

Sunday, July 31

Registration  
3:00 PM - 6:00 PM

Monday, August 1

9:00 AM - 11:30 AM Plenary Session 1 (Main Hall)

Lunch

Mid-sized Hall A	Mid-sized Hall B	Small Hall	Room 104&105	Room 201&202	Room 206	Room 207	Conference Hall (Oval Room)	Room 107&108	Room 204
1:30 PM - 3:00 PM [CMP15A] New Technology	1:30 PM - 3:00 PM [CMP3A] THz Biology and Imaging	1:30 PM - 3:00 PM [CMP4A] High Power, High Energy Lasers I	1:30 PM - 3:00 PM [CMP11A] QD Devices and Crystal Growth Technology	2:00 PM - 3:00 PM [CMP9A] High Capacity Optical Transport I	1:30 PM - 3:00 PM [CMP14A] 2D and Nanocarbon Materials I	1:30 PM - 2:45 PM [CMP18A] THz Transmission System	1:30 PM - 2:30 PM [CMP2A] Ultrafast Measurement and Control	1:30 PM - 1:40 PM [ISOM-OP] Opening Remark 1:40 PM - 2:15 PM [IMPA] Keynote 2:15 PM - 3:00 PM [IMPB] Holography I	1:30 PM - 3:00 PM [CMP16A] Metamaterial Devices
Coffee Break									
4:00 PM - 5:00 PM [CMP15B] Hardware and System	3:30 PM - 5:30 PM [CMP3B] THz Source and Device	3:30 PM - 4:45 PM [CMP4B] High Power, High Energy Lasers II	3:30 PM - 5:15 PM [CMP11B] III/V Waveguide Devices	3:30 PM - 4:15 PM [CMP9B] Optical Transmission in Various Media	3:30 PM - 5:30 PM [CMP14B] 2D and Nanocarbon Materials II	3:30 PM - 5:30 PM [CMP18B] Devices and Subsystems for Microwave Photonics	3:30 PM - 4:15 PM [CMP2B] Strong Field Phenomena	3:30 PM - 4:45 PM [IMPC] Special Session: Biological Application 4:45 PM - 5:45 PM [IMPD] Imaging I	3:30 PM - 4:45 PM [CMP16B] Fabrication Technologies for Plasmonics and Metamaterials
Main Hall 6:00 PM - 8:00 PM Poster Session [P-CM2] [P-CM3] [P-CM9] [P-CM11] [P-CM15] [P-CM16] [P-CM18]									

Tuesday, August 2

Mid-sized Hall A	Mid-sized Hall B	Small Hall	Room 104&105	Room 201&202	Room 206	Room 207	Conference Hall (Oval Room)	Room 107&108	Room 204
9:00 AM - 10:30 AM [CTuA7A] Single Photon Sources		9:30 AM - 10:30 AM [CTuA16C] Plasmonics and Metamaterials for Sensing Applications	9:00 AM - 10:30 AM [CTuA11C] Thin-film LN and AlN Devices	9:00 AM - 10:15 AM [CTuA15C] Photothermal and Optical Force	9:00 AM - 10:30 AM [CTuA14C] 2D and Nanocarbon Materials III	9:30 AM - 10:30 AM [CTuA9C] Electrical Nonlinear Equalization	9:00 AM - 10:30 AM [CTuA1A] MIR Lasers	9:00 AM - 10:30 AM [ITuAE] Imaging II	10:00 AM - 10:30 AM [CTuA2C] Ultrafast Spectroscopy and Coherent Control I
Coffee Break									
	11:00 AM - 11:45 AM [CTuA18C] Microwave Signal Generation	11:00 AM - 12:00 PM [CTuA16D] Optical Trapping and Photon Manipulation	11:00 AM - 12:00 PM [CTuA11D] Silicon Photonics	11:00 AM - 12:00 PM [CTuA15D] Scattering and Diffuse Reflectance		11:00 AM - 12:00 PM [CTuA9D] Space Division Multiplexing	11:00 AM - 12:00 PM [CTuA1B] Soliton Fiber Lasers	11:00 AM - 11:45 AM [ITuAF] Optical Memory	11:00 AM - 12:00 PM Spectroscopy and Coherent Control II
Lunch									
1:30 PM - 3:00 PM [CTuP7B] Novel Quantum Systems	1:30 PM - 3:00 PM [CTuP1C] High Power Fiber Amplifier	1:30 PM - 3:00 PM [CTuP16E] Metamaterial Absorber and Thermal Devices	1:30 PM - 3:00 PM [CTuP11E] Novel Light-emitting and Detection Devices	1:30 PM - 2:45 PM [CTuP3C] THz Spectroscopy	1:30 PM - 3:00 PM [CTuP5A] Beam Manipulation and Applications	2:00 PM - 3:00 PM [CTuP9E] High Capacity Optical Transport II	1:30 PM - 2:45 PM [CTuP8A] Emission from Atoms, Quantum Wells, and Quantum Dots	1:30 PM - 2:00 PM [ITuPG] Special Invited 2:00 PM - 3:00 PM [ITuPH] Metamaterial	1:45 PM - 3:00 PM [CTuP6A] Chip-Scale Comb Sources
Coffee Break									
3:30 PM - 5:30 PM [CTuP7C] Quantum Optics with Atoms	3:30 PM - 5:15 PM [CTuPID] Fiber Lasers	3:30 PM - 4:00 PM [CTuP16F] THz Technologies	3:30 PM - 5:00 PM [CTuP11F] Novel Semiconductor Lasers	3:30 PM - 5:15 PM [CTuP3D] THz Detection, Sensing, and Manipulation	3:30 PM - 5:00 PM [CTuP5B] 3D and Volume Processing	3:30 PM - 5:00 PM [CTuP9F] Novel Concepts and Fundamentals	4:00 PM - 5:30 PM [CTuP8B] 2D Materials in Nanophotonics and Non-Hermitian Nanophotonics	3:30 PM - 5:15 PM [ITuPI] Holography II 5:15 PM - 5:45 PM [ITuPJ] Optical Information	3:30 PM - 5:30 PM [CTuP6B] MIR and THz Comb
Main Hall 6:00 PM - 8:00 PM [CTuW1] 1. Photonics in the fight against COVID-19 6:00 PM - 8:00 PM [P-CTu4] [P-CTu8] [P-CTu10] [P-CTu12] [P-CTu14] [P-CTu17] 6:00 PM - 8:00 PM [P-ITu] [P-IPDP] 6:00 PM - 8:45 PM [CTuW2] 3. State-of-the-Art to Next-Era LiDAR Technologies									

Wednesday, August 3

9:00 AM - 11:30 AM Plenary Session 2 (Main Hall)

Lunch

Mid-sized Hall A	Mid-sized Hall B	Small Hall	Room 104&105	Room 201&202	Room 206	Room 207	Conference Hall (Oval Room)	Room 107&108	Room 204
1:30 PM - 3:00 PM [CWP2E] Ultrashort Pulse Generation and Nonlinear Propagation I	1:30 PM - 3:00 PM [CWP16G] Theory and Fundamentals	1:30 PM - 3:00 PM [CWP17A] Session of Excellent Papers in Sensors and Systems	1:30 PM - 2:45 PM [CWP12A] Silicon Photonics Devices for Communications	1:30 PM - 3:00 PM [CWP19A] X-ray Lasers and Their Applications I	1:30 PM - 3:00 PM [CWP10A] Fiber Lasers and Amplifier Devices	1:30 PM - 3:00 PM [CWP13A] Optical Signal Processing for FSO and Sensing	1:30 PM - 3:10 PM [IWPK/OWP] ISOM/ODF Joint Session: Advanced Imaging Technologies		2:00 PM - 3:00 PM [CWP4C] High Power, High Energy Lasers III
Coffee Break									
3:30 PM - 5:15 PM [CWP2F] Ultrashort Pulse Generation and Nonlinear Propagation II	4:00 PM - 5:00 PM [CWP16H] Photon Emission Devices and Related Technologies	3:30 PM - 5:15 PM [CWP17B] Fiber-based Sensors and Systems	4:00 PM - 5:00 PM [CWP12B] Hybrid Material Integration for Silicon Photonics I	3:30 PM - 4:30 PM [CWP19B] X-ray Lasers and Their Applications II	3:30 PM - 5:30 PM [CWP10B] Passive and Active Waveguide Devices		3:30 PM - 5:05 PM [OWP1A] Optical Design/Simulation/Fabrication I	3:30 PM - 4:30 PM [IWPJ] Bio-Imaging 4:30 PM - 5:15 PM [IPDP] Post Deadline 5:15 PM - 5:30 PM [ISOM-CL] Award & Closing	

6:30 PM - 8:30 PM Banquet (Sapporo Park Hotel)

Thursday, August 4

8:15 AM - 8:45 AM Plenary Session 3 (Conference Hall (Oval Room))

Mid-sized Hall A	Mid-sized Hall B	Small Hall	Room 104&105	Room 201&202	Room 206	Room 207	Conference Hall (Oval Room)	Room 107&108	Room 204
9:30 AM - 10:30 AM [CThA2G] Attosecond Science and Technology I	9:00 AM - 10:30 AM [CThA1E] Wavelength Conversion and Laser Devices	9:00 AM - 10:30 AM [CThA8C] High-Q Microresonators and Their Applications	9:00 AM - 10:15 AM [CThA17C] LIDAR and Remote Sensing	9:00 AM - 10:45 AM [CThA13B] Photonic Computing I	9:00 AM - 10:30 AM [CThA10C] Fiber Nonlinearity and Devices	9:00 AM - 10:30 AM [CThA15E] Raman Imaging	8:50 AM - 10:40 AM [OThA1B] Optical Design/Simulation/Fabrication II	9:00 AM - 10:30 AM [CThA7D] Solid State Photonic Quantum Systems	9:00 AM - 10:30 AM [CThA6C] Comb Metrology I
Coffee Break									
11:00 AM - 12:00 PM [CThA2H] High Harmonic Generation in Condensed Matters	11:00 AM - 12:00 PM [CThA1F] Tutorial - Diamond Lasers -	11:00 AM - 12:00 PM [CThA8D] Topological Photonics I	11:00 AM - 12:00 PM [CThA17D] Micro/Nano Optical Sensors			11:00 AM - 12:00 PM [CThA15F] Localization	11:00 AM - 12:10 PM [OThA4A] New Technologies I	11:00 AM - 12:00 PM [CThA7E] Quantum Communication and Quantum Information Processing	11:00 AM - 12:00 PM [CThA6D] Comb Metrology II
Lunch									
1:30 PM - 3:00 PM [CThP2I] Attosecond Science and Technology II	1:30 PM - 3:00 PM [CThP1G] Diamond and Novel Lasers	1:30 PM - 3:00 PM [CThP8E] Plasmonics	1:30 PM - 3:00 PM [CThP17E] Biomedical Sensors and Systems I	2:00 PM - 3:00 PM [CThP12C] New Applications of Silicon Photonics	1:30 PM - 3:00 PM [CThP5C] Material Synthesis and Deposition	1:30 PM - 2:30 PM [CThP13C] Optical Signal Processing for Communication	1:30 PM - 3:05 PM [OThP4B] New Technologies II	2:00 PM - 3:00 PM [CThP7F] Generation and Measurement of Quantum States I	1:45 PM - 3:00 PM [CThP6E] Comb Metrology III
Coffee Break									
3:30 PM - 5:30 PM [CThP2J] Emerging Attosecond Science	3:30 PM - 5:30 PM [CThP1H] Solid State and Vortex Lasers	3:30 PM - 5:30 PM [CThP8F] Si and SiN Photonics	3:30 PM - 5:30 PM [CThP17F] Biomedical Sensors and Systems II	3:30 PM - 5:30 PM [CThP12D] Hybrid Material Integration for Silicon Photonics II	3:30 PM - 5:15 PM [CThP5D] Surface Micromachining and Nanostructuring	4:00 PM - 5:15 PM [CThP13D] Photonic Computing II	3:30 PM - 5:10 PM [OThP2A] Optical Components/Devices I	3:30 PM - 4:45 PM [CThP7G] Generation and Measurement of Quantum States II	3:30 PM - 5:15 PM [CThP6F] Advanced Comb Sources and Applications
Main Hall 6:00 PM - 8:00 PM [CThW3] 2. Photonics in the Quantum Era 6:00 PM - 8:00 PM [P-CTh1] [P-CTh5] [P-CTh6] [P-CTh7] [P-CTh13] 6:00 PM - 8:00 PM [P-Oth]									

Friday, August 5

Mid-sized Hall A	Mid-sized Hall B	Small Hall	Room 104&105	Room 201&202	Room 206	Room 207	Conference Hall (Oval Room)	Room 107&108	Room 204
9:30 AM - 10:30 AM [CFA7H] Quantum Optics and Information Theory	9:15 AM - 10:30 AM [CFA1I] Ultrafast Lasers and Frequency Combs	9:15 AM - 10:30 AM [CFA8G] Metasurface, Radiation Control, and Quantum Dots	9:15 AM - 10:15 AM [CFA17G] Interferometric Sensing				8:30 AM - 9:25 AM [OFA2B] Optical Components/Devices II 9:35 AM - 10:30 AM [OFA2C] Optical Components/Devices III	9:00 AM - 10:15 AM [CFA12E] Advanced Designs of Silicon Photonics Devices	9:00 AM - 10:30 AM [CFA6G] Precision Clock and Network
Coffee Break									
11:00 AM - 12:00 PM [CFA7I] Quantum Frequency Conversion	11:00 AM - 12:00 PM [CFA1J] Ultra-high Rep Lasers and Frequency Comb	11:00 AM - 11:45 AM [CFA8H] Topological Photonics II	11:00 AM - 11:45 AM [CFA17H] Spectroscopy Sensors and Systems				11:00 AM - 12:25 PM [OFA3A] Optical Systems I	11:00 AM - 12:00 PM [CFA12F] Novel Functional Silicon Photonics Devices	11:00 AM - 12:00 PM [CFA6H] Highly Sensitive Quantum Sensing
Lunch									
		1:30 PM - 3:00 PM [CFP8I] Photonic Crystal Waveguide Devices					1:30 PM - 3:05 PM [OFP3B] Optical Systems II		1:45 PM - 3:00 PM [CFP6I] Ultrafast and Highly Nonlinear Metrology
Coffee Break									
		3:30 PM - 5:00 PM [CFP8J] Nano Laser, Optical Trapping, and Chiral Photonics					3:30 PM - 4:45 PM [OFPSSA] Special Session "Optics for Life Sciences" I 4:55 PM - 5:45 PM [OFPSSB] Special Session "Optics for Life Sciences" II 5:45 PM - 6:15 PM [ODE-CL] Closing		3:30 PM - 4:45 PM [CFP6J] Applied Metrology and Sensing

Plenary CLEO-PR2022 ISOM '22  
ODF '22 Workshop Joint Session

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Plenary Session | Plenary | Plenary Session 1 (CLEO-PR2022/ISOM'22)

## Plenary Session 1 (CLEO-PR2022/ISOM'22)

Session Chairs: Takashige Omatsu (Chiba Univ.), Hiroyuki Tsuda (Keio Univ.), Tsutomu Shimura (Univ. of Tokyo)

Mon. Aug 1, 2022 9:00 AM - 11:30 AM Main Hall (2/3) (1F)

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- [OP]                    Opening Remark  
                          9:00 AM - 9:15 AM
- [Plenary1-C1] The Revolution of Silicon Photonics  
                          [Presentation Style] Onsite  
                          \*Michal Lipson<sup>1</sup> (1. Columbia University (United States of America))  
                          9:15 AM - 10:00 AM
- [Plenary1-C2] Optical Communication Systems: Scaling Capacity and Energy  
                          [Presentation Style] Online  
                          \*Peter J. Winzer<sup>1</sup> (1. Nubis Communications, Inc. (United States of America))  
                          10:00 AM - 10:45 AM
- [Plenary1-I1] Non-volatile memory for data storage and Neuromorphic Computing  
                          [Presentation Style] Onsite  
                          \*Chong Tow Chong<sup>1</sup>, Rong Zhao<sup>1</sup> (1. Singapore University of Technology and Design  
(Singapore))  
                          10:45 AM - 11:30 AM

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9:00 AM - 9:15 AM (Mon. Aug 1, 2022 9:00 AM - 11:30 AM Main Hall (2/3))

## [OP] Opening Remark

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9:15 AM - 10:00 AM (Mon. Aug 1, 2022 9:00 AM - 11:30 AM Main Hall (2/3))

## [Plenary1-C1] The Revolution of Silicon Photonics

### [Presentation Style] Onsite

\*Michal Lipson<sup>1</sup> (1. Columbia University (United States of America))

[Presentation Style] Onsite

We are now experiencing a revolution in optical technologies, where one can print and control massive optical circuits, on a microelectronic chip. This revolution is enabling a whole range of applications that are in need for scalable optical technologies and its opening the door to areas that only a decade ago were unimaginable.

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10:00 AM - 10:45 AM (Mon. Aug 1, 2022 9:00 AM - 11:30 AM Main Hall (2/3))

## [Plenary1-C2] Optical Communication Systems: Scaling Capacity and Energy

### [Presentation Style] Online

\*Peter J. Winzer<sup>1</sup> (1. Nubis Communications, Inc. (United States of America))

[Presentation Style] Online

We discuss the capacity scaling of optical communications from ultra-long-haul subsea cables to ultra-low-power intra-datacenter interconnects and show that massive spatial parallelism is the only sustainable option for the next decade and beyond.

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10:45 AM - 11:30 AM (Mon. Aug 1, 2022 9:00 AM - 11:30 AM Main Hall (2/3))

## [Plenary1-I1] Non-volatile memory for data storage and Neuromorphic Computing

### [Presentation Style] Onsite

\*Chong Tow Chong<sup>1</sup>, Rong Zhao<sup>1</sup> (1. Singapore University of Technology and Design (Singapore))

[Presentation Style] Onsite

Non-volatile memories (NVMs) have revolutionized modern data storage systems, especially boosting the performance of latency-sensitive applications. Recently, they have also emerged as an important technical avenue for building neuromorphic computing systems. This plenary will cover recent advances of NVMs and applications in these exciting fields, and discuss opportunities and challenges.

Oral Session | ISOM '22 | Opening Remark

## Opening Remark

Session Chair: Akinori Furuya (Tokushima Bunri Univ.)

Mon. Aug 1, 2022 1:30 PM - 1:40 PM Room 107&108 (1F)

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[OP] Opening Remark

1:30 PM - 1:40 PM

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Oral Session | ISOM '22 | Keynote

## Keynote

Session Chair: Kimihiro Saito (Kindai Univ. Tech. College)

Mon. Aug 1, 2022 1:40 PM - 2:15 PM Room 107&108 (1F)

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[IMPA-01 (Invited)] Control and Measurement of Biological Functions by Light with  
Optoelectronic Devices

[Presentation Style] Onsite

\*Jun Ohta<sup>1</sup> (1. Nara Inst. of Sci. and Tech. (Japan))

1:40 PM - 2:15 PM

1:40 PM - 2:15 PM (Mon. Aug 1, 2022 1:40 PM - 2:15 PM Room 107&108)

[IMPA-01 (Invited)] Control and Measurement of Biological Functions by  
Light with Optoelectronic Devices  
[Presentation Style] Onsite

\*Jun Ohta<sup>1</sup> (1. Nara Inst. of Sci. and Tech. (Japan))

[Presentation Style] Onsite

This review describes the current status of the measurement and control of biological functions using light under free-moving conditions with the latest optoelectronic devices and discusses their challenges and prospects.

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Oral Session | ISOM '22 | Holography I

## Holography I

Session Chair: Yuichi Nakamura (Toyohashi Univ. Tech.)

Mon. Aug 1, 2022 2:15 PM - 3:00 PM Room 107&108 (1F)

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[IMPB-01] Acoustic Wave Measurement by Temporal and Spatial Heterodyne Digital Holography

[Presentation Style] Onsite

\*Daisuke Barada<sup>1</sup>, Shunki Ishibashi<sup>1</sup>, Yuri Morita<sup>1</sup> (1. Utsunomiya Univ. (Japan))

2:15 PM - 2:30 PM

[IMPB-02] Measuring Phase Distribution of a Half-Ball Lens using Phase Retrieval Holography with Two Holograms

\*Yohsuke Tanaka<sup>1</sup>, Takuma Matsumura<sup>1</sup>, Dai Nakai<sup>1</sup> (1. Kyoto Inst. Tech. (Japan))

2:30 PM - 2:45 PM

[IMPB-03] Study on a Holographic Pattern and its Spectral Distribution Formed by Two Approaching Spheres

[Presentation Style] Onsite

\*Dai Nakai<sup>1</sup>, Yohsuke Tanaka<sup>1</sup> (1. Kyoto Inst. of Tech. (Japan))

2:45 PM - 3:00 PM

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2:15 PM - 2:30 PM (Mon. Aug 1, 2022 2:15 PM - 3:00 PM Room 107&108)

## [IMPB-01] Acoustic Wave Measurement by Temporal and Spatial Heterodyne Digital Holography

[Presentation Style] Onsite

\*Daisuke Barada<sup>1</sup>, Shunki Ishibashi<sup>1</sup>, Yuri Morita<sup>1</sup> (1. Utsunomiya Univ. (Japan))

[Presentation Style] Onsite

The vibration of a stain-less steel plane was measured by our proposed method based on heterodyne digital holography. The wave shape of the acoustic wave was reconstructed by temporal and spatial Fourier analysis.

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2:30 PM - 2:45 PM (Mon. Aug 1, 2022 2:15 PM - 3:00 PM Room 107&108)

## [IMPB-02] Measuring Phase Distribution of a Half-Ball Lens using Phase Retrieval Holography with Two Holograms

\*Yohsuke Tanaka<sup>1</sup>, Takuma Matsumura<sup>1</sup>, Dai Nakai<sup>1</sup> (1. Kyoto Inst. Tech. (Japan))

We numerically apply phase retrieval holography with two holograms to measure the phase distribution of a half-ball lens. Results indicate the good agreement of the theoretical result to the numerical values with root-mean-square errors of 0.27 rad.

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2:45 PM - 3:00 PM (Mon. Aug 1, 2022 2:15 PM - 3:00 PM Room 107&108)

## [IMPB-03] Study on a Holographic Pattern and its Spectral Distribution Formed by Two Approaching Spheres

[Presentation Style] Onsite

\*Dai Nakai<sup>1</sup>, Yohsuke Tanaka<sup>1</sup> (1. Kyoto Inst. of Tech. (Japan))

[Presentation Style] Onsite

We compare numerically generated holograms with theoretical formulas for holographic patterns formed by a pair of approaching spheres. The numerically generated holograms can be fitted to the theoretical formula, suggesting that the sphere spacing can be estimated.



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Oral Session | ISOM '22 | Special Session: Biological Application

## Special Session: Biological Application

Session Chairs: Takayuki Shima (AIST), Ryuichi Katayama (Fukuoka Inst. of Tech.)

Mon. Aug 1, 2022 3:30 PM - 4:45 PM Room 107&108 (1F)

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[IMPC-01 (Invited)] Flow Cytometer system using optical disc technologies

[Presentation Style] Onsite

\*Motohiro Furuki<sup>1</sup> (1. Sony Corp. (Japan))

3:30 PM - 4:00 PM

[IMPC-02] Time-Lapse Imaging of Mouse Brain through Intact Skull Using a Label-Free Computational Conjugate Adaptive Optical Microscopy

[Presentation Style] Online

\*Yongwoo Kwon<sup>1,2</sup>, Seokchan Yoon<sup>1,2</sup>, Jin Hee Hong<sup>1,2</sup>, Sungsam Kang<sup>1,2</sup>, Hojun Lee<sup>3</sup>, Wonshik Choi<sup>1,2</sup> (1. Institute for Basic Science (Korea), 2. Korea Univ. (Korea), 3. Samsung Electronics Corp., Ltd (Korea))

4:00 PM - 4:15 PM

[IMPC-03] Deep Learning for Automatic Detection of Neural Canal Opening in Optical Coherence Tomography Images

[Presentation Style] Online

\*Jia-Ling Tu<sup>1</sup>, Chieh-En Lee<sup>1</sup>, Chung-Hao Tien<sup>1</sup> (1. National Yang Ming Chiao Tung University (Taiwan))

4:15 PM - 4:30 PM

[IMPC-04] Real-Time Fall Detection for Embedded System Using Deep Learning

[Presentation Style] Online

\*Chih-Chieh Yang<sup>1</sup>, Chieh-En Lee<sup>1</sup>, Tzu-Yuan Huang<sup>1</sup>, Chung-Hao Tien<sup>1</sup> (1. National Yang Ming Chiao Tung Univ. (Taiwan))

4:30 PM - 4:45 PM

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3:30 PM - 4:00 PM (Mon. Aug 1, 2022 3:30 PM - 4:45 PM Room 107&108)

## [IMPC-01 (Invited)] Flow Cytometer system using optical disc technologies

[Presentation Style] Onsite

\*Motohiro Furuki<sup>1</sup> (1. Sony Corp. (Japan))

[Presentation Style] Onsite

To improve stability and ease-of-use, Sony Flow Cytometer allows direct monitoring of particle flow status using technology originally developed for the optical disc technologies that delivers error free performance while operating at very high speed.

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4:00 PM - 4:15 PM (Mon. Aug 1, 2022 3:30 PM - 4:45 PM Room 107&108)

## [IMPC-02] Time-Lapse Imaging of Mouse Brain through Intact Skull Using a Label-Free Computational Conjugate Adaptive Optical Microscopy

[Presentation Style] Online

\*Yongwoo Kwon<sup>1,2</sup>, Seokchan Yoon<sup>1,2</sup>, Jin Hee Hong<sup>1,2</sup>, Sungsam Kang<sup>1,2</sup>, Hojun Lee<sup>3</sup>, Wonshik Choi<sup>1,2</sup> (1. Institute for Basic Science (Korea), 2. Korea Univ. (Korea), 3. Samsung Electronics Corp., Ltd (Korea))

[Presentation Style] Online

We implemented a computational conjugate adaptive optical microscopy system using a 1.3- $\mu$ m wavelength laser and conducted *in vivo* imaging of a 3- to 10-week-old mouse brain with an intact skull and observed myelination process

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4:15 PM - 4:30 PM (Mon. Aug 1, 2022 3:30 PM - 4:45 PM Room 107&108)

## [IMPC-03] Deep Learning for Automatic Detection of Neural Canal Opening in Optical Coherence Tomography Images

[Presentation Style] Online

\*Jia-Ling Tu<sup>1</sup>, Chieh-En Lee<sup>1</sup>, Chung-Hao Tien<sup>1</sup> (1. National Yang Ming Chiao Tung University (Taiwan))

[Presentation Style] Online

Neural canal opening (NCO) represents the crucial landmarks in an optical coherence tomography image. The objective of optic nerve head (ONH) segmentation is transformed into a binary classification and NCO localization tasks via deep learning.

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4:30 PM - 4:45 PM (Mon. Aug 1, 2022 3:30 PM - 4:45 PM Room 107&108)

## [IMPC-04] Real-Time Fall Detection for Embedded System Using Deep Learning

## [Presentation Style] Online

\*Chih-Chieh Yang<sup>1</sup>, Chieh-En Lee<sup>1</sup>, Tzu-Yuan Huang<sup>1</sup>, Chung-Hao Tien<sup>1</sup> (1. National Yang Ming Chiao Tung Univ. (Taiwan))

[Presentation Style] Online

In this study, we developed an embedded visual system which can real-time detect the falls by depth video in multiple views. Based on MoViNets, we successfully achieved 99.21% accuracy under 380 testing events.

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Oral Session | ISOM '22 | Imaging I

## Imaging I

Session Chairs: Yusuke Nakamura (Hitachi), Tetsuhiko Muroi (NHK)

Mon. Aug 1, 2022 4:45 PM - 5:45 PM Room 107&108 (1F)

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### [IMPD-01] BRDF color mapping using line scan camera

[Presentation Style] Onsite

\*Hiroshi Ohno<sup>1</sup>, Hiroya Kano<sup>1</sup> (1. Toshiba Corp. (Japan))

4:45 PM - 5:00 PM

### [IMPD-02] Development of a Near-Infrared Imaging System for Identifying Microplastics in Water

[Presentation Style] Onsite

\*Takayuki Shima<sup>1</sup>, Hiromitsu Furukawa<sup>1</sup>, Yuki Okamoto<sup>1</sup>, Wataru Iwasaki<sup>1</sup>, Masaaki Ichiki<sup>1</sup> (1.

National Inst. of Advanced Indus. Sci. and Tech. (Japan))

5:00 PM - 5:15 PM

### [IMPD-04] Modeling, Simulation, and Inpainting Methods of the Skylight Polarization Pattern in Urban Environments

[Presentation Style] Online

\*Qianhui Li<sup>1</sup>, Yao Hu<sup>1</sup>, Shaohui Zhang<sup>1</sup>, Qun Hao<sup>1</sup>, Liqun Dong<sup>1</sup> (1. Beijing Inst. of Tech. (China))

5:30 PM - 5:45 PM

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4:45 PM - 5:00 PM (Mon. Aug 1, 2022 4:45 PM - 5:45 PM Room 107&108)

## [IMPD-01] BRDF color mapping using line scan camera

[Presentation Style] Onsite

\*Hiroshi Ohno<sup>1</sup>, Hiroya Kano<sup>1</sup> (1. Toshiba Corp. (Japan))

[Presentation Style] Onsite

Optical imaging system of BRDF (Bidirectional Reflectance Distribution Function) color mapping using line scan camera is proposed here that can clearly obtain BRDF changes generated by surface micro-structures, which enables high-precision optical inspection of product surfaces.

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5:00 PM - 5:15 PM (Mon. Aug 1, 2022 4:45 PM - 5:45 PM Room 107&108)

## [IMPD-02] Development of a Near-Infrared Imaging System for Identifying Microplastics in Water

[Presentation Style] Onsite

\*Takayuki Shima<sup>1</sup>, Hiromitsu Furukawa<sup>1</sup>, Yuki Okamoto<sup>1</sup>, Wataru Iwasaki<sup>1</sup>, Masaaki Ichiki<sup>1</sup> (1. National Inst. of Advanced Indus. Sci. and Tech. (Japan))

[Presentation Style] Onsite

We have developed a near-infrared imaging system to automatically evaluate various properties of the microplastics. We have succeeded in obtaining images and identifying at least four types of materials set in water.

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5:30 PM - 5:45 PM (Mon. Aug 1, 2022 4:45 PM - 5:45 PM Room 107&108)

## [IMPD-04] Modeling, Simulation, and Inpainting Methods of the Skylight Polarization Pattern in Urban Environments

[Presentation Style] Online

\*Qianhui Li<sup>1</sup>, Yao Hu<sup>1</sup>, Shaohui Zhang<sup>1</sup>, Qun Hao<sup>1</sup>, Liquan Dong<sup>1</sup> (1. Beijing Inst. of Tech. (China))

[Presentation Style] Online

This paper introduces the idea of image inpainting to the skylight polarization pattern, and presents a set of modeling and simulation methods to generate urban polarization patterns to compare three inpainting algorithms.

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Oral Session | ISOM '22 | Imaging II

## Imaging II

Session Chairs: Shuhei Yoshida (Kindai Univ.), Masanori Takabayashi (Kyushu Inst. Tech.)

Tue. Aug 2, 2022 9:00 AM - 10:30 AM Room 107&108 (1F)

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[ITuAE-01 (Invited)] Computational Imaging with Randomness

[Presentation Style] Onsite

\*Ryoichi Horisaki<sup>1</sup> (1. The Univ. of Tokyo (Japan))

9:00 AM - 9:30 AM

[ITuAE-02 (Invited)] Holography for full-color 3D imaging of natural light with single-path interferometer

[Presentation Style] Onsite

\*Tatsuki Tahara<sup>1</sup>, Yuichi Kozawa<sup>2</sup>, Ayumi Ishii<sup>3</sup>, Ryo Okamoto<sup>4</sup> (1. National Institute of Information and Communications Technology (NICT) (Japan), 2. Tohoku University (Japan), 3. Teikyo University of Science (Japan), 4. Kyoto University (Japan))

9:30 AM - 10:00 AM

[ITuAE-03] Coded Aperture Imaging for Super-Resolution Using Inverted Coding Patterns

[Presentation Style] Online

\*Yutaro Katano<sup>1</sup>, Masahiro Usui<sup>1</sup>, Teruyoshi Nobukawa<sup>1</sup>, Kei Hagiwara<sup>1</sup>, Tetsuhiko Muroi<sup>1</sup> (1. Japan Broadcasting Corporation (Japan))

10:00 AM - 10:15 AM

[ITuAE-04] Phase Distortion Suppression by Deep Neural Network-Based Single-Pixel Imaging

[Presentation Style] Onsite

\*Moe Sakurai<sup>1</sup>, Hiroki Takahara<sup>1</sup>, Shuntaro Aragaki<sup>1</sup>, Kaito Nakao<sup>1</sup>, Taku Hoshizawa<sup>1</sup>, Eriko Watanabe<sup>1</sup> (1. The Univ. Electro-Communications (Japan))

10:15 AM - 10:30 AM

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9:00 AM - 9:30 AM (Tue. Aug 2, 2022 9:00 AM - 10:30 AM Room 107&108)

## [ITuAE-01 (Invited)] Computational Imaging with Randomness [Presentation Style] Onsite

\*Ryoichi Horisaki<sup>1</sup> (1. The Univ. of Tokyo (Japan))

[Presentation Style] Onsite

Computational imaging is a framework of optics incorporating image processing. Recent progress in information science, e.g., deep learning, has enhanced the impact of this area. I will present our research activity related to computational imaging.

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9:30 AM - 10:00 AM (Tue. Aug 2, 2022 9:00 AM - 10:30 AM Room 107&108)

## [ITuAE-02 (Invited)] Holography for full-color 3D imaging of natural light with single-path interferometer [Presentation Style] Onsite

\*Tatsuki Tahara<sup>1</sup>, Yuichi Kozawa<sup>2</sup>, Ayumi Ishii<sup>3</sup>, Ryo Okamoto<sup>4</sup> (1. National Institute of Information and Communications Technology (NICT) (Japan), 2. Tohoku University (Japan), 3. Teikyo University of Science (Japan), 4. Kyoto University (Japan))

[Presentation Style] Onsite

We present single-path digital holography techniques that consider temporal coherency for full-color three-dimensional (3D) imaging of natural light. Optical systems have been constructed and single-shot full-color 3D imaging of natural light has been experimentally performed.

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10:00 AM - 10:15 AM (Tue. Aug 2, 2022 9:00 AM - 10:30 AM Room 107&108)

## [ITuAE-03] Coded Aperture Imaging for Super-Resolution Using Inverted Coding Patterns [Presentation Style] Online

\*Yutaro Katano<sup>1</sup>, Masahiro Usui<sup>1</sup>, Teruyoshi Nobukawa<sup>1</sup>, Kei Hagiwara<sup>1</sup>, Tetsuhiko Muroi<sup>1</sup> (1. Japan Broadcasting Corporation (Japan))

[Presentation Style] Online

We developed a coded aperture imaging-based super-resolution method using two encoded images with negative-positive inversion for speeding up the shooting process and improving the image quality.

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10:15 AM - 10:30 AM (Tue. Aug 2, 2022 9:00 AM - 10:30 AM Room 107&108)

## [ITuAE-04] Phase Distortion Suppression by Deep Neural Network-Based Single-Pixel Imaging [Presentation Style] Onsite

\*Moe Sakurai<sup>1</sup>, Hiroki Takahara<sup>1</sup>, Shuntaro Aragaki<sup>1</sup>, Kaito Nakao<sup>1</sup>, Taku Hoshizawa<sup>1</sup>, Eriko Watanabe<sup>1</sup> (1. The Univ. Electro-Communications (Japan))

[Presentation Style] Onsite

We experimentally demonstrate the suppression of time-fluctuating spatial noise using a deep neural-network-based single-pixel imaging system. To quantify the time-fluctuating spatial noise, we express the spatial noise as phase plane distortions based on the Kolmogorov theory.



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Oral Session | ISOM '22 | Optical Memory

## Optical Memory

Session Chair: Satoru Higashino (Sony Storage Media Solutions)

Tue. Aug 2, 2022 11:00 AM - 11:45 AM Room 107&108 (1F)

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[ITuAF-01] Multibeam crosstalk cancellation method with binarized data for optical disc readout

[Presentation Style] Onsite

\*Kimihiro Saito<sup>1</sup> (1. Kindai Univ. Tech. College (Japan))

11:00 AM - 11:15 AM

[ITuAF-02] Effects of Al or Ga substitution on the optical properties of Bi-substituted rare earth iron garnets for magnetic hologram memory

[Presentation Style] Onsite

\*Yuichi Nakamura<sup>1</sup>, Shingo Korekawa<sup>1</sup>, Hideya Aoki<sup>1</sup>, Shinichiro Mito<sup>2</sup>, Pang Boey Lim<sup>1</sup> (1.

Toyohashi University of Technology (Japan), 2. National Institute of Technology, Tokyo College (Japan))

11:15 AM - 11:30 AM

[ITuAF-03] Reducing inter-crosstalk in collinear holographic storage system based on phase coding of reference light

[Presentation Style] Online

\*Haiyang Song<sup>1</sup>, Jianan Li<sup>1</sup>, Junchao Jin<sup>1</sup>, Dakui Lin<sup>1</sup>, Xiao Lin<sup>1</sup>, Xiaodi Tan<sup>1</sup> (1. Fujian Normal Univ. (China))

11:30 AM - 11:45 AM

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11:00 AM - 11:15 AM (Tue. Aug 2, 2022 11:00 AM - 11:45 AM Room 107&108)

[ITuAF-01] Multibeam crosstalk cancellation method with binarized data  
for optical disc readout

[Presentation Style] Onsite

\*Kimihiro Saito<sup>1</sup> (1. Kindai Univ. Tech. College (Japan))

[Presentation Style] Onsite

An improved method for canceling crosstalk from adjacent tracks using multibeam readout, which employs binarized data decoded from the readout signal of subspots is described. Its principle and computer simulation results are shown.

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11:15 AM - 11:30 AM (Tue. Aug 2, 2022 11:00 AM - 11:45 AM Room 107&108)

[ITuAF-02] Effects of Al or Ga substitution on the optical properties of Bi-  
substituted rare earth iron garnets for magnetic hologram  
memory

[Presentation Style] Onsite

\*Yuichi Nakamura<sup>1</sup>, Shingo Korekawa<sup>1</sup>, Hideya Aoki<sup>1</sup>, Shinichiro Mito<sup>2</sup>, Pang Boey Lim<sup>1</sup> (1. Toyohashi University of Technology (Japan), 2. National Institute of Technology, Tokyo College (Japan))

[Presentation Style] Onsite

The effects of Al or Ga substitution on the optical properties of Bi-substituted yttrium iron garnets. The figure of merit of the (Bi,Al):YIG was higher than that of the (Bi,Ga):YIG.

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11:30 AM - 11:45 AM (Tue. Aug 2, 2022 11:00 AM - 11:45 AM Room 107&108)

[ITuAF-03] Reducing inter-crosstalk in collinear holographic storage  
system based on phase coding of reference light

[Presentation Style] Online

\*Haiyang Song<sup>1</sup>, Jianan Li<sup>1</sup>, Junchao Jin<sup>1</sup>, Dakui Lin<sup>1</sup>, Xiao Lin<sup>1</sup>, Xiaodi Tan<sup>1</sup> (1. Fujian Normal Univ. (China))

[Presentation Style] Online

This paper compares sector and random orthogonal phase coded reference light method to the cross-talk caused by phase multiplexing by reference light in the collinear holographic storage system.

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Oral Session | ISOM '22 | ISOM '23 Announcement & Photo

## ISOM '23 Announcement &Photo

Session Chair: Akinori Furuya (Tokushima Bunri Univ.)

Tue. Aug 2, 2022 11:45 AM - 12:00 PM Room 107&108 (1F)

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[A/P(ISOM)] ISOM'23 Announcement &Photo

11:45 AM - 12:00 PM

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11:45 AM - 12:00 PM (Tue. Aug 2, 2022 11:45 AM - 12:00 PM Room 107&108)

## [A/P(ISOM)] ISOM'23 Announcement &Photo

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Oral Session | ISOM '22 | Special Invited

## Special Invited

Session Chair: Tetsuhiko Muroi (NHK)

Tue. Aug 2, 2022 1:30 PM - 2:00 PM Room 107&108 (1F)

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[ITuPG-01 (Invited)] Exploitation of the whole Information Content of the Light Field  
for the Inspection of Micro- and Nano-Components:  
Approaches & Limitations  
[Presentation Style] Onsite

\*Wolfgang Osten<sup>1</sup>, Maria Laura Goedecke (1. Univ. Stuttgart (Germany))

1:30 PM - 2:00 PM

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1:30 PM - 2:00 PM (Tue. Aug 2, 2022 1:30 PM - 2:00 PM Room 107&108)

[ITuPG-01 (Invited)] Exploitation of the whole Information Content of the  
Light Field for the Inspection of Micro- and Nano-  
Components: Approaches & Limitations  
[Presentation Style] Onsite

\*Wolfgang Osten<sup>1</sup>, Maria Laura Goedecke (1. Univ. Stuttgart (Germany))

[Presentation Style] Onsite

The current challenges for optical metrology and the physical limitations are addressed. Afterwards a systematization of existing approaches for resolution enhancement is presented and some modern approaches taking into account the whole information content of the light field are discussed.

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Oral Session | ISOM '22 | Metamaterial

## Metamaterial

Session Chair: Minoru Takeda (Kyoto Inst. Tech.)

Tue. Aug 2, 2022 2:00 PM - 3:00 PM Room 107&108 (1F)

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[ITuPH-01 (Invited)] Artificial Intelligent Meta-optic Imaging and Edge-sensing  
[Presentation Style] Online

\*Mu Ku Chen<sup>1</sup>, Xiaoyuan Liu<sup>1</sup>, Yubin Fan<sup>1</sup>, Jin Yao<sup>1</sup>, Yao Liang<sup>1</sup>, Jingcheng Zhang<sup>1</sup>,  
Linshan Sun<sup>1</sup>, Din Ping Tsai<sup>1</sup> (1. City University of Hong Kong (Hong Kong))

2:00 PM - 2:30 PM

[ITuPH-02 (Invited)] Metamaterial infrared absorber and infrared spectroscopy  
[Presentation Style] Onsite

\*Takuo Tanaka<sup>1,2,3</sup> (1. RIKEN Cluster for Pioneering Res. (Japan), 2. RIKEN Ctr. for  
Advanced Photonics (Japan), 3. Tokushima Univ. (Japan))

2:30 PM - 3:00 PM

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2:00 PM - 2:30 PM (Tue. Aug 2, 2022 2:00 PM - 3:00 PM Room 107&108)

## [ITuPH-01 (Invited)] Artificial Intelligent Meta-optic Imaging and Edge-sensing

[Presentation Style] Online

\*Mu Ku Chen<sup>1</sup>, Xiaoyuan Liu<sup>1</sup>, Yubin Fan<sup>1</sup>, Jin Yao<sup>1</sup>, Yao Liang<sup>1</sup>, Jingcheng Zhang<sup>1</sup>, Linshan Sun<sup>1</sup>, Din Ping Tsai<sup>1</sup> (1. City University of Hong Kong (Hong Kong))

[Presentation Style] Online

We developed a meta-lens array based light field imaging system for full-color imaging, depth perception, edge detection and intelligent sensing. We reported the design, fabrication, and applications of the intelligent meta-lens.

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2:30 PM - 3:00 PM (Tue. Aug 2, 2022 2:00 PM - 3:00 PM Room 107&108)

## [ITuPH-02 (Invited)] Metamaterial infrared absorber and infrared spectroscopy

[Presentation Style] Onsite

\*Takuo Tanaka<sup>1,2,3</sup> (1. RIKEN Cluster for Pioneering Res. (Japan), 2. RIKEN Ctr. for Advanced Photonics (Japan), 3. Tokushima Univ. (Japan))

[Presentation Style] Onsite

Metamaterial absorbers and their application for infrared spectroscopy are discussed. Using metal-insulator-metal metamaterial absorber, 1.8 attomole sensitivity was demonstrated. Metamaterials-nanofluidic hybrid device and 3D metamaterial absorber were proposed for liquid and gas samples.



## Holography II

Session Chairs: Daisuke Barada (Utsunomiya Univ.), Xiaodi Tan (Fujian Normal Univ.)

Tue. Aug 2, 2022 3:30 PM - 5:15 PM Room 107&108 (1F)

### [ITuPI-01 (Invited)] Linear Polarization Holography and its Characteristics

[Presentation Style] Onsite

\*Xiaodi Tan<sup>1</sup>, Jingyu Wang<sup>1</sup>, Lu Huang<sup>1</sup>, Shujun Zheng<sup>1</sup>, Peiliang Qi<sup>1</sup>, Xianmiao Xu<sup>1</sup>, Ayuan Lin<sup>1</sup>, Shenghui Ke<sup>1</sup>, Tian Ye<sup>1</sup>, Xinyi Yuan<sup>1</sup>, Zhiyun Huang<sup>1</sup>, Lili Zhu<sup>1</sup>, Yuanying Zhang<sup>1</sup>, Yi Yang<sup>1</sup>, Yuhong Ren<sup>1</sup> (1. Fujian Normal University (China))

3:30 PM - 4:00 PM

### [ITuPI-02 (Invited)] Holographic projection using phase-only spatial light modulators

[Presentation Style] Onsite

\*Tomoyoshi Shimobaba<sup>1</sup>, Michal Makowski<sup>2</sup>, Takashi Kakue<sup>1</sup>, Tomoyoshi Ito<sup>1</sup> (1. Chiba University (Japan), 2. Warsaw University of Technology (Poland))

4:00 PM - 4:30 PM

### [ITuPI-03] Synthetic Aperture with Image Interpolation for Incoherent Digital Holography

[Presentation Style] Online

\*Masahide Goto<sup>1</sup>, Teruyoshi Nobukawa<sup>1</sup>, Yutaro Katano<sup>1</sup>, Kei Hagiwara<sup>1</sup>, Tetsuhiko Muroi<sup>1</sup> (1. Japan Broadcasting Corporation (NHK) (Japan))

4:30 PM - 4:45 PM

### [ITuPI-04] High bandwidth-utilization digital holographic multiplexing microscope

[Presentation Style] Online

\*Zhengzhong Huang<sup>1</sup>, Liangcai Cao<sup>1</sup> (1. Tsinghua Univ. (China))

4:45 PM - 5:00 PM

### [ITuPI-05] Phase-Only Hologram by Angular Spectrum Method Using Padded Gerchberg-Saxton Algorithm

[Presentation Style] Online

\*Zehao He<sup>1</sup>, Liangcai Cao<sup>1</sup> (1. Tsinghua Univ. (China))

5:00 PM - 5:15 PM

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3:30 PM - 4:00 PM (Tue. Aug 2, 2022 3:30 PM - 5:15 PM Room 107&108)

## [ITuPI-01 (Invited)] Linear Polarization Holography and its Characteristics

[Presentation Style] Onsite

\*Xiaodi Tan<sup>1</sup>, Jingyu Wang<sup>1</sup>, Lu Huang<sup>1</sup>, Shujun Zheng<sup>1</sup>, Peiliang Qi<sup>1</sup>, Xianmiao Xu<sup>1</sup>, Ayuan Lin<sup>1</sup>, Shenghui Ke<sup>1</sup>, Tian Ye<sup>1</sup>, Xinyi Yuan<sup>1</sup>, Zhiyun Huang<sup>1</sup>, Lili Zhu<sup>1</sup>, Yuanying Zhang<sup>1</sup>, Yi Yang<sup>1</sup>, Yuhong Ren<sup>1</sup> (1. Fujian Normal University (China))

[Presentation Style] Onsite

Polarization holography is a newly researched field, that has gained traction with the development of tensor theory. In this paper, fundamental research on polarization holography with linear polarized wave and its applications have been reviewed.

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4:00 PM - 4:30 PM (Tue. Aug 2, 2022 3:30 PM - 5:15 PM Room 107&108)

## [ITuPI-02 (Invited)] Holographic projection using phase-only spatial light modulators

[Presentation Style] Onsite

\*Tomoyoshi Shimobaba<sup>1</sup>, Michal Makowski<sup>2</sup>, Takashi Kakue<sup>1</sup>, Tomoyoshi Ito<sup>1</sup> (1. Chiba University (Japan), 2. Warsaw University of Technology (Poland))

[Presentation Style] Onsite

Holographic projectors using phase-only spatial light modulators degrades the quality of the projected image. This study overcomes this drawback by using two techniques: a deep learning approach and binary amplitude coding.

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4:30 PM - 4:45 PM (Tue. Aug 2, 2022 3:30 PM - 5:15 PM Room 107&108)

## [ITuPI-03] Synthetic Aperture with Image Interpolation for Incoherent Digital Holography

[Presentation Style] Online

\*Masahide Goto<sup>1</sup>, Teruyoshi Nobukawa<sup>1</sup>, Yutaro Katano<sup>1</sup>, Kei Hagiwara<sup>1</sup>, Tetsuhiko Muroi<sup>1</sup> (1. Japan Broadcasting Corporation (NHK) (Japan))

[Presentation Style] Online

We present a synthetic aperture method with image interpolation for an incoherent digital holography system. We apply the proposed method to captured holograms and observe an improvement in image quality of the reconstructed images.

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4:45 PM - 5:00 PM (Tue. Aug 2, 2022 3:30 PM - 5:15 PM Room 107&108)

## [ITuPI-04] High bandwidth-utilization digital holographic multiplexing microscope

[Presentation Style] Online

\*Zhengzhong Huang<sup>1</sup>, Liangcai Cao<sup>1</sup> (1. Tsinghua Univ. (China))

[Presentation Style] Online

We proposed an extended field-of-view digital holographic microscope based on high bandwidth-utilization holographic multiplexing technology. It performs scan-free quantitative optical imaging for both amplitude and phase reconstruction without imposing any constraints on the sample.

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5:00 PM - 5:15 PM (Tue. Aug 2, 2022 3:30 PM - 5:15 PM Room 107&108)

## [ITuPI-05] Phase-Only Hologram by Angular Spectrum Method Using Padded Gerchberg-Saxton Algorithm

[Presentation Style] Online

\*Zehao He<sup>1</sup>, Liangcai Cao<sup>1</sup> (1. Tsinghua Univ. (China))

[Presentation Style] Online

An angular spectrum method using the padded Gerchberg-Saxton algorithm is presented. The holographic reconstructions present high contrasts, sharp details, and weak speckle noises. The proposed method can be also used in holographic three-dimensional displays.

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Oral Session | ISOM '22 | Optical Information

## Optical Information

Session Chair: Hiroshi Ohno (Toshiba)

Tue. Aug 2, 2022 5:15 PM - 5:45 PM Room 107&108 (1F)

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[ITuPJ-01] Dependence of activation function on image recognition accuracy in self-referential holographic deep neural network

[Presentation Style] Onsite

\*Rio Tomioka<sup>1</sup>, Masanori Takabayashi<sup>1</sup> (1. Kyushu Inst. of Tech. (Japan))

5:15 PM - 5:30 PM

[ITuPJ-02] Scattering-type optical encryption system for face recognition

\*Ming-Hsuan Wu<sup>1</sup>, Ya-Ti Chang Lee<sup>1</sup>, Chung-Hao Tien<sup>1</sup> (1. National Yang Ming Chiao Tung University (Taiwan))

5:30 PM - 5:45 PM

**No Show, Cancelled**

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5:15 PM - 5:30 PM (Tue. Aug 2, 2022 5:15 PM - 5:45 PM Room 107&108)

[ITuPJ-01] Dependence of activation function on image recognition accuracy in self-referential holographic deep neural network  
[Presentation Style] Onsite

\*Rio Tomioka<sup>1</sup>, Masanori Takabayashi<sup>1</sup> (1. Kyushu Inst. of Tech. (Japan))

[Presentation Style] Onsite

We numerically compared the image recognition properties of self-referential holographic deep neural network (SR-HDNN) with various activation functions. The image recognition rate was improved to 87.1% by applying intensity-ReLU function to SR-HDNN.

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5:30 PM - 5:45 PM (Tue. Aug 2, 2022 5:15 PM - 5:45 PM Room 107&108)

[ITuPJ-02] Scattering-type optical encryption system for face recognition

\*Ming-Hsuan Wu<sup>1</sup>, Ya-Ti Chang Lee<sup>1</sup>, Chung-Hao Tien<sup>1</sup> (1. National Yang Ming Chiao Tung University (Taiwan))

**No Show, Cancelled**

We proposed a lensless face recognition system with scattering encryption by an optical diffuser. The facial images were encrypted to be unrecognizable amid the imaging chain. The encrypted images can be identified by the ResNet18.

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**ISOM '22 Poster Session**Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3) (1F)

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- [P-ITu-01] Image reconstruction of object out of the line of sight using deep learning  
[Presentation Style] Onsite  
Ryoga Ichida<sup>1</sup>, \*Nobukazu Yoshikawa<sup>1</sup> (1. Saitama Univ. (Japan))
- [P-ITu-02] Raman-based classification through regularization and interpretation of resulting sparse vectors  
[Presentation Style] Onsite  
Nicolas Pavillon<sup>1</sup>, \*Nicholas I. Smith<sup>1,2</sup> (1. IFRc, Osaka University (Japan), 2. OTRI, Osaka University (Japan))
- [P-ITu-03] Dynamic Signal Measurement in Intra-body Communication using Electro-Optic Technique  
[Presentation Style] Onsite  
\*morimasa hashimoto<sup>1</sup>, hiro kambara<sup>1</sup>, nana akatani<sup>1</sup>, haruka kamimura<sup>1</sup>, mitsuru shinagawa<sup>1</sup> (1. Hosei Univ. (Japan))
- [P-ITu-04] Noise Analysis of Transceiver in Intra-Body Communication using Electro-optical Technique  
[Presentation Style] Onsite  
\*Haruka Kamimura<sup>1</sup>, Nana Akatani<sup>1</sup>, Hiro Kambara<sup>1</sup>, Shumpei Sasaki<sup>1</sup>, Mitsuru Shinagawa<sup>1</sup> (1. Hosei Univ. (Japan))
- [P-ITu-05] Analysis of AC Ground Effect on Electric Field Car Area Network using Electro-Optical Technique  
[Presentation Style] Onsite  
\*Hiroto Endo<sup>1</sup>, Daichi Kawamoto<sup>1</sup>, Nana Akatani<sup>1</sup>, Morimasa Hashimoto<sup>1</sup>, Mitsuru Shinagawa<sup>1</sup> (1. Hosei Univ. (Japan))
- [P-ITu-06] Shift Rotational Multiplexing Scheme with Spherical Waves for Holographic Data Storage  
[Presentation Style] Onsite  
\*Yamato Saito<sup>1</sup>, Shuhei Yoshida<sup>1</sup> (1. Kindai Univ. (Japan))
- [P-ITu-07] Proposal of a Single-Shot Complex-Amplitude Measurement Technique Using a Rhombic Low-Pass Filter  
[Presentation Style] Onsite  
\*Nobuhiro Yamagishi<sup>1</sup>, Atsushi Okamoto<sup>1</sup>, Akihisa Tomita<sup>1</sup> (1. Graduate School of Info. Sci. and Tech., Hokkaido Univ. (Japan))
- [P-ITu-08] Full-Color High-Speed Computer-Generated Holography with Digital Micromirror Device  
[Presentation Style] Onsite  
\*Yu Yamada<sup>1</sup>, Shuhei Yoshida<sup>1</sup> (1. Kindai Univ. (Japan))
- [P-ITu-09] Mode Diffusion Technique for Crosstalk Reduction in Volume Holographic Mode Exchanger  
[Presentation Style] Onsite  
\*SHUANGLU ZHANG<sup>1</sup>, Atsushi Okamoto<sup>1</sup>, Akihisa Tomita<sup>1</sup> (1. Hokkaido Univ. (Japan))

- [P-ITu-10] UV emission from ZnO thin film covered with Al nanoparticles as nanometric light source for EXA microscope  
[Presentation Style] Online  
\*Kei Hosomi<sup>1</sup>, Wataru Inami<sup>1</sup>, Yoshimasa Kawata<sup>1</sup> (1. Shizuoka Univ. (Japan))
- [P-ITu-11] Complex Amplitude Reconstruction Using Coaxial Optical Correlator-based Single-pixel Digital Holography  
\*Kaito Nakao<sup>1</sup>, Shuntaro Aragaki<sup>1</sup>, Taku Hoshizawa<sup>1</sup>, Eriko Watanabe<sup>1</sup> (1. The University of Electro-Communications (Japan))
- [P-ITu-12] Fast and accurate three-dimensional object profiling by FMCW optical ranging system using asymmetrically optical frequency chirped VCSEL  
[Presentation Style] Onsite  
\*Yogetsu Nagasaka<sup>1</sup>, Tomoharu Konishi<sup>1</sup>, Koichi Iiyama<sup>1</sup> (1. Kanazawa University (Japan))
- [P-ITu-13] DEVELOPMENT OF OBSERVATION METHOD OF MAGNETIC INTERFERENCE FRINGES BY SCANNING MAGNETO-OPTICAL MICROSCOPY  
[Presentation Style] Onsite  
\*Konan Mukuo<sup>1</sup>, Ryoya Suzuki<sup>1</sup>, Yuichi Nakamura<sup>1</sup>, Pang Boey Lim<sup>1</sup> (1. Toyohashi Tech. (Japan))
- [P-ITu-14] Detection performance of the TIE method for intensity- and phase-modulated signal beams generated by a single phase SLM  
[Presentation Style] Onsite  
\*Taishi Miwa<sup>1</sup>, Koki Abe<sup>2</sup>, Masatoshi Bunsen<sup>2</sup> (1. Graduate School of Eng., Fukuoka Univ. (Japan), 2. Faculty of Eng., Fukuoka Univ. (Japan))
- [P-ITu-15] Hysteresis Correction of a Magneto-Optic Field Measurements by Using a Multilayer Perceptron  
[Presentation Style] Onsite  
\*Shinichiro Mito<sup>1</sup>, Harunobu Taguchi<sup>1</sup> (1. National institute of technology, Tokyo college (Japan))
- [P-ITu-16] Spherical Wave Volume Holographic Optical Element for Super-Resolution Digital Holographic Microscopy  
[Presentation Style] Onsite  
\*Yuki Yamamoto<sup>1</sup>, Daisuke Barada<sup>1</sup> (1. Utsunomiya Univ. (Japan))
- [P-ITu-17] Magneto-optical imaging of carbon steel with smartphone for nondestructive inspection  
[Presentation Style] Onsite  
\*Ryosuke Hashimoto<sup>1</sup>, Toshiya Itaya<sup>1</sup>, Syunsuke Fukuchi<sup>1</sup> (1. National Inst. of Tech., Suzuka College (Japan))
- [P-ITu-18] Synthesis of angular multiplexed SQAM signals and signal detection by self-interference for holographic memory  
[Presentation Style] Onsite  
\*Jun Igarashi<sup>1</sup>, Hironori Ito<sup>1</sup>, Satoshi Honma<sup>1</sup> (1. Yamanashi Univ. (Japan))
- [P-ITu-19] Detection and profiling of building and human by FMCW LiDAR using highly coherent laser source  
[Presentation Style] Onsite  
\*Yuki Momose<sup>1</sup>, Zhou Yu<sup>1</sup>, Koichi Iiyama<sup>1</sup> (1. Kanazawa University (Japan))

- [P-ITu-20] Single and shift-multiplexing recording properties in self-referential holographic data storage with designed additional pattern  
[Presentation Style] Onsite  
\*Kazuki Chijiwa<sup>1</sup>, Masanori Takabayashi<sup>1</sup> (1. Kyushu Inst. of Tech. (Japan))
- [P-ITu-21] Pigment-Meta Hybrid IR Cut Filter  
[Presentation Style] Online  
\*Shang-ping Yeh<sup>1</sup>, Rong-Sheng Lin<sup>1</sup>, Chin-Ming Wang<sup>1</sup> (1. National Central Univ., Taiwan (Taiwan))
- [P-ITu-22] Deep learning-based pixel interpolation in spatial-domain phase shifting digital holography  
[Presentation Style] Onsite  
\*Shu Kajitani<sup>1</sup>, Masanori Takabayashi<sup>1</sup> (1. Kyushu Inst. of Tech. (Japan))
- [P-ITu-23] Two-dimensional Beam Expansion Using Cylindrical Wave Volume Holographic Waveguide  
[Presentation Style] Onsite  
\*Kazuya Okada<sup>1</sup>, Daisuke Barada<sup>1</sup> (1. Utsunomiya Univ. (Japan))



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(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

## [P-ITu-01] Image reconstruction of object out of the line of sight using deep learning

[Presentation Style] Onsite

Ryoga Ichida<sup>1</sup>, \*Nobukazu Yoshikawa<sup>1</sup> (1. Saitama Univ. (Japan))

[Presentation Style] Onsite

We propose a reconstruction method of objects out of the line of sight using deep learning. We demonstrate that the object can be reconstructed by DNN using small irradiance fluctuations in the captured images.

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(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

## [P-ITu-02] Raman-based classification through regularization and interpretation of resulting sparse vectors

[Presentation Style] Onsite

Nicolas Pavillon<sup>1</sup>, \*Nicholas I. Smith<sup>1,2</sup> (1. IFRc, Osaka University (Japan), 2. OTRI, Osaka University (Japan))

[Presentation Style] Onsite

Raman spectroscopy makes it possible to observe live biological samples through their intracellular molecular content. We study the performance of classification based on a regularization approach that enables biological interpretation with sparse separation vectors.

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(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

## [P-ITu-03] Dynamic Signal Measurement in Intra-body Communication using Electro-Optic Technique

[Presentation Style] Onsite

\*morimasa hashimoto<sup>1</sup>, hiro kambara<sup>1</sup>, nana akatani<sup>1</sup>, haruka kamimura<sup>1</sup>, mitsuru shinagawa<sup>1</sup> (1. Hosei Univ. (Japan))

[Presentation Style] Onsite

We use an electro-optic technique for measuring a signal strength of a wearable receiver in intra-body communication (IBC). The electro-optic technique can be applied to a dynamic measurement system for an IBC wearable device.

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(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

## [P-ITu-04] Noise Analysis of Transceiver in Intra-Body Communication using Electro-optical Technique

[Presentation Style] Onsite

\*Haruka Kamimura<sup>1</sup>, Nana Akatani<sup>1</sup>, Hiro Kambara<sup>1</sup>, Shumpei Sasaki<sup>1</sup>, Mitsuru Shinagawa<sup>1</sup> (1. Hosei Univ. (Japan))

[Presentation Style] Onsite

The environmental noise power of the transceiver in Intra-body communication is estimated using electro-optical technique. The noise power through the transceiver cable is larger than that through the human body.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

## [P-ITu-05] Analysis of AC Ground Effect on Electric Field Car Area Network using Electro-Optical Technique

[Presentation Style] Onsite

\*Hiroto Endo<sup>1</sup>, Daichi Kawamoto<sup>1</sup>, Nana Akatani<sup>1</sup>, Morimasa Hashimoto<sup>1</sup>, Mitsuru Shinagawa<sup>1</sup> (1. Hosei Univ. (Japan))

[Presentation Style] Onsite

We investigate the effect of AC ground on the electric field car area network using the electro-optic technique. Waveforms and spectra of the signal are distorted by the AC ground of the transmitter and receiver.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

## [P-ITu-06] Shift Rotational Multiplexing Scheme with Spherical Waves for Holographic Data Storage

[Presentation Style] Onsite

\*Yamato Saito<sup>1</sup>, Shuhei Yoshida<sup>1</sup> (1. Kindai Univ. (Japan))

[Presentation Style] Onsite

Holographic data storage has three main characteristics: fast data transfer rate, high storage density, and stable storage. In this study, we proposed the multiplexing scheme consisting of shift and rotational multiplexing with spherical waves.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

## [P-ITu-07] Proposal of a Single-Shot Complex-Amplitude Measurement Technique Using a Rhombic Low-Pass Filter

[Presentation Style] Onsite

\*Nobuhiro Yamagishi<sup>1</sup>, Atsushi Okamoto<sup>1</sup>, Akihisa Tomita<sup>1</sup> (1. Graduate School of Info. Sci. and Tech., Hokkaido Univ. (Japan))

[Presentation Style] Onsite

We propose a novel complex-amplitude measurement technique with a low single-shot measurement error that interferometrically measures the image of a signal light passing through a rhombic low-pass filter. The

operating principle was confirmed via numerical analysis.

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(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

**[P-ITu-08] Full-Color High-Speed Computer-Generated Holography with  
Digital Micromirror Device  
[Presentation Style] Onsite**

\*Yu Yamada<sup>1</sup>, Shuhei Yoshida<sup>1</sup> (1. Kindai Univ. (Japan))

[Presentation Style] Onsite

In this study, we investigated the full-color high-speed reproduction of CGH using a digital micromirror device (DMD). In the experiment, we used a DMD as a display device for CGH and obtained full-color hologram images using a time-divided method. Since the reproduced images were relatively close to the original 3D model with high speed, we believe that we could demonstrate the effectiveness of DMD as a display device for CGH to reproduce 3D images in full color.

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(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

**[P-ITu-09] Mode Diffusion Technique for Crosstalk Reduction in Volume  
Holographic Mode Exchanger  
[Presentation Style] Onsite**

\*SHUANGLU ZHANG<sup>1</sup>, Atsushi Okamoto<sup>1</sup>, Akihisa Tomita<sup>1</sup> (1. Hokkaido Univ. (Japan))

[Presentation Style] Onsite

In this study, the mode diffusion technique for crosstalk reduction was applied in a volume holographic mode exchanger to achieve a high exchange performance, which can separate a diffracted beam and crosstalk components from the propagation angle difference. Simulations results showed that the exchange performance significantly improved.

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(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

**[P-ITu-10] UV emission from ZnO thin film covered with Al nanoparticles  
as nanometric light source for EXA microscope  
[Presentation Style] Online**

\*Kei Hosomi<sup>1</sup>, Wataru Inami<sup>1</sup>, Yoshimasa Kawata<sup>1</sup> (1. Shizuoka Univ. (Japan))

[Presentation Style] Online

An ultraviolet (UV) emission from ZnO thin film is enhanced with deposition of Al nanoparticles. Intense UV emission can be applied to light source for electron excitation assisted optical microscope.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

## [P-ITu-11] Complex Amplitude Reconstruction Using Coaxial Optical Correlator-based Single-pixel Digital Holography

\*Kaito Nakao<sup>1</sup>, Shuntaro Aragaki<sup>1</sup>, Taku Hoshizawa<sup>1</sup>, Eriko Watanabe<sup>1</sup> (1. The University of Electro-Communications (Japan))

We propose coaxial optical correlator-based single-pixel digital holography (SPDH) for developing adaptive optic systems to measure complex amplitudes with high sensitivity and speed. We also perform complex amplitude reconstruction of optical correlator-based SPDH through a numerical calculation.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

## [P-ITu-12] Fast and accurate three-dimensional object profiling by FMCW optical ranging system using asymmetrically optical frequency chirped VCSEL

[Presentation Style] Onsite

\*Yogetsu Nagasaka<sup>1</sup>, Tomoharu Konishi<sup>1</sup>, Koichi Iiyama<sup>1</sup> (1. Kanazawa University (Japan))

[Presentation Style] Onsite

Fast and accurate object profiling was realized by the FMCW optical ranging system. Fast measurement was achieved by continuous scanning of the laser beam, and accurate measurement was achieved by asymmetric optical frequency chirp.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

## [P-ITu-13] DEVELOPMENT OF OBSERVATION METHOD OF MAGNETIC INTERFERENCE FRINGES BY SCANNING MAGNETO-OPTICAL MICROSCOPY

[Presentation Style] Onsite

\*Konan Mukuo<sup>1</sup>, Ryoya Suzuki<sup>1</sup>, Yuichi Nakamura<sup>1</sup>, Pang Boey Lim<sup>1</sup> (1. Toyohashi Tech. (Japan))

[Presentation Style] Onsite

In this study, we developed a quantitative evaluation method of Faraday rotation angle distribution in magnetic holograms using a scanning magneto-optical microscope. Magnetic interference fringes were observed with a two-dimensional scan, and the Faraday rotation angle distribution was successfully obtained quantitatively.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

## [P-ITu-14] Detection performance of the TIE method for intensity- and phase-modulated signal beams generated by a single phase

## SLM

### [Presentation Style] Onsite

\*Taishi Miwa<sup>1</sup>, Koki Abe<sup>2</sup>, Masatoshi Bunsen<sup>2</sup> (1. Graduate School of Eng., Fukuoka Univ. (Japan), 2. Faculty of Eng., Fukuoka Univ. (Japan))

[Presentation Style] Onsite

Methods to modulate the complex amplitude of signal beams by a phase SLM and a diffraction order extraction are investigated. The generated signal beams are confirmed to be successfully detected by the TIE method.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

### [P-ITu-15] Hysteresis Correction of a Magneto-Optic Field Measurements by Using a Multilayer Perceptron

#### [Presentation Style] Onsite

\*Shinichiro Mito<sup>1</sup>, Harunobu Taguchi<sup>1</sup> (1. National institute of technology, Tokyo college (Japan))

[Presentation Style] Onsite

Hysteresis characteristics on Faraday rotation signal of sputtered Bi:YIG film was collected for metal-free magneto-optic field sensing by using a multi-layer perceptron. The calibrated value was linearly fitted to the applied field.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

### [P-ITu-16] Spherical Wave Volume Holographic Optical Element for Super-Resolution Digital Holographic Microscopy

#### [Presentation Style] Onsite

\*Yuki Yamamoto<sup>1</sup>, Daisuke Barada<sup>1</sup> (1. Utsunomiya Univ. (Japan))

[Presentation Style] Onsite

A spherical wave volume holographic optical element for super-resolution digital holographic microscopy was fabricated. The volume holographic optical element was made of a two-chemistry photopolymer. The shape was fixed by using a rectangular cell.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

### [P-ITu-17] Magneto-optical imaging of carbon steel with smartphone for nondestructive inspection

#### [Presentation Style] Onsite

\*Ryosuke Hashimoto<sup>1</sup>, Toshiya Itaya<sup>1</sup>, Syunsuke Fukuchi<sup>1</sup> (1. National Inst. of Tech., Suzuka College (Japan))

[Presentation Style] Onsite

The magneto-optical (MO) imaging can visualize the stray magnetic field. In this study, we developed the MO imaging optical system with a smartphone and slit defect on the metal surface was visualized.

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(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

## [P-ITu-18] Synthesis of angular multiplexed SQAM signals and signal detection by self-interference for holographic memory

[Presentation Style] Onsite

\*Jun Igarashi<sup>1</sup>, Hironori Ito<sup>1</sup>, Satoshi Honma<sup>1</sup> (1. Yamanashi Univ. (Japan))

[Presentation Style] Onsite

We propose a method to simultaneously extracting two page data from holographic memory and detect the phase without external optical interferometer. From numerical results, the phase could be detected by this method.

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(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

## [P-ITu-19] Detection and profiling of building and human by FMCW LiDAR using highly coherent laser source

[Presentation Style] Onsite

\*Yuki Momose<sup>1</sup>, Zhou Yu<sup>1</sup>, Koichi Iiyama<sup>1</sup> (1. Kanazawa University (Japan))

[Presentation Style] Onsite

Fast and long-range FMCW LiDAR is demonstrated by using a highly coherent laser source and by continuous beam scanning. A building and human are clearly detected and profiled with the measurement time of several second.

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(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

## [P-ITu-20] Single and shift-multiplexing recording properties in self-referential holographic data storage with designed additional pattern

[Presentation Style] Onsite

\*Kazuki Chijiwa<sup>1</sup>, Masanori Takabayashi<sup>1</sup> (1. Kyushu Inst. of Tech. (Japan))

[Presentation Style] Onsite

The reconstruction quality and shift multiplexing properties of self-referential holographic data storage (SR-HDS) with additional patterns which are designed with a target intensity of nonuniform distributions such as Gaussian are numerically evaluated.

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(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

## [P-ITu-21] Pigment-Meta Hybrid IR Cut Filter

[Presentation Style] Online

\*Shang-ping Yeh<sup>1</sup>, Rong-Sheng Lin<sup>1</sup>, Chin-Ming Wang<sup>1</sup> (1. National Central Univ., Taiwan (Taiwan))

[Presentation Style] Online

We propose a new hybrid type with Pigment and metasurface for IR cut filter, to efficiently reduce the thickness of pigment layer with good transmittance and positive impact on contrast in visible area for CMOS sensor.

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(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

## [P-ITu-22] Deep learning-based pixel interpolation in spatial-domain phase shifting digital holography

[Presentation Style] Onsite

\*Shu Kajitani<sup>1</sup>, Masanori Takabayashi<sup>1</sup> (1. Kyushu Inst. of Tech. (Japan))

[Presentation Style] Onsite

We propose to apply deep learning to interpolate missing pixels in interferograms acquired by the spatial-domain phase-shifting interferometry (PSI), and numerically evaluate the quality of object light reconstructed from them.

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(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

## [P-ITu-23] Two-dimensional Beam Expansion Using Cylindrical Wave Volume Holographic Waveguide

[Presentation Style] Onsite

\*Kazuya Okada<sup>1</sup>, Daisuke Barada<sup>1</sup> (1. Utsunomiya Univ. (Japan))

[Presentation Style] Onsite

A two-dimensional beam expansion method with a volume holographic optical element is proposed. The optical element diffracts cylindrical waves to plane waves with arbitrary wave vectors. The two-dimensional beam expansion property was experimentally verified.

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Poster Session | ISOM '22 | ISOM'22 Poster Session (Post Deadline)

## ISOM'22 Poster Session (Post Deadline)

Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3) (1F)

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- [P-IPDP-01] A Deep Neural Network for Time-Fluctuation Spatial Noise Suppression in Optical Correlation Imaging based on a Progressive Growing Adversarial Network  
[Presentation Style] Onsite  
\*Hiroki Takahara<sup>1</sup>, Yuta Wada<sup>1</sup>, Kaito Nakao<sup>1</sup>, Taku Hosizawa<sup>1</sup>, Eriko Watanabe<sup>1</sup> (1. The University of Electro-Communications (Japan))
- [P-IPDP-02] Chirality Enhancement at Broadband UV-VIS Regimes for Bio-Sensing  
[Presentation Style] Online  
Aima Zahid<sup>1</sup>, Hafiz Saad Khaliq<sup>1</sup>, \*Yehia Massoud<sup>1</sup> (1. Innovative Technologies Laboratories (ITL), King Abdullah University of Science and Technology (KAUST), Thuwal 23955, Saudi Arabia (Saudi Arabia))
- [P-IPDP-03] Limitation of Signal-to-Noise Ratio in Differential Type Electro-Optic Sensors  
[Presentation Style] Onsite  
\*Mayuko Yamagishi<sup>1</sup>, Haruka Kamimura<sup>1</sup>, Mitsuru Shinagawa<sup>1</sup>, Jun Katsuyama<sup>2</sup>, Yoshinori Matsumoto<sup>2</sup>, Shin-ichiro Teduka<sup>2</sup> (1. HOSEI Univ. (Japan), 2. Yokogawa Electric Corp. (Japan))
- [P-IPDP-04] Influence of phase accuracy on mode compensation using progressive phase conjugation  
\*Zeyu Shen<sup>1</sup>, Atsushi Okamoto<sup>1</sup>, Akihisa Tomita<sup>1</sup> (1. Graduate School of Information Science and Technology, Hokkaido University (Japan))



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(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

**[P-IPDP-01] A Deep Neural Network for Time-Fluctuation Spatial Noise Suppression in Optical Correlation Imaging based on a Progressive Growing Adversarial Network**

**[Presentation Style] Onsite**

\*Hiroki Takahara<sup>1</sup>, Yuta Wada<sup>1</sup>, Kaito Nakao<sup>1</sup>, Taku Hosizawa<sup>1</sup>, Eriko Watanabe<sup>1</sup> (1. The University of Electro-Communications (Japan))

[Presentation Style] Onsite

We propose a deep neural network for time-fluctuation noise suppression (TFNS) by applying a progressive growing GAN (PG-GAN), called a PG-TFNS network. The accuracy of the proposed approach was improved by using an efficient sub-pixel convolutional neural network (ESPCN) for its super-resolution part.

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(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

**[P-IPDP-02] Chirality Enhancement at Broadband UV-VIS Regimes for Bio-Sensing**

**[Presentation Style] Online**

Aima Zahid<sup>1</sup>, Hafiz Saad Khaliq<sup>1</sup>, \*Yehia Massoud<sup>1</sup> (1. Innovative Technologies Laboratories (ITL), King Abdullah University of Science and Technology (KAUST), Thuwal 23955, Saudi Arabia (Saudi Arabia))

[Presentation Style] Online

An achiral aluminum-based metasurface is proposed for applications in bio-sensing and circular dichroism spectroscopy. The results demonstrate up to 20-fold chirality and 4.8-fold dissymmetry factor enhancement in both the ultraviolet and the visible domain

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(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

**[P-IPDP-03] Limitation of Signal-to-Noise Ratio in Differential Type Electro-Optic Sensors**

**[Presentation Style] Onsite**

\*Mayuko Yamagishi<sup>1</sup>, Haruka Kamimura<sup>1</sup>, Mitsuru Shinagawa<sup>1</sup>, Jun Katsuyama<sup>2</sup>, Yoshinori Matsumoto<sup>2</sup>, Shin-ichiro Teduka<sup>2</sup> (1. HOSEI Univ. (Japan), 2. Yokogawa Electric Corp. (Japan))

[Presentation Style] Onsite

This paper describes the limitations of the signal-to-noise ratio in a differential-type electro-optic sensor using Jones matrices. The signal-to-noise ratio is limited by the relative intensity noise, even if the optical balance is optimal.

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(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

## [P-IPDP-04] Influence of phase accuracy on mode compensation using progressive phase conjugation

\*Zeyu Shen<sup>1</sup>, Atsushi Okamoto<sup>1</sup>, Akihisa Tomita<sup>1</sup> (1. Graduate School of Information Science and Technology, Hokkaido University (Japan))

To compensate for mode coupling of the spatial mode beam in the multimode fiber, we conducted validation experiments to evaluate the influence of phase detection accuracy on the mode compensation effect using progressive phase conjugation (PPC). The results showed that the modes can be compensated by the proposed method.

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Oral Session | Joint Session | ISOM/ODF Joint Session: Advanced Imaging Technologies

## ISOM/ODF Joint Session: Advanced Imaging Technologies

Session Chairs: Hiroyuki Kawano (Mitsubishi Electric Corp.), Kimihiro Saito (Kindai Univ. Tech. College)

Wed. Aug 3, 2022 1:30 PM - 3:10 PM Conference Hall (Oval Room) (1F)

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[IWPK\_OWP-01 (Invited)] Development of T2SL infrared detector in JAXA

[Presentation Style] Onsite

\*Haruyoshi Katayama<sup>1</sup>, Makoto Hirose<sup>1</sup>, Seichi Sato<sup>1</sup>, Keisuke Shinozaki<sup>1</sup>,  
Toshiyoshi Kimura<sup>1</sup> (1. Japan Aerospace Exploration Agency (JAXA)  
(Japan))

1:30 PM - 1:55 PM

[IWPK\_OWP-02 (Invited)] Review of the development of infrared cameras for  
automotive applications in the framework of the European  
project Heliaus

[Presentation Style] Onsite

\*Guillaume Druart<sup>1</sup>, Florence De La Barrière<sup>1</sup>, Jean-Baptiste Volatier<sup>1</sup>,  
Valentin Reux<sup>2</sup>, Laurent Calvez<sup>2</sup>, Xiang-Hua Zhang<sup>2</sup>, Elodie Tartas<sup>3</sup>, Raphael  
Proux<sup>4</sup>, John Franks<sup>4</sup>, Susanne Ehret<sup>5</sup> (1. ONERA (France), 2. Univ. Rennes,  
CNRS, ISCR (France), 3. LYNRED (France), 4. UMICORE (France), 5.  
FRAUNHOFER IPT (Germany))

1:55 PM - 2:20 PM

[IWPK\_OWP-03 (Invited)] Beam and Image Steering by MEMS Array for AR and Lidar  
Applications

[Presentation Style] Onsite

\*Yuzuru Takashima<sup>1</sup> (1. University of Arizona (United States of America))

2:20 PM - 2:45 PM

[IWPK\_OWP-04 (Invited)] Long Range Automotive FMCW LiDAR with Solid State  
Scanning

[Presentation Style] Onsite

\*Alfredo Rueda<sup>1</sup> (1. Scantinel Photonics GmbH (Germany))

2:45 PM - 3:10 PM

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1:30 PM - 1:55 PM (Wed. Aug 3, 2022 1:30 PM - 3:10 PM Conference Hall (Oval Room))

**[IWPK\_OWP-01 (Invited)] Development of T2SL infrared detector in JAXA**  
**[Presentation Style] Onsite**

\*Haruyoshi Katayama<sup>1</sup>, Makoto Hirose<sup>1</sup>, Seichi Sato<sup>1</sup>, Keisuke Shinozaki<sup>1</sup>, Toshiyoshi Kimura<sup>1</sup> (1. Japan Aerospace Exploration Agency (JAXA) (Japan))

[Presentation Style] Onsite

We describe the development history of Type II superlattice infrared detector (T2SL) for future space applications in JAXA. Space-borne infrared detectors require higher sensitivity, higher resolution, and larger formats than ground-based infrared detectors. T2SL has preferable characteristics in terms of operating temperature and spectral sensitivity.

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1:55 PM - 2:20 PM (Wed. Aug 3, 2022 1:30 PM - 3:10 PM Conference Hall (Oval Room))

**[IWPK\_OWP-02 (Invited)] Review of the development of infrared cameras for automotive applications in the framework of the European project Heliaus**  
**[Presentation Style] Onsite**

\*Guillaume Druart<sup>1</sup>, Florence De La Barrière<sup>1</sup>, Jean-Baptiste Volatier<sup>1</sup>, Valentin Reux<sup>2</sup>, Laurent Calvez<sup>2</sup>, Xiang-Hua Zhang<sup>2</sup>, Elodie Tartas<sup>3</sup>, Raphael Proux<sup>4</sup>, John Franks<sup>4</sup>, Susanne Ehret<sup>5</sup> (1. ONERA (France), 2. Univ. Rennes, CNRS, ISCR (France), 3. LYNRED (France), 4. UMICORE (France), 5. FRAUNHOFER IPT (Germany))

[Presentation Style] Onsite

Infrared cameras could serve automotive applications as long as low-cost and high-throughput manufacturing methods are available. We explored infrared wafer-scale optics for QVGA sensors and high index chalcogenide glasses for VGA sensors.

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2:20 PM - 2:45 PM (Wed. Aug 3, 2022 1:30 PM - 3:10 PM Conference Hall (Oval Room))

**[IWPK\_OWP-03 (Invited)] Beam and Image Steering by MEMS Array for AR and Lidar Applications**  
**[Presentation Style] Onsite**

\*Yuzuru Takashima<sup>1</sup> (1. University of Arizona (United States of America))

[Presentation Style] Onsite

Beam and image steering by Micro Electro Mechanical Systems (MEMS) display enables unique features such as adaptive foveation, side-lobe rejection for lidar, and pixel pitch reduction, field-of-view expansion, pupil steering for Augmented Reality (AR) devices.

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2:45 PM - 3:10 PM (Wed. Aug 3, 2022 1:30 PM - 3:10 PM Conference Hall (Oval Room))

[IWPK\_OWP-04 (Invited)] Long Range Automotive FMCW LiDAR with  
Solid State Scanning  
[Presentation Style] Onsite

\*Alfredo Rueda<sup>1</sup> (1. Scantinel Photonics GmbH (Germany))

[Presentation Style] Onsite

We report on the development of a commercially available solid-state FMCW LiDAR improving the system's reliability, lifetime, production costs and compatibility to the automotive industry requirements.

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Oral Session | ISOM '22 | Bio-Imaging

## Bio-Imaging

Session Chair: Akinori Furuya (Tokushima Bunri Univ.)

Wed. Aug 3, 2022 3:30 PM - 4:30 PM Room 107&108 (1F)

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[IWPL-01 (Invited)] High-Speed Single-Pixel Imaging for Biomedical Applications  
[Presentation Style] Onsite

\*Hideharu Mikami<sup>1</sup> (1. Hokkaido Univ. (Japan))

3:30 PM - 4:00 PM

[IWPL-02 (Invited)] Optical Meta-devices for Bio-imaging  
[Presentation Style] Online

\*Din Ping TSAI<sup>1</sup>, Mu Ku Chen<sup>1</sup>, Yuan Luo<sup>2</sup> (1. City University of Hong Kong (Hong Kong), 2. National Taiwan University (Taiwan))

4:00 PM - 4:30 PM

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3:30 PM - 4:00 PM (Wed. Aug 3, 2022 3:30 PM - 4:30 PM Room 107&108)

## [IWPL-01 (Invited)] High-Speed Single-Pixel Imaging for Biomedical Applications

[Presentation Style] Onsite

\*Hideharu Mikami<sup>1</sup> (1. Hokkaido Univ. (Japan))

[Presentation Style] Onsite

We demonstrate high-speed single-pixel imaging is enabled by multiplexing techniques such as frequency-division multiplexing and time-division multiplexing. Specifically, we present frequency-time-division-multiplexed single-pixel imaging technique for high-speed fluorescence imaging of biological cells.

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4:00 PM - 4:30 PM (Wed. Aug 3, 2022 3:30 PM - 4:30 PM Room 107&108)

## [IWPL-02 (Invited)] Optical Meta-devices for Bio-imaging

[Presentation Style] Online

\*Din Ping TSAI<sup>1</sup>, Mu Ku Chen<sup>1</sup>, Yuan Luo<sup>2</sup> (1. City University of Hong Kong (Hong Kong), 2. National Taiwan University (Taiwan))

[Presentation Style] Online

We demonstrated optical meta-devices for bio-imaging, including varifocal, light-sheet, and abrupt autofocusing beam. Optical meta-devices have become the leading technique for in vivo imaging in the fields of disease, medicine, and cell biology research.

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Oral Session | ISOM '22 | Post Deadline

## Post Deadline

Session Chair: Kimihiro Saito (Kindai Univ. Tech. College)

Wed. Aug 3, 2022 4:30 PM - 5:15 PM Room 107&108 (1F)

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[IPDP-01] Phase Retrieval Method Based on Deep Learning with Single Image Training in Holographic Data Storage

[Presentation Style] Onsite

\*Jianying Hao<sup>1,2</sup>, Ruixian Chen<sup>1</sup>, Xiao Lin<sup>1</sup>, Tsutomu Shimura<sup>2</sup>, Xiaodi Tan<sup>1</sup> (1. Fujian Normal Univ. (China), 2. The Univ. of Tokyo (Japan))

4:30 PM - 4:45 PM

[IPDP-02] Evaluation of Memory Characteristics in a Surface Shift-multiplexing Holographic Memory

[Presentation Style] Onsite

\*Soki Hirayama<sup>1</sup>, Ryushi Fujimura<sup>2</sup>, Yoshito Y. Tanaka<sup>1</sup>, Tsutomu Shimura<sup>1</sup> (1. The Univ. of Tokyo (Japan), 2. Utsunomiya Univ. (Japan))

4:45 PM - 5:00 PM

[IPDP-03] Improvement of Spatial Resolution for Time-reversed Focusing in Turbid Medium using Phase-conjugate Wave

[Presentation Style] Onsite

Shaohao Tang<sup>1</sup>, \*Koichi Shimizu<sup>1,2</sup> (1. Waseda Univ. (Japan), 2. Xidian Univ. (China))

5:00 PM - 5:15 PM



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4:30 PM - 4:45 PM (Wed. Aug 3, 2022 4:30 PM - 5:15 PM Room 107&108)

## [IPDP-01] Phase Retrieval Method Based on Deep Learning with Single Image Training in Holographic Data Storage

[Presentation Style] Onsite

\*Jianying Hao<sup>1,2</sup>, Ruixian Chen<sup>1</sup>, Xiao Lin<sup>1</sup>, Tsutomu Shimura<sup>2</sup>, Xiaodi Tan<sup>1</sup> (1. Fujian Normal Univ. (China), 2. The Univ. of Tokyo (Japan))

[Presentation Style] Onsite

In this paper, a non-interferometric phase retrieval method based on deep learning is proposed. The relationship between the diffraction intensity and the encoded data page is established through the convolutional neural network (CNN). After training, the phase information can be detected directly from a single diffraction image. Moreover, by designing the encoded data page, only one pair of intensity-phase images are needed to finish the train of the neural network. The proposed method solves the problem that supervised end-to-end neural networks rely on a large amount of training data and cannot be used in practical applications due to the lack of sufficient numbers of training images from the experiment.

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4:45 PM - 5:00 PM (Wed. Aug 3, 2022 4:30 PM - 5:15 PM Room 107&108)

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[Presentation Style] Onsite

Shift-multiplexed surface holographic memory was proposed to avoid the disadvantages of volume holograms in conventional holographic memory. In this study, the memory characteristics and the required hologram fabrication accuracy were quantitatively evaluated by the developed simulator.

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5:00 PM - 5:15 PM (Wed. Aug 3, 2022 4:30 PM - 5:15 PM Room 107&108)

## [IPDP-03] Improvement of Spatial Resolution for Time-reversed Focusing in Turbid Medium using Phase-conjugate Wave

[Presentation Style] Onsite

Shaohao Tang<sup>1</sup>, \*Koichi Shimizu<sup>1,2</sup> (1. Waseda Univ. (Japan), 2. Xidian Univ. (China))

[Presentation Style] Onsite

Improvement in spatial resolution for near-infrared imaging through animal tissue was attempted. We introduced a frequency-scanned ultrasonic modulation of light for the time-reversed ultrasonically encoded imaging method using phase-conjugate wave. The feasibility was verified.

Oral Session | ISOM '22 | Award & Closing

## Award & Closing

Session Chair: Kimihiro Saito (Kindai Univ. Tech. College)

Wed. Aug 3, 2022 5:15 PM - 5:30 PM Room 107&108 (1F)

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[CL(ISOM)] Award & Closing

5:15 PM - 5:30 PM