

Welcome Message

The Japan Association of Medical Spectroscopy (JAMS) provides a platform for discussing a wide range of topics, from technological development to practical applications, with the aim of applying spectroscopy and spectroscopic measurement technologies to the biomedical field. Spectroscopic measurement technologies have rapidly advanced, from the development of devices to spectral analysis methods, and numerous new applications are being proposed in the biomedical field. This research meeting aims to contribute to future medical fields through cross-disciplinary discussions, covering topics from basic to applied research.

This time, we will co-organize an international workshop “Biomedical Raman Imaging (BRI) Workshop 2024.” The workshop will feature hands-on seminars, including lectures on the basics of Raman imaging and applications, including a demonstration of Raman imaging of biological samples. In addition, we will provide opportunities for discussions with experts in Raman imaging techniques, and we warmly welcome the participation of those interested in Raman imaging

Thank you for your participation, and we wish you a productive and inspiring symposium.

Warm regards,

Shunichi Sato	Professor Emeritus, National Defense Medical College
Katsumasa Fujita	Professor, Graduate School of Engineering, Osaka University Executive Director, Photonics Center, Osaka University
Yasuaki Kumamoto	Associate Professor, The Institute for Open and Transdisciplinary Research Initiatives (OTRI), Osaka University

Program at glance

Nov.25	Nov. 26	Nov. 27
		<u>9:00-10:30</u> Y. Ozeki Z. Huang P. Leproux
	<u>9:30-11:30</u> M. Suematsu M. Baranska H. J. Lee C.Zhang	<u>10:30-10:50</u> Coffee Break
	<u>11:30-13:00</u> Lunch & Coffee Break	<u>10:50-12:20</u> K. Dodo M. Kamiya L. Wei
<u>13:00-13:10</u> Opening Remark	<u>13:00-14:40</u> M. J. Booth R. Kato	<u>12:20-13:50</u> Lunch & Coffee Break
<u>13:10-14:40</u> H. Takeyama M. Egawa S. Shigeto J. Ando	T. Nishimura K. Sugiyama T. Shinotsuka	<u>13:50-15:05</u> K. Fujita M. Li Y. Kumamoto
<u>14:40-15:00</u> Coffee Break	<u>14:40-15:00</u> Coffee Break	
<u>15:00-16:35</u> A. Gupta M. Hashimoto K. Hashimoto N. I. Smith H. Sato	<u>15:00-16:30</u> Poster Session	<u>15:05-15:20</u> Coffee Break
<u>16:35-19:35</u> Networking	<u>16:30-18:15</u> T. Yamamoto H. Kano Y. Oshima S. Kawauchi T. Takamatsu M. Ishigaki	<u>15:20-17:50</u> BRI workshop Demonstration & Exchange

The 22nd Annual Meeting of The Japan Association of Medical Spectroscopy & Biomedical Raman Imaging Workshop 2024

Date: November 25-27, 2024

Venue: Convention Center/ Photonics Center, Suita Campus, Osaka University

Program

November 25@Convention Center, Osaka University

13:00 Welcome Message and Opening Remark

Shunichi Sato

Professor Emeritus, National Defense Medical College

JAMS Session 1

13:10 The fascinating world of microorganisms revealed by single-cell omics analysis

Haruko Takeyama, *plenary*

Department of Life Science and Medical Bioscience, Waseda University

Computational Bio Big-Data Open Innovation Laboratory, AIST-Waseda University

Research Organization for Nano & Life Innovation, Waseda University

Institute for Advanced Research of Biosystems Dynamics, Waseda University

13:40 Advancement of spectral imaging for skin characteristic evaluation

Mariko Egawa, *invited*

MIRAI Technology Institute, Shiseido Co., Ltd.

14:00 Discrimination of carotenoids in bacterial cells using multiwavelength-excited Raman microspectroscopy

Shinsuke Shigeto, *invited*

Department of Chemistry, Graduate School of Science and Technology, Kwansei

Gakuin University

14:20 SERS digital counting of single enzyme biomarkers

Jun Ando, *invited*

Riken

14:40 **Coffee Break**

JAMS Session 2

- 15:00 Label-free phenotypic and molecular profiling of drug-resistant breast cancer cells using Raman spectroscopy and optical diffraction tomography
Anoushka Gupta
Department of Mechanical Engineering, Johns Hopkins University
- 15:15 Effects of medium-chain fatty acids under the suppression of lipid metabolism using stimulated Raman scattering imaging
Mamoru Hashimoto
Faculty of Information Science and Technology, Hokkaido University
- 15:30 Identification of tipping point during developmental process of primary cultured neuron with Raman spectroscopy and dynamical network biomarker (DNB) analysis
Kosuke Hashimoto
Research Center for Pre-Disease Science, University of Toyama
School of Environmental Bioscience, Kwansai Gakuin University
- 15:45 Raman and phase imaging of the response to non-specific immunostimulatory and dietary triggers
Nicholas I. Smith, *invited*
Biophotonics Laboratory, Host Defense Laboratory, Immunology Frontier Research Center, Osaka University
- 16:05 Raman spectroscopy for prediction of life
Hidetoshi Sato, *invited*
School of Biological and Environmental Sciences, Kwansai Gakuin University
- 16:35 **Networking**

November 26@Convention Center, Osaka University

BRI Workshop Session 1

- 9:30 Prediction of invasiveness and post-operative prognosis of cancer by imaging metabolomics
Makoto Suematsu, *invited*
Central Institute for Experimental Medicine and Life Science (CIEM), Keio University
Professor Emeritus, Keio University WPI-BioQ2 Research Center
- 10:00 RamanSense: localization, quantification, and metabolism of cellular components
Malgorzata Baranska, *invited*
Faculty of Chemistry, Jagiellonian University in Kraków
Doctoral School of Exact and Natural Sciences, Jagiellonian University in Kraków

11:00 Lipid profiling at submicron resolution by hyperspectral stimulated Raman imaging
Hyeon Jeong Lee, *invited*
College of Biomedical Engineering & Instrument Science, Zhejiang University

11:00 Coherent Raman spectroscopy and microscopy for Imaging cells under stress
Conditions
Chi Zhang, *invited*
Department of Chemistry, Purdue University

11:30 **Lunch & Coffee Break**

JAMS Session3

13:00 Adaptive optics for deep tissue microscopy
Martin J. Booth, *plenary*
Department of Engineering Science, University of Oxford

13:30 Paving ways of mid-infrared photothermal microscopy for biomedical analysis
Ryo Kato, *invited*
Department of Systems Innovation, Osaka University
PREST, JST

13:50 In silico clinical trial for laser treatment: a biotissue optical property spectroscopy-
based approach
Takahiro Nishimura, *invited*
Graduate School of Engineering, Osaka University

14:10 Molecular imaging uncovered vascular wall changes leading to acute aortic
aneurysms and dissections in marfan syndrome
Kaori Sugiyama
Institute for Advanced Research Biosystem Dynamics, Research Institute for Science
and Engineering, Waseda University
Research organization for Nano and Life Innovation, Waseda University
Life Science Center for Survival Dynamics, Tsukuba Advanced Alliance, University of
Tsukuba

14:25 Visualization of brain water dynamics using stimulated Raman scattering microscopy
Takanori Shinotsuka
Department of Pharmacology, Keio University

14:40 **Coffee Break**

15:00 **Poster Session**

JAMS Session 4

- 16:30 An analytical study of functional oils from cockroach exploring the possibility of using them as livestock feed
Tatsuyuki Yamamoto
Matsue-minami senior high school
- 16:45 Investigating liquid-liquid phase separation in living organisms by multimodal nonlinear optical imaging of *Caenorhabditis elegans*
Hideaki Kano
Faculty of Science and Technology, Keio University
- 17:00 Raman spectroscopic validation of blood cancer cells with decision algorithm for practical use in clinical diagnosis
Yusuke Oshima
Laboratory for Clinical Photonics and Informatics, Faculty of Engineering, University of Toyama
Research Center for Pre-Disease Science, University of Toyama
Gastroenterological and Pediatric Surgery, Oita University Faculty of Medicine
- 17:15 Photonics-based analysis of glymphatic clearance in a blast-related traumatic brain injury model
Satoko Kawauchi, *invited*
Division of Bioinformation and Therapeutic Systems, National Defence Medical College Research Institute
- 17:35 Novel near-Infrared hyperspectral imaging systems for deep tissue structure visualization under endoscope
Toshihiro Takamatsu, *invited*
Health and Medical Research Institute, National Institute of Advanced Industrial Science and Technology
- 17:55 Liquid biopsy of embryo culture medium using Raman spectroscopy
Mika Ishigaki, *invited*
Institute of Agricultural and Life Sciences, Academic Assembly, Shimane University
- 18:15 **Closing Remark**
Katsumasa Fujita,
Professor, Graduate School of Engineering, Osaka University
Executive Director, Photonics Center, Osaka University

November 27@Photonics Center, Osaka University

BRI Workshop Session 2

- 9:00 Stimulated Raman scattering microscopy – basics and applications -
Yasuyuki Ozeki, *invited*
Research Center for Advanced Science and Technology, The University of Tokyo
- 9:30 Depth-coded stimulated Raman scattering tomography enables label-free
biomolecular and functional 3D imaging of live cells and tissues
Zhiwei Huang, *invited*
Optical Bioimaging Laboratory, Department of Biomedical Engineering, College of
Design and Engineering, National University of Singapore
- 10:00 Multiplex CARS microspectroscopy: simplifying instrumentation facilitating
applications
Philippe Leproux, *invited*
XLIM research institute, University of Limoges, France

10:30 **Coffee Break**

BRI Workshop Session 3

- 10:50 Development of Raman tags for bioactive compounds
Kosuke Dodo, *invited*
RIKEN Center for Sustainable Resource Science (CSRS)
- 11:20 Molecular design of activatable Raman probes for multiplexed bioimaging
Mako Kamiya, *invited*
Department of Life Science and Technology, Institute of Science Tokyo
- 11:50 Functional bond-selective microscopy for subcellular bioanalysis
Lu Wei, *invited*
Division of Chemistry and Chemical Engineering, California Institute of Technology

12:20 **Lunch & Coffee Break**

BRI Workshop Session 4

- 13:50 Raman microscopy for fast and high sensitivity imaging
Katsumasa Fujita, *invited*
Department of Applied Physics, Osaka University
- 14:15 Label-free and live-cell Raman imaging in cell biology
Menglu Li, *invited*
Shenzhen Medical Academy of Research and Translation (SMART)

14:40 Towards clinical translation of Raman spectroscopy and imaging

Yasuaki Kumamoto, *invited*

The Institute for Open and Transdisciplinary Research Initiatives (OTRI), The University of Osaka

Department of Applied Physics, The University of Osaka

Department of Pathology and Cell Regulation, Graduate School of Medical Science, Kyoto Prefectural University of Medicine

15:05 **Coffee Break**

15:20 **BRI Workshop, Demonstration & Exchange***

*Demonstration of cell imaging and analysis using spontaneous Raman/Stimulated Raman scattering microscopes in Fujita Lab at Photonics Center, Osaka University, after lectures of principle and application of Raman imaging techniques.

Poster Session (15:00 - 16:30)

- P-1. **Pooja Anantha**¹, Zhenhui Liu¹, Piyush Raj¹, Ishan Barman^{1,2,3} **"Revealing insights into white and brown adipocyte differentiation through optical diffraction tomography and Raman spectroscopy"**, ¹Department of Mechanical Engineering, Johns Hopkins University, Baltimore, ²Department of Oncology, Johns Hopkins University, Baltimore, ³The Russell H. Morgan Department of Radiology and Radiological Science, Division of Cancer Imaging Research, Johns Hopkins University School of Medicine
- P-2. **Syusuke Egoshi**^{1,2,3}, Kosuke Dodo^{2,3}, Kenta Mizushima^{1,3}, Yasuaki Kumamoto^{1,3}, Masahito Yamanaka^{1,3}, Mikiko Sodeoka^{2,3} and Katsumasa Fujita^{1,3} **"Chemical tags for Raman imaging of the intracellular small bioactive molecules"**, ¹Graduate School of Engineering, Osaka University. ²RIKEN CSRS. ³JST-CREST.
- P-3. **Rheta Elkhaira**¹, Keita Iwasaki¹, Hidetoshi Sato¹, **"Real-time investigation of cells' response to virus invasion with Raman spectroscopy"**, ¹Kwansei Gakuin University
- P-4. **Yuui Fujiyama**^{1,2}, Shu-hei Urashima¹, Rina Otsuka¹, Kenichi Oguchi^{1,2}, Takeru Ota^{2,3}, Hiroshi Hibino^{2,3}, Hiroharu Yui^{1,2}, **"Non-contact estimation for the mechanical properties of model lymph fluids by confocal Brillouin microspectroscopy"**, ¹Tokyo University of Science, ²AMED-CREST, AMED, ³Osaka University
- P-5. **Yukina Hiramatsu**¹, Mai Okano², Hirofumi Hitomi², Mika Ishigaki¹, **"Nondestructive evaluation of differentiation induction process of iPS cells using Raman spectroscopy – development of a monitoring method for urea cycle disorders"**, ¹Graduate School of Natural Science and Technology, Shimane University, ²Kansai Medical University
- P-6. **Soichiro Homma**¹, Naoki Yamato², Mamoru Hashimoto³, **"Multiplex CARS microspectroscopic imaging of *trans*-lipids degradation in adipose-like cells"**, ¹Grad. Sch./²Faculty of Info. Sci. and Tech., Hokkaido Univ. ²Edu. and Res. Ctr. for Math. and Data Sci., Hokkaido Univ.
- P-7. **Itsuki Yamamoto**¹, Kenta Temma¹, Kota Koike^{1,2}, Katsumasa Fujita^{1,2,3} **"Time-lapse 3D observation of cellular dynamics by stimulated Raman scattering microscopy using spectral focusing"**, ¹Department of Applied Physics, Osaka University, ²Advanced Photonics and Biosensing Open Innovation Laboratory, AIST-Osaka University, ³Institute for Open and Transdisciplinary Research Initiatives, Osaka University.
- P-8. **Taiki Inoue**¹, Yasuaki Kumamoto^{1,2}, Atsushi Ishikawa³, Katsumasa Fujita^{1,2} **"Compressive hyperspectral fluorescence microscopy for multicolor cellular imaging"**, ¹Department of Applied Physics, Osaka University, ²Institute of Transdisciplinary Research and Initiatives, Osaka University, ³Panasonic Holdings Corporation
- P-9. Ryoya Kondo¹, Yuta Mizuno^{1,2,3}, J. Nicholas Taylor², Jean-Emmanuel Clement^{2,3}, Katsumasa Fujita⁴, Yoshinori Harada⁵, Tamiki Komatsuzaki^{1,2,3}, **"Raman histology with information theoretic assessments based on chemo-spatial information"**, ¹Grad. School of Sci. and Eng., Hokkaido Univ., ²RIES, Hokkaido Univ., ³WPI- ICR/DD, Hokkaido Univ., ⁴Grad. School of Eng., Osaka Univ., ⁵Kyoto Pref. Univ. Med.

⁶Department of Frontier Biosciences, Osaka University

- P-10. **Toshiki Kubo**^{1,2}, Matthew Lindley¹, Stéphanie Devineau^{1,3}, Menglu Li¹, Katsumasa Fujita^{1,4,5}, **"Raman flowcytometry using time delay integration and light-sheet side illumination"**, ¹Department of Applied Physics, Osaka University, ²Department of Dermatology, Course of Integrated Medicine, Graduate School of Medicine, Osaka University, ³Université Paris Cité, CNRS, Unité de Biologie Fonctionnelle et Adaptative, ⁴Institute for Open and Transdisciplinary Research Initiatives, Osaka University, ⁵AIST-Osaka University Advanced Photonics and Biosensing Open Innovation Laboratory, National Institute of Advanced Industrial Science and Technology (AIST)
- P-11. **Pradjna N. Paramitha**¹, Bibin B. Andriana², Keita Iwasaki² and Hidetoshi Sato^{1,2}, **"Raman spectroscopy for rapid, non-destructive quantitative analysis of fat"**, ¹Graduate School of Science and Technology, Kwansei Gakuin University ²School of Biological and Environmental Sciences, Kwansei Gakuin University
- P-12. **Koki Ota**¹, Wataru Yamamoto², Takanori Yamaguchi³, Toyokazu Otubo³, Yusuke Murakami⁴, Zuliang Hu², and Hideaki Kano¹, **"Label-free imaging of human cardiac tissue for the early detection of cardiac amyloidosis"**, ¹Faculty of Science and Technology, Keio University, ²Faculty of Science, Kyushu University, ³Department of Cardiovascular Medicine, Saga University, ⁴Ph.D. Program in Humanics, University of Tsukuba
- P-13. **Shafa Shofiani**¹, Pradjna N. Paramitha¹, Bibin B. Andriana¹, Keita Iwasaki¹ and Hidetoshi Sato¹, **"Development of in situ Raman detecting technique for fat oxidation on fish meat"**, ¹Kwansei Gakuin University
- P-14. **Ayano Suzuki**^{1,2}, Masato Yasui², Mutsuo Nuriya^{2,3}, **"Characterization of water diffusion in brain tissues by SRS microscopy"**, ¹Department of Chemistry, Chemical Engineering & Life Science, Yokohama National University, ²Department of Pharmacology, Keio University School of Medicine, ³Graduate School of Environment and Information Sciences, Yokohama National University
- P-15. **Shota Taguchi**¹, Takumi Imura¹, Ryo Kato¹, Masahiro Kawasaki², Mitsuo Kawasaki², Takeo Minamikawa¹, **"Highly sensitive biosensing by Raman spectroscopy with plasmon-molecule remote coupling in distance over 100nm"**, ¹Osaka Univ., Japan, ²Kyoto Univ., Japan
- P-16. **Shafira Nurul Widya**¹, Bibin Andriana¹, Keita Iwasaki¹, and Hidetoshi Sato¹. **"In Vivo Analysis of acne mouse model by Raman spectroscopy "**, ¹Department of Biomedical Chemistry, Graduate School of Science and Technology, Kwansei Gakuin University.
- P-17. Miho Yakabe¹, Ryosuke Oketani¹, Kotaro Hiramatsu¹, and Hideaki Kano², **"Capturing the stages of keratinocytes differentiation using coherent anti-stokes Raman scattering (CARS) spectroscopic imaging"**, ¹Department of Chemistry, Faculty of Science, Kyushu University, ²Faculty of Science and Technology, Keio University