COMPOUND SEMICONDUCTOR WEEK 2022

48th International Symposium on Compound Semiconductors

33rd International Conference on Indium Phosphide and Related Materials

AWARDS CEREMONY

FRIDAY, JUNE 3
8:00 - 8:30 AM EDT
MICHIGAN LEAGUE, ANN ARBOR, MI

The International Symposium on Compound Semiconductors

June 3, 2022

ISCS Award 2022 Recipients

THE WELKER AWARD

Prof. Constance Chang-Hasnain
Berxel Photonics Ltd.

THE QUANTUM DEVICES AWARD

Prof. Masaaki Tanaka
The University of Tokyo

THE IPRM AWARD

Dr. Radha Nagarajan
Marvell

THE YOUNG SCIENTIST AWARD

Prof. Elaheh Ahmadi
University of Michigan

The Welker Award is supported by ams OSRAM
The Quantum Devices Award is supported by the ISCS Japanese Committee
The 2022 IPRM Award is sponsored by II-VI Incorporated

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THE WELKER AWARD

The Welker Award *was established in 1976 by Siemens AG in honor of Heinrich Welker, the pioneer in the field of III-V compound semiconductors. The award is now supported by Osram GmbH and given away for outstanding research in the area of III-V compound semiconductors.*

The Welker Award is supported by ams OSRAM

Prof. Constance Chang-Hasnain

Berxel Photonics Ltd.

For pioneering contributions to VCSEL photonics, nano-photonics and high contrast metastructures for optical communications and optical sensing

Dr. Connie Chang-Hasnain is the Founder and Chairperson of Berxel Photonics and Whinnery Chair Professor Emerita at the University of California, Berkeley. She is a member of the US National Academy of Engineering and National Academy of Inventors. She is a fellow of IEEE, OSA and IEE, and Immediate Past President of Optica (formerly known as OSA).

Dr. Chang-Hasnain received her B.S. in Electrical and Computer Engineering from the University of California, Davis in 1982; and her MS and Ph.D. in Electrical Engineering and Computer Science from the University of California, Berkeley in 1984 and 1987, respectively. Dr. Chang-Hasnain was a Member of the Technical Staff at Bell Communications Research (1987–1992) and Assistant Professor of Electrical Engineering at Stanford University (1992–1995). She joined UC Berkeley as Professor of Electrical Engineering and Computer Sciences in 1996. She was Whinnery Distinguished Chair Professor 2006-2020; Chair of the Nanoscale Science and Engineering Graduate Group 2006-2017; and Associate Dean for Strategic Alliances of College of Engineering

2014-2019. She was the Founding Co-Director of Tsinghua-Berkeley Shenzhen Institute (TBSI) 2015-2020 and the Chief Academic Officer of Berkeley Education Alliance for Research in Singapore (BEARS) 2015-2018. She is an Honorary Member of A.F. Ioffe Institute. She was a Visiting Professor at Tsinghua University, Peking University, National Jiao Tung University and National University of Singapore.

Dr. Chang-Hasnain's research interests range from semiconductor optoelectronic devices to materials and physics, with comprehensive investigations on VCSEL arrays, high contrast metastructures/gratings and nanostructure growth on mismatched substrates. She pioneered the first planar VCSEL structure using proton implantation for array fabrication with Gbps transmission over multi-mode fibers, first MEMS-VCSEL with a continuous wavelength sweep, and the first 940-nm wavelegnth VCSEL arrays for 3D imaging. She developed low-temperature vapor-liquid-solid growth mode of single crystalline compound-semiconductor nanowires/nanopillars on substrates with giant lattice mismatches and the corresponding critical diameter theory for nanorod growth. She invented a completely new class of flat optics using a single-layer of 1D/2D structures with a large refractive index contrast, resulting in extraordinary optical properties for thin-film optics. Her inventions have led to disruptive concepts to revolutionize optics and many commercial applications.

Dr. Chang-Hasnain has been honored with many awards including the Okawa Prize (2018), UNESCO Medal For the Development of Nanoscience and Nanotechnologies (2015), IEEE David Sarnoff Award (2011), the OSA Nick Holonyak Jr. Award (2007), IEEE Photonics Society William Streifer Award for Scientific Achievement (2003), and the Microoptics Award from Japan Society of Applied Physics (2009). Additionally, she has been awarded with a Vannevar Bush Faculty Fellowship, a Humboldt Research Award, and a Guggenheim Fellowship. She was a member of IEEE LEOS Board of Governors, OSA Board of Directors, and NRC's Board on Assessment of NIST Programs,. She was the Editor-in-Chief of Journal of Lightwave Technology 2007-2012.

THE QUANTUM AWARD

The Quantum Devices Award *was initiated by Fujitsu Quantum Devices Ltd. in 2000, and is now sponsored by the Japanese section of the ISCS steering committee. The Award honors pioneering contributions to the field of compound semiconductor devices and quantum nanostructure devices including physics and epitaxial growth.*

The Quantum Devices Award is supported by the ISCS Japanese Committee.

Prof. Masaaki Tanaka

The University of Tokyo

For pioneering contribution to epitaxial synthesis of advanced semiconductor based spintronics materials and strucexploratory devices applications

Professor Masaaki Tanaka obtained B.E., M.E., and Ph.D. degrees in electronic engineering from the University of Tokyo, Japan, in 1984, 1986, and 1989, respectively. In 1989, he joined the Department of Electrical and Electronic Engineering at the University of Tokyo as a research associate and became a lecturer in 1990. There, he started to study heterostructures of dissimilar materials consisting of semiconductors, metals, and magnetic materials. In 1992, he joined Bell Communications Research (Bellcore) at Red Bank, New Jersey, USA, as a visiting research scientist, where he studied molecular beam epitaxy and properties of ferromagnet/semiconductor heterostructures. In 1994, he returned to the University of Tokyo as an associate professor. Since then, he has been studying various materials, spin-related phenomena, and devices including magnetic semiconductors, ferromagnet/semiconductor heterostructures and nanostructures, magnetic tunnel junctions, spin transistors. He is currently a professor of electrical and electronic engineering, and Director of the Center for Spintronics Research Network (CSRN), at the University of Tokyo. He has authored and coauthored over 300 scientific publications, and presented over 160 invited talks at international conferences and meetings.

THE IPRM AWARD

The IPRM Award *was initiated by the Indium Phosphide and Related Materials (IPRM) Conference in 1993, as The Michael Lunn Award. During the first three years following its introduction (1993-1995), the award was given for the best paper presented at IPRM. The award criteria were revised in 1996 to recognize individuals who have made "outstanding contributions to the InP community". In 2007, the award was renamed the IPRM Award and has since been sponsored by the IPRM international steering committee to recognize individuals or organizations who have made an outstanding contribution to the InP and related materials community, especially in the areas of materials growth, integrated photonic components, and high frequency electronics.*

IPRM Award is sponsored by II-VI Incorporated.

Dr. Radhakrishnan Nagarajan

Marvell

In recognition of the breakthrough work in the development and commercialization of Large Scale InP Photonic Integrated Circuits

Radha Nagarajan is currently the Senior Vice President and Chief Technology Officer of the Optical and Copper Connectivity Group at Marvell. In this current role at Marvell, Dr. Nagarajan manages the development of the company's optical platform technology and products.

Dr. Nagarajan holds a B.Eng. from the National University of Singapore, M.Eng. from the University of Tokyo, and Ph.D. from the University of California, Santa Barbara, all in Electrical Engineering. After his Ph.D., he was a research faculty at UCSB, for 2.5 years, where he continued his work, on the impact of carrier transport, on the performance of high-speed quantum well lasers. He then joined SDL, Inc., where, among other things, he managed the development, and transferred to manufacturing, high power 980nm pump modules for EDFA applications, and gigabit fiber optic transmitters and receivers for harsh environment applications.

In 2001, Dr. Nagarajan joined Infinera where he began his work in photonics integration. As a Fellow at Infinera, his breakthrough designs

resulted in the successful development and commercialization of large scale InP photonic integrated circuits (PIC). Optical systems based on these PIC's have been widely deployed in metropolitan and long-haul transport links. He joined Inphi in 2013, where he continued his work in photonic integration, focusing on Si. This development work resulted in the commercialization of the first DWDM, PAM 4, Si photonics modules, which are deployed in data center interconnects. At Inphi, Dr. Nagarajan was the Chief Technology Officer and a Senior Vice President.

Dr. Nagarajan has been awarded 213 US patents. He is a Fellow of the IEEE, Optical Society (Optica) and Institution of Engineering and Technology (IET). In 2006, he was awarded the IEEE/LEOS Aron Kressel Award in recognition of breakthrough work in the development and manufacturing of large scale photonic integrated circuits.

THE ISCS YOUNG SCIENTIST AWARD

The ISCS Young Scientist Award *is supported by the International Symposium on Compound Semiconductors (ISCS). Established in 1986, the ISCS Young Scientist Award acknowledges technical achievements in the field of compound semiconductors by a scientist younger than 40 years on the first day of the Symposium.*

Prof. Elaheh Ahmadi

University of Michigan

For seminal contributions to molecular beam epitaxy of N-polar (Al,Ga,In)N and $(Al,Ga)_2O_3$ heterostructures

Prof. Ahmadi received her BS and MS degrees both from Sharif University of Technology,Tehran, Iran in 2008 and 2010 respectively. She then joined Prof. Mishra's group to pursue her Ph.D. at UC Santa Barbara in 2010, where she worked on epitaxial growth and characterization of GaN-based electronic devices. After earning her PhD degree in 2015, she started her postdoctoral research in Prof. Speck's group working on epitaxial growth and characterization of Ga_2O_3 devices. She joined the University of Michigan as an Assistant Professor in Jan 2018. She received AFOSR and ONR Young Investigator Program awards in 2020 and NSF CAREERand DARPA Young Faculty Awards in 2021.

Prof. Ahmadi has made significant contributions to molecular beam epitaxy of N-polar (Al,Ga,In)N and $(Al,Ga)_2O_3$ heterostructures. She achieved, for the first time, N-polar InAlN films with uniform composition by plasma-assisted molecular beam epitaxy (PAMBE). Before that, it was believed that, regardless of the polarity, growth of InAlN films by PAMBE leads to formation of honeycomb microstructures with In-rich boundaries and Al-rich cores. Using

this discovery, she developed N-polar high electron mobility transistors (HEMT) structures with InAlN back-barriers with record mobility at the time. She has also made significant contributions to the early developments of $(Al,Ga)_2O_3$ heterostructures and electronic devices demonstrating Ge doping of Ga_2O_3 films, for the first time, and the first $(Al,Ga)_2O_3$ -Ga_2O_3 modulation-doped field effect transistors. At the University of Michigan, she has continued to make significant contributions to the development of N-polar GaN and Ga$_2O_3$ epitaxial growth and electronic devices. Very recently, her group discovered a growth condition by MBE that leads to a self-assembled, naturally strain- managed superlattice structure composed of GaN and InGaN layers on nominal “InGaN” films grown on Ga-polar and N-polar GaN with potential novel electronic and photonic applications.