of absorption coefficient of atmosphere by near-IR laser beam
*Naoto Sakaki[1], Toshikazu Ebisuzaki[1], Masashi Iwashimizu[2], Shingo Nishikata[2], Hiroyuki Daigo[2], Shinji Motokoshi[3], Masayuki Fujita[3]
1. RIKEN
2. Mitsubishi Heavy Industries, Co., Ltd.
3. Institute for Laser Technology
Absorption coefficient of the atmosphere in various conditions is important for propagation of high-power near-IR laser. We describe details of the absorption coefficient measurement in a laboratory using thermal blooming effect.

Coffee Break (15:00-15:30)

15:30-16:40 LSSE-7 — Room 316

Adaptive Optics

Chair: Toshikazu Ebisuzaki, *RIKEN*

LSSE-7-01 15:30-16:00 INVITED
LEO survey system using CMOS sensors

*Toshifumi Yanagisawa[1], Kohki Kamiya[1], Hirohisa Kurosaki[1], Naoyuki Fujita[1]
1. Japan Aerospace Exploration Agency
LEO survey system using CMOS sensors will be power tool for monitoring LEO environment. It will contribute to the space situation awareness along with the radar system.

LSSE-7-02 16:00-16:20
Experience in developing a mirror collimator to simulate infinitely distant light point objects and background effects while ensuring its efficiency under conditions of outer space simulation
*Maksim Simonov[1], Igor Galyavov[1], Oleg Ponin[1]
1. LZOS
The article presents the results of research on the simulation of infinitely distant point of light objects and background effects. The obtained data were used to create a test bench for thermal vacuum tests and complex equipment configuration under conditions of space simulation.

LSSE-7-03 16:20-16:40
Adaptive optics systems for bio-imaging and intense lasers
*Rakchanok Rungsawang[1], Guillaume Dovillaire[1], Guillaume Beaugrand[1], Audrius Jasaitis[1], Fabrice Harms[1], Nadezda Varkentina[1], Xavier Levecq[1]
1. Imagine Optic
Electromagnetic actuator- and mechanical actuator-based deformable mirrors are used to correct wavefront aberrations from table-top optical systems to high-power laser facilities with the help of a wavefront sensor and control software.

LSSE-7-04 16:40-17:00
Conduction Cooled Compact Laser for the SuperCam LIBS-Raman Instrument

*Christophe Derycke[1], A. Soujaeff[1], E. Durand[1], L. Roucayrol[2], M. Boutillier[2], B. Faure[2], S. Maurice[3]
1. Thales LAS
2. CNES
3. IRAP
A new compact laser for SuperCam instrument aboard Mars 2020 Rover is presented. Flight model has been built, characterised and delivered. We also report environmental testing of this model.