### Friday, December 7 (Day 1)

**Registration ( Till 17:00)**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>09:30 - 09:45</td>
<td>Annual Meeting of Taiwan Photonics Society</td>
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<tr>
<td>09:45 - 10:00</td>
<td>(2) Speaker: Satoshi Kawata*, OPTICA President</td>
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<tr>
<td>10:00 - 10:15</td>
<td>Lunch Break</td>
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<tr>
<td>10:15 - 10:30</td>
<td>Optica Plenary Lectures</td>
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<tr>
<td>10:30 - 10:45</td>
<td>(1) Speaker: Ching-Chening Sun</td>
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<tr>
<td>10:45 - 11:00</td>
<td>(2) Speaker: Bernard Kress, SPIE Pres.-Elect</td>
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<tr>
<td>11:00 - 11:15</td>
<td>Lunch Break</td>
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<tr>
<td>11:15 - 11:30</td>
<td>Lunch</td>
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**Lunch Time**

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<tr>
<th>Time</th>
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<tbody>
<tr>
<td>13:00 - 13:15</td>
<td>Oral 1</td>
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**Oral 1**

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**Lunch Break**

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**Oral 2**

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<tr>
<td>15:15 - 15:30</td>
<td>Oral 2</td>
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**Lunch Break**

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*online remote presentation*
### Saturday, December 3 (Day 2)

#### Teaching & Research Building (中央大學教研大樓)

#### OPTIC Plenary Lectures @ TR-A001–003
- 09:00 AM: Opening Session
  - Speakers: Ray-Hua Miao & Ping
- 09:15 AM: Plenary Lecture: Anita Mahadevan-Joseph
- 09:30 AM: Plenary Lecture: Bahram Javadi
- 09:45 AM: Plenary Lecture: Federico Capasso
- 10:00 AM: Plenary Lecture: David Brady

#### OPTIC Plenary Lectures @ TR-A303
- 09:00 AM: Reception Session
  - Presiders: Ching-Cheng Sun & Sun
- 09:15 AM: Plenary Lecture: Jie Wang
- 09:30 AM: Plenary Lecture: Yeh-Chih Huang
- 09:45 AM: Plenary Lecture: Chi-Ray Chen
- 10:00 AM: Plenary Lecture: Henri Porto

### Sunday, December 4 (Day 3)

#### Teaching & Research Building (中央大學教研大樓)

#### OPTIC Poster Session I & II
- 09:00 AM: Poster Session I
- 09:30 AM: Poster Session II

#### TPS/OSI Joint Symposium
- 10:00 AM: TPS/OSI Joint Symposium comfy

#### Exhibition @ TR-B101
- 10:00 AM: Exhibition Opening
- 10:15 AM: Exhibition Break

#### Exhibition @ TR-C102
- 10:45 AM: Exhibition Break

### Conference Banquet
- 18:00 PM: Conference Banquet at South Garden Hotels & Resorts
Thursday, December 1 (Day 0)
@Kwoh-Ting Optics and Photonics Building
(中央大學鼎光電大樓)

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<tr>
<th>Time</th>
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<tr>
<td>12:45 - 13:00</td>
<td>Reviewing Meeting @ IL-322</td>
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<tr>
<td>13:00 - 13:15</td>
<td>2022 Advanced Display Technology</td>
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<td>(AR/VR/MR/XR) Innovative Project Contest</td>
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<td>13:15 - 13:30</td>
<td>IL-120 (閱覽室) &amp; IL-322 (會議室)</td>
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Location for Plenary Talks / Oral / Poster Sessions

- Teaching & Research Building & Auditorium
Optics & Photonics Taiwan, the International Conference (OPTIC) 2022
- Annual Meeting of Taiwan Photonics Society

Optics & Photonics Taiwan International Conference (OPTIC), by the Taiwan Photonics Society (TPS), serves as the largest annual meeting on optics and photonics in Taiwan. It aims to bring great minds from around the globe to share the latest advancements in optical materials, optical technology, and metaverse photonics. OPTIC 2022 will be held from 2-4 December 2022 at National Central University, Zhongli (Chungli), R.O.C. (Taiwan).

This year OPTIC 2022 comprises 10 parallel sessions covering a broad spectrum of optics and photonics:

I. Nanophotonic Materials and Devices
II. Optical Waveguides and Communications
III. Quantum and Laser Technology
IV. Optical Information Processing and Holography
V. Optical Design, Testing, and Engineering
VI. Biophotonics and Biomedical Imaging
VII. Display and Solid-State Lighting
VIII. Thin Film and Photovoltaic Technology
IX. Optical Sensing
X. Metaverse Photonics

With the combination of these ten conferences, OPTIC 2022 will be one of the most valuable conferences on optics/photonics for all participants from around the globe.

Website & Advance Program online

[QR Code for Website]
[QR Code for Advance Program Online]
On behalf of the Taiwan Photonics Society (TPS), I would like to welcome all of you to participate in OPTIC 2022. OPTIC has been traditionally the largest international optics/photonics-related conference in Taiwan. The papers announced in OPTIC reflect the trend of optics/photonics research in the world and Taiwan. Optics and photonics technology has played more and more roles in modern life when breakthrough devices or systems change the lifestyle of people in the world.

OPTIC 2022 will be held on National Central University (NCU) campus in ChungLi/Taoyuan, an industrial city in north Taiwan. The Department of Optics and Photonics (DOP) was founded in 1982 when the optical industry in Taiwan started. OPTIC 2022 then is regarded as one of the 40th-anniversary activities of DOP. As you may know, DOP has been famous in Taiwan and the world for her education and research in optical science and engineering, where more than 4,000 DOP alumni are distributed in Taiwan and around the world. DOP has really made a big impact on the worldwide optics/photonics community. It is an honor for TPS to hold OPTIC 2022 in collaboration with DOP.

DOP, the organizer of OPTIC 2022, has made a significant effort to offer OPTIC fans an excellent venue on the beautiful campus to exchange their ideas in person. I believe that all the attendees of the three-day conference will experience a very fruitful trip to Taoyuan.

Besides, we would like to thank international societies, including SPIE, OPTICA, IEEE, and OSJ, for their sponsorship and friendship. We also would like to thank NSTC and NCU for their outstanding efforts to make OPTIC 2022 extraordinary.

Finally, we would like to thank all committee members, the staff, the presiders, and all participants. Your participation will make OPTIC 2022 a great success.

Ching-Cherng Sun
President, Taiwan Photonics Society
General Chair, OPTIC 2022
As the Photonics Program Chairman of the National Science and Technology Council (NSTC), it is my greatest pleasure to welcome you to OPTIC2022, which is the joint Meeting of the 27th Annual Meeting of NSTC Photonics Program and the 2022 Annual Meeting of Taiwan Photonics Society, held at National Center University, Taoyuan, Taiwan during December 2-4, 2022. Thanks to the great efforts of the organizing committee and program committee, we are expecting a very successful event and fruitful interactions among the attendees.

Photons Program, an extramural program under the NSTC, was founded in 1996. The first Annual Meeting of NSTC Photonics Program and Photonics/Taiwan 96 were hosted jointly. The following year, the 2nd Photonics Program Annual Meeting, combined with the Annual Meeting of Taiwan Photonics Society, was renamed Optics and Photonics/Taiwan’97(OPT). After that, this tradition of a joint meeting format has been maintained, and OPTIC becomes the largest annual photonic conference in Taiwan. With so many details to arrange, I appreciate the full support of Taiwan Photonics Society and National Center University to make the 2022 joint meeting possible.

OPTIC aims to promote the scholarly communication between all photonics researchers of academia and industry, including the principal investigators of NSTC Photonics Program. We hope to rearrange and design the meeting in a way that creates an atmosphere for national policy discussion and idea exchange among photonics researchers regarding our future focus and opportunities. I would like to acknowledge your attendance, for not only showcasing your outstanding achievements in the Photonics Program, but also providing your precious opinions, and participating in our future planning. I hope all of you enjoy the technical program and social events in OPTIC2022.

San-Liang Lee
Chairman, Photonics Program, National Science and Technology Council

Optics & Photonics Taiwan International Conference, OPTIC, is the largest annual meeting on optics and photonics in Taiwan. The conference is supported by Taiwan Photonics Society and granted by National Science and Technology Council. This year, Department of Optics and Photonics of National Central University hosts the conference. On behalf of the host organization, we want to thank you for attending the OPTIC 2022. National Central University located at Chung-Li is the national university in Taiwan which is the nearest to the Taoyuan International airport. It’s quite convenient for the attendees from the world to the campus.

OPTIC aims to bring great minds from around the globe to share the latest advancements in optical materials, optical technology, nanotechnology, quantum optics, optical information, biophotonics, display, lighting, thin film, light source, sensors and related photon technology. This year, for the first time, metaverse photonics is also included as a session topic. The broad spectrum in optics and photonics provides the best opportunity for the attendees to discuss and to exchange the knowledge.

The activities of the international societies Optica, SPIE and IEEE are involved in the conference for their committees, members or students. The special sessions of Taiwan Photonics Society and National Science and Technology Council are also organized. The exhibition of the local and international companies in optics and photonics will show their newest products. OPTIC gathering the people from universities, international societies, government and companies will provide the multi-dimensional perspective. Hope all attendees can enjoy the program of the conference.

Sincerely yours,

Chii-Chang Chen
General Chair of OPTIC 2022
Distinguished Professor of Department of Optics and Photonics
National Central University
2022.11.9 Taiwan
OPTIC 2022 Committees

**Honorary Chair:**

**Jing-Yang Jou,**
President, National Central University

**Honorary Chair:**

**Cheng-Chung Lee,**
Honorary Professor, National Central University

**General Chairs:**

**Ching-Cherng Sun,**
President, Taiwan Photonics Society

**General Chairs:**

**Chii-Chang Chen,**
National Central University

**General Chairs:**

**San-Liang Lee,**
Chairman, Photonics Program, National Science and Technology Council

**Organizing Committee Chair:**

**Tsung-Hsun Yang,**
National Central University

**Program Committee Chair:**

**Sheng-Hui Chen,**
National Central University
Organizing Committee:

Organizing Committee Chair:
Tsung-Hsun Yang, National Central University (Taiwan)

Organizing Committee Members:
Chih-Ming Wang, National Central University (Taiwan)
Ko-Ting Cheng, National Central University (Taiwan)
Ching-Cherng Sun, National Central University (Taiwan)
Rong-Seng Chang, National Central University (Taiwan)
Chi-Chang Chen, National Central University (Taiwan)
Sheng-Hui Chen, National Central University (Taiwan)
Yen-Hung Chen, National Central University (Taiwan)
Yin-Jung Chang, National Central University (Taiwan)
Te-Yuan Chung, National Central University (Taiwan)
Kun-Yu Lai, National Central University (Taiwan)
Chao-Yi Tai, National Central University (Taiwan)
Shu-Yu Chen, National Central University (Taiwan)
Fan-Ching Chien, National Central University (Taiwan)
Pi-Gang Luan, National Central University (Taiwan)
Wen-Shing Sun, National Central University (Taiwan)
Chao-Wen Liang, National Central University (Taiwan)
Yi-Chung Chen, National Central University (Taiwan)
Jui-Fen Chang, National Central University (Taiwan)
Chien-Cheng Kuo, National Central University (Taiwan)
Yeh-Wei Yu, National Central University (Taiwan)
Pei-Hsun Wang, National Central University (Taiwan)

Steering Committee:

Steering Committee Chair:
Ching-Cherng Sun, National Central University (Taiwan)

Steering Committee Members:
Ray Hua Horng, National Yang Ming Chiao Tung University (Taiwan)
Chi-Kuang Sun, National Taiwan University (Taiwan)
Shou-Jin Chang, National Cheng Kung University (Taiwan)
Jian-Jang Huang, National Taiwan University (Taiwan)
Chih-Wei Chu, National Yang Ming Chiao Tung University (Taiwan)
Chih-I Wu, National Taiwan University (Taiwan)
Hsin-Ying Lee, National Sun Yat-sen University (Taiwan)
Tsung-Hsien Lin, National Taiwan University (Taiwan)
Yi-Hsun Lin, National Yang Ming Chiao Tung University (Taiwan)
Chien-Cheng Lin, National Yang Ming Chiao Tung University (Taiwan)
Albert Lin, National Cheng Kung University (Taiwan)
Tsung-Fang Guo, National Central University (Taiwan)
Sheng-Hui Chen, National Central University (Taiwan)
Yen-Hung Chen, National Central University (Taiwan)
Zingway Pei, National Chung Hsing University (Taiwan)
Tien-Chang Lu, National Yang Ming Chiao Tung University (Taiwan)
Arthur Chiao, National Yang Ming Chiao Tung University (Taiwan)
Dong-Sing Wu, National Chi Nan University (Taiwan)
Oscar Hsu, HPB Optoelectronics (Taiwan)
Hao-Chung Kuo, National Yang Ming Chiao Tung University (Taiwan)
Shien-Kuei Liaw, National Taiwan University of Science and Technology (Taiwan)
Program Committee:

Program Committee Chair:
Sheng-Hui Chen, National Cheng Kung University (Taiwan)

S1. Nanophotonic Materials and Devices:

Chair:
Ta-Jen Yen, National Tsing Hua University (Taiwan)

Co-Chair:
Chih-Ming Wang, National Central University (Taiwan)

Members:
Meng-Chyi Wu, National Tsing Hua University (Taiwan)
Chin-Ping Yu, National Sun Yat-sen University (Taiwan)
Wun-Jhang Ho, National Taipei University of Technology (Taiwan)
Tung-Wen Wang, Feng Chia University (Taiwan)
Jiin-Wei Shi, National Central University (Taiwan)
Shih-Yen Lin, Research Center for Applied Sciences, Academia Sinica (Taiwan)
Hwu-Cheng Hsu, National Cheng Kung University (Taiwan)
Chen-Bin Huang, National Tsing Hua University (Taiwan)
Kuo-Ping Chen, National Tsing Hua University (Taiwan)
Bruce (Jun-Yu) Ou, National Sun Yat-sen University (Taiwan)
Che-Chin Chen, National Applied Research Laboratories (Taiwan)
Yu-Jung Lu, Research Center for Applied Sciences, Academia Sinica (Taiwan)

S2. Optical Waveguides and Communications:

Chair:
Shien-Kuei Liaw, National Taiwan University of Science and Technology (Taiwan)

Co-Chairs:
Chi-Wai Chow, National Yang Ming Chiao Tung University (Taiwan)
Pei-Hsun Wang, National Central University (Taiwan)

Members:
Jyehong Chen, National Yang Ming Chiao Tung University (Taiwan)
Kai-Ming Feng, National Tsing Hua University (Taiwan)
Ming-Chang Lee, National Tsing Hua University (Taiwan)
Shuo-Yen Tseng, National Cheng Kung University (Taiwan)
Shih-Hsiang Hsu, National Taiwan University of Science and Technology (Taiwan)
Woei-Hi Cheng, National Chung Hsing University (Taiwan)
Yi-Jen Chia, National Sun Yat-sen University (Taiwan)
Hsin-Hui Lu, National Taipei University of Technology (Taiwan)
Tien-Tsung Shih, National Kaohsiung University Science and Technology (Taiwan)
Chien-Hung Yeh, Feng Chia University (Taiwan)
Hiroki Kishikawa, Tokushima University (Japan)
Krishman Chitra, Vellore Institute of Technology (India)
Hon Ki Tsang, Chinese University of Hong Kong

S3. Quantum Electronics and Laser Technology:

Chair:
Yen-Chieh Huang, National Tsing Hua University, Taiwan

Co-Chair:
Yen-Hung Chen, National Central University, Taiwan

Members:
Fredrik Laurell, KTH Royal Institute of Technology (Sweden)
Frank Setzerndorf, Friedrich Schiller-Universität Jena (Germany)
Chao-Kuei Lee, National Sun Yat-sen University (Taiwan)
Sheng-Kuang Huang, National Cheng Kung University (Taiwan)
Te-Yuan Chang, National Central University (Taiwan)
Ming-Chang Chen, National Tsing Hua University (Taiwan)
Hsu-Hsun Chu, National Central University (Taiwan)
Tsung-Dong Wang, Chung-Shan Institute of Science and Technology (Taiwan)
Shou-Tai Lin, National Central University (Taiwan)
Yuan-Yao Lin, National Sun Yat-sen University (Taiwan)
Yu-Fan Lin, National Yang Ming Chiao Tung University (Taiwan)
Yi-Cheng Cheng, Chung-Shan Institute of Science and Technology (Taiwan)

S4. Optical Information Processing and Holography:

Chair:
Shiuang-Huei Lin, National Yang Ming Chiao Tung University, Taiwan

Co-chairs:
Jung-Ping Liu, National Chung Hsing University of Education (Taiwan)
Yeh-Wei Yu, National Central University (Taiwan)

Members:
Vera Marinova, Bulgarian Academy of Sciences (Bulgaria)
Geng-Chih Hsu, National United University (Taiwan)
Chi-Ching Chang, Mingdao University (Taiwan)
Chi-Yuan Han, National United University (Taiwan)
Chung-Chih Wu, National Tsing Hua University (Taiwan)
Fan-Yi Lin, National Chung Hsing University (Taiwan)
Fu-Li He, National Cheng Kung University (Taiwan)
Hao-Yen Tu, National Chung Hsing University (Taiwan)
Hui-Chi Chen, Fu Jen Catholic University (Taiwan)
Hung-Chih Hsieh, National United University (Taiwan)
Jen-Ju Lin, National Kaohsiung University of Science and Technology (Taiwan)
Feng Chia University (Taiwan)
Jui-Ming Hsu, National United University (Taiwan)
National Kaohsiung University of Science and Technology (Taiwan)
National Chung Hsing University of Education (Taiwan)
National Central University (Taiwan)
National Yang Ming Chiao Tung University (Taiwan)
National Kaohsiung University of Science and Technology (Taiwan)
University of South Carolina (US)
University of Texas at Austin (US)

S7. Display and Solid-State Lighting:

Chair:
Chung-Chih Wu,
National Taiwan University (Taiwan)

Co-chair:
Ray-Hua Horng,
National Yang Ming Chiao Tung University (Taiwan)
Chih-Lung Lin,
National Cheng Kung University (Taiwan)
Ko-Ting Cheng,
National Central University (Taiwan)

Members:
Dong-Sing Wu,
National Chi Nan University (Taiwan)
Jun-Haw Lee,
National Taiwan University (Taiwan)
Jan-Jang Huang,
National Taiwan University (Taiwan)
Tien-Lung Chiu,
National Yang Ming Chiao Tung University (Taiwan)
Lung-Chien Chen,
National Taiwan University (Taiwan)
Chia-Feng Lin,
National Yang Ming Chiao Tung University (Taiwan)
Yen-Hsiang Fang,
Industrial Technology Research Institute (Taiwan)
Chia-Rong Sheu,
National Cheng Kung University (Taiwan)
Li-Yin Chen,
National Yang Ming Chiao Tung University (Taiwan)
Jue Wang,
Corning Research & Development Corporation (USA)
Nan Zhang,
Beijing Institute of Technology (China)
Yuan-Fong Chou-Chau,
Universiti Brunei Darussalam (Brunei)
Chuan-Chung Chang,
Coretronic Corporation (Taiwan)
Wei-Chi Lai,
National Chuen Kung University (Taiwan)
Chia-Feng Lin,
National Chung Hsing University (Taiwan)
Tae Yeon Seong,
Korea University (Korea)

S8. Thin Film and Photovoltaic Technology:

Chair:
Yi-Jun Jen,
National Taipei University of Science and Technology (Taiwan)

Co-chair:
Hsin-Ying Lee,
National Cheng Kung University (Taiwan)
Chih-Jen Yu,
National Sun Yat-sen University (Taiwan)
Chien-Cheng Kuo,
National Central University (Taiwan)

Members:
Hsuen-Li Chen,
National Taiwan University (Taiwan)
Chuen-Lin Tien,
National Chi Nan University (Taiwan)
Jin-Cheng Hsu,
National Yang Ming Chiao Tung University (Taiwan)
Hsi-Chao Chen,
National Yang Ming Chiao Tung University (Taiwan)
Po-Tsung Liu,
National Yang Ming Chiao Tung University (Taiwan)
Po-Tsung Lee,
National Yang Ming Chiao Tung University (Taiwan)
Wei-Chi Lai,
National Yang Ming Chiao Tung University (Taiwan)
Chia-Feng Lin,
National Yang Ming Chiao Tung University (Taiwan)
Yen-Hsiang Fang,
National Yang Ming Chiao Tung University (Taiwan)
Chia-Rong Sheu,
National Yang Ming Chiao Tung University (Taiwan)
Li-Yin Chen,
National Yang Ming Chiao Tung University (Taiwan)
Nan Zhang,
Beijing Institute of Technology (China)
Yuan-Fong Chou-Chau,
Universiti Brunei Darussalam (Brunei)
Chuan-Chung Chang,
Coretronic Corporation (Taiwan)
Wei-Chi Lai,
National Chuen Kung University (Taiwan)
Chia-Feng Lin,
National Chung Hsing University (Taiwan)
Tae Yeon Seong,
Korea University (Korea)
S9. Optical Sensing:

Chair:
Wen-Fung Liu,
Feng Chia University (Taiwan)

Co-chair:
Cheng-Ling Lee,
National United University (Taiwan)

Chi-Ching Yu,
National Sun Yat-sen University (Taiwan)

Chao-Yi Tai,
National Central University (Taiwan)

Members:
Li-Karn Wang,
National Tsing-Hua University (Taiwan)

Ja-Yu Lu,
National Cheng Kung University (Taiwan)

Yu-Lung Lo,
National Cheng Kung University (Taiwan)

Yin-Wen Lee,
National Taipei University of Technology (Taiwan)

Cheng-Mu Tsai,
National Chung Hsing University (Taiwan)

Ming-Chang Shih,
National University of Kaohsiung (Taiwan)

Wen-Shao Tsai,
National Chung Hsing University Taiwan

Tsung Sheng Kao,
National Yang Ming Chiao Tung University (Taiwan)

Morten Ibsen,
University of Southampton (United Kingdom)

S10. Metaverse Photonics:

Chair:
Yu-Hsin Liu,
National Yang Ming Chiao Tung University (Taiwan)

Co-chair:
Tom Liang,
Metalenz Inc. (Taiwan)

Chern-Yu Chen,
National Taiwan University of Science & Technology (Taiwan)

Tsung-Hsun Yang,
National Central University (Taiwan)

Members:
Cheng-Huan Chen,
National Yang Ming Chiao Tung University (Taiwan)

Chia-Yen Huang,
National Central University (Taiwan)

Chih-Wei Huang,
Coretronic Corporation (Taiwan)

Chuan-Chung Chang,
National Sun Yat-sen University (Taiwan)

Homer H. Chen,
National Taiwan University (Taiwan)

Hung-Ming Chen,
National Yang Ming Chiao Tung University (Taiwan)

Jian-Haw Lee,
National Taiwan University (Taiwan)

Li-Yin Chen,
National Yang Ming Chiao Tung University (Taiwan)

Shih-Huei Lin,
National Yang Ming Chiao Tung University (Taiwan)

Tsung Sheng Kao,
National Yang Ming Chiao Tung University (Taiwan)

Wei-Chia Su,
National Changhua Normal University (Taiwan)

Yao-Wei Huang,
National Yang Ming Chiao Tung University (Taiwan)

Yeh-Wei Yu,
National Yang Ming Chiao Tung University (Taiwan)

Yu-Chia Chang,
National Taipei University of Technology (Taiwan)

Yu-Jen Wang,
Meta (United States of America)

Conference Highlights

OPTIC 2022 Plenary Sessions

Friday 2 December 2022
Teaching & Research Building, Auditorium

10:30 to 11:15
Optics and Cambrian explosion
Satoshi Kawata,
President, OPTICA (USA)
Professor, Osaka University (Japan)

11:15 to 12:00
Novel display architectures addressing wearable, visual and social comfort requirements for next generation smart glasses and AR goggles
Bernard Kress,
Director XR hardware, Google Inc. (USA)

Abstract: There has been recently a lot of efforts throughout industry in developing next generation AR and VR headsets to enable use cases compatible with Metaverse gateways as well as “all-day-use” smart glasses. Most AR and VR devices have been previously dedicated to the enterprise sector (Google Glass, HoloLens, Magic Leap, etc). Today, in order to address a burgeoning consumer market, additional challenges related to wearable, visual and social comforts need to be solved. Optics and Photonics are key enabling technologies to integrate functionality such as display, imaging and sensing and provide solutions to these consumer comfort requirements. We review such challenges and the recent developments in this field.

Saturday 3 December 2022
Teaching & Research Building, TR-A001~003

9:00 to 9:45
Anita Mahadevan Jansen,
President 2022, SPIE (USA)
Professor, Vanderbilt University (USA)

9:45 to 10:30
High-performance flat optics based on metasurfaces from the near IR to the XUV, including structured light and dark
Federico Capasso,
Professor, Harvard University (USA)

Abstract: Since the demonstration of the generalized laws of refraction for metasurfaces and the first high performance metalenses, metaoptics has rapidly progressed from the laboratory to manufacturing, propelled by the vision that the foundries that manufacture ICs will manufacture CMOS compatible flat optics using the same semiconductor technology based on deep-UV lithography. This will impact the consumer electronics market in areas such as smart phones and wearable displays for AR/VR. Metaoptics are now on the market through the partnership of Metalenz Inc. with STMicroelectronics, marking the introduction of this revolutionary optical technology in real-world devices. I will present recent major advances in on scale achromatic RGB metalenses for
VR by inverse design and 10 cm metalenses for space optics consisting of 20 billion metatoms. A compact and highly integrated metasurface-based inverse designed mode multiplexer that takes three single-mode fiber inputs and converts them into the first three linearly polarized spatial modes of a few-mode fiber with high fidelity the C-band (1530–1565 nm) of fiber optics will be presented. I will discuss hybrid silicon-organic electrooptic telecommunication wavelength metasurface modulators that use Mie resonances for efficient electro-optic modulation at GHz speeds for free-space communications and the recent demonstration of flat lenses in the XUV (λ=50 nm) using high harmonic generation, in collaboration with Martin Schultze group at Graz University. I will conclude with work on 2D and 0D singularities of helical beam.

15:30 to 16:15
Structured light evolves materials science
Takashiige Omatsu, Professor Chiba University (Japan)

Abstract: Optical vortex, possessing an orbital angular momentum (OAM), twists irradiated materials to establish chiral structured materials on the nano-/micro-scale. We review exotic physical phenomena via interaction between OAM of light and matters, and advanced technologies based on optical vortex illumination.

16:15 to 17:00
What are the challenges of Developing Satellite Optical Systems?
Steven Chia-Ray Chen, National Space Organization (Taiwan, R.O.C.)

Abstract: The 3rd phase long-term space program in Taiwan started from 2019 and marked the new era for domestic space industry. Thanks to the low cost of launch cost and small satellites, e.g., microsats and cubesats, there are more and more research institutes and private companies involving in the space technology development in Taiwan. FormosaSat-8 program, i.e., a series of optical remote sensing satellites, is executed by NSPO in the 3rd phase long-term space program. Besides that, many research institutes and private companies in Taiwan would like to develop their own optical systems in space for scientific or commercial missions. Most of local companies can deliver high quality products such as notebooks, cell phones, optical measurement systems, etc. However, the design approach and material selection of space instruments are quite different from the one on the ground. What kind of issues should be considered and verified will be discussed in this presentation.

Saturday 3 December 2022
Teaching & Research Building, TR-A203
09:00 to 09:45
Advances in Automated Disease Identification with Digital Holography
Bahram Javidi, Professor, University of Connecticut (USA)

Abstract: This Plenary is an overview of advances in rapid automated disease identification with low-cost field portable bio-photonics systems. We present a variety of bio-photonics sensors including 3D printed thin lensless sensors using pseudo-random phase encoding, and self-referencing digital holographic systems. In specific, recent applications of shearing digital holography and dedicated algorithms for rapid COVID-19 detection and sickle cell disease identification will be discussed.

09:45 to 10:30
Terapixel Cameras
David Brady, Professor, University of Arizona (USA)

Abstract: Over the past half century, supercomputing speeds, communications bandwidth and storage costs have all improved by factors of >1 million. Since the dawn of digital photography, however, cameras have been stuck in the megapixel era. 1 million × improvement in imager capacity is possible, however, through integrated design of novel optics, efficient electrical processing and intelligent data networks. This talk reviews lens design for heterogeneous array cameras, discusses array camera data management and considers a roadmap for super camera development.

15:30 to 16:15
Particle Acceleration with Laser-Driven Photonic Structures
Joel England, Stanford University (USA)

Abstract: Acceleration of particles in photonic nanostructures fabricated using semiconductor manufacturing techniques and driven by ultrafast solid-state lasers is a new and promising approach to developing future generations of compact particle accelerators. Substantial progress has been made in this area in recent years, fueled by a growing international collaboration of universities, national laboratories, and companies. Performance of these micro-accelerator devices is ultimately limited by laser-induced material breakdown limits, which can be substantially higher for optically driven dielectrics than for radio-frequency metallic cavities traditionally used in modern particle accelerators, allowing for 1 to 2 order of magnitude increase in achievable accelerating fields. The lasers required for this approach are commercially available with moderate (micro-Joule class) pulse energies and repetition rates in the MHz regime. We summarize progress to date and outline potential near-term applications and offshoot technologies.
16:15 to 17:00
New advanced developments in Photonics technologies within exaill-ixblue

Henri Porte,
Director Photonics Strategy, EXAIL, (France)

Abstract: During this presentation, I will describe the activities of the company exaill which results from the merger in autumn 2022 of the French companies iXblue and ECA, forming a group of 1500 people with a wide offer of advanced industrial solutions structured around four poles. I will place a particular emphasis on the photonics pole. In recent years, this pole has been established to assert itself as a European leader in the most advanced photonics technologies.

The approach around photonics was first motivated by a vertical integration strategy to secure the supply of the key components of the fiber optic gyroscope (FOG) that are the lithium niobate optical phase modulator and the polarization maintaining fiber coil. This strategy has ensured a very high degree of independence for the exaill-ixblue core business of FOG-based inertial navigation systems (INS). Today, high speed optical modulation solutions and specialty optical fiber are the two first building blocks of the Photonics pole.

More recently, in 2021, two new photonic activities joined exaill-ixblue. The first, the activity of integrated photonic systems, is based on positioning of optical components in free space without dynamic alignment and leading to solutions that are both stable and compact. The second is dedicated to quantum sensors that take advantage of the physics of atoms laser cooling to develop quantum gravimeters. Today these industrial instruments offer performance unparalleled with previous generations of gravimeters. The entire offer of these four technologies around lasers and optical fibers makes it possible to address the markets of sensors, intense lasers, space and LaserCom, quantum sensors, quantum cryptography. Above all, it makes it possible to propose complex instruments by taking advantage of the synergies that have been made possible by the convergence of these technologies. Our vision is based on our belief that the most advanced technologies can lead to fantastic developments for a safer world and the greatest economic successes.

Special Events

- **2022 Advanced Display Technology (AR/VR/MR/XR) Innovative Project Contest**
  Thursday 1 December 2022
  14:00 to 16:30
  @ IL-120, Kwoh-Ting Optics and Photonics
  @ IL-322, Kwoh-Ting Optics and Photonics
  16:30 to 17:30
  @ IL-322, Kwoh-Ting Optics and Photonics Building

- **OPTICA Taiwan Chapter & Student Chapter Meetings**
  Friday 2 December 2022
  12:00 to 13:00
  @ TR-A311, Teaching & Research Building.

- **Special Symposium on Silicon Photonics Integration**
  Friday 2 December 2022
  13:00 to 17:00
  @ TR-A311, Teaching & Research Building.

- **SPIE Student Chapter Meeting**
  Saturday 3 December 2022
  12:00 to 13:00
  @TR-A311, Teaching & Research Building.

- **Women in Optics & Women in Engineering**
  Saturday 3 December 2022
  13:00 to 17:00
  @ TR-A311, Teaching & Research Building.

- **IEEE Member Meeting & Promotion**
  Saturday 3 December 2022
  16:30 to 17:00
  @ TR-A206, Teaching & Research Building.
Coffee Break and Lunch

The coffee breaks will be held in the Venue of OPTIC 2022 (Teaching & Research Building).

<table>
<thead>
<tr>
<th>Time</th>
<th>Route</th>
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<tbody>
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<td>Friday, 2 December</td>
<td>10:00 to 10:15, and 15:00 to 15:15</td>
</tr>
<tr>
<td>Saturday, 3 December</td>
<td>10:30 to 10:45, and 15:15 to 15:30</td>
</tr>
<tr>
<td>Sunday, 4 December</td>
<td>10:45 to 11:00</td>
</tr>
</tbody>
</table>

Conference Banquet

Saturday 3 December 2022
18:00 to 20:30

Conference Banquet will take place on Saturday, 3 Dec (18:00 onwards) at South Garden Hotels and Resorts (No. 8, Shuzih Rd., Chungli Dist., Taoyuan City). Shuttle service is available free of charge for guests with bought banquet ticket. Please follow the sign to the pick-up point. The timetable for the shuttle bus is shown below:

<table>
<thead>
<tr>
<th>Time</th>
<th>Route</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
<td>To: South Garden Hotels and Resorts</td>
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<tr>
<td>18:10</td>
<td>From: OPTIC 2022 Conference site</td>
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<td>To: OPTIC 2022 Conference site</td>
</tr>
<tr>
<td>21:00</td>
<td>From: South Garden Hotels and Resorts</td>
</tr>
<tr>
<td></td>
<td>To: Taiwan High Speed Rail, Taoyuan Station</td>
</tr>
</tbody>
</table>
General Information

Registration
The conference registration desk is located in the 1F Hall Square, Teaching & Research Building.

Registration Hours
Friday 2 December 08:30 to 17:00
Saturday 3 December 08:30 to 17:00
Sunday 4 December 08:30 to 11:00

Conference registration includes admission to all conference sessions, plenaries, panels, and poster sessions, exhibition, coffee breaks, and lunches. The Banquet is included or excluded depending on the registration type. Upon the registration, you will receive your conference materials, including a conference bag, an identification badge, and an advance program. The identification badge is required to be worn at all conference activities.

Presentation Information

Oral Sessions
All oral speakers, including plenary sessions and invited speakers, should be in the meeting room at least 10 minutes before the session or sub-session, to upload and check the presenting files. It is not recommended to use a personal laptop for presentations due to the limitations of the playback system. The allotted time for each presentation is as follows:

<table>
<thead>
<tr>
<th>Session type</th>
<th>Plenary</th>
<th>Invited</th>
<th>Oral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total length</td>
<td>30 mins (on line and video)</td>
<td>45 mins (in person)</td>
<td>15 mins (including Q&amp;A)</td>
</tr>
</tbody>
</table>

Poster Sessions
Poster session I: Saturday, 3 Dec., 14:00 to 16:00
Poster session II: Sunday, 4 Dec., 09:00 to 10:45
For poster sessions, the OPTIC 2022 provides each presenter a bulletin board where the speaker can mount a poster [90 cm (W) x 120 cm (H)] and provide flyers of the research, if any. Poster presenters must set up their posters at the poster session of their assigned presentation. Paper numbers will be posted on the poster boards in numerical order; please find your paper number and post your poster in the designated space. Note that authors must be around their bulletin board during the presentation time of the poster sessions to present their research and answer questions from attendees. Presenters must remove their posters immediately after the poster session. The OPTIC 2022 assumes no responsibility for posters left up after the end of each poster session.

Student Paper Award
Please note that to be eligible for the Student Paper Award, the candidate must be a student who is the speaker and the first author of the paper. Also, the candidate must be around his/her poster during the presentation time window to take any questions (in English) from the reviewers. The awards presentation will be held at the Greeting Remark of the OPTIC 2022 on Saturday, Dec. 3.

Internet Access
Free internet access is provided in the Venue of OPTIC 2022 for the convenience of the conference participants.

WIFI SSID: eduroam
Username: optic2022@wifi.ncu
Password: 20221234
CA certificate settings:
İOS click “Trust” certificate.
Android please click “Do not verify”.

Transportation

1. Taiwan Taoyuan International Airport
The NCU campus is accessible from Taiwan Taoyuan International Airport (TPE) by taxi, buses, or driving a car. As no direct connection between the airport and the NCU campus, a metered taxi may be the most convenient option.

2. Taiwan High Speed Rail (THSR)
Get off at THSR Taoyuan Station. To reach NCU, there are several bus routes to choose from: direct lines are the quickest; other buses head for Chung-Li City, where a connection is needed. Other options include driving a car or taking a taxi. The service is provided by Taiwan Taxi. Call 4058-8888 anywhere in Taiwan, or dial 55688 on the cell phone. From THSR Taoyuan Station to NCU, taxi fare charges around NT$250.

Direct bus:
Get to Taoyuan High-Speed Rail Station by Taoyuan Metro from Taoyuan International Airport. Then transfer to the city bus No. 132 or No. 172 (at Bus Platform 8) heading for NCU (a 15-to 20-minute ride). For more detailed information, please see

Contact OPTIC 2022

OPTIC 2022 is organized by:
Department of Optics and Photonics,
National Central University, Chung-Li, Taiwan
Email: optic2022@dop.ncu.edu.tw
Friday 2 December

Oral Session I

Room: TR-A003

1:00 pm to 3:00 pm

2:45 pm [2022-FRI-S0101-0006]

A liquid index sensor based on chirped guided mode resonance filter. Qi-Yu Huang, Alfredo Erico, Yung-Yi Hung, National Sun Yat-sen University (Taiwan)

Coffee Break

Oral Session II

Room: TR-A003

1:30 pm to 1:30 pm

Nanophotonic Materials and Devices II

Session Chairs: Kuo-Ping Chen, National Yang Ming Chiao Tung University (Taiwan); You-Chang Chang, National Yang Ming Chiao Tung University (Taiwan)

3:15 pm [2022-FRI-S0102-0001]

A Revolution in Nanophotonic Metasurfaces for Flat Optical Applications. Pin-Chieh Wu, National Cheng Kung University (Taiwan)

3:45 pm [2022-FRI-S0102-0001]

Actively tunable varifocal metalenses. Po-Sheng Huang, Amir Hasani, Dong Qiu, Pin-Chieh Wu, National Cheng Kung University (Taiwan)

Lunch

Oral Session IV

Room: TR-A003

1:30 pm to 1:30 pm

Nanophotonic Materials and Devices IV

Session Chairs: Yuh-Shing Chou, National Taiwan University (Taiwan); Che-Chin Chen, Institute Research Institute, NARlabs (Taiwan)

4:00 pm [2022-FRI-S0104-0001]

Vacuum Ultraviolet Ultrabright Nonlinear Metalens. Ming Luan Tsong, National Yang Ming Chiao Tung University (Taiwan); Michael Sheen, National Chiao Tung University; Wen-Sien Huang, Taiwan Semiconductor Research Institute (Taiwan); Jia-Min Shieh, National Yang Ming Chiao Tung University (Taiwan); Taiwan Semiconductor Research Institute (Taiwan); Pei-Chen Yu, You-Chang Chang, National Yang Ming Chiao Tung University (Taiwan)

4:35 pm [2022-FRI-S0104-0001]

Compact Integration of Meta-hologram and PCS tals for Structured Light Generation. Chia-Hsun Chang, Yaw-Yi Huang, National Yang Ming Chiao Tung University (Taiwan)

4:45 pm [2022-FRI-S0102-0005]

Tunable circular polarization microcavity laser with photothermally controlled motion. Chi-Chien Chu, Academia Sinica (Taiwan); Yuan-Chieh Chi, Academia Sinica (Taiwan); Po-Yu Cheng, Academia Sinica (Taiwan); Chiao-Chieh Cheng, Shih-Wei Chang, Min-Hsiung Shih, Academia Sinica (Taiwan), National Yang Ming Chiao Tung University (Taiwan)

Saturday 3 December

Oral Session III

Room: TR-A003

1:45 pm to 12:00 pm

Nanophotonic Materials and Devices III

Session Chairs: Tsung-Lun Tseng, National Yang Ming Chiao Tung University (Taiwan); Yuh-Shing Chou, National Cheng Kung University (Taiwan)

10:45 am [2022-SAT-S0103-0001] (Invited Paper)

Active mode locking of ZnO plasmonic nanolasers on the graphene-insulator-metal platform. Tien-Chang Lu, National Yang Ming Chiao Tung University (Taiwan)

11:15 am [2022-SAT-S0103-0001]

Modal GeO p-i-n Photodetectors on Silicon for Full Short-Wave Infrared Detection. Meng-Hsien Li, Meng-Chyi Wu, National Chung Cheng University (Taiwan)

11:30 am [2022-SAT-S0103-0002]

4f Interference for Building Scaling Laws of Perovskite Nanolasers. Cheng-Ching Li, Zhen-Ting Huang, Tien-Chang Lu, National Yang Ming Chiao Tung University (Taiwan)

11:45 am [2022-SAT-S0103-0003]

Optically Tunable Guided Lasers on Silicon. Chen-Chen Wu, Yi-Feng Peng, Yue-Tong Jheng, Bo-Rui Wu, Lung-Yi Hsu, Guo-En Chang, National Chung Cheng University (Taiwan)

Lunch

Oral Session V

Room: TR-A003

1:00 pm to 3:00 pm

Nanophotonic Materials and Devices V

Session Chairs: Yuh-Shing Chou, National Yang Ming Chiao Tung University (Taiwan); Hsin-Chieh Yu, National Yang Ming Chiao Tung University (Taiwan)

9:00 am [2022-SUN-S0105-0001]

Photo-responsive grafted-amine based sensor for assessment of total antioxidant capacity from human saliva. Shih, Academia Sinica (Taiwan), National Central University, Taiwan; I-Huan Chou, Hsing-Ying Lin, National Tung Hua University (Taiwan); Chen-Han Huang, National Chiao Tung University (Taiwan)

9:15 am [2022-SUN-S0105-0002]

Low-Resistance Amorphous Carbon/Cu Hybrid Structures. Yi-Hsiang Shih, National Cheng Kung University (Taiwan)

9:30 am [2022-SUN-S0105-0003]

Integrated reflective terahertz photonic microsensor with self-fabricated Large Area Transceiver. Ching-Huan Hu, Tsung-Hao Wu, Shih-Hsin Yang, Hsiu-Tsai Liu, National Tung Hua University (Taiwan)

9:45 am [2022-SUN-S0105-0004]

Ridge waveguide based GeSn Light emitting diodo. Ruthika Bansal, Guo-En Chang, National Cheng Kung University (Taiwan)

10:00 am [2022-SUN-S0105-0005]

Dielectric Metagrating Based on Gradient-based Optimization. Pei-Cheng Yang, Yao-Wei Huang, National Yang Ming Chiao Tung University (Taiwan)

10:15 am [2022-SUN-S0105-0005]

Nanomanipulation Lithography: Alk-dielectric Geometric Phase Meta-surfaces. Yuan-Hsiu Yu, Jen-Yun Chen, Chieh Chi, National Central University (Taiwan)

10:30 am [2022-SUN-S0105-0007]

Optical and morphology modulation of two-dimensional layered lead iodide perovskites via organic cation doping. Li-Ming Chang, Shung-Sheng Kao, Yi-Liang Hsu, National Yang Ming Chiao Tung University (Taiwan)
Poster Session I - Saturday
Location: TR-A318... Sat 2:00 pm to 4:00 pm

[2022-SAT-P0101-P001] Optical sectioning fluorescence microscopy: work in progress - Qing Hsu, Sun-Yi Lin, Ming-Chi University of Technology (Taiwan); Pei-Yen Chen

[2022-SAT-P0101-P010] Photoacoustic Spectroscopy Measurement for Laser-Induced-Graphene Nanorods Colloid, Shang-Ying Yu, Ching Gong University (Taiwan); Chien-Shiang Huang, National Central University (Taiwan); Chih-Lin Wang, National Chiao Tung University (Taiwan); Ming-Chi University of Technology (Taiwan); Jin-Jung Wu, Chiao-Kung University (Taiwan)

[2022-SAT-P0101-P013] Synthesis of perovskite nanocrystals tethering a conjugated sulfonate ligand for light-emitting diodes, Chen-Hsuan Kuan, Fu-Bing Chiu, National Yang Ming Chiao Tung University (Taiwan)

[2022-SAT-P0101-P019] The geometrical design for all-dielectric metasurface excited by 650 nm light source, Chia-Shu Chang, National Yang Ming Chiao Tung University (Taiwan); Ching-Hong Lin, National Yang Ming Chiao Tung University (Taiwan); Wei-Chen Chang, National Yang Ming Chiao Tung University (Taiwan)

[2022-SAT-P0101-P020] Low-threshold of Suspended Whispering-gallery-mode Laser of Near-band Edge States in 2D Phenylethylamine Lead Bromide Perovskite, Chia-Hui Kao, Ssu-Chin Lin, National Central University (Taiwan); Po-Yi Lee, Yu-En Xiao, Sheng-Hsiung Yang, National Chiao Tung University (Taiwan)

[2022-SUN-P0102-P001] Surface plasmon polariton induced by a metal-insulator-semiconductor resonator. Kun-Wen Fu, Chih-Hsien Lai, National Yunlin University of Science and Technology (Taiwan); Ming-Chi University of Technology (Taiwan)

[2022-SUN-P0102-P006] Spectral Tuning on Deep Gold Nanomaterials for Optical Sensing and Mode Coupling Effects, Chei-Wei Wu, National Chung Hsing University (Taiwan); Chih-Lung Li, Academia Sinica (Taiwan); Cheng-Li Yu, National Chi Yung University (Taiwan); Sheng-Yu Chen, National Chi Yung University (Taiwan)

[2022-SUN-P0102-P010] High Power Transient-Printed Photonic Crystal Nanolaser to SiNx Waveguide for In-Situ Detection of Antibiotics on Chicken Surface, K v

[2022-SUN-P0102-P015] Design of processes of high efficiency for fabricating perovskite solar cells with low-dimensional conjugated topological photonic crystals, Kun-Lin Chiang, Pei-Kuen Wei, National Yang Ming Chiao Tung University (Taiwan); Chih-Kai Chang, Min-Hsiung Shih, Academia Sinica (Taiwan); Yuan-Li Huang, Wei-Sheng Guo, NYCU (Taiwan)

[2022-SUN-P0102-P016] Room-temperature lasing from MgO-based memory device, Hsu-Cheng Hsu, National Cheng Kung University (Taiwan); Yu-Chen Hsu, National Cheng Kung University (Taiwan); Chiao-Yun Chang, National Taiwan Ocean University (Taiwan); Min-Hsiung Shih, Academia Sinica (Taiwan); Chih-Chiang Yang, Kun Shan University (Taiwan); Wei-En Wang, Yu-Chieh Hung, National Tsing Hua University (Taiwan)

[2022-SUN-P0102-P020] Linear random laser from organic dye covered silk fibrin film, Chia-Jung Chou, Shao-Yun Tsay, Ja-Hin Lin, National Taipei University of Technology (Taiwan)

Poster Session II - Sunday
Location: TR-A318... Sun 11:00 am to 11:45 am

[2022-JUN-P013-001] Nanocasting generation of 2D photonic crystal nanostructures: work in progress - Tzu-Chun Chen, Po-I Lee, Yu-En Xiao, Ssu-Chin Lin, National Central University (Taiwan)

[2022-JUN-P013-003] Efficient Energy Efficiency Large-Area Metalenses using in-line photolithography with intelligent topological optimization, Jia-Chih Sheng, Wei-En Wang, Yu-Chieh Hung, National Tsing Hua University (Taiwan)

[2022-JUN-P013-004] Topological optimization calculation of high-contrast refractive property of light, Kun-Lin Chiang, Ying-Sheng Kao, National Yang Ming Chiao Tung University (Taiwan)

[2022-JUN-P013-005] Enhancing surface plasmon resonance image detection of periodic nanostructure using color CCD with filter, Chih-Kai Chiang, Pei-Kuen Wei, Shu-Cheng Lo, Academia Sinica (Taiwan)

[2022-JUN-P013-006] High intensity high directivity Metamaterials Perfect Absorber and Enhancer with composite metal, Sheng-Hsiung Yang, National Tung Hua University (Taiwan); Chie-Chin Cheng, Tung Hwa University (Taiwan)

[2022-JUN-P013-007] Enhanced Valley-Polarized Emission of monolayer WS2 with Plasmonic Chiral Structural Assembly on Negative Refractive Index Materials, Ting Huang, Su-Hui Cheng, Ko-Ting, National Central University (Taiwan)


[2022-JUN-P013-009] Analyses of transmissive and reflective spectra of chiral nematics with Helmholtz defocusing and a twisted wall structure, Ting Huang, Su-Hui Cheng, Ko-Ting, National Central University (Taiwan)

[2022-JUN-P013-010] Continuously linear-polarization rotators based on a liquid crystal wedge cell, Yu-Ya Wang, Jie-Sin Hsueh, Chi-Tiang Huang, Kang-Lin Li, Ko-Tsing, National Central University (Taiwan)


[2022-JUN-P013-013] Carrier Recombination Dynamics of Near-band Edge States in 2D Phenylalanine Lead Bromide Perovskite, Chia-Kai Lin, Shen-Ching Wu, Lin, Hsu, Cheng-Hua, National Cheng Kung University (Taiwan)

Saturday 3 December

Oral Session I
Room: TR-A002 - 01:45 pm to 3:15 pm
Optical Waveguides and Communications I
Session Chair: Chen-Bin Huang, National Taiwan University (Taiwan)

1:00 pm [2022-SAT-P0201-P001] [Invited Paper]
SBER 2022: Towards 65 Mobile Communications, Peng-Cheng Peng, National Taiwan University of Technology (Taiwan)

1:30 pm [2022-SAT-P0201-P002]
Widely steerable 16x16 silicon phased array with 1x16 optical switches, Wei-Cheng Peng, Ting-Hsien Chen, Wei-Chih Chen, Pan-Hsin Lee, National Taiwan University of Science and Technology (Taiwan); Po-Yi Wu, Yen-Kuo, Ting-Tsai Ho, POCI Fiber Optic Communications (Taiwan)

2:45 pm [2022-SAT-P0201-P003]
Fabrication and Characterization of C4+VAG Thin Film Employing Sol-Gel Method, Ping-Chun Yang, Yu-Chen Chen, Chien-Feng Pan, National Cheng Kung University (Taiwan)

4:20 pm [2022-SAT-P0201-P004]
Pulse-Locked Power of 10.60-GHz Low Earth Orbit Optical Communication System, Dong-Sheng Vo and M. J. Abril, Optomotica and Machine Learning, Jia-Ping Yu, Yi-Jun Cai, Shao-Hung Yang, Wei-Yi Lin, National Chiao Tung University (Taiwan); Chen-Jie Feng, National Space Organization (Taiwan); Chen-Ting Lin, National Yang-Ming Chiao Tung University (Taiwan)

12:15 pm [2022-SAT-P0201-P005]
Passive and Phase-Shift Quantum Key Distribution, Ping-Chun Bi, Yu-Renn Wu, National Chiao Tung University (Taiwan)

1:15 pm [2022-SAT-P0201-P006]
Study of High Power Conversion Efficiency Using Semiconductor Lasers at Period-One Nonlinear Dynamics, Ting-Chen Tsai, Wei-Sheng Chiang, and Cheng-Kwang Huang, National Chiao Tung University (Taiwan)

10:30 am [2022-SAT-P0201-P010]
High-speed Optical Mode-Dependent Receiver, Po-Cheng Huang, Ting-Chen Lin, National Chiao Tung University (Taiwan)

11:00 am [2022-SAT-P0201-P011]
CMOS-Compatible Silicon Photonic Analog Front-Ends, Nan-Chen Lin, Ming Chi University of Technology (Taiwan)

11:30 am [2022-SAT-P0201-P012]
Investigation of Nonlinear Loss and Broadband Optical Modulation by Quantum Key Distribution, Ling-Ying Wu, Po-Hung Chen, National Chiao Tung University (Taiwan)

1:30 pm [2022-SAT-P0201-P013] [Invited Talks]
Optics & Photonics 2022 Conference Chair: Hong-Chang Huang, National Central University (Taiwan)

2:00 pm [2022-SAT-P0201-P014]
Mitigation of Thermal Rovolver in VCSEL based Time-of-Flight Sensing Application, Shu-Cheng Huang, National Central University (Taiwan)

2:30 pm [2022-SAT-P0201-P015]
Phase Modulation by QWI SOA-integrated EAM, Yi-Heng Lin, National Chiao Tung University (Taiwan); Hao-Chun Hsieh, Wistron Corporation (Taiwan)

Saturday 4 December

Oral Session V
Room: TR-A002 - 09:00 am to 10:45 am
Optical Waveguides and Communications V
Session Chairs: Nai-Shieng Sun, I-Shou University (Taiwan); Yu-Hsiang Chang, National Taiwan University (Taiwan)

9:00 am [2022-SUN-S0201-O001]
Fiber-BASED NR Transmission Using Single Optical Carrier and Cost-Effective Optical Translating, Wei-Cheng Fan, Yu-Shen Lin, Cheng-Jin Lin, Hsu-Hao Huang, Hsin-Liu Lee, National Taiwan University of Technology (Taiwan)

9:15 am [2022-SUN-S0201-O002]
Imaging-based Hollow Waveguide Fabrication and Analysis Using Optical Phase Modulation, Wei-Hsin Liu, National Taiwan University (Taiwan)

9:30 am [2022-SUN-S0201-O003] [Invited Paper]
Method of Mathematical Approximation on Mach-Zehnder Modulator Based on Terahertz Wireless System, Fen-Kai Shi, Po-Cheng Chiu, Shu-Chun Chang, Hsin-Lien Chiu, National Taiwan University (Taiwan)

9:45 am [2022-SUN-S0201-O004]
Compact Wavelength-division multiplexing (WDM) multimode interconnection for optical interconnect, Wei-Hao Chiu, National Taiwan University (Taiwan)

10:15 am [2022-SUN-S0201-O005]
Study of Second-Order Phase-Mismatch Quantum Key Distribution, Ping-Chun Cheng, Yu-Renn Wu, National Chiao Tung University (Taiwan)

10:30 am [2022-SUN-S0201-O006]
Improved Direct detection of non-Gaussian Quantum Key Distribution, Ping-Chun Bi, Yu-Renn Wu, National Chiao Tung University (Taiwan)
Conference III · Room: TR-A001
Friday-Sunday 2-4 December 2022 · OPTIC 2022
Quantum and Laser Technology

Program Committee: Fredrik Laurell, Royal Institute of Technology (Sweden); Frank Setzpfandt, Friedrich-Schiller-Universität Jena (Germany); Chao-Kuei Lee, National Sun Yat-sen University (Taiwan); Sheng-Kwang Kwang, National Cheng Kung University (Taiwan); Te-Yuan Chung, National Central University (Taiwan); Ming-Chang Huang, National Sun Yat-sen University (Taiwan); Hsin-Chien Chien, National Cheng Kung University (Taiwan); Shou-Tai Lin, Feng Chia University (Taiwan); Yu-Pin Li, National Chiao Tung University (Taiwan); Yi-Cheng Cheng, Chung-Shan Institute of Science and Technology (Taiwan)

1:00 pm [2022-FRI-S0301-0001] Photonic-Crystal Surface-Emitting Lasers Array with Isolation Pattern and SOI Chip by an Apodized 2D Slanted Grating Coupler
Room: TR-A001
3:00 pm [2022-FRI-S0301-0008] Vectoral vortex beams generated by photonic-crystal surface-emitting lasers with honeycomb lattice, Yi-Jing Wu, Bing-Hung Chiang, Chia-Jui Chang, Lin-Chang Liu, National Yang Ming Chiao Tung University (Taiwan)

Coffee Break

Friday 2 December

Oral Session I
Room: TR-A001
Friday: 1:00 pm to 3:30 pm
Quantum and Laser Technology I
Session Chairs: Chao-Kuei Lee, National Sun Yat-sen University (Taiwan); Hsin-Chien Chien, National Central University (Taiwan)

1:00 pm [2022-FRI-S0301-0001] Photonic-Crystal Surface-Emitting Lasers Array with Isolation Pattern and SOI Chip by an Apodized 2D Slanted Grating Coupler
Yi-Jing Wu, Bing-Hung Chiang, Chia-Jui Chang, Lin-Chang Liu, National Yang Ming Chiao Tung University (Taiwan)

1:15 pm [2023-SUNP-0202-P0120] Generation and manipulation of photon pairs from a four- state optical source, Hsuan-Ting Su, Tien-Tao Chen, Cheng-Chung Chiu, Pin-Yu Tsai, Yin-Hung Chen, National Central University (Taiwan)

1:30 pm [2022-SUNP-0202-P0121] Dual Electrodes in 850 nm Coupled Cavity VCSEL array for enhancement of High-Speed Data Transmission, Zhahib Khan, Min-Long Wen, Cheng-Wei Lin, Jen-Wei Shi, National Central University (Taiwan)

1:45 pm [2022-SUNP-0202-P0122] Passively mode-locked Er-doped fiber laser based on graphene oxide/silk fibroin film, Hisang-Wei Tseng, Shwu-Yun Tsai, Tzu-Yan Hsu, Shanghai Jiao Tong University, National Taipei University of Technology (Taiwan)

2:00 pm [2022-SUNP-0202-P0123] Characteristics of High-speed 1.3 µm DFB Laser for Direct Modulation Applications under Commissions Temperature Range, Te-Hua Liu, Hao-Cheng Jiang, Hisang-Chun, Yen-Chieh Hsu, Jen-Hsin Lin, National Taipei University of Technology (Taiwan)

2:15 pm [2022-SUNP-0202-P0124] High brightness generation using semiconductor lasers subject to mutual injection for physical random number generation, Zhan-Yu Liu, Chin-Hao Tseng, Department of Photonics (Taiwan); Sheng-Kweng Department of Photonics (Taiwan), Advanced Optoelectronic Technology Center of Excellence (Taiwan)

3:00 pm [2022-SUNP-0202-P0125] Photonic microwave generation using period-dynamics features with self-sustained coupled nonlinear semiconductors, Chien-Hao Tseng, Bin-Kai Liao, Sheng-Kwang Iwaw, National Cheng Kung University (Taiwan)

3:15 pm [2022-SUNP-0202-P0126] Photonic-Crystal Surface-Emitting Lasers Array with Isolation Pattern and SOI Chip by an Apodized 2D Slanted Grating Coupler
Yi-Jing Wu, Bing-Hung Chiang, Chia-Jui Chang, Lin-Chang Liu, National Yang Ming Chiao Tung University (Taiwan)

3:30 pm [2022-FRI-S0301-0008] Vectoral vortex beams generated by photonic-crystal surface-emitting lasers with honeycomb lattice, Yi-Jing Wu, Bing-Hung Chiang, Chia-Jui Chang, Lin-Chang Liu, National Yang Ming Chiao Tung University (Taiwan)

Oral Session II
Room: TR-A001
Friday: 3:30 pm to 5:00 pm
Quantum and Laser Technology II
Session Chairs: Yin-Hung Chen, National Central University (Taiwan); Sheng-Kwang Kwang, National Cheng Kung University (Taiwan)

3:30 pm [2022-FRI-S0301-0002] Emerging Materials for Plasmonics in the Visible Region: From Discovery to Application, Yu-Jung Lu, Academia Sinica (Taiwan)

3:45 pm [2022-FRI-S0301-0003] 60-GHz/s NRZ-OOK Encoding of Dual-mode 850-nm VCSEL with High-In-doped and small Zn-diffused Einkoarea, Shih-Chien Lin, Ming-Chang Huang, National Yang Ming Chiao Tung University (Taiwan)

4:00 pm [2022-FRI-S0302-0002] 25-Gb/s 1.270-µm IntCAxAS Directly Modulated Laser, Shih-Chien Chen, Te-Hua Liu, Chee-Kewng Yee, Yun-Cheng Yang, Hao-Cheng Cheng, National Central University (Taiwan); Tien-Tsong Shih, National Kaohsiung Univ. of Science and Technology (Taiwan); Chao-Kuei Lee, National Chiao Tung University (Taiwan)

4:15 pm [2022-FRI-S0302-0003] Generation of few-cycle visible pulses by cascaded multiplate semiconductor lasers, Pei Chi Huang, Bing-Hung Chiang, Sheng-Kweng Department of Photonics (Taiwan), National Taipei University of Technology (Taiwan)

4:30 pm [2022-FRI-S0302-0004] Broad-soliton generation in Cr-Er co-doped mode-locked fiber laser, Shou-Tai Lin, Feng Chia University (Taiwan)

4:45 pm [2022-FRI-S0302-0005] 60-GHz/s NRZ-OOK Encoding of Dual-mode 850-nm VCSEL with High-In-doped and small Zn-diffused Einkoarea, Shih-Chien Lin, Ming-Chang Huang, National Yang Ming Chiao Tung University (Taiwan)

5:00 pm [2022-FRI-S0302-0006] High-speed generation of a passively mode-locked fiber laser using graphene oxide/silk fibroin film, Hisang-Wei Tseng, Shwu-Yun Tsai, Tzu-Yan Hsu, Shanghai Jiao Tong University, National Taipei University of Technology (Taiwan)

5:15 pm [2022-FRI-S0302-0007] Passively mode-locked Er-doped fiber laser based on graphene oxide/silk fibroin film, Hisang-Wei Tseng, Shwu-Yun Tsai, Tzu-Yan Hsu, Shanghai Jiao Tong University, National Taipei University of Technology (Taiwan)
2:00 pm [2022-SAT-S0304-O004] Two-dimensional amplification on Fiber Union (Taiwan)

2:30 pm [2022-SAT-S0304-O005] 3D Printed PQ/MMMA for VBR recording, Chi-Yao Huo, Te-Yuan Chou, National central university (Taiwan)

2:45 pm [2022-SAT-S0304-O006] Mode-locked Erbium-doped fiber laser with Covalent Organic Framework (COF) saturable absorber, Hsu-Hsiun Wang, Ahmed F. M. El, Mahdy, Shaie-Wei Kuo, National Sun Yat-sen University (Taiwan); Gong-Ru Lin, National Taiwan University (Taiwan); Chao-Kuei Lee, National Sun Yat-sen University (Taiwan)

3:00 pm [2022-SAT-S0304-O007] The Development of Integrated Optoelectronic Amplifiers and Thermal Sensors Using Light-Emitting Transistors circuits, Sheng-Wen Cheng, Lu-Chang Hsueh, Mubul Kumar, Chao-Hsin Wu, Shu-Jui Hsu, National Taiwan University (Taiwan)

Coffee Break………………………. Sat 3:15 pm to 3:30 pm

Poster Session I - Saturday
Location: TR-A318………… Sun 9:00 am to 11:00 am


[2022-SAT-P0301-P002] Chaotic Dynamics of Semiconductor Lasers under Polarization-Rotated Optical Feedback, Hsiu-Hsuan Huang, Huang-Chen Lee, Yi-Jen Chiu, National Sun Yat-sen University (Taiwan); Min-Hsiung Shih, Academia Sinica (Taiwan); Yu-Chi-Lee Wang, National Sun Yat-sen University (Taiwan); Chao-Kuei Lee, National Sun Yat-sen University (Taiwan)

[2022-SAT-P0301-P003] Research On High-Efficiency Supercontinuum Generation Based On Tantalum Pentoxide Nonlinear Waveguide, Long Huang, Chieh Huang, Guang-Hong Lee, Yi-Jen Chiu, National Sun Yat-sen University (Taiwan); Min-Hsiung Shih, Academia Sinica (Taiwan); National Chiao Tung University (Taiwan); Chao-Kuei Lee, National Sun Yat-sen University (Taiwan)

[2022-SAT-P0301-P004] Particle-in-Cell Simulation of Phase-Matched High Harmonics Generation in Highly Ionized Plasma, Ying-Shan Chen, National Central University (Taiwan); Yuan-Yao Lin, Yuan-Yao Lin, National Cheng Kung University (Taiwan); Han Hou, Pei-Lin Li, Jung-Chen Tung, National Taipei University of Technology (Taiwan); Chien-Lin Lin, National Yang Ming Chiao Tung University (Taiwan); Ming-Chang Chen

[2022-SAT-P0301-P005] Generating Structured Vector Fields with Quasicrystal and Superlattice Patterns by Diffraction Optics, Ling-Qi Huang, Pi-Hui Tuan, National Chung Cheng University (Taiwan)

[2022-SAT-P0301-P006] Generation of various optical crystalline and kaledoscopic beams: fabrication of periodic nanorecess structures and liquid crystal gratings, Yin-Jie Cheng, National Taiwan Ocean University (Taiwan); Wei-Hsiang Fan, National Yang Ming Chiao Tung University (Taiwan); Hsin-Hsiang Liu, National Taiwan Ocean University (Taiwan); National Yang Ming Chiao Tung University (Taiwan); Hao-Chung Kuo, National Chang Kung University (Taiwan)

[2022-SAT-P0301-P007] Optimal Probe States for Quantum Target Detection, Wei-Ming Chen, Pin-Ju Tsai, National Central University (Taiwan)

[2022-SAT-P0301-P008] Generating High-Peak-Power Lissajous Beams by an Nd:YVO4/Cr4+:YAG Laser with a Concave-Conves Cavity, Wan-Chen Taisi, Wei-Ru Chen, Pi-Hui Tuan, National Chung Cheng University (Taiwan)

[2022-SAT-P0301-P009] Assessment of HTOL stressed VCELs using beam profiling techniques, Han-Tien Cheng, Tzian-Ting Zhang, Te-Hui Liu, Guo-Ting Huang, Hsiao-Yu Lin, Chao-Hsin Wu, National Taiwan University (Taiwan); Hsu-Yi Wu, National Taiwan University (Taiwan)

Poster Session II - Sunday
Location: TR-A318………… Sun 9:00 am to 11:00 am

[2022-SUN-P0302-P001] Enhancement of laser-driven hard X-ray source by asymmetry injection, Song-Wei Huang, Wei-Cheng Liau, Shao-Chiou Liu, National central university (Taiwan)

[2022-SUN-P0302-P002] Numerical investigation of conversion efficiency of laser-produced tin plasma EUV light sources, Chao-Yu Wu, National Central University (Taiwan); Yoo-Liu Liu, Institute of Space and Plasma Sciences (Taiwan); Po-Yen Lai, Shih-Hung Chen, National Central University (Taiwan)

[2022-SUN-P0302-P003] The Formation of Conjugated Resonator in the Circular Ring Laser Diode, Ming-Chang Shih-Shih, Chen Feng-Yen, Ching Ming Chen, National University of Kaohsiung (Taiwan)

[2022-SUN-P0302-P004] Effects of Tm3+ cross relaxation on the Q-switching efficiency of a Ti:Yb all-fiber laser, Yu-Cheng Song, Lasers and Photonics Laboratory, Institute of Microelectronics (Taiwan), Industrial Technology Research Institute South Campus (Taiwan); Tsung-Yow Tsaih, Lasers and Photonics Laboratory, Institute of Microelectronics (Taiwan)

[2022-SUN-P0302-P005] Observation of mode coupling in a 10.6GHz pump laser, Yuan-Yao Lin, Yuan-Yao Lin, National Cheng Kung University (Taiwan); Yu-Chi-Lee Wang, National Sun Yat-sen University (Taiwan); Chao-Kuei Lee, National Sun Yat-sen University (Taiwan)

[2022-SUN-P0302-P006] Simultaneous Generation of Dual-polar Optical Parametric Oscillators and Orange-Yellow Lasers, Fu-Hsiang Feng, NTU (Taiwan)

[2022-SUN-P0302-P007] Remedial laser direct writing waveguide in MgO:LN, Chao-Yuan Yang, Shih-Zhe Pan, Hui-Mi Li, Feng-Chia University (Taiwan); Yu-Ting Song, Huan-Teng Su, Zhi-Ming Hsieh, Wei-Wei Hsiang, Fu Jen Catholic University (Taiwan); Shou-Tai Lin, Feng-Chia University (Taiwan)

[2022-SUN-P0302-P008] Generating the robustness of discrete optical vortexes in Raman lasers, Pei-Lin Lin, Ming-Han Hou, Jung-Chen Tung, National Taipei University of Technology, Taipet Tech (Taiwan)

[2022-SUN-P0302-P009] Investigating polarization-resolved Raman spectrum of Kd(VO4)2 crystal, Ming-Han Hou, Pei-Lin Lin, Jung-Chen Tung, National Taipei University of Technology, Taipet Tech (Taiwan)


[2022-SUN-P0302-P011] Investigation of Heat Dissipation of Flip-Chip VCSEL Array with Different Heat Sink, Yu-Xiang Yang, National Yang Ming Chiao Tung University (Taiwan); Hao-Chung Kuo, National Yang Ming Chiao Tung University (Taiwan); Hsiung-Chieh, Yu, Institute of Lighting and Energy Photonics (Taiwan)

[2022-SUN-P0302-P012] Stability Analysis of Period One Dynamics Applying Feedback Loop in Semiconductor Lasers, Hong-Sheng Hu, Yu-Shan Su, Su-Wei Wang, Yuan-Ze University (Taiwan)

[2022-SUN-P0302-P013] Light Condensation in SOA-based Fiber Cavity, Wen-Hsuan Kuan, Kuei-Huei Lin, University of Taipei (Taiwan)

[2022-SUN-P0302-P014] Development of the laser patterning process for transparent and efficient organic photodetector, Yuan-Yao Lin, Institute of Space and Plasma Sciences, National Chiao Tung University of Science and Technology (Taiwan); Abdul Khalik Albas, Shun-Wei Liu, Ming Chi University of Technology (Republic of China (Taiwan)
Friday 2 December

Oral Session I
Room: TR-羅家倫講堂 — Fri 1:00 pm to 3:00 pm
Optical Information Processing and Holography I
Session Chairs: Wei-Chia Su, National Changhua University of Education (Taiwan); Shun-Hui Lin, National Yang Ming Chiao Tung University (Taiwan)

1:00 pm [2022-FRI-S0401-001] (Invited Paper)
Holographic optical engine (HOE) for optical fiber laser processing with high-throughput, high stability, and high usability
Yu-Fang Lin, Tsai-Shih Hsu, Shih-Ting Hsu, Kun-Wei Hung, National United University (Japan)

1:15 pm [2022-FRI-S0401-002] (Invited Paper)
Improvement of Image Quality in Diffraction Additive Manufacturing Technology
Wei-Feng Hu, Chu-Yang Tsai, Fu-Hsiung Chiu, Yu-Yu Chou, National Taiwan University of Science and Technology (Taiwan)

1:30 pm [2022-FRI-S0401-003] (Invited Paper)
Studies on the effect of light source coherence to speckle noise for holographic display
Chen-Chi Li, Shun-Hui Lin, National Yang Ming Chiao Tung University (Taiwan); Vera Marinova, Bulgarian Academy of Sciences (Bulgaria); Chieh-En Lee, National United University (Taiwan)

1:45 pm [2022-FRI-S0401-004] (Invited Paper)
Holographic optical engine (HOE) for optical fiber laser processing with high-throughput, high stability, and high usability
Yu-Fang Lin, Tsai-Shih Hsu, Shih-Ting Hsu, Kun-Wei Hung, National United University (Japan)

2:00 pm [2022-FRI-S0401-005]
Fabrication of Microwave Lenses Using Additive Manufacturing Technology
Jun-Ming Bai, Chen-Hsin Tu, National United University (Taiwan)

2:15 pm [2022-FRI-S0401-006]
ARDinary 3D Micropatterned Multiphoton Stimulation via Deep Combined Holography with Propagation Matrix
Shiuan-Huei Lin, Ming-Li Wang, Chieh-En Lee, Chia-Yu Huang, Ming-Hsiung Liu, National Taiwan University of Science and Technology (Taiwan)

2:30 pm [2022-FRI-S0401-007]
Measurement of the misalignment of two parallel gratings by using heterodyne grating interferometer
Shih-Han Huang, Chi-Jung Wang, Min-Rui Wu, Li-Chieh Huang, National United University (Taiwan)

2:45 pm [2022-FRI-S0401-008]
Optical Information Processing and Holography II
Session Chairs: Jung-Ping Liu, Feng Chia University (Taiwan)

3:00 pm [2022-FRI-S0402-001] (Invited Paper)
Steady-state model of photorefractive index modulation in low-loss crystal with low velocity
Yi-Chun Chen, National United University (Taiwan); Vera Marinova, Bulgarian Academy of Sciences (Bulgaria); Chieh-En Lee, National United University (Taiwan)

3:15 pm [2022-FRI-S0402-002] (Invited Paper)
Effect of pixel size on the performance of a digital micro-mirror device
Peng-Sheng Huang, Chiun-Hsiong Wang, Wing-Ping Li, National Taiwan University of Science and Technology (Taiwan)

3:30 pm [2022-FRI-S0402-003] (Invited Paper)
Optical Information Processing and Holography III
Session Chairs: Hsiu-Fu Shih, National Cheng Hsing University (Taiwan); Ju-Yi Lee, National Central University (Taiwan)
Multifocal illumination based confocal fluorescence microscopy using volume holographic light sources

An optical system for measuring liquid crystal phase retardation

Measurement of liquid crystal optical materials using phase-shifting interferometry

Birefringence measurement of phase gratings in Photo-aligned liquid crystal cell by polarization holography

Optical plates using Michelson interferometry

Holographic grating

Using You Only Look Once (YOLO) Neural Network to improve face recognition speed for the FaceNet System

Additive Manufacturing Technologies by a Phase Shift Interferometer with Moving Grating

Additive Manufacturing Technologies by a Phase Shift Interferometer with Moving Grating

Positioning System by Diffraction-based Heterodyne Phase Measurement

An optical system for measuring optical signals from a short depth of field

A scanning profilometer with optical coherence tomography

Compact incoherent digital holographic camera based on common path architecture

A simple autofocus method for microscopic imaging

2022 Annual Meeting of Taiwan Photonics Society, TPS | Optics & Photonics Taiwan International Conference
27th Annual Meeting of Photonics Division, NSTC
Conference V - Room: TR-A201
Friday-Sunday, 2-4 December 2022 - OPTIC 2022

Optical Design, Testing and Engineering
Program Chairs: Yi-Chin Fang, National Kaohsiung University Science and Technology (Taiwan); Chao-Chung Chang, Coretronics Corporation (Taiwan)

Friday 2 December
Oral Session
Room: TR-A201

1:00 pm [2022-FRI-S0501-I001] (Invited Paper)

Optical Design, Testing and Engineering I
Session Chairs: Chuan-Chung Chang, Coretronics Corporation (Taiwan); Guo-Dung Su, National Taiwan University (Taiwan)

1:15 pm [2022-FRI-S0501-I003]

Title: Optimal Phase Plate Plasma Control and Inertial Physics
Speaker: Wen-Sheng Wang, National Taipei University of Technology (Taiwan)

1:30 pm [2022-FRI-S0501-I004]

Title: An Experimental Study of the Plasma Structure and Dynamics in Plasma-Driven Fusion Reactor
Speaker: Chi-Hsien Lin, National Taiwan University (Taiwan)

1:45 pm [2022-FRI-S0501-I005]

Title: Design of a High-Performance Q Switched Laser for next-Generation Laser Technology
Speaker: Yen-Lung Kao, National Taiwan University (Taiwan)

2:00 pm [2022-FRI-S0501-I006]

Title: A New Method for Calibrating the Performance of High Power Lasers
Speaker: Chao-Chung Chang, Coretronics Corporation (Taiwan)

2:15 pm [2022-FRI-S0501-I007]

Title: Development of High-Power Optical Filters for Advanced Laser Applications
Speaker: Yi-Chin Fang, National Kaohsiung University Science and Technology (Taiwan)

2:30 pm [2022-FRI-S0501-I008]

Title: A Comparative Study of Different Laser Technologies for Medical Applications
Speaker: Chao-Chung Chang, Coretronics Corporation (Taiwan)

2:45 pm [2022-FRI-S0501-I009]

Title: Recent Advances in Optical Fiber Technology
Speaker: Yi-Chin Fang, National Kaohsiung University Science and Technology (Taiwan)

Oral Session II
Room: TR-A201

1:15 pm [2022-FRI-S0502-O003]

Title: Design of a High-Contrast Light Pattern with the use of a Cylindrical Lens Array
Speaker: Feng-Yi Wu, Chia-Yuan Chang, National Cheng Kung University (Taiwan)

1:30 pm [2022-FRI-S0502-O004]

Title: Accurate 3D Microfabrication by Noninvasive Inspection based on Multiphoton Microscopy
Speaker: Chao-Wen Liang, Chiao-Hsiu Chang, Wei-Lun Liang, National Sun Yat-sen University (Taiwan)

1:45 pm [2022-FRI-S0502-O005]

Title: Novel approach for high-resolution, ultra-smooth LEDs array with Quantum Dots
Speaker: Chao-Chung Chang, National Taiwan University (Taiwan)

2:00 pm [2022-FRI-S0502-O006]

Title: Direct TIR Lens with cylindrical lens array for K-mark Low Beam Design
Speaker: Bo-Xiang Peng, Chi-Shou Wu, Tsung-Hsien Lin, Bo-Hao Peng, National Sun Yat-sen University (Taiwan)

2:15 pm [2022-FRI-S0502-O007]

Title: Design of freeform lens with user-defined irradiance and high collimation, by using numerical method
Speaker: Tsu-Chen Yu, Chao-Hsien Chen, Graduate Institute of Precision Engineering (Taiwan)

2:30 pm [2022-FRI-S0502-O008]

Title: Fabrication and Verification of Large Wavefront Sensor
Speaker: Lin-Guang Lin, Bo-Hsien Wang, National Central University (Taiwan)

2:45 pm [2022-FRI-S0502-O009]

Title: Transmission and reflection dual wavefront measurements in large and medium size lenses
Speaker: Shih-Min Peng, Cao-Wen Liang, National Central University (Taiwan)

3:00 pm [2022-FRI-S0502-O010]

Title: Using interferometry to evaluate asphere for space optics
Speaker: Hsing-Yu Wu, System Manufacturing Center (Taiwan), Department of Optics and Photonics & Center for Astronautics and Engineering (Taiwan)

3:15 pm [2022-FRI-S0502-O011]

Title: Temperature-insensitive Fiber-Optic Refractometer Based on Double-side Open Cavity
Speaker: Yu-Tin Lin, Ching-ping Yu, National Sun Yat-sen University (Taiwan)

3:30 pm [2022-FRI-S0502-O012]

Title: Temperature-insensitive Fiber-tip FPI Refractometer Based on Double-side Open Cavity
Speaker: Yu-Tin Lin, Ching-ping Yu, National Sun Yat-sen University (Taiwan)

Oral Session III
Room: TR-A201

1:15 pm [2022-FRI-S0503-I001]

Title: Solving Aspheric Stiglets and Cemented Doublet with Given Primaries Aberrations
Speaker: Chao-Hsien Chen, National Kaohsiung University Science and Technology (Taiwan)

1:30 pm [2022-FRI-S0503-I002]

Title: Non-destructive inspection of compound semiconductor mirrors using optical coherence tomography
Speaker: Po-Hao Tseng, Chia-Chung Huang, National Taiwan University (Taiwan)

1:45 pm [2022-FRI-S0503-I003]

Title: Development of a multi-chip LED array for solid-state lighting applications
Speaker: Wei-Lun Liang, Bo-Hao Peng, National Sun Yat-sen University (Taiwan)

2:00 pm [2022-FRI-S0503-I004]

Title: A Data Transmission Method
Speaker: Po-Yi Chen, National Dong Hwa University (Taiwan)
[2022-SAT-P0501-P008] Development of a common-path interferometer for displacement and angle measurements, Yue-jung Lee, Hung-Lin Hsiao, National Taiwan University (Taiwan)

[2022-SAT-P0501-P009] The Periscope-Type of Mobile Phone Camera, Tse-Fan Hsu, Industrial Technology Research Institute (Taiwan)

[2022-SAT-P0501-P023] Thermal Properties Analysis of Temperature -5 Circular-Multiplier Interference Contrast Microscopy, Shyh-Tsong Lin, Che-Wei Kuo, Yue-Jing Lin, Yu-Feng Huang, National Taipei University of Technology (Taiwan)

Poster Session II - Sunday Location: TR-A318..... Sun 9:00 am to 11:00 am

[2022-SUN-P0502-P001] Near-Room Temperature Waste Heat Recovery through Radiative Cooling, Tsu-Chen Hsiao, Yu-Feng Lo, Yuan-Chieh Lin, National Taiwan University of Science and Technology (Taiwan)


[2022-SUN-P0502-P004] Eye Protection Effectiveness Consideration on Anti-reflection Coatings Based on Circle Letters Using and Conducting Candlelight OLED in Text Reading, Jing Yi Ye, Yu-I Hung, Huang, National Taichung University (Taiwan)

[2022-SUN-P0502-P005] Analysis of lens characteristics and lens manufacturing assembly tolerances on lens defects using a spectrophotometer, Yu-Lin Su, National Central University (Taiwan), National Applied Research Laboratories (Taiwan)

[2022-SUN-P0502-P006] Developing an intelligent automatic process to polish large-scale optics, Hsing-Yuan Liao, Hsiao-Yi Lee, National Kaohsiung University of Applied Sciences and Technology (Taiwan)

[2022-SUN-P0502-P010] Gait Training Rehabilitation System Based on Depth Measuring, Shu-Chi Wu, Lin-Wang Lee, Hsiu-Shi Shih, Sheng-Yang Zhang, National Chung Hsing University (Taiwan)

[2022-SUN-P0502-P011] Double-side Anisotropic Wet Etching, Ying-Nan Lin, Yi-Chien Lin, Shih-Hui Chang, National Taipei University of Technology (Taiwan)

[2022-SUN-P0502-P012] Analysis of the Efficiency of a Pseudo Non-diffraction Beam of Twisted Nematic Liquid Crystal THz Wave Plates with functional groups with ppy-type Ir (III) complexes, Hsing-Yuan Liao, Hsiao-Yi Lee, National Kaohsiung University of Applied Sciences and Technology (Taiwan)

[2022-SUN-P0502-P013] Effect of Reading-light Color on Visual Contrast Sensitivity, Yu-Hsiu Lin, Chih-Chen Chien, Shih-Yao Chao, Shu-Guang Girls' Senior High School (Taiwan); Hsing-Yuan Liao, Hsiao-Yi Lee, National Kaohsiung University of Applied Sciences and Technology (Taiwan)

[2022-SUN-P0502-P014] Effect of Effect of Board-color on Viewing Clarity, Yu-Hsiu Lin, Chih-Chen Chien, Shih-Yao Chao, Shu-Guang Girls' Senior High School (Taiwan); Po-Ting Yeh, National Taiwan University Hospital (Taiwan); Lin-Ming Huang, Tamkang University (Taiwan); Kuo-Hsien Chou, National Defence University of Science and Technology (China); Chih-Hsin Chen, Tamkang University (Taiwan)

[2022-SUN-P0502-P015] Effect of Color Shade on Visual Contrast Sensitivity, Yu-Hsiu Lin, Chih-Chen Chien, Shih-Yao Chao, Shu-Guang Girls' Senior High School (Taiwan); Hsing-Yuan Liao, Hsiao-Yi Lee, National Kaohsiung University of Applied Sciences and Technology (Taiwan)

Conference VI · Room: TR-A202
Friday-Sunday 2-4 December 2022 · OPTIC 2022

Biophotonics and Biomedical Imaging
Conference Chairs: Chi-Kuang Sun, National Taiwan University (Taiwan); Xiu-Yu Chen, National Central University (Taiwan); Yuan Luo, National Taiwan University (Taiwan)

Program Committee: Shean-Jen Chen, National Yang Ming Chiao Tung University (Taiwan); Ming-Chen Chan, National Yang Ming Chiao Tung University (Taiwan); Sheng-Hao Tseng, National Cheng Kung University (Taiwan); Wen-Chun Kuo, National Yang Ming Chiao Tung University (Taiwan); Yu-Chen Kao, National Yang Ming Chiao Tung University (Taiwan); Tsu-Ming Liu, University of Macau (China); Felix Fanjul-Veloz, University of Cantabria (Spain); Chau-Hwang Lee, Academia Sinica (Taiwan); Fan-Ching Chien, National Central University (Taiwan); Yu-Chin Lin, National Taiwan University (Taiwan)

Friday 2 December
Oral Session I
Room: TR-A202 .......... Fri 1:00 pm to 3:00 pm
Biophotonics and Biomedical Imaging I
Session Chairs: Fan-Ching Chien, National Central University (Taiwan); Yi-Chun Chen, National Central University (Taiwan)

1:00 pm [2022-FRI-S0601-0001]
In vivo voltage imaging of mice deep brain neurons by using a 1.5-kilohertz frame rate two-photon microendoscopy system. Guan-Ying Chen, Chen-Yi Hong, National Taiwan University (Taiwan); Po-Ting Yeh, National Taiwan University (Taiwan); National Taiwan University and Academia Sinica (Taiwan); Bhaskar Jayoti Borah, National Taiwan University (Taiwan); Yun-Hsu Lu, National Taiwan University Hospital (Taiwan); Shih-Kuo Chen, National Taiwan University (Taiwan); National Taiwan University and Academia Sinica (Taiwan); Ni-Chung Lee, Wuh-Liang Hwu, National Taiwan University Hospital (Taiwan); Chi-Kuang Sun, National Taiwan University (Taiwan)

1:15 pm [2022-FRI-S0601-0002]
Inter-Modality Unsupervised Image Translation from Harmonic generation microscopy (HGM) image to H&E-stained image via Deep Learning Network. Wei-Chun Huang, Yuan-Chun Wu, National Yang Ming Chiao Tung University (Taiwan); Fu-Jen Kao, National Taiwan University (Taiwan); Yan-Chun Wu, Bandwith10 Ltd (United States of America); Ting-Yen Tsai, Ting-Hao Chen, Chuan-Bor Chiu, National Taiwan University (Taiwan); Michael C. Y. Huang, Bandwith10 Ltd (United States of America); Hisan-Chieh Lee, National Taiwan University (Taiwan)

1:30 pm [2022-FRI-S0601-0003]
Clear and Deep Temporal Focusing Multiphoton Microscopy via Prediction Model with Depth Information. Hao-Chung Chi, National Yang Ming Chiao Tung University (Taiwan); Yvonne Yuling Hu, National Cheng Kung University (Taiwan); Feng-Chun Hsu, Chia-Wei Hsu, Yu-Hao Tseng, Ching-Yu Lin, Shean-Jen Chen, National Yang Ming Chiao Tung University (Taiwan)

1:45 pm [2022-FRI-S0601-0004]
Optimum parameter selection though U-curve method for diffuse optical imaging. Nian-Du Wu, Min-Chun Pan, National Central University (Taiwan)

2:00 pm [2022-FRI-S0601-0005]
U-net model for Single-Axis Quantitative Differential Phase Contrast imaging of cells. Yen-Chih Yu, National Yang Ming Chiao Tung University (Taiwan); Sun-Yu Lai, National Taiwan University (Taiwan); Yi-Chen Chen, National Taiwan University (Taiwan)

Coffee Break........................Fri 3:00 pm to 3:15 pm

Oral Session II
Room: TR-A202 .......... Fri 3:15 pm to 5:00 pm
Biophotonics and Biomedical Imaging II
Session Chairs: Yu-Chin Lin, National Taiwan University (Taiwan); Sheng-Hao Tseng, National Cheng Kung University (Taiwan)

3:15 pm [2022-FRI-S0602-0001] (Invited Paper)
Model-driven diffuse reflectance spectroscopy for retrieving various local and systematic functional parameters of the human body. Sheng-Hao Tseng, National Cheng Kung University (Taiwan)

3:45 pm [2022-FRI-S0602-0001]
Deep Learning for Automatic Neural Canal Opening Detection with Differentiable Spatial to Numerical Transform. Pei-Chia Tsai, National Yang Ming Chiao Tung University (Taiwan)

4:00pm [2022-FRI-S0602-0002]
Deep Unsupervised Learning for Image Enhancement in Nonlinear Optical Microscopy. Yun-Je Jiang, National Taiwan University (Taiwan)
Hua University (Taiwan); Xin Lin, Shih-Hua Chan, Zi-Ping Chen, National Yang Ming Chiao Tung University (Taiwan); Wei-Chih Chen Wu, Kaohsiung Medical University (Taiwan); Ming-Tsung Wu, Kaohsiung Medical University Hospital (Taiwan); Guan-Yu Zhu, China Medical University (Taiwan); Hsing-Chen Chen, National Tsing Hua University (Taiwan).

4:15 pm [2022-FRI-S0602-0003]
Modification of laser's scanning system to meet Canadian safety standards, MD Azharuddin Ansari, Apoorv Chaudhari, Yuan Ze University (Taiwan); Jinghui David White, Yuan Ze University (Taiwan).

4:30 pm [2022-FRI-S0602-0004]
A Hybrid algorithm for imaging Breast tumor(s) in highly heterogenous Non-Homogeneous Medium, Nazish Murad, Min-Chun Pan, National Central University (Taiwan).

4:45 pm [2022-FRI-S0602-0005]
Quantitative Differential Phase Contrast Microscopy for Phase Retrieval with Self-supervised Neural Network, Ting-Yu Chen, Yu-Hsin Chia, Sunil Vyas, Yuan Ze University (Taiwan), College of photonics, National Taichung University (Taiwan); Chiu Chao-Tsung, Ming Chiao Tung University (Taiwan); Yu-Hsin Chia, Sunil Vyas, Yuan Ze University (Taiwan).

Saturday 3 December

Oral Session III
Room: TR-A202
Sat 1:00 pm to 2:15 pm
Biophotonics and Biomedical Imaging
Session Chairs: Chia-Wei Sun, National Yang Ming Chiao Tung University (Taiwan).

10:45 am [2022-SAT-S0603-0015] (Invited Paper)
Probing the protein expression at its native state, Bi-Chang Chen, Academia Sinica (Taiwan).

11:15 am [2022-SAT-S0603-0016]
Bone mineral density prediction by deep learning with optical bone densitometry, Hsun-Jui Wang, National Yang Ming Chiao Tung University (Taiwan); Wei-Chih Chen Wu, Kaohsiung Medical University (Taiwan); Hsing-Chen Chen, National Tsing Hua University (Taiwan).

2022 Annual Meeting of Taiwan Photonics Society, TPS | Optics & Photonics Taiwan International Conference
27th Annual Meeting of Photonics Division, NSTC
Conference VII • Room: TR-A203
Friday-Sunday 2-4 December 2022 • OPTIC 2022

Display and Solid-State Lighting
Conference Chairs: Chung-Chih Wu, National Taiwan University (Taiwan); Ko-Ting Cheng, National Central University (Taiwan); Chih-Lung Lin, National Cheng Kung University (Taiwan); Ray-Hua Horng, National Yang Ming Chiao Tung University (Taiwan)

Program Committee: Dong-Sing Wu, National Chi Nan University (Taiwan); Jiun-Haw Lee, National Taiwan University (Taiwan); JianJang Huang, National Taiwan University (Taiwan); Tien-Lung Chiu, Yuan Ze University (Taiwan); Lung-Chien Chen, National Taipei University of Technology (Taiwan); Po-Tsun Liu, National Yang Ming Chiao Tung University (Taiwan); Po-Tsun Liu, National Yang Ming Chiao Tung University (Taiwan); Wei-Chi Lai, National Cheng Kung University (Taiwan); Chia-Feng Lin, National Cheng Kung University (Taiwan); Yen-Hsiang Fang, Industrial Technology Research Institute (Taiwan); Chi-Rong Sheu, National Cheng Kung University (Taiwan); Li-Tin Chen, National Yang Ming Chiao Tung University (Taiwan); Tae Yeon Seong, Korea University (Korea)

Friday 2 December

Oral Session I
Room: TR-A203 • Fri 1:00 pm to 3:00 pm

Display and Solid-State Lighting I
Session Chairs: Chih-Lung Lin, National Cheng Kung University (Taiwan); Ko-Ting Cheng, National Central University (Taiwan)

1:00 pm [2022-FRI-S0701-I001] (Invited Paper)
Driving Schemes for AMOLED and Micro-LED Displays, Chih-Lung Lin, National Cheng Kung University (Taiwan)

1:30 pm [2022-FRI-S0701-I002] (Invited Paper)
There is light; there is infinity display, Chi-Chang Liao, IRIS Optronics Co., Ltd (Taiwan)

2:00 pm [2022-FRI-S0701-I003]
Image quality improvement of transparent waveguide display based on a twisted nematic mode polymer-stabilized liquid crystal, Chi-Shun Yang, Heng-Yi Tseng, Kuan-Wu Lin, Li-Min Chang, Guan-Yu Lu, Cheng-Chang Li, National Sun Yat-Sen University (Taiwan); Sheng-Wen Wang, Ko-Ting Cheng, National Central University (Taiwan); Tsung-Hsien Lin, National Sun Yat Sen University (Taiwan)

2:15 pm [2022-FRI-S0701-I004]
Lattice Analyzing of Three-Dimensional Photonic Liquid Crystals by a Diffraction Method, Yin-Huan Chen, Po-Chang Chen, Dian-Yi Guo, Ting-Mao Feng, Hong-Chang Jau, Tsung-Hsien Lin, National Sun Yat-sen University (Taiwan)

2:30 pm [2022-FRI-S0701-I005]
Control of large-area orderliness of electrically-induced 2D supramolecular chiral microstructures by 1D microgroove structures, Zi-Qun Wang, Yu-I-Fon Wong, Chia-Rong Lee, National Cheng Kung University (Taiwan)

2:45 pm [2022-FRI-S0701-I006]
Planar alignment of nematic liquid crystal networks via microchannels, Wei-Yung Hsu, Yu-Chih Cheng, National Taipei University of Technology (Taiwan)

Coffee Break........................ Fri 3:00 pm to 3:15 pm

Oral Session II
Room: TR-A203 • Fri 3:15 pm to 5:00 pm

Display and Solid-State Lighting II
Session Chairs: Ray-Hua Hong, National Yang Ming Chiao Tung University (Taiwan); Po-Tsun Liu, National Yang Ming Chiao Tung University (Taiwan)

3:15 pm [2022-FRI-S0702-I001]
The mini-LED matrix with IR phosphor applied to forward lighting, Ting-Wei Hsu, Quang-Hui Nguyen, Yi-Jou Lin, National Central University (Taiwan); Ching Sun, National Yang Ming Chiao Tung University (Taiwan); Yuan-Hao Lee, Shih-Kang Lin, Chi-Shou Wu, Tsung-Hang Yang, National Central University (Taiwan); Yuan-Li Wu, National Yang Ming Chiao Tung University (Taiwan); Tsung-Yuan Lee, National Taiwan University of Science and Technology (Taiwan); Chao-Hsin Chien, National Yang Ming Chiao Tung University (Taiwan); Yeh-Wei Yu, Ching-Cheng Sun, National Central University (Taiwan)

3:30 pm [2022-FRI-S0702-I002]
Tandem ionic/nonionic hybrid white phosphorescent organic electroluminescent device, Dian Lao, Hao-Ching Su, National Yang Ming Chiao Tung University (Taiwan); Chih-Hao Huang, Yuan Ze University (Taiwan)

3:45 pm [2022-FRI-S0702-I003]
Novel Emitter for Non-Doped Thermally Activated Delayed Fluorescence White-light Organic Light-emitting Diode, Chiu-Chih Chu, Chiu-Hsien Hsu, Chih-Pin Hsai, National Taiwan University (Taiwan); Bo-Yen Lin, National Dong Hwa University (Taiwan); Man-Kit Leung, National Taiwan University (Taiwan); Tien-Lung Chiu, Yuan Ze University (Taiwan); Jian-Haw Lee, National Taiwan University (Taiwan)

4:00 pm [2022-FRI-S0702-I004]
Compact Mini-LED Driving Circuit with Low Power Consumption Structure For Use in LCD Backlight Units, Yi-Chien Chen, Chih-I Liu, Chung-Tien Chu, Chih-Lung Lin, National Cheng Kung University (Taiwan)

4:15 pm [2022-FRI-S0702-I005]
CsPbBr3/Cs4PbBr6@SiO2 Quantum Dots and Distributed Bragg Reflector for Micro-LED Displays, Wei-Yi Zhi, Chih-Wei Lo, Kai-Ping Chang, Kuang-Wei Liao, Chia-Hsun Huang, Chun-Ting Tai, Che-Chun Lu, Chao-Chun Yen, National Chung Hsing University (Taiwan); Dong-Sing Wuu, National Chung Hsing University (Taiwan)
SATURDAY 3 DECEMBER

Session Chairs: Long-Chien Chen, National Taipei University of Technology (Taiwan); Wei-Chi Lai, National Cheng Kung University (Taiwan)

10:45 am [2022-SAT-0701-P003] Efficiency Improvement of AlGaN-based Ultraviolet Light-Emitting Diode on p-Type Contact Layer and Nano-Patterned Sapphire Substrates, Tien-Chen Chen, Hung-Chang Hsieh, Chin-Tien Kao, Tsung-Hao Wu

11:00 am [2022-SAT-0701-P004] Development of Direct-Type Auto-Balancing Backlight Module Conforming to Standard, Guo-Huan Liu, Yiu-Xuan Cheng, Epoch Electrooptics Corp. (Taiwan)

11:30 am [2022-SAT-0701-P005] High efficiency micro-scale IVC light-emitting diodes with surrounding porous-AlGaN structures, Yi-Xuan Wang, National Cheng Hsing University (Taiwan)

11:45 am [2022-SAT-0701-P006] Investigation of alloy disorder effects in conventional III-V states of America); Yuh-Renn Wu, National Taiwan University (Taiwan); Gnanasekaran, Yi-Min Chang, Tunghai University (Taiwan); Hsin-Pao Chang, National Taiwan University (Taiwan); Hsiang Wang, Nai-Ren Chang, Kai-Ping Chang, Po-Liang Liu, National Taiwan University (Taiwan)

Poster Session I - Saturday

Location: TR-A138  Saturday 3 December 2022 2:00 pm to 4:00 pm

[2022-SAT-P0701-P001] Highly Efficient Deep-Blue OLEDs based on multiple resonance thermally activated delayed fluorescence (MR-TADF) emitter: Chih-An Chen, Chia-Hui Chen, National Taiwan University (Taiwan); Bo-Yen Lin, National Dong Hwa University (Taiwan); Chih-Pin Han, National Taiwan University (Taiwan); Yi-Ting Lee, Soochow University (Taiwan); Man-Kit Leung, National Taiwan University (Taiwan); Tien-Lang Chuang, Yue University (Taiwan); Jiun-Haw Lee, National Taiwan University (Taiwan)

[2022-SAT-P0701-P002] Achieving Low and Consistent Reflectance toward Various Angles by Altering the OLED Structure to Reduce Scattering, Chi-Jui Chang, Chen-Hua Lin, Wei-Kai Lee, Kai-Chen Lin, National Taiwan University (Taiwan); Chih-Kai Tsai, Yu-Ting Chen, National Taiwan University (Taiwan); All Optronics Corporation (Taiwan); Ching-Chih Wu, National Taiwan University (Taiwan)

[2022-SAT-P0701-P003] Bistable waveguide display devices based on dynamic scattering with the fully electromagnetic wave, Chang-Cheng Lee, Po-Hsiang Liao, Wei-Kai Lee, Yi-Ting Chen, Chien-Wen Wen, Chen-Wei Huang, Chang-Chih Wu, National Taiwan University (Taiwan)

POSTER SESSION II - SUNDAY

Location: TR-A318  Sunday 4 December 2022 9:00 am to 11:00 am

[2022-SAT-P0702-P001] Multiscale optical analysis on 3D printed devices fabricated by using dynamic scattering with photopolymerizable materials, Yen-Chieh Lin, Yen-Yao Chou, Shou-Guang Chou, Ting-Yi Wu, Cheng-Yu Cheng, Chih-Li Kuo, Wei-Meng Wu, Shao-Wei Chang, National Taiwan University (Taiwan)
Saturday 3 December

Oral Session III
Room: TR-A204, 4:15 pm to 12:00 pm

Thin Film and Photovoltaic Technology

Presentation Title
Speaker(s)
Institution

Optical properties of micro-scale InGaAs devices with resonant cavity
Metal-Gap Junction confinement
structures, Yi-Sian Hsieh, National Chung Hsing University (Taiwan)

4:15 pm [2022-SAT-S0800-O004-0003]

Inhibition of Crack on Plastic Substrate by Nanolaminates Layer Deposition During Plasma Enhanced Anodization Process
Jia-Lun Ho, Cheng-Fu Wang, Cheng-Sheng Tsai, and Min-Feng Chen, National Central University (Taiwan)

4:45 pm [2022-SAT-S0800-O004-0004]

The use of the slope of merit function algorithm in finding the stopping criteria of spectrum in broadband optical monitoring system, Shih-Chuang, Lin-Hsin, Cheng-Tien Yang, Fung-Chi Chen (Taiwan)

2:00 pm [2022-SAT-S0800-O004-0005]

Epidayc growth low-temperature gallium sinter on silicon substrate by Using the Pulsed Magnetron Sputtering Deposition, Hung-Sheng Liu, Zhi-Gang Chen, Sheng-Hui Chen, National Central University (Taiwan)

2:30 pm [2022-SAT-S0800-O004-0006]

Design Strategy to Improve the Ideality Factor of SnO2-p-n Junction Diodes, Mohamad Januar, Chang Gung University (Taiwan); Sunhendro Purbo Prakoso, National Taiwan University of Science and Technology (Taiwan); Jiang-Hsin Hsieh, National Yang Ming Chiao Tung University (Taiwan); Ming Chi University of Technology (Taiwan); Kuo-Chen Liu, Chang Gung University (Taiwan), Ming Chi University of Technology (Taiwan)

2:45 pm [2022-SAT-S0800-O004-0007]

Epitaxy growth silicon nanocrystals in silicon substrate by using the pulsed magnetron sputtering deposition, Hung-Sheng Liu, Zhi-Gang Chen, Sheng-Hui Chen, National Central University (Taiwan)

3:00 pm [2022-SAT-S0800-O004-0008]

Micro Thin Film Thickness Measurement Platform Based on Interference Spectrum, Ciao-Ming Tsai, National Taiwan Hua University (Taiwan); Wei-Yi Kong, Wei-Hsiu Chiu, National Taiwan University of Science and Technology (Taiwan); Wuleun Fang, National Taiwan Hua University (Taiwan); Chien-Hao Ko, National Taiwan University of Science and Technology (Taiwan)

1:45 pm [2022-SAT-S0800-O004-0009]

Coffee Break

1:00 pm [2022-SAT-S0800-O004-0010]

Oral Session IV
Room: TR-A204, 1:00 pm to 3:15 pm

Thin Film and Photovoltaic Technology

Presentation Title
Speaker(s)
Institution

Carrier Transport between 2D Material Layers: Photo-detector Applications of 2D Material Hetero-structures
Rung-Jin Chang, National Yang Ming Chiao Tung University (Taiwan); Pei-Mei Huang, National Taiwan University (Taiwan); Ao-Hui Lian, National Applied Research Laboratories (Taiwan)

1:00 pm [2022-SAT-S0800-O004-0011]

Conversion Efficiency of InGaP/GaAs Triple-Junction Solar Cells Enhanced by Indium Nanoparticles Sheet Embedded in TiO2 Antireflection Coatings
Jin-Hao Jia, Wei-Jen Liu, Shou-Yi Kuo, Department of Electrical Engineering, National Taiwan University of Technology (Taiwan); Chien-Jen Yang, National Taiwan University of Science and Technology (Taiwan)

1:15 pm [2022-SAT-S0800-O004-0012]

Effect of Bias voltage on the monocrystalline germanium films by using magnetron sputtering deposition, Ting-Fang Wu, Yu-Ci Li, Sheng-Hui Chen, National Central University (Taiwan)

1:30 pm [2022-SAT-S0800-O004-0013]

Oral Session V
Room: TR-A204, 9:00 am to 10:45 am

Optoelectronic Technology

Presentation Title
Speaker(s)
Institution

Optical performance of mirror coated IGZO thin films on the flexible substrate by using high-power impulse magnetron sputtering deposition, Wei-Shian Tseng, Yu-Shing Su, Sheng-Feng Lin, National Taiwan University of Technology (Taiwan)

9:00 am [2022-SAT-S0800-O004-0014]

Optical Pressure Sensor Fabricated by D-Shaped Fiber with 0.999 Carrier Energy in Ag/n-Si Schottky Diode Photodetector
Jue Wang, Corning Advanced Optics (United States of America)

9:15 pm [2022-SAT-S0800-O004-0015]

Optical properties of micro-scale InGaAs devices with resonant cavity
Metal-Gap Junction confinement
structures, Yi-Sian Hsieh, National Chung Hsing University (Taiwan)

9:30 pm [2022-SAT-S0800-O004-0016]

Thermal Annealing Effect on Harvesting Infrared Enhanced Solar Cells, Hung-Chang Lin, Chang-Han Chang, Ching-Fuh Lin, National Chiao Tung University (Taiwan)

9:45 pm [2022-SAT-S0800-O004-0017]

Optical properties of a SiC/a-Si:H superlattices, Yu-Long Jiang, Shuo-Rong Chien, Yu-Yu Su, National Chung Hsing University (Taiwan)

10:00 pm [2022-SAT-S0800-O004-0018]
Conference IX • Room: TR-A205
Friday 2-4 December 2022 • OPTIC 2022
Optical Sensing

Conference Chairs: Wen-Fong Lin, Fenchia University (Taiwan); Chao-Yi Tai, National Central University (Taiwan); Cheng-Ling Lee, National United University (Taiwan); Chin-Ping Yu, National Sun Yat-sen University (Taiwan)

Program Committee: Li-Karn Wang, National Tsing-Hua University (Taiwan); Ja-Yu Lu, National Cheng Kung University (Taiwan); Yu-Lung Lo, National Cheng Kung University (Taiwan); Yin-Wen Lee, National Taiwan University of Technology (Taiwan); Cheng-Mu Tsai, National Chung Hsing University (Taiwan); Ming-Chang Shih, National University of Kaohsiung (Taiwan); Wann-Shao Tsao, National Taiwan University; National Yang Ming Chiao-Tung University; Morten Ibsen, University of Southampton (United Kingdom)

Friday 2 December

Room: TR-A205 • Fri 1:00 pm to 3:00 pm
Optical Sensing I

Session Chairs: Wen-Shao Tsao, National Chung Hsing University (Taiwan); Tsung-Sheng Kao, National Yang Ming Chiao-Tung University (Taiwan)

1:00 pm [2022-FRI-S0901-I001] (Invited Paper)

Nano-Photonic Imaging Method for Microfluidic Diagnostic Immunoassays, Pei-Kuen Wei, Academia Sinica (Taiwan)

1:15 pm [2022-FRI-S0901-I002]

Optical and Electrical Crosstalk Reduction using Tap emojis with image sharing for Liquid Level Sensing, Meng-Chen Lee, Chee Wei Liu, College of Electrical Engineering and Computer Science (Taiwan)

1:30 pm [2022-FRI-S0901-I003]

Design of novel electrode materials for supercapacitors using a high entropy oxide, Bing-Chia Ho, Li-Chen Hsu, National Yang Ming Chiao-Tung University (Taiwan)

1:45 pm [2022-FRI-S0901-I004]

Silicon core based photonic crystal fiber applied for NM3 gas sensor, Hsien-Yuan Chiu, Ying-Tzu Lin, Hua-Chuan Weng, Yi-Lin Yu, Fenchia University (Taiwan); Kinio Oguchi, National Taiwan University of Science and Technology (Taiwan); Wen-Fung Liu, Fenchia University (Taiwan)

2:00 pm [2022-FRI-S0901-I005]

Deep Neural Network Acceleration for Optical Dispersion Estimation with PN2 Integration, Xin-Li, Chia-Chen Pang, Yu-Chen Chang, Shi-Yu Huang, National Cheng Kung University (Taiwan)

2:15 pm [2022-FRI-S0901-I006]

Fiber Michelson Based Wavefront and Intensity Sensing via U-Net, Wei-Shih Shang, Peng-Chun Wu, Chiu-Yu Li, National Yang Ming Chiao-Tung University (Taiwan); Shieh-Chen Chen, National Yang Ming Chiao-Tung University (Taiwan); Chun-Yao Tou, Ming Chi University of Technology (Taiwan); Yeong Wang, Feng Chia University (Taiwan); Pi-Chun Juan, National United University (Taiwan)

2:30 pm [2022-FRI-S0901-I007]

Fiber-tip FPI Sensor with A Hole for Gas Pressure Sensing, Yu-Ya Lin, Chin-ping Yu, National Sun Yat-sen University (Taiwan); Ming-Chen Shih, National Taiwan University of Technology (Taiwan); Yu-Cheng Lin, National United University (Taiwan)

2:45 pm [2022-FRI-S0901-I008]

Using Diffraction Imaging of Micro-Polymer Probes to Manufacture Fiber End Fingers for Liquid Lids, Ching-Shen Chen, National Sun Yat-sen University; Liang-Chieh Shih, National United University (Taiwan); Ming-Chang Shih, National Taiwan University of Technology (Taiwan)

Coffee Break ...

Friday 3 December

Room: TR-A205 • Fri 3:15 pm to 5:00 pm
Optical Sensing II

Session Chairs: Yin-Wen Lee, National台北技术大学 (Taiwan); Ja-Yu Lu, National Cheng Kung University (Taiwan)

3:15 pm [2022-FRI-S0902-I001]

Photon Confinement by Plasmonic Diffraction for Near-Infrared Sensitivity Improvement of Silicon Image Sensor, Takahiro Yoda, Kazuma Hashimoto, Nobukazu Teranishi, Atsushi Oho, Shizuoka University (Japan)

3:30 pm [2022-FRI-S0902-I002]

Study of the Application of Multimode Optical Fiber Cross-Sectional Reflective Images to Liquid Level Sensing, En-Yi Lin, Fenchia University; National Chia-Yi University (Taiwan)

3:45 pm [2022-FRI-S0902-I003]

High-performance Avalanche Photodiode for 4D FCW Lidar Applications, Zohauddin Ahmad, National Central University (Taiwan); Po-Shin Wang, Naseem Nine, National Central University (Taiwan); Yong-Ming Wang, National Yang Ming Chiao-Tung University (Taiwan); Cheng-Chen Wei, National Sun Yat-sen University (Taiwan); Jin-Wei Shi, National Central University (Taiwan)

4:00 pm [2022-FRI-S0902-I004]

4 micron wavelength single pixel camera, Hengxuan Liu, Yang Shang, Te-Yuan Chung, National Central University (Taiwan)

4:15 pm [2022-FRI-S0902-I005]

Fiber-tipped FPI Sensor with A Hole for Gas Pressure Sensing, Yu-Ya Lin, Chin-ping Yu, National Sun Yat-sen University (Taiwan); Ming-Chen Shih, National Taiwan University of Technology (Taiwan); Yu-Cheng Lin, National United University (Taiwan)

4:30 pm [2022-FRI-S0902-I006]

The importance of micromachs and aperture in optical under-screen fingerprint recognition, Yu Ren, Ling, Wen-Tei Huang, Dung-Su, National Taiwan University (Taiwan)
The study of Deep-Ultraviolet Light-Emitting Diodes (UVLEDs) with Multi Quantum Wells (MQWs) structures for the sterility is above the 10mg/L concentration, Nguyen Van Hue, University of Science, YUNHCM (Viet Nam)

27th Annual Meeting of Photonics Division, NSTC

11:15 am [2022-SAT-S0903-0001] Ultra-precise light level sensor by using a tapered-fiber Bragg grating sensors(NTU), Yau-Li Lai, Weihua University (Taiwan), Wei-Lin Shu, Feng-Chia University (Taiwan), National Tsing Hua University (Taiwan), Wen-Feng Liu, Yu-Chun Chang, Feng-Chia University (Taiwan).

11:30 am [2022-SAT-S0903-0002] High Performance Plasmonic Sensors Using Hybrid YGodes in Gold Nanoscale Arrays on Bراق Nanoscale, Shui-Chung, Le, National Taiwan University (Taiwan), Chien-Chi, Lai, Shao-Jushen, WANG, Academia Sinica (Taiwan), Ruey-Lin Chen, National Taiwan University (Taiwan), Pei-Kuen Wei, Academia Sinica (Taiwan).

11:45 am [2022-SAT-S0903-0003] Screening of Affinity and Selectivity of Enterovirus-Natural Drug Interactions using Plasmonic Biosensor, Michael Grady, Mochamad [Yin], Samuel Husin Surya Mandala, Chang Gung University (Taiwan), Liang-Tzung Lin, Taipei Medical University (Taiwan), Kuei-Chun, Lai, Chiang Gung Memorial Hospital(Taiwan).

Lunch ........................................................................................................................................ Sat 12.00 pm to 1.00 pm

Session V: C-Hsing Hue (Chairman), National Pingtung University of Science and Technology (Taiwan), Zhong Ye, National Cheng Kung University (Taiwan)

09:00 am [2022-SUN-S0905-0001] LiDAR Velocity Measurement through Hilbert Phase Subdivision, Yu-Yi Xu, Shih-Lin Hu, National Taiwan University of Science and Technology (Taiwan).

09:15 am [2022-SUN-S0905-0002] The Two-Dimensional Infrared Fiber Sensor for Applying in an Endoscope, Chih-Chieh Li, Wen-Feng Liu, Feng-Chia University (Taiwan), Chen-Yu Lin, Feng-Chia University (Taiwan), National Taiwan University (Taiwan), Yu-Chen Chang, Feng-Chia University (Taiwan), Ming-Yu Fu, Air Force Academy (Taiwan), Yu-Yi, Fu, Feng-Chia University (Taiwan).

09:30 am [2022-SUN-S0905-0003] Development of a transmission linear encoder based on double-direction design, Yue-Chin, Leung, Hsin-Lin Hseh, National Taiwan University of Science and Technology (Taiwan).

09:45 am [2022-SUN-S0905-0004] Optical, Structural and Photodetection Properties of Zinc Selenide Thin Films, Chi-Hong Fan, Wen-Yen Chen, Hsin-Wen Huang, National Taiwan University of Science and Technology (Taiwan).

10:00 am [2022-SUN-S0905-0005] optical, Structural, and Photodetection Properties of Zinc Selenide Thin Films, Chi-Hong Fan, Wen-Yen Chen, Hsin-Wen Huang, National Taiwan University of Science and Technology (Taiwan).

10:15 am [2022-SUN-S0905-0006] AlGaN Photodetector with Electrochemical Etching Process with an improved sensitivity, Yau-Chen Chang, Chia-Chung Che-Min, National Cheng Hsin University of Technology (Taiwan).

10:30 am [2022-SUN-S0905-0007] Photo-Reflection of Silver Nanoparticles on Gold Nanoparticles and the SERS Application, Naushad Ahmad Khan, Cheng-Chung, Hung, Chao Chang, National Taiwan University (Taiwan).

10:45 am [2022-SUN-S0905-0008] Fabrication and Characterization of a Silicon Gate Photodetector, Yan-He Lin, Wei-Jen Hsiao, Chen-Yi, Lin, National Taiwan University of Science and Technology (Taiwan).

11:00 am [2022-SUN-S0905-0009] Fabrication and characterization of an InP avalanche photodiode, Hsin-Lin Cheng, Jen-Jui, Lai, National Taiwan University of Science and Technology (Taiwan).

11:15 am [2022-SUN-S0905-0010] Fabrication of a silicon avalanche photodiode, Bo-Rui, Lai, Guan-Yu Li, ziyong, Pei, National Cheng Hsin University of Technology (Taiwan).


11:45 am [2022-SUN-S0905-0012] Oxygen Sensing Fabrication of a Silicon-Based Photodetector, Ting-Yu, Chiu, Meng-Chang, Hsiao, Chi-Shih-Ting, National Taiwan University of Science and Technology (Taiwan).

12:00 pm [2022-SUN-S0905-0013] Single Photon Avalanche Detector, Yau-Chen Chang, Chia-Chung Che-Min, National Cheng Hsin University of Technology (Taiwan).


12:30 pm [2022-SUN-S0905-0015] Two parameters detecting by using a silicon core based fiber Bragg grating, Hua-Chun, Huang, Chao-Chang, National Taiwan University (Taiwan), Kymio Ooguchi, National Taiwan University of Science and Technology (Taiwan), Lin Wu, Feng-Chia University (Taiwan).

12:45 pm [2022-SUN-S0905-0016] Detection of several fiber Bragg Grating sensors using Multi Quantum Wells (MQWs) structures, Chia-Chun, Chiu, Chia-Chung, Che-Min, National Cheng Kung University (Taiwan), Tai-Yue, Tsao, American University of Science and Technology (United States of America).

Closing Remark ..................................................... Sun 11.00 am to 12.30 pm

Post Session V - Saturday

Location: TR-A319. Sat 10:00 am to 12:15 pm

Session V: C-Hsing Hue (Chairman), National Pingtung University of Science and Technology (Taiwan), Zhong Ye, National Cheng Kung University (Taiwan)

10:00 am [2022-SAT-P0901-P014] Development of Bioluminescent E. coli based on Luminous E. coli, Yi-Long Chen, Bo-Heng Chen, Chi-Shiang Chen, Ching-Fuh Lin, National Taiwan University of Science and Technology (Taiwan).

10:15 pm [2022-SAT-P0901-P015] Fabrication of a Silicon-Based Photodetector, Ting-Yu, Chiu, Meng-Chang, Hsiao, Chi-Shih-Ting, National Taiwan University of Science and Technology (Taiwan).

10:30 pm [2022-SAT-P0901-P016] Development of Biosensors for Quantitative Analysis of Novel Coronavirus (SARS-CoV-2) by Recombinase Polymerase Amplification, Ying-Hao Wang, Nan-Fu Chio, Electro-Optical Science and Technology (Taiwan).
Infrared Absorption and Optical Sensor Modeling of Microplastics, Pei-Chun Tseng, Jie-Yi Chen, Yi-Chun Chen, National Central University (Taiwan)

[2022-SUN-P0902-P010] High Sensitivity Surface Plasmon Image-based measurement with Automated Detection System, Ting-Hui Tu, Academia Sinica (Taiwan), National Yang Ming Chiao Tung University (Taiwan); Hsu-Cheng Lo, Sheng-Hann Wang, Pei-Kuen Wei, Academia Sinica (Taiwan)

[2022-SUN-P0902-P011] Weeding in the Field with a Robotic Arm and Camera Onboard, Yih-Ran Shue, Southern Taiwan University of Science and Technology (Taiwan); Ting-Ming Huang, Yu-Wen Li, National Applied Research Laboratories (Taiwan); Shean-Jen Chen, National Yang Ming Chiao Tung University (Taiwan); Kuang-Hua Chang, Council of Agricultural (Taiwan)

[2022-SUN-P0902-P012] Creating hot spots within air for better sensitivity through design of oblique wire bundle metamaterial perfect absorbers, TSUNG-YU HUANG, JING-Chiao Tung University (Taiwan); Kuang-Hua Chang, Council of Agricultural (Taiwan); Ming Huang, Da-Der Liu, National Applied Research System Taiwan University of Science and Technology (Taiwan); Ting-Robotic Arm and Camera Onboard, Yu-Shou Liu, Guan-Yu Huang, Yung-Jhe Yan, Mang Ou-Yang, National Yang Ming Chiao Tung University (Taiwan); Chen-Yu Chan, Tung-Yun Hsieh, National Space Organization (Taiwan)

[2022-SUN-P0902-P014] Development of coffee roasting degree analyzer with dual-channel sensing method, Yi-Ming Li, National Taiwan University of Science and Technology (Taiwan); Li-Yu Hou, Ruh Hua Institute of Technology (Taiwan); Tsung-Xian Lee, National Taiwan University of Science and Technology (Taiwan)

[2022-SUN-P0902-P016] Organic Phototransistor with High Responsivity in Visible-Light-Band via Tri-Layer Light-Absorbing Layer, Yi-Chieh Fu, Bo-Ren Lin, Ching-Lin Fan, National Taiwan University of Science and Technology (Taiwan)

Conference X • Room: TR-A206

Friday-Sunday 2-4 December 2022 • OPTIC 2022

Metaverse Photonics

Conference Chairs: Yi-Hsin Lin, National Yang Ming Chiao Tung University (Taiwan); Tsung-Hsun Yang, National Central University (Taiwan); Chien-Yu Chen, National Taiwan University of Science and Technology (Taiwan); Tom Liang, Jorgin Technologies Inc. (Taiwan)

Program Committee: Yao-Wei Huang, National Yang Ming Chiao Tung University (Taiwan); Yu-Chieh Cheng, National Taipei University of Technology (Taiwan); Ly-Tien Chen, National Yang Ming Chiao Tung University (Taiwan); Huang-Ming Chen, National Yang Ming Chiao Tung University (Taiwan); Chien-Ta Wan, National Yang Ming Chiao Tung University (Taiwan); Tsung Sheng Kao, National Yang Ming Chiao Tung University (Taiwan); You-Chia Chang, National Taiwan University of Science and Technology (Taiwan); Chia-Yen Huang, National Yang Ming Chiao Tung University (Taiwan); Juin-Haw Lee, National Taiwan University (Taiwan); Cheng-Huan Chen, National Yang Ming Chiao Tung University (Taiwan); Yu-Jen Wang, Meta (United States of America); Chun-Chung Chang, Coretronics Corporation (Taiwan); Homer H. Chen, National Taiwan University (Taiwan); Chih-Wei Huang, National Central University (Taiwan); Shihuan Hsieh, National Yang Ming Chiao Tung University (Taiwan); Wei-Chia Su, National Changhua Normal University (Taiwan); Yeh-Wei Yu, National Central University (Taiwan)

Friday 2 December

Oral Session I

Room: TR-A206

Friday, 9:00 am to 12:00 pm

Metaverse Photonics I

Session Chairs: Yu-Wei Yu, National Central University (Taiwan); Yu-Chieh Cheng, National Taipei University of Technology (Taiwan)

1:00 pm [2022-FRI-S1001-O001] (Invited Paper) Machine Learning-based 3D Visual Positioning, Chih-Wei Huang, National Central University (Taiwan)

1:30 pm [2022-FRI-S1001-O003] Development of the Head-mounted Display Based on Curved Holographic Waveguide Combining, Shao-Kui Zhou, Wen-Kai Lin, National Chianghua University of Education (Taiwan), National Yang Ming Chiao Tung University (Taiwan); Yu-Chen Lin, Department of Photonics (Taiwan); Han-Yen Yu, Department of Electrical Engineering (Taiwan); Chau-Jern Cheng, Institute of Electro-Optical Engineering (Taiwan)

1:45 pm [2022-FRI-S1001-O002] A liquid crystal lens set in augmented reality systems and virtual reality systems for rapidly varifocal images and vision correction, TING-WEI HUANG, HAO-HSIN HUANG, YU-JEN WANG, YI-HSIEN LIN, National Yang Ming Chiao Tung University (Taiwan)

2:00 pm [2022-FRI-S1001-O003] Single-shot three-dimensional face detection based on fringe projection incoherent digital holography, Ssu-Chia He, Institute of Electro-Optical Engineering (Taiwan); Yu-Chih Lin, Che-Wei Chen, Department of Photonics (Taiwan); Han-Yen Yu, Department of Electrical Engineering (Taiwan); Chau-Jern Cheng, Institute of Electro-Optical Engineering (Taiwan)

2:15 pm [2022-FRI-S1001-O004] A new Method for Design of Diffusor Waveguide for Augmented Reality Display, Po-Hsin Chiu, Su-Tsu Chen, Ji-Ping Chen, TaiTech Tech (Taiwan); Ting-Wei Huang, Chien-Yi Huang, Wen-Chang Hung, ASUSTEK COMPUTER INC (Taiwan); Yu-Chen Lin, TaiTech Tech (Taiwan)

2:30 pm [2022-FRI-S1001-O005] Full-colour volume holographic waveguide for augmented reality application, Ching-Hsin Hsiao, Wan Lin Lin, Zi Fan Chen, Shihuan Hsieh, National Yang Ming Chiao Tung University (Taiwan); Vera Marinova, National Yang Ming Chiao Tung University (Taiwan), Bulgarian Academy of Science (Bulgaria); K. Y. Hsu, National Yang Ming Chiao Tung University (Taiwan)

2:45 pm [2022-FRI-S1001-O006] Resolution Optimization Analysis for Near-Eye Light Field Display, Che-Hong Kuo, Yu-Hong Huang, Chih-Hung Chen, Yeh-Wei Yu, Tsung-Hsin Yang, Ching-Cherng Sun, National Central University (Taiwan)

Coffee Break.................................Fri 3:00 pm to 3:15 pm

Oral Session II

Room: TR-A206

Friday, 2:00 pm to 5:00 pm

Metaverse Photonics II

Session Chairs: Yao-Wei Huang, National Yang Ming Chiao Tung University (Taiwan); You-Chia Chang, National Yang Ming Chiao Tung University (Taiwan)

3:15 pm [2022-FRI-S1002-O001] Polarizer-free and electrically controllable liquid crystal ambient-light modulator, Chao-Ting Wu, Ko-Ting Cheng, National Central University (Taiwan)

3:30 pm [2022-FRI-S1002-O002] Waveguide-based Augmented Reality Devices Design using Hybrid Rigorous Coupled-wave Analysis and Ray-tracing Method, Yang-Kuan Tseng, Tsung-Xian Lee, National Taiwan University of Science and Technology (Taiwan)

3:45 pm [2022-FRI-S1002-O003] Analytical solution for the trade-off between the wavelength selectivity and the angular selectivity, Yu-Chen Wang, Yu-Hong Huang, Yeh-Wei Yu, Tsung-Hsin Yang, Ching-Cherng Sun, Chih-Hung Chen, Chien-Yuan Cheng, National Central University (Taiwan)

4:00 pm [2022-FRI-S1002-O004] Deep Learning Based Eye Tracking using in Light Field Image Display, Guan-Pu Zhu, Yu-Hong Huang, Ching-Cherng Sun, Miao-Kai Wang, National Central University (Taiwan)
Saturday 3 December
Oral Session III
Room: TR-A206. Session 1: 10:15 am to 12:00 pm

**Metaverse Photonics III**

Session Chairs: Chong-Huan Chen, National Yang Ming Chiao Tung University (Taiwan); Huang-Ming Chen, National Yang Ming Chiao Tung University (Taiwan)

10:45 am [2022-SAT-S1003-P001] (Invited Paper)
Large-scale RGB-canceling Metalens for Virtual Reality and Augmented Reality, Yu-Wei Hung, National Yang Ming Chiao Tung University (Taiwan)

11:15 am [2022-SAT-S1003-P002] (Invited Paper)
Investigation of Laser Ablation on SiN Film by Using Unsupervised Machine Learning in CMOS-MEMS Process, Chien-Chung Tsai, Chih-Chun Chan, Ming-Jye Syu, Hao-Hsin Gao, Mingshin University of Science and Technology (Taiwan)

Lunch ............................ Sat 12:00 pm to 1:00 pm

Sunday 4 December
Oral Session V
Room: TR-A206. Session 2: 9:00 am to 10:45 am

**Metaverse Photonics V**

Session Chairs: Chia-Yen Huang, National Yang Ming Chiao Tung University (Taiwan); Chien-Ta Wang, National Sun Yat-sen University (Taiwan)

09:00 am [2022-SUN-S1005-P001] (Invited Paper)
Fully automated solution for metalenses/metasurfaces with inverse design capability, Richard Ho, Synopsys (Taiwan)

09:30 am [2022-SUN-S1005-P002] (Invited Paper)
Tradeoff and system consideration for AR optical engine, Chuan-Chung Chang, Coretronic (Taiwan)

10:00 am [2022-SUN-S1005-P003] (Invited Paper)
Gaussion Helf Propagation for Bundle Adjustment with Neural Network, Jiau-Yu Chen, Yu-Shang Fong, Hao-Chun Wang, Chih-Wei Huang, National Central University (Taiwan); Jann-Long Cheng, National Taiwan Normal University (Taiwan)

10:15 am [2022-SUN-S1005-P002] (Invited Paper)
MR Application Accelerated by A Client-Server Architecture, Shu-Li Chen, Yuan-Yu Chen, Chih-Wei Huang, National Central University (Taiwan); Jann-Long Cheng, National Taiwan Normal University (Taiwan)

Closing Remark........................Sun 11:00 am to 12:30 pm

Poster Session I - Saturday
Location: TR-A310. Thu 2:00 pm to 4:00 pm

[2022-SAT-P1001-P001] Compensation of color breaking in a holographic-optical-element based augmented reality display, Zhi-Fan Chen, Shih-Wei Hsiao, National Yang Ming Chiao Tung University (Taiwan); Vera Marinova, Burgas University of Architecture, Civil Engineering and Geodesy (Bulgaria)


[2022-SAT-P1001-P003] Design of large FOV AR display based on combination of holographic light guides, Xiao-Ching Lin, National Changhua University of Education (Taiwan); Chen-Chung Chang, Fu-Ming Chuang, Coretronic (Taiwan)

[2022-SAT-P1001-P004] Large FOV Maxwellian view display based on holographic waveguide, Yuan-Yan Liang, National Changhua University of Education (Taiwan)

[2022-SAT-P1001-P005] Electrically tunable focusing liquid crystal lenses based on multiple-zone and three-dimensional curved electrodes, Yu-Qi Hung, Ching-An Chih, National Central University (Taiwan); Shiao-Chen Su, National Taiwan University (Taiwan); Cheng-Kai Lin, National Central University (Taiwan); Guo-Dung Su, National Taiwan University (Taiwan)


[2022-SAT-P1001-P007] Red-Orange Thermally Activated Delayed Fluorescence Organic Light-Emitting Diode by Solution Process, Lien-Chung Huang, Chia-Hsun Chen, National Taiwan University (Taiwan); Bo-Yen Lin, National Dong Hwa University (Taiwan)

[2022-SAT-P1001-P008] High Efficiency green thermally Activated Delayed Fluorescence Organic Light-Emitting Diode based on Carbazole-derivative host material, Zi-Wei Su, Chia-Hsun Chen, National Taiwan University (Taiwan); Bo-Yen Lin, National Dong Hwa University (Taiwan); Karolis Letenas, Matus Gazuian, Jozua Vidus Gražulevičius, Kaunas University of Technology (Lithuania)

[2022-SAT-P1001-P009] High Efficiency Blue Triplet-Triplet Annihilation OLED based on Pyrene derivative with Different Dopant Concentration, Yuan-Zhen Zhuang, Chih-Hsun Chen, Chi-Chih Chang, National Taiwan University (Taiwan); Bo-Yen Lin, National Dong Hwa University (Taiwan); Man-Ki Leung, National Taiwan University (Taiwan); Tien-Lung Chiu, Yuan-Ze University (Taiwan); Jiu-Haw Lee, National Taiwan University (Taiwan)

[2022-SAT-P1001-P010] Implementation of meta-gratings for augmented reality (AR) glasses using double patterning with KrF photolithography, Chun-Yen Chou, Po-Chen Yu, Yu-Teng Chen, National Yang Ming Chiao Tung University (Taiwan)

[2022-SAT-P1001-P011] Floating Display Based on The Freeform-mirror, Dong-Yu Zhao, Zhong-Che Chou, Chong-Huan Tao, Chih-Hao Chuang, National Taiwan University of Science and Technology (Taiwan); Shu-Cheng Hsu, National Taiwan University of Science and Technology (Taiwan); GDPower Technology Co., Ltd (Taiwan); Chien-Yu Chen, National Taiwan University of Science and Technology (Taiwan)
Sunday 4 December
Room: TR-A001
Session Chair: Cheng-Cheng Sun, National Central University (Taiwan)
9:00 am
Contactless vein authentication system using moving images, Hiroyuki Suzuki, Gunma University (Japan)
9:30 am
Single-shot Ultrafast Optical Waveform Measurement System, Tatsutoshi Shioda, Saitama University (Japan)
10:00 am
Fabrication and Process Optimization of Integrated Waveguide Microresonators, Pei-Hsun Wang, National Central University (Taiwan)

Friday 2 December
Room: TR-A311
Session Chair: Yi-Jen Hsu, National Sun Yat-sen University (Taiwan)
1:25 pm
Opening Remarks, San-Liang Lee, National Taiwan University of Science and Technology (Taiwan)
1:30 pm
Millimeter Wave Si Photonics Interposer, Ming-Chang Lee, National Tsing Hua University (Taiwan)
Abstract: Integrated Si optoelectronics and photonics are the key technology platform for developing large-scale integrated optics for various optical applications. Meanwhile, these technologies are also exploited for implementing compact sensor chips, spatial light modulation, multianzaes and quantum photonic circuits. In this talk, I will introduce a new direction of application by using Si photonics components to implement a compact mmWave-over-fiber antenna for in-building 5G/6G mmWave wireless transmission.
SG NR band in mmWave has the advantage of wide data transmission bandwidth. However, due to the nature of short wavelength of millimeter waves, the transmission is easily blocked by objects, resulting in an issue of data transmission inside a building. One solution is to use a fiber-wireless network to deploy a large number of femtocells in the rooms and hallways. However, traditional mmWave components are expensive and consume a lot of power, so they are not suitable for large-scale indoor deployment. Here, we demonstrated an integrated mmWave radio-over-fiber antenna module comprising silicon photonics chips, CMOS RF chips and phased array antennas. This antenna module is advantageous in small size, low power consumption, and is potential for mass production, which can be massively deployed inside a building to form a mmWave local area network.

2:00 pm
Silicon Photonics Coherent Transceiver Modules for Communication Applications, Yinchieh Lai, National Yang Ming Chiao Tung University (Taiwan)
Abstract: Coherent optical communication technologies have many advantages compared to conventional direct detection schemes. The required complexity has made the coherent optical transceiver an excellent application target for integrated photonics. Silicon photonics has been recognized as the most promising technology to manufacture the coherent optical transceivers due to its potential large-scale integration capability. The international standards for 400G coherent transmission have been published and commercial 400G coherent optical transceivers based on silicon photonics or other integrated photonics platforms have also become available. In view of these trends, we have started our own development work at National Yang Ming Chiao Tung University a few years ago. The development includes the various aspects of related technologies including: (1) silicon photonics coherent transmission (Prof. J. Chen); (2) silicon photonics active devices (Prof. J.-W. Shi); (3) silicon photonics passive devices (Prof. C.-W. Chow); (4) silicon photonics coherent transceiver ICs (Prof. W.-Z. Chen); (5) silicon photonics coherent transceiver packaging (Prof. C.-C. Lin); (6) heat dissipation techniques for silicon photonics coherent transceivers (Prof. R.-H. Horng); (7) integrated simulation/design platform for silicon photonics & advanced communication applications (Prof. Y. Lai). In this talk I shall present some of the representative achievements obtained by our team members.

3:15 pm
Silicon Photonics Based Rapid Multi-Module Medical Sensing: Investigation and Implementation, Shian-Wei Liaw, National Taiwan University of Science and Technology (Taiwan)
Abstract: This talk will describe the silicon-based photonics integration (SiP) into optical coherence tomography (OCT) and Raman spectroscopy, which are vitally important for medical multi-modal detection of tissue and blood coagulation factors.
We developed a fast scanning silicon photonics chip for ultra-broadband optical amplifiers. Meanwhile, the key components and technologies are developed, such as fast scanning laser light source, narrow linewidth Raman light source, medical detection chip for blood micro fluid and wafer bonding. The fiber-array was also developed to optimize the coupling efficiency for silicon photonics. We also applied artificial intelligence (AI) to analyze biomedical images and Raman spectroscopies. For application technology, there are
cell-level tissue imaging, high-sensitivity coagulation factor detection and AI intelligent analysis issues; For system technology, we focus on fast multi-module silicon photonics medical testing with OCT and Raman spectral analysis ability; For modules technology, there are silicon photonics resonance/modulator/coupler, medical detection chip and swept source issues.

For the past four years, our team created considerable academic-industrial cooperation projects and technology transfer. More than 100 journals and conference proceeding are published and 10 related patents were invented so may help to promote the silicon photonics related market in Taiwan.

3:45 pm

Toward New Era 1.6-Tbps Si-Photonics Transceiver Platform, Tien-Tsong Shih, National Kaohsiung University of Science and Technology (Taiwan)

Abstract: Due to the huge demand of the data transmission inside data centers, a novel transceiver structure with four wavelengths by four singlemode fibers is proposed. Total 16 signal channels are realized in a compact silicon photonic chip. Every channel transmits 100Gb/s and the aggregated transmission rate is 1.6Tb/s. The transission chip includes the splitters, Mach-Zehnder modulators (MZM), and optical wavelength division multiplexers (WDM). The environmental temperature and the injected wavelength change the operational modal loss of MZM. However, we adjust the voltage bias on the both arms of MZM carefully to get the best performance of very MZM in the chip. The MZM is driven by commercial linear ICs. A clear optical eye diagram of 50Gb/s NRZ or 60Gb/s PAM4 is obtained. Under 100Gb/s QAM16-OFDM modulation, a clear constellation diagram is shown and maintains the performance after transmitting for 1km singlemode fiber. The receiving chip includes WDMs and 16 Ge photodetectors. The detected optical signal is amplified by linear trans-impedance amplifier (TIA) ICs. The receiving part shows a matching performance with the transmission side.

4:15 pm

IMEC isipp50/isipp200 Experience and TSRI Technology Platform, Ming-Wei Lin, Taiwan Semiconductor Research Institute (Taiwan)

Abstract: TSRI’s silicon photonics service platform provides design, manufacturing and measurement services, recently covering high frequency/high speed testing, optoelectronic chip R&D and integration, optical fiber packaging, etc. This report will highlight TSRI’s tape-out execution experience at imec and explain the technical highlights of the TSRI platform.

4:45 pm

Discussions
Women in Optics & Women in Engineering
Room: TR-A311

Friday-Sunday 2-4 December 2022 · OPTIC 2022

Saturday 3 December
Room: TR-A311............................Sat 1:00 pm to 5:00 pm

1:00 pm
Registration

1:20 pm
Academic leadership and lab management, Shih-Lun Chen, Chung Yuan Christian University (Taiwan)

Break..............................Sat 2:20 pm to 2:30 pm

2:30 pm
Coffee academic forum
Topic 1: Lab management
Topic 2: Challenges of trans-disciplinary collaboration

Break..............................Sat 3:40 pm to 3:50 pm

3:50 pm
History of Taiwan's coffee, Fat-Fat Tree Ray Wang (Taiwan)

Annual Member Meeting of the IEEE Photonics Society Taipei Chapter
Room: TR-A206

Friday-Sunday 2-4 December 2022 · OPTIC 2022

President of IEEE Photonics Society Taipei Chapter: Tien-Chang Lu, National Yang Ming Chiao Tung University (Taiwan)

The annual general meeting of the IEEE Photonics Society Taipei Chapter will be held at OPTIC 2022 on Saturday, December 3, 2022 at 4:00 pm in Room A206 of Teaching & Research Building at National Central University (NCU). The chairman, vice-chairman, and chief financial officer attended on behalf of the IEEE Photonics Society to report the current situation of this year and the development report of 2023.

Saturday 3 December
Room: TR-A206............................Sat 4:00 pm to 5:00 pm

4:00 pm
Chapter status report

4:30 pm
Election of Treasurer

4:45 pm
Member free discussion

Hope all members and student members can actively participate this meeting!
實現 5G 光通訊的模擬技術平台

Room: TR-A206
Friday-Sunday 2-4 December 2022 • OPTIC 2022

Saturday 3 December
Room: TR-A206................................Sat 1:00 pm to 2:50 pm

第一場次
1:00 pm
報到 / 入場

1:10 pm
歡迎, Cybernet Systems Taiwan (Taiwan)

1:15 pm
實現 5G 光通訊的模擬技術平台, 張閔期, Cybernet Systems Taiwan (Taiwan)

1:45 pm
Q&A / 回饋時間, Cybernet Systems Taiwan (Taiwan)

1:50 pm
散會

第二場次
2:00 pm
報到 / 入場

2:10 pm
歡迎, Cybernet Systems Taiwan (Taiwan)

2:15 pm
實現 5G 光通訊的模擬技術平台, 張閔期, Cybernet Systems Taiwan (Taiwan)

2:45 pm
Q&A / 回饋時間, Cybernet Systems Taiwan (Taiwan)

2:50 pm
散會

Sponsors Acknowledgments
Exhibitors

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FEATURE ISSUE

OPTICS CONTINUUM

OPTIC 2022: Optical Science and Technology

Submission Opens: 1 November 2022
Submission Deadline: 23 January 2023

Taiwan Photonics Society will hold the Optics & Photonics Taiwan International Conference (OPTIC) on 2-4 December 2022. This conference serves as the largest annual meeting on optics and photonics in Taiwan and aims to bring great minds from around the world to share the latest advancements in optical materials, optical technology, and metaverse photonics, inside and outside Taiwan, to present and discuss the updated works in English. The scope of this conference corresponds with the scope of the technically sound journal, Optics Continuum, which aims to publish research, including negative results, with high standards for technical accuracy, scientific rigor, and presentation quality, without judgment of the potential impact or significance in optics and photonics.

This feature issue in Optics Continuum will include papers from authors who presented at OPTIC 2022. The feature issue will cover a wide range of new fundamental science and advanced technologies for optical science and photonics. This issue also welcomes useful computational numerical simulations in optical science and photonics, and manuscripts that offer technical "know-how" in the related applications as presented at the OPTIC 2022 meeting. Topics of interest correspond to the OPTIC session titles:

1. Nanophotonic Materials and Devices: Photonics crystals, Plasmonic devices, Metamaterials, Biosensors
2. Optical Waveguides and Communications: Semiconductor devices, Photonic integrated circuits, Silicon photonics, Optical fibers, Applications using photonic devices
3. Quantum and Laser Technology: Quantum information and processing, Quantum devices, Nonlinear frequency conversion, Ultrafast nonlinear optics, Nonlinear optical materials, Lasers, Ultrafast lasers, Optical frequency combs, Laser materials processing
4. Optical Information Processing and Holography: Digital holography, Holographic data storage, 3D imaging and display, Computational imaging, single pixel imaging, Multispectral imaging, Adaptive optics, Machine learning
5. Optical Design, Testing and Engineering: Geometrical optics, Design theory, Optical design and testing for freeform surfaces, meta-surfaces, diffractive surfaces, Imaging systems design and testing for visual systems, medical and biological, space and astronomy, microscopy and lithography
6. Biophotonics and Biomedical Imaging: Microscopy, Spectroscopy, OCT, Biomedical optics, Photonic acoustic imaging, Biomedical imaging. Tissue engineering with light, Biomaterials for photonics, and Medical laser systems

7. Display and Solid-State Lighting: LED and OLED technologies for lighting and display applications. Lighting and display application, system level design and optimization, Device level packaging, and testing. Reliability, 3D, 2D/3D convertible displays, Mini- and micro-LED materials and displays, Quantum-dot displays (QDIs), SLM, LCOS, and MEMS for displays

8. Thin Film and Photovoltaic Technology: Fundamental on coating design theory, materials, deposition methods, characterization technologies and applications, Fundamental thin films, Hard Coatings, 2D photonic materials, Vander Waals heterostructures, High efficiency silicon solar cells, Compound solar cells, Perovskite solar cells, Next generation solar cells, Advanced PV devices and new materials. Testing for solar cell and PV module, and Optics and photonics for PV applications

9. Optical Sensing: Optical sensing and sensors, Chemical and gas sensing, Biological sensing, Fiber-based sensing, Integrated based sensing, THz sensing, Novel materials for sensing, Sensors for industrial applications

10. Metaverse Photonics: Augmented Reality (AR), Virtual Reality (VR) and Mixed Reality (VR) technologies, Metaverse-related display and interactive technologies, Telepresence technologies, VR/AR/MR (virtual, augmented and mixed reality) displays, HUD (head-up display), NTE (near-eye) and wearable displays, Holographic and light-field displays

All submissions should present original, previously unpublished work and will be subject to the normal standards and peer review processes of the journal. The standard Optics Continuum Article Processing Charges will apply to all published articles. To be eligible for publication, an expanded conference paper needs to add value to the original conference proceedings and the conference paper number must be included in the cover letter at submission. Please see Optica Publishing Group’s guidelines on expanded conference papers for details. Please prepare manuscripts according to the author instructions for submission to Optics Continuum and submit through our online submission system, specifying from the drop-down menu that the manuscript is for the feature issue from OPTIC 2022.

Guest Editors
Sheng-Hui Chen, National Central University, Taiwan (Lead Editor)
Yi-Jun Jan, NationalTaipei University of Science and Technology, Taiwan
Daewook Kim, University of Arizona, USA
Shiu-Huei Lin, National Yang Ming Chiao Tung University, Taiwan
Wei-Chia Su, National Changhua University of Education, Taiwan

Special Research Program for Silicon Photonics and Photonic Integrated Circuits

NSC Subsidy No: NSC-110-2224-E-011-004

Silicon Photonics based Rapid Multi-Module Medical Sensing: Investigation and Implementation

National Taiwan University of Science and Technology
shenku@ntust.edu.tw

Project PX
Shien-Kuei Liaw, Dept Chairman and Distinguished Professor (NTUST)

Team Member
Sheng-Lung Huang (NTU), Benjamin Tien-His Lee (NCU), Kung-Chia Young (NCKU), Chun Chiu (NTUST), Shih-Hsiang Hsu (NTUST), Pinghui Sophia Yeh (NTUST), Fu-Liang Yang (Academia Sinica), Chal-Ching Chiang (NTUST)

Technical Breakthrough

In a silicon chip-based spectral-domain optical coherence tomography (SD-OCT) system, a broadband optical power splitter, Mach-Zehnder directional coupler (MZDC), is utilized as a Michelson interferometer and outputs the light source to the object and reference ends. Then the MZDC will receive the reflected signals from both ends. Finally, the interference signal will be directed into the wavelength filter. The arrayed optical waveguide (AWG) phase in the arrayed waveguide grating (AWG) filter will vary somewhat due to the manufacturing process. This kind of phase disorder effectively causes high output spectrum crosstalk, which increases the noise of the OCT point spread function. Therefore, an echelle grating is proposed as a wavelength filter. Although the broadband phenomenon of MZDC is process insensitive, the flatness of the bi-directional output spectrum will not be maintained, which can be compensated by the echelle grating transmission to preserve the OCT axial resolution.

Technical Application Field

- Biomedical sensing and detection, blood testing, and cell testing

Applicable Industry

This project can help the industry to commercialize patents and create technology transfer manufacturers, assist the development of domestic industries. It is conducive to develop domestic silicon photonic integrated circuits. It will promote the development of interdisciplinary biomedical testing in Taiwan.
Si Photonics mmWave-over-Fiber Antenna Applied for 5G Wireless Communication

**National Tsing Hua University**
Dept. of Electrical Engineering

**Project PI**
Prof. Ming-Chang Lee (NTHU)
(mclee@ee.nthu.edu.tw)

**Team Member**
Prof. Yi-Chun Liu (NTHU), Kai-Ming Feng (NTHU), Prof. Meng-Chi Wu (NTHU)

**Technical Breakthrough**
Unlike the existing radio-over-fiber antennas that are implemented by packaging discrete microwave and optoelectronic components, the integrated mmWave-over-fiber antenna developed in our project is to employ silicon photonics technology for monolithic integration of passive integrated optics and high-frequency optoelectronic components on a single chip, which is able to perform multi-channel sophisticated optical signal processing. This chip can be further packaged with millimeter-wave RF chips as well as encapsulated antennas on a single printed circuit board to form mmWave-over-fiber antenna in package, which can greatly reduce the volume of module.

**Technical Application Field**
The integrated mmWave radio-over-fiber antenna module developed in this project is small in size with low power consumption and has the potential for mass production. It can be massively deployed inside a building to form an mmWave-over-fiber centralized RAN. The main applications include Gigabyte wireless Ethernet, high-speed vehicle wireless sensing and low-latency communications, cable-free TV and projection devices for transmission of uncompressed high-definition multimedia, wireless digital storage devices such as solid-state drives and high-definition quality cameras and interactive wireless AR/VR used by multiple people, etc.

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**Special Research Program for Silicon Photonics and Photonic Integrated Circuits**
NSTC Subsidy No. : NSTC-110-2224-E-007-005

**Si Photonics mmWave-over-Fiber Antenna Applied for 5G Wireless Communication**

**National Tsing Hua University**
Dept. of Electrical Engineering

**Project PI**
Prof. Ming-Chang Lee (NTHU)
(mclee@ee.nthu.edu.tw)

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**Special Research Program for Silicon Photonics and Photonic Integrated Circuits**
NSTC Subsidy No. : NSTC-110-2224-E-A49-003

**Silicon Photonics Coherent Transceiver Modules for Communication Applications**

**Main PI**: Prof. Yinchieh Lai (National Yang Ming Chiao Tung University). Email: yclai@nycu.edu.tw

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**Main Participating Universities**: NYCU, NCU

**Applicable Industry and Technical Application Field**

Silicon photonics coherent transceiver modules have many technical advantages for optical communication applications with the transmission distance in the range of tens kilometers or longer (such as the metropolitan edge network and the decentralized data center applications). The application demand is expected to increase rapidly and there are already 100-400 Gb/s silicon photonics coherent transceiver products on the market. Some important international standards for 400 Gb/s optical coherent transceiver modules have also been finalized. Continuous rapid growth of the future market share can be expected.

**Technical Breakthrough**
100-400G silicon photonics coherent transceiver transmission measurement platform, new signal processing schemes for silicon photonic coherent transceivers, silicon photonics coherent transmitter & receiver chips, advanced silicon photonics modulators/phase-shifter devices, modulator drivers & receiver TIAs for silicon photonics coherent transceivers, optical packaging technologies and thermal control technologies for silicon photonics chips, advanced 1D/2D silicon photonics surface grating devices and advanced applications, ...
Special Research Program for Silicon Photonics and Photonic Integrated Circuits

NSTC Subsidy No.: NSTC -110-2224-E-992 -001

Project Name: Heterogeneous silicon photonics gyroscope chip and miniaturized module development

Project PI name and title: Prof. Yi-Jen Chiu Email: vichiu@faculty.nvvsu.edu.tw

Project Implementation Entity: Department of Photonics

Team members: Prof. Yung-Jr Hung, Prof. Chia Chien Wei, Prof. Chao-Kuei Lee, Prof. Tsung-Hsien Lin, Prof. Chua-Chin Wang, A. P. Chin-Ping Yu, Dr. Ren-Young Liu, Asst. Prof. Chun-Ta Wang

Applicable industry: photonic semiconductor manufacturing, photonic semiconductor sensor, photonic integration

Technical Breakthrough: This joint project is to develop a photonic integration chip base on fiber optical gyro (FOG) function with compactness, high sensitivity, mass production and low cost. A broadband light source, Si photonic gyro-functional chip, low-loss optical waveguide and fiber loop, ASIC driving circuit, and the related package with noise reduction technique have been realized. The package module of Si photonics chip has been demonstrated with tactical level. Bias stability as low as 0.34 deg/hr has been shown its potential for future market. Therefore, National Chung-Shan Institute of Science & Technology are going to collaborate with our team for applying this technology to defense guns and satellites. Moreover, this technology is oral presented at the largest conference of this field – IEEE Inertial 2022, and got Taiwan and US patent certificates in 2022. This achievement attracts national and international companies for cooperation such as AIST (National Institute of Advanced Industrial Science and Technology), TSMC (Taiwan Semiconductor Manufacturing Company), and LandMark Optoelectronics Corporation.

Critical Technologies

- Light Source Design
- Low-loss Fiber/Waveguide Coil
- Integrated Circuit Packaging
- Si-Photonic Chip
- Noise Reduction
- Si-Photonic Gyroscope Module System
- ASIC

Technical Breakthrough

A novel 4-wavelength by 4-singmode fiber transmission structure is proposed and the silicon photonic technology realizes this structure to a compact chip accordingly. The aggregated transmission rate is 1.6Tb/s with total 16-channel. The transmitting chip is composed by 16 Mach-Zehender Modulator (MZM), optical wavelength-division multiplexers, optical splitters, and optical couplers. The receiving chip includes 16 high speed Ge detectors, optical wavelength-division de-multiplexers, and optical couplers. To drive the MZMs, commercial linear driver ICs are used and a commercial trans-impedance amplifier (TIA) is adopted to amplify the signal from receiving chip. These ICs and passive components are mounted on a high speed printed-circuit-board (PCB). We assemble the module by bonding the chip and PCB on a copper heatsink. A temperature-stable system is embedded inside the heatsink. The transmitting module is shown as the attached figure.

This module shows an excellent performance with a 50Gb/s NRZ, 60Gb/s PAM4, and 100Gb/s 16QAM-OFDM transmission by one channel. Therefore the final target of an aggregated 1.6Tb/s transmission rate is achieved. The transmission distance is as long as 1km with a standard singlemode fiber. Besides, a superior RF circuit design, high accuracy optical alignment, and high speed transmission test platform are demonstrated.

Industrial Applicability

- Hyper scale data center
- High speed optical switching network
- Co-package optics
- Interconnection for high performance computing

1.6Tb/s Tx Module
Development of high-energy ultrashort lasers at extreme wavelengths
Institute of Atomic and Molecular Sciences, Academia Sinica
Department of Physics, National Central University

Development and application of laser-plasma based tabletop free electron laser

Applications in semiconductor fabrication
- Ultraviolet lithography
- Scatterometry for nanoscale characterization

Team members: Chun-Cheng Chu, Jhih-Jia Wang, Chun-Cheng Chu, Jhih-Jia Wang,
(swhou@phy.ncu.edu.tw)

Prof. Chou, Shao-Wei

Compact tunable high-gradient permanent magnet quadrupoles

Development and application of high energy ultrashort pulse CO₂ laser

Generation of 50-μJ, 10.2-μm 200-ps chirped pulses, compressible to 1.5 ps

Applications in laser-plasma science
- Particle acceleration
- X-ray generation
- Neutron generation
- Nuclear fusion
- Laboratory astrophysics
- Laser fabrication

Team members: Ya-Po Yang, Jheng-Yu Lee

Technical Breakthrough
- Ming-Hsiung Wu et al., Optics Letters 46 (23), 5900–5903 (2021). (Awarded Spotlights on Optics by OPTICA/OSA)
- Yen-Chieh Huang et al., APL Photonics 7, 066101 (2022). (cover story of the journal)

Ultra-high-power Multi-cycle THz Laser

Single-electron Free-electron Laser
(APL Photonics Cover Story)

Industry Applications
High-resolution See-through Imaging
Optical 5.7 THz 2 THz

Novel Laser for Drilling SiC & Si
競賽主題

前瞻顯示科技(AR/VR/MR/XR)之應用創新之專題實作，範圍涵蓋各領域與顯示科技相關之場域需求，並深耕前瞻顯示科技之應用，以不定題方式開放參賽團隊自由發揮。

競賽議程

決賽評選：2022/12/01 14:00-17:00 國立中央大學 國鼎光電大樓
作品展示：2022/12/02 10:00-16:00 國立中央大學 教學研究大樓1F廣場
頒獎典禮：2022/12/02 17:00 國立中央大學 教學研究大樓B1 TR-A002

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※ 銅金獎、金獎、銀獎及優勝將獲頭腦教育部與光電學會(中英文)頒發之乙狀
※ 入選獎將獲頒主辦單位獎狀乙紙
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OPTIC 2022
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