

Optical Manipulation Conference'16

OMC'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 Symposium

Room 414+415

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

O. Matoba (Kobe Univ., Japan)

**BISC&OMC1-1 (Invited) Direct Real Time En-face
13:30 Optical Coherence Tomography**

Adrian Podoleanu

University of Kent, UK

**BISC&OMC1-2 (Invited) Nanoscale localization sampling
14:00 by plasmonic aperture arrays for imaging
molecular events**

Donghyun Kim

Yonsei Univ., Republic of Korea

**BISC&OMC1-3 (Invited) Advanced light shaping for
14:30 biomedical applications**

Kishan Dholakia

University of St Andrews, UK

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

**BISC&OMC1-4 (Invited) Improvements and applications
15:30 in "in vivo" multi-photon microscopy**

Tomomi Nemoto, Ryosuke Kawakami,

Terumasa Hibi, Kohei Otomo, Sari

Ipponjima, Kazuaki Sawada, Ayano Tanabe

Hokkaido Univ., Japan

**BISC&OMC1-5 Full-field optical coherence tomography
16:00 using ultrathin forward-imaging short
multimode fiber**

Manabu Sato¹, Daisuke Saito¹, Kou Shouji¹,
and Izumi Nishidate²

¹Yamagata Univ., Japan, ²Tokyo University
of Agriculture and Technology, Japan

**BISC&OMC1-6 Optical trapping of quantum-dot
16:15 conjugated cell surface molecules of
neuronal cell cultured onto a plasmonic
chip**

Chie Hosokawa¹, Kohei Miyauchi^{1,2}, Suguru
N. Kudoh², Takahisa Taguchi³, Keiko Tawa²

¹National Institute of Advanced Industrial
Science and Technology (AIST), Japan,

²Kwansei Gakuin University, Japan,

³National Institute of Information and

Communications Technology (NICT), Japan

18:00-20:00 OPIC Reception

Room 501+502

Thursday, May 19

9:00-10:30 OMC1: Optical Manipulation

Room 414+415

Chair: Sile Nic Chormaic, OIST Graduate University, Japan

**OMC1-1 (Invited) Angular momentum enabled
9:00 opto-mechanical elements**

Saulius Juodkazis

Swinburne University, Australia

**OMC1-2 Submicron particle trapping and
9:30 manipulation with plasmonic nanoring
devices**

Xue Han, Viet Giang Truong, Seyedeh Sahar

Seyed Hejazi, and Sile Nic Chormaic

Light-Matter Interactions Unit, Okinawa

Institute of Science and Technology

Graduate University, Japan

**OMC1-3 A study of the metal particle manipulation
9:45 in the glass by laser irradiation**

Tatsuki Iwamoto, Jun Wada, Hirofumi Hidai,

Souta Matsusaka, Akira Chiba, Noboru

Morita

Chiba University, Japan

**OMC1-4 Rotational dynamics and heating of
10:00 trapped nanovaterite particles**

Yoshihiko Arita^{1,2}, Joseph M. Richards,

Michael Mazilu¹, Gabriel C. Spalding³,

Susan E. Skelton Spesyvtseva¹, Derek

Craig¹, Kishan Dholakia¹

¹SUPA, School of Physics and Astronomy,

University of St Andrews, United

Kingdom, ²MCRC, Molecular Chirality

Research Centre, Graduate School of

Advanced Integration Science, Chiba

University, Japan, ³Illinois Wesleyan

University, USA

**OMC1-5 Hydrodynamics of micro-objects near
10:15 curved surfaces**

S. Zhang, D. M. Carberry, T. A. Nieminen,

H. Rubinsztein-Dunlop

Department of Mathematics and Physics, the

University of Queensland, Australia

----- Break (10:30-11:00) -----

11:00-12:00 OMC2: OptoMechanics

Room 414+415

Chair: Kishan Dholakia, University of St Andrews, UK

**OMC 2-1 (Invited) Nanoengineered angular
11:00 optomechanics**

H. Magallanes¹, G. Seniutinas²,

D. Hakobyan^{1,2}, S. Juodkazis², E.Brasselet¹

¹University of Bordeaux 1, France, ²Centre

for Micro-Photonics, Swinburne University,

Australia

OMC2-2 Rotation of multiple trapped

11:30 **microparticles in vacuum: observation of optically mediated parametric resonances and optical binding**

Yoshihiko Arita^{1,2}, Michael Mazilu¹, Tom Vettenburg¹, Ewan M. Wright^{1,3}, Kishan Dholakia^{1,3}

¹SUPA, School of Physics and Astronomy, University of St Andrews, United Kingdom, ²MCRC, Molecular Chirality Research Centre, Graduate School of Advanced Integration Science, Chiba University, Japan, ³College of Optical Sciences, The University of Arizona, USA

OMC2-3
11:45 **Photon-induced Force Microscopy in Heterodyne AM Technique**

Junsuke Yamanishi, Yoshitaka Naitoh, Yan Jun Li, and Yasuhiro Sugawara
Department of Applied Physics, Graduate School of Engineering, Osaka University, Japan

----- Lunch Break (12:00-13:00) -----

13:00-15:15 **OMC3: OptoMechnics & Plasmonics**

Room 414+415

Chair: Tatsuya Shoji, Osaka City University, Japan

OMC3-1
13:00 **(Invited) Enhanced optical tweezers for studies of complex biological systems**

Halina Rubinsztein-Dunlop
University of Queensland, Australia

OMC3-2
13:30 **Transfer of orbital angular momentum of light to trapped particles in vacuum: a platform for new quantum tests in optomechanics**

Yoshihiko Arita^{1,2}, Michael Mazilu¹, Tom Vettenburg¹, Juan M. Aunon¹, Ewan M. Wright^{1,3}, Kishan Dholakia^{1,3}

¹SUPA, School of Physics & Astronomy, University of St Andrews, United Kingdom, ²MCRC, Molecular Chirality Research Centre, Graduate School of Advanced Integration Science, Chiba University, Japan, ³College of Optical Sciences, The University of Arizona, USA

OMC3-3
13:45 **Potential analysis of nano-particle plasmonic trapping using a trimer nano-structure**

Shutaro Ishida, Takashi Wada, and Keiji Sasaki
Research Institute for Electronic Science, Hokkaido University, Japan

OMC3-4
14:00 **(Invited) Microscopic Thermodynamics with levitated Nanoparticles: Approaching the quantum regime**

Jan Gieseler
Harvard University, Department of Physics, Cambridge, MA, United States

OMC3-5
14:30 **Near-field enhancements of mid-infrared femtosecond pulses upon collective plasmon excitations in metal nanorod arrays**

Akinobu Takegami^{1,2}, Fumiya Kusa^{1,2}, Satoshi Ashihara¹

¹Dept. of Applied Physics, Tokyo Univ. of

Agriculture and Technology, Japan, ²Institute of Industrial Science, The Univ. of Tokyo, Japan

OMC3-6
14:45 **Generation and control of plasmonic wave packet in a single gold nanorod**

Yoshio Nishiyama¹, Kohei Imura³, Hiromi Okamoto^{1,2}

¹Institute for Molecular Science, Japan, ²The Graduate Univ. for Advanced Studies (Sokendai), Japan, ³School of Advanced Science and Engineering, Waseda University, Japan

OMC3-7
15:00 **Selective Trapping and Fixation of DNAs at Desired Positions Using Plasmonic Optical Tweezers**

Kenta Itoh¹, Tatsuya Shoji¹, Kei Murakoshi², Takahiro Yoshii², Yasuyuki Tsuboi¹

¹Graduate School of Science, Osaka City University, Japan, ²Graduate School of Chemical Sciences and Engineering, Hokkaido University, Japan

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

15:30-17:45 **OMC4: Structured Light**

Room 414+415

Chair: Takashige Omatsu, Chiba University, Japan

OMC4-1
15:30 **Tuning of whispering gallery modes of microspheres during optical levitation**

Yosuke Minowa, Yusuke Toyota, and Masaaki Ashida
Osaka University, Japan

OMC4-2
15:45 **Topological Transformations between Integer and Fractional Optical Vortex Beams**

Maruthi M. Brundavanam, Satyajit Maji and Abhijit Roy
Department of Physics, Indian Institute of Technology Kharagpur, India

OMC4-3
16:00 **Plasmonic Archimedean Spiral Modes on Concentric Metal Ring Gratings**

Yi-Chieh Lai and Yung-Chiang Lan
Department of Photonics, National Cheng Kung University, Taiwan

OMC4-4
16:15 **Rule of selection for geometric modes in broad-area vertical cavity surface emitting lasers**

Yan-Ting Yu, Pi-Hui Tuan, Kai-Chi Chang, Kuan-Wei Su, and Yung-Fu Chen
Department of Electrophysics, National Chiao Tung University, Taiwan

OMC4-5
16:30 **Octave-band tunable optical vortex parametric laser**

Roukuya Mamuti¹, Aizitiaili Abulikemu¹, Katsuhiko Miyamoto^{1,2}, Takashige Omatsu^{1,2}
¹Graduate School of Advanced Integration Science, Chiba University, Japan, ²Molecular chirality research center, Chiba University, Japan

OMC4-6
16:45 **Study of Surface Processing onto Photonic-crystal Lasers for Generating Optical Vortex Beam**

Kyoko Kitamura^{1,2}, Miki Kitazawa¹, and Susumu Noda^{2,3}

- ¹Kyoto Institute of Technology, Japan,
²Department of Electronic Science and Engineering, Graduate School of Engineering, Kyoto University, Japan,
³Photonics and Electronics Science and Engineering, Kyoto University, Japan
- OMC4-7**
17:00
Generation of third-harmonic vortex beams in air using nearinfrared femtosecond laser pulses
Yu-Chieh Lin, Yasuo Nabekawa, Katsumi Midorikawa
RIKEN, Japan
- OMC4-8**
17:15
Single-Shot Measurements of Anisotropic Excitons via Four-Wave Mixing Spectroscopy with Radially Polarized Pulses
Kyohei Shigematsu, Masato Suzuki, Keisaku Yamane, Ryuji Morita, and Yasunori Toda
Department of Applied Physics, Hokkaido University, Japan
- OMC4-9**
17:30
Maxwell–Schrödinger equations for space-variant wave plates and Pancharatnam–Berry phase on the extended Poincaré sphere
Masato Suzuki, Keisaku Yamane, Kazuhiko Oka, Yasunori Toda, Ryuji Morita
Department of Applied Physics, Hokkaido University, Japan

Friday, May 20

9:00-10:45 OMC5: Structured Materials Fabrication

Room 414+415

Chair: Masaaki Ashida, Osaka University, Japan

- OMC5-1**
9:00
(Invited) Ultrafast lasers: as tools for micro/nanofabrication and probing surface plasmons
Quan Sun¹, Takaya Tokiwa¹, Hidenori Asahi¹, Han Yu¹, Kosei Ueno¹, Atsushi Kubo², Yasutaka Matsuo¹, and Hiroaki Misawa¹

¹Research Institute for Electronic Science, Hokkaido University, ²Institute of Physics, University of Tsukuba

- OMC5-2**
9:30
Optical fabrication and manipulation of semiconductor nanoparticles in superfluid helium
Masaaki Ashida¹, Yosuke Minowa¹, and Hajime Ishihara²
¹Osaka University, Japan, ²Osaka Prefecture University, Japan

- OMC5-3**
9:45
How does the optical angular momentum of an optical vortex shape a monocrystalline silicon needle?
Honami Fujiwara¹, Fuyuto Takahashi¹, Kai Izumisawa¹, Katsuhiko Miyamoto^{1,2}, Ryuji Morita³, Takashige Omatsu^{1,2}

¹Graduate School of Advanced Integration Science, Chiba University, Japan, ²Molecular chirality research center, Chiba University, Japan, ³Department of Applied Physics, Hokkaido University, Japan

- OMC5-4**
10:00
Chiral bias on circularly polarized laser-induced chiral crystallization from NaClO₃ solution containing plasmonic Ag nanoparticles

Hiromasa Niinomi¹, Teruki Sugiyama², Miho Tagawa³, Kenta Murayama³, Shunta Harada³, Katsuhiko Miyamoto^{1,4}, Takashige Omatsu^{1,4} and Toru Ujihara³

¹Molecular Chirality Research Center, Chiba University, Japan, ²National Chiao Tung University, Taiwan, ³Nagoya University, Japan, ⁴Graduate School of Advanced Integration Science, Chiba University, Japan

- OMC5-5**
10:15
Imprinted single-armed chiral surface relief on soda-lime silica glass

Guzhaliayi Juman¹, Itsuki Yoshida¹, Keigo Masuda¹, Shogo Nakano¹, Daisuke Sakai², Kenji Harada³, Katsuhiko Miyamoto^{1,4}, Takashige Omatsu^{1,4}

¹Graduate School of Advanced Integration Science, Chiba University, Japan,

²Department of System Engineering, Kitami Institute of Technology, Japan, ³Department of Computer Science, Kitami Institute of Technology, Japan, ⁴Molecular Chirality Research Center, Chiba University, Japan

- OMC5-6**
10:30
Using optical vortex to form the droplets filament

Kai Izumisawa¹, Fukutaro Shiraiishi¹, Yuri Nakamura¹, Katsuhiko Miyamoto^{1,2}, Kazumi Suzuki³, Masaki Yoshino⁴, Takashige Omatsu^{1,2}

¹Graduate School of Advanced Integration Science, Chiba University, Japan, ²Molecular chirality research center, Chiba University, Japan, ³Chemical Technology & Products Business Group, RICOH, Japan, ⁴Imaging Engine Development Division, RICOH, Japan

----- Break (10:45-11:00) -----

11:00-12:00 OMC6: Advanced Optical Manipulation

Room 414+415

Chair: Saulius Juodkazis, Swinburne University, Australia

- OMC6-1**
11:00
(Invited) Laser Assembler - Fabrication, manipulation and assembly of microstructures with optical tools
Sarah Isabelle Ksouri, Christoph Böttinger, Cemal Esen, Andreas Ostendorf
Ruhr-Universitaet Bochum, Germany

- OMC6-2**
11:30
(Invited) Nanostructured optical fibres for particle trapping
Sile Nic Chormaich
OIST Graduate University, Japan

----- Lunch Break (12:00-13:00) -----

----- Poster session (13:00-14:30) -----

Exhibition Hall A

- OMCp-2**
Holographic mapping of gold nanoparticles based on twilight-field holographic microscopy

- Siti Nabilah Hassan, Kazufumi Goto, and Yoshio Hayasaki
Center for Optical Research & Education (CORE), Utsunomiya University, Japan
- OMCp-3** **Highly flexible plasmon-assisted manipulation based on optical nonlinearity**
Masayuki Hoshina, Nobuhiko Yokoshi and Hajime Ishihara
Department of Physics and Electronics, Osaka Prefecture University, Japan
- OMCp-4** **LC microlens array without disclination lines by controlling pretilt angle**
Che-Ju Hsu¹, Bao-Long Chen², and Chi-Yen Huang^{1,2,*}
¹Graduate Institute of Photonics, National Changhua University of Education, Taiwan, ²Department of physics, National Changhua University of Education, Taiwan
- OMCp-5** **Positive-negative switchable liquid crystal lens with dual hole-patterned electrode**
Yung-Hsiang Hsu¹, Chia-Rong Sheu¹
¹Department of Photonics, National Cheng Kung University, Taiwan, ²Advanced Optoelectronic Technology Center, National Cheng Kung University, Taiwan
- OMCp-6** **Theoretical investigation of lateral resolution given by annular super-resolution phase plate**
Yoshinori Iketaki^{1,2,*}, Hiroshi Kumagai², Kumei Nagai³ and Nandor Bokor⁴
¹Olympus Corporation, Japan
²School of Allied Health Sciences Physics, Kitasato University, Japan, ³NTT-AT, Japan
⁴Department of Physics, Budapest University of Technology and Economics, Hungary
- OMCp-7** **Low Voltage Liquid Crystal Lens with addition of a Ring Floating Electrode**
Jyun-Jia Jhang¹, Che-Ju Hsu¹, Chi-Yen Huang^{1,2}
¹Graduate Institute of Photonics, National Changhua University of Education, Taiwan, ²Department of physics, National Changhua University of Education, Taiwan
- OMCp-8** **Selective excitation towards optical size-separation for CdSe quantum dots**
Mitsutaka Kumakura, Asuka Kinan
University of Fukui, Japan
- OMCp-9** **Prism Compressor for dispersion compensation**
Hongying Liu, Tian Lan, Zhenmin Shen, Xiaomei Chen, Guoqiang Ni
Beijing Institute of Technology, China
- OMCp-10** **Monocycle THz vortex generation by using a Tsurupica spiral phase plate**
Katsuhiko Miyamoto^{1,2}, Bong Joo Kang³, Yuta Sasaki¹, Won Tae Kim³, Takayoshi Yano¹, Kazuki Sano¹, Tomohito Yamasaki¹, Fabian Rotermund³ and Takashige Omatsu^{1,2}
¹Graduate School of Advanced Integration Science, Chiba University, Japan, ²Molecular chirality research center, Chiba University, Japan, ³Department of Physics and Division of Energy Systems Research, Ajou University, Korea
- OMCp-11** **Selective plasmonic optical trapping of nano sized fluorescence dye aggregates**
Ayaka Mototsuji¹, Tatsuya Shoji¹, Hiroshi Yao², Takahiro Yoshii³, Kei Murakoshi³, Yasuyuki Tsuboi¹
¹Graduate School of Science, Osaka City University, Japan, ²Graduate School of Material Science, University of Hyogo, Japan, ³Graduate School of Chemical Sciences, and Engineering, Hokkaido University, Japan
- OMCp-12** **Kinetics simulation of nano-particle two-color trapping using resonant nonlinear optical effect**
Tatsuya Nakai and Hajime Ishihara
Osaka Prefecture University, Japan
- OMCp-13** **Magnetic Trapping of Superconductor Micro-Particles Produced by Laser Ablation in Liquid Helium**
Y. Takahashi¹, J. Suzuki¹, N. Yoneyama¹, Y. Tohkawa¹, N. Suzuki¹, M. Kumakura², M. Ashida³, F. Matsushima¹, and Y. Moriwaki¹
¹University of Toyama, Japan, ²University of Fukui, Japan, ³Osaka University, Japan
- OMCp-14** **High fidelity detection of single atoms trapped in holographic microtrap arrays**
Hikaru Tamura¹, Tomoyuki Unakami¹, Jun He², Yoko Miyamoto³, and Ken'ichi Nakagawa¹
¹Institute for Laser Science, University of Electro-Communications, Japan, ²State Key Laboratory of Quantum Optics and Quantum Optics Devices, and Institute of OptoElectronics, Shanxi University, China
³Department of Information and Communication Engineering, University of Electro-Communications, Japan
- OMCp-15** **Topological properties of superposition of two scalar Laguerre-Gaussian beams**
Sunil Vyas, and Yoko Miyamoto
Department of Engineering Sciences, The University of Electro-Communications, Japan
- OMCp-16** **Ultrafast molecular dynamics by femtosecond CARS and hybrid FS/PS CARS spectroscopy**
Yuanqin Xia^{1*}, Zhibin Zhang¹, Yang Zhao¹, Sheng Zhang²
¹National Key Laboratory of Science and Technology on Tunable Laser, Harbin Institute of Technology, China, ²Department of Physics, Harbin Institute of Technology, China
- OMCp-17** **Numerical study on isotope separation of radioactive cesium by light-induced drift**
Kenta Yuki, Leo Matsuoka, Shinichi Namba
Hiroshima University, Japan
- 14:45-15:45 OMC7: Photon Radiation Forces**
Room 414+415
- Chair: Yoshihiko Arita, University of St Andrews , U.K.,
MCRChiba University, Japan
- OMC7-1** **Effect of optical manipulation on the an protocol**
14:45

- Vladimir V. Nikulin¹, David H. Hughes², John Malowicki²
¹State University of New York, USA, ²Air Force Research Laboratory, USA
- OMC7-2**
15:00 **Dependence of radiation forces on an ellipsoidal particle on the beam polarization state**
 Kristine Faith J. Roque, Giovanni A. Tapang, Caesar A. Saloma
 University of the Philippines, Philippines
- OMC7-3**
15:15 **Polarization-inverted modes in optically trapped metallic nanoparticles for the excitation of forbidden states**
 Mamoru Tamura, Takuya Iida
 Department of Physical Science, Graduate School of Science, Osaka Prefecture University, Japan
- OMC7-4**
15:30 **Raman Microspectroscopy for determining Polymer Concentration in an Optically Trapped Poly(N-isopropylacrylamide).**
 Tatsuya Shoji, Kenta Ushiro, Mitsuhiro Matsumoto, Taka-aki Asoh, Yasuyuki Tsuboi
 Division of Molecular Materials Science, Graduate School of Science, Osaka City University, Japan

---- Break (15:45-16:15) ----

16:15-17:30 OMC8: Hydrodynamics & Plasmonics

Room 414+415

Chair: Ryuji Morita, Hokkaido University, Japan

- OMC8-1**
16:15 **(Invited) Collective motion of hydrodynamically coupled micro-objects driven by optical force**
 Shogo Okubo, Shuhei Shibata, Yuriko Sassa Kawamura and Yasuyuki Kimura
 Kyusyu University, Japan
- OMC8-2**
16:45 **Phase tunable anisotropic metamaterials for nano-object detection and manipulation**
 Marios Sergides, Viet Giang Truong, and Síle Nic Chormaic
 Light-Matter Interactions Unit, OIST Graduate University, Japan
- OMC8-3**
17:00 **Evolution of Surface-Enhanced Raman Scattering Intensity at Metal Surface under Electrochemical Potential Control**
 Kei Murakoshi¹, Yumi Wakisaka¹, Mai Takase¹, Hiro Minamimoto¹, Satoshi Yasuda¹, Syoji Ito², Hiroshi Miyasaka², Tatsuya Shoji³, Yasuyuki Tsuboi³
¹Department of Chemistry, Faculty of Science, Hokkaido University, Japan, ²Division of Frontier Materials Science and Center for Promotion of Advanced Interdisciplinary Research, Graduate School of Engineering Science, Osaka University, Japan, ³Division of Molecular Materials Science, Graduate School of Science, Osaka City University, Japan
- OMC8-4** **Plasmon-induced Photosensitization of**

- 17:15** **Porous TiO₂ Electrodes with Au-Ag Alloy Nanoparticles Prepared by Ionic Liquid/Metal Sputter Deposition**
 Tatsuya Kameyama¹, Eisaku Kumazawa¹, Susumu Kuwabata², Tsukasa Torimoto¹
¹Nagoya University, Japan, ²Osaka University, Japan

17:30- Closing

Room 414+415

Closing Remarks

Takashige Omatsu, OMC'16 Chair, Chiba Univ., Japan.