



**2nd Biomedical Imaging and Sensing Conference  
(BISC'16)**

**Conference Proceeding**

**18-20 May, 2016**

**Pacifico Yokohama**

**Yokohama, Japan**

## **Welcome Message**

We are delighted that the 2nd Biomedical Imaging and Sensing Conference in Yokohama is going to open successfully, within the framework of the OPTICS & PHOTONICS International Congress (OPIC 2016). In biomedical optics and photonics, optical tools are employed for the understanding and treatment of diseases, from the cellular level to macroscopic applications. At the cellular level, highly precise laser applications allows the manipulation, operation or stimulation of cells, even in living organisms or animals. Optical microscopy has been revolutionized by a thorough understanding of the different markers and their switching behavior. Maker-free microscopy, like CARS, SHG or THG-microscopy is spreading into multiple biological and clinical imaging applications. OCT is continuously broadening its clinical applicability by even higher resolution, higher speed and more compact and the use of Doppler and polarization sensitivity for functional imaging. In the field of optics and photonics, biomedical imaging and sensing areas are most quickly progressing and expanding. Techniques developed in these areas could bring us great steps in advances of physical, engineering and biological knowledge as well as optics and photonics technology. This Conference aims at covering several aspects from the fundamental studies at cellular level to clinical applications of various optical technologies. Finally we hope the 2nd Biomedical Imaging and Sensing Conference contributes to the progress in this fields and we hope you enjoy fruitful discussions in the Conference.

Toyohiko Yatagai

Conference Chair

Center for Optical Research and Education, Utsunomiya University

## **Committee**

### **Conference Chairs**

Toyohiko Yatagai (Utsunomiya Univ., Japan)

### **Steering Committee**

#### **Co-chairs**

Osamu Matoba (Kobe University, Japan)

Yasuhiro Awatsuji (Kyoto Institute of Technology, Japan)

#### **Members**

Masaki Hisaka (Osaka Electro-Communication Univ., Japan)

Wataru Inami (Shizuoka Univ., Japan)

Katsunori Ishii (Osaka Univ., Japan)

Takashi Kakue (Chiba Univ., Japan)

Izumi Nishidate (TUAT, Japan)

Yusuke Ogura (Osaka Univ., Japan)

Tatsuki Tahara (Kansai Univ., Japan)

Eriko Watanabe (UEC, Japan)

Peng Xia (AIST, Japan)

### **Technical Program Committee**

#### **Co-chairs**

Yoshihisa Aizu (Muroran IT, Japan)

#### **Members**

Yasuhiro Awatsuji (Kyoto IT, Japan)

Barry Cense (Utsunomiya Univ., Japan)

Wonshik Choi (Korea Univ., Korea)

Shi-Wei Chu (National Taiwan Univ., Taiwan)

Katsumasa Fujita (Osaka Univ., Japan)

Ichiro Ishimaru (Kagawa Univ., Japan)

Toshiaki Iwai (TUAT, Japan)

Myung K. Kim (University of South Florida, USA)

Yuji Matsuura (Tohoku Univ., Japan)

Nishimura Goro (Hokkaido Univ., Japan)

Eiji Okada (Keio Univ., Japan)

Yoshitoshi Otani (Utsunomiya Univ., Japan)

Yong Keun Park (KAIST, Korea)

Manabu Sato (Yamagata Univ., Japan)

Shunichi Sato (National Defense Medical College, Japan)

Takeshi Yasui (Tokushima Univ., Japan)

## **Co-Sponsor**

The Japan Society of Applied Physics (JSAP)

The Optical Society of Japan (OSJ)

# Biomedical Imaging and Sensing Conference 2016

## BISC'16

Wednesday, May 18

### 9:00-12:10 OPIC Plenary Session

Room 501+502

----- Lunch Break (12:10-13:30) -----

### 13:30-16:30 BISC & OMC Joint Session

Room 414+415

Chairs: T. Omatsu (Chiba Univ., Japan)

O. Matoba (Kobe Univ., Japan)

#### **BISC&OMC-1 (Invited) Direct Real Time *En-face* 13:30**

##### **Optical Coherence Tomography**

A. Podoleanu<sup>1,4</sup>, A. Bradu<sup>1</sup>, S. Rivet<sup>1</sup>, K. Kapinchev<sup>2</sup>, F. Barnes<sup>2</sup>, M. Maria<sup>1,3</sup>, T. Feuchter<sup>3</sup>, L. Leick<sup>3</sup>, T. Garway-Heath<sup>4</sup>, P. Keane<sup>4</sup>, R. Rajendram<sup>4</sup>

<sup>1</sup>Appl. Opt. Univ. of Kent, UK, <sup>2</sup>School of Comput. Univ. of Kent, UK, <sup>3</sup>NKT Photonics A/S, Denmark, <sup>4</sup>Univ. Col. London, UK

#### **BISC&OMC-2 (Invited) Nanoscale Localization 14:00**

##### **Sampling by Plasmonic Aperture Arrays for Imaging Molecular Events**

D. Kim  
Yonsei Univ., Republic of Korea

#### **BISC&OMC-3 (Invited) Advanced Light Shaping for 14:30**

##### **Biomedical Applications**

K. Dholakia  
Univ. of St Andrews, UK

----- Break (15:00-15:30) -----

#### **BISC&OMC-4 (Invited) Label-free Multimodal Imaging 15:30**

##### **for Discrimination of Cell Type and Pathogen Response**

N. Smith<sup>1</sup>, N. Pavillon<sup>1</sup>, A. Hobro<sup>1</sup>, K. Fujita<sup>2</sup>

<sup>1</sup>Biophotonics Laboratory, IFRc, Osaka Univ., Japan, <sup>2</sup>Department of Applied Physics, Osaka Univ., Japan

#### **BISC&OMC-5 Full-field Optical Coherence 16:00**

##### **Tomography Using Ultrathin Forward-imaging Short Multimode Fiber**

M. Sato<sup>1</sup>, D. Saito<sup>1</sup>, K. Shouji<sup>1</sup>, I. Nishidate<sup>2</sup>

<sup>1</sup>Yamagata Univ., Japan, <sup>2</sup>Tokyo Univ. of Agriculture and Technology, Japan

#### **BISC&OMC-6 Optical Trapping of Quantum-dot 16:15**

##### **Conjugated Cell Surface Molecules of Neuronal Cell Cultured onto a Plasmonic Chip**

C. Hosokawa<sup>1</sup>, K. Miyauchi<sup>1,2</sup>, S. N. Kudoh<sup>2</sup>, T. Taguchi<sup>3</sup>, K. Tawa<sup>2</sup>

<sup>1</sup>AIST, Japan, <sup>2</sup>Kwansei Gakuin Univ., Japan, <sup>3</sup>NICT, Japan

### 18:00-20:00 OPIC Reception

Room 501+502

Thursday, May 19

### 9:00-9:15 Opening

Room 419

#### Opening Remark

9:00 T. Yatagai, Chair of BISC'16, Utsunomiya Univ., Japan

### 9:15-10:45 BISC1: OCT, Phase Imaging

Room 419

Chairs: O. Matoba (Kobe Univ., Japan)

B. Cense (Utsunomiya Univ., Japan)

#### **BISC1-1 (Invited) Towards Intraoperative 9:15**

##### **Evaluation of Microvascular Anastomosis Based on Fourier Domain Optical Coherence Tomography**

Y. Huang<sup>1</sup>, S. Xia<sup>1</sup>, J. U. Kang<sup>2</sup>, X. Tan<sup>1</sup>  
<sup>1</sup>School of Optoelectronics, Beijing Institute of Technology, China, <sup>2</sup>Department of Electrical and Computer Engineering, the Johns Hopkins Univ., USA

#### **BISC1-2 (Invited) Dispersion-Insensitive Optical 9:45**

##### **Coherence Tomography Based on Spectral Intensity Interferometry**

T. Shirai  
AIST, Japan

#### **BISC1-3 Sensor-less Adaptive Optics Optical 10:15**

##### **Coherence Tomography with a Liquid Crystal Wavefront Corrector and a 3.0 mm Beam**

M. Reddikumar<sup>1</sup>, A. Tanabe<sup>2</sup>, N. Hashimoto<sup>2</sup>, B. Cense<sup>1</sup>

<sup>1</sup>Center for Optical Research and Education, Utsunomiya Univ., Japan, <sup>2</sup>Citizen Holding, Japan

#### **BISC1-4 Compact and Optical Table Free 10:30**

##### **Quantitative Phase Microscope for non-Invasive Live Cell Imaging**

T. Yamauchi, H. Yamada, K. Goto, Y. Ueda  
Hamamatsu Photonics K.K., Japan

----- Break (10:45-11:15) -----

### 11:15-12:15 BISC2: Microscopy

Room 419

Chairs: G. Nishimura (Hokkaido Univ., Japan)

M. Sato (Yamagata Univ., Japan)

#### **BISC2-1 (Invited) Emerging Endomicroscopy 11:15**

##### **Technologies for Histological Imaging of Biological Tissues *in vivo***

S. W. Yuan<sup>1</sup>, W. Liang<sup>1</sup>, J. Mavadia-Shukla<sup>1</sup>, H.-C Park<sup>1</sup>, M.-J Li<sup>2</sup>, X. Li<sup>1</sup>

<sup>1</sup>Department of Biomedical Engineering, School of Medicine, Johns Hopkins Univ., USA, <sup>2</sup>Science and Technology Division, Corning Incorporated, USA

#### **BISC2-2 High Resolution Imaging of Biological 11:45**

##### **Cell by EXA Microscope with Electron Irradiation Damage Suppression**

M. Fukuta<sup>1</sup>, Y. Nawa<sup>2</sup>, W. Inami<sup>2</sup>, Y. Kawata<sup>2</sup>

<sup>1</sup>Shizuoka Univ., Japan, <sup>2</sup>RIE Shizuoka Univ., Japan

#### **BISC2-3 High Resolution Raman Imaging by 12:00**

##### **Structured Line Illumination Microscopy**

K. Watanabe<sup>1</sup>, A. F. Palonpon<sup>1</sup>, N. I. Smith<sup>2</sup>, L. Chiu<sup>3</sup>, A. Kasai<sup>4,5</sup>, H. Hashimoto<sup>4,6,7</sup>, S. Kawata<sup>1</sup>, K. Fujita<sup>1</sup>

<sup>1</sup>Osaka Univ., Japan, <sup>2</sup>IFReC, Osaka Univ., Japan, <sup>3</sup>Univ. of Tokyo, Japan, <sup>4</sup>Graduate

School of Pharmaceutical Sciences, Osaka Univ., Japan, <sup>5</sup>Institute for Academic Initiatives, Osaka Univ., Japan, <sup>6</sup>Graduate School of Pharmaceutical Sciences, Osaka Univ., Japan, <sup>7</sup>Molecular Research Center for Children's Mental Development, United Graduate School of Child Development, Osaka Univ., Kanazawa Univ., Hamamatsu Univ. School of Medicine, Chiba Univ. and Univ. of Fukui, Japan.

----- Lunch Break (12:15-13:30) -----

**13:30-15:00 BISC3: Holography**

Room 419

**Chairs: O. Matoba (Kobe Univ., Japan)**

**Y. Awatsuji (Kyoto Inst. Tech., Japan)**

**BISC3-1 (Invited) Spatial-spectral Biomedical Holographic Microscopy**

13:30

Y. Luo<sup>1,2</sup>, H.-H. Chen<sup>1</sup>, C. Y. Lin<sup>1</sup>

<sup>1</sup>Institute of Medical Device and Imaging, National Taiwan Univ., Taiwan, <sup>2</sup>Molecular Imaging Center, National Taiwan Univ., Taiwan

**BISC3-2 (Invited) Interferometric Generation of Vortex Beams from Gaussian Beam**

14:00

D. N. Naik, N. K. Viswanathan

Univ. of Hyderabad, India

**BISC3-3 4D Imaging of Zebrafish Microcirculation by Digital Holography**

14:30

D. Donnarumma, A. Brodoline, D. Alexandre, M. Gross

Laboratoire Charles Coulomb - UMR 5221

CNRS-Université de Montpellier, France

**BISC3-4 Non-axial-scanning Multifocal Confocal System with Volume Holographic Gratings**

14:45

P.-H. Wang<sup>1,2</sup>, K.-B. Sung<sup>2,3</sup>, Y. Luo<sup>1,2</sup>

<sup>1</sup>Inst. of Medical Device and Imaging, National Taiwan Univ., Taiwan, R.O.C,

<sup>2</sup>Molecular Imaging Center, National Taiwan Univ., Taiwan, R.O.C, <sup>3</sup>National Taiwan Univ., Taiwan, R.O.C

----- Break (15:00-15:30) -----

**15:30-18:00 Organized Session BISC4: Adaptive Optics: Pushing the boundaries of deep imaging in living cells and tissues**

Room 419

**Chairs: Y. Tamada (Natl. Inst. Basic Biol., Japan)**

**M. Hattori (Natl. Inst. Basic Biol., Japan)**

15:30

**Opening remark**

Y. Tamada (Natl. Inst. Basic Biol., Japan)

BISC4-1

15:33

**(Invited) Adaptive Optics from Microscopy to Nanoscopy**

Martin Booth

Univ. Oxford, UK

BISC4-2

16:08

**(Invited) A Test Bench of General Purpose Adaptive Optics and its Application to Microscopy**

M. Hattori

Natl. Inst. Basic Biol., Japan

BISC4-3

16:33

**(Invited) Super-resolution and Chromatic Correction above the Cover Slip**

A. Matsuda

Natl. Inst. Inform. Commun. Tech., Japan

BISC4-4

16:58

**(Invited) A Practical Way to Use Adaptive Optics in Optical Coherence Tomography for Retinal Imaging**

B. Cense

Utsunomiya Univ., Japan

BISC4-5

17:23

**(Invited) Adaptive Optical Microscopy Using Direct Wavefront Sensing**

J. Kubby

Univ. California, USA

17:58

**Closing remark**

Y. Tamada (Natl. Inst. Basic Biol., Japan)

**Friday, May 20**

**9:00-10:00 BISC5: Multi-modal Imaging, Photo-acoustic Imaging**

Room 419

**Chairs: K. Fujita (Osaka Univ., Japan)**

**BISC5-1 (Invited) Improvements and Applications in "in vivo" Multi-photon Microscopy**

9:00

T. Nemoto, R. Kawakami, T. Hibi, K. Otomo, S. Ipponjima, K. Sawada, A. Tanabe

Hokkaido Univ., Japan

**BISC5-2 (Invited) Improvement of Imaging Speed and Contrast in Two-photon Photoacoustic Microscopy (TP-PAM)**

9:30

Y. Yamaoka

Saga Univ., Japan

----- Break (10:00-10:30) -----

**10:30-12:00 BISCp6: Poster Session**

Exhibition Hall A

**Chair: Y. Awatsuji (Kyoto Inst. Tech., Japan)**

**BISCp6-1 Unstained Biological Cell Imaging Using a Phase-Contrast Scanning Optical Microscope with Annular illumination**

Y. Miyake<sup>1</sup>, M. Hisaka<sup>2</sup>, T. Ikuta<sup>3</sup>

<sup>1</sup>Graduate School of Biomed. Eng., Osaka Electro-Communication Univ., Japan, <sup>2</sup>Dept. of Biomed. Eng., Osaka Electro-Communication Univ., Japan, <sup>3</sup>Dept. of Elect. and Electron. Eng., Osaka Electro-Communication Univ., Japan

**BISC p6-2 Non-scanning in-vivo Three-dimensional Structured Illumination Microscopy**

C.Y. Lin<sup>1,2</sup>, W.-H. Lin<sup>2,3</sup>, J.-H. Chien<sup>2</sup>, Y. Luo<sup>2,4</sup>

<sup>1</sup>Dept. of Electr. Eng. and Graduate Institute of Photonics and Optoelectronics, National Taiwan Univ., Taiwan ROC, <sup>2</sup>Institute of Medical Device and Imaging, National Taiwan Univ., Taiwan R.O.C, <sup>3</sup>School of Medicine, National Taiwan University, Taiwan R.O.C, <sup>4</sup>Molecular Imaging Center, National Taiwan Univ., Taiwan

**BISCp6-3 Real-time Phase Analysis by Differential Interference Contrast Microscope Using Pixelated Polarization Camera**

S. Shibata<sup>1</sup>, H. Ishiwata<sup>2</sup>, Y. Otani<sup>1</sup>, T. Yatagai<sup>1</sup>

<sup>1</sup>Utsunomiya Univ., Japan, <sup>2</sup>Olympus Corp., Japan

- BISCp6-4** **Object Recovery from Diffused Light**  
 Vinu R. V, R.K. Singh  
 Department of Physics, Indian Institute of Space Science and Technology (IIST), India
- BISCp6-5** **Interference of Coherence Waves**  
 R.K. Singh<sup>1</sup>, S. Vyas<sup>2</sup>, Y. Miyamoto<sup>2</sup>  
<sup>1</sup>Department of Physics, Indian Institute of Space Science and Technology (IIST), India, <sup>2</sup>Department of Engineering Sciences, The Univ. of Electro-Communications, Japan.
- BISCp6-6** **Measuring Temporal Fluctuations of Optical Field Scattered from Cell-aggregate by Heterodyne Mach-Zehnder Interferometer**  
 S. Wang<sup>1,2</sup>, H. Yamada<sup>1</sup>, T. Yamauchi<sup>1</sup>, K. Goto<sup>1</sup>, Y. Ueda<sup>1</sup>, H. Zhang<sup>2</sup>  
<sup>1</sup>Hamamatsu Photonics K.K., Japan, <sup>2</sup>State Key Laboratory of Modern Optical Instrumentation, Zhejiang Univ., China
- BISCp6-7** **Phase Sensitive CT Measurement Using a Pixelated Polarizing Shearing Interferometer**  
 D. I. Serrano-Garcia<sup>1</sup>, Y. Otani<sup>1,2</sup>  
<sup>1</sup>Center of Optical Research and Education, Utsunomiya Univ., Japan, <sup>2</sup>Department of Optical Engineering, Utsunomiya Univ., Japan
- BISCp6-8** **Holographic Fluorescence Mapping Using Space-division Matching**  
 R. Abe<sup>1</sup>, M. Iwanaga<sup>2</sup>, H. Miyakawa<sup>3</sup>, Y. Hayasaki<sup>1</sup>  
<sup>1</sup>Center for Optical Research & Education (CORE), Utsunomiya Univ., Japan, <sup>2</sup>Faculty of Agriculture, Utsunomiya Univ., Japan, <sup>3</sup>Center for Bioscience Research and Education (CBRE), Utsunomiya Univ., Japan
- BISCp6-9** **Algorithm for Removing the Limitation of Intensity Ratio in Four-step Dual-wavelength Digital Holography Based on Phase-division Multiplexing**  
 T. Tahara<sup>1</sup>, K. Omae<sup>1</sup>, R. Otani<sup>2</sup>, Y. Arai<sup>1</sup>, Y. Takaki<sup>3</sup>  
<sup>1</sup>Faculty of Engineering Science, Kansai University, Japan, <sup>2</sup>Sigmakoki Co., Ltd., Japan, <sup>3</sup>Institute of Engineering, Tokyo Univ. of Agriculture and Technology, Japan
- BISCp6-10** **Color Digital Holographic Microscopy Using Speckle Illuminations for Removing Twin Image**  
 H. Funamizu, T.Q. Chen, Y. Aizu  
 Division of Mechanical Systems and Materials Engineering, Muroran Institute of Technology, Japan
- BISCp6-11** **Magnification and Wavelet Processing in Digital Inline Holographic Microscopy**  
 J.C. Aguilar<sup>1</sup>, M. Misawa<sup>1</sup>, K. Matsuda<sup>1</sup>, L. R. Berriel-Valdos<sup>2</sup>  
<sup>1</sup>Human Technology Research Institute, AIST, Japan, <sup>2</sup>Instituto Nacional de Astrofísica, Óptica y Electrónica, México
- BISCp6-12** **Phase Measurement by Parallel Phase-Shifting Digital Holographic Microscopy**  
 T. Fukuda<sup>1</sup>, P. Xia<sup>2</sup>, K. Nishio<sup>1</sup>, Y. Awatsuji<sup>1</sup>, O. Matoba<sup>2</sup>  
<sup>1</sup>Kyoto Institute of Technology, Japan, <sup>2</sup>Kobe Univ., Japan
- BISCp6-13** **Quantitative Imaging of Refractive Index of Transparent Object by Parallel Phase-shifting Digital Holography**  
 Y. Wang<sup>1</sup>, P. Xia<sup>2</sup>, Y. Awatsuji<sup>3</sup>, K. Nishio<sup>4</sup>, O. Matoba<sup>2</sup>  
<sup>1</sup>Graduate School of Science and Technology, Kyoto Institute of Technology, Japan, <sup>2</sup>Graduate School of System Informatics, Kobe Univ., Japan, <sup>3</sup>Faculty of Electrical Engineering and Electronics, Kyoto Institute of Technology, Japan, <sup>4</sup>Advanced Technology Center, Kyoto Institute of Technology, Japan
- BISCp6-14** **Numerical Simulation of Parallel Phase-shifting Digital Holographic Tomography**  
 M. Shinomura<sup>1</sup>, P. Xia<sup>2</sup>, Y. Awatsuji<sup>1</sup>, K. Nishio<sup>1</sup>, O. Matoba<sup>2</sup>  
<sup>1</sup>Kyoto Institute of Technology, Japan, <sup>2</sup>Kobe Univ., Japan
- BISCp6-15** **Miniaturization of Low-cost Portable Digital Holographic Microscopy**  
 S. Abiru, M. Sano, T. Shimobaba, T. Kakue, T. Ito  
 Graduate School of Engineering, Chiba Univ. Japan
- BISCp6-16** **In vivo Swept Source Optical Coherence Tomography Monitoring of Plant Seeds Treated with Different NaCl Concentrations**  
 N.K. Ravichandran<sup>1</sup>, R.E. Wijesinghe<sup>1</sup>, S.-Y. Lee<sup>2</sup>, M.F. Shirazi<sup>1</sup>, K. Park<sup>1</sup>, H.-Y. Jung<sup>2</sup>, M. Jeon<sup>1</sup>, J. Kim<sup>1</sup>  
<sup>1</sup>School of Electronics Engineering, College of IT Engineering, Kyungpook National Univ., Korea, <sup>2</sup>School of Applied Biosciences, Kyungpook National Univ., Korea
- BISCp6-17** **Bio-optical Measurement for the Morphological Analysis of Anthracnose Infected *Diospyros Kaki***  
 R.E. Wijesinghe<sup>1</sup>, S.-Y. Lee<sup>2</sup>, R.N. Kumar<sup>1</sup>, R.K. Jha<sup>1</sup>, H.-Y. Jung<sup>2</sup>, M. Jeon<sup>1</sup>, J. Kim<sup>1</sup>  
<sup>1</sup>School of Electronics Engineering, College of IT Engineering, Kyungpook National Univ., Korea, <sup>2</sup>School of Applied Biosciences, Kyungpook National Univ., Korea
- BISCp6-18** **Spectral Domain Optical coherence tomography Using Wavelet Transform**  
 T. Serizawa<sup>1</sup>, T. Suzuki<sup>1</sup>, S. Choi<sup>2</sup>, O. Sasaki<sup>2</sup>  
<sup>1</sup>Niigata Univ., Graduate School of Science and Technology, Japan, <sup>2</sup>Niigata University, Faculty of Engineering, Japan
- BISCp6-19** **Dual Path Handheld System for Cornea and Retina Imaging Using Optical Coherence Tomography**  
 M.F. Shirazi, K. Kim, R.E. Wijesinghe, K. Park, M. Jeon, J. Kim

- School of Electronics Engineering, College of IT Engineering, Kyungpook National Univ., Korea
- BISCp6-20** **Experimental Estimation of Influence of Cosmetic Foundation on Optical Path Length in the Skin**  
R. Sato, M. Kato, E. Okada  
Department of Electronics and Electrical Engineering, Keio Univ., Japan
- BISCp6-21** **Theoretical and Numerical Analysis of Light Reflection from the Human Skin Based on Wave Optics**  
R. Sakai<sup>1</sup>, T. Igarashi<sup>2</sup>, M. Takabayashi<sup>1</sup>, T. Okamoto<sup>1</sup>  
<sup>1</sup>Graduate School of Computer Science and Systems Engineering, Kyushu Institute of Technology, Japan, <sup>2</sup>Kao Corporation, Japan
- BISCp6-22** **Simulation of Spectral Reflectance Image in Human Skin Model Having a Measured Surface Texture by Ray Tracing**  
T. Yuasa<sup>1</sup>, K. Mizunuma<sup>1</sup>, R. Goto<sup>1</sup>, T. Maeda<sup>2</sup>, H. Funamizu<sup>1</sup>, Y. Aizu<sup>1</sup>  
<sup>1</sup>Muroran Institute of Technology, Japan, <sup>2</sup>Kushiro National College of Technology, Japan
- BISCp6-23** **Near-Infrared Reflectance Spectroscopy System for Noninvasive Estimation of Skin Hydration**  
I. Saknite<sup>1</sup>, A. Zavorins<sup>2</sup>, J. Spigulis<sup>1</sup>, J. Kisis<sup>2</sup>  
<sup>1</sup>Institute of Atomic Physics and Spectroscopy, University of Latvia, Latvia, <sup>2</sup>Department of Infectology and Dermatology, Riga Stradins Univ., Latvia
- BISCp6-24** **Non-contact Measurement of Heart Rate Variability Using Time Series Color Images of Human Skin**  
Y. Aoki<sup>1</sup>, A. Hoshi<sup>1</sup>, K. Nakano<sup>2</sup>, K. Niizeki<sup>3</sup>, Y. Aizu<sup>4</sup>, I. Nishidate<sup>1</sup>  
<sup>1</sup>Graduate School of Bio-Applications & Systems Engineering, Tokyo Univ. of Agriculture and Technology, Japan, <sup>2</sup>Faculty of Science, Tokyo Univ. of Science, Japan, <sup>3</sup>Graduate School of Science and Engineering Yamagata Univ., Japan, <sup>4</sup>Graduate School of Mechanical Systems and Materials Engineering, Muroran Institute of Technology, Japan
- BISCp6-25** **Optical Spectroscopy of Ketone Bodies for Blood Screening of Diabetes**  
C.H. Lin<sup>1</sup>, M. Iigo<sup>2</sup>, M. Ogawa<sup>3</sup>, N. Anzai<sup>4</sup>, T. Yatagai<sup>1</sup>  
<sup>1</sup>Center for Optical Research and Education, Utsunomiya Univ., Japan, <sup>2</sup>Center for Bioscience Research and Education, Utsunomiya Univ., Japan, <sup>3</sup>Faculty of Science and Engineering, Teikyo Univ., Japan, <sup>4</sup>Department of Pharmacology and Toxicology, Dokkyo Medical Univ., Japan
- BISCp6-26** **Extensive Pelagic Spectroscopic Measurement Using an Ultrasonically Assisted Unit Based on a Traveling Wave**  
K. Mori<sup>1</sup>, K. Nogo<sup>1</sup>, M. Yoshida<sup>1</sup>, P.K.W. Abeygunawardhana<sup>1</sup>, S. Suzuki<sup>1</sup>, A. Nishiyama<sup>2</sup>, K. Wada<sup>2</sup>, I. Ishimaru<sup>1</sup>  
<sup>1</sup>Faculty of Engineering Kagawa Univ., Japan, <sup>2</sup>Faculty of Medicine Kagawa Univ., Japan
- BISCp6-27** **High Sensitivity Terahertz Electron Paramagnetic Resonance Spectroscopy**  
M. Grosman<sup>1</sup>, A. Larkin<sup>2</sup>  
<sup>1</sup>Universite Louis Pasteur de Strasbourg, France, <sup>2</sup>National Research Nuclear University MEPhI, Russia
- BISCp6-28** **Estimation of Stress Condition Based on Autonomic Nervous Function by Bio-Speckle Imaging**  
N. Yokoi<sup>1</sup>, Y. Shimatani<sup>2</sup>, M. Kyoso<sup>2</sup>, H. Funamizu<sup>3</sup>, Y. Aizu<sup>3</sup>  
<sup>1</sup>Department of Mechanical Systems Engineering, Asahikawa National College of Technology, Japan, <sup>2</sup>Biomedical Engineering Department, Tokyo City University, Japan, <sup>3</sup>Division of Science for Composite Functions, Muroran Institute of Technology, Japan
- BISCp6-29** **Simultaneous Imaging of Blood Flow and Blood Concentration Change Using Laser Speckle in Fiber Illumination**  
T. Shinohara<sup>1</sup>, N. Yokoi<sup>2</sup>, H. Funamizu<sup>1</sup>, T. Yuasa<sup>1</sup>, Y. Aizu<sup>1</sup>  
<sup>1</sup>Muroran Institute of Technology, Japan, <sup>2</sup>Asahikawa National College of Technology, Japan
- BISCp6-30** **Imaging of Tissue Oxygen Saturation in Ocular Fundus of Rat Using a Digital RGB Camera**  
R. Hirofuji, I. Nishidate  
Graduate School of Bio-Applications & Systems Engineering, Tokyo Univ. of Agriculture and Technology, Japan
- BISCp6-31** **Imaging of Regional Cerebral Oxygen Saturation of Rat with a Digital Red-green-blue Camera**  
Y. Harasaki<sup>1</sup>, I. Nishidate<sup>1</sup>, S. Kawauchi<sup>2</sup>, S. Sato<sup>2</sup>, M. Sato<sup>3</sup>, Y. Kokubo<sup>4</sup>  
<sup>1</sup>Graduate School of Bio-Applications & Systems Engineering, Tokyo Univ. of Agriculture and Technology, Japan, <sup>2</sup>Division of Biomedical Information Sciences, National Defense Medical College Research Institute, Japan, <sup>3</sup>Graduate School of Science and Engineering, Yamagata Univ., Japan
- BISCp6-32** **Improvement of Source-collector Geometries in Single Reflectance Fiber Probe System for *in vivo* Estimation of Optical Properties in Brain Tissue**  
T. Tanabe<sup>1</sup>, I. Nishidate<sup>1</sup>, S. Kawauchi<sup>2</sup>, S. Sato<sup>2</sup>, M. Sato<sup>3</sup>  
<sup>1</sup>Graduate School of Bio-Applications & Systems Engineering, Tokyo Univ. of Agriculture and Technology, Japan, <sup>2</sup>Division of Biomedical Information Sciences, National Defense Medical College Research Institute, Japan, <sup>3</sup>Graduate School of Science and Engineering, Yamagata



- Univ., Japan
- BISCp6-33** **Estimation of Scattering Characteristics of Artificial Scattering Medium by Lamination Technique with Shifted Structure**  
N. Nakatani<sup>1,2</sup>, W. Yan<sup>1</sup>, O. Matoba<sup>1</sup>  
<sup>1</sup>Graduate school of System Informatics, Kobe Univ., Japan, <sup>2</sup>SCREEN Holdings Co., Ltd., Japan
- BISCp6-34** **Experimental Verification of Optical Power Ratio Distribution to Extract Absorbers in Scattering Media**  
T. Yamaoki, Y. Hamada, O. Matoba  
Graduate School of System Informatics, Kobe Univ. Japan
- BISCp6-35** **Infrared Thermal Imaging by Bundled Tube-leaky Hollow Optical Fibers**  
T. Kobayashi<sup>1</sup>, T. Katagiri<sup>2</sup>, Y. Matsuura<sup>1</sup>  
<sup>1</sup>Graduate School of Biomedical Engineering, Tohoku Univ., Japan, <sup>2</sup>Graduate School of Engineering, Tohoku Univ., Japan
- BISCp6-36** **Application of CVD-diamonds Films for Sensing Selected Blood Component**  
D. Milewska<sup>1</sup>, M. Ficek<sup>1</sup>, K. Karpienko<sup>1</sup>, M. Wąsowicz<sup>2</sup>, P. Niedzialkowski<sup>3</sup>, T. Ossowski<sup>3</sup>, M. Jędrzejewska-Szczerska<sup>1</sup>  
<sup>1</sup>Department of Metrology and Optoelectronics, Faculty of Electronics, Telecommunications and Informatics, Gdańsk Univ. of Technology, Poland, <sup>2</sup>Department of Morphological Sciences, Faculty of Veterinary Medicine, Warsaw Univ. of Life Sciences, Poland, <sup>3</sup>Faculty of Chemistry, Univ. of Gdansk, Poland
- BISCp6-37** **Lipid Nanoparticles Encapsulating Near-infrared Dye as a Non-targeted Exogenous Contrast Agent to Improve the Resolution for Angiography**  
Jia-You Fang<sup>1</sup>, C.-J. Wen<sup>2</sup>, Y.-H. Huang<sup>1</sup>  
<sup>1</sup>Pharmaceutics Laboratory, Graduate Institute of Natural Products, Chang Gung Univ., Taiwan, <sup>2</sup>Center for Vascularized Composite Allotransplantation, Chang Gung Memorial Hospital, Taiwan
- BISCp6-38** **Choosing the Right Video Interface for Medical Imaging Systems**  
J. Phillips  
Pleora Technologies, Canada
- BISCp6-39** **Compressive Sensing for an Imaging Method with One Dimensional Hadamard Patterns Illumination**  
K. Morimoto, S. Hayashi, K. Nitta, O. Matoba  
Graduate School of System Informatics, Kobe Univ. Japan
- BISCp6-40** **Experimental Verification for a Method for Computational Ghost Imaging with Laser Array Modulation**  
C. Kitada, K. Nitta, O. Matoba  
Graduate School of System Informatics, Kobe Univ. Japan
- BISCp6-41** **Microscopic Polarization Imaging of Human Breast Cancer Cells**  
K. Ikeda<sup>1</sup>, N. Hara<sup>1</sup>, T. Hoshiba<sup>2</sup>, E. Watanabe<sup>1</sup>  
<sup>1</sup>Univ. of Electro-Communications, Japan, <sup>2</sup>Yamagata Univ., Japan.  
----- **Lunch Break (12:00-13:00)** -----  
**13:00-14:45** **BISC7: Nano, Fluorescence, Spectral Imaging, Biosensor**  
Room 419  
**Chairs: Y. Matsuura (Tohoku Univ., Japan)**  
**I. Ishimaru (Kagawa Univ., Japan)**
- BISC7-1** **(Invited) Application of Fluorescent Nanodiamonds to Bio-imaging**  
**13:00**  
Y. Harada  
Kyoto Univ., Japan
- BISC7-2** **(Invited) Integrated Differential Si-Ring Resonator Biosensors for Selective Detection of Antigen-Antibody Reaction**  
**13:30**  
S. Yokoyama<sup>1,2</sup>, T. Taniguchi<sup>2,1</sup>, T. Ikeda<sup>3,1</sup>, A. Kuroda<sup>3,1</sup>  
<sup>1</sup>Res. Inst. Nanodevice and Bio Sys., Hiroshima Univ., Japan, <sup>2</sup>Dept. Semicon. Electr. Integ. Sci., Hiroshima Univ., Japan, <sup>3</sup>School of Advanced Sci. Matter, Hiroshima Univ., Japan
- BISC7-3** **Optical Far-field Nanoscopy with Local Probes**  
**14:00**  
X. Chen, F. Sun  
Univ. of Science and Technology of China, China
- BISC7-4** **Enhanced Imaging of Lipid in Atherosclerotic Tissue-mimicking Phantom by Multispectral Angioscope at Wavelengths around 1200 nm**  
**14:15**  
D. Matsui<sup>1</sup>, K. Ishii<sup>1</sup>, K. Awazu<sup>1,2,3</sup>  
<sup>1</sup>Graduate School of Eng., Osaka Univ., Japan, <sup>2</sup>Graduate School of Frontier Biosciences, Osaka Univ., Japan, <sup>3</sup>Global Center for Med. Eng. Informat., Osaka Univ., Japan
- BISC7-5** **Bayesian-based Localization of Fluorescence-encoded Images for Single Shot Super-resolution Fluorescence Imaging**  
**14:30**  
H. Kimura, T. Nishimura, Y. Ogura, J. Tanida  
Osaka Univ., Japan  
----- **Break (14:45-15:15)** -----  
**15:15-17:30** **BISC8: Brain Imaging, Spectral Imaging, Image Processing**  
Room 419  
**Chairs: E. Okada (Keio Univ., Japan)**  
**Y. Otani (Utsunomiya Univ., Japan)**
- BISC8-1** **(Invited) Visible Brain-wide Networks at Single-neuron Resolution**  
**15:15**  
Q. Luo<sup>1,2</sup>, H. Gong<sup>1,2</sup>, S. Zeng<sup>1,2</sup>, A. Li<sup>1,2</sup>, J. Yuan<sup>1,2</sup>, X. Li<sup>1,2</sup>  
<sup>1</sup>Britton Chance Center for Biomedical Photonics, Wuhan National Laboratory for Optoelectronics-Huazhong University of Science and Technology, China, <sup>2</sup>Key Laboratory of Biomedical Photonics of Ministry of Education, Department of

- Biomedical Engineering, Huazhong University of Science and Technology, China
- BISC8-2**  
**15:45** **A New Strategy of the Time-domain Fluorescence Imaging for a Semi-infinite Turbid Media**  
K. Prieto, G. Nishimura  
Hokkaido Univ., Japan
- BISC8-3**  
**16:00** **Determination of Anisotropy Factor Spectrum for Biological Tissue Based on Spectroscopic Measurement of Scattering Angular Distributions**  
M. Iwamoto<sup>1</sup>, K. Ishii<sup>1</sup>, D. Fukutomi<sup>1</sup>, D. Matsui<sup>1</sup>, K. Awazu<sup>1,2,3</sup>  
<sup>1</sup>Graduate School of Eng., Osaka Univ., Japan, <sup>2</sup>Graduate School of Frontier Biosciences, Osaka Univ. Japan, <sup>3</sup>Global Center for Med. Eng. Informat., Osaka Univ. Japan
- BISC8-4**  
**16:15** ***In vivo* Imaging of Hemodynamics in Liver Tissue during Ischemia-Reperfusion Based on Spectrocolorimetry**  
S. Akter<sup>1</sup>, S. Maejima<sup>2</sup>, S. Kawauchi<sup>3</sup>, S. Sato<sup>3</sup>, A. Hinoki<sup>2</sup>, S. Aosasa<sup>2</sup>, J. Yamamoto<sup>2</sup>, I. Nishidate<sup>1</sup>  
<sup>1</sup>Graduate School of Bio-Appl. Sys. Eng., Tokyo Univ. of Agriculture and Technology, Japan <sup>2</sup>Dept. of Surgery, National Defense Medical College, Japan, <sup>3</sup>Division of Biomedical Information Sciences, National Defense Medical College Research Institute, Japan
- BISC8-5**  
**16:30** **Evaluation of Spontaneous Low-frequency Oscillations in Cerebral Intrinsic Optical Signals with a Digital Red-green-blue Camera**  
A. Mustari<sup>1</sup>, Y. Aoki<sup>1</sup>, I. Nishidate<sup>1</sup>, S. Kawauchi<sup>2</sup>, S. Sato<sup>2</sup>, M. Sato<sup>3</sup>  
<sup>1</sup>Graduate School of Bio-Appl. Sys. Eng., Tokyo Univ. of Agriculture and Technology, Japan, <sup>2</sup>Division of Biomedical Information Sciences, National Defense Medical College Research Institute, Japan, <sup>3</sup>Graduate School of Science and Engineering, Yamagata Univ. Japan
- BISC8-6**  
**16:45** **Noncontact Image Sensing of Pulse Wave Velocity Using Digital Red-Green-Blue Images**  
K. Nakano<sup>1</sup>, Y. Aoki<sup>2</sup>, R. Satoh<sup>2</sup>, H. Suzuki<sup>3</sup>, I. Nishidate<sup>2</sup>  
<sup>1</sup>Faculty of Sci. Division, Tokyo Univ. of Science, Japan, <sup>2</sup>Graduate School of Bio-appl. Sys. Eng., Tokyo Univ. of Agriculture and Technology, Japan, <sup>3</sup>Imaging Science and Engineering Laboratory, Tokyo Institute of Technology, Japan
- BISC8-7**  
**17:00** **Processing Dental X-ray Images by Shearlet Transform**  
L. Cadena<sup>1</sup>, N. Espinosa<sup>1</sup>, F. Cadena<sup>2</sup>, D. Barkova<sup>3</sup>  
<sup>1</sup>Universidad de las Fuerzas Armadas ESPE, Ecuador, <sup>2</sup>Colegio Fiscal Eloy Alfaro, Ecuador, <sup>3</sup>Siberian Federal Univ., Russia
- BISC8-8**  
**17:15** **Acousto-optic Enhancement of Image Contrast for Morphological Diagnostics Cancer**  
K. B. Yushkov<sup>1</sup>, V. Y. Molchanov<sup>1</sup>, S. I. Chizhikov<sup>1</sup>, P. V. Belousov<sup>2</sup>, A. Y. Abrosimov<sup>3</sup>  
<sup>1</sup>National Univ. of Science and Technology, MISIS, Russia, <sup>2</sup>Faculty of Biology, Lomonosov Moscow State Univ., Russia, <sup>3</sup>Endocrinology Research Center, Russia
- 17:30-17:40** **Closing** Room 419  
**Closing Remark**  
**17:30** O. Matoba, Kobe Univ., Japan