

LPM2017

The 18th International Symposium on Laser Precision Microfabrication

June 5 – 8, 2017

Toyama, Japan

<http://www.jlps.gr.jp/lpm2017/>

LPM2017 Tentative Program

updated February 22, 2017

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Oral Session

Day 1: June 5, Monday

Main Hall

Opening

Chair: Koji Sugioka, RIKEN, Japan

10:00 Opening Remark

Main Hall

Plenary Session

Chair: Yongfeng Lu, University of Nebraska Lincoln, USA

10:10 MoM-PL-1 **Plenary** A184

Photonics beyond diffraction limit: Plasmon waveguide, cavities and integrated laser circuits, Xiang Zhang¹, ¹University of California, Berkeley, USA

10:50 MoM-PL-2 **Plenary** A183

Giant micro-photonics for ubiquitous power lasers, Takunori Taira¹, ¹Laser Research Center, Institute for Molecular Science (IMS), Japan

11:30 MoM-PL-3 **Plenary** A206

High-speed surface structuring using Direct Laser Interference Patterning – fundamentals, applications and technology transfer, Andres Fabian Lasagni¹, ¹Institute for Manufacturing Technology, Technische Universität Dresden, Germany

12:10 Lunch Break

Day 1: June 5, Monday

1. SS2-1 Optimisation of laser ablation processes using ultrashort pulse lasers I

Chair: G. Raciukaitis, Center for Physical Sciences and Technology, Lithuania

14:00 Mo1-I-1 **Invited** A007

Ultrafast laser processing of metals: Comparative studies of experimental and simulated transient optical properties, Heinz P. Huber¹, Stephan Rapp¹, Jan Winter¹, ¹*Department of Applied Sciences and Mechatronics, Munich University of Applied Sciences (MUAS), Germany*

14:30 Mo1-O-2 A107

Multiple pulse laser induced breakdown spectroscopy for monitoring of femtosecond laser micromachining process in water, Aurimas Baskevicius¹, Ona Balachninaite¹, Simas Butkus¹, Domas Paipulas¹, Valdas Sirutkaitis¹, ¹*Laser Research Center, Vilnius University, Lithuania*

14:50 Mo1-O-3 **Student** A051

Systematic study of refractive index modifications induced by ultrafast laser in bulk chalcogenide glasses, Madhura Somayaji¹, Ciro D'Amico¹, Jean Philippe Colombier¹, Johann Troles², Razvan Stoian¹, ¹*Laboratoire Hubert Curien, UMR 5516 CNRS, Université de Lyon, Université Jean Monnet, France*, ²*Chemical Sciences Institute of Rennes, UMR 6226 CNRS, University of Rennes I, France*

15:10 Mo1-O-4 A076

Nonlinear absorption of ultrafast laser pulses on thermal stress generation of chemically strengthened glass, Arun Satyal^{1,2}, Carlos Juan Hernandez Castaneda^{1,3}, Yee Cheong Lam^{1,2}, Hongyu Zheng^{1,3}, ¹*SIMTech-NTU Joint Laboratory (Precision Machining), Nanyang Technological University, Singapore*, ²*School of Mechanical & Aerospace Engineering, Nanyang Technological University, Singapore*, ³*Machining Technology Group, Singapore Institute of Manufacturing Technology (SIMTech), Singapore*

15:30 Mo1-O-5 A155

Femtosecond laser scribing of transparent conductive oxides in CIGS solar cells and their characterization by scanning spreading resistance microscopy, Aiko Narazaki¹, Tadataka Sato¹, Hiroyuki Niino¹, Hideyuki Takada², Kenji Toriduka², Jiro Nishinaga³, Kamikawa-Shimizu Yukiko³, Shogo Ishizuka³, Hajime Shibata³, Shigeru Niki⁴, ¹*Research Institute for Sustainable Chemistry, AIST, Japan*, ²*Electronics and Photonics Research Institute, AIST, Japan*, ³*Research Center for Photovoltaics, AIST, Japan*, ⁴*Renewable Energy Research Center, AIST, Japan*

15:50 Coffee Break

Room 2

3. Medical and biological applications
1

Chair: TBA

14:00 Mo2-I-1 **Invited** A171
Biofabrication of thin layers and nanoparticles under controlled pulsed laser irradiation, Ion N. Mihailescu¹, Carmen Ristoscu¹, ¹*Lasers Department, National Institute for Lasers, Plasma and Radiation Physics, Romania*

14:30 Mo2-O-2 A170
Pulsed laser synthesis of bioactive thin layers with antimicrobial properties, Carmen Ristoscu¹, Laura Floroian², Natalia Mihailescu¹, Anita Visan¹, Ana Jancovic³, Mariana Carmen Chifiriuc⁴, Ion N. Mihailescu¹, ¹*Lasers Department, National Institute for Lasers, Plasma and Radiation Physics, Romania*, ²*Transilvania University of Brasov, 29 Eroilor Blvd, 500036, Brasov,, Romania*, ³*Innovation Center, Faculty of Technology and Metallurgy,, University of Belgrade, 11000 Belgrade,, Serbia*, ⁴*Department of Microbiology, Faculty of Biology,, University of Bucharest, 060101 Bucharest,, Romania*

14:50 Mo2-O-3 A034
Laser patterning of GaAs (001) functionalized with alkanethiol self-assembled monolayers, Vivien Lacour^{1, 2}, Celine Elie-Caille², Therese Leblois², Khalid Moumanus¹, Jan J Dubowski¹, ¹*Université de Sherbrooke*, ²*Université de Bourgogne Franche-Comté*

15:10 Mo2-O-4 **Student** A151
Picosecond laser surface micro/nano texturing of stainless steel as a method to reduce the adhesion of bacteria, Fatema Rajab¹, Paul Benson², Lin Li³, Kathryn Whitehead⁴, ¹*Laser Processing Research Centre, School of Mechanical, Aerospace and Civil Engineering, University of Manchester, UK*, ²*Centre for Biomedicine, Manchester Metropolitan University, UK*, ³*Laser Processing Research Centre, School of Mechanical, Aerospace and Civil Engineering, University of Manchester, UK*, ⁴*Centre for Biomedicine, Manchester Metropolitan University, UK*

15:30 Mo2-O-5 A062
Bio-inspired designing superhydrophobic and superoleophobic surfaces by femtosecond laser, Feng Chen¹, Qing Yang², Jiale Yong¹, Yao Fang¹, Jinglan Huo¹, Xun Hou¹, ¹*State Key Laboratory for Manufacturing System Engineering and Shaanxi Key Laboratory of Photonics Technology for Information, School of Electronic & Information Engineering, Xi'an Jiaotong University, PR China*, ²*School of Mechanical Engineering, Xi'an Jiaotong University, PR China*

15:50 Coffee Break

Room 3

5. Fundamental aspects

Chair: TBA

14:00 Mo3-O-1 A168
3D nano-fabrication using controlled Bessel-glass interaction in ultrafast modes, Manoj Kumar Bhuyan^{1, 2}, Praveen Kumar Velpula¹, Madhu Somayaji¹, Jean Philippe Colombier¹, Razvan Stoian¹, ¹*Laboratoire Hubert Curien, UMR 5516 CNRS, Université de Lyon, Université Jean Monnet, Saint Etienne, France*, ²*RIKEN-SIOM Joint research Unit, RIKEN Center for Advanced Photonics, Wako, Japan*

14:20 Mo3-O-2 A050
The development of simulation on intense femtosecond laser pulse propagation dynamic, Yuheng Wang¹, Yiming Yang¹, Qingbang Shu¹, Huan Zhang¹, Liangwen Shi¹, Olivier Utéza², ¹*The Center for Numerical Simulation and Software, Northwest Institute of Nuclear Technology, China*, ²*LP3, Aix Marseille Université, CNRS, France*

14:40 Mo3-I-3 **Invited** A096
Laser micromachining of metals with ultra-short pulses: Factors limiting the scale-up process, Beat Jeggi¹, Stefan Remund¹, Rene Streubel², Bilal Goekce², Stephan Barcikowski², Beat Neuenschwander¹, ¹*Institute of Applied Laser, Photonics and Surface Technologies ALPS, Bern University of Applied Sciences, Switzerland*, ²*Technical Chemistry I and Center for Nanointegration, University of Duisburg-Essen, Germany*

15:10 Mo3-O-4 A166
Open-air isotopic fingerprinting by laser-ablation mass spectrometry, Yunshen Zhou^{1,2,3}, Yao Lu¹, Yongfeng Lu¹, ¹*Electrical and Computer Engineering, University of Nebraska-Lincoln, USA*, ²*Advanced Optowave Corporation, USA*, ³*INNO Research Institute, INNO Laser, PRC*

15:30 Mo3-O-5 A125
Thermal damage of carbon fiber reinforced plastics (CFRP) by IR fiber laser irradiation, Hiroyuki Niino¹, Yoshihisa Harada¹, Akira Fujisaki², ¹*AIST, JAPAN*, ²*Furukawa Electric Co., Ltd., JAPAN*

15:50 Coffee Break

2. SS2-2 Optimisation of laser ablation processes using ultrashort pulse lasers II

Chair: H. P. Huber, Munich University of Applied Sciences (MUAS), Germany

16:20 Mo1-I-6 **Invited** A003

Efficient metal and glass processing using high average power ultrafast laser, John Lopez¹, Konstantin Mishchik², Kevin Gaudfrin³, Girolamo Mincuzzi³, Eric Audouard², Eric Mottay², Rainer Kling³, ¹UNIV BORDEAUX, CNRS, CEA, CELIA UMR5107, France, ²AMPLITUDE SYSTEMES, France, ³ALPHANOV, France

16:50 Mo1-O-7 **Student** A104

Comparison of GHz, MHz and kHz femtosecond burst mode micromachining of invar foils, Simas Butkus^{1,2}, Martynas Barkauskas^{1,2}, Domas Paipulas¹, Valdas Sirutkaitis¹, ¹Quantum electronics, Laser research center, Vilnius university, Lithuania, ²MGF Light Conversion, Lithuania

17:10 Mo1-O-8 **Student** A126

Sub-ns laser effective ablation of metals, Paulius Gečys¹, Andrius Žemaitis¹, Mindaugas Gedvilas¹, Gediminas Račiukaitis¹, ¹Department of laser technologies, Center for Physical Sciences and Technology, Lithuania

17:30 Mo1-O-9 A105

Optimizing the specific removal rate with the burst mode under varying conditions, Beat Jaeggi¹, Stefan Remund¹, Yiming Zhang¹, Thorsten Kramer¹, Beat Neuenschwander¹, ¹Institute for Applied Laser, Photonics and Surface Technologies ALPS, Bern University of Applied Sciences, Switzerland

17:50 close

Room 2

4. Medical and biological applications
2

Chair: TBA

16:20 Mo2-I-6 **Invited** A015

Laser-based methodologies for point-of-care diagnostics devices on paper, Collin L Sones¹, Peijun J. W. He¹, Ioannis N Katis¹, Robert W Eason, ¹Optoelectronics Research Centre, University of Southampton, United Kingdom

16:50 Mo2-O-7 A180

Femtosecond laser surface modification of an immunoassay microchip for spatially-localized antibody immobilization, Kenji Goya¹, Yusuke Fuchiwaki¹, Masato Tanaka¹, Toshihiko Ooie¹, ¹Health Research Insisute, National Institute of Advanced Industrial Science and Tachnology, Japan

17:10 Mo2-O-8 **Student** A072

Development of high-throughput cell sorting system utilizing femtosecond laser impulse, Zhen-Yi Hong¹, Takanori Iino¹, Hiroki Hagihara¹, Takanori Maeno¹, Kazunori Okano¹, Yoichiroh Hosokawa¹, ¹Graduate School of Materials Science, Nara Institute of Science and Technology, Japan

17:30 Mo2-O-9 **Student** A073

Ca²⁺ signal activation and propagation in mouse myoblast cells triggered by femtosecond laser impulse, Yuki Oshikawa¹, Kazunori Okano¹, Takanori Maeno¹, Takanori Iino¹, Ryohei Yasukuni¹, Yoichiroh Hosokawa¹, ¹Graduate School of Materials Science, Nara Institute of Science and Technology, Japan

17:50 close

Room 3

6. Advanced laser processing

Chair: TBA

16:20 Mo3-O-6 A012

Water-jet assisted laser processing in air and underwater, Suvradip Mullick¹, Yvraj Kumar Madhukar², Sagar Sarkar³, Ashish Kumar Nath³, ¹Department of Manufacturing Engineering, NIT Jamshedpur, Jharkhand- 831014, India, ²School of Engineering and physical Science, Heriot-Watt University, Edinburgh, EH14 5AS, UK, ³Department of Mechanical Engineering, Indian Institute of Technology, Kharagpur, 721302, West Bengal, India

16:40 Mo3-O-7 A044

High speed laser processing using a 3 kW single-mode fiber laser with a 20-m long delivery fiber, Keisuke Uchiyama¹, Shinya Ikoma¹, Yuya Takubo¹, Masahiro Kashiwagi¹, Kensuke Shima¹, Daiichiro Tanaka¹, ¹Fiber Laser Research Department, Advanced Technology Laboratory, Fujikura Ltd., Japan

17:00 Mo3-I-8 **Invited** A131

Overview on ultrafast laser applications and relevant markets in microelectronics industry, Nam Seong KIM, ¹Laser Applications Research Laboratory, EO Technics, Republic of Korea

17:30 Mo3-O-9 A197

Welding of thin section dissimilar metals with ns pulsed fiber lasers, Masahashi Tsuchiya¹, Jack Gabzdyl², Audery Bourriez², ¹Laser, Sumitomo Heavy Industries, Japan, ²Pulsed Laser Business Line, SPI Lasers Ltd, UK

17:50 close

Day 2: June 6, Tuesday

Room 1

7. SS2-3 Optimisation of laser ablation processes using ultrashort pulse lasers III

Chair: B. Neunschwander, BUAS, Switzerland

9:00 Tu1-I-1 Invited A002

System level tools for integrating laser micro processing modules in production lines, Stefan S. Dimov¹, ¹*Department of Mechanical Engineering, University of Birmingham, UK*

9:30 Tu1-O-2 Student A145

High precision laser micro cutting and laser micro drilling using diffractive beam splitting and flexible beam spreading for highest efficiency, Frank Zibner¹, Arnold Gillner¹, Clemens Hoenninger², Jens Holtkamp³, Lior Shachaf⁴, Natan Kaplan⁴, ¹*Micro- and Nanostructuring, Fraunhofer ILT, Germany*, ²*Research & Development, Amplitude Laser, France*, ³*Research & Development, Pulsar Photonics, Germany*, ⁴*Research & Development, HoloOr, Isreal*

9:50 Tu1-O-3 A071

Ultrashort pulse laser technology for processing of advanced electronics materials, Jim M. Bovatsek¹, Rajesh S. Patel¹, ¹*Spectra-Physics, MKS Instruments, Inc., USA*

10:10 Tu1-O-4 Student A049

In-fiber Mach-Zehnder interferometer fabricated by femtosecond laser micromachining assisted chemical etching for Bovine Serum Albumin sensing, Zhengyong Li¹, Changrui Liao¹, Yiping Wang¹, Ying Wang¹, ¹*College of Optoelectronic Engineering, Shenzhen University, China*

10:30 Tu1-O-5 A116

Improving fatigue properties of laser welded 2024 aluminum alloy using femtosecond laser peening, Tomokazu Sano¹, Takayuki Eimura¹, Akio Hirose¹, Seiichiro Tsutsumi², Yousuke Kawahito², Seiji Katayama², Kazuto Arakawa³, Ayumi Shiro⁴, Takahisa Shobu⁵, Kiyotaka Masaki⁶, Yuji Sano⁷, ¹*Graduate School of Engineering, Osaka University, Japan*, ²*Joining and Welding Research Institute, Osaka University, Japan*, ³*Shimane University, Japan*, ⁴*National Institute for Quantum and Radiological Science and Technology, Japan*, ⁵*Japan Atomic Energy Agency, Japan*, ⁶*National Institute of Technology, Okinawa College, Japan*, ⁷*Toshiba Corporation, Japan*

10:50 Coffee Break

Poster I

Chair: TBA

11:10 Short Presentation for Poster Session I (Room 1)

Poster I

12:10 Poster Session I and Exhibition (Foyer on 3rd floor)

& Lunch Time (up to 13:50)

Room 2

10. 3-D micro- and nano-fabrication 1

Chair: TBA

9:00 Tu2-O-1 **Student** A101

Estimation of diffractive optics fabricated inside glass using a femtosecond laser, Ibuki Yamaguchi¹, Satoshi Hasegawa¹, Yoshio Hayasaki¹, ¹Center for Optical Research and Education (CORE), Utsunomiya University, Japan

9:20 Tu2-O-2 A023

Aberration-free high NA focusing in transparent media, Alexander Laskin¹, Vadim Laskin¹, Aleksei Ostrun², ¹AdlOptica Optical Systems GmbH, Germany, ²St. Petersburg National Research University ITMO, Russia

9:40 Tu2-I-3 **Invited** A127

Mid-infrared surface sensing waveguides in silica glass: Monitoring of water microstructure and contaminants, Airan Rodenas¹, Javier Martinez², Roberto Osellame³, Francesc Diaz², ¹Istituto di Fotonica e Nanotecnologie (IFN), Consiglio Nazionale delle Ricerche (CNR), Italy, ²Departament de Química Física i Inorgànica, Universitat Rovira i Virgili, Spain, ³Dipartimento di Fisica, Politecnico di Milano, Italy

10:10 Tu2-O-4 A161

Water-assisted laser drilling for miniature internal thread in glass and evaluation of its strength, Reo Murakami¹, Hiroyuki Nakagawa¹, Shigeki Matsuo¹, ¹Department of Mechanical Engineering, Shibaura Institute of Technology, Japan

10:30 Tu2-O-5 **Student** A120

Residual heat in ultrashort laser drilling of metals, Daniel Johannes Förster^{1,2}, Rudolf Weber², Thomas Graf², ¹Graduate School of Excellence advanced Manufacturing Engineering GSaME, University of Stuttgart, Germany, ²Institut für Strahlwerkzeuge IFSW, University of Stuttgart, Germany

10:50 Coffee Break

Room 3

13. New ripple formation

Chair: TBA

9:00 Tu3-O-1 A173

Modifications induced in bulk fused silica with double femtosecond laser pulse sequence, Valdemar Stankevič^{1,2}, Gediminas Račiukaitis¹, ¹Laser department, Center for Physical Sciences and Technology, Lithuania, ²ELAS, Ltd, Lithuania

9:20 Tu3-O-2 A080

Formation of nanograting on tellurite glass by femtosecond laser irradiation, Tetsuo Kishi¹, Fatmah Ebrahim², Ray Jay Jeng¹, Nobuhiro Matsushita¹, Tetsuji Yano¹, Yves Bellouard², ¹Materials Science & Engineering, Tokyo Institute of Technology, Japan, ²IMT/STI, Ecole Polytechnique Fédérale de Lausanne, Switzerland

9:40 Tu3-O-3 A097

Tuning stainless steel wetting properties by femtosecond laser-induced periodic surface structures, Olga Varlamova¹, Juergen Reif¹, Rodica Borcia¹, Sepehr Razi², Debasish Sarker³, ¹Institute of Physics, BTU Cottbus-Senftenberg, Germany, ²Amirkabir University of Technology, Teheran, Iran, ³Experimental Thermal Fluid Dynamics, Helmholtz-Zentrum Dresden-Rossendorf, Germany

10:00 Tu3-O-4 A046

Laser nano-structuring of pre-structured substrates, Evangelos Skoulas¹, Emmanuel Stratakis¹, Georgy Airatovich Shafeev^{2, 3}, Ekaterina Vladimirovna Barmina², ¹Institute of Electronic Structure and Laser, Foundation for Research & Technology—Hellas, (IESL-FORTH), Institute of Electronic Structure and Laser, Foundation for Research & Technology—Hellas, (IESL-FORTH), Greece, ²Wave Research Center, A.M. Prokhorov General Physics Institute of the Russian Academy of Sciences, Russian Federation, ³National Research Nuclear University MEPhI, National Research Nuclear University MEPhI, Russian Federation

10:20 Tu3-O-5 A041

The influences of surface plasmons and thermal effects on femtosecond laser-induced subwavelength periodic ripples on Au film by pump-probe imaging, Tianqing Jia¹, ¹State Key Laboratory of Precision Spectroscopy, East China Normal University, China

10:40 Coffee Break

8. SS1-1 Lasers and nanoparticles in liquids -Fundamentals-

Chair: Amendola, Uni Padova, Italy / Cai, CAS
Hefei, China

14:20 Tu1-I-6 **Invited** A004

Origin of the nano-carbon allotropes in pulsed laser ablation in liquids synthesis, David Amans¹, Mouhmed Diouf¹, Julien Lam¹, Gilles Ledoux¹, Christophe Dujardin¹, ¹*Institut Lumière Matière, Univ Lyon, Université Claude Bernard Lyon 1, CNRS, FRANCE*

14:50 Tu1-O-7 A119

Formation of alloy nanoparticles by laser ablation in liquid environment, Vincenzo Amendola¹, Elti Cattaruzza², ¹*Chemical Sciences, University of Padova, Italy*, ²*Department of Molecular Sciences and Nanosystems, Università Ca' Foscari Venezia, Italy*

15:10 Tu1-O-8 A174

Ultrathin oxide layer-wrapped gold nanoparticles induced by laser ablation in solutions and their enhanced performances, Haoming Bao¹, Hongwen Zhang¹, Weiping Cai¹, ¹*Key Lab of Materials Physics, Institute of Solid State Physics, Chinese Academy of Sciences, China*

15:30 Tu1-O-9 A047

Balance of O₂ and H₂ content under laser-induced breakdown of aqueous colloidal solutions, Ekaterina Vladimirovna Barmina¹, Alexander Vladimirovich Simakin¹, Georgy Airatovich Shafeev^{1,2}, ¹*Wave Research Center, A.M. Prokhorov General Physics Institute of the Russian Academy of Sciences, Russian Federation*, ²*National Research Nuclear University MEPhI, National Research Nuclear University MEPhI, Russian Federation*

15:50 Coffee Break

Room 2

Room 3

11. 3-D micro- and nano-fabrication 2

14. Glass/Ceramic processing

Chair: TBA

Chair: TBA

14:00 Tu2-O-6 A162

3D biomimetic architectures in closed microfluidic structures created by ultrafast laser ship-in-a-bottle integration for evaluation of cancer cells migration, Felix Sima^{1,3}, Daniela Serien¹, Dong Wu¹, Jian Xu¹, Hiroyuki Kawano², Katsumi Midorikawa¹, Koji Sugioka¹, ¹SIOM Joint Research Unit, RIKEN, Japan, ²Brain Science Institute, RIKEN, Japan, ³CETAL, INFLPR, Romania

14:20 Tu2-O-7 A030

Ship-in-a-bottle integration of 3D proteinaceous microstructures inside glass microchannel by two-photon cross-linking, Daniela Serien¹, Katsumi Midorikawa², Koji Sugioka¹, ¹RIKEN-SIOM Joint Research Unit, RIKEN Center for Advanced Photonics, RIKEN, Japan, ²RIKEN Center for Advanced Photonics, RIKEN, Japan

14:40 Tu2-O-8 A033

Fabrication of three-dimensional micro-structures in glass by picosecond laser micro-machining and welding, Krystian L. Wlodarczyk¹, Richard M. Carter¹, Amir Jahanbakhsh¹, Duncan P. Hand¹, Robert R.J. Maier¹, Mercedes Maroto-Valer¹, ¹School of Engineering and Physical Sciences, Heriot-Watt University, United Kingdom

15:00 Tu2-O-9 Student A150

Fabrication of electro-optic tunable lithium niobate microresonators with integrated in-plane microelectrodes using femtosecond laser micromachining, Min Wang¹, Jintian Lin¹, Zhiwei Fang¹, Yingxin Xu², Wei Fang², Ya Cheng^{1,3}, ¹State Key Laboratory of High Field Laser Physics, Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences, China, ²State Key Laboratory of Modern Optical Instrumentation, College of Optical Science and Engineering, Zhejiang University, China, ³State Key Laboratory of Precision Spectroscopy, East China Normal University, China

15:20 Tu2-O-10 Student A201

Femtosecond laser assisted three-dimensional free-form fabrication of complex three dimensional metallic structures made of copper, silver and their alloys, embedded in fused silica, Fatmah Ebrahim¹, Raphael Charvet², Cyril Denereaz², Suzanne Verheyden², Lea Deillon², Andreas Mortensen², Yves Bellouard¹, ¹Galatea Lab, STI-IMT, Ecole Polytechnique Federale de Lausanne (EPFL), Switzerland, ²Mechanical Metallurgy Laboratory, STI-IMX, Ecole Polytechnique Federale de Lausanne (EPFL), Switzerland

15:40 Coffee Break

14:00 Tu3-O-6 A133

Effect of laser pulse duration on non-linear absorptivity and modification size in borosilicate glass, Isamu Miyamoto^{1, 2}, Kazuhiko Maeda¹, Etsuji Ohmura¹, ¹Osaka University, Japan, ²Erlangen Graduate School of Advanced Optical Technologies (SAOT), Germany

14:20 Tu3-O-7 A052

Drilling of through holes in sapphire and glass using femtosecond laser pulses, Konstantin Mishchik¹, Kevin Gaudfrin², John Lopez², ¹Amplitude Systemes, France, ²CELIA UMR5107, Université Bordeaux CNRS CEA, France

14:40 Tu3-O-8 A115

Nanosecond and femtosecond laser irradiation of metal nano composite glass obtained through ionic exchange or by direct metal incorporation in situ during the manufacture of glass, Mohammed Cherif Sow¹, Jean Phillippe Blondeau², Nadia Pellerin², Nadjib Semmar¹, Eric Elillon¹, Chantal Leborgne¹, ¹GREMI, France, ²CEMHTI, France

15:00 Tu3-I-9 Invited A055

Stress dynamics in ultrashort pulse laser processing inside transparent materials, Masaaki Sakakura¹, Yasuhiko Shimotsu², Kiyotaka Miura², ¹Office of Society-Academia Collaboration for Innovation, Kyoto University, Japan, ²Graduate school of engineering, Kyoto University, Japan

15:30 Tu3-O-10 A204

Time resolved study of femtosecond laser induced micro-modifications inside transparent brittle materials, Frank Hendricks¹, Matthias Domke², Heinz P. Huber³, Victor V. Matylitsky¹, ¹Spectra-Physics, Austria, ²Vorarlberg Technical University, Austria, ³Laser Center of Munich University of Applied Sciences, Germany

15:50 Coffee Break

9. SS1-2 Lasers and nanoparticles in liquids - Colloid Processing -

Chair: S. Hasimoto, University of Tokushima, Japan / T. Asahi, Ehime University, Japan

16:20 Tu1-I-10 **Invited** A028

Fabrication of colloidal Si nanoparticles by pulsed-laser irradiation of porous Si in liquid: Toward high productivity and size control, Toshihiro Nakamura¹, Ze Yuan², Sadao Adachi¹,
¹Graduate School of Science and Technology, Gunma University, Japan, ²Faculty of Pure and Applied Sciences, University of Tsukuba, Japan

16:50 Tu1-O-11 A175

Fabrication of metal phthalocyanine nanoparticles in organic solvents by nanosecond laser fragmentation, Ryo Kihara¹, Taisei HImeda¹, Tsuyoshi Asahi¹,
¹Department of Materials Science and Biotechnology, Ehime University, Japan

17:10 Tu1-O-12 A008

Laser-induced fabrication of nanoholes on glass substrates exploiting gold nanoparticles, Yuki Osaka¹, Satoshi Sugano¹, Shuichi Hashimoto¹,
¹Department of Optical Science and Technology, University of Tokushima, Japan

17:30 Tu1-O-13 **Student** A066

Laser parameter effects on submicrometer spherical particles synthesized by pulsed laser melting in liquid, Shota Sakaki¹, Naoto Koshizaki¹, Hiroshi Ikenoue², Takeshi Tsuji³, Yoshie Ishikawa⁴,
¹Graduate school of Engineering, Hokkaido University, Japan, ²Department of Gigaphoton Next GLP, Kyusyu University, Japan, ³Interdisciplinary Graduate School of Science and Engineering, Shimane University, Japan, ⁴Nanomaterials Research Institute, National Institute of Advanced Industrial Science and Technology, Japan

17:50 close

Room 2

Room 3

12. 3-D micro- and nano-fabrication 3

15. Advanced materials processing

Chair: TBA

Chair: TBA

16:20 Tu2-O-11 A082

Selective polymer powder deposition with microscale accuracy by vibrating nozzles in SLS machines, Thomas Stichel^{1,3}, Tobias Laumer^{1,2,3}, Max Rath¹, Stephan Roth^{1,3}, ¹*Bayerisches Laserzentrum GmbH, Germany*, ²*Erlangen Graduate School in Advanced Optical Technologies, Germany*, ³*Collaborative Research Center (CRC) 814 "Additive Manufacturing", Germany*

16:20 Tu3-O-11 A158

Synthesis of semiconductor microspheres by laser ablation, Daisuke Nakamura¹, Ryohei Tasaki¹, Mitsuhiro Higashihata¹, Akira Suwa², Hiroshi Ikenoue², ¹*Department of Electrical Engineering, Graduate School of Information Science and Electrical Engineering, Kyushu University, Japan*, ²*Department of Gigaphoton Next GLP, Graduate School of Information Science and Electrical Engineering, Kyushu University, Japan*

16:40 Tu2-O-12 A045

Laser-based quasi-simultaneous preheating for generating multi-material components with micro-sized structures in the boundary zone by laser sintering of polymer powders, Tobias Laumer^{1,2,3}, Thomas Stichel^{1,3}, Michael Schmidt^{1,4}, ¹*Bayerisches Laserzentrum GmbH, Germany*, ²*Erlangen Graduate School in Advanced Optical Technologies, Germany*, ³*Collaborative Research Center 814 "Additive Manufacturing, Germany*, ⁴*Institute of Photonic Technologies, Friedrich-Alexander-University, Germany*

16:40 Tu3-O-12 A157

Micrometer-scale photo direct machining of PDMS using laser plasma EUV light, Tetsuya Makimura¹, Hikari Urai¹, Hiroyuki Niino², ¹*Institute of Applied Physics, University of Tsukuba, Japan*, ²*ISC, AIST, Japan*

17:00 Tu2-O-13 A017

Fabrication of three-dimensional metallic nanostructures using multiphoton reduction, Xianfan Xu, ¹*Purdue University, United States*

17:00 Tu3-I-13 **Invited** A186

Laser printing using spatially modulated pulses, Alberto Piqué¹, R.C.Y. Auyeung¹, S. A. Mathews¹, N. A. Charipar¹, H. Kim¹, ¹*Materials Science and Technology Division, US Naval Research Laboratory, USA*

17:20 Tu2-O-14 A074

High efficiency femtosecond laser microfabrication for functional microdevices, Dong Wu¹, Bing Xu¹, Yanlei Hu¹, ¹*Precision Machinery and Precision Instrument, University of Science and Technology of China, China*

17:30 Tu3-O-14 **Student** A111

Beam shaping with optimized photonic crystals from chirp to numeric design, Darius Gailevičius¹, Vytautas Purlys¹, Martynas Peckus¹, Roaldas Gadonas¹, Kestutis Staliunas^{2,3}, ¹*Laser Research Center, Department of Quantum Electronics, Vilnius University, Lithuania*, ²*Departament de Física i Enginyeria Nuclear, Universitat Politècnica de Catalunya, Lithuania*, ³*Institucio Catalana de Reserca i Estudis Avançats (ICREA), Spain*

17:40 Tu2-O-15 A210

Preparation of large-area uniform silver nanocrystal arrays for SERS, Wei-Wei Xu¹, Shun Kamada², Masaru Kamano¹, Toshihiro Okamoto², Lei Wang³, Bin-Bin Xu⁴, Masanobu Haraguchi², ¹*Department of Creative Technology, Course of Chemical Engineering, Anan College of Technology, Japan*, ²*Department of Optical Science and Technology, Faculty of Engineering, The University of Tokushima, Japan*, ³*State Key Laboratory on Integrated Optoelectronics, College of Electronic Science and Engineering, Jilin University, China*, ⁴*Centre of Excellence for Quantum Computation and Communication Technology, School of Physics, University of New South Wales, Australia*

17:50 close

18:00 close

Day 3: June 7, Wednesday

Room 1

16. SS1-3 Lasers and nanoparticles in liquids - Applications -

Chair: Barcikowski, CENIDE, Germany / Wada, TiTech, Japan

9:00 We1-I-1 Invited A121

Fuel cell catalysts using graphene, Junji Nakamura¹, ¹*Faculty of Pure and Applied Sciences, University of Tsukuba, Japan*

9:30 We1-O-2 A009

Functionality of ligand-free alloy nanoparticles for heterogeneous catalysis made by scaleable laser synthesis, Galina Marzun¹, Ina Haxhiaj¹, Sebastian Kohsakowski¹, Sven Reichenberger¹, Stephan Barcikowski¹, ¹*Technical Chemistry 1, University of Duisburg-Essen, Germany*

9:50 We1-O-3 Student A020

Preparation of amorphous selenium nanoparticles and their nonlinear optical application, Churong Ma¹, Guowei Yang², ¹*School of Materials Science & Engineering, Nanotechnology Research Center, China*, ²*School of Materials Science & Engineering, Nanotechnology Research Center, China*

10:10 We1-O-4 Student A109

Functionalization of 2PP-structures by embedding of laser-generated magnetic nanoparticles, Alexander Kanitz¹, Jannis Köhler¹, Gordon Zyla¹, Cemal Esen¹, Maria del Mar Sanz², Marco Maicas², Evgeny Lev Gurevich¹, Andreas Ostendorf¹, ¹*Applied Laser Technologies, Ruhr-Universität Bochum, Germany*, ²*Instituto de Sistemas Optoelectrónicos y Microtecnología, Universidad Politécnica de Madrid, Spain*

10:30 We1-O-5 Student A021

Laser generated tantalum carbide nanoparticles for X-ray computed tomography imaging and ex vivo detection in mice as peroxidase mimetics, Tongming Chen¹, Xiumei Tian², Guowei Yang¹, ¹*State Key Laboratory of Optoelectronic Materials and Technologies, Nanotechnology Research Center, School of Materials Science & Engineering, School of Physics, Sun Yat-sen University, P. R. China*, ²*Department of Biomedical Engineering, Guangzhou Medical University, P. R. China*

10:50 *Coffee Break*

Poster II

Chair: TBA

11:10 Short Presentation for Poster Session II (Room 1)

Poster II

12:10 Poster Session II and Exhibition (Foyer on 3rd floor)

& Lunch Time (up to 13:50)

Room 2

Room 3

19. Micro-structuring

Chair: TBA

9:00 We2-O-1 A083

Laser processing of nanofiber tissue scaffolds, Marco Götze¹, Abdul Mannan Farhan^{1,2}, Tobias Kürbitz³, Olaf Krimig¹, Sven Henning³, Andreas Heilmann^{2,3}, Georg Hillrichs¹, ¹Engineering and Natural Sciences, University of Applied Sciences Merseburg, Germany, ²Electrical and Electronic Engineering, Mechanical and Industrial Engineering, University of Applied Sciences Anhalt, Germany, ³Biological and Macromolecular Materials, Fraunhofer Institute for Microstructure of Materials and Systems Halle (S.), Germany

9:20 We2-O-2 A075

The effect of ultrafast laser fabricated surface micro/nano structures on reactive spreading kinetic, Yingchuan Zhang¹, Lei Liu¹, Guisheng Zou¹, Aiping Wu¹, Yunhong Norman Zhou^{1,2}, ¹Department of Mechanical Engineering, State Key Laboratory of Tribology, Tsinghua University, Beijing, China, ²Department of Mechanical Engineering, University of Waterloo, Waterloo, Canada

9:40 We2-O-3 A043

Experimental investigation of speckle pattern creating techniques for digital image correlation, Chao-Ching Ho¹, Dong-shen Wu², Yuan-Jen Chang², Jin-Chen Hsu², Chia-Lung Kuo², S.-K. Kuo³, ¹Graduate Institute of Manufacturing Technology and Department of Mechanical Engineering, National Taipei University of Technology, Taiwan, ²Department of Mechanical Engineering, National Yunlin University of Science and Technology, Taiwan, ³Iron and Steel Research and Development Department, China Steel, Taiwan

10:00 We2-O-4 A098

Surface functionalization of metals by laser texturing, Nerea Otero¹, Sara Vidal¹, Pilar Rey¹, Pablo Romero¹, ¹Laser Applications Centre, AIMEN, Spain

10:20 We2-O-5 Student A084

Rapid nanostructuring using multi-beam-interference with consecutively overlapped ultrashort laser pulses, Chao He^{1,2}, Michael Steger², Arnold Gillner^{1,2}, ¹Chair for Laser Technology LLT, RWTH Aachen University, Germany, ²Micro and nanostructuring, Fraunhofer Institute for Laser Technology ILT, Germany

10:40 Coffee Break

22. Surface treatment

Chair: TBA

9:00 We3-O-1 A024

Effect of picosecond laser based modifications of amorphous carbon coatings on lubricant-free tribological systems, Tom Haefner^{1,2}, Johannes Heberle^{1,2}, Hubert Hautmann¹, Rong Zhao³, Jennifer Steiner⁴, Stephan Tremmel³, Marion Merklein^{2,4}, Michael Schmidt^{1,2}, ¹Institute of Photonic Technologies, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany, ²Erlangen Graduate School in Advanced Optical Technologies (SAOT), Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany, ³Institute of Engineering Design, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany, ⁴Institute of Manufacturing Technology, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

9:20 We3-O-2 A149

New laser surface texturing method enabling high processing speeds, Jiri Martan¹, Denys Moskal¹, Martin Kucera¹, ¹New Technologies Research Centre (NTC), University of West Bohemia, Czech Republic

9:40 We3-O-3 Student A139

Investigation of Nd³⁺:YAG laser aided surface texturing to improve the tribological characteristics of piston ring, Ezhilmaran V¹, Vijayaraghavan L¹, Vasa N.J², Cherian N.K³, ¹Department of Mechanical Engineering, Indian Institute of Technology Madras, India, ²Department of Engineering Design, Indian Institute of Technology Madras, India, ³India Pistons Ltd, Indian Institute of Technology Madras, India

10:00 We3-O-4 A093

Grain boundary engineering of SUS304 by laser shocking and annealing, Zhen Yu Gu¹, Xiao Xu¹, Wen Feng¹, Sen Yang¹, ¹School Materials Science and Engineering, Nanjing University of Science and Technology, P.R. China

10:20 We3-O-5 Student A138

Enhancing light trapping and minority carrier lifetime of a-Si thin films using nanosecond laser treatment, Esther Blesso Vidhya Y¹, Nilesh Jayantilal Vasa¹, ¹Engineering Design, Indian Institute of Technology Madras, India

10:40 Coffee Break

17. SS3 Laser processes for packaging of high power electronics and energy storage systems

Chairs: Arnold Gillner / Fraunhofer-Institut für Lasertechnik ILT / Germany

14:00 We1-I-6 **Invited** A146

Laser based joining processes for battery assembly and high power electronics - recent results and future applications, Alexander Michael Olowinsky¹, Simon Britten¹, André Häusler², Johanna Helm¹, Sören Hollatz¹, ¹*Ablation and Joining, Fraunhofer Institute for Laser Technology, Germany,* ²*Chair for Laser Technology, RWTH Aachen University,, Germany*

14:30 We1-I-7 **Invited** A188

Laser welding for battery pack manufacture, Geoff Shannon¹, David van der Waal², Tatsunori Hayakawa³, ¹*Amada Miyachi America, USA,* ²*Amada Miyachi Europe B.V., The Netherlands,* ³*Amada Miyachi Co.,Ltd., Japan*

15:00 We1-I-8 **Invited** A160

Novel laser slicing technology for SiC, KABRA, Kazuya Hirata¹, Ryohei Yamamoto¹, Yoko Nishino¹, Yukio Morishige¹, Kunimitsu Takahashi, ¹*Engineering R&D Division, DISCO Corporation, Japan*

15:30 We1-O-9 A092

Fundamental study on slicing method of gallium nitride by ultrashort pulsed laser, Togo Shinonaga¹, Motoki Ota¹, Yasuhiro Okamoto¹, Akira Okada¹, ¹*Graduate School of Natural Science and Technology, Okayama University, Japan*

15:50 Coffee Break

Room 2

20. Ultra-short laser processing 1

Chair: TBA

14:00 We2-O-6 **Student** A112

Design and fabrication optically transparent infrared radiating energy device by laser ablation, E Manikanda¹, B. S Sreeja¹, S Radha¹,
¹*Electronics & Communication Engineering, SSN College of Engineering, India*

14:20 We2-O-7 **Student** A070

Chemical wet etching on a rear surface of silicon substrate assisted by an infrared femtosecond laser via non-linear absorption processes, Khanh Phu Luong¹, Rie Tanabe¹, Yoshiro Ito¹,
¹*Department of Mechanical Engineering, Nagaoka University of Technology, Japan*

14:40 We2-O-8 **Student** A038

Micro welding of copper and glass with a gap by a femtosecond fiber laser pulses, Satoshi Matsuyoshi¹, Yusuke Mizuguchi¹, Atsushi Muratsugu², Takayuki Tamaki³, Wataru Watanabe¹,
¹*Department of Electrical & Electronic Engineering, Ritsumeikan University, Japan*, ²*Science Technology Entrepreneurship Laboratory, Office for University-Industry Collaboration, Osaka University, Japan*, ³*Department of Control Engineering, National Institute of Technology, Nara College, Japan*

15:00 We2-O-9 **Student** A068

Cu micropatterning using femtosecond laser reduction of Cu₂O nanospheres, Yukinari Kondo¹, Mizue Mizoshiri¹, Junpei Sakurai¹, Seiichi Hata¹,
¹*Department of Micro-Nano Systems Engineering, Graduate School of Engineering, Nagoya University, Japan*

15:20 We2-O-10 **Student** A143

Femtosecond laser assisted fabrication of 3D anatase TiO₂ for photocatalytic degradation, Jinlong Lu¹, Ting Hung¹, Rongshi Xiao¹,
¹*Institute of Laser Engineering, Beijing University of Technology, China*

15:40 Coffee Break

Room 3

23. Film deposition and synthesis

Chair: TBA

14:00 We3-I-6 **Invited** A113

Advanced thin films prepared by ultraviolet laser-assisted chemical solution processing for electrical and optical applications, Tetsuo Tsuchiya¹, Tomohiko Nakajima¹, Iwao Yamaguchi¹,
¹*Advanced Coating Technology Research Center, National Institute of Advanced Industrial Science and Technology (AIST), Japan*

14:30 We3-O-7 **Student** A140

Pulsed laser deposition and laser annealing of SiC thin films, Emmanuel Paneerselvam¹, Nilesh J Vasa¹, Mitsuhiro Higashihata², Daisuke Nakamura², Ramachandra Rao M S³,
¹*Department of Engineering Design, Indian Institute of Technology Madras, Chennai, India*, ²*Graduate School of Information Science and Electrical Engineering, Kyushu University, Fukuoka, Japan*, ³*Department of physics, Indian Institute of Technology Madras, Chennai, India*

14:50 We3-O-8 A094

Fabrication of square-shaped depressed cladding waveguides in transparent materials with slit-shaped femtosecond laser beams, Yang Liao¹, Peng Wang^{1,2,3}, Jia Qi^{1,2,3}, ZhengMing Liu^{1,2,3}, Wei Chu¹, Ya Cheng^{1,4},
¹*State Key Laboratory of High Field Laser Physics, Shanghai Institute of Optics and Fine Mechanics, China*, ²*School of Physical Science and Technology, Shanghai Tech University, China*, ³*University of Chinese Academy of Sciences, China*, ⁴*State Key Laboratory of Precision Spectroscopy, East China Normal University, China*

15:10 We3-O-9 A198

Picosecond laser-induced electrical resistance changes in graphite oxide, Romualdas Trusovas¹, Gediminas Račiukaitis¹, Jurgis Barkauskas², Gediminas Niaura³, Algimantas Lukša⁴, Jurgis Bukauskas⁴,
¹*Department of Laser Technologies, Center for Physical Sciences and Technology, Lithuania*, ²*Department of Inorganic Chemistry, Faculty of Chemistry, Vilnius University, Lithuania*, ³*Department of Organic Chemistry, Center for Physical Sciences and Technology, Lithuania*, ⁴*Department of Physical Technologies, Center for Physical Sciences and Technology, Lithuania*

15:30 Coffee Break

18. Direct writing 1

Chair: TBA

16:20 We1-I-10 **Invited** A048

Laser direct printing of micro-optical elements, Marti Duocastella¹, Salvatore Surdo¹, Simonluca Piazza¹, Alberto Diaspro¹, ¹*Istituto Italiano di Tecnologia*

16:50 We1-O-11 A087

UV laser photo-polymerization of elastic 2D/3D structures using photo-curable PDMS (polydimethylsiloxane), Oliver Suttman¹, Kotaro Obata¹, Yasutaka Nakajima², Arndt Hohnholz¹, Jürgen Koch¹, Mitsuhiro Terakawa^{2,3}, Ludger Overmeyer¹, ¹*Production & Systems Department, Laser Zentrum Hannover e.V., Germany*, ²*School of Integrated Design Engineering, Keio University, Japan*, ³*Department of Electronics and Electrical Engineering, Keio University, Japan*

17:10 We1-O-12 **Student** A110

Down-scaling of organic-inorganic 3D polymer lattices through pyrolysis, Darius Gailevičius¹, Linas Jonušauskas¹, Danas Sakalauskas², Simas Šakirazanovas², Roaldas Gadonas¹, Saulius Juodkazis^{3,4}, Vygantas Mizeikis⁵, Kestutis Staliunas^{6,7}, Mangirdas Malinauskas¹, ¹*Laser Research Center, Department of Quantum Electronics, Vilnius University, Lithuania*, ²*Department of Applied Chemistry, Vilnius University, Lithuania*, ³*Faculty of Engineering and Industrial Sciences, Swinburne University of Technology, Australia*, ⁴*Melbourne Center for Nanofabrication, Australian National Fabrication Facility, Australia*, ⁵*Research Institute of Electronics, Shizuoka University, Japan*, ⁶*Departament de Física i Enginyeria Nuclear, Universitat Politècnica de Catalunya, Spain*, ⁷*Institucio Catalana de Reserca i Estudis Avançats (ICREA), Spain*

17:30 We1-O-13 A156

Laser-induced μ -plasma (LI μ P) in a confinement mode as an effective tool for transparent materials processing, Vadim Veiko¹, Andrei Samokhvalov¹, Roman Zakoldaev¹, Maksim Sergeev¹, ¹*Laser Systems and Technologies, ITMO University, Russia*

17:50 Break**Banquet**18:30 from the venue to Banquet on foot19:00 Banquet (ANA Crowne Plaza Toyama, Room "Ohtori" on 3rd floor)

Room 2

21. Ultra-short laser processing 2

Chair: TBA

16:20 We2-O-11 A059

Nano-crystal in photo-thermal refractive glass preparing with fs laser and thermal development, Guang Hua Cheng¹, Jie Yun Zhang¹,
¹*State Key Laboratory of Transient Optics and Photonics, Xi'an Institute of Optics and Precision Mechanics of CAS, China*

16:40 We2-O-12 A165

Plasma dynamics in ultrashort pulsed laser processing of transparent materials, Matthew R Ross¹, Christian A Rothenbach², Anping Liu¹,¹*Optical Physics, Corning Incorporated, USA*,²*Measurement Control System, Corning Incorporated, USA*

17:00 We2-I-13 **Invited** A130

Femtosecond laser hyperdoping crystal: Principle and applications, Qiang Wu¹, Jianghong Yao¹, Chunling Zhang¹, Jiwei Qi¹, Jingjun Xu¹,
¹*School of Physics, Nankai University, China*

17:30 We2-O-14 A202

Plasmon-less Raman enhancement mechanism induced by dense networks of nanoparticles produced by femtosecond lasers, Yves Bellouard¹, Erica Block^{1,2}, Jeff Squier², Jean Gobet³,¹*GALATEA LAB, STI-IMT, Ecole Polytechnique Federale de Lausanne (EPFL), Switzerland*,²*School of Physics, Colorado School of Mines, USA*,³*CSEM SA, Switzerland*

17:50 Break

Room 3

24. Industrial applications

Chair: TBA

16:20 We3-I-10 **Invited** A026

Femtosecond laser architecture for high throughput industrial micromachining, Julien Pouysegur¹, Martin Delaigue¹, Nicolas Bonnetat¹, Birgit Weichelt¹, Franck Morin¹, Jorge Sanabria¹, Ludovic Hebrard¹, Clemens Hoenninger¹, Eric Mottay¹,¹*Research & Development, Amplitude Systemes, France*

16:50 We3-I-11 **Invited** A099

Anti-resonant fibres for flexible high peak-power beam delivery, Richard Mark Carter¹, Fei Yu², William J Wadsworth², Jonathan D Shephard¹, Jonathan C Knight², Duncan Paul Hand¹,
¹*Institute of Photonics and Quantum Sciences, Heriot-Watt University, UK*,²*Centre for Photonics and Photonic Materials, University of Bath, UK*

17:20 We3-I-12 **Invited** A205

Polygon scanner systems for laser microprocessing, Ronny De Loor¹, Lars Penning², Beat Neuenschwander³, Beat Jaeggi⁴, Bogdan Voisiat⁵, Gedmininas Račiukaitis⁶,¹*Next Scan Technology, Belgium*,²*Next Scan Technology, Belgium*,³*Bern University of Applied Sciences, Switzerland*,⁴*Bern University of Applied Sciences, Switzerland*,⁵*Center for Physical Sciences and Technology, Lithuania*,⁶*Center for Physical Sciences and Technology, Lithuania*

17:50 Break

Day 4: June 8, Thursday

Room 1

25. Direct writing 2

Chair: TBA

9:00 Th1-O-1 A114

Comparative study of refractive index sensing based on three different long-period grating configurations by pulsed ArF excimer laser, Jian-Neng Wang¹, Wei-Te Wu², Chien-Hsing Chen³, ¹*Department of Civil and Construction Engineering, National Yunlin University of Science and Technology, Taiwan,* ²*Department of Biomechatronics Engineering, National Pingtung University of Science and Technology, Taiwan,* ³*Department of Electro-Optical Engineering, National Taipei University of Technology, Taiwan*

9:20 Th1-O-2 A081

Reversible deformations of laser-written 3D photoresist structures, Sima Rekstyte¹, Domas Paipulas¹, Mangirdas Malinauskas¹, Vyngantas Mizeikis², ¹*Laser Research Center, Vilnius University, Lithuania,* ²*Research Institute of Electronics, Shizuoka University, Japan*

9:40 Th1-O-3 **Student** A031

Fiber-surface Bragg grating waveguide for refractive index measurement, Chupao Lin¹, Changrui Liao¹, Jun He¹, Ying Wang¹, Yiping Wang¹, ¹*Key Laboratory of Optoelectronic Devices and Systems of Ministry of Education and Guangdong Province, College of Optoelectronic Engineering, Shenzhen University, China*

10:00 Th1-O-4 **Student** A039

Study on micro, macro regulations of graphene based materials by laser processing, Fangcheng Wang^{1,2}, Kedian Wang^{1,2}, Xuesong Mei^{1,2}, ¹*School of Mechanical Engineering, Xi'an Jiaotong University, China,* ²*State Key Laboratory for Manufacturing Systems Engineering, Xi'an Jiaotong University, China*

10:20 Th1-O-5 **Student** A035

Fabrication of silver/PDMS composite microstructures by using femtosecond laser, Yasutaka Nakajima¹, Kotaro Obata², Manan Machida¹, Jürgen Koch², Oliver Suttman², Mitsuhiro Terakawa^{1,3}, ¹*School of Integrated Design Engineering, Keio University, Japan,* ²*Laser Zentrum Hannover e.V., Germany,* ³*Department of Electronics and Electrical Engineering, Keio University, Japan*

10:40 Coffee Break

Room 2

27. Micro-fabrication of functional structures

Chair: TBA

9:00 Th2-O-1 **Student** A135

Hybrid laser scribing and chemical etching technique using pulsed Nd³⁺: YAG laser to fabricate controlled micro channel profile, Srinagalakshmi Nammi¹, Sooraj S¹, Nilesh J Vasa¹, Balaganesan G², Anil C Mathur³, ¹Department of Engineering Design, Indian Institute of Technology Madras, India, ²Department of Mechanical Engineering, Indian Institute of Technology Madras, India, ³Antenna Mechanical Design Division, Indian Space Research Organization, India

9:20 Th2-O-2 **Student** A016

Fabrication of quad band terahertz planar antenna by laser ablation, E Manikandan¹, B S Sreeja¹, A Elakkiya¹, S Radha¹, ¹Electronics and Communication Engineering, SSN College of Engineering, India

9:40 Th2-O-3 A088

Laser printed multifunctional plasmonic structures and surfaces, Sergey Syubaev², Aleksandr Nepomnyashchii², Aleksandr Kuchmizhak^{1,2}, ¹School of Natural Sciences, Far Eastern Federal University, Russia, ²Institute of Automation and Control Processes (IACP), Far Eastern Branch of Russian Academy of Science (FEBRAS), Russia

10:00 Th2-O-4 A018

Preparation of microscopy sample using picosecond laser micromachining prior to ion milling, Aurélien Sikora¹, Lahouari Fares², Jérôme Adrian², Vincent Goubier², Anne Delobbe³, Antoine Corbin³, Thierry Sarnet¹, Marc Sentis¹, ¹LP3, Aix Marseille Univ, France, ²STMICROELECTRONICS, France, ³Orsay Physics, France

10:20 Th2-O-5 **Student** A103

Resistance measurement of dissimilar laser welds, Pascal Schmalen¹, Peter Plapper¹, ¹RUES, University of Luxembourg, Luxembourg

10:40 Coffee Break

Room 3

29. Drilling and cutting 1

Chair: TBA

9:00 Th3-O-1 A164

Laser ablation cutting of yttria-stabilized zirconia plate using picosecond green laser, Susumu Nakamura¹, ¹Department of Electrical and Electronic Systems Engineering, National Institute of Technology, Nagaoka College, Japan

9:20 Th3-O-2 **Student** A054

Ultrafast laser helical drilling of three-dimensional shaped holes using synchronized adaption of energy deposition, Chao He^{1,2}, Jannik Bühring², Frank Zibner², Arnold Gillner^{1,2}, ¹Chair for Laser Technology LLT, RWTH Aachen University, Germany, ²Micro and nanostructuring, Fraunhofer Institute for Laser Technology ILT, Germany

9:40 Th3-O-3 **Student** A085

Preparation of samples for micro-mechanical tests using femtosecond laser ablation, Manuel Johannes Pfeifenberger¹, Severin Jakob¹, Anton Hohenwarter², Daniel Kiener², Stefan Wurster², Reinhard Pippan¹, ¹Erich Schmid Institute, Austrian Academy of Sciences, Austria, ²Department of Materials Physics, Montanuniversitaet Leoben, Austria

10:00 Th3-O-4 **Student** A136

Nano second, pico second and femto second laser assisted micro-scribing of copper thin films, S. Sooraj¹, Nammi Srinagalakshmi¹, Nilesh Jayantilal Vasa¹, J Ramkumar², ¹Engineering Design, Indian Institute of Technology Madras, India, ²Mechanical Engineering, Indian Institute of Technology Kanpur, India

10:20 Th3-O-5 **Student** A152

An improved scanning strategy for long pulsed laser drilling of carbon fiber textiles, Stefan Janssen¹, Markus Christian Eckstein¹, ¹Drilling and Precision Cutting, Fraunhofer ILT, Germany

10:40 Coffee Break

26. Direct writing 3

Chair: TBA

11:00 Th1-O-6 A079

Tailoring of 3D optical perfect absorber metamaterials using direct laser write technique, Vyngantas Mizeikis¹, Ihar Faniayeu^{1,2},
¹*Research Institute of Electronics, Shizuoka University, Japan*, ²*Department of Radiophysics and Electronics, Gomel State University, Belarus*

11:20 Th1-O-7 A064

Ultrafast direct laser writing near-infrared spectro-interferometer in bulk GLS chalcogenide glass, Ciro D'Amico¹, Guillaume Martin², Manoj Bhuyan¹, Johann Troles³, Etienne Le Coarer², Razvan Stoian¹, ¹*Laboratoire Hubert Curien, Jean Monnet University, Saint-Etienne, France*, ²*IPAG, Grenoble Alpes University, Grenoble, France*, ³*Chemical Sciences Institute, University of Rennes I, Rennes, France*

11:40 Th1-O-8 A078

P- and n-type thermoelectric micropatterns fabricated by femtosecond laser reduction of CuO/NiO nanoparticles, Mizue Mizoshiri¹, Junpei Sakurai¹, Seiichi Hata¹, ¹*Department of Micro-Nano Systems Engineering, Graduate School of Engineering, Nagoya University, Japan*

12:00 Th1-O-9 A208

TBA, Fatih Ömer Ilday¹, ¹*Department of Electrical and Electronics Engineering, Bilkent University, Turkey*

12:20 Lunch break

Room 2

Room 3

28. Ultra-short laser processing 3

Chair: TBA

11:00 Th2-O-6 A142

Recovery of grating formation in PMMA fabricated with femtosecond laser Bessel beam, Wataru Watanabe¹, Yu Matushiro¹, Koji Hatanaka², Saulius Juodkazis^{3,4}, ¹*Department of Electrical & Electronic Engineering, College of Science and Engineering, Ritsumeikan University, Japan*, ²*Research Center for Applied Sciences, Academia Sinica, Taiwan*, ³*Faculty of Science, Engineering and Technology, Swinburne University of Technology, Australia*, ⁴*Melbourne Center for Nanofabrication, Australian National Fabrication Facility, Australia*

11:20 Th2-O-7 A178

Reduction of ablation rate on silicon surface irradiated by a double-pulse beam, Masaki Hashida^{1,2}, Shinichiro Masuno¹, Yuki Furukawa^{1,2}, Mitsuhiko Kusaba³, Hitoshi Sakagami⁴, Shunsuke Inoue^{1,2}, Shuji Sakabe^{1,2}, Masahiro Tsukamoto⁵, ¹*ARCBS, Institute for Chemical Research, Kyoto University, Japan*, ²*Department of Physics, Graduate School of Science, Kyoto University, Japan*, ³*Department of Electronics, Information and Communication Engineering, Osaka Sangyo University, Japan*, ⁴*National Institute for Fusion Science, Japan*, ⁵*JWRI, Osaka University, Japan*

11:40 Th2-O-8 A025

Influence of wavelength on glass welding by ultra-short laser pulses, Kristian Cvecek^{1,4}, Florian Stenglein¹, Isamu Miyamoto^{3,4}, Michael Schmidt^{1,2,4}, ¹*Bayerisches Laserzentrum GmbH, Germany*, ²*Institute of Photonic Technologies, Friedrich-Alexander-University of Erlangen-Nuremberg, Germany*, ³*Osaka University, Japan*, ⁴*Erlangen Graduate School in Advanced Optical Technologies, Friedrich-Alexander-University of Erlangen-Nuremberg, Germany*

12:00 Th2-O-9 A132

Nonlinear laser absorption process in glass based on rate equation model, Isamu Miyamoto^{1, 2}, Kristian Cvecek³, Michael Schmidt^{3, 4}, ¹*Osaka University, Japan*, ²*Erlangen Graduate School of Advanced Optical Technologies (SAOT), Germany*, ³*Bayerisches Laserzentrum, Germany*, ⁴*Institute of Photonic Technologies, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany*

12:20 Lunch break

30. Drilling and cutting 2

Chair: TBA

11:00 Th3-I-6 **Invited** A134

Picosecond laser drilling of micro holes in spinnerets for cellulose fibres, Rudolf Weber¹, Anne Feuer¹, Thomas Arnold¹, Thomas Graf¹, Johanna Spoerl², Antje Ota², Frank Hermanutz², ¹*IFSW, University of Stuttgart, Germany*, ²*ITCF, Institut fuer Textil- und Chemiefasern, Germany*

11:30 Th3-O-7 A192

Femto-second laser induced structural modification in boro-aluminosilicate glasses, Ravindra Akarapu¹, Barada Nayak², ¹*Modeling and Simulation, Corning, USA*, ²*Optical Physics, Corning, USA*

11:50 Th3-O-8 A010

Laser cutting with controlled fracture for ultrathin flexible glass, Chwan-Huei Tsai¹, Wen-Chian Luo¹, Chang-Wei Cheng¹, ¹*Department of Mechatronic Engineering, Huafan University, Taiwan*

12:10 Th3-O-9 A118

Excimer lasers microfabrication for interposer materials made of industrial glass and organic matter, Hiroaki Oizumi¹, Masakazu Kobayashi¹, Kouji Kakizaki¹, Toshio Mimura¹, Junichi Fujimoto¹, Hakaru Mizoguchi¹, ¹*Gigaphoton Inc., Japan*

12:30 Lunch break

Main Hall**31. Joint Session**

Chair: TBA

14:00 ThM-I-1 **Invited** A187

Nonlinear laser lithography, going from 2D to 3D, Fatih Ömer Ilday¹,
¹*Department of Electrical and Electronics Engineering, Bilkent University, Turkey*

14:30 ThM-I-2 **Invited** A199

Laser based micro fabrication systems for electronics packaging,
Haibin Zhang¹, ¹*Director Technology Development, Electro Scientific Industries, Inc., USA*

15:00 ThM-I-3 **Invited** A200

Laser micro and nanoprocessing: Current trends and future prospect, Arnold Gillner¹, ¹*Leiter Kompetenzfeld Abtragen und Fügen, Department Manager Ablation and Joining, Managing Director Fraunhofer Group Light and Surfaces, Fraunhofer-Institut für Lasertechnik ILT, Germany*

Main Hall**Closing**

Chair: Hiroyuki Niino, AIST, Japan

15:30 Outstanding Awards

Closing Remark

16:00 close

Poster Session

June 6, 11:10 Short Presentations of the presenting authors for odd-numbered posters: Poster Session I (Room 1)

June 6, 12:10 Poster Session I and Exhibition (Foyer on 3rd floor)

June 7, 11:10 Short Presentations of the presenting authors for even-numbered posters: for Poster Session II (Room 1)

June 7, 12:10 Poster Session II and Exhibition (Foyer on 3rd floor)

The presenting authors for odd-numbered posters should be present in front of their posters during 12:10-13:50 on June 6, while even-numbered posters, during 12:10-13:50 on June 7.

P-1 **Student** A108

Resiliency of fs-laser 3D lithography made microlenses to \sim GW/cm² intensity 300 fs 515 nm light, Linas Jonušauskas¹, Darius Gailevičius¹, Roaldas Gadonas¹, Mangirdas Malinauskas¹, ¹*Department of Quantum Electronics, Faculty of Physics, Vilnius University, Lithuania*

P-2 **Student** A005

Phase-shifted fiber Bragg grating fabricated with femtosecond laser radiation and its application, Yong Du¹, Yueli Zhang¹, Tao Chen¹, Jinhai Si¹, ¹*Department of Electronic science and technology, Shaanxi Key Lab of Information Photonic Technique., School of Electronic and Information Engineering, Xi'an Jiaotong University, China*

P-3 A128

Polarization-dependent periodic nanostructure embedded in semiconductor, Yasuhiko Shimotsuma¹, Yuta Nakanishi¹, Masaaki Sakakura², Kiyotaka Miura¹, ¹*Department of Material Chemistry, Graduate School of Engineering, Kyoto University, Japan*, ²*Society-Academia Collaboration for Innovation, Kyoto University, Japan*

P-4 A129

Influence of double pulse irradiation on ablation area by femtosecond laser with different delay time, Masahito Katto¹, Takaaki Sugihara², Shoichi Kubodera³, Masahiro Tsukamoto⁴, Masanori Kaku², Atsushi Yokotani², ¹*CRCC, University of Miyazaki, Japan*, ²*Faculty of Science and Engineering, Soka University, Japan*, ³*Faculty of Engineering, University of Miyazaki, Japan*, ⁴*Joining and Welding Research Institute, Osaka University, Japan*

P-5 **Student** A141

Morphology of separated glass substrates after ultrashort laser microwelding, Takayuki Tamaki¹, Masaki Yokota¹, Wataru Watanabe², ¹*Department of Control Engineering, National Institute of Technology, Nara College, Japan*, ²*Department of Electrical & Electronic Engineering, College of Science and Engineering, Ritsumeikan University, Japan*

P-6 A144

Welding of PMMA and metal by ultrashort fiber laser, Yusuke Mizuguchi¹, Satoshi Matsuyoshi¹, Atsushi Muratsugu², Takayuki Tamaki³, Wataru Watanabe¹, ¹*Department of Electrical & Electronic Engineering, College of Science and Engineering, Ritsumeikan University, Japan*, ²*Science Technology Entrepreneurship Laboratory, Office for University-Industry Collaboration, Osaka University, Japan*, ³*Department of Control Engineering, National Institute of Technology, Nara College, Japan*

P-7 A061

Femtosecond laser direct writing compound eye microlens array on curved surface, Hao Bian¹, Feng Chen¹, Qing Yang², Guangqing Du¹, Jiale Yong¹, Xun Hou¹, ¹*State Key Laboratory for Manufacturing System Engineering and Shaanxi Key Laboratory of Photonics Technology for Information, School of Electronic & Information Engineering, Xi'an Jiaotong University, PR China*, ²*School of Mechanical Engineering, Xi'an Jiaotong University, PR China*

- P-8 A060
Fabrication of complex three-dimensional metallic microcoils based on femtosecond laser micromachining, Qing Yang², Feng Chen¹, Hao Bian¹, Guangqing Du¹, Jiale Yong¹, Xun Hou¹, ¹State Key Laboratory for Manufacturing System Engineering and Shaanxi Key Laboratory of Photonics Technology for Information, School of Electronic & Information Engineering, Xi'an Jiaotong University, PR China, ²School of Mechanical Engineering, Xi'an Jiaotong University, PR China
- P-9 A209
Femtosecond laser induced plasmonic nanoimprinting for large-area surface texturing, Lei Wang¹, Xiao-Wen Cao¹, Qian-Kun Li¹, Qi-Dai Chen¹, Hong-Bo Sun^{1,2}, ¹State Key Laboratory on Integrated Optoelectronics, College of Electronic Science and Engineering, Jilin University, China, ²College of Physics, Jilin University, China
- P-10 A189
Formation of crack-free SiO₂ thin film by F₂ laser induced photochemical modification of hard silicone coating film on polycarbonate, Hidetoshi Nojiri^{1,2}, Masayuki Okoshi¹, ¹Electronics and Information Engineering, National Defence Academy, Japan, ²Development office, Renias Co., Ltd., Japan
- P-11 A106
Microchip laser based on a photonic crystal, Darius Gailevicius¹, Volodymyr Koliadenko², Vytautas Purlys¹, Martynas Peckus¹, Victor Taranenko², Kestutis Staliunas^{3,4}, ¹Laser Research Center, Department of Quantum Electronics, Physics Faculty, Vilnius University, Lithuania, ²International center "Institute of Applied Optics" NAS of Ukraine, Ukraine, ³Departament de Física i Enginyeria Nuclear, Universitat Politècnica de Catalunya, Spain, ⁴Institucio Catalana de Reserca i Estudis Avançats (ICREA), Spain
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Continuous trench micromachining on PMMA substrate using visible-LIBWE, Hui-Fang Chang¹, Wei-Chen Kao¹, Wing-Kiu Yeun¹, Klaus Zimmer², Ji-Yen Cheng^{1, 3, 4, 5}, ¹Research Center for Applied Sciences, Academia Sinica, Taiwan, ²Leibniz-Institut für Oberflächenmodifizierung e. V., Germany, ³Institute of Biophotonics, National Yang-Ming University, Taiwan, ⁴Biophotonics and Molecular Imaging Research Center (BMIRC), National Yang-Ming University, Taiwan, ⁵Department of Mechanical and Mechatronic Engineering, National Taiwan Ocean University, Taiwan
- P-14 A042
Study on copper surface wetting transformation by UV laser fabrication, Qing Weng¹, Xiaozhu Xie¹, Ronghong Che¹, Xin Wei¹, Wei Hu¹, Qinglei Ren¹, ¹School of Electro-Mechanical Engineering, Guangdong University of Technology, China
- P-15 A122
Cross-section analysis for irradiation modes of μ -grooves manufactured with the laser-induced etching, Kwang H. Oh¹, Dong Seob Kim¹, Jae Yong Oh¹, ¹Laser Center, Jeonnam Technopark, Stiftung, Republic of Korea
- P-16 A147
Ablation depth control of ITO thin film using a beam shaped femtosecond laser, Hoon-Young Kim^{1,2}, Won-Suk Choi^{1,2}, Young-Gwan Sin^{1,2}, Suk-Young Ji^{1,2}, Jin-Woo Jeon^{1,2}, Sung-Hak Cho^{1,2}, ¹Nano Machining Laboratory, Korea Institute of Machinery & Materials, Korea, ²Department of Nano-Mechatronics, University of Science and Technology, Korea
- P-17 A154
Single shot LIBWE for laser marking of glass materials, Tadatake Sato¹, Aiko Narazaki¹, Hiroyuki Niino¹, ¹Research Institute of Sustainable Chemistry, National Institute of Advanced Industrial Science and Technology (AIST), Japan
- P-18 A177
Morphological characteristics of micro holes drilled by IR, visible and UV ultrashort pulse lasers in hard metals, Jae Yong Oh¹, Dong Sub Kim¹, Kwang H Oh¹, ¹Laser Advanced System Industrialization Center, Jeonnam Technopark, Republic of Korea

- P-19 A011
Controls of surface quality in pulsed laser micromachining on lithium niobate, Tepei Onuki¹, Hiroataka Ojima¹, Jun Shimizu¹, Libo Zhou¹, ¹*Intelligent systems engineering, Ibaraki University, Japan*
- P-20 A148
Surface texturing of CRFP composites using femtosecond laser interferometry, Victor Oliveira^{1,2}, Raúl Moreira³, Marcelo de Moura⁴, Rui Vilar^{2,5}, ¹*Physics, Instituto Superior de Engenharia de Lisboa, Portugal*, ²*Center of Physics and Engineering of Advanced Materials, Portugal*, ³*Instituto de Ciência e Inovação em Engenharia Mecânica e Engenharia Industrial, Portugal*, ⁴*Mechanical Engineering, Universidade do Porto, Portugal*, ⁵*Chemistry, Universidade de Lisboa, Portugal*
- P-21 A191
Polarisation control in direct laser interference ablation setup for flexible generation of periodic patterns, Simonas Indrišiūnas¹, Bogdan Voisiat¹, Mindaugas Gedvilas¹, Gediminas Račiukaitis¹, ¹*Department of Laser Technologies, Center for Physical Sciences & Technology, Lithuania*
- P-22 A190
Optimisation of P3 laser scribing process in thin-film solar cells, Edgaras Markauskas¹, Paulius Gečys¹, Gediminas Račiukaitis¹, ¹*Department of Laser Technologies, FTMC, Lithuania*
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Optical arrangement of gold nanoparticles by array of Bessel-like beams, Evaldas Stankevicius¹, Mantas Garliauskas¹, Gediminas Raciukaitis¹, ¹*Department of Laser Technologies, Center for Physical Sciences and Technology, Lithuania*
- P-24 A037
3D printing of enhanced green fluorescent protein by femtosecond laser direct writing, Masashi Abe¹, Daniela Serien², Mitsuhiro Terakawa^{1,3}, Hiroyuki Kawano⁴, Atsushi Miyawaki⁴, Katsumi Midorikawa⁵, Koji Sugioka², ¹*School of Integrated Design Engineering, Keio University, Japan*, ²*RIKEN-SIOM Joint Research Unit, RIKEN Center for Advanced Photonics, RIKEN, Japan*, ³*Department of Electronics and Engineering, Keio University, Japan*, ⁴*RIKEN-Brain Science Institute, RIKEN, Japan*, ⁵*RIKEN Center for Advanced Photonics, RIKEN, Japan*
- P-25 A067
Surface finishing of 3D printed metallic structure using vibration-assisted electrochemical polishing, Uk Su Kim¹, Jae Yong Oh², Jeong Woo Park³, ¹*Department of mechanical system engineering, Chosun University, Korea*, ²*Laser advanced system industrialization center, Jeonnam technopark, Korea*, ³*School of mechanical system and automotive engineering, Chosun University, Korea*
- P-26 A124
Polarization dependence of femtosecond laser reduction on plasmonic metasurfaces, Hiroaki Nishiyama¹, Yukinori Ohzeki¹, ¹*Graduate School of Science and Engineering, Yamagata University, Japan*
- P-27 A207
Removal processing inside PDMS by short pulse laser, Katsuyuki Hayashi¹, Shigeki Matsuo¹, ¹*Department of Mechanical Engineering, Shibaura Institute of Technology, Japan*
- P-28 A196
Three-dimensional focal field engineering by the dynamical weighted Yang-Gu algorithm, Dong Yang¹, Lipu Liu¹, Qihuang Gong^{1,2}, Yan Li^{1,2}, ¹*State Key Laboratory for Mesoscopic Physics, Department of Physics, Peking University, China*, ²*Collaborative Innovation Center of Extreme Optics, Shanxi University, China*
- P-29 A069
Paper piercing without carbonization by longitudinally excited CO₂ laser, Hayato Goto¹, Kazuyuki Uno¹, Omi Yoshida¹, Tetsuya Akitsu¹, Takahisa Jitsuno², ¹*Faculty of Engineering, University of Yamanashi, Japan*, ²*Institute of Laser Engineering, Osaka University, Japan*
- P-30 A091
Vibration assisted femtosecond laser hole drilling with taper angle control on invar for AMOLED fine metal mask, Wonsuk Choi^{1,2}, Hoon Young Kim^{1,2}, Jin Woo Jeon², Sung-Hak Cho^{1,2}, ¹*Department of Nano-Mechatronics, Korea University of Science and Technology (UST), South Korea*, ²*Department of Laser & Electron Beam Application, Korea Institute of Machinery and Material (KIMM), South Korea*

- P-31 **Student** A123
Heat accumulation effects on efficiency during laser drilling of metals, Daniel Johannes Förster^{1,2}, Rudolf Weber², Thomas Graf², ¹Graduate School of Excellence advanced Manufacturing Engineering GSaME, University of Stuttgart, Germany, ²Institut für Strahlwerkzeuge IFSW, University of Stuttgart, Germany
- P-32 **Student** A058
Direct joining of thermoplastic material to selective laser melting 3D metal microstructures, Sheng-Hong Tang, Chung-Wei Cheng, Ren-Yu Yeh, Ray-Quan Hsu, ¹National Chiao Tung University, Taiwan, ²National Chiao Tung University, Taiwan, ³National Chiao Tung University, Taiwan, ⁴National Chiao Tung University, Taiwan
- P-33 **Student** A077
Suppression of crack and stress generation in glass welding using picosecond laser with high repetition rates by temporal modulation of laser pulse energies, Akinao Nakamura¹, Masaaki Sakakura², Yasuhiko Shimotsuma¹, Kiyotaka Miura¹, ¹Department of Material Chemistry, Graduate School of Engineering, Kyoto University, Japan, ²Society-Academia Collaboration for Innovation, Kyoto University, Japan
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Three-dimensional hot-film flow sensors fabricated using femtosecond laser reduction of CuO nanoparticles, Mizue Mizoshiri¹, Shun Arakane¹, Junpei Sakurai¹, Seiichi Hata¹, ¹Department of Micro-Nano Systems Engineering, Graduate School of Engineering, Nagoya University, Japan
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Optical fiber temperature sensor based on micro bubble with high sensitivity, Jinyu Gu¹, Yongquan An¹, Guanjun Wang¹, Zhiguo Gui¹, Xinglin Liu¹, Lu Yan¹, Meiqin Zhang¹, Gao Wang¹, Zhibin Wang¹, Pinggang Jia², ¹School of Information and Communication Engineering, North University of China, China, ²School of Instrument and Electronics, North University of China, China
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Effects of graphite-like layers in In-Ga-Zn-O thin-film specimens on electrical and optical properties in tribotests, Tse-Chang Li¹, ¹Department of Mechanical Engineering, National Cheng Kung University, Taiwan (R.O.C.)
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Electroless deposition of confined copper layer based on selective activation by pulsed laser, Rui Zhou¹, Tingting Huang¹, Shengdong Lin¹, ¹School of Aerospace Engineering, Xiamen University, China
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Development of flexible resistor thin film by ELAMOD using photo-reaction of hybrid solution (PRHS), Yuko Uzawa¹, Iwao Yamaguchi¹, Tomohiko Nakajima¹, Tetsuo Tsuchiya¹, ¹Advanced Coating Technology Research Center, National Institute of Advanced Industrial Science and Technology (AIST), Japan
- P-39 **Student** A176
Nanofiber formation of copper Pc induced by pulse laser excitation in organic solvents, Ryo Kihara¹, Tsuyoshi Kawai², Tsuyoshi Asahi¹, ¹Department of Materials Science and Biotechnology, Ehime University, Japan, ²Graduate School of Materials Science, Nara Institute of Science and Technology, Japan
- P-40 A013
Effects of laser treatment power on the crystal quality of AlN films for filter applications, H. K. Lin¹, U. G. Huang¹, H. C. Chen¹, Y. C. Chen², W. T. Chang³, ¹Graduate Institute of Materials Engineering, National Pingtung University of Science and Technology, Taiwan, ²Department of Electrical Engineering, National Sun Yat-Sen University, Taiwan, ³Metal Industries Research & Development Centre, Taiwan
- P-41 **Student** A040
The effect of thin film coating on fiber grating sensor sensing characteristics by CO₂ laser processing, Yi-Cheng Hsu¹, ¹Department of Biomechanics Engineering, National Pingtung University of Science and Technology, Taiwan
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Selective laser sintering of silver nanoparticle inks with real-time NURBS curve interpolator, Shin-Hung Wu, Yang-Jie Lin, Chung-Wei Cheng, ¹National Chiao Tung University, ²National Chiao Tung University, ³National Chiao Tung University

- P-43 **Student** A057
Study of the selective laser melting process by a multi-beam laser system, Chun-Yu Tsai, Ho-In Hong, Chung-Wei Cheng, Chun-Ming Chang, ¹National Chiao Tung University, Taiwan, ²National Chiao Tung University, Taiwan, ³National Chiao Tung University, Taiwan, ⁴National Applied Research Laboratories, Taiwan
- P-44 **Student** A014
Laser patterning on lithium disilicate dental ceramics, H. K. Lin, H. A. Chen, U. G. Huang, Y. T. Lu, ¹Graduate Institute of Materials Engineering, National Pingtung University of Science and Technology, Taiwan, ²Graduate Institute of Materials Engineering, National Pingtung University of Science and Technology, Taiwan, ³Graduate Institute of Materials Engineering, National Pingtung University of Science and Technology, Taiwan, ⁴Metal Industries Research & Development Centre, Taiwan
- P-45 **Student** A172
Glass cutting enhancement using the non-ideal axicon-generated Bessel beam, Juozas Dudutis¹, Paulius Gečys¹, Gediminas Račiukaitis¹, ¹Department of Laser Technologies, Center for Physical Sciences and Technology, Lithuania
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Fast and precision fabrication of phase gratings for interference micro-patterning schemes, Vladislav Koval¹, Vladimir Rymkevich¹, Maksim Sergeev¹, Roman Zakoldaev¹, Vadim Veiko¹, ¹Laser Systems and Technologies, ITMO University, Russia
- P-47 **Student** A089
Componential analysis of cavitation bubble induced by femtosecond laser and its bio applications, Saaya Takayama¹, Yasutaka Hanada¹, ¹Graduate school of Science and Technology, Hirosaki Univ, Japan
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Femtosecond laser processing of biological tissues using computer-generated hologram, Satoshi Hasegawa¹, Yoshio Hayasaki¹, ¹Center for Optical Research and Education (CORE), Utsunomiya University, Japan
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Enhancing refractive index sensitivity of fiber-optic particle plasmon resonance sensor based on spatial laser source modulation technology, Chien-Hsing Chen¹, Wei-Te Wu², Jian-Neng Wang³, ¹Department of Electro-Optical Engineering, National Taipei University of Technology, Taiwan, ²Department of Biomechatronics Engineering, National Pingtung University of Science and Technology, Taiwan, ³Department of Civil and Construction Engineering, National Yunlin University of Science and Technology, Taiwan
- P-50 **Student** A063
Time-dependent wettability of nano-patterned surfaces fabricated by femtosecond laser with high efficiency, Yingchuan Zhang¹, Guisheng Zou¹, Lei Liu¹, Yue Zhao¹, Qiong Liang¹, Aiping Wu¹, Yunhong Norman Zhou^{1,2}, ¹Department of Mechanical Engineering, State Key Laboratory of Tribology, Tsinghua University, Beijing, China, ²Department of Mechanical Engineering, University of Waterloo, Waterloo, Canada
- P-51 A032
Laser/stamping hybrid drilling process for micro-scale holes fabrication on Al sheets, Y. Z. Hong¹, Y. J. Chang¹, C. C. Ho², J. C. Hsu¹, C. L. Kuo¹, ¹Mechanical Engineering, National Yunlin University of Science and Technology, Taiwan, ²Mechanical Engineering, National Taipei University of Technology, Taiwan
- P-52 **Student** A137
Welding between SiC and fused silica with fs laser, Guodong Zhang¹, Xun Li¹, Guanghua Cheng¹, ¹State Key Laboratory of Transient Optics and Photonics, Xi'an Institute of Optics and Precision Mechanics of CAS, China
- P-53 A179
Extremely low ablation rate of metals using XeCl excimer laser, Mitsuhiro Kusaba¹, Masaki Hashida^{2,3}, Shuji Sakabe^{2,3}, ¹Department of Electronics, Information and Communication Engineering, Osaka Sangyo University, Japan, ²Institute for Chemical Research, Kyoto University, Japan, ³Department of Physics, Graduate School of Science, Kyoto University, Japan
- P-54 **Student** A167
Liquid-phase pulsed laser ablation synthesis of graphitized carbon-encapsulated palladium core-shell nanospheres for catalytic reduction of nitrobenzene to aniline, Hanbit Park¹, D. Amaranatha Reddy¹, Tae Kyu Kim¹, ¹Chemistry, Pusan National University, Republic of Korea

- P-55 **Student** A027
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- P-56 **Student** A036
Experimental study on processing of polyamide bar with femtosecond laser, Zhaoyang Zhai^{1,2}, Wenjun Wang^{1,2}, Xuesong Mei^{1,2}, Xin Zhao³, Bo Han³, ¹*School of Mechanical Engineering, Xi'an Jiaotong University, China*, ²*State Key Laboratory for Manufacturing Systems Engineering, Xi'an Jiaotong University, China*, ³*Wuzhou Engineering Group Corporation LTD, China*
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- P-58 A211
Effect of femtosecond laser surface treatment on bending strength of yttria-stabilized zirconia ceramics, Masayuki Kakehata¹, Atsuo Ito², Hidehiko Yashiro¹, Ayako Oyane³, Kenji Torizuka¹, ¹*Electronics and Photonics Institute, National Institute of Advanced Industrial Science and Technology (AIST), Japan*, ²*Health Research Institute, National Institute of Advanced Industrial Science and Technology (AIST), Japan*, ³*Nanomaterials Research Institute, National Institute of Advanced Industrial Science and Technology (AIST), Japan*

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