



2006 OSA Awards

OSA is proud to announce the winners of its 2006 awards and medals. The Society has chosen to honor these distinguished individuals because they have exhibited dedication, ingenuity and perseverance in attaining the highest level of scientific achievement in their chosen fields. The OSA Board of Directors approved the awards at its meeting in February. Most awards will be presented at Frontiers in Optics 2006, the 90th OSA annual meeting.

Overall Distinction in Optics

Frederic Ives Medal/ Jarus W. Quinn Endowment

The highest award of the Society, the Ives Medal recognizes overall distinction in optics



>> To **Erich P. Ippen** for laying the foundations of ultrafast science and engineering, and providing vision and sustained leadership to the optics community

Dr. Ippen received his Ph.D. from the University of California at Berkeley

in 1968 and was a member of the technical staff at Bell Laboratories from 1968 to 1980. In 1980, he joined the faculty of MIT, where he is now the Elihu Thomson Professor of Electrical Engineering and professor of physics. He is a member of the National Academy of Sciences, the National Academy of Engineering and the American Academy of Arts and Sciences.

At Bell Labs in the mid-1970s, Dr. Ippen and Charles Shank produced the first pulses of light shorter than 1 ps and carried out the first femto-second experiments in molecules, semiconductors and biological complexes. Since 1980, Dr. Ippen and his students have continued to advance femtosecond science and technology, decreasing pulse durations to less than two cycles, studying ultrafast phenomena in materials and developing compact short-pulse lasers and fiber-optic devices for optical communications and signal processing.

Esther Hoffman Beller Medal

In recognition of outstanding contributions to optical science and engineering education



>> To **Sang Soo Lee** for laying the foundation for optical science and engineering in Korea through 40-plus years of teaching and research

Dr. Lee received his Ph.D. from the Imperial College of Science and Technology in the United Kingdom. He was a research fellow at Harvard University from 1964 to 1965. He headed the physical research division at the Korea Atomic Energy Research Institute (KAERI) in 1961, and became director in 1967. In 1970, he was director-general for Korea's Office of Atomic Energy. He is professor emeritus and founding president of the Korea Advanced Institute of Science and Technology (KAIST).

Over his career, Dr. Lee has been a member of the National Academy of Science in Korea (1981), president of the Korean Physical Society (1979-1981), honorary president of the Optical Society of Korea (1989) and a fellow of OSA and the Institute of Physics in the United Kingdom. He was the vice president of the International Commission for Optics from 1993 to 1999 and a council member of UN University from 1989 to 1995.

In KAERI, Dr. Lee worked on the reactor Cerenkov radiation. He achieved the spectroscopy of the r-ray by measuring the decay mode of CR from the moment of scram of the reactor. In KAIST, his research was on laser development. He helped design the variable polarization dye laser for use in generating phase conjugate work, and the iodine photo-dissociation laser for use in various material processing. He developed a nearly aberration-free four-mirror system for various applications, including X-ray optics.

Max Born Award

In recognition of contributions to physical optics



>> To **Richart E. Slusher** for outstanding experimental contributions to quantum optics in squeezed state generation, in microcavity lasers and in optical pulse propagation through periodic and nonlinear media

Dr. Slusher is director of quantum information research at Lucent Technologies, Bell Laboratories in Murray Hill, N.J. He received his Ph.D. in physics from the University of California at Berkeley in 1965. Since then, he has conducted research in optical and quantum physics at Bell Laboratories. He directed a research department in optical, quantum and device physics beginning in 1977. He received the 1995 Arthur Schawlow Prize in laser spectroscopy from the American Physical Society (APS).

Dr. Slusher's research interests have included Raman scattering in solid He and semiconductors, light scattering from laboratory and Tokamak plasmas, laser annealing, nonlinear photonic crystals, nonlinear optical waveguides and fibers, optical microresonators, quantum optics and quantum computation. He and his collaborators were the first to observe squeezed light in 1985, a new quantum state of light with uncertainties in one field component below

the standard quantum limit. His current research involves scalable multiplexed ion traps for quantum computing.

Joseph Fraunhofer Award/ Robert M. Burley Prize

In recognition of significant accomplishments in optical engineering



>> To **Susumu Noda** for fabricating some of the world's most advanced photonic crystals and photonic crystal devices, working uncompromisingly at optical frequencies

Dr. Noda received his Ph.D. in electronics from Kyoto University, Japan, in 1991. From 1984 to 1988, he was with the central research laboratory at Mitsubishi Electric Corporation, where he studied optoelectronic devices, including distributed feedback lasers with a quantum well and grating-coupled surface-emitting lasers.

In 1988, he joined Kyoto University as an assistant professor in the department of electronic science and engineering. He became an associate professor in 1992 and a full professor in 2000.

Since joining Kyoto University in 1988, Dr. Noda has been studying quantum optoelectronics, including photonic and quantum nanostructures. He has been published in more than 200 scientific journals. Dr. Noda has also served as director of a research project on photonic crystals at Japan's Science and Technology Agency since 2000.

From 2003 to 2005, he served as a distinguished lecturer of the Institute of Electrical and Electronic Engineers/Lasers in Electro-Optics Society (IEEE/LEOS).

Goodman Book Writing Award

A new biennial award sponsored by OSA and SPIE and funded by the J.W. & H.M. Goodman Foundation, the Goodman Award recognizes a recent and outstanding book in the field of optics and photonics that has contributed significantly to research, teaching or the optics and photonics industry.

>> To **Harrison H. Barrett** and **Kyle J. Myers** for their book, *Foundations of Image Science*



Dr. Barrett received a Ph.D. in applied physics from Harvard in 1969. He worked for the Raytheon Research Division until 1974, when he came to the University of Arizona. He is a professor in the College of Medicine and the College of Optical Sciences, and he has appointments in applied mathematics and biomedical engineering as well as the Arizona Cancer Center.

In 1983, Dr. Barrett served as acting director of the Optical Sciences Center, and in 1990 he was named a regents professor. He is a fellow of OSA, IEEE, APS and the American Institute of Medical and Biological Engineering. He holds 22 U.S. patents and has written more than 150 technical papers. Under his direction, more than 50 students

have received their Ph.D. degrees.

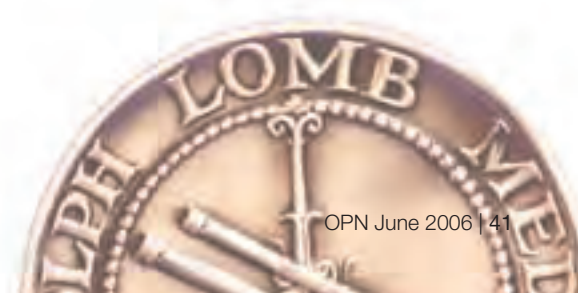
His awards include a Humboldt Prize, the 2000 IEEE Medical Imaging Scientist Award, an E.T.S. Walton Award from Science Foundation Ireland, and the 2005 C.E.K. Mees Medal from OSA.

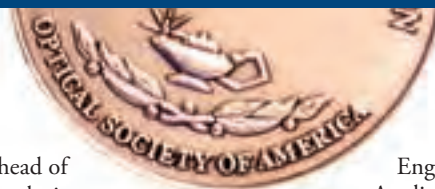
Dr. Barrett's current research is in image science, with applications in medicine and astronomy. He is director of the Center for Gamma-ray Imaging, an NIH-funded research resource that develops state-of-the-art instruments for radiotracer studies of small animals. He is also active in developing new methods for assessing and optimizing image quality and in applying parallel computers to tomographic imaging.



Dr. Myers received a Ph.D. in optical sciences from the University of Arizona in 1985. Following a post-doc at Arizona, she worked in the research labs of Corning Inc. Since 1987, she has worked for the Center for Devices and Radiological Health at the U.S. Food and Drug Administration, where she is currently the director of the Medical Imaging and Diagnostics Laboratory.

She has been an active participant and program committee member for the SPIE Medical Imaging Symposium





for many years. She is a member of OSA and the Medical Image Perception Society (MIPS), and she recently served as co-chair of the Medical Image Perception Conference sponsored by MIPS. She is a fellow of the American Institute for Medical and Biological Engineering.

The research group she directs is engaged in the areas of digital imaging system characterization, soft-copy display evaluation, computer-aided diagnosis, ultrasound imaging and tissue characterization and advanced statistical methods for imaging system evaluation.

Nick Holonyak Jr. Award

In recognition of significant contributions to optics based on semiconductor-based devices and optical materials, including basic science and technological applications



>> To **James J. Coleman** for a career of contributions to quantum well and strained-layer semiconductor lasers through innovative epitaxial growth methods and novel device designs

Dr. Coleman received his degrees in electrical engineering from the University of Illinois, Urbana.

After working at Bell Laboratories and Rockwell International, he returned to the University of Illinois, where he holds the Intel Alumni Endowed Chair in Electrical and Computer Engineering. He is a fellow of OSA, IEEE, APS and AAAS. He received the William Streifer Scientific Achievement Award and the ISCS Heinrich Welker Award, and was an IEEE/LEOS Distinguished Lecturer.

Dr. Coleman and his students are studying quantum dots, quantum well heterostructures and low-threshold and high-power single-mode index-guided lasers. They have demonstrated reliable low-threshold index-guided lasers and high-power lasers from lattice-mismatched strain-accommodated InGaAs-GaAs heterostructures. This work has helped to confirm the counter-intuitive notion that strained layer lasers—which are now a critical component of fiber optic telecommunications systems—are indeed reliable in the 980 nm wavelength range.

Edwin H. Land Medal

In recognition of pioneering entrepreneurial creativity that has had a major public impact (co-sponsored with the Society for Imaging Science and Technology)



>> To **George H. Heilmeyer** for the discovery of new electro-optic effects in liquid crystals, and visionary anticipation of today's liquid crystal displays

Dr. Heilmeyer received his Ph.D. in solid-state electronics from Princeton University. In 1966, he

became head of solid state device research at RCA Laboratories. His work with electro-optic effects in liquid crystals led to the first liquid-crystal displays for calculators, watches, computers and instrumentation.

In 1970, he was chosen as a White House fellow working on long-range research and development planning and technology assessment as a special assistant to the Secretary of Defense. A year later, he was appointed assistant director of defense research and engineering. He became director of the Defense Advanced Research Projects Agency (DARPA) in 1974.

In 1977, Dr. Heilmeyer joined Texas Instruments as vice president responsible for R&D in petroleum exploration, systems technology, microelectronics and software for TI's equipment businesses. In 1978, he was appointed vice president of corporate research, development, engineering and strategic planning. He was named senior vice president and chief technical officer in 1983.

He has received numerous awards, including the National Medal of Science by President Bush (1991), the National Academy of Engineering Founders Award (1992) and the Eta Kappa Nu's Vladimir Karapetoff Eminent Members' Award (1993). He won the IEEE Medal of Honor in 1997 and the John Fritz Award in 1999.

Dr. Heilmeyer is a member of the Defense Science Board, the National Security Agency Advisory Board, the Board of Directors of the MITRE Corporation, the National Academy of Engineering, the General Motors Technology Advisory Board and the Board of Overseers of the University of Pennsylvania's School of

Engineering and Applied Science.

He is an IEEE fellow and a member of the American Academy of Arts and Sciences.

Dr. Heilmeyer is chairman emeritus of Telcordia Technologies, formerly Bellcore. Prior to his retirement in 1997, he was chairman and chief executive officer. He is also a former director of ADP Corp, TRW and Compaq Computer Corp.

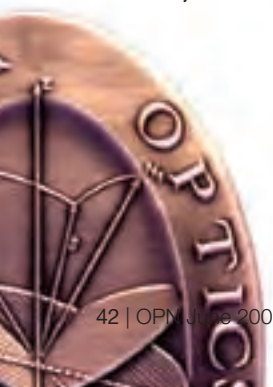
Ellis R. Lippincott Award

In recognition of contributions to vibrational spectroscopy (co-sponsored with the Coblenz Society and the Society for Applied Spectroscopy)



>> To **Hai-Lung Dai** for seminal studies of the structure/dynamics of radicals, highly excited molecules, adsorbates and buried interfaces at surfaces through innovative spectroscopic techniques, and for demonstrating extraordinarily efficient transition-dipole-mediated vibrational energy transfer

Dr. Dai received his Ph.D. from the University of California at Berkeley in 1981. After postdoctoral study at MIT, he began his career at the University of Pennsylvania, where he served as chairman of the chemistry department from 1996 to 2002 and is currently the Hirschmann-Makineni professor of chemistry and director of the Penn Science Teacher Institute. He is the



2006 chair of the APS chemical physics division.

Dr. Dai has published 140 papers and edited several monographs in molecular and surface sciences. His major research accomplishments resulted from working with more than 50 Ph.D. and postdoctoral students. Their achievements include discovering how long-range interactions contribute to collision energy transfer, developing fast time-resolved and multiple resonance spectroscopy for detecting highly excited molecules and transient radicals, and developing nonlinear optical spectroscopy for probing molecule-surface interactions.

Adolph Lomb Medal

In recognition of noteworthy contributions made to optics before reaching the age of 35



>> To **John Charles Howell** for innovative contributions in quantum optics, particularly to aspects of quantum cloning, violations of Bell's inequalities and maximal photonic entanglement

Dr. Howell received his Ph.D. in physics from Pennsylvania State University. For his postdoctoral work, he joined Dirk Bouwmeester's group at Oxford University. In 2002, he joined the department of physics and astronomy at the University of Rochester.

Dr. Howell's research interests can be broadly categorized as experimental quantum information and atomic vapor physics. He has participated in experimental realizations of universal quantum cloning, phase-covariant quantum cloning, a momentum-position realization of the Einstein-Podolsky-Rosen paradox, quantum imaging, qudit quantum information and high bandwidth quantum entanglement. His group has also recently demonstrated many fractional delays in a hot alkali vapor and low-light cross-phase modulation.

William F. Meggers Award

In recognition of outstanding work in spectroscopy



>> To **Jun Ye** for development of innovative spectroscopic techniques based on femtosecond optical frequency combs

Dr. Ye received his Ph.D. from the University of Colorado, Boulder, in 1997. He was an R.A. Millikan Postdoctoral Fellow at the California Institute of Technology from 1997 to 1999. He has been a fellow of JILA, the National Institute of Standards and Technology (NIST) and the University of Colorado since 2001. He has been a fellow of NIST since 2004. He is also a fellow of the APS and OSA.

His research interests include precision measurement, ultracold

atoms and molecules, optical frequency metrology, and ultrafast science and quantum control. He has co-authored more than 150 technical papers and is a recipient of a number of awards from professional societies and government agencies, including the Adolph Lomb Medal from OSA, the Arthur S. Flemming Award, the Presidential Early Career Award for Scientists and Engineers and the Commerce Department group Gold Medal from the U.S. government.

David Richardson Medal

In recognition of contributions to optical engineering, primarily in the commercial and industrial sectors

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>> To **Gary S. Duck** for innovation and leadership in the development and manufacture of optical components and instrumentation for the realization of practical and reliable wavelength-division-multiplexed optical fiber telecommunications systems

Mr. Duck received his M.Sc. in engineering physics at McMaster University in Hamilton, Ontario, Canada. He started his career in the late 1970s at Bell-Northern Research, where he was one of a team of physicists who designed first-generation components for fiber optic systems. In 1981, he and three other co-workers (Jozef Straus, Bill Sinclair and Philip Garel-Jones) co-founded JDS Optics. The company provided the telecom industry with the

necessary passive optical components and instruments required for developing optical networks. In 1996, the company merged into JDS Uniphase Inc. and became the world's largest supplier of a full range of fiber optic hardware.

During his career at JDS Uniphase, Mr. Duck held vice president positions and worked on the research, development and manufacture of numerous passive optical components. He specialized in WDM technology, which was one of the keys to meeting the explosive growth in bandwidth requirements demanded by the telecommunications industry in the late 1990s. In 1999, Mr. Duck was made a fellow at JDS Uniphase. He retired from JDS Uniphase in 2001 and is currently self-employed at Ventana Management Services in Ottawa.

During his 25-year career in fiber optics, Mr. Duck developed or co-developed numerous optical components for the telecom industry. Most were used in the implementation of WDM systems to greatly increase the capacity of optical networks. He was also involved in the manufacture and volume production processes for many of these devices, and the development of generic techniques for improving optical isolation, return loss, directivity and polarization properties of components. He holds more than 40 patents.



Edgar D. Tillyer Award

In recognition of distinguished work in the field of vision



>> To **Donald I.A.**

MacLeod for unparalleled virtuosity in the psychophysical dissection of the visual pathway into the stages that culminate in color, spatial and temporal vision

Dr. MacLeod attended Glasgow University in Scotland. Following a year at the Institute for Perception in Soesterberg, he went to Cambridge, where he worked under the guidance of Paul Whittle in the Psychological Laboratory and William Rushton in the department of zoology.

In 1974, after a visiting appointment in the Institute of Molecular Biophysics at Florida State University, he joined (together with Bob Boynton) the department of psychology at the University of California, San Diego, where he remains today.

Dr. MacLeod's research experience and current interests are in color vision, visual sensitivity and visual resolution. He strives to understand the process of human vision in physiological or mechanistic terms, generally using the tools of psychophysics in conjunction with electrophysiological and anatomical data from animals to trace the sequence of operations that occurs as information flows from the retina to the brain.

Charles Hard Townes Award

In recognition of outstanding contributions to quantum electronics



>> To **Orazio Svelto** for

pioneering work on ultrashort laser pulses and solid state lasers, and for the invention of the hollow-fiber compressor, leading to advances in extreme nonlinear optics and attosecond science

Orazio Svelto received his "Laurea" degree in nuclear engineering in 1960 and the "Libera Docenza" degree in quantum electronics in 1967.

Since 1975, he has been director of the Center of Quantum Electronics of the Italian National Research Council. He has been a professor of quantum electronics at the Polytechnic School of Milan since 1976. He is a fellow of OSA and IEEE and a member of the Italian Academies "Accademia dei XL" and "Accademia dei Lincei."

Dr. Svelto's research has covered much in the fields of laser physics and quantum electronics, starting from the beginnings of these disciplines. He has worked on ultrashort-pulse generation and applications, development of novel laser resonators and mode-selecting techniques, laser applications in biology and biomedicine and the development of novel solid-state lasers.

He is the author of the book *Principles of Lasers*, which is

presently in its fourth edition. Among other inventions, he is credited for creating the hollow-fiber compressor, which has allowed generation of high-energy few-cycle laser pulses with applications in extreme nonlinear optics and attosecond sciences.

John Tyndall Award

In recognition of contributions to fiber optic technology (co-sponsored with IEEE/LEOS)



>> To **Donald R. Scifres** for

seminal contributions to semiconductor laser diode technology that powers the optical fiber networks and for being an entrepreneur in creating one of the premier companies that bring to practice the semiconductor diode laser technology to serve the fiber optics industry

Dr. Scifres received his Ph.D. in electrical engineering from the University of Illinois in 1972. That year, he joined Xerox PARC and set up a new laboratory for the study of semiconductor lasers and integrated optics.

In 1974, he and his co-workers reported and patented the first distributed feedback semiconductor injection laser, which became the preferred light source for high-speed long-distance optical fiber communications. Dr. Scifres also performed pioneering work

on integrated optical devices, vertical cavity surface emitting lasers and high power semiconductor lasers for communications, medical, industrial and aerospace applications.

Based on this work, Dr. Scifres co-founded SDL, Inc., in 1983. He served as CEO, president and chairman of the board of SDL, Inc. until February 2001, when SDL merged with JDS Uniphase Corporation in the largest technology buyout reported at that time.

He served as co-chair and chief strategy officer of JDS Uniphase until January 2003. After that, he founded SDL Ventures, LLC, an investment firm focused on early stage investments in the fields of lasers, photonics, fiber optics and microwave communications.

Dr. Scifres is a fellow of IEEE and OSA and a member of the National Academy of Engineering, APS and SPIE. He holds more than 140 U.S. patents, and has published more than 300 technical articles and book contributions.

He has received a number of IEEE awards, including the Jack Morton Medal (1985), the LEOS Award for Engineering Excellence (1994), the Third Millennium Medal (2000), and the Robert Noyce Medal (2003).

He has also received OSA's Edward H. Land Medal (1996), the APS George E. Pake Prize (1997), the Rank Prize (2001) from The Rank Foundation of the United Kingdom and the Eta Kappa Nu Eminent

Member Award (2003). Dr. Scifres has served as president of IEEE/LEOS, the Laser and Electro Optics Manufacturers Association and as a member of the board of directors of OSA and the board of governors of IEEE/LEOS.

R. W. Wood Prize

In recognition of an outstanding discovery, scientific or technological achievement or invention

>> To **Louis E. Brus, Alexander L. Efros** and **Aleksey Ekimov** for the discovery of nanocrystal quantum dots and pioneering studies of their electronic and optical properties



Dr. Brus has a Ph.D. from Columbia University in chemical physics. As a lieutenant in the U.S. Navy, he worked in the solid state and chemistry divisions of the Naval Research Laboratory.

In 1973, he joined the chemistry and materials research area of Bell Laboratories in Murray Hill, N.J. He joined the Columbia faculty in 1996.

At NRL, Dr. Brus worked on chemical lasers, chemisorptive luminescence and molecular radiationless transitions. In Bell

Labs, he studied small molecule relaxation dynamics in rare gas solids and transient Raman structures of short-lived chemical intermediates.

After 1983, he focused on semiconductor nanocrystal synthesis, spectroscopy and theory. Confocal microscope methods were developed to record the luminescence of single molecules and nanocrystals at 23° C.

At Columbia, his research interests include carbon nanotubes, local electromagnetic field enhancement and transition metal oxide nanocrystals.



Dr. Efros received his Ph.D. from St. Petersburg Technical University. From 1981 to 1990, he worked at the Ioffe Institute, Leningrad. From 1990 to 1992, he worked at the Physics Department of the Technical University of Munich.

Since 1999, he has been a senior researcher at the Naval Research Laboratory, where he started to work as a consultant in 1993. He is a co-author on more than 140 articles and a fellow of the APS.

Dr. Efros's research has been on the theory of optical, transport and magnetic properties of low-dimensional semiconductor structures, including linear and nonlinear

optical properties of nanocrystals, nanorods, nano-wires and quantum wells; optically active Si-based structures, Auger processes and impact ionization, and the influence of magnetic and electric fields on the optical spectra of low-dimensional structures; and the theory of optical and electric field manipulation of electron spin and an electron spin coherence time for spintronics and quantum information processing.



Dr. Ekimov graduated from the Leningrad State University and joined the A.F. Ioffe Physical-Technical Institute of the Russian Academy of Sciences in 1968.

In 1977, he joined the S.I. Vavilov State Optical Institute as a senior research associate and group leader. He joined the Ioffe Institute as a leading research associate in 1990. He received a Candidate degree (Ph.D) and doctor degree (habilitation) at the A.F. Ioffe Physical-Technical Institute in 1974 and 1990, respectively. Since 1999, he has been at Nanocrystals Technology Inc.

While in the Ioffe Institute, his research resulted in the first observation of optical pumping and optical detection

of spin-polarized electrons and nuclei in semiconductors. His principal research interests over the past 25 years have been in the areas of quantum confinement of electronic and vibronic excitations in semiconductor nanocrystals.

In 1976, he received a State Prize in Physics of the U.S.S.R. and, in 1996, he was awarded the Alexander von Humboldt Senior Scientist Award. He is a member of the APS.



About the 2007 Awards

For information on nominating candidates for next year's awards, please contact the OSA Executive Office Programs Department at 202-416-1969 or e-mail awards@osa.org.

To learn more, visit the OSA Web site: www.osa.org

