



## **Integrated Photonics Symposium**

Worcester Polytechnic Institute

Quinsigamond Community College

### **Matthew Adams**

Matthew Adams is a Sr. Product Manager at Viavi Solutions, a network test and optics technology company. He has been with Viavi, and its predecessor company JDSU, for over 20 years. Over that time, he has held various leadership positions across the organization spanning R&D, corporate technology planning, and product group management. He is currently focused on developing test and measurement products used during the design and manufacture of next generation fiber optic components, modules and sub-systems for optical communications. He is an active participant in the development of international test and measurement standards with the IEC for fiber connectivity and passive optical systems. He has also coauthored several patents in the area and has a M.Eng. degree in Engineering Physics from McMaster University.

### **Anu Agarwal**

Dr. Anu Agarwal received her doctoral degree in Electrical Engineering from Boston University in 1994, where she investigated the spatial extent of point defect interactions in silicon.

She has been at MIT's Microphotonics Center since 1994, except for a short (2001-2004) stint at Clarendon Photonics, where she was a part of a team of engineers developing a novel optical filter.

As a Principal Research Scientist at MIT, she developed integrated Si-CMOS compatible linear and non-linear materials for photonic devices, especially in the mid-IR regime, for hyperspectral imaging and chem-bio sensing, because most chemical and biological toxins have their fingerprints in this range. She has over 100 journal and refereed conference publications, 6 awarded patents and 5 pending patents. Her work on MIR materials and devices is creating a planar, integrated, Si-CMOS-compatible microphotonics platform which will enable on-chip imaging and sensing applications.

As AIM Photonics Academy Leader of LEAPs (Labs for Education and Application Prototypes), she works closely with the Commonwealth of Massachusetts to identify potential investments in LEAPs and build a LEAP network to train a workforce in integrated photonics and support AIM Photonics' MPW (multi-project wafer) and packaging facilities in New York.

### **Gerald Gagnon**

Gerald Gagnon studied and completed a certificate in Optics and Photonics at Springfield Technical Community College after obtaining his Associates degree the year prior. This came after relocating from his home state of Texas where he worked within the fields of Criminal Justice and Social Work.

Relocating to Massachusetts gave the opportunity to follow a childhood interest that spawned into a new adventure in Technology. Currently employed at MIT Lincoln Laboratory as a Technician, he will venture further into the field by pursuing a degree in engineering in order to optimize a robust career.

## **Richard Grzybowski**

Dr. Richard Grzybowski is the Director of Research & Development at MACOM Lightwave where he leads the silicon photonics design team. Before being acquired by MACOM, Dr. Grzybowski was Chief Technical Officer at Photonic Controls, an organization specializing in wrapping electronic control and packaging around systems with photonic cores, silicon photonic design, control and testing. Prior to this, Dr. Grzybowski was Research Director of Systems Engineering & Program Management at Corning Inc. where he led the systems engineering competency for the Science & Technology organization with special emphasis on early stage programs for keystone components in complex systems. Products developed included high performance glass manufacturing, automotive controls, ultra-capacitors, RF distribution systems, optical backplanes (25G), optical switches (40G), and optical transceivers from research to early stage manufacturing. Dr. Grzybowski has authored and been awarded multiple DoD, DARPA and DoE contracts where he has served as program manager and chief systems engineer. These programs have included the delivery of supercomputer optical interconnect products and harsh environment jet engine control systems.

Dr. Grzybowski has served as Chairman of the Industrial Board of Directors for the Optoelectronics Industry Development Association (OIDA) and is currently Chairman of the Industrial Board of Directors for the MIT Microphotonics Center's Communication Technologies Roadmapping Consortium. Richard holds a Ph.D. from the University of Connecticut, a M.S. from Rensselaer Polytechnic Institute, and a B.S. from Yale University—all in electrical engineering. He has 24 patents, over 90 publications and is a co-author of the book *High Temperature Electronics* (CRC Press).

## **Brian Kimball**

Mr. Brian Kimball received his B.S. at Worcester Polytechnic Institute (WPI). He received his M.S. in the area of radiometric ellipsometry as a Wyman-Gordon Foundation Fellow, at the Center for Holographic Studies and Laser Technology at WPI. Mr. Kimball has led a basic research effort exploring the optical properties of nano-structured arrays for which he was recognized as a 2005 winner of the Nanotech Briefs Nano-50 Award. He has twice been the recipient of the Department of the Army Research and Development Achievement Award. He has authored over 90 publications. Brian Kimball is currently an NSRDEC Project Officer leading the Soldier Vision Protection and Enhancement applied research project.

Disclaimer: The views presented are those of the speaker and do not necessarily represent the views of DoD or its Components.

## **Rachel LeBlanc**

Rachel LeBlanc is the Assistant Vice President of Academic and Corporate Engagement at Worcester Polytechnic Institute. For the past 15 years, she has been working to bridge the gap between the needs of industry and the skills of the incumbent workforce. Rachel has managed the workforce development department for the university for several years, focusing on building market-driven programs that leverage WPI's academic strengths. She is also responsible for strategic economic engagement, including the WPI Boston Seaport innovation space and the launch of a new medical cyber-physical systems research and development center, PracticePoint. Rachel currently serves on the board of directors for the International

Council on Systems Engineering and AUVSI New England. She has a B.S. and M.S. in the life sciences, and an M.B.A.

### **Michael Liehr**

Michael Liehr is the Chief Executive Officer of the American Institute for Manufacturing (AIM) Photonics. Michael focuses on the creation of new AIM business opportunities, and is responsible for the effective and efficient operation of AIM's programs including SUNY Poly's strategic 300mm integrated photonic semiconductor and 3D packaging. He is also SUNY Polytechnic Institute's Executive Vice President for Technology and Innovation. Prior to this assignment, he led the Global 450mm Consortium through the start-up phase as the General Manager and was an IBM Distinguished Engineer.

### **Carlos Macias**

Mr. Carlos Macias is the Manufacturing Engineering Director supporting the Networking Business Unit at MACOM, where he leads the New Product Introduction, Packaging, Assembly and Sustaining Test Engineering teams in the Operations Organization. This team is responsible for delivering packaging solutions for Data Center and Telecom applications. Before being acquired by MACOM, Mr. Macias was the Operations Engineering Director at Mindspeed Technologies, where he directed all Engineering activities in the Operations group from Wafer Foundry, Packaging, Assembly and Final Test. In this role, Mr. Macias was also responsible for providing Package Design and Signal Integrity support for Voice Over IP (VoIP) and High Performance Analog solutions.

Mr. Macias holds a B.S. in Electrical Engineering from the Autonomous University of Baja California (UABC) in Mexico.

### **Alex Medeiros**

Alex Medeiros is an Electronic Photonic Test Engineer who works with the MIT Lincoln Laboratory Quantum Information and Integrated Nano-Systems group to characterize novel optical semiconductor devices. He is passionate about understanding fundamental physical interactions of light and strives to support the advancement of optical technology. He has formerly worked in the field of diffractive optics, supporting the development and manufacturing of diffractive waveguides for applications ranging from medical science to augmented reality displays to high energy laser research. Alex holds a Bachelors in Professional Physics from Bridgewater State University.

### **Erin Morissette**

Erin Morissette is a senior, undergraduate physics student at Worcester Polytechnic Institute. She is currently completing her Major Qualifying Project (MQP) at MIT Lincoln Laboratory, working with the Quantum Information and Integrated Nanosystems Group (89) to characterize world-class InGaAsP/InP photodetectors fabricated at the Lab. Over the summer, Erin was an AIM Photonics intern for Group 89 and conducted epitaxial regrowth experiments for semiconductor amplifiers. At WPI, she is a Clare Boothe Luce Fellow in the Titova Terahertz Laser Lab studying the carrier dynamics of thin-film tin disulfide via terahertz spectroscopy. Additionally, Erin enjoys playing clarinet in the WPI concert band and orchestra.

## **Ira Moskowitz**

Ira Moskowitz is the Director of Advanced Manufacturing Programs at the Massachusetts Technology Collaborative (MassTech). MassTech is an innovative public agency working to enhance economic growth, accelerate technology use and adoption, and harness the value of research by engaging in meaningful collaborations across academia, industry, and government. Ira oversees the Massachusetts Manufacturing Innovation Initiative, an economic development program investing over \$100 Million in projects that create new manufacturing technology. He also co-chairs the Massachusetts Advanced Manufacturing Collaborative, the state's leadership commission of industry, academics and policymakers, and serves as a Mentor, Judge and Industry Champion at MassChallenge, the world's largest start-up accelerator. Prior to this position, Ira spent over 30 years managing semiconductor technology development and manufacturing, including operations in the US, Europe, and Southeast Asia. Ira first worked at AT&T Bell Labs, where he was named a Distinguished Member of Technical Staff, the highest technical designation. Following Bell Labs, Ira joined Analog Devices, Inc., where he progressed through a series of manufacturing positions, most recently serving as Vice President and General Manager, US Operations. Ira holds a BS in Electrical Engineering from the University of Rochester, an MS in Electrical Engineering and Computer Science from MIT, and an MBA in Finance and International Business from NYU. He is a member of the Board of Directors of the Advanced Functional Fabrics of America (AFFOA), the Board of Directors of Greentown Learn, the Leadership Council of AIM Photonics, and multiple university and industry advisory boards.

## **Jacob Nordquist**

Jacob Nordquist is a Technician in the Test & Burn-in department of IPG Photonics in Oxford, MA where he has been working since 2016. IPG Photonics is the leading developer & manufacturer of high tech fiber lasers for use in many markets including manufacturing, aerospace, medical, transportation, electric vehicles, communications and more. It is a global company with manufacturing facilities in the U.S., Germany, Russia & Italy. Jacob was inspired to advance his education in the field of photonics, and graduated with a Certificate in Photonics from Quinsigamond Community College in May of 2018. He is currently working toward achieving his Associate degree in Science in Electronics Engineering Technology – Photonics Option, also at QCC.

## **Luis Predraja**

As a child, Dr. Predraja emigrated from Cuba and grew up in a low-income Miami neighborhood. He became the first in his family to attend college, receiving his BA from Stetson University in Florida. He later earned a Ph.D. from the University of Virginia in Philosophical Theology and Religious Studies. As QCC's new president, Dr. Predraja provides leadership to the college community and is working to enhance the mission of QCC to address higher education needs and economic development. Dr. Predraja lives in Worcester with his wife and daughter. Prior to QCC, Dr. Predraja served as Interim Vice Chancellor of Academic Affairs for California's 35,000 student Peralta Community College District, where he led faculty, staff, and administrators to develop innovative programs and ensure student success. From 2011-2016, Dr. Predraja was Provost and Vice President of Academic Affairs at Antioch University Los Angeles, a non-profit institution serving adult students with bachelor degree completion and professional graduate programs. From 2004-2011, Dr. Predraja served as Vice President for the Middle States Commission on Higher

Education. He advanced universal access to quality higher education by overseeing accreditation of community colleges and universities from New York to Washington, D.C., and in Puerto Rico. Dr. Pedraja also led the first program to grant American accreditation to foreign universities. Since then, universities in South America, Asia, and Europe have retained him for guidance on achieving American higher education standards. At Middle States, Dr. Pedraja also developed higher education policy and advocated strategic solutions to a range of challenges including financial, governance, and political crises. Early in his career, Dr. Pedraja taught philosophy, ethics, and religious studies at the University of Puget Sound and Southern Methodist University, where he also served as a division chair and faculty senator. Additionally, he served as VP of Academic Affairs and Dean at the Memphis Theological Seminary. During this time, Dr. Pedraja mentored Latino graduate students and served as President of La Comunidad of Hispanic Scholars in his discipline. He has continued mentoring at QCC and is working with several minority, first-generation students. Dr. Pedraja advocates passionately for increased higher education access for all people, especially those who have been underserved historically by the American higher education system. He served on the University of Virginia Religion and Race Work Group and participated in multiple events at the National Civil Rights Museum in Memphis with many civil rights leaders. Throughout his career, Dr. Pedraja has focused on Latino perspectives, and has published many books and articles exploring how understanding language and culture can promote intercultural dialogue and tolerance. He is the author of several books, including *Teologia and Jesus is my Uncle* and has contributed chapters in books such as *The Ties that Bind* and *Beyond the Pale: Reading Theology from the Margins*.

### **Doug Petkie**

Douglas T. Petkie is the Department Head and Professor of Physics at Worcester Polytechnic Institute (WPI). He received a BS in physics from Carnegie Mellon University and a PhD in physics from The Ohio State University. In support of AIM Photonics, and in partnership with Quinsigamond Community College, AIM Photonics Academy, and the Massachusetts Manufacturing Innovation Initiative (M2I2) program, he is the faculty lead for the Worcester Lab for Education and Application Prototypes (LEAP) at Worcester Polytechnic Institute. The Worcester LEAP facility will facilitate student engagement in educational activities through WPI's signature Project Based Learning curriculum as well as provide other workforce development and hands-on training opportunities. The LEAP facility will also support the development of the integrated photonics manufacturing sector and supply chain in Central Massachusetts by collaborating with industry partners and serving as an on-ramp to AIM Photonics.

### **Yi Qian**

Dr. Qian is the Vice President of Marketing at MRSI Systems. Dr. Qian joined MRSI Systems in 2015 to help develop the company's market strategy and product roadmaps, drive the development of new products, and diversify MRSI product offerings to target higher growth market segments. He has over 20 years of experience in large corporations and small start-up companies, developing and marketing advanced optoelectronic and mechanical components and systems with integrated hardware and software, for fiber optics / photonics, sensors, medical devices and other industries. Prior to MRSI Systems he was Director of Product Management and Marketing at Cambridge Technology, a Novanta company, delivering high performance laser scanners for multiple industries. Before that, Dr. Qian worked at Oclaro as Director of Product Management for 40G/100G optical transceivers and line cards. He was Vice President of Engineering in Dimensional Photonics International, a 3D laser sensor system startup that was acquired by Danaher Dental. Prior to that he was Director of Engineering making high speed and high power semiconductor laser diodes and modules in Corning's Lasertron division. He started his career

in industry at Lasertron Inc before Corning's acquisition. Dr. Qian received a Bachelor's Degree in Electrical Engineering from Zhejiang University and a Ph.D. Degree in Physics from Institute of Semiconductors, Chinese Academy of Sciences. He was also a postdoctoral researcher at Cornell University focusing on wafer-bonded long wavelength VCSELs, new compliant substrate structures and materials, and advanced nanofabrication technologies. He holds 10 issued and pending patents and has published more than 45 articles in the areas of nano-Silicon, high power and high speed lasers, and 3D optical sensing systems.

### **Kathy Rentsch**

Kathy Rentsch was recently appointed Assistant Vice-President for Workforce Readiness & Innovation at Quinsigamond Community College. She served previously as Dean for the School for Business, Engineering & Technology. She has actively engaged with faculty to expand business, engineering and technical education and training. Over the past several years, QCC revamped delivery of workforce education and training by increasing availability of stackable certificates and more flexible and responsive curriculum paths leading to industry credentials and employment in six key industries, including advanced manufacturing, mechatronics, photonics, IT/IS, computer science, and engineering.

Ms. Rentsch was elected to the National Coalition of Advanced Technology Centers (NCATC) Board of Directors in October 2016. She serves on the Board of Directors for the MA Manufacturing Extension Partnership. MMEP recognized her leadership in building a non-credit to credit pathway in advanced manufacturing, naming her the *MassMEP 2014 Manufacturing Champion*. She is currently completing doctoral work at Northeastern University.

### **Sajan Saini**

Sajan Saini is the Education Director at AIM Photonics Academy, where he oversees the production of workforce teaching and learning materials, including classroom education modules, online courses, and a one-week intensive training program at MIT. He has lectured at Princeton University and was a professor of physics at Queens College of CUNY. He has taught courses in photonics, physics, general astronomy, writing, and communications. Sajan has co-authored several patents and his scientific and science writings have appeared in IEEE and APL publications, book chapters, Harper's Magazine, and TED-Ed.

### **Winston Soboyejo**

Wole Soboyejo received a BSc in mechanical engineering from King's College London in 1985. He then went on to Cambridge University where he obtained his PhD in materials science in 1988. Between 1988 and 1992, he worked as a Research Scientist at the McDonnell Douglas Research Labs. In 1992, he worked briefly at the Edison Welding Institute before joining the Department of Materials Science and Engineering at The Ohio State University, where he worked from 1992 until 1999. Between 1997 and 1998, he spent a year as a Visiting Martin Luther King Associate Professor at MIT. He then moved to Princeton University as a Professor of Mechanical and Aerospace Engineering in 1999. At Princeton, he has served as the Director of the US/Africa Materials Institute (USAMI) and the interdisciplinary undergraduate program in materials science. Soboyejo is the recipient of National Young Investigator Awards from the National Science Foundation and the Office of Naval Research. He is also a recipient of the ASM's Bradley Stoughton Award for excellence in the teaching of materials science, the Lumley

Research Award of The Ohio State University, and Princeton University's Old School Award for Innovation. Soboyejo is a Fellow of the American Society of Mechanical Engineers (ASME), the Nigerian Academy of Science (NAS), the African Academy of Science, and the Materials Society of Nigeria. He is the author of 3 textbooks and almost 400 peer-reviewed journal papers. He has also edited 20 special issues of journals and conference proceedings. Between 2012 and 2014, Soboyejo served as the President and Provost of the African University of Science and Technology in Abuja, Nigeria. In September of 2016, Soboyejo moved to the Worcester Polytechnic Institute (WPI) as the Bernard M. Gordon Dean of Engineering and Professor of Engineering Leadership. He was appointed to serve as the Interim Provost at WPI in September 2018. Soboyejo's current research focuses on biomaterials, materials for energy and multifunctional materials.

### **Cheryl Sorace-Agaskar**

Dr. Cheryl Sorace-Agaskar is a technical staff member in the Quantum Information and Integrated Nanosystems Group at MIT Lincoln Laboratory. Her current research focuses on integrated photonics for microwave photonic applications, sensing and scalable quantum computing, as well as on behavioral modeling of integrated photonic components. Prior to joining Lincoln Laboratory, Dr. Sorace-Agaskar earned her Ph.D. in Electrical Engineering from MIT, and her B.S. in Engineering Physics from Cornell University.

### **Nicholas Usechak**

Nicholas G. Usechak is the Government's Chief Technology Officer for the Integrated Photonics Manufacturing Innovation Institute. He has been heavily involved in the creation of the Institute and helped to define and shape its overall vision beginning in May 2014. He is also the Director of the Ultrafast Photonics Devices and Research Laboratory at the Air Force Research Laboratory's (AFRL) Sensors Directorate. At AFRL Dr. Usechak has worked in basic and applied research for the past ten years under funding from the Air Force Office of Scientific Research. His work has focused on the theory, modeling, and characterization of lasers and integrated photonics devices and systems. In this role he has collaborated with a number of leading research groups at various universities including the University of Central Florida, the University of California Santa Barbara, the University of California San Diego, the University of Rochester, Massachusetts Institute of Technology, and the University of Washington. Dr. Usechak has also supported more than ten DARPA program managers and been involved in many DARPA programs in various roles including serving as a contract officer's representative and a subject matter expert.

Dr Usechak was born in Long Branch, NJ, in 1976. He received B.S. degrees with high honors in both electrical engineering and engineering physics from Lehigh University, Bethlehem, PA, in 2000. In 2003 he received an M.S. degree and in 2006 a Ph.D. both in optical engineering from the Institute of Optics, University of Rochester, Rochester NY where his dissertation focused on experiments, simulations, and the theory of FM mode-locked fiber lasers.

He worked at Trumpf Photonics in Cranbury, NJ as a Senior Engineer for a year following graduation characterizing high-power semiconductor laser arrays, automating experiments, and modeling the thermal effects of solder interfaces using transient temperature-extraction experiments to ground those models. After Trumpf he joined the Air Force Research Laboratory at Wright-Patterson Air Force Base where he is currently employed as a Senior Electronics Engineer.

At Lehigh he was a presidential scholar during the academic year 1999-2000. At the University of Rochester he conducted his experimental work in the Laboratory for Laser Energetics where he was a Frank J. Horton Fellow. His current research interests include nonlinear optics, fiber lasers, ultrafast optics, high-speed test and measurement, mode-locked lasers, parametric processes, optical clock generation, novel gain media, diverse waveform generation, integrated photonics, partial differential equations, delay differential equations, and numerical modeling.

Dr. Usechak is a member of the OSA, Tau Beta Pi, Sigma Xi, and a Senior Member of the IEEE.

### **Bogdan Vernescu**

Bogdan Vernescu has held a variety of positions during his time at WPI, and is currently Professor of Mathematical sciences and the Vice Provost for Research. His research is in applied mathematics for multiscale materials sciences, focusing on the characterization of material properties of composites, porous media, suspensions, emulsions and electrorheological/magnetorheological materials. He has published over 60 research papers, a monograph and a proceedings volume. He has held visiting positions at MIT and at several universities in Europe.

In 1997, he co-founded WPI's Center for Industrial Mathematics and Statistics—which developed mathematics and statistics research projects for the corporate world—and served as its director until 2003. From 2003 to 2013, he was the head of the Department of Mathematical Sciences. In 2007 he became the Founding President of the National Professional Science Master's Association (NPSMA), and served two terms on its board of directors.

In 2018 he was appointed by Governor Charlie Baker on the Advisory Board of the Massachusetts Technology Collaborative (MTC). He is currently a member of the Technology and Leadership and Strategy Initiative (TLSI) Chief Technology Officers Roundtable, at the Council on Competitiveness, on the Board of Directors of the National Defense Industrial Association (NDIA) New England Chapter, and a Trustee of the Romanian American Foundation (RAF).

Vernescu earned his BS and MS in applied mathematics at the University of Bucharest, and his PhD in mathematics at the Institute of Mathematics of the Romanian Academy.

### **Preetinder Virk**

Preetinder Virk has served as Senior Vice President and General Manager, Networks BU at Macom Technology Solutions, Inc., since October 2014. Prior to that he had served as our Senior Vice President, Strategy, since December 2013. In his current role, he leads Macom's High Performance Analog and CMOS SoC investments in Data Center, Access – wireless & Wireline & Metro Long Haul Optical networks, developing market leading connectivity semiconductor components.

From May 2012 to December 2013, Mr. Virk served as Senior Vice President and General Manager, Communications Processing, for Mindspeed Technologies, Inc. ("Mindspeed"). From April 2009 to February 2012, Mr. Virk served as Director, Global Network Segment Marketing, for Freescale Semiconductor, Inc., a provider of embedded processing solutions for the automotive, consumer, industrial and networking markets. From October 2007 to April 2009, Mr. Virk served as Mindspeed's Senior Vice President and General Manager, Enterprise and Consumer Premise. Mr. Virk earned a



Master's Degree in Business Administration and a Master's Degree in Electrical Engineering from Worcester Polytechnic Institute. He also is a graduate of Thapar Institute of Engineering in India.

### **Michael Watts**

Michael R. Watts received his Bachelor of Science in Electrical Engineering from Tufts University in 1996. He then joined Draper Laboratory as a Member of Technical Staff in their Fiber Optics Group. In 1999 he became a Draper Fellow and received his SM and PhD degrees from MIT in 2001 and 2005, respectively. In 2005 he joined Sandia National Labs where he was a Principal Member of Technical Staff and led their silicon photonics development. In 2009 he received an R&D100 Award for work in ultralow power microphotonic modulators and switches. In 2010 he returned to MIT where he is an Associate Professor in the Electrical Engineering and Computer Science Department (EECS). Professor Watts' research focuses on photonic microsystems for low-power communications, sensing, and microwave-photonics applications. In 2012, Prof. Watts founded Analog Photonics, where he currently serves as CEO, and is developing chip-scale optical phased array based LiDAR. In 2015 the silicon photonics platform Prof. Watts had developed with SUNY Albany (CNSE) led to the creation of AIM Photonics, a \$600M public-private partnership, to which Dr. Watts was named to and currently serves as the Chief Technical Officer (CTO). Prof. Watts holds numerous patents and has authored or co-authored over 200 journal and conference publications and is a member of the Optical Society of America (OSA) and the IEEE.