

**TECHNICAL
PROGRAM**

SPIE. PHOTONICS WEST

27 JANUARY-1 FEBRUARY 2024

THE MOSCONE CENTER | SAN FRANCISCO, CALIFORNIA USA



OPTO DAILY CONFERENCE SCHEDULE

Check the conference schedule frequently for updates
Presentation times are subject to change

SATURDAY 27 January	SUNDAY 28 January	MONDAY 29 January	TUESDAY 30 January	WEDNESDAY 31 January	THURSDAY 1 February
Optoelectronic Materials and Devices (James G. Grote, Shubin Jiang)					
			12880 Physics and Simulation of Optoelectronic Devices XXXII (Bernd Witzigmann; Marek Osiński; Yasuhiko Arakawa) Location: Moscone Center, Room 2008 (Level 2 West)		
		12881 Physics, Simulation, and Photonic Engineering of Photovoltaic Devices XIII (Alexandre Freundlich; Stéphane Collin; Karin Hinzer; Ian R. Sellers) Location: Moscone Center, Room 2014 (Level 2 West)			
		12882 Optical Components and Materials XXI (Shubin Jiang; Michel J. F. Digonnet) Location: Moscone Center, Room 2012 (Level 2 West)			
				12883 Organic Photonic Materials and Devices XXVI (William M. Shensky III; Ileana Rau; Okihiko Sugihara) Location: Moscone Center, Room 2018 (Level 2 West)	
		12884 Ultrafast Phenomena and Nanophotonics XXVIII (Markus Betz; Abdulkhem Y. Elezzabi) Location: Moscone Center, Room 2020 (Level 2 West)			
		12885 Terahertz, RF, Millimeter, and Submillimeter-Wave Technology and Applications XVII (Laurence P. Sadwick; Tianxin Yang) Location: Moscone Center, Room 2016 (Level 2 West)			
		12886 Gallium Nitride Materials and Devices XIX (Hiroshi Fujioka; Hadis Morkoc; Ulrich T. Schwarz) Location: Moscone Center, Room 2024 (Level 2 West)			
		12887 Oxide-based Materials and Devices XV (David J. Rogers; Ferechteh H. Teherani) Location: Moscone Center, Room 2022 (Level 2 West)			
			12888 2D Photonic Materials and Devices VII (Arka Majumdar; Carlos M. Torres Jr.; Hui Deng) Location: Moscone Center, Room 2010 (Level 2 West)		
Photonic Integration (Yakov Sidorin, Jean-Emmanuel Broquin)					
		12885 Terahertz, RF, Millimeter, and Submillimeter-Wave Technology and Applications XVII (Laurence P. Sadwick; Tianxin Yang) Location: Moscone Center, Room 2016 (Level 2 West)			
		12889 Integrated Optics: Devices, Materials, and Technologies XXVIII (Sonia M. Garcia-Blanco; Pavel Cheben) Location: Moscone Center, Room 304 (Level 3 South)			
		12890 Smart Photonic and Optoelectronic Integrated Circuits 2024 (Sailing He; Laurent Vivien) Location: Moscone Center, Room 302 (Level 3 South)			
		12891 Silicon Photonics XIX (Graham T. Reed; Andrew P. Knights) Location: Moscone Center, Room 301 (Level 3 South)			
		12892 Optical Interconnects XXIV (Ray T. Chen; Henning Schröder) Location: Moscone Center, Room 204 (Level 2 South)			
		12893 Photonic Instrumentation Engineering XI (Lynda E. Busse; Yakov Soskind) Location: Moscone Center, Room 312 (Level 3 South)			
		12894 Next-Generation Optical Communication: Components, Sub-Systems, and Systems XIII (Guifang Li; Kazuhide Nakajima; Atul K. Srivastava) 12894 Location: Moscone Center, Room 314 (Level 3 South)			

CONFERENCE 12892

Optical Interconnects XXIV

29 - 31 January 2024 | Moscone Center, Room 204 (Level 2 South)

Conference Chair(s): Ray T. Chen, The Univ. of Texas at Austin (United States); Henning Schröder, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration IZM (Germany)

Program Committee: Darrell Childers, US Conec Ltd. (United States); Douwe H. Geuzebroek, Lionix International BV (Netherlands); Tingyi Gu, Univ. of Delaware (United States); Ruth Houbertz, ThinkMade Engineering & Consulting (Germany); Marika P. Immonen, TTM Technologies, Inc. (Finland); Takaaki Ishigure, Keio Univ. (Japan); Wei Jiang, Nanjing Univ. (China); Mikko Karppinen, VTT Technical Research Ctr. of Finland Ltd. (Finland); Sanjay Krishna, The Ohio State Univ. (United States); Tobias Lamprecht, OST – Ostschweizer Fachhochschule (Switzerland); Frank Lerch, EPIGAP Optronik GmbH (Germany); Matthias Lorenz, AEMtec GmbH (Germany); Christopher T. Middlebrook, Michigan Technological Univ. (United States); Peter O'Brien, Tyndall National Institute (Ireland); Bert Jan Offrein, IBM Research - Zürich (Switzerland); Hyo-Hoon Park, KAIST (Korea, Republic of); Ignazio E. M. Piacentini, IP Consulting (Italy); Nikos Pleros, Aristotle Univ. of Thessaloniki (Greece); Richard C. A. Pitwon, Resolute Photonics Ltd. (United Kingdom); Moritz Seyfried, ficonTEC Service GmbH (Germany); Harish Subbaraman, Oregon State Univ. (United States); Michael Thiel, Nanoscribe GmbH & Co. KG (Germany); David J. Thomson, Optoelectronics Research Ctr. (United Kingdom); Andreas Umbach, AUCCEPT Consulting (Germany); Alan X. Wang, Baylor Univ. (United States); Ian H. White, Univ. of Cambridge (United Kingdom); Chris Q. Wu, Corning Incorporated (United States); Yi Zou, ShanghaiTech Univ. (China)

Monday 29 January 2024

OPTO PLENARY SESSION

29 January 2024 • 08:00 AM - 10:15 AM | Moscone Center, Room 207/215 (Level 2 South)

Session Chairs: Karin Hinzer, Univ. of Ottawa (Canada) and Ulrich T. Schwarz, Technische Univ. Chemnitz (Germany)

8:00 AM - 8:15 AM: Welcome and Opening Remarks

Announcement of the Aden and Marjorie Meinel Technology Achievement Award

12891-501 • 08:15 AM - 08:55 AM

Silicon photonics: the quest for sustainable growth (Plenary Presentation)

Author(s): Roel G. Baets, Ghent Univ. (Belgium), imec (Belgium)

12890-501 • 08:55 AM - 09:35 AM

Neuromorphic photonics (Plenary Presentation)

Author(s): Paul R. Prucnal, Princeton Univ. (United States)

12904-501 • 09:35 AM - 10:15 AM

Semiconductor lasers pushed deeper into unseen wavelengths and frontiers (Plenary Presentation)

Author(s): Åsa Haglund, Chalmers Univ. of Technology (Sweden)

Coffee Break 10:15 AM - 10:45 AM

SESSION 1: NOVEL OPTICAL INTERCONNECT AND NEURAL NETWORK SYSTEMS

29 January 2024 • 10:45 AM - 12:55 PM | Moscone Center, Room 204 (Level 2 South)

Session Chair(s): Ray T. Chen, The Univ. of Texas at Austin (United States)

12892-1 • 10:45 AM - 11:15 AM

Optics informed neural networks towards accelerating linear operations (Invited Paper)

Author(s): Apostolos Tsakyridis, Miltiadis Moralis-Pegios, George Giamougiannis, Christos Pappas, Theodoros Moschos, Stefanos Kovaivos, Ioannis Roubos, Nikos Pleros, Aristotle Univ. of Thessaloniki (Greece)

12892-2 • 11:15 AM - 11:45 AM

Development of dynamic data centre networks and fast-tunable lasers in the DYNAMOS project (Invited Paper)

12892-33 • 08:00 AM - 08:30 AM

Silicon photonic packaging and integration for Tbps optical interconnects *(Invited Paper)*

Author(s): Hiren D. Thacker, Cisco (United States); Sandeep Razdan, Cisco Systems, Inc. (United States)

12892-34 • 08:30 AM - 08:50 AM

A monolithically integrated 20-Gb/s 850-nm optical receiver realized in 28-nm CMOS technology

Author(s): Jae-Ho Lee, Seung-Jae Yang, Yonsei Univ. (Korea, Republic of); Myung-Jae Lee, Korea Institute of Science and Technology (Korea, Republic of); Woo-Young Choi, Yonsei Univ. (Korea, Republic of)

12892-35 • 08:50 AM - 09:20 AM

Polymer-based hybrid photonic integration for terabit optical transceivers *(Invited Paper)*

Author(s): David de Felipe Mesquida, Martin Kresse, Madeleine Weigel, Marcel Amberg, Michael Theurer, Tianwen Qian, Philipp Winkhofer, Klara Mihov, Jakob Reck, Csongor Keuer, Moritz Kleinert, Crispin Zawadzki, Patrick Runge, Martin Moehrle, Norbert Keil, Martin Schell, Fraunhofer-Institut für Nachrichtentechnik, Heinrich-Hertz-Institut, HHI (Germany)

12892-36 • 09:20 AM - 09:50 AM

High-power 150 mW extended cavity Si₃N₄ tunable narrow-linewidth laser *(Invited Paper)*

Author(s): Albert van Rees, Wilson Tsong, Ian van den Vlekkert, Fathema Farjana, Rob E. M. Lammerink, Chilas B.V. (Netherlands); Ilka Visscher, Chris G. H. Roeloffzen, LioniX International BV (Netherlands); Sami Musa, Dimitri Geskus, Chilas B.V. (Netherlands)

12892-37 • 09:50 AM - 10:10 AM

Photonic building blocks for architectural reconfigurability in hyperscale data centres

Author(s): Richard C. A. Pitwon, Resolute Photonics Ltd. (United Kingdom); Bernard Lee, SENKO Advanced Components Ltd. (Hong Kong, China)

12892-38 • 10:10 AM - 10:40 AM

Co-packaged optics: optical infrastructure from the faceplate to the PIC *(Invited Paper)*

Author(s): Martin Hempstead, Corning Incorporated (United States)

Coffee Break 10:40 AM - 10:55 AM

SESSION 9: MICRO-OPTIC ASSEMBLY AND HYBRID PHOTONIC MICROSYSTEM MANUFACTURING

31 January 2024 • 10:55 AM - 12:55 PM | Moscone Center, Room 204 (Level 2 South)

Session Chair(s): Richard C. A. Pitwon, Resolute Photonics Ltd. (United Kingdom)

12892-39 • 10:55 AM - 11:25 AM

Industrial photonics packaging for high volume applications *(Invited Paper)*

Author(s): Milan Milosevic, Zerihun G Tegegne, Chunting Zhong, David van Duinen, PHIX Photonics Assembly (Netherlands); Xin Yin, Johan Bauwelinck, Univ. Gent (Belgium); Maria Massaouti, Efstathios Andrianopoulos, National Technical Univ. of Athens (Greece); Panos Groumas, Optagon Photonics (Greece); Michael Theurer, Durvasa Y Gupta, Martin Martin Kresse, Madeleine Weigel, David De Filipe, Norbert Keil, Fraunhofer Institute for Telecommunications, Heinrich Hertz Institute (Germany); Joost van Kerkhof, PHIX Photonics Assembly (Netherlands)

12892-40 • 11:25 AM - 11:45 AM

Photonic-System-in-package (pSiP): miniaturization, panel level assembly, and optical waveguide integration in thin glass substrates

Author(s): Henning Schröder, Oliver Kirsch, Julian Schwietering, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration IZM (Germany)

12892-41 • 11:45 AM - 12:05 PM

Performance evaluation of a new thermoplastic polymer against glass and thermoset resins for optical transceivers

Author(s): Peter M. Johnson, SABIC (United States); Gabriele Hoogland, Young Joon Choi, SABIC (Netherlands)

12892-42 • 12:05 PM - 12:35 PM

High-power tests of expanded beam connectors for co-packaged optics applications *(Invited Paper)*

Author(s): Martin Hempstead, Riley S. Freeland, Stephen Q. Smith, Sean B. Treacy, Corning Incorporated (United States); Sharon Lutz, Sherri Dempsey, Arnold Deal, Tom Mitchelltree, US Conec Ltd. (United States); Erman Timurdogan, Albert Benzoni, Lumentum (United States); Michael Kadar-Kallen, US Conec, Ltd. (United States)

12892-43 • 12:35 PM - 12:55 PM


Designs of meta-lenses for optical fiber coupling

Author(s): Yuan-Kai Zhou, Jin-Li Wong, Guo-Dung John Su, National Taiwan Univ. (Taiwan)

Paper 12892-34

A monolithically integrated 20-Gb/s 850-nm optical receiver realized in 28-nm CMOS technology

31 January 2024 • 8:30 AM - 8:50 AM PST | Moscone Center, Room 204 (Level 2 South)

 Add to My Schedule

Abstract

Authors

The demand for high-bandwidth interconnects in applications such as data centers and high-performance computing has led to the widespread adoption of optical interconnect solutions. To further enhance the market acceptance of these applications, cost reduction is essential. For this, we realized an avalanche photodetector (APD) that relies on the vertical N+/P-well Si junction for photodetection. It achieves the responsivity of 0.28 A/W and the bandwidth of 5.9 GHz for 0 dBm incident optical power. We implemented a monolithically integrated optical receiver that contains APD, under-damped trans-impedance amplifier, and output buffers using 28-nm standard CMOS technology without any process modification and design rule violation. The fabricated optical receiver successfully operates up to 20 Gb/s. Details of the monolithic optical receiver performance as well as the limiting factors that need to be overcome for further performance improvement will be discussed in the presentation.

Presenter

Jae-Ho Lee


Yonsei Univ. (Korea, Republic of)

Jae-Ho Lee is with the High-Speed Circuits and Systems Laboratory, Department of Electrical and Electronic Engineering, Yonsei University, Seoul. He is currently pursuing a Ph.D. in the field of optical receivers.

Paper 12892-34

A monolithically integrated 20-Gb/s 850-nm optical receiver realized in 28-nm CMOS technology

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