

THE TWENTY-SIXTH MICROOPTICS CONFERENCE

# MOC2021

## CONFERENCE PROGRAM



*Sponsored by the Japan Society of Applied Physics (JSAP)  
Organized by Microoptics Group, JSAP  
Technically Cosponsored by IEEE Photonics Society*



**September 26 – 29, 2021**

**Online Conference**

**Online Management Center at Congress Center, ACT CITY Hamamatsu,  
Shizuoka, Japan**

# Agenda At-A-Glance

JST	2021/9/26 (Sun)	2021/9/27 (Mon)	2021/9/28 (Tue)	2021/9/29 (Wed)	
8:30					
8:45					
9:00		Opening Remarks	Session E Active Devices (1) 8:30-9:45		
9:15		Plenary Session 1 9:15-10:45	Break		
9:30					
9:45					
10:00					
10:15			Session F Active Devices (2) 10:00-11:00	Microconcert MC2 10:00-11:15 <a href="https://www.youtube.com/watch?v=i2cXtv_R54w">https://www.youtube.com/watch?v=i2cXtv_R54w</a>	
10:30		Break	Break		
10:45					
11:00		Session A Emerging Photonics (1) 11:00-11:45	Session G Emerging Photonics (2) 11:15-12:15	Commemorative Talk CT 11:20-12:00	
11:15					
11:30					
11:45					
12:00					
12:15					
12:30		Lunch 11:45-13:30		Lunch 12:00-13:15	
12:45			Lunch 12:15-14:00		
13:00					
13:15	Special Symposium "Photonics Progress Review" 13:00-14:35	Session B Microoptics for Sensing (1) 13:30-14:30	Session H Fabrication Technology 14:00-15:00	Session M Optical Processing (2) 13:15-14:15	
13:30				Break	
13:45				Session N Silicon Photonics 14:30-15:30	
14:00				Break	
14:15		Break	Break		
14:30					
14:45	Special Symposium "Photonics Progress Review" 14:50-17:05	Session C Microoptics for Sensing (2) 14:45-16:00	Break	Session J New Materials 15:15-16:15	
15:00				Break	
15:15				Session PD Postdeadline Papers 15:45-16:30	
15:30			Break		
15:45			Session D Photonic Integration 16:15-17:15	Session K Optical Processing (1) 16:30-17:30	Awards & Closing 16:30-17:00
16:00					
16:15		Break	Break		
16:30					
16:45					
17:00	Break				
17:15	Get-Together Party 17:15-18:15+	Break	Break		
17:30					
17:45			Session L Novel Transmission Technology 17:45-19:00		
18:00		Plenary Session 2 17:30-19:00			
18:15					
18:30					
18:45		MOC Award Ceremony	Break		
19:00					
19:15			Session PO Poster Session 19:20-21:00 19:20-20:10 Even numbers 20:10-21:00: Odd numbers		
19:30					
19:45					
20:00					
20:15					
20:30					
20:45					
Microconcert MC1: Viewing possible at anytime, see the concert program page. <a href="http://www.comemoc.com/moc2021/microconcert.html">http://www.comemoc.com/moc2021/microconcert.html</a>					

# Technical Program

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The 26th MICROOPTICS CONFERENCE (MOC2021) will be held in an online format during September 26 - September 29, 2021. This conference is sponsored by the Japan Society of Applied Physics (JSAP) and organized by Microoptics Group and in cooperation with several academic societies and associations. The MOC2021 is intended to provide a central forum for an update and review of scientific and technical information covering a wide range of microoptics field from fundamental researches to systems and applications.

The latest information will be available on the following web site:

<https://moc2021.com/>

## Special Symposium “Photonics Progress Review”

Special symposium will be held on Sunday, September 26.

### “Introductory Talk”

Yoshimasa Kawata, *Shizuoka University*

### “New photonics industries starting from Shizuoka, Japan”

Yoshihiro Takiguchi, *The Graduate School for the Creation of New Photonics Industries*

### “Multi-tap time-resolved CMOS image sensors and their applications”

Shoji Kawahito, *Shizuoka University*

### “Photonic crystal surface-emitting lasers and their application to LiDAR”

Susumu Noda, *Kyoto University*

### “Development of 20-inch photomultiplier tube for neutrino experiments”

Yuji Yoshizawa, *Hamamatsu Photonics K.K.*

### “Clinical near-infrared spectroscopy and imaging”

Yoko Hoshi, *Hamamatsu University School of Medicine*

## Plenary Session

Plenary Sessions will be held twice in the morning and afternoon on Monday, September 27. The following papers are invited as the plenary talks.

### “Novel VCSEL Designs for the Next Generation of Photonic Systems”

Dieter Bimberg, *CIOMP, CAS / TU Berlin*

### “Flat Optics Based on Metasurfaces: From Components to Cameras”

Federico Capasso, *Harvard University*

### “Exploring Photonics --Research activity on spatial light modulator in Hamamatsu--”

Tsutomu Hara, *Hamamatsu Photonics K.K.*

### “InGaN-Based Nanocolumn Optical Devices”

Katsumi Kishino, *Sophia University*

## Commemorative Talk

Commemorative talk of IEEE Edison Medal will be held on Wednesday, September 29.

### “VCSEL: Its Concept, Physics, and Development”

Kenichi Iga, *Tokyo Institute of Technology*

## Oral Presentation

The oral presentation sessions are held in an online format. The online oral presentations are given live via Zoom Meeting, with presentation slides being shared. The presentation time (including discussion) will be 30 minutes for invited papers, 15 minutes for regular papers and post deadline papers. All the speakers should check if their internet connection and sharing of presentation slides work in the break time just before the session. All the oral presentations are recorded on Zoom, and the recorded videos will be available on YouTube for the participants only.

## Poster Session

Each poster presentation will be given at a Zoom Meeting Breakout room, which is set for each presenter. The poster session is held online from 19:20 to 21:00 JST on Tuesday, September 28. For the convenience of the participants, the presentation time is divided into two periods. The first period (19:20-20:10 JST) is for authors with the paper in even-number (PO-02, PO-04, ...), and the second period (20:10-21:00 JST) is for authors with the paper in odd-number (PO-01, PO-03, ...). The presenters should remain in their own Breakout room for discussions during their core time. Posters should be a one-page PDF slide with the MOC2021 logo in wide screen size. The presenter presents your research and discusses it with the participants by shares their poster on Zoom.

## Paper Publication

Accepted papers will be published in **IEEE/Xplore** in addition to Technical Digest. The authors also have a chance to publish an extended, full-length version of the paper presented at MOC2021 in **a special issue of the JJAP**, which is an international journal published by the Japan Society of Applied Physics and IOP publishing. The papers can partially include the MOC2021 paper and will be published in August 2022. The instructions for preparation and submission of a manuscript are on MOC2021 website. The deadline for submission of manuscripts is January 17, 2022. Submitted papers will be reviewed based on the JJAP standard.

## Paper Awards

Some excellent contributed papers will be awarded the Best Paper Award. Moreover, some students presented excellent papers will be awarded the Student Award.

## Official Language

The official language of MOC2021 is English.

## Photograph and Video

No photographing or video recording is permitted during all technical sessions.



## Conference Materials

- Conference Program
- Technical Digest\*
- Award Booklet
- Conference Novelty Items\*

[1] "VCSEL Odyssey", Optronics e-Book written by Kenichi Iga, the Inventor of VCSEL.

[2] Table of Elements (Elements and their applications to optoelectronics.)

[3] Technical Digest of MOC2019

\*Only registered participants can download at the Download site.

## Social Events

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### Get-Together

Get Together Party will be held with Zoom after the Special symposium on Sunday, September 26. Stay in Party! All the attendees of MOC2021 are cordially invited. When you join the Get-together Party online, please be prepared with your own mag, glass, or cup to toast (kanpai). Registration is not required.

### Award Ceremony

MOC award ceremony will be held via Zoom at 19:00, Monday, 27 September.

MOC paper award ceremony will be held via Zoom at 16:30, Wednesday, 29 September.

### Microconcert

"Microconcert" will be provided by Machida Philharmony Baroque Ensemble (MPB). The performance has been prerecorded and will be delivered via YouTube limited to the participants of MOC2021.

#### Microconcert MC1

Please see the next page for the detailed program and the entrance to the concert.

You can watch or listen to Microconcert any time you like on demand during MOC2021.

#### Microconcert MC2

The playback of 2019 Concert by Machida Philharmony Baroque Ensemble at Potpourri Hall at Machida, Tokyo. Some of the pieces were played at MOC2019 in Toyama.

- 1) Georg Friedrich Händel: "Concerto Grosso" Op.6-7
- 2) John Rutter: "Suite for Strings"
- 3) Carl Philipp Emanuel Bach: "Symphony for String Orchestra" Wq. 182 No.4
- 4) Ralph Vaughan-Williams: "Fantasia on Green-Sleeves"
- 5) Peter I. Tchaikovsky: "Souvenir de Florence" 1st mov.
- 6) Charles Gounod-Bach: "Ave Maria" (Encore)

To Concert:

[https://www.youtube.com/watch?v=i2cXtv\\_R54w](https://www.youtube.com/watch?v=i2cXtv_R54w)

or QR code on the right.

Scheduled on Wednesday, 29 September, 10:00 AM-11:15 AM



# ♪ The 21st MicroConcert ♪

- The Social Event of MOC2021 -

September 26-29, 2021  
Online Video Concert

Viewing possible at anytime during the conference  
via YouTube limited to MOC participants.  
The URL or QR code is provided below "To Concert".

**Machida Philharmony Baroque Ensemble (MPB)**  
has recorded for 2021 MicroConcert.



**To Concert**

<http://www.comemoc.com/moc2021/microconcert.html>



< Program >

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- 1) Arcangelo Corelli: "Concerto Grosso" Op. 6-1
  - 2) Georg Friedrich Händel: "Cembalo Concerto" Op. 4-6
  - 3) Georg Friedrich Händel: "Ombra mai fù"
  - 4) Edward Elgar: "Serenade for Strings" Op. 20
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Sponsored by MOC2021: <https://moc2021.com>

# Program

## 1) Arcangelo Corelli (1653—1713)

### “Concerto Grosso” Op.6-1

Concerto grosso is played by a concertino group (here a 1st violin, a 2nd violin and a violoncello) and a group of accompanying strings with continuo. His works are characterized by beautiful and graceful melodies which are played with elegant accompanying voices. Op. 6 consists of 12 concerto grossi and was the last work before his death. Corelli had a great influence on Vivaldi, Händel, and other composers in later ages.

1 <sup>st</sup> Movement	Largo-Allegro
2 <sup>nd</sup> Movement	Largo-Allegro
3 <sup>rd</sup> Movement	Largo
4 <sup>th</sup> Movement	Allegro
5 <sup>th</sup> Movement	Allegro

Play I:

<https://youtu.be/RfVHHA8QMn8>

Play II:

<https://youtu.be/VY5LLXB-5S8>



Violin Solo:  
Takako Yoshii



Violin Solo:  
Yoshikazu Karasawa



Violoncello Solo:  
Masamichi Ishikawa

## 2) Georg Friedrich Händel (1685—1759)

### “Cembalo Concerto” Op. 4-6

Händel had affection for opera and oratorio throughout his life. His concertos were played at the opening or during the intermission of opera and oratorio for the amusement of his audiences. The cembalo concerto is the most familiar one to the present and occasionally performed by harp or organ.

1 <sup>st</sup> Movement	Andante allegro
2 <sup>nd</sup> Movement	Larghetto
3 <sup>rd</sup> Movement	Allegro moderato

<https://youtu.be/OBJIU5rNik0>



Cembalo Solo: Naomi Hanzawa

### 3) Georg Friedrich Händel (1685–1759)

#### “Ombra mai fù”

The piece is an aria from the opera “Serse” by Händel. The words mean as follows;

“Ombra mai fù di vegetabile, cara ed amabile, soave più”

“Never was a shade of any plant, dearer and more lovely, or sweeter.”

<https://youtu.be/Xi7GwkA0VRs>



Vocal: Hirochika Nakajima

### 4) Edward Elgar (1857–1934)

#### “Serenade for Strings” Op. 20

Elgar got married to Caroline Alice Roberts, novelist and Elgar’s student of piano, 8 years older than him. The work was composed for her at the occasion of the 3rd anniversary wedding celebration. The very famous piece “Love’s Greeting” was also presented to her in memory of their engagement. He got strong emotional support from her during his obscure time. The music is composed of three movements, fast-slow-fast, and full of his love and gratitude.

1<sup>st</sup> Movement Allegro piacevole

2<sup>nd</sup> Movement Larghetto

3<sup>rd</sup> Movement Allegretto



[https://youtu.be/8EEgbM\\_euZo](https://youtu.be/8EEgbM_euZo)

Microconcert of MOC2019, Toyama

## Machida Philharmony Baroque Ensemble (MPB)

Machida Philharmony Baroque Ensemble (MPB) is a community string orchestra located at Machida-city, Tokyo. This Ensemble was founded in 1990 and has been performing the Microconcert as the social event of Microoptics Conferences.



Concert 2019 at Popuri Hall, Tokyo

### Members on Stage

Chair: Prof. Kenichi Iga

Solo Concertmistress & Coach: Takako Yoshii

Secretary & Stage Manager: Akio Yoshii

Violin: Takako Yoshii, Kaeko Fujii, Tomoko Iga, Yoshikazu Karasawa, Mizue Hoshi,  
Mariko Furuta, Shoko Suzuki, Hideyo Miyamura

Viola: Yoko Miyazaki, Yumi Matsubayashi, Reiko Araki

Violoncello: Kazutaka Okasaka, Masamichi Ishikawa

Contrabass: Kenichi Iga

Cembalo: Naomi Hanzawa

代表: 伊賀健一

Solo Concertmistress & Coach: 吉井孝子

Secretary & Stage Manager: 吉井昭夫

Violin: 吉井孝子, 藤井賀江子, 伊賀智子, 柄澤良和, 星 瑞枝, 古田真理子,  
鈴木蕉子, 宮村秀世

Viola: 宮崎洋子, 松林友美, 荒木玲子

Violoncello: 岡坂和孝, 石川正道

Contrabass: 伊賀健一

Cembalo: 半澤尚美

MPB: <http://www.home.f09.itscom.net/mpb/>



# Technical Sessions

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Sunday, 26 September

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Moderators:

Y. Kokubun, *Inst. Technologist*

Y. Takiguchi, *Hamamatsu Photonics K. K.*

## 13:00–17:05 Session SS: Special Symposium "Photonics Progress Review"

### SS-0 Introductory talk

13:00 Y. Kawata, *Shizuoka Univ.*

### SS-1 New photonics industries starting from Shizuoka, Japan

13:05 Y. Takiguchi, *The Graduate School for the Creation of New Photonics Industries*

### SS-2 Multi-tap time-resolved CMOS image sensors and their applications

13:50 S. Kawahito, *Shizuoka Univ.*

Break (14:35–14:50)

### SS-3 Photoniccrystal surface-emitting lasers and their application to LiDAR

14:50 S. Noda, *Kyoto Univ.*

### SS-4 Development of 20-inch photomultiplier tube for neutrino experiments

15:35 Y. Yoshizawa, *Hamamatsu Photonics K.K.*

### SS-5 Clinical near-infrared spectroscopy and imaging

16:20 Y. Hoshi, *Hamamatsu Univ. School of Med.*

Break (17:05–17:15)

## 17:15–18:15+ Get Together Party

### #17:15 Open Door to Virtual Party on Zoom of MOC2021

Background Music: From the Album of Duo21.

By Kenichi Iga and Genichi Hatakoshi

Note: Please be prepared with your own mag, glass, or cup to join "Kampai".

### #17:30-18:15+ Get-Together Party

Moderator: Kiichi Hamamoto (MOC2014/2018 Conference Chair)

Welcome: Taro Arakawa (Conference Chair)

Kanpai on Do: Kenichi Iga (General Chair of Microoptics Group)

Closing: Muneharu Kuwata (Conference Chair)

**9:00–9:15 Opening Remarks**

Conference Co-chairs:

- T. Arakawa, *Yokohama National Univ.*  
M. Kuwata, *Mitsubishi Electric Corp.*

**9:15–10:45 Session PL1: Plenary Session 1**

Chairs: T. Arakawa, *Yokohama National Univ.*  
M. Kuwata, *Mitsubishi Electric Corp.*

**PL1-1 InGaN-based nanocolumn optical devices**

9:15 K. Kishino, *Sophia Univ.*

**PL1-2 Flat optics based on metasurfaces: from components to cameras**

10:00 F. Capasso, *Harvard Univ.*

**Break (10:45–11:00)**

**11:00–11:45 Session A: Emerging Photonics (1)**

Chairs: S. Park, *Samsung Electronics Corp.*  
K. Hamamoto, *Kyushu Univ.*

**A-1 All-dielectric Mie-resonant metaphotonics (Invited)**

11:00 Y. Kivshar, *Australian National Univ.*

**A-2 Conservation law of spin & orbital angular momentum for a vortex generated by a silicon photonic gear**

11:30 S. Saito, *Hitachi, Ltd.*

**Lunch (11:45–13:30)**

**13:30–14:30 Session B: Microoptics for Sensing (1)**

Chairs: K. Kato, *Kyushu Univ.*  
H. Tan, *Australian National Univ.*

**B-1 Artificial chirality evolution in micro-/nano-scale three-dimensional plasmonic metamaterials (Invited)**

13:30 J. Rho, *Pohang Univ. of Science and Tech.*

**B-2 Real-time LiDAR system using VCSEL-integrated amplifier/beam scanner**

14:00 K. Tanahashi, I. Fujioka, S. Hu, X. Gu, and F. Koyama, *Tokyo Inst. Tech.*

**B-3 MOEMS technology based compact and robust broadband wavelength-swept mid-infrared quantum cascade laser**

14:15 N. Akikusa<sup>1</sup>, A. Sugiyama<sup>1</sup>, T. Ochiai<sup>1</sup>, T. Edamura<sup>1</sup>, and H. Furukawa<sup>2</sup>, <sup>1</sup>*Hamamatsu Photonics K.K.*, <sup>2</sup>*AIST*

**Break (14:30–14:45)**

**14:45–16:00 Session C: Microoptics for Sensing (2)**

Chairs: S. Iwamoto, *Univ. Tokyo*  
R. Katayama, *Fukuoka Inst. Tech.*

**C-1 Light-induced spiral motion of micro-objects in nonliquid environments (Invited)**

14:45 W. Tang<sup>1,2</sup>, W. Lv<sup>1,2</sup>, J. Lu<sup>3</sup>, F. Liu<sup>1,2</sup>, J. Wang<sup>1,2</sup>, W. Yan<sup>1,2</sup>, and M. Qiu<sup>1,2</sup>, <sup>1</sup>*Westlake Univ.*, <sup>2</sup>*Westlake Institute for Advanced Study*, <sup>3</sup>*Zhejiang Univ.*

- C-2 Hybridized plasmonic surface lattice resonance perovskite laser**  
15:15 Z.-T. Huang, C.-W. Yin, H. Li, K.-B. Hong, and T.-C. Lu, *National Yang Ming Chiao Tung Univ.*
- C-3 Optical metrology and sensing in times of digital transition (Invited)**  
15:30 W. Osten, *Univ. Stuttgart*

**Break (16:00–16:15)**

**16:15–17:15 Session D: Photonic Integration**

Chairs: W. Osten, *Univ. Stuttgart*  
S. Saito, *Hitachi, Ltd.*

- D-1 Photonics packaging for integrated photonics, from research to pilotscale manufacturing (Invited)**  
16:15 P. O'Brien, *Tyndall National Inst.*
- D-2 A freeform-based versatile microfluidic raman lab-on-chip system**  
16:45 Q. Liu, H. Thienpont, and H. Ottevaere, *Vrije Univ. Brussel*
- D-3 Optoacoustic mode-locking based on micro-core photonic crystal fibre**  
17:00 W. He<sup>1</sup>, M. Pang<sup>1</sup>, D.-H. Yeh<sup>1,2</sup>, and P. St. J. Russell<sup>1</sup>, <sup>1</sup>*Max Planck Institute for the Science of Light*,  
<sup>2</sup>*Friedrich-Alexander Univ.*

**Break (17:15–17:30)**

**17:30–19:00 Session PL2: Plenary Session 2**

Chairs: T. Arakawa, *Yokohama National Univ.*  
M. Kuwata, *Mitsubishi Electric Corp.*

- PL2-1 Exploring photonics — research activity on spatial light modulator in Hamamatsu —**  
17:30 T. Hara, *Hamamatsu Photonics K.K.*
- PL2-2 Novel VCSEL designs for the next generation of photonic systems**  
18:15 D. Bimberg, *CIOMP, CAS/ TU Berlin*

**19:00–19:15 MOC Award Ceremony**

Chair: T. Sato, *NTT Corp.* (Program Chair)  
Presenter: Conference Co-chairs  
T. Arakawa, *Yokohama National Univ.*  
M. Kuwata, *Mitsubishi Electric Corp.*

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**8:30–9:45 Session E: Active Devices (1)**

Chairs: K.-P. Chen, *National Chiao Tung Univ.*  
T. Miyamoto, *Tokyo Inst. Tech.*

**E-1 High-efficiency photovoltaic power converters and application to optical power transmission (Invited)**

8:30 S. Fafard, D. Masson, J.G. Werthen, J. Liu, T.C. Wu, C. Hundberger, M. Schwarzfischer, G. Steinle, C. Gaertner, C. Piemonte, B. Luecke, J. Wittl, and M. Weigert, *Broadcom*

**E-2 1fJ/bit coupling-based ITO monolithic modulator in integrated photonics**

9:00 C. S. Patil<sup>1</sup>, H. Dalir<sup>1,2</sup>, H. Wang<sup>1</sup>, and V. Sorger<sup>1,2</sup>, <sup>1</sup>*George Washington Univ.*, <sup>2</sup>*Optelligence LLC*

**E-3 Commercialization of VCSELs (Invited)**

9:15 J. Tatum, L. Graham, J. Guenter, and P. Khurana, *Dallas Quantum Devices*

**Break (9:45–10:00)**

**10:00–11:00 Session F: Active Devices (2)**

Chairs: M. Mori, *AIST*  
J. Rho, *Pohang Univ. of Science and Tech.*

**F-1 60-Times power enhancement of 300-GHz terahertz wave by 8-arrayed UTC-PDs**

10:00 K. Kondo, Y. Matsuo, and K. Kato, *Kyushu Univ.*

**F-2 Terahertz-wave beam steering by photomixing with chromatic dispersion of optical fibers**

10-15 T. Saito<sup>1</sup>, S. Takasaka<sup>2</sup>, and K. Kato<sup>1</sup>, <sup>1</sup>*Kyushu Univ.*, <sup>2</sup>*Furukawa Electric Co., Ltd.*

**F-3 Active-MMI SOA on quantum-dots toward high saturation output power under high temperature**

10:30 Z. Fan, Y. Hinokuma, H. Jiang, and K. Hamamoto, *Kyushu Univ.*

**F-4 Miniaturized vertically-stacked photovoltaic/bypass diode module**

10:45 Y.-C. Wu, J.-C. Shih, Y.-C. Chen, J.-F. Liao, and Y. Hung, *National Sun Yat-sen Univ.*

**Break (11:00–11:15)**

**11:15–12:15 Session G: Emerging Photonics (2)**

Chairs: H. Ishii, *Furukawa Electric Co., Ltd.*  
T.-C. Lu, *National Chiao Tung Univ.*

**G-1 Structural colors and lasers by lattice resonance in silicon nitride metasurfaces (Invited)**

11:15 K.-P. Chen, *National Chiao Tung Univ.*

**G-2 Two-dimensional topological photonic crystals with helical edge states below the light line**

11:45 C. Zhang<sup>1</sup>, H. Yoshimi<sup>1</sup>, Y. Ota<sup>2</sup>, and S. Iwamoto<sup>1</sup>, <sup>1</sup>*The Univ. of Tokyo*, <sup>2</sup>*Keio Univ.*

**G-3 Fabrication of valley photonic crystals with CMOS-compatible process**

12:00 T. Yamaguchi<sup>1</sup>, H. Yoshimi<sup>1</sup>, M. Seki<sup>2</sup>, M. Ohtsuka<sup>2</sup>, N. Yokoyama<sup>2</sup>, Y. Ota<sup>3</sup>, M. Okano<sup>2</sup>, and S. Iwamoto<sup>1</sup>, <sup>1</sup>*The Univ. of Tokyo*, <sup>2</sup>*AIST*, <sup>3</sup>*Keio Univ.*

**Lunch (12:15–14:00)**

**14:00–15:00 Session H: Fabrication Technology**

Chairs: S.-L. Lee, *Taiwan Tech.*  
H. Takahashi, *Sophia Univ.*

**H-1 Random depolarization film doped with calcite microparticles for clear real-color displays**

14:00 S. Sasaki<sup>1</sup>, M. Udono<sup>1</sup>, and Y. Koike<sup>1,2</sup>, <sup>1</sup>*Keio Univ.*, <sup>2</sup>*Keio Photonics Research Inst.*

- H-2 Blue/green-light resistant non-doped silica waveguide for visible-light applications**  
14:15 Y. Fujiwara, J. Sakamoto, K. Watanabe, and R. Kasahara, *NTT Corp.*
- H-3 Fabrication of GaN-QPM crystals for slab waveguide type wavelength conversion devices**  
14:30 H. Ishihara, K. Matsuhisa, K. Kurose, Y. Kawata, A. Sugita, Y. Inoue, and T. Nakano, *Shizuoka Univ.*
- H-4 Laser-wavelength stabilization by a focusing cavity-resonator-integrated guided-mode resonance filter**  
14:45 R. Ueda<sup>1</sup>, A. Watanabe<sup>1</sup>, K. Ozawa<sup>1</sup>, K. Kintaka<sup>2</sup>, K. Nishio<sup>1</sup>, T. Kusuura<sup>1</sup>, J. Inoue<sup>1</sup>, and S. Ura<sup>1</sup>, <sup>1</sup>*Kyoto Inst. Tech.*, <sup>2</sup>*AIST*

**Break (15:00–15:15)**

**15:15–16:15 Session J: New Materials**

Chairs: T. Kita, *Waseda Univ.*  
U. D. Zeitner, *Fraunhofer IOF*

- J-1 Novel structural optimization of femtosecond laser writing of waveguides in lithium niobate by raman spectroscopy**  
15:15 A. Inoue, Y. Fujiwara, and K. Watanabe, *NTT Corp.*
- J-2 Two-photon polymerization-based direct laser writing and characterization of micro-lenses for optical interconnect applications**  
15:30 K. Vanmol, A. Kandeel, G. Y. Belay, H. Thienpont, H. Ottevaere, and J. V. Erps, *Vrije Univ. Brussel*
- J-3 Micro-optics in single crystal diamond (Invited)**  
15:45 N. Quack, G. Huszka, A. Toros, T. Graziosi, M. Kiss, and S. Mi, *EPFL*

**Break (16:15–16:30)**

**16:30–17:30 Session K: Optical Processing (1)**

Chairs: Y. Luo, *Tsinghua Univ.*  
O. Sugihara, *Utsunomiya Univ.*

- K-1 Color centers with exceptional properties in diamond (Invited)**  
16:30 T. Lühmann, S. Pazzagna, and J. Meijer, *Univ. Leipzig*
- K-2 Phase characteristic of phase-only spatial light modulator under high-power laser irradiation**  
17:00 Y. Takiguchi, H. Tanaka, T. Watanabe, Y. Ohtake, and H. Toyoda, *Hamamatsu Photonics K.K.*
- K-3 Silicon photonic optical phase arrays with apodized subwavelength gratings**  
17:15 T.-H. Lee<sup>1</sup>, S.-H. Chung<sup>1</sup>, W.-X. Chen<sup>1</sup>, Y.-H. Lin<sup>1</sup>, P.-Y. Wu<sup>2</sup>, V. Kung<sup>2</sup>, T.-T. Hu<sup>2</sup>, and S.-L. Lee<sup>1</sup>, <sup>1</sup>*National Taiwan Univ. of Science and Technology*, <sup>2</sup>*FOCI Fiber Optic Communications, Inc.*

**Break (17:30–17:45)**

**17:45–19:00 Session L: Novel Transmission Technology**

Chairs: R. Kou, *AIST*  
N.-C. Park, *Yonsei Univ.*

- L-1 Vector vortex beams propagation, manipulation, and detection in classical and quantum regime (Invited)**  
17:45 T. Giordani, *Sapienza Univ. di Roma*
- L-2 Recent advancements in optical wireless communications (Invited)**  
18:15 H. Haas, *The Univ. of Strathclyde*
- L-3 High output and high efficiency handy-sized LED-array based optical wireless power transmission system using fresnel lenses**  
18:45 M. Zhao and T. Miyamoto, *Tokyo Inst. Tech.*

**Break (19:00–19:20)**



**19:20–21:00 Session PO: Poster Session**

Chairs: T. Sato, *NTT Corp.*

T. Watanabe, *Kagoshima Univ.*

(19:20–20:10) Even numbers

(20:10–21:00) Odd numbers

- PO-1 Termination of fiber fuse propagation using optical pulses**  
K. Kurokawa and D. Shimokura, *Kitami Inst. Tech.*
- PO-2 Fabrication of polarization control devices using metal grating structures**  
A. Motogaito, Y. Hayashi, A. Watanabe, and K. Hiramatsu, *Mie Univ.*
- PO-3 Influence of lateral displacement of laguerre-gaussian beams on spiral mode sorting**  
S. Kunimatsu, H. Kishikawa, N. Goto, and J. Fujikata, *Tokushima Univ.*
- PO-4 Nb<sub>2</sub>O<sub>5</sub>-based grating coupler employing multiple Nb<sub>2</sub>O<sub>5</sub>/SiO<sub>2</sub> layers in integrated probe for cross-sectional velocity distribution measurement**  
K. Maru<sup>1</sup>, Y. Yamamoto<sup>1</sup>, and K. Nakatsuhara<sup>2</sup>, <sup>1</sup>*Kagawa Univ.*, <sup>2</sup>*Kanagawa Inst. Tech.*
- PO-5 Silk fibroin optical planar waveguides fabricated on acrylic polymer foil**  
V. Prajzler<sup>1</sup>, K. Min<sup>2</sup>, S. Kim<sup>2</sup>, and P. Nekvindova<sup>3</sup>, <sup>1</sup>*Czech Technical Univ. in Prague*, <sup>2</sup>*Ajou Univ.*, <sup>3</sup>*Institute of Chemical Technology*
- PO-6 Femtosecond laser fabrication of metallic nanostructures using polarization control**  
M. Shimose, S. Toriyama, K. Hashimoto, V. Mizeikis, and A. Ono, *Shizuoka Univ.*
- PO-7 Research on deep ultraviolet photodetectors based on carbon dots**  
Y. Fang, Z. Zhao, Z. Weng, and M. Zhu, *Southeast Univ.*
- PO-8 Surface plasmon propagation of fluorescence from quantum dots through a crystalline silver nanowire**  
T. Komatsu, Y. Hayashi, X. Ren, and A. Ono, *Shizuoka Univ.*
- PO-9 LiNbO<sub>3</sub>/Si-hybrid slot-waveguide electro-optical modulator designs for 1550 nm**  
T. M. Mercier<sup>1</sup>, M. D.B. Charlton<sup>1</sup>, and I. Tomita<sup>2</sup>, <sup>1</sup>*Univ. of Southampton*, <sup>2</sup>*National Inst. Tech., Gifu College*
- PO-10 Liquid crystal clad polymer waveguide based electro-optic attenuator**  
R. Panchal and A. Sinha, *Indian Inst. Tech. Delhi*
- PO-11 Numerical modelling of initial photoacoustic pressure in colloidal suspensions for photoacoustic imaging**  
H. Fujii, T. Aoki, Y. Inoue, I. Terabayashi, K. Kobayashi, and M. Watanabe, *Hokkaido Univ.*
- PO-12 Sensitivity improvement of dynamic displacement measurement system composed of phase-modulated fiber optic interferometer**  
M. Fujimori, S. Takemae, and Y. Tanaka, *Tokyo Univ. of Agriculture and Technology*
- PO-13 Switchable mode converter for four-mode MDM system assisted by passive mode controlling device designed by wavefront matching method**  
Y. Sawada, T. Fujisawa, T. Sato, and K. Saitoh, *Hokkaido Univ.*
- PO-14 Simulation on non-axisymmetric ring resonator with nano-antenna for heat-assisted magnetic recording**  
J. Chen<sup>1</sup>, R. Katayama<sup>1</sup>, and S. Sugiura<sup>2</sup>, <sup>1</sup>*Fukuoka Inst. Tech.*, <sup>2</sup>*InnovaStella, Inc.*
- PO-15 Imaging spectral detection of single gold nanorod based on polarization-controlled excitation**  
L. Shen, Y.-C. Hou, and W.-S. Tsai, *National Chung Hsing Univ.*
- PO-16 Experimental demonstration of full-range high-speed high-reliability wavelength switching at DFB laser with current temperature cooperative control**  
S. Ye, M. Che, and K. Kato, *Kyushu Univ.*

- PO-17 Fabrication of vertical-taper structures for silicon photonic devices by local-thickness-thinning process**  
S. Abe<sup>1,2</sup>, H. Hara<sup>2</sup>, S. Masuda<sup>2</sup>, and H. Yamada<sup>1</sup>, <sup>1</sup>*Tohoku Univ.*, <sup>2</sup>*Advantest Laboratories Ltd.*
- PO-18 All-dielectric perfect absorber of quadrupole modes by using cross-shaped Mie resonators**  
R. Xu and J. Takahara, *Osaka Univ.*
- PO-19 A cost-effective mode converter based on staircase structure for thin-film lithium niobate devices**  
M. Wang and K. Chen, *Univ. of Electronic Science and Technology of China*
- PO-20 Safety system of optical wireless power transmission by suppressing light beam irradiation to human using depth camera**  
X. Ma and T. Miyamoto, *Tokyo Inst. Tech.*
- PO-21 Imprinted microoptics for grey scale pattern projectors**  
T. Scharf, W. Noell, G. Quaranta, M. Pfeiffer, and R. Völkel, *Suss Microoptics SA*
- PO-22 Multipoint sensing system with a fine refractive index resolution by combining multimode-interference-sensors and wavelength selection configuration**  
H. Fukano and T. Mukai, *Okayama Univ.*
- PO-23 Holographic gratings formed by wavelength multiplexing in liquid crystal composites**  
A. Ogiwara<sup>1</sup> and M. Watanabe<sup>2</sup>, <sup>1</sup>*Kobe City College of Technology*, <sup>2</sup>*Okayama Univ.*
- PO-24 Formation of temperature dependent polymer dispersed liquid crystal using laser speckle pattern irradiation**  
A. Ogiwara<sup>1</sup> and H. Kakiuchida<sup>2</sup>, <sup>1</sup>*Kobe City College of Technology*, <sup>2</sup>*AIST*
- PO-25 Acceptable angular range of beam pointing in free-space optical communications**  
T. Nakayama<sup>1</sup>, Y. Takayama<sup>1</sup>, C. Fujikawa<sup>1</sup>, and K. Kodate<sup>2</sup>, <sup>1</sup>*Tokai Univ.*, <sup>2</sup>*Japan Women's Univ.*
- PO-26 Highly sensitive and stable temperature sensing method using amplified-spontaneous-emission feedback circuit**  
H. Masuda and B. Biswas, *Shimane Univ.*
- PO-27 Correlated photon pairs generation from a silicon micro-ring resonator with a gain-switched laser diode**  
F. Yang, M. Fukunaga, K. Edamatsu, H. Yokoyama, H. Yamada, and N. Matsuda, *Tohoku Univ.*
- PO-28 Compact plasmonic enhanced MoTe<sub>2</sub> photodetector based on engineering gain-bandwidth-product scaling laws**  
H. Wang<sup>1</sup> and V. J. Sorger<sup>1,2</sup>, <sup>1</sup>*The George Washington Univ.*, <sup>2</sup>*Optelligence LLC*
- PO-29 Formation of periodic nanostructures induced by circularly-polarized femtosecond laser**  
R. Miyagawa, H. Matsuura, A. Nakamura, and O. Eryu, *Nagoya Inst. Tech.*
- PO-30 Orbital angular momentum mode recognition based on sparse coding**  
K. Suzuki, H. Kishikawa, N. Goto, and J. Fujikata, *Tokushima Univ.*
- PO-31 Highly accurate, reliable and non-contaminating two-dimensional material transfer system**  
C. S. Patil<sup>1</sup>, C. Dong<sup>1</sup>, H. Dalir<sup>1,2</sup>, and V. J. Sorger<sup>1,2</sup>, <sup>1</sup>*George Washington Univ.*, <sup>2</sup>*Optelligence LLC*
- PO-32 Optimizing optical convolution with nonlinear absorption**  
J. K. George, M. Gorgone-Solyanik, and V. J. Sorger, *George Washington Univ.*
- PO-33 Optical feedback tolerance of transverse coupled cavity VCSELs**  
H. R. Ibrahim<sup>1,2</sup>, A. M. A. Hassan<sup>1,3</sup>, M. Ahmed<sup>2</sup>, and F. Koyama<sup>1</sup>, <sup>1</sup>*Tokyo Institute of Technology*, <sup>2</sup>*Minia Univ.*, <sup>3</sup>*Al Azhar Univ., Assiute*
- PO-34 Thermal crosstalk evaluation of 1.1  $\mu\text{m}$ -band vertical cavity surface emitting laser array for multi-core fiber transmission**  
L. Dong<sup>1</sup>, X. Gu<sup>1,2</sup>, and F. Koyama<sup>1</sup>, <sup>1</sup>*Tokyo Inst. Tech.*, <sup>2</sup>*Ambition Photonics Inc.*
- PO-35 An apodization method for grating coupler in waveguide cavity**  
A. Watanabe<sup>1</sup>, K. Ozawa<sup>1</sup>, R. Ueda<sup>1</sup>, J. Inoue<sup>1</sup>, K. Kintaka<sup>2</sup>, and S. Ura<sup>1</sup>, <sup>1</sup>*Kyoto Inst. Tech.*, <sup>2</sup>*AIST*
- PO-36 Disk-hole array structure for hot-electron emission enhancement**  
H. Morisawa, A. Ono, W. Inami, and Y. Kawata, *Shizuoka Univ.*

- PO-37 Light-induced self-written waveguide using soft material**  
Z. Ni, H. Terasawa, and O. Sugihara, *Utsunomiya Univ.*
- PO-38 Tunable mode converter based on Mach-Zehnder interferometer**  
D. Minemura, S. Liu, Y. Shoji, and T. Mizumoto, *Tokyo Inst. Tech.*
- PO-39 Mode decomposition from near-field intensity pattern by a correlation discriminant and stochastic parallel gradient descent combined algorithm**  
W. Jiang and K. S. Chiang, *City Univ. of Hong Kong*
- PO-40 4-Stage Mach-Zehnder interferometer optical switch with phase generating couplers**  
M. Kawasako, T. Watanabe, T. Nagayama, and S. Fukushima, *Kagoshima Univ.*
- PO-41 Demonstration of equal input (intensity and phase) MMI like power coupler by using nano-pixel structure**  
K. Shoda, X. He, K. Kozu, H. Jiang, and K. Hamamoto, *Kyushu Univ.*
- PO-42 Compact high-extinction-ratio multimode interference electroabsorption modulator**  
Y. Kanesaka and T. Arakawa, *Yokohama National Univ.*
- PO-43 Stability of spatiotemporal soliton in multimode fiber with optically induced temporal potential**  
V. Mishra and M. S. Kang, *KAIST*
- PO-44 221K local heating in a Co loaded Si plasmonic waveguide**  
N. Ota, T. Miyauchi, and H. Shimizu, *Tokyo Univ. of Agriculture and Technology*
- PO-45 Modeling of surface grating-loaded VCSEL with slowing light**  
C. Ge and F. Koyama, *Tokyo Inst. Tech.*
- PO-46 36.6 dB/mm extinction ratio in TE mode semiconductor optical isolators with Co**  
R. Oshikiri, Y. Kobayashi, S. Nishiyama, and H. Shimizu, *Tokyo Univ. of Agriculture and Technology*
- PO-47 Emission enhancement of fluorescence using electron beam excited localized plasmons**  
Y. Matsui, W. Inami, and Y. Kawata, *Shizuoka Univ.*
- PO-48 Development of luminescent thin films based on superlattice structures of Al<sub>2</sub>O<sub>3</sub> and ZnO by atomic layer deposition**  
S. Kobayashi, A. Nakamura, W. Inami, and Y. Kawata, *Shizuoka Univ.*
- PO-49 Enhancing the figure of merit in surface plasmon resonance sensors with a wedge-shape Au thin film**  
T. Ogura, T. Maeda, S. Suzuki, and H. Shimizu, *Tokyo Univ. of Agriculture and Technology*
- PO-50 Evaluation of modal power distribution of graded-index plastic optical fiber connections**  
S. Ueda and O. Sugihara, *Utsunomiya Univ.*
- PO-51 Optical reflection and fluorescence study for non-destructive estimation of crude protein content in leaves of grass**  
M. Sakakura, N. Kita, G. Ishigaki, and M. Arai, *Univ. of Miyazaki*
- PO-52 Zn doping effect on surface morphology of metamorphic InAs on GaAs grown by MOVPE**  
S. Nakagawa, Y. Imamura, Y. Hirata, K. Maeda, and M. Arai, *Univ. of Miyazaki*
- PO-53 Design of high-order series-coupled microring resonator wavelength filter with differential evolution method**  
Y. Udagawa and T. Arakawa, *Yokohama National Univ.*
- PO-54 Footprint reduction of arrayed waveguided grating by waveguide width variation**  
H. Zhou, S. Heinsalu, Y. Matsushima, H. Ishikawa, and K. Utaka, *Waseda Univ.*
- PO-55 Observation of living cells using surface plasmon resonance in the deep ultraviolet region**  
K. Kobayashi, W. Inami, and Y. Kawata, *Shizuoka Univ.*
- PO-56 Study on the single-mode condition for lithium niobate-on-insulator (LNOI) rib waveguides**  
X. Yu, M. Wang, and K. Chen, *Univ. of Electronic Science and Technology of China*

- PO-57 Nb<sub>2</sub>O<sub>5</sub> horizontal slot waveguides fabricated by an improved etching process**  
T. Hinata, Y. Hayama, N. Sawayanagi, T. Touma, K. Nakatsuhara, M. Takeda, and T. Nishizawa, *Kanagawa Inst. Tech.*
- PO-58 Inflection in hysteresis and haze of PDLC devices by ferroelectric nanoparticle**  
A. Kumari and A. Sinha, *Indian Inst. Tech. Delhi*
- PO-59 Analysis and experiments of surface-plasmon tip-tapered fiber sensor with gold nanoparticles**  
M. Yamamoto, T. Matsumura, Y. Matsushima, H. Ishikawa, and K. Utaka, *Waseda Univ.*
- PO-60 Proposal and analysis of Si/CaF<sub>2</sub> distributed feedback waveguide for near- and mid- infrared applications**  
G. Tei, K. Kitamura, L. Liu, Y. Koyanagi, D. Sugawara, and M. Watanabe, *Tokyo Inst. Tech.*

(Following postdeadline papers are accepted for poster presentation)

- PO-61 Proposal of space-mode “compressor” by using nano-pixel**  
Y. Wang, H. Jiang, and K. Hamamoto, *Kyushu Univ.*
- PO-62 Proposal of the all-optical memory using the pseudo-localized plasmon resonance excited by an optical vortex beam**  
D. Tanaka<sup>1</sup>, H. Jiang<sup>2</sup>, and K. Hamamoto<sup>2</sup>, <sup>1</sup>*National Inst. Tech., Oita College*, <sup>2</sup>*Kyushu Univ.*
- PO-63 Investigation on diffraction properties of polarization gratings with optically biaxial anisotropy**  
R. Momosaki<sup>1</sup>, M. Sakamoto<sup>1</sup>, K. Noda<sup>1</sup>, T. Sasaki<sup>1</sup>, T. Sakai<sup>2</sup>, Y. Hattori<sup>2</sup>, N. Kawatsuki<sup>3</sup>, and H. Ono<sup>1</sup>, <sup>1</sup>*Nagaoka Univ. of Technology*, <sup>2</sup>*Hayashi Telempu Corp.*, <sup>3</sup>*Univ. of Hyogo*
- PO-64 Examination for the application of Laguerre-Gaussian beams for underwater optical wireless communication**  
Y. Yokoyama, K. Yada, and K. Ogawa, *Japan Women's Univ.*
- PO-65 Affection analysis of frequency response with photon-photon-resonance (PPR) to directly modulated 40 Gbps signal**  
H. Xiao, K. Shoda, K. Koudu, H. Jiang, and K. Hamamoto, *Kyushu Univ.*
- PO-66 Beta-BBO-on-insulator waveguide design for coherent deep-ultraviolet light generation**  
M. S. Mohamed, and S. Forouhar, *Jet Propulsion Lab., California Inst. Tech.*

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**10:00–11:15 Microconcert MC2**

- 1) Georg Friedrich Händel: “Concerto Grosso” Op.6-7
  - 2) John Rutter: “Suite for Strings”
  - 3) Carl Philipp Emanuel Bach: “Symphony for String Orchestra” Wq. 182 No.4
  - 4) Ralph Vaughan-Williams: “Fantasia on Green-Sleeves”
  - 5) Peter I. Tchaikovsky: “Souvenir de Florence” 1st mov.
  - 6) Charles Gounod-Bach: “Ave Maria” (Encore)
- [https://www.youtube.com/watch?v=i2cXtv\\_R54w](https://www.youtube.com/watch?v=i2cXtv_R54w)

**Break (11:15–11:20)**

**11:20–12:00 Session CT: Commemorative Talk: IEEE Edison Medal**

Chair: Y. Tohmori, *Tsurugi-Photonics Foundation*

**CT VCSEL: Its Concept, Physics, and Development**

11:20 Kenichi Iga, *Tokyo Inst. Tech.*

**Lunch (12:00–13:15)**

**13:15–14:15 Session M: Optical Processing (2)**

Chairs: D. Inoue, *Sumitomo Electric Ind., Ltd.*

K. Ogawa, *Japan Women's Univ.*

**M-1 Optical excitation and detection of picometer-order longitudinal motion in sub- $\mu\text{m}$  plasmomechanical resonator**

13:15

S. Lee and M.-K. Seo, *Korea Advanced Institute of Science and Technology*

**M-2 Plasmonic color modulation of crystalline Ag nanocube monolayer by dynamic control of stretchable substrate**

13:30

A. Mizuno<sup>1,2</sup> and A. Ono<sup>1</sup>, <sup>1</sup>*Shizuoka Univ.* <sup>2</sup>*JSPS*

**M-3 Symmetric two-mode waveguide directional coupler on thin-film lithium niobate for electro-optic mode switching**

13:45

M. Zhang<sup>1</sup>, K. Chen<sup>1</sup>, M. Wang<sup>1</sup>, H. Yao<sup>1</sup>, and K. S. Chiang<sup>2</sup>, <sup>1</sup>*Univ. of Electronic Science and Technology of China*, <sup>2</sup>*City Univ. of Hong Kong*

**M-4 Color-selective photodetector based on hexagonal-lattice silver nanodisk array**

14:00

Z. Wu, Y. Zhai, and Q. Wang, *Southeast Univ.*

**Break (14:15–14:30)**

**14:30–15:30 Session N: Silicon Photonics**

Chairs: S. Ura, *Kyoto Inst. Tech.*

K. Yu, *KAIST*

**N-1 Ultracompact autocorrelator with pulse-width-range switch function integrated on a silicon photonic chip**

14:30

K. Kondo and H. Oshima, *Utsunomiya Univ.*

**N-2 High-efficiency focusing double-etched SiN grating coupler for trapped ion qubit manipulation**

14:45

M. Shirao<sup>1</sup>, D. Klawson<sup>1</sup>, S. Mouradian<sup>2</sup>, and M. C. Wu<sup>1</sup>, <sup>1</sup>*Univ. of California*, <sup>2</sup>*Univ. of California, Berkeley*

**N-3 High extinction ratio Si optical modulator loaded with integrated polarizer**

15:00

H. Kojima<sup>1</sup>, J. Fujikata<sup>2</sup>, and T. Kita<sup>1</sup>, <sup>1</sup>*Waseda Univ.*, <sup>2</sup>*Tokushima Univ.*



- N-4**    **A unique combination of microlens and pillar on fiber facet using UV-curable resin for high optical coupling to silicon photonics**  
15:15    Y. Kamiura, T. Kurisawa, C. Fujikawa, and O. Mikami, *Tokai Univ.*

**Break (15:30–15:45)**

**15:45–16:30    Session PD: Postdeadline Session**

Chairs: T. Sato, *NTT Corp.*

T. Watanabe, *Kagoshima Univ.*

- PD-1**    **Characterization of Laguerre-Gaussian mode multiplexing in atmospheric turbulence for optical wireless communication**  
15:45    K. Yada, and K. Ogawa, *Japan Women's Univ.*

- PD-2**    **Rapid automatic waveguide recognition using YOLO for 3D waveguide drawing**  
16:00    S. Matsubara, T. Zennouji, H. Jiang, and K. Hamamoto, *Kyushu Univ.*

- PD-3**    **50 Gb/s 850 nm Few-Mode VCSELs for Pre-emphasis NRZ-OOK over 100-m GI-SMF Transmission**  
16:15    Y.-W. Yeh, P.-T. Lee, and H.-C. Kuo, *National Yang Ming Chiao Tung Univ.*

**16:30–16:45    Award Ceremony**

**16:45–17:00    Closing Remarks**

Program Co-chairs:

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