FAAP <Room 412>

Monday, 21 April

[FAAP1] 13:00-15:05
Keynote 1
Chair: Satoshi Wada
RIKEN

FAAP-OP 13:00

Opening Remarks
Satoshi Wada
RIKEN

FAAP1-01 13:05 ***Invited***

Prospects of Data-driven Agrifood Systems Upcoming
Sakae Shibusawa
Tokyo University of Agriculture and Technology
The term "data-driven agrifood systems" is standardized and become a core of future agriculture bonding many different events. Heliostat-combined wooden greenhouse, water saving system for farming and interoperable food chain system will be discussed.

FAAP1-02 14:05 ***Invited***

Agri Open Innovation: Shizuoka Prefecture's Efforts to Promote Agriculture
Kosuke Chris Yamada
Tokai University
The Agri Open Innovation (AOI) Institute, a foundation fully funded by Shizuoka Prefecture Government, provides various support activities to stakeholders in agriculture. The AOI Institute manages a members-only forum that has a membership of over 300. This presentation will mainly introduce our support activities for research and development for members.

FAAP1-03 14:35 ***Invited***

Sustainable Agriculture through Possible Utilization of Unused Resources
Shigeharu Moriya, Satoshi Wada
RIKEN
Currently, agricultural resources are supplied by chemical industry, but a significant portion could potentially be replaced by ecological resources. This presentation discusses these possibilities based on initiatives in Shizuoka Prefecture.

Tuesday, 22 April

[FAAP2] 10:00-12:00
Keynote 2
Chair: Satoshi Wada
RIKEN

FAAP2-01 10:00 ***Invited***

Developing Technologies to Unravel the Microbial World at the Single-Cell Level
Haruko Takeyama
Waseda University
Agricultural soils host diverse microbes that interact with crops. To elucidate their functions, we apply omics approaches. Given culturing challenges, single-cell analysis enables the discovery of novel microbial functions. This talk presents technologies and findings from single-cell omics analyses.

FAAP2-02 11:00 ***Invited***

Quantifying the Subjective Quality of Agricultural Products with Spectral Sensing: The Case of Freshness and Sensory Attributes
Akifumi Ikehata
NARO
This study used near-infrared (NIR) spectroscopy to evaluate tomato taste/texture and cabbage freshness, modeling sensory attributes and storage changes. Results highlight its potential for objective fruit and vegetable quality assessment.

FAAP2-03 11:30 ***Invited***

Future of Agriculture and Advanced Photonics
Satoshi Wada
RIKEN
As the Conference Chair, I am pleased to introduce the FAAP2025 conference, which will focus on advancements in optical technology in agriculture and its integration with other scientific fields, providing a platform for discussing research and development while considering the agricultural environment and conditions.

----- Lunch 12:00-13:00 -----

[FAAP3] 13:00-15:00
Session 3
Chair: Shigeharu Moriya
RIKEN

FAAP3-01 13:00 ***Invited***

Transforming Agriculture with LED Lighting: Advancing Precision Farming and Sustainability through Photonics
Edwin Ong
ARIANETECH PTE LTD
The strategic use of LED lighting in vertical farming enhances crop yields, reduces energy consumption, and optimizes growth cycles, creating a sustainable and profitable business model while advancing precision farming and environmental resilience through photonics.

FAAP3-02 13:30 ***Invited***

Optimizing Photosynthesis and Energy Efficiency with Intelligent Agricultural Lighting Automation
Wang Wenwei
Republic Polytechnic
Optimize photosynthesis and energy utilization efficiency for plants in urban agriculture, achieve significant energy savings, and increase crop yields through automatic, dynamic, and precise lighting management using IoT systems.

FAAP3-03 14:00 ***Invited***

Plant Nanobionics
Min Hao Wong
*A*STAR - Agency for Science, Technology and Reseach*
Nanotechnology is an emerging field of research within recent decades and is based upon the exploitation of nano-sized materials. In this talk, we will explore the latest advances in nanobiotechnology and its applications to the real world, particularly in plants and in agriculture.

FAAP3-04 14:30 ***Invited***

UAV-Based Hyperspectral Imaging for Rubber Tree Canopy Mapping: Assessing Leaf Fall Dynamics Across Clones and Tree Ages
Masita Dwi Mandini Manessa[1], Anisya Feby Efriana[1], Farida Ayu[1], Fajar Dwi Pamungkas[1], Charlos Togi Stevanus[2], Iqbal Putut Ash Shidiq[1], R. Rokhmatulloh[1], S. Supriatna[1], Retno Lestari[1], Kiwamu Kase[3], Minami Matsui[3], Tri Rapani Febbiyanti[2]
[1]Universitas Indonesia, [2]IRRI, Palembang, Indonesia, [3]Riken
This study uses UAV hyperspectral imagery and machine learning to analyze leaf fall in rubber plantations. Spectral Angle Mapper accurately classified leaf fall severity, revealing clone- and age-specific senescence patterns, aiding plantation management and productivity.

Friday, 25 April

[FAAP4] 10:00-11:40
Session 4
Chair: Taro Fukuyama
Tamagawa University

FAAP4-01 10:00 ***Invited***

The Future of Food Supply and Demand and the Role of Science and Technology
Atsushi Shinjo
Keio University
The global population is set to exceed 9 billion, causing food security concerns. Japan faces challenges with an aging and declining farming population. This presentation will explore how science and technology can address future food supply issues in Japan and globally.

FAAP4-02 10:30 ***Invited***

Fluorescence imaging for detecting bio-material surface changes
Naoshi Kondo
Kyoto University
Most biological materials fluoresce and their properties change according to their age, quality, growing environment, and other reasons. Their information of specific excitation based images is useful for sustainable food production.

FAAP4-03 11:00

High sensitivity tapered fiber optic sensor coupled with a support vector machine for the identification of red wine
Jesus Alberto Parada[1], Juan Carlos Hernandez-Garcia[2], Raul Enrique Sánchez-Yáñez[1], Juan Manuel Sierra-Hernandez[1], María Susana Avila-Garcia[1], Marco Bianchetti[1], María Elena Sosa-Morales[1], Stefano Toffanin[3], Julian Moises Estudillo-Ayala[1], Roberto Rojas-Laguna[1]
[1]División de Ingenierías CIS, Universidad de Guanajuato, Salamanca, Gto, México, [2]Investigadoras e investigadores por México CONAHCYT, CDMX, México, [3]Institute of Nanostructured Materials Italian National Research Council, Bologna Italy
A fiber optic fiber tapered, coupled with a support vector machine classifier, identifies red wines with 99.847% accuracy, analyzing 1680 spectral samples, showing potential for quality control in the wine industry.

FAAP4-04 11:20

Early Detection of Water Stress in Plants using Frequency-Domain Fluorescence Lifetime Imaging Microscopy (FD-FLIM)
Cheng-Hao Lin, Hsiao-Mei Wu
Department of Biomechatronics Engineering, National Taiwan University
Fluorescence lifetime imaging microscopy allows precise, non-invasive, and early detection of photosynthetic efficiency. We optimized LED-based FD-FLIM to overcome the limitations of high-frequency modulation, providing a robust tool for the detection of stress in plants.

----- Lunch 11:40-13:00 -----

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Friday, 25 April

[FAAP5] 13:00-14:40
Session 5
Chair: Toshikazu Ebisuzaki
RIKEN

FAAP5-01 13:00 ***Invited***

Non-destructive Evaluation of Produce in Plant Factories with Artificial Light using Spectroscopy: Application to Equipment Maintenance

Taro Fukuyama, Miyuki Ostuka, Keiko Ohashi-Kaneko
Tamagawa University

We developed a non-destructive method to predict alkaloid concentrations in Catharanthus roseus using VIS-NIR spectroscopy. This method could be applied for quality control and equipment maintenance in plant factories with artificial light.

FAAP5-02 13:30 ***Invited***

Transformations in Horticulture Systems with the Large-Scale Adoption of Renewable Energy

Tomohiro Jishi
CRIEPI

I will present the use of renewable energy in agriculture, methods of using renewable energy that benefit farmers, the role that plant factories, and the electric power system in farming and fishing villages.

FAAP5-03 14:00

Automated stem detection of Mikania micrantha based on the Hough transform for efficient laser weeding

Yi Lun Li, Yu Pin Lan
National Yang Ming Chiao Tung University

This work presents a novel approach for real-time stem identification of Mikania micrantha. A parallel circuit implemented on a field-programmable gate array (FPGA) significantly accelerates Hough transform computations, enabling rapid and efficient image recognition.

FAAP5-04 14:20

Prevention of Mango Stem-End Rot Using Laser Irradiation

Yudai Iwakiri, Hikari Yoshioka, Kaito Makinose, Okubo Atsuhiro, Masakazu Arai
Miyazaki University

The effectiveness of laser irradiation for preventing stem-end rot of mangoes was investigated. A 100% suppression effect was confirmed by irradiating a 20W optical output, 940nm wavelength laser for 10 seconds, and caused no detectable internal damage.

----- Coffee Break 14:40-15:30 -----

[FAAP6] 15:30-16:30
Session 6
Chair: Atsushi Shinjo
Keio University

FAAP6-01 15:30

Early Detection of *Diaporthe Destruens* in Sweet Potatoes

Ziyu Wang[1], Riku Matsuzaki[1], Risa Shimooki[2], Yuko Inoue[2], Hiroaki Yoshioka[1], Minoru Takeshita[2], Masaya Miyazaki[3], Yuji Oki[1,4]
[1]Kyushu University, [2]Miyazaki University, [3]HaKal Co. Ltd., [4]SOPT LLC.

Fourier Transform Infrared Spectroscopy (FTIR) and Ultraviolet (UV) fluorescence were utilized to detect early-stage stem rot in sweet potatoes. Observed spectral differences indicate their potential for non-destructive early disease detection.

FAAP6-02 15:50 ***Invited***

The Agriculture Outside the Earth

Toshikazu Ebisuzaki
RIKEN

I will discuss the possibility of the sustainable agriculture outside the Earth in the spacecraft, planets, and asteroids. I will study the availability of H_2O and CO_2, the two raw materials of the photosynthesis of plants and then three major nutrients, N, P, and K, as well as other essential nutrients.

FAAP-CL 16:20

Closing Remarks

Toshikazu Ebisuzaki
RIKEN