International Symposium on SSS Laser Processing (3S-LP)
at Keio University
February 27th to March 1st, 2019
Yokohama - JAPAN

Program

Sponsor
Faculty of Science and Technology, Keio University

http://www.tera.elec.keio.ac.jp/3SLP
Aim and Scope

Thanks to the attractive properties of ultrafast laser processing including non-thermal processing, internal modification, material conversion, precise additive manufacturing, etc., current laser processing is not limited to process hard materials, but can exploit the frontier for processing human-compatible Soft materials such as polymers, gels, and living cells. Such materials are Sensitive to external forces, but ultrafast laser processing enables precise processing to fabricate Small structures down to sub-micro- and nano-scale in size. International Symposium of SSS Laser Processing (3S-LP) provides a forum to discuss state-of-the-art technologies and future prospects of laser processing in the emerging research field. Moreover, researchers in the field of applications and characterizations of soft materials are also welcome. 3S-LP aims to further international exchange between distinguished scientists participating from all over the world to establish new networks.

Chair and committees

Chair
Mitsuhiro Terakawa (Keio University)

Co-chairs
Wataru Watanabe (Ritsumeikan University)
Hiroaki Nishiyama (Yamagata University)
Hiroaki Onoe (Keio University)

Advisory Committees
Koji Sugioka (RIKEN)
Toshiharu Saiki (Keio University)

General Information

Date
February 27th to March 1st, 2019

Venue
Hiyoshi Campus, Keio University
4-1-1 Hiyoshi, Kohoku-ku, Yokohama, Kanagawa
223-8521 JAPAN

Contact
sss@tera.elec.keio.ac.jp
February 27th (Wed), 2019

10:00:
Opening Remarks
Mitsuhiro Terakawa
Keio University, Japan

Session I  Chair: Wataru Watanabe
10:10
Femtosecond Laser Micromachining of Ophthalmic Materials: The Route to Non-invasive Vision Correction (INVITED)
Wayne H. Knox
The Institute of Optics, University of Rochester, USA

10:40
Microfabrication of UV-transparent Polymer CYTOP using Various Lasers for Biochip Applications (INVITED)
Yasutaka Hanada
Hirosaki University, Japan

11:10
In Vitro Tissue Engineering Using 3D Microfluidic Devices (INVITED)
Ryo Sudo
Department of System Design Engineering, Keio University, Japan

11:40
Fast Sub-Wavelength Laser Nanopatterning using Engineered Materials and Acoustically-Shaped Light (INVITED)
Martí Duocastella, Simonluca Piazza, Salvatore Surdo
Nanophysics, Istituto Italiano di Tecnologia, Italy

Lunch 12:10-13:30

Session II  Chair: Martí Duocastella
13:30
Micro/Nanofabrication of Stimuli-Responsive Soft Actuator by Multi-Photon Lithography (INVITED)
Akihiro Nishiguchi1), Martin Möller2)
1) Biomaterials Field, Research Center for Functional Materials, National Institute for Materials Science, Japan
2) DWI Leibniz-Institute for Interactive Materials, Germany

14:00
Laser Direct Writing of Graphene-Based Interdigitated Electrode and Sensor Application (INVITED)
Akira Watanabe1), Jinguang Cai2)
1) Institute of Multidisciplinary Research for Advanced Materials, Tohoku University, Japan
2) Institute of Materials, China Academy of Engineering Physics, China
14:30  
Ultrafast Laser Machining of Polymer Separators to Improve Safety in Li-ion Batteries (INVITED)  
Craig Arnold  
Mechanical and Aerospace Engineering, Princeton University, USA

15:00  
Femtosecond Laser Reduction Based Assembling of Functional Nanomaterials (INVITED)  
Hiroaki Nishiyama  
Engineering Faculty of Engineering Mechanical Systems, Yamagata University, Japan

Coffee Break 15:30-15:50

Session III  Chair: Hiroaki Nishiyama
15:50  
Laser-based Microscale Additive Manufacturing of Micromachines (INVITED)  
Shoji Maruo  
Department of Mechanical Engineering and Materials Science, Yokohama National University, Japan

16:20  
Laser Direct Writing of Conductive Structure in Polymers (INVITED)  
Patricia Scully$^{1,2}$, Bryce Dorin$^2$, Patrick Parkinson$^2$  
1) National University of Ireland, Ireland  
2) The University of Manchester, Manchester, UK

16:50  
Fabrication of Gratings in PMMA and PDMS by Femtosecond Laser Direct Writing (INVITED)  
Wataru Watanabe  
Department of Electrical and Electronic Engineering, College of Science and Engineering, Ritsumeikan University, Japan

17:20  
Microfluidic Formation of Hydrogel Microstructures for Biomedical Applications (INVITED)  
Hiroaki Onoe  
Department of Mechanical Engineering, Faculty of Science and Technology, Keio University, Japan
February 28th (Thu), 2019

Session I    Chair: Patricia Scully
9:30
3D Laser Nanoprinting: Recent Progress (INVITED)
Martin Wegener
Institute of Applied Physics and Institute of Nanotechnology, Karlsruhe Institute of Technology (KIT), Germany
10:00
Natural Intelligence with Light-Driven Active Soft Matter (INVITED)
Toshiharu Saiki
Department of Electronics and Electrical Engineering, Keio University, Japan
10:30
Femtosecond Laser Direct Writing of Three-Dimensional Cu-Based Microstructures (INVITED)
Mizue Mizoshiri
Nagaoka University of Technology, Japan
11:00
Ultrafast Laser Nanofabrication for Regulating Cell Functions and its Biomedical Applications (INVITED)
Hojeong Jeon
Center for Biomaterials, Biomedical Research Institute, Korea Institute of Science and Technology, Korea

Lunch 11:30-12:45

POSTER SESSION    12:45-14:00

Session II    Chair: Hiroaki Onoe
14:00
Construction of Bio-Inspired Molecular Robots Based on a DNA Nanotechnology (INVITED)
Masahiro Takinoue
Department of Computer Science, Tokyo Institute of Technology, Japan
14:30
Laser Nanojoining of Copper Nanowires for Single Wire Glucose Sensors (INVITED)
Anming Hu
Department of Mechanical, Aerospace and Biomedical Engineering, University of Tennessee Knoxville, USA
15:00
Fabrication of Micro/Nano Structures inside Elastic Materials
Mitsuhiro Terakawa
Department of Electronics and Electrical Engineering, Keio University, Japan
Coffee Break 15:30-15:50

Session III  Chair: Anming Hu
15:50
Femtosecond Laser 3D Micro/Nanofabrication for Biochip and Sensor Applications (INVITED)
Koji Sugioka, Felix Sima, Daniela Serien, Shi Bai
Advanced Laser Processing Research Team, RIKEN Center for Advanced Photonics, Japan

16:20
Micropatterning of Hydrogels by Means of Multiphoton Lithography (INVITED)
Aleksandr Ovsianikov1,2), Maximilian Tromayer2,3), Agnes Dobos1,2), Peter Gruber1,2), Marica Markovic1,2), Arnulf Rosspeintner4), Eric Vauthey4), Heinz Redl2,5), Robert Liska2,3)
1) Institute of Materials Science and Technology, TU Wien (Technische Universitaet Wien), Austria
2) Austrian Cluster for Tissue Regeneration
3) Institute of Applied Synthetic Chemistry, TU Wien (Technische Universitaet Wien), Austria
4) Physical Chemistry Department, Sciences II, University of Geneva, Switzerland
5) Ludwig Boltzmann Institute - Experimental and Clinical Traumatology, Austria

16:50:
Closing: Poster Awards and Closing Remarks
Wataru Watanabe
Ritsumeikan University, Japan

March 1st (Fri), 2019
Laboratory tour, Excursion, and Banquet
**Poster Presentations**  
12:45-14:00, February 28th (Thu)

[P-01] Three-dimensional ceramic microstructures produced by microstereolithography using an optical fiber  
Yuanyi Chen¹, Taichi Ibi², Yohei Noda², Taichi Furukawa³, Shoji Maruo¹  
¹ College of Science and Technology, Yokohama National University, ² Graduate School of Engineering Science, Yokohama National University, ³ Faculty of Engineering, Yokohama National University

[P-02] A simple autofocus system for large-scale, two-photon microstereolithography  
Yoko Fujishiro ¹, Taichi Furukawa ², Shoji Maruo ²  
¹ Graduate School of Engineering Science, Yokohama National University, ² Faculty of Engineering, Yokohama National University

[P-03] Analysis of morphology and function of cholangiocytes cultured on soft and rigid substrates  
Ryota Kaku, Yasuaki Tokunaga, Ryo Sudo  
Department of System Design Engineering, Keio University

[P-04] DNA aptamer-linked structural color hydrogel for repeatable biochemical detection  
Tomoki Hayashi¹, Masahiro Takinoue², Hiroaki Onoe¹  
¹ Keio University, ² Tokyo Institute of Technology

[P-05] Fabrication of multi-layer volume gratings inside PDMS by femtosecond laser pulses  
Mitsutoshi Fukumoto, Seiya Terai, Kentaro Honma, Wataru Watanabe  
Department of Electrical and Electronic Engineering, College of Science and Engineering, Ritsumeikan University,

[P-06] Femtosecond laser doping of plasmonic Ag nanoparticles into volume phase transition hydrogels  
S. Aso, S. Odashima, H. Nishiyama  
Grad. School of Eng. & Sci., Yamagata University

[P-07] Fabrication of Soft Spiral-shaped Micro-swimmer  
Koki Yoshida, Hiroaki Onoe  
Keio University

[P-08] Direct laser writing of conductive silver structures by single-photon photoreduction  
Takuma Komori¹, Taichi Furukawa², Motoyuki Iijima³, Shoji Maruo²  
¹ Graduate School of Engineering, Yokohama National University, ² Faculty of Engineering, Yokohama National University, ³ Faculty of Environment and Information Sciences, Yokohama National University
[P-09] Three-dimensional shape reconstruction of 3D-printed transparent microparts
Heilili Nuerahemaiti\(^1\), Keishi Koyama\(^2\), Taichi Furukawa\(^3\), Shoji Maruo\(^2\)
\(^1\) Graduate School of Engineering, Yokohama National University, \(^2\) Faculty of Engineering, Yokohama National University

[P-10] Dynamical control of phase-change material coated Janus particles
Ryo Soma\(^1\), Eiji Yamamoto\(^1\), Masashi Kuwahara\(^2\), Toshiharu Saiki\(^1\)
\(^1\) Graduate School of Science and Technology, Keio University, \(^2\) National Institute of Advanced Industrial Science and Technology

[P-11] Fabrication of Cu-based microstructures using green femtosecond laser sintering of Cu2O nanoparticles
Atsushi Tanokuchi\(^1\), Yukinari Kondo\(^2\), and Mizue Mizoshi\(^1\)
\(^1\) Nagaoka University of Technology, \(^2\) Nagoya University

[P-12] Fabrication of gold and silver microstructures inside a hydrogel by multi-photon photoreduction
Manan Machida\(^1\), Maria Leilani Torres-Mapa\(^2\), Alexander Heisterkamp\(^2,4\), Mitsuhiro Terakawa\(^1,4\)
\(^1\) School of Integrated Design Engineering, Keio University, \(^2\) Institute of Quantum Optics, Gottfried Wilhelm Leibniz University Hannover, \(^3\) Industrial and Biomedical Optics Department, Laser Zentrum Hannover e.V., \(^4\) Department of Electronics and Electrical Engineering, Keio University

[P-13] Regeneration of Organ-scale Vascular Networks in a Decellularized Liver by Flow-induced Mechanical Stress
Masafumi Watanabe\(^1\), Koki Yano\(^1\), Koki Okawa\(^1\), and Ryo Sudo\(^1,2\)
\(^1\) School of Integrated Design Engineering, Keio University, \(^2\) Department of System Design Engineering, Keio University

[P-14] Apelins-12 and 13 enlarge in vitro microvessels with pericytes via eNOS
Kohei Ono\(^1\), Hiromu Sano\(^1\), Ryo Sudo\(^1,2\)
\(^1\) School of Integrated Design Engineering, Keio University, \(^2\) Department of System Design Engineering, Keio University

Naonari Kondo\(^1\), Izumi Takayama\(^2\), Mitsuhiro Terakawa\(^1,2\)
\(^1\) School of Integrated Design Engineering, Keio University, \(^2\) Department of Electronics and Electrical Engineering, Keio University, Japan

[P-16] Multi-Contrast Imaging of Femtosecond Laser Induced Material Modifications in PMMA with an LED Array Microscope
Ryo Sugimoto, Seiya Terai, Mitsutoshi Fukumoto, Kentaro Honma, Wataru Watanabe
Department of Electrical and Electronic Engineering, College of Science and Engineering, Ritsumeikan University
[P-17] Fabrication of conductive silver structure inside a hydrogel by femtosecond laser-induced photoreduction
Toshihiko Uemura1), Manan Machida1), Alexander Heisterkamp2,3,4), Hiroaki Onoe1), Mitsuhiro Terakawa1,4)  
1) School of Integrated Design Engineering, Keio University, 2) Institute of Quantum Optics, Gottfried Wilhelm Leibniz University Hannover, 3) Industrial and Biomedical Optics Department, Laser Zentrum Hannover e. V., 4) Department of Electronics and Electrical Engineering, Keio University

[P-18] Perfusable double-layer collagen microtube for vascularized heterogeneous culture
Shun Itai, Hiroaki Onoe  
Keio University

[P-19] A single-photon microstereolithography system for the production of high-aspect-ratio structures
Shingo Kozaki1), Taichi Furukawa2), Shoji Maruo2)  
1) Graduate School of Engineering, Yokohama National University, 2) Faculty of Engineering, Yokohama National University

[P-20] Dynamics of Colloidal Particles in a Temperature-Responsive Polymer Solution
Bokusui Nakayama1), Eiji Yamamoto1), Yuki Hiruta1), Masashi Kuwahara2), Toshiharu Saiki1)  
1) Graduate School of Science and Technology, Keio University, 2) National Institute of Advanced Industrial Science and Technology

[P-21] Femtosecond-laser-based synthesis of high-density silver nanoparticles in gelatin
Akito Katayama1), Kazuki Eda2), Manan Machida1), Mitsuhiro Terakawa1,2)  
1) School of Integrated Design Engineering Keio University, 2) Department of Electronics and Electrical Engineering, Keio University

[P-22] Strain sensing using electrically conductive β-SiC structures fabricated by femtosecond laser direct modification of PDMS
Shuichiro Hayashi1), Yasutaka Nakajima2), Mitsuhiro Terakawa1,2)  
1) Department of Electronics and Electrical Engineering, Keio University, 2) School of Integrated Design Engineering, Keio University

[P-23] Fabrication of CNF/PDMS composite microstructures by multi-photon photo-polymerization
Hiroki Sugiyama1), Akito Katayama2), Yasutaka Nakajima2), Mitsuhiro Terakawa1,2)  
1) Department of Electronics and Electrical Engineering, Keio University, 2) School of Integrated Design Engineering, Keio University