

Harnessing Light: Capitalizing on Optical Science Trends and Challenges for Future Research

Committee

Paul F. McManamon

Co-Chair

Dr. Paul McManamon is a Consultant at Exciting Technology, LLC. He is also half time as technical director of the Ladar and Optical Communications Institute, LOCI, at the University of Dayton. Dr. McManamon is a former member of the scientific and technical cadre of senior executives. He was Chief Scientist, Sensors Directorate, Air Force Research Laboratory, Wright-Patterson Air Force Base, Ohio. The Sensors Directorate consists of approximately 1,250 people responsible for developing new sensor technology for the Air Force. Dr. McManamon was responsible for the directorate's technical portfolio. Dr. McManamon also served more than two years as acting Chief Scientist for Avionics. He was the technical lead for more than 500 scientists and engineers, and he was responsible for the technical content of all electro-optical and microwave sensors development, electron device development, automatic target recognition as well as avionics systems, concepts and simulation. Prior to this, he was the Sensor Directorate's Senior Scientist for Infrared Sensors, developing multi-discriminate electro-optical sensors, including multifunction laser radar technology, novel electro-optical countermeasure systems and optical phased-array beam steering technology. Dr. McManamon is widely recognized in the electro-optical community. He was the 2006 president for SPIE, the International Society for Optics and Photonics. He was on the board of directors of SPIE for 7 years, and on the executive committee for 4 years. He is a Fellow of SPIE, a Fellow of AFRL, Air Force Research Laboratory, a Fellow of the Military Sensing Symposia, a Fellow of IEEE, the Institute of Electrical and Electronics Engineers, and a Fellow of OSA, the Optical Society of America.

Alan E. Willner

Co-Chair

Dr. Alan E. Willner is currently the Steven and Kathryn Sample Chaired Professor of Engineering in the Ming Hsieh Department of Electrical Engineering of the Viterbi School of Engineering at the University of Southern California. Department of Electrical Engineering, University of Southern California. Professor Willner received his Ph.D. (1988) in Electrical Engineering from Columbia University. He was a Postdoctoral Member of the Technical Staff at AT&T Bell Laboratories and a Member of Technical Staff at Bellcore. He is a Member of the Defense Science Research Council, has served on many scientific advisory boards for small companies, and has advised several venture capital firms. Prof. Willner's awards include: International Fellow of the U.K. Royal Academy of Engineering, Presidential Faculty Fellows Award from the White House, Packard Foundation Fellowship, NSF National Young Investigator Award, Fulbright Foundation Senior Scholars Fellowship, Optical Society of America (OSA) Paul Forman Engineering Excellence Award, IEEE Photonics Society Distinguished Lecturer Award, OSA Leadership Award, 2001 Eddy Paper Award from Pennwell Publications for Best Contributed Technical Article, and Armstrong Foundation Memorial Award. He is a Fellow of the IEEE, OSA and SPIE. Prof. Willner's professional activities have included: President of the IEEE Photonics Society (formerly LEOS), Editor-in-Chief of the IEEE/OSA Journal of Lightwave Technology, Editor-in-Chief of OSA Optics Letters, Editor-in-Chief of the IEEE Journal of Selected Topics in Quantum Electronics Co-Chair of the Science & Engineering Council of the OSA, Chair of the IEEE TAB Ethics and Member Conduct Committee, and General Co-Chair of the Conference on Lasers and Electro-Optics (CLEO). Prof. Willner has 875 publications, including one book, 25 U.S. patents, 17 keynotes/plenaries, and 16 book chapters. His research is in optical communications, optical signal processing & networks, fiber optics, and optical technologies.

Rod C. Alferness

Member

Dr. Rod C. Alferness [NAE] is the Chief Scientist at Bell Labs, Alcatel-Lucent. Prior to this position, he was the Bell Labs Research Senior Vice President. He has also served as the Bell Labs Optical Networking Research Senior Vice President and was the Chief Technical Officer and Advanced Technology and Architecture Vice-President of the Optical Networking Group, Lucent Technologies. Prior to that role, he was head of the Photonics Networks Research Department of Bell Labs, Lucent Technologies. Dr. Alferness joined Bell Labs in 1976 after receiving a Ph.D. in physics from the University of Michigan where his thesis research, under the supervision of Professor Emmett Leith, concerned optical propagation in volume holograms. His early research at Bell Labs included the demonstration of novel waveguide electro-optic devices and circuits - including switch/modulators, polarization controllers, tunable filters - and their applications in high capacity lightwave transmission and switching systems. This research led to the early development of titanium diffused lithium niobate waveguide modulators that are now deployed as the high-speed signal-encoding engine in fiber optic transmission systems around the world. Dr. Alferness has also made contributions in photonic integrated circuits in InP, including widely tunable lasers, as well as in photonic switching systems and reconfigurable WDM (wavelength-division-multiplexed) optical networks. In the mid-90's, he was an originator and the Bell Labs Program Manager for the DARPA funded MONET project which demonstrated the feasibility of wavelength routed optical networks that are now being implemented for both backbone and metro networks. Dr. Alferness has authored over 100 papers, holds 30 patents and has authored five book chapters. Dr. Alferness is a member of the National Academy of Engineering. He is a Fellow of the Optical Society of America and the IEEE Lasers and Electro-Optics Society (LEOS). Dr. Alferness received the 2005 IEEE Photonics Award. He received the OSA Leadership Award in 2010. He served as an elected member of the Optical Society of America Board of Directors from 2001-2003.

He was the OSA President in 2008. He has served as an elected member of the LEOS AdCom and was the President of IEEE LEOS in 1997. He was General Co-Chair of the 1994 Optical Fiber Communications Conference (OFC'94). Dr. Alferness has served as Associate Editor for Optics Letters and for Photonic Technology Letters. He served as the Editor-in-Chief of the IEEE and OSA-sponsored Journal of Lightwave Technology from 1995-2000. Dr. Alferness currently serves on the International Advisory Board of the European Conference on Optical Communication (ECOC) Executive Management Committee.

Thomas M. Baer

Member

Dr. Thomas M. Baer is the Executive Director of the Stanford Photonics Research Center and a member of the Applied Physics Department at Stanford University. His current research is focused on developing imaging and analysis technology for exploring the molecular basis of developmental biology and neuroscience. From 1996 to 2005 Dr. Baer was the CEO, chairman, and founder of Arcturus Bioscience, a biotechnology company located in Mountain View, CA, which he established in 1996. Arcturus Bioscience pioneered the area of Microgenomics. Prior to Arcturus, Dr. Baer was Vice President of Research at Biometric Imaging. From 1981 to 1992 Dr. Baer was at Spectra-Physics, Inc., where he held positions as Vice-President of Research and Spectra-Physics Fellow. While at Spectra-Physics his research focused on ultra-fast lasers, optical pulse compression, diode-pumped solid-state lasers, and non-linear optics. Dr. Baer has made major contributions in the areas of biotechnology, quantum electronics, and laser applications, and is listed as an inventor on 60 patents and is a co-author on many peer reviewed publications in a number of different scientific fields. His commercial products have received many industry awards for design innovation. Co-founder of four companies in Silicon Valley, he was named entrepreneur of the year for emerging companies in Silicon Valley in 2000, by the Silicon Valley Business Journal. Dr. Baer graduated with a BA degree in Physics Magna Cum Laude from Lawrence University and received his MS and Ph.D. degrees in Atomic Physics from the University of Chicago. He is also an alumnus of Harvard Business School and in 1994 he received the Distinguished Alumni Award from Lawrence University. He has been elected to the status of Fellow in two international scientific societies, the American Association for the Advancement of Science and The Optical Society of America (OSA) and served as the President of OSA in 2009.

Joseph Buck

Member

Dr. Joseph Buck is the Vice President of Program Development at Boulder Nonlinear Systems, Inc. He is currently focused on integrating non-mechanical beam control capabilities into optical communications and ladar remote sensing and imaging systems. His work spans Department of Defense, academic, and commercial applications and markets. He has led cross-disciplinary teams to develop multi-function ladar sensors for 3D imaging, vibrometry, polarimetry, and optical aperture synthesis for both ground and flight systems. Dr. Buck has also extensively studied the limits of both coherent and direct detection theory as applied to communications, imaging, and remote sensing systems. Dr. Buck earned his Ph.D. in Physics from the California Institute of Technology, where he conducted experiments on the physics of individual atom-photon interactions using trapped atoms and high-finesse cavities, and research in the areas of quantum information processing as applied to communication protocols. Dr. Buck began his career with The Aerospace Corporation where he was a member of the team that pioneered some of the early demonstrations of optical aperture synthesis, and he led efforts to combine optical aperture synthesis and laser vibrometry. He then joined Lockheed Martin Coherent Technologies where he became a Principal Research Scientist leading teams that developed several new remote sensing systems. Dr. Buck is currently serving on the Active Optical Sensing committee for the OSA Conference on Lasers and Electro-Optics. Dr. Buck is a lifetime member of the Optical Society of America, the American Physical Society, and SPIE, and a member of IEEE LEOS.

Milton M. Chang

Member

Dr. Milton Chang is Managing Director, Incubic Management LLC. Dr. Chang has an exceptional investment track record, and founded Incubic to institutionalize this approach in a venture capital and management advisory firm. Milton has personally built Newport Corporation and New Focus Inc., to successful IPO, as CEO, and has provided the first capital to more than a dozen high-tech startup companies, all were successful. He is helpful to entrepreneurs and his operating principle is fairness. Having been an entrepreneur, he is effective as a sounding board to provide advice to entrepreneurs. He is active in the technical and business community and has received a number of prestigious awards from professional societies. He is a Fellow of the IEEE, Optical Society of America, and the Laser Institute of America, and a former President of IEEE Photonics Society and LIA. He is well-known for sharing his experience freely and writes monthly business columns for Laser Focus World and contributes articles to Photonics Spectra. Milton earned a B.S. in Electrical Engineering with highest honors from the University of Illinois, and M.S. and Ph.D. degrees in EE from the California Institute of Technology and completed the Harvard OPM Program. He has received the Distinguished Alumni Award from both the University of Illinois and Caltech and is a member of the Board of Trustees of Caltech and an Overseer of the Huntington Library.

Constance Chang-Hasnain

Member

Dr. Constance Chang-Hasnain is the John R. Whinnery Chair Professor for the Electrical Engineering and Computer Sciences Department, University of California, Berkeley. Professor Chang-Hasnain received her Ph.D. degree from the same department in 1987. Prior to joining the Berkeley faculty, Dr. Chang-Hasnain was a member of the technical staff at Bellcore (1987–1992) and an Assistant Professor of Electrical Engineering at Stanford University (1992–1996). She currently serves as Chair of the Nanoscale Science and Engineering (NSE) Graduate Group. She is also an Honorary Member of A.F. Loffe Institute (Russia), Chang Jiang Scholar Endowed Chair at Tsinghua University (China), Visiting Professor of Peking University (China) and National Jiao Tung University (Taiwan). Professor Chang-Hasnain's research interests span from devices to materials and physics, particularly focusing on new optical structures and nano-materials for integrated optoelectronics. Most recently, she and her students achieved ground-breaking results of nano-lasers on MOSFET-silicon based on their discovery of a brand new nanoneedle growth mode. Professor Chang-Hasnain is recognized by international scientific community with awards such as IEEE David Sarnoff Award 2011 for pioneering contributions to vertical cavity surface emitting laser (VCSEL) arrays and tunable VCSELs; Optical Society of America (OSA) Nick Holonyak Jr. Award 2007 from for significant contributions to vertical cavity surface emitting laser arrays, injection locking and slow light; and Japan Society of Applied Physics Microoptics Award 2009 for distinguished works and contributions to develop and to promote microoptics technologies. She received the Guggenheim Memorial Foundation

Fellowship 2009, Humboldt Research Award from Alexander von Humboldt Stiftung Foundation 2009, and Chang Jiang Scholar Endowed Chair Award from the Peoples Republic of China 2009. She was also awarded with the National Security Science and Engineering Faculty Fellowship, one of the most prestigious faculty fellowships by the Department of Defense. Prof. Chang-Hasnain has been the Editor in Chief of Journal of Lightwave Technology since 2007.

Charles M. Falco

Member

Professor Charles Falco has joint appointments in Optical Sciences and Physics at the University of Arizona where he holds the UA Chair of Condensed Matter Physics. He is a Fellow of four professional societies (the American Physical Society, the Institute of Electrical and Electronics Engineers (IEEE), the Optical Society of America, and the Society of Photo-optical Instrumentations Engineers (SPIE)), has published more than 250 scientific manuscripts, co-edited two books, has seven US patents and given over 400 invited talks at conferences, research institutions, and cultural organizations in 27 countries. In addition to his scientific research, he was co-curator of the Solomon R. Guggenheim museum's "The Art of the Motorcycle" which, with over 2 million visitors in New York, Chicago, Bilbao, and the Guggenheim Las Vegas, was by far the most successful exhibition of industrial design ever assembled. More recently, he and the world-renowned artist David Hockney found artists of such repute as van Eyck, Bellini and Caravaggio used optical projections in creating portions of their work. Two international conferences have been organized around these discoveries, and recognition for them includes the 2008 Ziegfeld Lecture Award from the National Art Education Association.

Erica R. Fuchs

Member

Erica R.H. Fuchs is an Assistant Professor in the Department of Engineering and Public Policy at Carnegie Mellon University. Her research focuses on the role of government in technology development and the effect of location on the competitiveness of new technologies. In 2008 she received the Oak Ridge Associated Universities Junior Faculty Enhancement Fellowship for her research on the impact of offshoring on technology directions, and in 2011 she received an NSF CAREER award for her research rethinking national innovation systems. Over the past year, she has been playing a growing role in national meetings on the future of U.S. advanced manufacturing. She also currently serves on the National Research Council committee on future trends and challenges in optical science. Before coming to CMU, Dr. Fuchs completed her Ph.D. in Engineering Systems at M.I.T. in June 2006. She also received her Masters and her Bachelors degrees from M.I.T. in Technology Policy (2003) and Materials Science and Engineering (1999), respectively. Prior to graduate school, Dr. Fuchs spent 1999-2000 as a fellow at the United Nations in Beijing, China. There, she conducted research at state-owned industrial boiler manufacturers on policies to encourage innovation. Her work has been published in High Temperature Materials and Processes, Journal of Lightwave Technology, Composite Science and Technology, International Journal of Vehicle Design, Issues in Science and Technology, Research Policy, and Management Science. Dr. Fuchs has been an invited speaker at a wide range of venues including the United Nations Industrial Development Organization, the U.S. Department of Commerce's National Advisory Council on Innovation and Entrepreneurship, and the Council on Foreign Relations.

Waguih S. Ishak

Member

Dr. Waguih S. Ishak is Division Vice President & Director for Corning West Technology Center, Corning Incorporated. Dr. Ishak's M.Sc. and Ph.D. degrees in electrical engineering (Magnetic Bubble Memories) were awarded by McMaster University, Ontario, Canada, in 1975 and 1978, respectively. In 1999, Waguih completed the Stanford Executive Program at Stanford University. In 1987, Waguih became the manager of the Photonics Technology Department of the Instruments & Photonics Laboratory at Hewlett and Packard, which is responsible for R&D programs in fiber optics, integrated optics, optoelectronics, micro-optics, and optical interconnects for applications in measurements. In 1995, Waguih was promoted to Director of the Communications & Optics Research Laboratory. Waguih led his R&D team in the areas of photonics (fiber optics, integrated optics, optoelectronics, and micro-optics) and integrated electronics. In 2003, Waguih became the Director of the Photonics & Electronics Research Lab at Agilent Labs, responsible for the R&D programs in photonics, high-speed electronics, sensors, semiconductor test, wireless communications and consumer electronics. In 2005, Waguih became the Vice President and Chief Technology Officer at Avago Technologies. Waguih manages the company's U.S. Advanced R&D Center and is responsible for creating technologies for its Electronic Components Business Unit. In 2007, Waguih joined Corning Incorporated as the Division VP and Director of the Corning West Technology Center. Waguih manages a team of scientists to develop applications for Corning's glass and fiber technologies and to conduct state-of-the-art research in the areas of microstructures and nanotechnology. Dr. Ishak's has seven patents, two book chapters, 75 publications and is currently Fellow, IEEE., Chairman of the Board-Elect, Optoelectronics Industry.

Prem Kumar

Member

Dr. Prem Kumar is the AT&T Professor of Information Technology for the EECS Department, at Northwestern University. Professor Kumar is also Director of the Center for Photonic Communication and Computing. He is also a Professor of Physics and Astronomy. He received his Ph.D. (1980) in physics from SUNY Buffalo and joined Northwestern in 1986 after spending five years at MIT. His publications include one edited book, one book chapter, six patents, 180 peer-reviewed journal papers, 45 proceedings articles, and 300 (90 invited) conference paper. His research focuses on photonic devices and applications utilizing the principles of nonlinear and quantum optics. Current development areas include generation, distribution, and ultrafast processing of quantum entanglement for cryptography and computing; novel optical amplifiers and devices for networked communications; and novel quantum light states for precision measurements and quantum imaging and sensing. He is a fellow of the OSA, APS, IEEE, IoP (UK), AAAS, and SPIE. In 2006 he received the Martin E. and Gertrude G. Walder Research Excellence Award from Northwestern University. In 2004 he received the 5th International Quantum Communication Award from Tamagawa University, Tokyo, Japan. He has been a Distinguished Lecturer for the IEEE Photonics Society, 2008-2010. He is active in professional societies (OSA, IEEE, APS, SPIE, and AAAS) in various roles including: OSA Long-Term Planning Group, 2008-10; General (Program) Chair, QELS 2008 (2006); Chair, Steering Committee: Int'l Conf. on Quantum Communication, Measurement, and Computing (QCMC) (Brisbane, 2010; Calgary, 2008; Tsukuba City, 2006; Cambridge, 2002; Evanston, 1998, Principal Organizer). He is the founder and managing partner of NuCrypt LLC in Evanston, IL.

David A. Miller

Member

Dr. David A.B. Miller [NAS/NAE] is the W. M. Keck Professor of Electrical Engineering, a Professor by Courtesy of Applied Physics, and a Co-Director of the Stanford Photonics Research Center at Stanford University. Dr. Miller received his B.Sc. from St Andrews University and, in 1979, the Ph.D. from Heriot-Watt University, both in Physics. He was with Bell Laboratories from 1981 to 1996, as a department head from 1987, latterly of the Advanced Photonics Research Department. He has served as Director of the Ginzton Laboratory and of the Solid State and Photonics Laboratory at Stanford. His research interests include physics and devices in nanophotonics, nanometallics, and quantum-well optoelectronics, and fundamentals and applications of optics in information sensing, switching, and processing. He has published more than 230 scientific papers, holds 69 patents, and is the author of Quantum Mechanics for Scientists and Engineers (Cambridge, 2008). Dr. Miller has served as a Board member for both the Optical Society of America (OSA) and the Institute of Electrical and Electronics Engineers (IEEE) Lasers and Electro-Optics Society (LEOS), and in various other society and conference committees. He was President of the IEEE LEOS in 1995. He has also served on Boards for various photonics companies, and on the Defense Sciences Research Council for DARPA. He was awarded the Adolph Lomb Medal and the R. W. Wood Prize from the OSA, the International Prize in Optics from the International Commission for Optics, and the IEEE Third Millennium Medal. He is a Fellow of OSA, IEEE, the American Physical Society, the Royal Society, the Royal Society of Edinburgh, holds Honorary Doctorates from the Vrije Universiteit Brussel and Heriot-Watt University, and is a Member of the National Academy of Sciences and the National Academy of Engineering.

Duncan T. Moore

Member

Dr. Duncan T. Moore [NAE], is the Rudolf and Hilda Kingslake Professor of Optical Engineering and Professor of Biomedical Engineering, as well as Professor of Business Administration in the William E. Simon Graduate School of Business Administration, at the University of Rochester. In 2006, he was also appointed Director for Entrepreneurship at the University and in 2007, he became the Vice Provost for Entrepreneurship. From 2004 until 2009, he was responsible for the \$3.6 million Kauffman grant on Entrepreneurship with a \$7.2 million matching from the University of Rochester. The Ph.D. degree in Optics was awarded to Dr. Moore in 1974 from the University of Rochester. He had previously earned a master's degree in Optics at Rochester and a bachelor's degree in Physics from the University of Maine. Dr. Moore has extensive experience in the academic, research, business, and government arenas of science and technology. He is an expert in gradient-index optics, computer-aided design, and the manufacture of optical systems. He has advised more than 50 graduate thesis students. In 1993, Dr. Moore began a one-year appointment as Science Advisor to Senator John D. Rockefeller IV of West Virginia. Dr. Moore was elected to the National Academy of Engineering in February 1998. Professor Moore's major areas of research are in gradient-index materials, computer-aided design (including design for manufacturing methods), the manufacture of optical systems, medical optics (especially optics for minimally invasive surgery), and optical instrumentation. His most recent Ph.D. thesis student topics have been: very high efficiency solar cells; polymer gradient index optics; built-in accommodation system for the eye; terahertz imaging; generalized three-dimensional index gradients; single-point diamond turning of glass; design methods for gradient-index imaging systems; effect of diffusion chemistry on gradient-index profiles formed via sol-gel; quantitative phase imaging in scanning optical microscopy; integration of the design and manufacture of gradient-index optical systems; and interferometric characterization of the chromatic dispersion of gradient-index glasses.

David C. Mowery

Member

Dr. David C. Mowery is William A. and Betty H. Hasler Professor of New Enterprise Development at the Walter A. Haas School of Business at the University of California, Berkeley and a Research Associate of the National Bureau of Economic Research. He received his undergraduate and Ph.D. degrees in economics from Stanford University and was a postdoctoral fellow at the Harvard Business School. Dr. Mowery taught at Carnegie-Mellon University, served as the Study Director for the Panel on Technology and Employment of the National Academy of Sciences, and served in the Office of the United States Trade Representative as a Council on Foreign Relations International Affairs Fellow. He has been a member of a number of National Research Council panels. During 2003-2004, he was the Marvin Bower Research Fellow at the Harvard Business School. His research deals with the economics of technological innovation and with the effects of public policies on innovation; he has testified before Congressional committees and served as an adviser for the Organization for Economic Cooperation and Development, various federal agencies and industrial firms. Dr. Mowery has published numerous academic papers and has written or edited a number of books, including the Oxford Handbook of Innovation; Innovation, Path Dependency, and Policy; Innovation in Global Industries; Ivory Tower and Industrial Innovation: University-Industry Technology Transfer Before and After the Bayh-Dole Act; Paths of Innovation: Technological Change in 20th-Century America; The International Computer Software Industry: A Comparative Study of Industry Evolution and Structure; U.S. Industry in 2000; The Sources of Industrial Leadership; Science and Technology Policy in Interdependent Economies; Technology and the Pursuit of Economic Growth; Alliance Politics and Economics: Multinational Joint Ventures in Commercial Aircraft; Technology and Employment: Innovation and Growth in the U.S. Economy; The Impact of Technological Change on Employment and Economic Growth; Technology and the Wealth of Nations; and International Collaborative Ventures in U.S. Manufacturing. His academic awards include the Raymond Vernon Prize from the Association for Public Policy Analysis and Management, the Economic History Association's Fritz Redlich Prize, the Business History Review's Newcomen Prize, and the Cheit Outstanding Teaching Award.

N. D. Sankey

Member

Dr. N. Darius Sankey is currently a Director of Portfolio Strategy at Intellectual Ventures. Dr. Sankey is also a Managing Director of Opteris, a Private Equity fund specializing in secondary transactions for the venture capital industry. Dr. Sankey has also served as a Managing Director at Zone Ventures, an affiliate venture capital fund of Draper Fisher Juvetson based in Los Angeles. Dr. Sankey led the Zone Ventures technology assessment efforts and oversaw its portfolio investments for over eight years, serving as a board member for several companies including Siimpel Corporation, Lumexis, Inc. and Microfabrica and Neven Vision (Acquired by Google). He has led several transactions in the micro electronics, wireless telecommunications, media & entertainment, and business & consumer software sectors. Dr. Sankey has a strong interest in strategizing market applications for basic science research on the university level. This interest has also led him to a position as a visiting professor at the Rady School of Business at the University of California, at San Diego (UCSD). Before his tenure at Zone Ventures, Dr. Sankey worked as a management consultant at McKinsey & Company, Inc. and held strategic planning, consulting, and R&D positions at RAND and AT&T Bell Laboratories. Dr. Sankey holds a B.S. in Physics and Electrical Engineering from MIT and a Ph.D. in Optical Engineering from the Institute of Optics, University of Rochester.

Edward White

Member

Mr. Edward White is the President of Edward White Consulting, LLC. He is also a native of New York State, and began his career at Kodak after earning a BS Mechanical Engineering from the University of Rochester. He later went on to earn an Executive MBA also from the University of Rochester. At Kodak, Mr. White has held a variety of management positions in Engineering, Research & Development, and the Business Units. As General Manager of Kodak's Optical Products Business Unit and Vice President Commercial Imaging Group, Mr. White led an organization responsible for designing and manufacturing optical systems for Kodak Products as well as for high tech customers external to Kodak. His global organization of over 1800 people included Engineering and Manufacturing operations located in the US, Europe, Latin America, China, Taiwan, and Japan with sales of \$100M. After retiring from Kodak in 2009, he took an interim position as President and CEO of JML Optical, a manufacturer of precision optical components and assemblies and in 2010 he founded Edward White Consulting, LLC. His consulting business specializes in assisting engineering and manufacturing companies solve challenging business and operational issues around the world. He is currently engaged helping companies improve operations in the US as well as establish new operations in China and India. Mr. White is active in his community and serves on several Not For Profit Boards. He currently chairs the Rochester United Way Services Corporation Board, is a member of the Finance Committee of the Greater Rochester United Way Services Corporation Board, and is a member of the Board of the Rochester's Children's Success Fund.