

ADVANCE PROGRAM

ISOM'17

IN
COOPERATION
WITH



The Magnetics
Society of
Japan (MSJ)

The Institute of
Electronics,
Information and
Communication
Engineers (IEICE)

The Chemical
Society of Japan

Information
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of Japan

The Institute of
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of Japan

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Image Electronics
Engineers of Japan

The Institute of
Image Information
and Television
Engineers

The Japan Society
for Precision
Engineering

The Laser Society of
Japan

Shimane Univ.

NIT Yonago College

International Symposium on

Imaging, Sensing, and Optical Memory 2017

Kunibiki Messe, Matsue, Shimane, Japan

Oct. 22 - Oct. 25, 2017

SPONSORED BY

-The Optical Society of Japan (OSJ)

COSPONSORED BY

-The Japan Society of Applied
Physics (JSAP)

-Optoelectronics Industry and
Technology Development
Association (OITDA)

FINANCIALLY SUPPORTED BY

-Support Center for Advanced
Telecommunications
Technology Research,
Foundation



-The Takano Eiichi Optical
Science Funds



-The Murata Science Foundation

-Shimane Prefecture

-Matsue City

Deadlines

Post Deadline Papers :

Aug. 19, 2017

Advance Registration :

Oct. 8, 2017

<http://www.isom.jp/>

Symposium Schedule

	Sunday Oct. 22	Monday Oct. 23	
9:00	Registration 15:00 – 17:00	Registration 8:30 – 13:00	9:00
10:00		Mo-A Opening Remarks & Keynote	10:00
11:00		Mo-B Computational Imaging	11:00
12:00		Break	12:00
13:00		Mo-C Optical Memory	13:00
14:00		Lunch	14:00
15:00		Mo-D Special Invited	15:00
16:00		Mo-E Display	16:00
17:00		Break	17:00
18:00	Get Together	Mo-F Bio-sensing (Special Session)	18:00
19:00			19:00
20:00			20:00
21:00			21:00

	Tuesday Oct. 24	Wednesday Oct. 25	
9:00	Registration 8:30 – 13:00	Registration 8:30 – 12:00	9:00
10:00	Tu-G Holographic Memory	We-K Sensing & New Technologies	10:00
		Break	
11:00	Break		11:00
12:00	Tu-H Computational Imaging (Special Session)	We-L Digital Holography	12:00
	ISOM'18 Announcement & Photo		
13:00	Lunch	Lunch	13:00
14:00			14:00
15:00	Tu-I Nano Photonics & Plasmonics	We-M Holography Applications (Special Session)	15:00
	Break		
16:00		We-PD Post Deadline	16:00
17:00	Tu-J Poster Session	Award & Closing	17:00
18:00	Break		18:00
19:00	Banquet		19:00
20:00			20:00
21:00			21:00

WELCOME TO ISOM'17

WELCOME STATEMENT FROM THE ORGANIZING COMMITTEE CHAIRPERSON



The 27th ISOM (ISOM'17) will be held in Matsue, Shimane, Japan from Oct. 22 to 25, 2017.

On behalf of the ISOM organizing committee, I am delighted to welcome all of you to the ISOM'17 in Japan.

The last ISOM meeting held in Kyoto, Japan was very successful to share new developments of high density recording, holographic memories, blue-LED/LD, signal processing, media and material science, digital archival applications, etc.

ISOM extended the conference scope to broader optical fields and applications, and changed the conference name as "International Symposium on Imaging, Sensing, and Optical Memory." The new ISOM includes the fields of image sensing, medical and bio-optics, information system, optical technologies, as well as optical memory. We believe that the change of ISOM produces technological innovations in imaging and sensing technologies and new and many applications of optical memory technologies in medical and bio-technologies, image sensing, etc.

We are very proud of the ISOM activities, because many of technologies leading new developments and new applications have been first presented and discussed in ISOM meeting. Since the first ISOM meeting in 1987, ISOM has led innovation of optical memory and economic growth in optical industry.

I sincerely ask all of ISOM'17 participants to discuss on new technologies of the next generation optical memory and new applications of optical memory technologies in coming ISOM'17.

A handwritten signature in black ink, appearing to read 'Yoshimasa Kawata'. The signature is fluid and cursive, with a large loop at the end.

Yoshimasa Kawata
ISOM'17 Organizing Committee, Chairperson

INTRODUCTION

The 27th ISOM (ISOM'17) will be held from October 22 to October 25, 2017 at Kunibiki Messe, Matsue, Shimane, Japan.

The origin of ISOM is SOM (Symposium on Optical Memory), which was held firstly in 1985 in Tokyo as a Japanese domestic symposium. The first ISOM (International Symposium on Optical Memory) was held in 1987 also in Tokyo. Until 1994, ISOM and SOM were held alternately every other year, and since 1995, ISOM has been held every year. The total number of papers of the past symposiums has reached 3,285, and the total number of participants has reached 10,195.

The purpose of the symposium was to provide a forum for information exchange on a broad range of topics covering science and technology in optical memory and its related fields. However, information explosion in the internet and cloud service has been enforcing optical memory to change from that for consumer storage to that for enterprise storage. Many colleagues of us have been seeking for new frontiers of optical memory technologies. Considering this situation, the scopes of ISOM are being continuously updated and have been reorganized in 2016. To further highlight them, the official name of ISOM is changed from “International Symposium on Optical Memory” to “International Symposium on Imaging, Sensing, and Optical Memory” in 2017. Presentations related to the new scopes as well as the conventional ones would be strongly encouraged.

In ISOM'17, along this direction, it will be very much expected to discuss the current status of optical memory, imaging, sensing, and other related technologies. In addition, we are planning to have demonstration poster papers at the symposium as in the last two years, in which authors will be able to show their vivid and attractive research results.

We are looking forward to your participation and seeing you in Matsue, Shimane, Japan.

SCOPE OF THE SYMPOSIUM

ISOM'17 will discuss the current status of Optical Memory, Imaging, Sensing, and Other Related Technologies.

The scope of ISOM'17 is drastically changed to cover the above research fields. Optical memory is still one of the main topics of the symposium, but imaging and sensing are new important topics. ISOM will provide the attractive fields to exchange the latest advances or ideas in above research fields and also provide scientific interaction and collaboration.

Topics to be covered in this symposium include, but are not restricted to:

1. Optical Memory

- Professional Archive System
- Holographic Memory
- High-density Recording
- Media and Material Science
- Drive Technologies and Signal Processing
- Components and Devices
- Testing Methods
- Others

2. Imaging

- Computational Imaging
- Wavefront Coding
- Image Processing
- Optical System Design
- Devices
- Others

3. Sensing

- Medical and Bio-systems
- Three-dimensional Sensing
- Digital Holography
- Spectroscopy
- Bio-Lab on a Disc
- Others

4. Other Related Technologies

- Optical Interconnection and Switching
- Optical Information Processing
- Nanophotonics and Plasmonics
- Components
- Material
- Display
- Photolithography
- Nonvolatile Memory
- Emerging Technologies and New World
- Others

REGISTRATION

All participants (including speakers) are requested to register, and are encouraged to register in advance (by **October 8, 2017**) in order to receive the early registration discount.

I. Advance Registration

The Symposium registration information and forms can be obtained from ISOM'17 website (<http://www.isom.jp>). If you have any questions, please contact ISOM'17 secretariat office.

II. Onsite Registration

The registration desk will be located at the 3rd floor of “Kunibiki Messe” (Shimane Prefectural Convention Center) from Sunday through Wednesday during the following hours.

Oct. 22: 15:00 - 17:00

Oct. 24: 08:30 - 13:00

Oct. 23: 08:30 - 13:00

Oct. 25: 08:30 - 12:00

Type	Before / On October 8, 2017	Onsite
Regular	JPY 50,000	JPY 60,000
Student & Retiree	JPY 10,000	JPY 15,000
Banquet	JPY 5,000	JPY 7,000
Additional Technical Digest (CD-R)	JPY 6,000	JPY 6,000

The registration fee for the symposium includes admission to all the technical sessions, a Technical Digest (Online and CD-R), and consumption tax. Students are asked for showing their ID cards.

III. Registration and Payment

Those who wish to attend ISOM'17 should register on the web (<http://www.isom.jp/>) after about August, 2017. The deadline for advance registration is **October 8, 2017**. After that, the registration will be processed at the symposium site upon arrival.

Payment should be made in Japanese Yen by bank transfer (inside Japan only), by credit cards (VISA and Master Card) payable to ISOM'17, or by cash onsite. No personal checks will be accepted.

IV. Registration Cancellation Policy

As a rule, no refunds of the registration fee will be made for any reasons whatever. In the event of registrant unable to attend the symposium, a Technical Digest (CD-R) will be sent after the symposium.

INSTRUCTION FOR SPEAKERS

ORAL PRESENTATION

- ▶ Time assigned for

Type	Total	Presentation	Discussion
Keynote	30 min.	30 min.	---
Invited	25 min.	20 min.	5 min.
Contributed	20 min.	15 min.	5 min.

- ▶ All speakers are requested to get in touch with their presiders 15 minutes before their sessions start.
- ▶ The conference room will contain a projector, a laptop, a podium microphone, a screen and a laser pointer. Speakers may use their own laptop.
- ▶ If speakers use their own laptop, they will be requested to confirm its connection with the projector in the conference room during break time or in the morning. We recommend all speakers to have this check the day before their presentations.
- ▶ If speakers don't use their own laptop, they are requested to upload their presentation materials in a USB memory at the podium at least one hour prior to their presentations. We recommend the speakers to use PDF files in order to prevent file format or version troubles.
- ▶ We recommend all speakers to use more than 16-point font. The audience expects well-prepared presentations with clearly visible figures and captions, as well as good conclusion.

POSTER PRESENTATION

- ▶ Your session code will be indicated on the panel board. You will be provided with the material to mount your poster onto the board.
- ▶ Each author is provided with a 210 cm high x 120 cm wide poster space on which a summary of the paper is to be displayed.
- ▶ All authors are requested to affix their posters on the day of the poster session. Posters are to be removed immediately after the session ends.
- ▶ Authors must remain in the vicinity of the poster board at least for the duration of the assigned session (1 hour 30 min.). The absence of authors during the assigned session is treated as "CANCELLED". The session presiders will check all authors during the assigned session time.

Any papers which are not presented during the Oral or Poster session will be regarded as "CANCELLED".

POST-DEADLINE PAPERS

A limited number of papers will be accepted for presentation of significant results obtained after the deadline. A delegated author has to fill in the paper submission form including a 35-word abstract following the instruction for submission at the ISOM website (<http://www.isom.jp/>), and then a 2-page PDF summary should be submitted through the website.

The ISOM web submission system does not accept any PDF file including 2-byte characters (for example, Japanese, Chinese and Korean characters). The local fonts should be removed from the text body and figures before submission.

Submission website will be open from July to August 19, 2017. The best four post-deadline papers are allowed as oral presentations in the final session. Other post-deadline papers (but limited numbers) will be presented in the poster session. Authors will be notified by the middle of September, 2017 whether their papers are accepted.

- Time assigned for:

Type	Total	Presentation	Discussion
Post deadline	15 min.	12 min.	3 min.

FINANCIAL SUPPORT

Thanks to the Takano Eiichi Optical Science Funds, limited financial support for student presenters in ISOM'17 will be provided.

Applicants must be full-time students living overseas.

Student presenters who are interested in getting this support should submit an application form (announced later) after receiving the acceptance notice of their submitted paper.

DEMO PRESENTATION IN POSTER SESSION

Poster presentations with demonstration will be in the poster session. This is a new approach of poster session in addition to usual poster presentation.

The technical demonstration will be exhibited repeatedly during the session in front of poster boards. Participants can take a close look at the new technologies!

PUBLICATION OF SYMPOSIUM PAPERS

Technical Digest (Online and CD-R) includes invited papers, accepted contributed papers, and limited numbers of post deadline papers.

Online Technical Digest will be available on October 16-25, 2017. If you complete the payment, you will be informed of the website of the online Technical Digest on October 16, 2017 and able to download it in advance. Otherwise, you will be able to download it onsite.

The conference papers will be published in September 2018 as a special issue of the Japanese Journal of Applied Physics (JJAP), which is the English-language journal of the Japan Society of Applied Physics (JSAP). The authors who will have, by themselves, presented papers at ISOM'17 will be allowed to submit their papers for publication in this special issue.

The instructions for preparation of manuscript and the agreement form for the special issue will appear on the ISOM website after the conference. The deadline for submission of manuscripts is January 28, 2018. Submitted papers will be reviewed based on the JJAP standard.

SPECIAL PROGRAMS

Get Together Reception

- Date & Time: Sunday, October 22, 17:00-19:00
- Place: Kunibiki Messe 1F, Restaurant SHISEI
- Fee: No charge

All attendees including spouses are invited to the Get Together Reception.

Banquet Reception

- Date & Time: Tuesday, October 24, 18:00-20:00
- Place: Matsue Excel Hotel Tokyu 2F, Banquet Hall
- Fee: Advance registration 5,000 JPY

Onsite registration 7,000 JPY

Ticket for the Banquet Reception is not included in the registration fee. Application for Banquet can be made online or onsite.

ISOM'17 Secretariat

Mitsuhiro Kimura (Secretary)

- Tel: +81-3-5925-2840 / Fax: +81-3-5925-2913
- E-mail: secretary@isom.jp
- Add: c/o Adthree Publishing Co., Ltd.
27-37, Higashinakano 4-chome,
Nakano-ku, Tokyo 164-0003, Japan

GENERAL INFORMATION

I. Official Language

The official language of ISOM'17 is English.

II. Message Board

Official Information Board and Message Board will be set near the Registration Desk. Message will be taken during registration hours on Monday through Wednesday and posted on the Message Board. Please check the bulletin board daily to receive your messages. Messages for participants at the meeting should be directed to ISOM'17 Symposium Registration Desk.

III. Lunches

We will reserve the Restaurant SHISEI in Kunibiki Messe 1F for ISOM'17 participants during the lunch time. Please use it by all means.

(Payment is not included in the Registration Fee.)

IV. Others

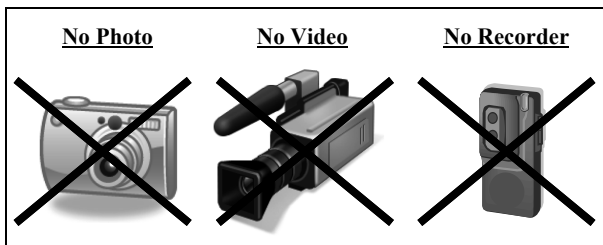
To receive further ISOM'17 announcement, please visit ISOM website (<http://www.isom.jp/>).

Information of Matsue City

Matsue City has a lot of fascinating sightseeing places such as Matsue Castle, Sunset over Lake Shinji, Horikawa Sightseeing Boat, and so on. We are going to supply the brochures of Matsue sightseeing information at the Registration Desk. Please feel free to use them.

ATTENTION

It is not allowed to take photos and videos of any presentation materials in ISOM'17.



TECHNICAL PROGRAM

October 23, 2017 (Monday)

Mo-A: Opening & Keynote

President: Osamu Matoba (Kobe University, Japan)

Mo-A-01

09:00 Opening Remarks

Yoshimasa Kawata (Shizuoka University, Japan)

Organizing Committee Chairperson

Mo-A-02 Keynote

09:15 Computational Imaging toward a Redefinition of Optical Computing

Jun Tanida

Osaka University (Japan)

Computation imaging provides a variety of functionalities by the cooperation of optics and computing. Besides increase of computational power, optical processing holds a key for further development. The expected functions prompt a new definition of optical computing.

Mo-B: Computational Imaging

Presiders: Xiaodi Tan (Beijing Institute of Technology, China)

Akinori Furuya (Tokushima Bunri University, Japan)

Mo-B-01 Invited

09:45 Dynamic Imaging Technologies Using High-speed Optical Components

Hiromasa Oku

Division of Electronics and Informatics, Faculty of Science and Technology, Gunma University (Japan)

High-speed optical components such as a liquid lens offer a new avenue for noble dynamic imaging methods, particularly when they are coupled with image processing technologies. This presentation introduces the concept and the results of such studies.

Mo-B-02

10:10 **Close-up Technology for Lensless Light-field Imaging**

Mayu Sao, Yusuke Nakamura, Kazuyuki Tajima, Takeshi Shimano

Hitachi, Ltd. (Japan)

We propose close-up technology for the lensless light-field imaging using a thin Fresnel zone aperture film. The technology was experimentally confirmed to improve the image quality and field of view.

Mo-B-03

10:30 **Extracting Small Motion of Particle from Planar Doppler Phase Detection Using Micro Lens Array**

Koh Ikeda

Department of Industrial Engineering, Ibaraki College, National Institute of Technology (Japan)

In this study, applying the micro lens array optics and the planar Phase Doppler Anemometry optics, new technique for measuring velocity distributions without sacrificing spatial resolution are proposed. And the feasibility of the technique will be shown with experiment.

10:50 - 11:10 **Coffee Break**

Mo-C: Optical Memory

Presiders: Ryuichi Katayama (Fukuoka Institute of Technology, Japan)
Hideyoshi Horimai (Egarim Co., Ltd., Japan)

Mo-C-01 **Invited**

11:10 **Introduction of Archival Disc**

Yasushi Kobayashi¹, Yo Ota²

¹Panasonic Corporation, ²Sony Semiconductor Solutions Corporation (Japan)

Panasonic and Sony Corporation developed Archival Disc (AD) format that can realize the most reliable and cost-effective data storage for exploding digital data. The advantages and the technology features of AD format are introduced in this paper.

Mo-C-02 Invited

11:35 Signal Processing Methods in Telecommunication Area Applied to Optical Disc Systems

Kimihiro Saito

Department of Comprehensive Engineering, Kindai University Technical College (Japan)

Orthogonal Frequency Division Multiplexing (OFDM) method is widely utilized in the area of telecommunication. Applications of some signal processing methods in different area to increase optical disc storage capacity will be introduced.

Mo-C-03

12:00 Improvement of Transient Response Based on Initial Value Compensation for Multilayer Disc with a Separate Guide Layer

Yukinobu Tanaka, Takeshi Ogata, Seiji Imagawa
Hitachi, Ltd. (Japan)

We have developed a servo compensation method for improving a transient response based on Initial Value Compensation for multilayer disc with a separate guide layer. And we confirmed its effectiveness against black band which is one of the disturbances.

12:20 - 14:00 Lunch

Mo-D: Special Invited

President: Osamu Matoba (Kobe University, Japan)

Mo-D-01 Special Invited

14:00 Digital Electro-optics Platform (X-on Silicon)

Kenneth Tai, Chun-Wei Tsai

Jasper Display Corp. (JDC) (Taiwan)

Digital Electro-optics Platform is the main concept of Jasper Display Corp. (JDC) to develop various applications. These applications are based on our X-on-Silicon technologies, for example, Liquid Crystal on Silicon (LCoS), μ LEDoS, OLEDoS, CELLoS, etc.

Mo-E: Display

Presider: Osamu Matoba (Kobe University, Japan)

Mo-E-01 Invited

14:30 Depth Reproducibility of Integral Photography Generated from Multi-view Stereoscopic Images

Sumio Yano¹, Yuta Katayose¹, Min-Chul Park²

¹Shimane University (Japan), ²KIST (Korea)

A multi-view stereoscopic image was obtained with a fixation point and integral photography was generated. The depth reproduction in integral photography was computationally examined and the influence of depth reproduction on visual perception was examined.

Mo-E-02 Invited

14:55 3D Color Imaging by Holographic Printing

Hoonjong Kang, Elena Stoykova, Youngmin Kim, Sunghee Hong, Jisoo Hong, Chunseong Shin

Digital Holography Research Team, Korea Electronics Technology Institute (Korea)

Design and implementation of a holographic wavefront printer with demagnification of the object beam is presented. The printer prints white light viewable color reflection holograms from 3D contents generated by a fast phase-added stereogram approach.

Mo-E-03 Invited

15:20 See-through Holographic RGB Illumination ~Ega-rim~

Hideyoshi Horimai¹, Toshihiro Kasezawa¹, Toshitaka Nara², Hiroshi Tabuchi², Tsutomu Shimura³

¹Egarim Co., Ltd., ²Okamoto Glass Co., Ltd., ³The University of Tokyo (Japan)

We proposed and demonstrated the see-through illumination unit by using holographic technology, called "Ega-rim". Since this unit looks like a just plane glass, it can be installed in a photo-frame for the 3D hologram contents.

Mo-E-04

15:45 **Investigation of Novel Thin-film for Optical Imaging and Displays**

Zhiyuan Yan, Xinglong Ji, Rong Zhao

Singapore University of Technology and Design (Singapore)

We demonstrate a novel metal-insulator-metal thin-film for optical imaging and micro-displays, whose refractive index can be transformed by varying insulation layer thickness. Colour variation can also be achieved and reconfigured under thermal or electrical stimulation.

16:05 - 16:25 **Coffee Break**

Mo-F: Bio-sensing (Special Session)

Presiders: Masayuki Ono (JVC Kenwood, Japan)
Junji Tominaga (AIST, Japan)

Mo-F-01 **Invited**

16:25 **Laser-scanned Imaging for Bacteria in Water Based on Optical Disk Technology**

Takayuki Shima, Makoto Fujimaki, Koichi Awazu

Electronics and Photonics Research Institute (ESPRIT), National Institute of Advanced Industrial Science and Technology (AIST) (Japan)

We have developed an imaging system based on the optical disk technology for a healthcare use inspecting bacteria in water. An image of Escherichia coli dispersing on the disk sample was successfully obtained.

Mo-F-02 **Invited**

16:50 **Transmissive Liquid-crystal Device for Correcting Low-order Zernike Aberrations in Two-photon Excitation Microscopy**

Ayano Tanabe

Citizen Watch Co., Ltd. (Japan)

Wavefront aberration produced inside a biospecimen can degrade the image quality. Our transmissive liquid-crystal device for correcting low-order Zernike aberrations can provide a simple approach to acquiring higher-quality images

of biospecimens in two-photon excitation microscopy.

Mo-F-03

17:15 Long Working Distance Fundus Photography with Correlated Laser Speckle

Jie-En Li¹, Wan-Hsueh Lai¹, Yu-Chien Chung², Shih-Jen Chen², Yan Zhang³, Chung-Hao Tien¹

¹Department of Photonics, College of Electrical and Computer Engineering, NCTU, ²Department of Ophthalmology, Taipei Veterans General Hospital (Taiwan), ³New England College of Optometry (U.S.A.)

A laser speckle imaging system, including an additional off-axis coherent illumination system and the original imaging system of fundus camera, is proposed to measure the retinal image with long working distance.

October 24, 2017 (Tuesday)

Tu-G: Holographic Memory

Presiders: Nobuhiro Kinoshita (NHK, Japan)

Evgenii Zlokazov (National Research Nuclear University, Bauman Moscow State Technical University, Russia)

Tu-G-01

09:00 Computer Generated Fourier Holograms: Features and Examples of Application for Information Processing, Sensing, Imaging and Data Storage

Evgenii Zlokazov^{1,2}, Sergey Odinokov², Aleksander Betin², Sergey Donchenko², Rostislav Starikov¹

¹National Research Nuclear University, ²Bauman Moscow State Technical University (Russia)

In the report the method of synthesis and specificities of CGFH realization using SLM are presented. Also the examples of CGFH application for such an issues as optical image recognition, wavefront sensing, holographic memory and optical sight indicators are demonstrated.

Tu-G-02

09:20 Spatial Differential Encoding and Wavefront Estimation for Phase Multi-level Holographic Data Storage

Takeru Utsugi

Hitachi-LG Data Storage, Inc. (Japan)

We propose a new method for eliminating the phase distortion of detected phase signal by using spatial differential encoding and digital wavefront estimation method.

Tu-G-03

09:40 Performance of Heat-sink Multilayer Structure for Volumetric Magnetic Hologram Media with Errorless Reconstruction

Yuichi Nakamura, Zen Shirakashi, Naoki Hoshiba, Taichi Goto, Hiroyuki Takagi, Pang Boey Lim, Hironaga Uchida, Mitsuteru Inoue

Toyohashi University of Technology (Japan)

We investigated heat-sink multilayered (HSL)

media for the magnetic hologram. The HSL medium showed enough high diffraction efficiency and also non-error reconstruction of the data using collinear system with magnetic assisted recording.

Tu-G-04

10:00 Image Recognition Demodulation Using Convolutional Neural Network for Holographic Data Storage

Yutaro Katano, Tetsuhiko Muroi, Nobuhiro Kinoshita, Norihiko Ishii

Japan Broadcasting Corporation (NHK) (Japan)

We propose a data demodulation method for holographic data storage (HDS) on the basis of image recognition. A convolutional neural network that learns optical properties of HDS demodulates data at a low error rate.

Tu-G-05

10:20 Fast Phase Retrieval with a Combined Method between Interferometry and Non-interferometry in the Holographic Data Storage

Yang Li¹, Xiao Lin¹, Jinpeng Liu¹, Jinyan Liu¹, Yong Huang¹, Tsutomu Shimura², Ryushi Fujimura³, Xiaodi Tan¹

¹Beijing Institute of Technology (China), ²The University of Tokyo, ³Utsunomiya University (Japan)

We proposed a combined method between interferometry and non-interferometry to retrieve phase quickly. Our method decreased the requirement of interferometry.

10:40 - 11:00 Coffee Break

Tu-H: Computational Imaging (Special Session)

Presider: Takanori Nomura (Wakayama University, Japan)

Tu-H-01 Invited

11:00 Wavefront Coding for Extending Depth-of-field of Optical Imaging System

Shinichi Komatsu, Waku Hashimoto, Yasuaki Machida, Tomohiro Sekiguchi, Tsubasa Fukuda, Masaya Takahashi, Masaya Nakamura, Ryoma Onose

Department of Applied Physics, Waseda University (Japan)

The principle of wavefront coding (WFC) using the cubic phase mask (CPM) is explained in terms of pupil modulation in Fourier optics. Recent studies on improving image qualities with alternative phase masks are also introduced, along with related topics.

Tu-H-02 Invited

11:25 Computational photography : Camera as an Optical Image Processor

Shinsaku Hiura

Graduate School of Information Sciences, Hiroshima City University (Japan)

Camera encodes the light field of the real scene into the intensity distribution on a 2-D plane. Computational photography aims to optimize this process for the objectives and following computation.

Tu-H-03 Invited

11:50 Lensless Light-field Imaging with Fresnel Zone Aperture

Yusuke Nakamura, Kazuyuki Tajima, Mayu Sao, Takeshi Shimano

Center for Technology Innovation - Electronics, Hitachi Ltd. (Japan)

We have been developing a lensless light-field imaging technology. It realizes a thin camera and a re-focusing feature since it acquires light-field information. We will explain the principle and applications with its demonstration at the conference.

12:15 - 12:30 ISOM'18 Announcement & Photo

12:30 - 13:45 Lunch

Tu-I: Nano Photonics & Plasmonics

Presiders: Yoshimasa Kawata (Shizuoka University, Japan)
Minoru Takeda (Kyoto Institute of Technology, Japan)

Tu-I-01 Invited

13:45 Optical Performance Evaluation of Plasmonic Meta-hologram

Chih-Ming Wang¹, Yao-Wei Huang², Wei Ting Chen², Wei-Yi Tsai², Pin Chieh Wu^{2,3}, Din Ping Tsai^{2,3}

¹Department of Opto-electronic Engineering, National Dong Hwa University, ²Department of Physics, National Taiwan University, ³Research Center for Applied Sciences, Academia Sinica (Taiwan)

In this talk, we experimentally demonstrated polarization division-multiplexing and wavelength division-multiplexing computer-generated hologram using high efficient plasmonic metasurfaces. The optical performances of the hologram, such as modulation transfer function, image resolution and contrast, will be evaluated and discussed.

Tu-I-02 Invited

14:10 Control of Light Emission in Nanostructured Perovskite Metamaterials

Giorgio Adamo¹, Harish N. S. Krishnamoorthy¹, Behrad Gholipour², Daniele Cortecchia^{3,4}, Annalisa Bruno⁴, Jin-Kyu So¹, Muhammad D. Birowosuto⁵, Nikolay I. Zheludev^{1,2}, Cesare Soci¹

¹Centre for Disruptive Photonic Technologies, TPI, SPMS, Nanyang Technological University (Singapore), ²Optoelectronics Research Centre & Centre for Photonic Metamaterials, University of Southampton (UK), ³Interdisciplinary Graduate School, Nanyang Technological University, ⁴Energy Research Institute @ NTU, Nanyang Technological University, ⁵CINTRA UMI CNRS/NTU/THALES (Singapore)

We demonstrate that subwavelength nanopatterning

of solution-processable metal-halide perovskite films can be used to control their luminescence spectra and lead to create color tuning and up increase of luminescence yield.

Tu-I-03

14:35 Achromatic Metasurface Lenses

Cheng Hung Chu¹, Hui-Hsin Hsiao¹, Pin Chieh Wu¹, Shuming Wang², Vin-Cent Su³, Yi-Chieh Lai⁴, Jia-Wern Chen⁵, Mu-Ku Chen⁵, Chieh-Hsiung Kuan³, Tao Li², Shining Zhu², Din Ping Tsai¹

¹Research Center for Applied Sciences, Academia Sinica (Taiwan), ²National Laboratory of Solid State Microstructures, School of Physics, College of Engineering and Applied Sciences, Nanjing Univ. (China), ³Department of Electrical Engineering and Graduate Institute of Electronics Engineering, National Taiwan University, ⁴Department of Photonics and Advanced Optoelectronic Technology Center, National Cheng Kung University, ⁵Department of Physics, National Taiwan University (Taiwan)

The broadband achromatic flat optical metadevices based on the integrated resonance are proposed. The focusing metalenses and beam deflection with gradient metasurfaces are demonstrated at arbitrary wavelength in near infrared region.

Tu-I-04

14:55 Flat Optical Metadevices in Demand

Hui-Hsin Hsiao¹, Pin Chieh Wu², Yi-Chieh Lai³, Cheng Hung Chu², Mu-Ku Chen¹, Jia-Wern Chen¹, Tsung Lin Chung¹, Ren Jie Lin¹, Yu Han Chen¹, Greg Sun⁴, Harry Atwater⁵, Nikolay Zheludev⁶, Din Ping Tsai²

¹Department of Physics, National Taiwan University, ²Research Center for Applied Sciences, Academia Sinica, ³Department of Photonics and Advanced Optoelectronic Technology Center, National Cheng Kung University (Taiwan), ⁴Department of Engineering, University of Massachusetts Boston, ⁵Thomas J. Watson Laboratories of Applied Physics and Kavli Nanoscience Institute, California Institute of Technology (U.S.A.), ⁶Optoelectronics Research Centre and Centre for Photonic Metamaterials, University of Southampton (UK)

Several research topics for metasurface-based devices in demand will be discussed: high efficiency anomalous beam deflection, holographic imaging, versatile polarization generation, tunable metadevices and generation of non-radiating anapole mode.

Tu-I-05

15:15 Plasmon-enhanced Lasing Behaviors in Hybrid Solution-processed Organometal Halide Perovskite Thin Film

Tsung Sheng Kao, Yu-Heng Hong, Guan-Yu Chen, Kuo-Bin Hong, Fang-Chung Chen, Tien-Chang Lu

Department of Photonics, National Chiao Tung University (Taiwan)

The lasing performance can be greatly promoted and room-temperature operated in solution-processed organometal halide perovskite films incorporated with gold nanoparticles, paving new perspectives towards the promising flexible perovskite-based laser devices.

15:35 - 15:50 Break

Tu-J: Poster Session

Presiders: Osamu Matoba (Kobe University, Japan)
Masayuki Ono (JVC Kenwood, Japan)
Nobuhiro Kinoshita (NHK, Japan)
Takanori Nomura (Wakayama University, Japan)

Tu-J-01

15:50 First Principles Study of Optical Properties Change of Sb_2Te_3 Due to the Melting

Haruyuki Sano¹, Masashi Kuwahara², Goro Mizutani³

¹National Institute of Technology, Ishikawa College, ²Electronics and Photonics Research Institute, National Institute of Advance Industrial Science and Technology, ³School of Materials Science, Japan Advanced Institute of Science and Technology (Japan)

Due to the melting, electronic density of states of Sb_2Te_3 around the Fermi level increases, and optical properties change from semiconductor to quasi-metallic behavior. The mechanism of the optical absorption change is proposed.

Tu-J-02

15: 50 Effect of Size of Calculation Area in Phase Object Mapping Algorithm Based on Local Variance Evaluation

Koshi Komuro¹, Takanori Nomura²

¹Graduate School of Systems Engineering, Wakayama University, ²Faculty of Systems Engineering, Wakayama University (Japan)

A phase object mapping technique is proposed to simultaneously measure different depth positioned objects. The effect of calculation area of local variance estimation is investigated by a numerical experiment.

Tu-J-03

15: 50 High Accuracy Evaluation of Holographic Data Storage Medium

Takeru Utsugi

Hitachi-LG Data Storage, Inc. (Japan)

We propose a new evaluation method for high M/# medium by suppressing the unwanted diffraction in plane wave tester.

Tu-J-04

15: 50 Analysis of Curing Process of Adhesive Using both Digital Holographic Interferometry and Spectroscopy

Mohamad Haidar Bin Aziz, Kotaro Kanamori, Masayuki Yokota

Dept. of Mechanical, Electrical & Electronic Eng., Shimane Univ. (Japan)

A technique to study the curing of adhesive, based on digital holography and spectroscopy, is presented. The technique is applied to the UV (Ultra-violet) curable adhesive at different level of light intensity.

Tu-J-05

15: 50 Reconstruction of Phase Data Page Using Transport of Intensity Equation for Computer-generated-hologram-based Holographic Data Storage

Naru Yoneda¹, Yusuke Saita², Koshi Komuro¹, Teruyoshi Nobukawa³, Takanori Nomura²

¹Graduate School of Systems Engineering, Wakayama University, ²Faculty of Systems Engineering, Wakayama University, ³Electronics and Photonics Research Institute, National Institute of Advanced Industrial Science and Technology (AIST) (Japan)

To reconstruct phase information in a holographic memory using a computer-generated hologram, a phase recovering technique based on a transport of intensity equation is introduced. Numerical simulations confirm the feasibility of the method.

Tu-J-06

15: 50 A Design Method for Time Delayed Feedback Control System

Yusuke Kanatake, Nobuo Takeshita

Advanced Technology R&D Center, Mitsubishi Electric Corp. (Japan)

A design method of disturbance observer for time delayed feedback control system is discussed. The effectiveness of proposed control system was confirmed.

Tu-J-07

15: 50 Power Stability of Point Spread Function in Optical Coherence Tomography with $\text{KTa}_{1-x}\text{Nb}_x\text{O}_3$ Swept Light Source

Kazuma Endo¹, Hiroshi Sunaga¹, Takafumi Ogawa¹, Mitsuru Shinagawa¹, Seiji Toyoda², Masahiro Ueno², Yuzo Sasaki², Meishin Chin², Tadashi Sakamoto²

¹Faculty of Science and Engineering, Hosei University, ²NTT Device Innovation Center, NTT Corporation (Japan)

This paper shows that the power stability of the point spread function in the optical coherence tomography with the $\text{KTa}_{1-x}\text{Nb}_x\text{O}_3$ swept light source. The relation between source signal stability and the PSF stability in the SS-OCT system noises is investigated. We found that the high PSF stability can be obtained by improving the source signal stability.

Tu-J-08

15: 50 Phase-unwrapping-free Refractive Index Tomography Based on the Transport of Intensity Equation

Aina Ikezaki¹, Takanori Nomura²

¹Graduate School of Systems Engineering, Wakayama University, ²Faculty of Systems Engineering, Wakayama University (Japan)

Phase-unwrapping-free refractive index tomography based on the transport of intensity equation is proposed. Numerical simulation results show that the phase unwrapping error and calculation costs can be reduced by the proposed method.

Tu-J-09

15: 50 Lifetime Measurement of Fluorescence Excited with Surface Plasmon Resonance in Deep-ultraviolet

Taras Hanulia¹, Atsushi Ono¹, Wataru Inami¹, Leonid Poperenko², Yoshimasa Kawata¹

¹Shizuoka University (Japan), ²Taras Shevchenko National University of Kyiv (Ukraine)

Lifetime fluorescence (FLT) of CdSe quantum dots and anthracene in toluen was measured. To enhance fluorescence intensity we propose combination FLT measurement and surface plasmon resonance in deep-ultraviolet.

Tu-J-10

15: 50 Experimental Investigation of Depth of Field and Magnification Change of Reconstructed Image in Incoherent Holography Using Rotational Shearing Interferometer

Takuya Matsuda¹, Takanori Nomura²

¹Graduate School of Systems Engineering, Wakayama University, ²Faculty of Systems Engineering, Wakayama University (Japan)

The depth of field of image reconstructed by incoherent holography using a rotational shearing interferometer is investigated. Experimental results show that there is no limit of the depth of field in this method.

Tu-J-11

15: 50 **Distributional Measurement of Effective Refractive Index Differences in Graded Index 2-mode Fiber**

Yusuke Sagisaka¹, Masashi Yokota¹, Fumihiko Ito¹, Ryo Maruyama², Nobuo Kuwaki³

¹Dept. of Mechanical, Electrical & Electronic Eng., Shimane Univ., ²Optical Fiber Division, Fujikura Ltd., ³Corporate R&D Planning Division, Fujikura Ltd. (Japan)

A novel method for distributionally evaluating the effective refractive index differences in multimode optical fibers is successfully demonstrated, for the first time, in graded-index 2-mode fibers, based on the Brillouin spectrum analysis.

Tu-J-12

15: 50 **Subwavelength UV Light Focusing by a Surface Plasmonic Lens with Extended Focal Length**

Yusuke Miura¹, Akihiro Tsuchiyama¹, Minoru Takeda¹, Makoto Okada², Shinji Matsui², Tsutomu Inoue³, Kento Aizawa³

¹Kyoto Institute of Technology, ²University of Hyogo, ³JASCO Corporation (Japan)

We improved the design parameter of the surface plasmonic lens for UV wavelength and experimentally performed a tight focal spot with subwavelength size (320nm) and the extended focal length (3.2 μ m). We also applied nanoimprint lithography process to fabricate the integrated lens array.

Tu-J-13

15: 50 **Improvement of CL Spatial Uniformity of Thin Film Used for EXA Microscope**

Taiki Uchiyama, Yoshimasa Kawata, Wataru Inami

Shizuoka University (Japan)

We have developed electron beam excitation assisted optical microscope. In order to observe excellent images with an EXA microscope, a fluorescent thin film excellent in CL uniformity is required. In this study, we compare ZnO, Zn₂SiO₄ and focused Ion beam processed thin film

Tu-J-14

15: 50 **Polarization Independent Refractive Index Sensor**

Jia-Wern Chen¹, Pin Chieh Wu², Hisang-Chu Wang¹, Hui-Hsin Hsiao¹, Chun Yen Liao¹, Din Ping Tsai²

¹National Taiwan University, ²Academia Sinica (Taiwan)

Four vertical split-ring resonators with a significant plasmon confinement for an isotropic perfect absorption are demonstrated. A refractive index sensor with high sensing performance is also proposed because of its high absorption.

Tu-J-15

15: 50 **Computational Ghost Imaging with Designed Low Spatial Frequency Mask**

Yuya Yamazaki¹, Takanori Nomura²

¹Graduate School of Systems Engineering, Wakayama University, ²Faculty of Systems Engineering, Wakayama University (Japan)

Computational ghost imaging (CGI) with a designed low spatial frequency mask is proposed. An object image can be obtained under weak illumination with less number of measurements than CGI with a random mask.

Tu-J-16

15: 50 **Spatial Quadrature Amplitude Modulator with Photorefractive Device Based on Two-step Exposure Method for Holographic Memories**

Satoshi Honma, Hikaru Takahashi

Yamanashi University (Japan)

We propose a spatial quadrature amplitude modulator with a photorefractive device based on Two-step exposure method for holographic memories. Comparing the conventional method, the quantity of consumed monomer for recording data is reduced under half.

Tu-J-17

15: 50 Signal Measurement Tool Using Electro-optical Technique for Two-person Intra-body Communication

Narumi Sekine¹, Yuki Sato¹, Mitsuru Shinagawa¹,
Daisuke Saito², Kyoji Oohashi²

¹Faculty of Science and Engineering, Hosei University, ²Nippon Signal Company (Japan)

We developed a new measurement tool using an electro-optical technique to estimate through two human bodies. The gain of an amplifier in the new tool was redesigned to improve the frequency characteristics. We confirmed that the new tool can be applied to estimate two-person communication successfully.

Tu-J-18

15: 50 Particle Positioning Using Single-shot Digital Holography with Inverse-problem Approach

Shinya Hasegawa, Masato Kajita

Hiroshima Institute of Technology (Japan)

In digital holography, twin image must be eliminated for performing particle measurement. We used phase-shifting and an inverse problem approach to this end. The results show that precise positioning was achieved.

Tu-J-19

15: 50 Ultra-thin Interference Metasurface

Cheng Hung Chu¹, Hisang-Chu Wang², Hui-Hsin Hsiao², Pin Chieh Wu¹, Hui Jun Wu¹, Jia-Wern Chen², Yi-Chieh Lai², Wei Hou Lee², Din Ping Tsai¹

¹Research Center for Applied Sciences/ Academia Sinica, ²Department of Physics/ National Taiwan University (Taiwan)

We utilize ultrathin thin film interference to achieve metasurface operating in visible spectrum. Devices for beam deflection with normal or higher order reflections depressed and polarization independent meta-holograms are experimentally demonstrated.

Tu-J-20

15: 50 Interference Waveform Simulator with Voltage Noise and Jitter in Optical Coherence Tomography with KTN Swept Light Source

Hiroshi Sunaga¹, Kazuma Endo¹, Takafumi Ogawa¹, Mitsuru Shinagawa¹, Masahiro Ueno², Seiji Toyoda², Yuzo Sasaki², Meishin Chin², Tadashi Sakamoto²

¹Faculty of Science and Engineering, Hosei University, ²NTT Corporation (Japan)

This paper describes a developing interference waveform simulator with noise in optical coherence tomography with $\text{KTa}_{1-x}\text{Nb}_x\text{O}_3$ swept light source. A high-quality tomographic image is obtained by noise reduction in accordance with the noise analysis of the interference waveform. The noise of the interference waveform was modeled into a voltage noise and a jitter, and a simulator of the interference waveform with graphical user interface was developed.

Tu-J-21

15: 50 Readout Channel Using Double Head Type Output Read from Super-resolution Near-field Structure Discs

Takaya Tanabe, Shota Hosogai

National Institute of Technology, Ibaraki College (Japan)

A new super-RENS readout channel having double head type output at the mark edge of the super-RENS discs is assessed. The readout channel offers excellent resolution.

Tu-J-22

15: 50 Noise Analysis of Electro-optic Measurement System for Differential Detection

Masahiro Yada¹, Yukihiro Ishihara¹, Tomoya Naoe¹, Mitsuru Shinagawa¹, Hiroyuki Sugino², Hiroaki Tanaka², Jun Katsuyama², Yoshinori Matsumoto²

¹Faculty of Science and Engineering, Hosei University, ²Innovation Center Marketing Headquarters, Yokogawa Electric Corporation (Japan)

We examined a noise characteristics of an electro-optic (EO) measurement system using

experimental results. The noise of the EO measurement system is modeled, and a noise simulator was developed. Characteristics of the experimental results agree with those of the simulation results.

Tu-J-23

15: 50 Use of Digital Filter before Recording Data Pages to Improve SNR in Holographic Memory

Tetsuhiko Muroi, Yutaro Katano, Nobuhiro Kinoshita, Norihiko Ishii

Japan Broadcasting Corporation (NHK) (Japan)

The SNR of the reproduced data is degraded by a spatial filter in the optical setup. Then, we applied a digital filter to the data pages before recording and improved the SNR.

Tu-J-24

15: 50 Three Dimensional Measurement by a Phase-shifting Fringe Projection Profilometry with a Normalization Method

Takanori Sato, Nobukazu Yoshikawa

Saitama University (Japan)

A normalization method for the generalized phase-shifting fringe projection method was proposed. The 3-step normalization method can restore the object shape even if the object has complicated structure.

Tu-J-25

15: 50 Experiment on Spatial Mode Demultiplexing Technique Using Cascaded Volume Hologram

Shimpei Shimizu¹, Atsushi Okamoto¹, Fumiya Mizukawa¹, Kazuhisa Ogawa¹, Akihisa Tomita¹, Taketoshi Takahata², Satoshi Shinada³, Naoya Wada³

¹Hokkaido University, ²Optoquest Co., Ltd., ³National Institute of Information and Communications Technology (Japan)

For a mode division multiplexing, we have proposed a volume holographic demultiplexer (VHDM). In this work, we propose a cascaded VHDM for improving the utilization efficiency of signals in the VHDM.

Tu-J-26

15: 50 Homogenization of Intensity Profile of 2D Holographic Data Page in Holographic Data Storage System

Kenichi Shimada¹, Makoto Hosaka¹, Kazuyoshi Yamazaki¹, Tatsuro Ide¹, Takeru Utsugi¹, Mitsuru Nagasawa¹, Takahiro Mouri², Hiroyuki Takatsuji², Katsuhiko Izumi², Hideo Suenaga²

¹Hitachi, Ltd. (Japan), ²Hitachi-LG Data Storage, Inc. (Japan)

We introduced a beam homogenizing lens and readout scheme employing P-polarized reference beam into HDSS. Owing to increase of a coupling efficiency between reference and reproduced beam, the intensity profile of the reproduced holographic data page was successfully homogenized.

Tu-J-27

15: 50 Measurement of Wavefield Correlation with Spatial Light Modulator

Hao-Ping Ku, Jie-En Li, Xuan-En Hong, Shih-Hsun Huang, Chung-Hao Tien

Department of Photonics, College of Electrical and Computer Engineering, NCTU (Taiwan)

In this work, we propose a two-step process to measure the wavefield correlation by means of generating a pseudo double-slit with spatial light modulator (SLM).

Tu-J-28

15: 50 Detection of Spatially Quadrature Amplitude Modulated Signal with Multilevel Intensity and Phase Modulation by Transport of Intensity Equation Method

Shosei Tateyama, Kazutaka Kanno, Masatoshi Bunsen

Fukuoka University (Japan)

We demonstrate non-interferometric phase retrieval from signal beam in HDS with intensity and phase modulation by using the Transport of Intensity Equation method. Successful phase retrieval is experimentally and numerically shown with slight RMSE deterioration.

Tu-J-29

15: 50 Speckle Noise Reduction for Digital Holography Using Efficient Sub-pixel Convolutional Neural Network

Wonseok Jeon, Kyungchan Son, Wooyoung Jeong, Hyunseok Yang

Yonsei University (Korea)

In this paper, we proposed very simple and fast network structure applying ESPCN for the speckle noise reduction using only one holographic image.

Tu-J-30

15: 50 Reflection Image-plane Disk-type Multiplex Holography Using Two-step Replication

Chih-Hung Chen, Yih-Shyang Cheng

Department of Optics and Photonics, National Central University (Taiwan)

Two-step holographic recording is described to obtain duplicated holograms from a master hologram. We also introduce a single-beam holographic setup for copying the image-plane disk-type multiplex hologram as a reflection hologram.

Tu-J-31

15: 50 Advances in Continuous Maskless Lithography Production Capabilities Using DCA G3-VIA Systems and DRIE

Doug Carson

DCA, Inc. (U.S.A.)

Significant advancements have been made in precision, speed and production capabilities of Bio-Chips. Presentation will cover how these improvements move research and development technology into global production for Bio-Lab on a Disc applications.

Tu-J-32

15: 50 High-range Autofocusing Algorithm for Digital Holographic Imaging System Using Convolutional Neural Networks

Kyungchan Son, Wooyoung Jeong, Wonseok Jeon, Hyunseok Yang

Yonsei University (Korea)

Digital holographic imaging system is a promising three-dimensional imaging system. In this paper, high-range autofocusing algorithm using convolutional neural networks is proposed. An object distance from hologram is obtained with shorter computational time.

Tu-J-33

15: 50 Compensation of SQAM Signal with Pilot Signal for Two-step Exposure Method in Holographic Data Storage

Hikaru Takahashi, Satoshi Honma

Yamanashi University (Japan)

We propose a compensation method of the spatial quadrature amplitude modulation signal by inserting pilot signals into phase pages for the two-step exposure method. We evaluate the quality improvement of the compensated signal.

Tu-J-34

15: 50 Monitoring of the Drying Process for an Ink Dot on Tracing Paper by Using Digital Holographic Microscopy

Eiji Kusunoki¹, Fumiya Aoyama², Masayuki Yokota¹

¹Dept. of Mechanical, Electrical & Electronic Eng., Shimane Univ., ²Delta Kogyo Co., Ltd. (Japan)

Drying processes of ink dots on a tracing paper have been analyzed by using digital holographic microscopy. The deformation of both the ink dots having different size and the paper was observed.

Tu-J-35

15: 50 Spatial Mode Separation and Conversion Technique Using Volume Hologram with a Random Optical Diffuser

Fumiya Mizukawa, Atsushi Okamoto, Yuta Goto, Shimpei Shimizu, Kazuhisa Ogawa, Akihisa Tomita

Hokkaido University (Japan)

We propose a novel scheme using a random optical diffuser for spatial mode separation and conversion technique. This method improves the conversion accuracy between higher-order modes

by smoothing the intensity distribution of incident modes.

Tu-J-36

15: 50 Image-plane Disk-type Multiplex Holography with Higher Magnification Factor

Yih-Shyang Cheng, Chih-Hung Chen, Yu-Hsin Tu

Department of Optics and Photonics, National Central University (Taiwan)

In this study we focus on obtaining possible values of magnification factor and suitable observation factors. The consideration of limitation in our system is also discussed, and a preliminary experimental result is then followed.

Tu-J-37

15: 50 A Proposal for Digital Holographic 3-D Measurement Method by Using FMCW Technique

Tatsuya Ishikawa, Yutaro Nakashima, Masayuki Yokota

Dept. of Mechanical, Electrical & Electronic Eng., Shimane Univ. (Japan)

Frequency Modulated Continuous Wave technique has been introduced into digital holography and the three-dimensional position measurement is conducted. In addition, numerical calculation was conducted to investigate the experimental results using the simple models.

Tu-J-38

15: 50 Improvement of Demodulation Accuracy of Spatially Quadrature Amplitude Modulated Signal with Phase-shift Embedding Method

Tatsuki Yamamoto, Kazutaka Kanno, Masatoshi Bunsen

Fukuoka University (Japan)

We propose methods for improving demodulation accuracy of the spatially quadrature amplitude modulated signal beam using the phase-shift embedding method in holographic data storage. Effectiveness of the proposed methods are confirmed by numerical simulation.

Tu-J-39**15: 50 Environmentally Robust Phase Detection Methods for Industrial Non-destructive Inspection**

Kazuyoshi Yamazaki¹, Yuzuru Takashima²

¹Center for Technology Innovation - Electronics, Hitachi, Ltd. (Japan), ²University of Arizona, College of Optical Sciences (U.S.A.)

In order to achieve robust and fast phase detection against the signal intensity deviation, we newly developed the time differential phase detection for non-destructive and in-line inspection. The time differential phase detection uses a differential signal detected by same detector at difference time to retrieve phase.

Tu-J-40**15: 50 Selective Detection of Escherichia Coli by Imaging Light Intensity Transmitted through an Optical Disk**

Hideyuki Shiramizu¹, Chiaki Kuroda¹, Yoshimichi Ohki¹, Takayuki Shima², Xiaomin Wang², Makoto Fujimaki²

¹Waseda University, ²National Institute of Advanced Industrial Science and Technology (Japan)

To establish a superior detection of Escherichia coli in water, we developed an optical disk system for imaging substances using transmitted light through the disk. By staining Escherichia coli, we successfully distinguished it from contaminants.

17:20 - 18:00**Break****18:00 - 20:00****Banquet at Matsue Excel Hotel Tokyu**

October 25, 2017 (Wednesday)

We-K: Sensing & New Technologies

Presider: Osamu Matoba (Kobe University, Japan)

We-K-01 Invited

09:00 Explore the New Opportunity for Optical Brain Inspired Computing

Lu-Ping Shi, Jing Pei, Hai Zheng Xu, Wei He
Tsinghua University (China)

Brain inspired computing (BIC) is one of the two most promising technologies to further develop computers in post Moore period. Optical technology provides a great potential for development of BIC. In this talk, we will discuss the challenge and the current status of BIC and the possible optical technologies that can be used to develop BIC. We will address how to develop BIC system based on optical technologies using some recent finding in neuroscience.

We-K-02

09:25 Thermodynamics of Radiation Pressure and Photon Momentum

Masud Mansuripur

University of Arizona (U.S.A.)

Theoretical analyses of radiation pressure and photon momentum in the past 150 years have focused almost exclusively on classical and/or quantum theories of electrodynamics. In these analyses, Maxwell's equations, the properties of polarizable and/or magnetizable material media, and the stress tensors of Maxwell, Abraham, Minkowski, Chu, and Einstein-Laub have typically played prominent roles. Each stress tensor has subsequently been manipulated to yield its own expressions for the electromagnetic force, torque, energy, and linear as well as angular momentum densities of the electromagnetic field. We will present an alternative view of radiation pressure from the perspective of classical thermodynamics, invoking the properties of blackbody radiation in conjunction with gas-filled cavities that contain electromagnetic energy in thermal equilibrium with the container. In this type of analysis, Planck's quantum hypothesis, Einstein's A and B coefficients, the entropy of the gas, and the spectral distribution of the trapped radiation play the central roles.

We-K-03

09:45 Two-dimensional Object Profiling by FMCW Optical Sensing System Using One-Dimensional Photodiode Array

Koichi Iiyama, Kohei Yamaguchi

Kanazawa University (Japan)

We have demonstrated two-dimensional object profiling by FMCW optical sensing system using one-dimensional photodiode array. The spatial distribution to the object is simultaneously measured, and the object with 0.64mm step is successfully profiled.

10:05 - 10:25 Coffee Break

We-L: Digital Holography

Presiders: Shinya Hasegawa (Hiroshima Institute of Technology, Japan)
Masayuki Yokota (Shimane University, Japan)

We-L-01 Invited

10:25 Digital Holography for Assessment of Drying and Hardening Processes of Films

Masayuki Yokota, Eiji Kusunoki, Kotaro Kanamori

Interdisciplinary Faculty of Science and Engineering, Shimane University (Japan)

The techniques to investigate drying/hardening processes of films using digital holography are presented. The proposed technique can be applied to assessment of drying states of films such as paint, ink dot, adhesive and so on.

We-L-02 Invited

10:50 Optical Scanning Holography – a Technique of 3D Imaging by Single-pixel Detector

Jung-Ping Liu

Department of Photonics, Feng Chia University (Taiwan)

Optical scanning holography (OSH) can record a coherent hologram or an incoherent hologram by a single-pixel detector without the noise arisen in other single-pixel imaging techniques. The principle and applications of OSH will be introduced.

We-L-03 Invited

11:15 Two Problems in Particle Measurement Using Digital Holography

Yohsuke Tanaka, Atsuo Kubonishi, Shigeru Murata

Kyoto Institute of Technology (Japan)

There are two problems in particle measurement using digital holography. First, twin image problem is suppressed by phase retrieval holography using two cameras. Second, depth-of-focus problem is suppressed by a volumetric filtering.

We-L-04 Invited

11:40 Low-cost, Low Noise Digital Holography with Single LED and MLCC-based Actuators

No-Cheol Park¹, Sunghbin Jeon¹, Jin-Sang Lim², Guk-Jong Choi¹, Janghyun Cho², Young-Pil Park¹

¹Department of Mechanical Engineering, Yonsei University, ²Center for Information Storage Device, Yonsei University (Korea)

In this study, we propose a low-cost, high-quality digital holography system using LED and MLCC (Multi-Layer Ceramic Capacitor). MLCC-based actuators achieve similar accuracy and stability at lower cost and drive voltage than PZT. In addition, digital holography systems using LEDs can achieve lower speckle noise levels and better image quality than laser-based setups.

We-L-05

12:05 Digital Holography and Information Processing for Sound Security

Sudheesh K Rajput, Osamu Matoba

Kobe University (Japan)

Optical voice encryption scheme based on digital holography and optical encryption technique is proposed. The feasibility is confirmed by the optical recording of the sound wave and image processing of the optical encryption.

12:25 - 14:00 Lunch

We-M: Holography Applications (Special Session)

Presiders: Tsutomu Shimura (The University of Tokyo, Japan)
Tetsuhiko Muroi (NHK, Japan)

We-M-01 Invited

14:00 Optical Model of a Coaxial Holographic Data Storage System with Considering Recording Dynamics of Material

Yeh-Wei Yu¹, Chi-Hsien Yang², Shiuan-Huei Lin³, Ching-Cherng Sun^{1,2,3}

¹Optical Sciences Center, National Central University, ²Department of Optics and Photonics, National Central University, ³Department of

Electrophysics, National Chiao Tung University
(Taiwan)

A simulation model with considering the recording dynamics of material is built. It provides mathematical link between recording material model and the optical system model in a volume holographic memory system.

We-M-02 Invited

14:25 Optimal Structure and Sync Mark Design for Digital Micro-mirror Device Based Collinear Holographic Data Storage System

Jinping Liu¹, Hideyoshi Horimai², Xiao Lin¹,
Jinyan Liu¹, Yong Huang¹, Xiaodi Tan¹

¹School of Optoelectronics, Beijing Institute of Technology (China), ²HolyMine Corporation (Japan)

We studied the optimal structure of DMD used in collinear holographic data storage for amplitude modulation, and proposed a robust sync mark design corresponding to optimal structure.

We-M-03 Invited

14:50 Holographic Window for Solar Power Generation System

Toshihiro Kasezawa¹, Hideyoshi Horimai¹,
Hiroshi Tabuchi², Tsutomu Shimura³

¹Egarim Co., Ltd., ²Okamoto Glass Co., Ltd.,
³The University of Tokyo (Japan)

I will introduce the basic principle of Holo-Window, including the optical configuration and requirement of hologram characteristics, the hologram fabrication technology to achieve high diffraction angle to capture sunlight, and I will discuss the performance.

We-PD: Post Deadline

Presiders: TBD

(15:15) We-PD-01

(15:30) We-PD-02

(15:45) We-PD-03

(16:00) We-PD-04

16:15 - 16:35 Award & Closing

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Hong, Jisoo	Mo-E-02
Hong, Kuo-Bin	Tu-I-05
Hong, Sunghee	Mo-E-02
Hong, Xuan-En	Tu-J-27
Hong, Yu-Heng	Tu-I-05
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Hsiao, Hui-Hsin	Tu-I-03 Tu-I-04 Tu-J-14 Tu-J-19
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Huang, Yong	Tu-G-05 We-M-02

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Kawata, Yoshimasa	Mo-A-01
	Tu-J-09
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	Tu-J-23
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Komatsu, Shinichi	Tu-H-01

Komuro, Koshi	Tu-J-02
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	Tu-I-04
	Tu-J-19
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Li, Jie-En	Mo-F-03
	Tu-J-27
Li, Tao	Tu-I-03
Li, Yang	Tu-G-05
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Lim, Jin-Sang	We-L-04
Lim, Pang Boey	Tu-G-03
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Park, Min-Chul Mo-E-01
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Sagisaka, Yusuke Tu-J-11
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Takahashi, Masaya	Tu-H-01
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Takatsuji, Hiroyuki	Tu-J-26
Takeda, Minoru	Tu-J-12
Takeshita, Nobuo	Tu-J-06
Tan, Xiaodi	Tu-G-05 We-M-02
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Tanabe, Takaya	Tu-J-21
Tanaka, Hiroaki	Tu-J-22
Tanaka, Yohsuke	We-L-03
Tanaka, Yukinobu	Mo-C-03
Tanida, Jun	Mo-A-02
Tateyama, Shosei	Tu-J-28
Tien, Chung-Hao	Mo-F-03 Tu-J-27
Tomita, Akihisa	Tu-J-25 Tu-J-35
Toyoda, Seiji	Tu-J-07 Tu-J-20
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W	
Wada, Naoya	Tu-J-25
Wang, Chih-Ming	Tu-I-01
Wang, Hisang-Chu	Tu-J-14 Tu-J-19
Wang, Shuming	Tu-I-03
Wang, Xiaomin	Tu-J-40
Wu, Hui Jun	Tu-J-19
Wu, Pin Chieh	Tu-I-01 Tu-I-03 Tu-I-04 Tu-J-14 Tu-J-19

X	
Xu, Hai Zheng	We-K-01

Y	
Yada, Masahiro	Tu-J-22
Yamaguchi, Kohei	We-K-03
Yamamoto, Tatsuki	Tu-J-38
Yamazaki, Kazuyoshi	Tu-J-26 Tu-J-39
Yamazaki, Yuya	Tu-J-15
Yan, Zhiyuan	Mo-E-04
Yang, Chi-Hsien	We-M-01
Yang, Hyunseok	Tu-J-29 Tu-J-32
Yano, Sumio	Mo-E-01
Yokota, Masashi	Tu-J-11
Yokota, Masayuki	Tu-J-04 Tu-J-34 Tu-J-37 We-L-01
Yoneda, Naru	Tu-J-05
Yoshikawa, Nobukazu	Tu-J-24
Yu, Yeh-Wei	We-M-01

Z	
Zhang, Yan	Mo-F-03
Zhao, Rong	Mo-E-04
Zheludev, Nikolay I.	Tu-I-02
Zlokazov, Evgenii	Tu-G-01

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Yokota, M. (Shimane Univ.)

ACCESS TO CONFERENCE SITE

< Access to Izumo Airport >

至「出雲空港」

From Haneda Airport: approx. 80 minutes.

自「羽田空港」

From Itami Airport: approx. 50 minutes.

自「伊丹空港」

From Fukuoka Airport: approx. 70 minutes.

自「福岡空港」

< Access to Yonago Airport >

至「米子空港」

From Haneda Airport: approx. 80 minutes.

自「羽田空港」

< From Izumo Airport to Matsue City >

自「出雲空港」



Limousine Bus:

Traveling time to JR Matsue Station is about 30 minutes.

< From Yonago Airport to Matsue City >

自「米子空港」



Limousine Bus:

Traveling time to JR Matsue Station is about 45 minutes.

< From Shin-Osaka Station to JR Matsue Station >

至「JR 松江駅」



Sanyo Shinkansen line: 「山陽新幹線」

(From Shin-Osaka to Okayama)



JR Express YAKUMO: 「JR 特急やくも」

(From Okayama to Matsue)

Traveling time is 3 hours 10 minutes.

< From Hakata Station to JR Matsue Station >

至「JR 松江駅」



Sanyo Shinkansen line: 「山陽新幹線」

(From Hakata to Okayama)



JR Express YAKUMO: 「JR 特急やくも」

(From Okayama to Matsue)

Traveling time is 4 hours 10 minutes.

< From JR Matsue Station to Kunibiki Messe >

自「JR 松江駅」

Walk 7 minutes from the station.

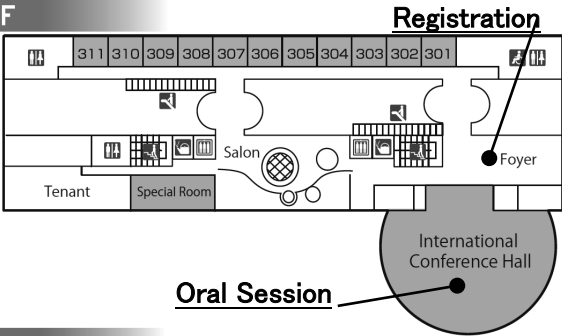
For more information, please refer to the following URL:

<http://www.kunibikimesse.jp/60.html>

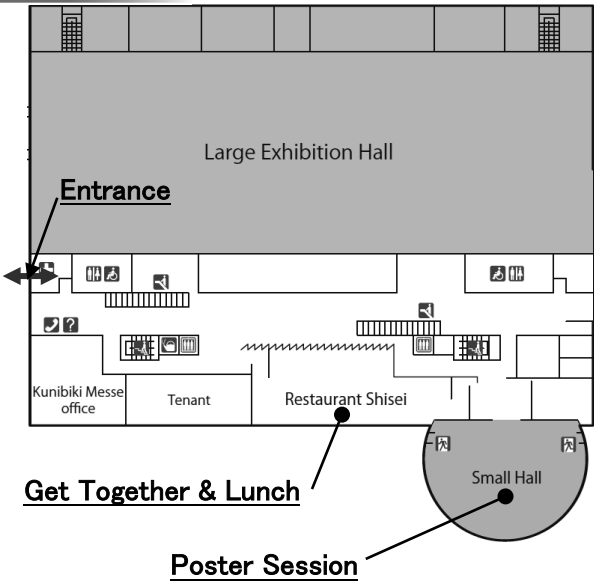
CONFERENCE SITE FLOOR

Kunibiki Messe Floor Map

3F



1F



Banquet is going to be held at the Matuse Excel Hotel Tokyu.
Please see the CITY AND HOTEL MAP.

HOTEL ACCOMMODATIONS

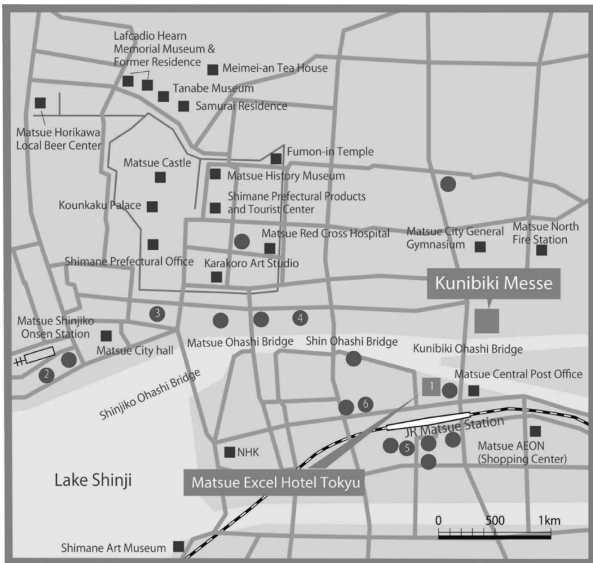
There are a lot of online booking sites in Japan. As the example, some of them are listed below. You can reserve your rooms in English at these sites. ISOM does not prepare any special blocks of rooms for the participants.

- JAPANiCAN.com
<http://www.japanican.com/>
- Japan Traveler Online
<http://japantraveleronline.com/>
- Rakuten Travel
<http://travel.rakuten.com/>
- Hotel Japan.com
<http://en.hoteljapan.com/>

Shown below are some candidate hotels near the ISOM'17 conference hall (Kunibiki Messe).

- Matsue Excel Hotel Tokyu
http://www.tokyuhotelsjapan.com/en/hotel/TE/TE_MATUE/index.html
- Hotel Ichibata
<http://www.ichibata.co.jp/hotel/stay/english.html>
- Matsue New Urban Hotel
<http://new.matsue-urban.co.jp/en/>
- Hotel ROUTE-INN Matsue
http://www.route-inn.co.jp.e.ut.hp.transer.com/language/hotel_detail.php?hotel_id=79
- Matsue Plaza Hotel
http://www.m-plazahotel.jp/annai/info_en.html
- Toyoko Inn Matsue Ekimae
http://www.toyoko-inn.com/e_hotel/00098/index.html

CITY AND HOTEL MAP



- 1 Matsue Excel Hotel Tokyu
- 2 Hotel Ichibata
- 3 Matsue New Urban Hotel
- 4 Hotel ROUTE-INN Matsue
- 5 Matsue Plaza Hotel
- 6 Toyoko Inn Matsue Ekimae

Example

- Facility
- Hotel
- Horikawa Sightseeing Boat Course
- Road

Kunibiki Messe

1-2-1 Gakuen Minami, Matsue City, Shimane, 690-0826

MEMO

MEMO

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