

The 5th International Symposium on Laser Precision Microfabrication
— SCIENCE AND APPLICATIONS —

LPM2004

<http://www.jlps.gr.jp/lpm/lpm2004/>

11(Tue.)–14(Fri.) May, 2004
Nara-Ken New Public Hall

<http://www.pref.nara.jp/koukaido-e/>

Nara, Japan

[What and where is “Nara”: http://www.pref.nara.jp/nara_e/index.html]

[Access to “Nara”: <http://www.kcn.ne.jp/~info-ncb/e/ecoakuse1.html>]

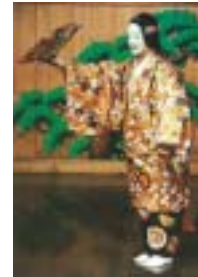
Landscape of Nara "Yakushi-ji Temple"
The World Heritage by UNESCO ('98)



Main Hall of the Symposium site
A Noh play stage. *Noh* is a traditional Jpn. masked drama with dance and song.



A Noh play



Sponsored by:

Japan Laser Processing Society (JLPS)
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Call for Papers

Aims and Scope

Miniaturization and high precision are rapidly becoming a requirement on many industrial processes and products. As result, there is greater interest in the use of laser microfabrication approaches to achieve these goals. The International Symposium on Laser Precision Microfabrication (LPM), is annually held to provide a forum for research and technology development in the area of laser micro/nanofabrication. The topics encompass novel developments in hardware, software and in the fundamental chemistry/physics that buttress laser material interaction process. The unique aspect of this conference is the interchange between fundamental research and industrial applications. LPM is held in Japan on even years and in other host countries on odd years. To date, LPM has been successfully hosted in Omiya/Japan (2000), Singapore/Singapore (2001), Osaka/Japan (2002), and Munich/Germany(2003). The 5th meeting of the LPM will be on May 2004 in the ancient Japanese capital Nara.

The aim of LPM2004 is to provide a forum for discussion on the fundamental aspects of laser/material interaction, the state of the art of laser materials processing and in the germination of next-generation ideas that arises from collaborating scientists, end users and laser manufacturers. The LPM2004 Proceedings will be published by SPIE after the event. We extend a welcome and hope that you will join us at LPM2004!

Topics

LPM 2004 covers the following topics. A special session on Glass/Ceramic processing is also planned.

1. Fundamental aspects (Dynamics, Modeling, Simulation, etc.)
2. Process monitoring and control
3. Nanotechnology
4. Direct write process (MAPLE-DW, LIFT, etc.)
5. Ultra-short pulse laser processing
6. VUV laser processing
7. Surface treatment (Texturing, Cleaning, Annealing, modification, etc.)
8. Micro-patterning and micro-structuring
9. Micro-machining
10. 3-D micro- and nano-fabrication
11. Drilling and cutting
12. Welding and bonding
13. Micro-forming
14. Wafer dicing
15. Marking and trimming
16. Packaging and mounting process
17. Lithography (including EUV Source and Application)
18. Manufacture of micro devices and systems
19. Film deposition and synthesis of advanced materials (PLD, CVD, etc)
20. Nano- and micro-particles
21. Medical and biological applications
22. Optics and systems for laser microprocessing
23. Laser devices
24. Industrial applications
25. Glass/Ceramic processing (Special session, see below for more details.)
26. Others

Special Session-1 “Laser Microfabrication of Glass Ceramic Materials and Novel Applications”

Session Organizers: **Henry Helvajian** (The Aerospace Corporation),
Kathleen Richardson (CREOL, School of Optics, University of Central Florida)

Lasers can play a strong role in the development of advanced technology devices and in instruments or components where *glass or ceramic* materials are used as the substrate in lieu of other materials. Lasers processing of glass or ceramic does not always have to be via a brute force energy deposition process. Glass chemistry and structure can be tailored for photosensitivity to enhance laser material processing at specific wavelengths permitting site-selective transformations (i.e. crystallization, phase transformation (amorphization) as well as ablation) that lead to a more controlled approach to material removal or alteration. Certain photo-structurable glass ceramic already exist and micro-fabrication experiments have shown the fidelity enhancement possible.

The LPM 2004 will host a special session that invites glass/material scientists and laser processing experts to submit papers. Papers will be accepted in research or development of glass/ceramic materials designed for optical excitation and in laser processing techniques that use photo-chemical interactions in the glass to advantage. The session will also accept contributions on topics where either the glass or the processing of the glass material via laser photochemical means is used towards realization of components with novel properties for unique applications.

Invited talks for Special Session-1

Tutorials/overview

Kathleen Richardson (University of Central Florida, USA) and **Henry Helvajian** (The Aerospace Corporation, USA)

Invited Talks

Denise Krol, UC Davis/LLNL, USA

Alex Kolobov, AIST, Japan

Stefan Nolte, Friedrich-Schiller-University Jena, Germany, "Ultrafast laser processing - new possibilities for photonic device production".

Vladim Veiko, Saint Petersburg State Institute of Fine Mechanics and Optics, Russia, "Laser modification of glass - ceramics structure and properties: the new view on to the old materials"

Special Session-2: "High-power single-mode fiber lasers and their novel applications"

Session Organizers: Isamu Miyamoto (Osaka University), **Andreas Tuennermann** (Fraunhofer Institute)

Fiber lasers have a lot of advantages such as excellent beam quality, extremely high conversion efficiency and very long life time in comparison with existing lasers such as Nd:YAG lasers and CO₂ lasers, and can be operated without maintenance such as water-cooling and optical alignment. Materials processing has been improved very much by the advent of high-power single-mode fiber lasers. The future progress of the laser materials processing, without any doubt, strongly depends on the advance of the fiber laser technology.

LPM2004 hosts special session of "High-power single-mode fiber lasers and applications to novel materials processing". Papers will be accepted in research or development of high-power single-mode fiber lasers with CW and pulsed operations. This session also welcomes scientists and specialists dealing with fundamentals of laser-matter interaction, and novel applications of high-power single-mode fiber lasers to microwelding, microsoldering, microcutting, microdrilling, marking, trimming, surface modifications, sintering and so on.

Invited talks for Special Session-2

Andreas Tuennermann, Fraunhofer IOF, Jena, Germany (Invited), "Fiber lasers and amplifiers – novel avenues to real world applications of ultrashort lasers"

Valentin Gapontsev, IPG Laser GmbH, Germany (Invited), "Fiber lasers – New opportunities in precision microfabrication"

Johan Nilsson, University of Southampton, England (Invited), "Tailoring fiber lasers for micro-machining applications"

Isamu Miyamoto, Osaka University, Japan (Invited), "Applications of high-power single-mode fiber lasers to novel microwelding and microcutting"

Invited Speakers (Partial List)

Plenary Talks:

F. Dausinger, University of Stuttgart, Germany, "Micro machining with micro-, nano-, pico- or femtosecond pulses: European research results and applications".

K. Sugioka, RIKEN, Japan, "Three-dimensional laser microfabrication".

C. Paul Christensen, Potomac Photonics, USA, "Laser Microfabrication from a Commercial Perspective".

Invited Talks in Regular Sessions:

Fundamentals

S. V. Garnov, A.M. Prokhorov General Physics Institute, Russia, "Ultrafast optical and electrical diagnostics of laser-induced modification of transparent materials".

Nanotechnology

J. H. Klein-Wiele, Laser Laboratorium Gottingen e.V., Germany, "Nano-fabrication of solid materials with UV femtosecond pulses".

Femtosecond laser processing

R. Stoian, Max Born Institute (MBI), Germany, "Temporal pulse manipulation and adaptive optimization in ultrafast laser processing of materials".

J. Solis, CSIC, Spain, "Waveguide structures in heavy-metal oxide glasses written with fs laser pulses".

3-D microfabrication

J. W. Perry, The University of Arizona, USA, "Two-photon 3D lithography: materials and applications".

Surface microstructuring

M. Kuwahara, AIST, Japan, "Volume change thermal lithography technique for ultra-high density optical ROM mastering process"

Call for Papers

Laser micromachining and microdevice fabrication

T. Lippert, Paul Scherrer Institut, Switzerland, "Laser micromachining of optical devices"

C. Arnold, Princeton Univ., USA, "Manufacture of mesoscale energy storage systems by laser-direct write".

Drilling

S. Lazare, University of Bordeaux, France, "Recent experimental and theoretical advances in microdrilling of polymers with ultraviolet laser beams".

Biological applications

K. Koenig, University Jena, Germany, "Femtosecond laser application in biotechnology and medicine".

Industrial Applications

T. Hagiwara, CMET Inc., Japan, "Current status and future prospects of laser stereolithography".

Micro Welding

A. Olowinsky, Fraunhofer-Institut für Lasertechnik, Germany, "SHADOW- A new laser beam welding technology, Basics and applications".

Symposium Format

The symposium is planned as a four-day event that includes a plenary session, a special session on Glass/Ceramic processing, oral and poster sessions, and a tabletop exhibition. The special session and the oral sessions will run in parallel and will be comprised of both invited and contributed papers.

Official Program

A Noh play and a garden party are planned for the evening of Wednesday, May 12, 2004 at Nara-Ken New Public Hall.

Submission of Abstracts

We invite you to submit abstract(s) on the topics indicated, but not limited to, above. Submitted abstracts should contain original and unpublished work. Authors are asked to secure company and/or governmental security clearances to present and publish the data, prior to abstract submission. The abstracts will be reviewed by members of the Program Committee and judged for acceptance. An accepted paper will be presented either as an oral or poster format. The Program Committee may ask authors to change the presentation style (oral / poster).

Your abstract should include:

- 1. Paper Title**
- 2. Authorship** First (given) name, Last (Family) name, Affiliations, Country for ALL authors.
- 3. Corresponding Author** Mailing address, Telephone, Fax numbers and E-mail address
- 4. Abstract within 300 words** Text only, no pictures, graphics, charts, etc.
- 5. Topics** Select up to 3 terms among 26 topics listed above, and indicate the number. The selected topics will be used as a program reference.
- 6. Keywords** Indicate up to six keywords.
- 7. Presentation** Please indicate your preference for Oral Presentation or Poster Presentation.

All abstracts can be submitted to the following address by e-mail **before December 15, 2003**. Style template of abstract submission form in Microsoft Word is available on the web page. Submission using the template is strongly recommended. Please do **not** use special characters or fonts except Times New Roman and symbol font in your submission form.

If it is not possible to use the given Microsoft Word template, please follow the instruction below.

1. Make the same form according to the Guideline.
2. Fill out your form with all the necessary information.
3. Save your form to a MS Word-compatible file, and also make its PDF file.
4. Send both the PDF format and MS-Word-compatible files as email attachments to the following address.

E-mail: abs-lpm2004@jlps.gr.jp

Symposium Proceedings

Symposium proceedings will be published from SPIE.

Publication Policy

Manuscript due dates must be strictly observed. Late manuscripts run the risk of not being published in the proceedings.

Paper Review

To ensure a high-quality conference, all submitted manuscripts will be reviewed by the Program Committee for technical merit and content prior to publication as a Proceedings of SPIE.

Submission of Manuscript

The deadline for the paper submission of all invited, oral and poster presenters is the first day of the symposium, May 11th, 2004. We invite all authors to bring **their original manuscripts** to the symposium site, with **one hard copy and a copy on CD-ROM**, instead of sending them to SPIE by mail. Please note that for the publication of your manuscript, SPIE also needs a copyright transfer statement, which you can get from the web pages of SPIE using the given link below. You can bring this form to the conference site together with your paper.

SPIE web page: http://www.spie.org/app/Publications/pdfs/copyright_form.pdf

Manuscript Specifications

Camera-ready manuscripts are only acceptable. The detailed manuscript specifications will be informed with acceptance notice of your abstracts.

Participant Registration Fee

(Participant Full Registration Fee includes one technical digest, one proceedings book and the banquet)

Full Registration Payment Received by **31 March 2004**:

Member of JLPS/SPIE:	¥46,000
Non-Member:	¥52,000

Full Registration Payment Received after **31 March 2004** → **by 30 April 2004, or On-site**:

Member of JLPS/SPIE:	¥58,000
Non-Member:	¥63,000
One day Ticket:	¥30,000
Student:	¥10,000
Banquet Fee:	
One-day-participant and Accompanied person:	¥10,000
Student:	¥ 5,000

Please note: Banquet and proceedings is not included with student registration and one day ticket.

Student registration will not be processed without a copy of your Valid Student ID. Please include with Registration form.

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Welcome to NARA Welcome to NARA Welcome to NARA

Nara is a beautiful ancient city recognized in the World Heritage List of 754 properties (582 cultural, 149 natural and 23 mixed properties in 129 States Parties). Nara is located about 35 km east of Osaka and south of Kyoto. Nara is a city of cultural and historical importance to Japan, having served as the capital in 710-784 A.D. There are numerous temples, shrines, statues, carvings and paintings, many of which are well-preserved and designated as important cultural assets and national treasures. Nara-ken New Public Hall (*Shin-kokaido*) is situated in Nara Park, where you can also find famous historical buildings such as Todai-ji Temple, Koufuku-ji Temple, and Kasuga Grand Shrine. Nara park is also famous for its thousands of tame deer that roam freely.

Access to Nara

Transportation to Nara from abroad is shown in the following diagram. The most convenient means of transportation is to take a direct flight to the Kansai International Airport (KIX). From there, the simplest route to Nara is by the Airport Limousine Bus, which takes approximately 85 minutes to arrive at Nara Hotel and Nara Station (Kintetsu and JR lines). This costs ¥1,800 one way, per person. Buses depart from stop No.9 and are scheduled to depart approximately once every 60 minutes. Should there be any inquiries

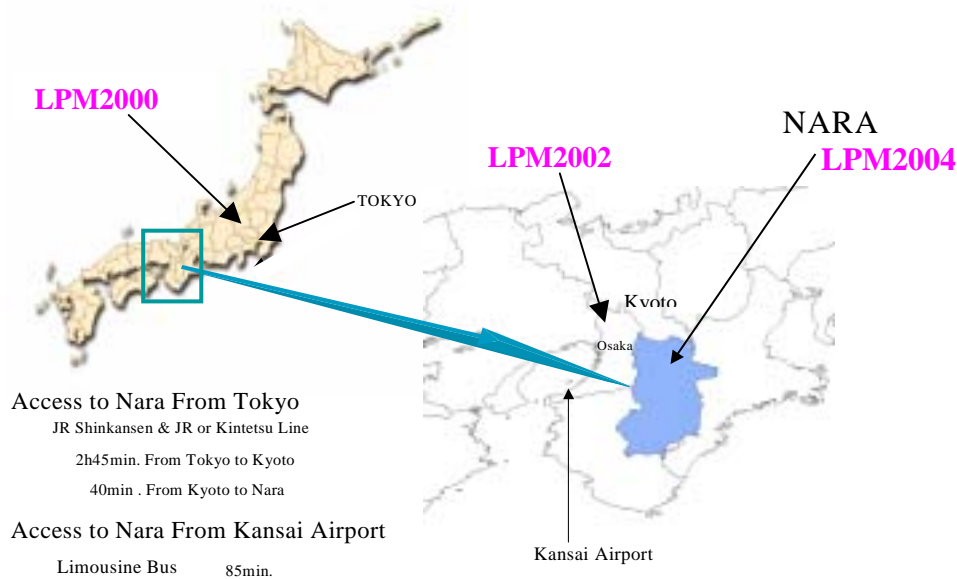
Call for Papers

regarding access to Nara, please ask at the Information Desk at the airport on the first floor in front of the arrivals area.

[Limousine bus timetable] Kansai Airport & Osaka Airport: http://www.kate.co.jp/pc/time_table/nara_tt.html

From Nara Station, city bus numbers 2 or 6, or buses bound for Takabatake-cho may be taken to bus stop, “Daibutsu-den Kasugataisha Mae” (approximately a five-minute ride). From there it is only a three-minute walk to the Nara-ken New Public Hall. Buses run every five minutes. The basic fare for a taxi is ¥590 per 1.5km. The cost of a taxi from JR Nara Station, or Kintetsu Nara Station to the Nara-ken New Public Hall (*Shin-kokaido*) should be around ¥680-¥800.

It is recommended that participants planning to travel in Japan purchase a Japan Rail Pass. This pass encompasses all JR trains including the Bullet train (Shinkansen) and the Narita Express. Please note that this pass must be purchased prior to arrival since it cannot be purchased in Japan. The price for a 7-day pass is about ¥30,000.



Abstract Submission and Notification Schedule

Abstract Due Date	December 15, 2003
Early Registration Deadline	March 31, 2004
Final Manuscript Due Date	May 11, 2004