CURRICULUM VITAE

William Esco (W. E.) Moerner
Harry S. Mosher Professor and Professor of Applied Physics (courtesy)
Department of Chemistry and Biophysics Program
Stanford University, Stanford, California 94305-5080
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Education

1975	B.S. Physics (Final Honors) B.S. Electrical Engineering (Final Honors) A.B. Mathematics (summa cum laude)	Washington University St. Louis, Missouri
1978	M.S. (Physics)	Cornell University Ithaca, New York
1982	Ph.D. (Physics)	Cornell University Ithaca, New York

Thesis Topic: Vibrational Relaxation Dynamics of an IR-Laser-Excited Molecular Impurity Mode in Alkali Halide Lattices
Thesis Advisor: Professor A. J. Sievers

Academic Honors

1963-82	Grade Point Average of All A's (4.0)
1971-75	Alexander S. Langsdorf Engineering Fellow, Washington University
1975	Dean's Award for Unusually Exceptional Academic Achievement
1975	Ethan A. H. Shepley Award for Outstanding Achievement (university-wide)
1975-79	National Science Foundation Graduate Fellow

Career Summary

2016-	Affiliated Faculty Member, Stanford Neurosciences Institute
2014-	Faculty Fellow, Sarafan ChEM-H at Stanford
2011-2014	Chemistry Department Chair
2005-	Professor, by courtesy, of Applied Physics
2002-	Harry S. Mosher Professor of Chemistry
1998-	Professor of Chemistry Department of Chemistry Stanford University

Multidisciplinary education and research program on single-molecule spectroscopy, imaging, and quantum optics in solids, proteins, and liquids; single-molecule biophysics in cells; nanophotonics of metallic nanoantennas; and photoactive polymer materials with emphasis on photorefractive polymers. Major milestones include: first room-temperature single-molecule source of single photons, antibunching for a single CdSe/ZnSe nanocrystal, observation of nucleotide-dependent orientational flexibility of single kinesin motors bound to microtubules, single-pair FRET for a dual-GFP sensor of calcium ion concentrations, full characterization of the single-copy properties of DsRed fluorescent proteins, first analysis of diffusion of single MHCII transmembrane protein complexes in cells, discovery of a new class of single-molecule fluorophores and development of these for cellular imaging, direct measurement of local electromagnetic field enhancement for bowtie nanoantennas and their use in surface-enhanced Raman scattering and in enhancing single-molecule fluorescence, observation of single GFP fusions in bacteria acting as nanoscale, photoswitchable light sources to show super-resolved cellular structures, invention of a new trap for nanoscale objects and single biomolecules in solution, observation of specific ATP-induced conformational changes for a model substrate interacting with the chaperonin GroEL/ES, determination of ADP number distributions for single multi-subunit enzymes in solution, cellular imaging of huntingtin protein aggregates and behavior of signaling proteins in the Hedgehog pathway of the primary cilium, and demonstration of 3D superresolution imaging and tracking of single photoactivatable molecules, cellular structures, DNA loci in yeast chromatin, and cellular mRNA particles with a double-helix point-spread function microscope. Numerous studies of protein and oligonucleotide motions and distributions in *Caulobacter crescentus* beyond the diffraction limit. First method for correction of dipole-induced shifts in single-molecule localization imaging, analysis of the impact of orientation flexibility on this effect. Development of various pupil-plane phase modulation strategies to extract additional information from single-molecule images, and invention of TILT-3D super-resolution microscope for thick cells. Application of the ABEL trap to the analysis of photosynthetic antenna protein photodynamics, G-protein-coupled receptors, single fluorophores, single electron-transfer enzymes in solution, redox behavior in single carboxysomes, and direct detection of mobility and diffusion coefficient of single biomolecules. Trapping of single nanoscale objects without fluorescence, with label-free interferometric scattering. Correlative low-temperature single-molecule localizations to provide single-molecule annotations of cryo-electron tomography images. Applications of deep neural nets for phase retrieval and structured background estimation for single-molecule localization microscopy in 3D. Direct measurement of lack of dipole character for stimulated emission. Super-resolution atlas of viral RNA and protein locations for SARS-CoV-2 infection of mammalian cells. Label-free interferometric image scanning microscopy for 120 nm resolution imaging in live cells.

1995-1998 First Holder, Distinguished Chair in Physical Chemistry
Professor of Chemistry
Department of Chemistry and Biochemistry
University of California San Diego

Multidisciplinary education and research program on single-molecule spectroscopy and quantum optics in solids, proteins, and liquids; single-molecule biophysics, near-field microscopy; and photoactive polymer materials with emphasis on photorefractive polymers.

Major milestones include 3-D studies of single molecules diffusing in gels, observation of blinking and switching in single GFP molecules, pumping of single molecules with whispering gallery modes of microspheres, and beam fanning and self-pumped phase conjugation in new extremely high gain photorefractive polymers. Research group included four postdoctoral research associates, three graduate students, and three undergraduates.

1994-95 Research Staff Member and Project Leader
IBM Almaden Research Center
San Jose, California

Multidisciplinary research program on single-molecule spectroscopy, near-field optics, and photorefractive (PR) polymers. Project leader for ARPA contract on PR polymers.

1993-1994 Visiting Guest Professor and IBM Research Staff Member
Laboratory for Physical Chemistry
ETH Zentrum (Swiss Federal Institute of Technology)
Zürich, Switzerland

Research program in single-molecule spectroscopy, spectral hole-burning, and near-field optics. Educated and supervised 4 Ph.D. students and two visiting scientists; lectured on single-molecule laser spectroscopy and photorefractive polymers. Major accomplishments included discovery and imaging of single molecules in Shpol'skii matrices and the first near-field single-molecule spectroscopy. Continued as consultant on IBM project on photorefractive polymer materials research and development.

1989-1993 Research Staff Member and Project Leader
IBM Almaden Research Center
San Jose, California

Multidisciplinary research program in Organic Optoelectronic Materials Department with two main thrust areas: (i) precision fundamental spectroscopy of defect centers in solids including single-molecule detection and spectroscopy, statistical fine structure, and spectral hole-burning, and (ii) optical and physical properties of nonlinear materials, including organic photorefractive polymeric materials.

Novel accomplishments:
Single-Molecule Spectroscopy and Spectral Hole-Burning:

Phase-sensitive, time-resolved study of ballistic phonon propagation in a solid; direct observation of spectral diffusion in a solid using a single-molecule probe; observation of lifetime-limited linewidths, dephasing, and nonlinear saturation for a single molecule; observation of hole-burning and spectral diffusion for a single molecule in a polymer; observation of photoinduced reaction kinetics for a single molecule; observation of photon antibunching for a single molecule in a solid; measurement of vibrationally dispersed fluorescence from a single molecule in a crystal and in a polymer; and magnetic resonance of a single molecular spin.

Organic Nonlinear Materials:

Intracavity second harmonic generation in an organic crystal; observation of photorefractivity in a polymer; demonstration of two-beam coupling in a photorefractive polymer; subsecond photorefractive response in a polymer; sensitization of a photorefractive polymer with C_{60}; development of photorefractive polymers with net gain and efficiency sufficient to surpass some conventional inorganic crystals; and image storage in a photorefractive polymer.

1988-1989 Manager, Laser-Materials Interactions
IBM Almaden Research Center
San Jose, California

Managed Research Staff Members in Laser-Materials Interactions Project which concentrated on laser spectroscopy of solids and quantum optics. Continued research on statistical properties of inhomogeneously broadened lines and on mechanisms of the photorefractive effect in electro-optic crystals. Major accomplishment: first optical detection and spectroscopy of a single impurity molecule in a solid.

1981-1988 Research Staff Member
IBM Almaden Research Center
San Jose, California

Performed individual research on materials and mechanisms for frequency domain optical storage using high resolution, low temperature laser spectroscopy and photochemical and nonphotochemical hole-burning spectroscopy. Developed high sensitivity measurement techniques such as laser frequency modulation, optical normalization, and ultrasonic modulation to measure extremely small changes in optical absorption.

Novel accomplishments:

Photochemical hole burning at GaAs laser wavelengths, observation of high efficiency photochemistry for an infrared color center; observation of two-photon absorption for linear polyenes in crystals using cw lasers; detailed studies of hole-burning bottlenecks for organic and inorganic systems; use of the quantum-limited sensitivity of FM spectroscopy to measure the stimulated Raman gain in deuterium; use of high resolution ultrasonic modulation to detect photochemical holes; observation of photochemical hole production in 100 ns; complete analysis of coupled reading-writing constraints for single-photon hole-burning materials leading to the need for photon-gating; observation of photon-gated hole-burning in an organic system; development of photon-gating via a donor-acceptor electron transfer mechanism, which allowed fast (30 ns) hole formation in small focused laser spots; and observation of statistical fine structure in an inhomogeneously broadened spectral line.

1975-1981 Graduate Research Assistant and NSF Graduate Fellow
Laboratory for Atomic and Solid State Physics,
Cornell University, Ithaca, New York

Performed basic research on the vibrational relaxation dynamics of molecular impurities in alkali halides. Principal techniques included low temperature laser saturation, high resolution spectral hole burning, and coherent transient spectroscopy with CO_2 and PbSnTe diode lasers.

Major accomplishments were the first measurements of T_1 and T_2 for ReO_4^- molecules in a variety of alkali halide hosts, and the discovery of persistent nonphotochemical spectral hole burning for a molecular vibrational mode in a crystalline lattice.

1972-1975 Research Assistant
Department of Physics
Washington University, St. Louis, Missouri

Performed experiments, computer simulations, and theory to develop more accurate formulae for the determination of ultrasonic propagation velocity and dispersion in composite resonators. Assisted in ultrasonic studies of the magnetoelastic properties of single crystal Co and Ni.

1970-1971 Statistical Computer Programmer
Department of Biomedical Engineering
University of Texas Medical School at San Antonio, Texas

Wrote and/or executed a large number of statistical analysis programs up to the complexity of factor analysis for comparative analysis of a large data base of measured taxa distributions in the Kuroshio Sea, under the mentorship of Dr. Richard G. Domey.

Honors and Awards

Pioneer Award, Precision Medicine World Conference 2026
Fellow of the Biophysical Society 2023, for achieving the first optical detection and spectroscopy of a single molecule in condensed phases and for establishing optical study of single molecules for broad applications in biophysics
W. E. (William E.) Moerner **Festschrift**, *The Journal of Physical Chemistry* virtual special issue, February 17, 2022
Co-recipient, Chemistry Biology Interface Division Horizon Prize from the Royal Society of Chemistry, 2021
Hall of Honor, Sigma Xi, The Scientific Research Honor Society, 2018
Wu Zheng Kai Chemistry Prize, Fudan University, 2018
Distinguished Eagle Scout Award, National Eagle Scout Association, 2017
Photonics Pioneer Award, Duke University Fitzpatrick Institute for Photonics, 2016
Distinguished Alumnus Award, Washington University, St. Louis, 2015
Julio Palmaz Award for Innovation in Healthcare and Biosciences, Biomed SA, 2015
Fellow, SPIE-The International Society for Optics and Photonics, 2015
Honorary Fellow, Royal Society of Chemistry, 2015
Nobel Prize in Chemistry, 2014
John Gamble Kirkwood Medal for Outstanding Achievement in Science, from Yale University and the New Haven Section of the American Chemical Society, 2013
Engineering Alumni Achievement Award, Washington University, 2013
Peter Debye Award in Physical Chemistry, 2013
Pittsburgh Spectroscopy Award, 2012
Irving Langmuir Prize in Chemical Physics, 2009
Wolf Prize in Chemistry, 2008
Member, National Academy of Sciences, 2007

Fellow, American Association for the Advancement of Science, 2004
Geoffrey Frew Fellow, Australian Academy of Sciences, 2003
Fellow, American Academy of Arts and Sciences, 2001
Earle K. Plyler Prize for Molecular Spectroscopy, American Physical Society, 2001
Robert Burns Woodward Visiting Professor, Department of Chemistry, Harvard University, 1997-1998
IBM Outstanding Technical Achievement Award for Single-Molecule Detection and Spectroscopy, November 22, 1992
Fellow, American Physical Society, November 16, 1992
Fellow, Optical Society of America, May 28, 1992
Senior Member, Institute of Electrical and Electronics Engineers, June 17, 1988
IBM Outstanding Technical Achievement Award (with R. M. Macfarlane and R. M. Shelby) for Photon-Gated Spectral Hole-Burning, July 11, 1988
National Winner of the Roger I. Wilkinson Outstanding Young Electrical Engineer Award for 1984, from the electrical engineering honorary society, Eta Kappa Nu, April 22, 1985

Doctor Honoris Causa

University Aix Marseille, November 9, 2016
University of Chile, December 10, 2015

Honorary Professorships

Huazhong University of Science and Technology, Wuhan, China, November 2019
Moscow State Pedagogical University, Moscow, Russia, August 2018
Fudan University, Shanghai, China, July 2018

Named Lectureships

Henry Eyring Lecturer, Department of Chemistry, University of Utah, April 2025
LeRoy Eyring Lecturer, School of Molecular Sciences, Arizona State University, October 2024
Closs Lecturer, Department of Chemistry, University of Chicago, April 2024
Futurist of the Year, SGMK Copernicus University, Poland, April 2024
Bryce. L. Crawford, Jr. Memorial Lecturer, Department of Chemistry, University of Minnesota, September 2023
Oliver Smithies Nobel Lecture, University of North Carolina, September 2020
Purdue College of Engineering Distinguished Lecture, Purdue University, February 2020
Physical Chemistry Student Select Lecture, University of Illinois at Urbana-Champaign, December 2019
J. T. Donald Lecturer, Chemistry Department, McGill University, Montreal, Canada, September, 2019
Jin Si Lecture, Fudan University, China, July 2018
Hermann Anton Haus Lecture, Massachusetts Institute of Technology, April 2018
Nelson Lecture, The University of Miami, April 2018
E. U. Condon Lecture, University of Colorado, Boulder, Colorado, February 2018
Munushian Lecture, Ming Hsieh Department of Electrical Engineering, Viterbi School of Engineering, University of Southern California, February 2017
Morris Travers Memorial Lecture, Indian Institute of Science, Bangalore, January 2017

Andreas C. Albrecht Memorial Lecture, Department of Chemistry and Chemical Biology, Cornell University, April 2016
Hightower Lecture, Department of Physics, Emory University, April 2016
Fred J. Robbins Memorial Lectures, Department of Chemistry, Pomona College, March 2016
Provost Lecture, Temple University, Philadelphia, Pennsylvania, March 2016
Wallace H. Coulter Lecture, Pittcon, Atlanta, Georgia, March 2016
Paul D. Gottlieb Lecture, Institute of Cellular and Molecular Biology, The University of Texas at Austin, February 2016
Sir Ernst Chain Lecture, Imperial College of London, November 2015
Samuel I. Weissman Memorial Lectures, Department of Chemistry, Washington University, St. Louis, Missouri, November 2015
Presidential Distinguished Lecture, The University of Texas Health Science Center at San Antonio, September 2015
Presidential Distinguished Lecture, The University of Texas at San Antonio, September 2015
Paul C. Cross Lecture, Department of Chemistry, University of Washington, May 2015
George B. Kistiakowsky Lecturer, Department of Chemistry and Chemical Biology, Harvard University, March 2015
John Gamble Kirkwood Lecturer, Department of Chemistry, Yale University, September 2013
Walter Kauzmann Lecturer in Biophysical Chemistry, Princeton University, September 2013
E. K. C. Lee Lecturer, Department of Chemistry, University of California, Irvine, May 2013
Samuel Krimm Lecture in Biophysics, University of Michigan, April 2013
Ehrenfest Colloquium Lecturer (repeat), University of Leiden, The Netherlands, June 2012
Pittsburgh Conference Lecturer, Department of Chemistry, University of Pittsburgh, 2011
Leica Scientific Forum United Kingdom Lecturer, June 2011
Willis Flygare Memorial Lecturer, Department of Chemistry, University of Illinois at Urbana-Champaign, 2011
Joe L. Franklin Lecturer, Department of Chemistry, Rice University, 2010
William Lloyd Evans Lecturer, Department of Chemistry, The Ohio State University, 2009
Karl Friedrich Bonhoeffer Lecturer, Max Planck Institute for Biophysical Chemistry, Göttingen, Germany, 2009
Neil Gordon Frontiers in Chemistry Lecturer, Department of Chemistry, Wayne State University, 2009
A. S. Noyes Lecturer, Department of Chemistry and Biochemistry, University of Texas at Austin, 2009
DuPont-Marshall Lecturer, Department of Chemistry, University of Pennsylvania, 2008
Herbert H. King Lecturer, Department of Chemistry, Kansas State University, 2006
Edwin Yunker Lecturer, Department of Physics, Oregon State University, 2006
A. R. Gordon Distinguished Lecturer, Department of Chemistry, University of Toronto, 2006
Lecturer, Summer School on Visualization, Manipulation, and Modeling of Single Biomolecules, ENS Paris, France, 2005
Geoffrey Frew Fellowship Lecturer, Australian Academy of Sciences (University of Queensland, Australian National University, Swinburne Institute of Technology, University of Melbourne), 2003
International Invited Lecturer (Basel, Berne, Lausanne, Geneva): Conference Universitaire de Suisse Occidentale du 3ème Cycle en Chimie, 2003
Moses Gomberg Lecturer, Department of Chemistry, University of Michigan, 2001

William Draper Harkins Lecturer, Department of Chemistry, University of Chicago, 2001
Guest Lecturer in Frontiers in Spectroscopy, Ohio State University, 1999
Arthur D. Little Lecturer, Department of Chemistry, Massachusetts Institute of Technology, 1995
Ehrenfest Colloquium Lecturer, University of Leiden, The Netherlands, March 1994
Samuel M. McElvain Lecturer, Department of Chemistry, University of Wisconsin, 1993

Patents

U. S. Patent 4,614,116: "Phase Sensitive Ultrasonic Modulation Method for the Detection of Strain-Sensitive Spectral Features", September 30, 1986.
U. S. Patent 5,064,264: "Photorefractive Materials", November 12, 1991.
U. S. Patent 5,361,148: "Apparatus for Photorefractive Two-Beam Coupling," November 1, 1994.
U. S. Patent 5,460,907: "Photorefractive Materials", October 24, 1995.
U. S. Patent 5,607,799: "Optical Photorefractive Article," March 4, 1997.
U. S. Patent 6,046,925: "Photochromic Fluorescent Proteins and Optical Memory Storage Devices Based on Fluorescent Proteins," April 4, 2000.
U. S. Patent 6,280,884: "Process for Photorefractive Index Grating Formation," August 28, 2001.
U. S. Patent 7,068,698 "Room-Temperature Source of Single Photons Based on a Single Molecule in a Condensed Matter Host," June 27, 2006.
U. S. Patent 8,057,655: "Sub-Micron Object Control Arrangement and Approach Therefor," Nov. 15, 2011 (provisional application filed August 20, 2004).
U. S. Patent 8,153,446 B2: "Fluorogenic Compounds Converted to Fluorophores by Photochemical or Chemical Means and Their Use in Biological Systems," April 10, 2012 (provisional application filed May 23, 2008).
U. S. Patent 8,693,742 B2: "Three-Dimensional Single-Molecule Fluorescence Imaging Beyond the Diffraction Limit Using a Double-Helix Point Spread Function," April 8, 2014 (provisional application filed December 17, 2008).
U. S. Patent 8,772,048 B2: "Fluorogenic Compounds Converted to Fluorophores by Photochemical or Chemical Means and Their Use in Biological Systems," July 8, 2014 (provisional application filed May 23, 2008).
U. S. Patent 9,075,010 B2: "Enhancement of Molecular Emission Using Optical-Antenna Structures," July 7, 2015 (provisional application filed October 15, 2010).
U. S. Patent 9,693,034 B2: "Apparatus and Method for Localizing Objects for Distance and/or in Three Dimensions Using a Spiral Point Spread Function," June 27, 2017, Disclosure filed May 17, 2012 (provisional filed December 13, 2011).
U. S. Patent 10,187,626 B2: "Apparatuses and Methods for Three-Dimensional Imaging of an Object," Issued January 22, 2019 (provisional filed April 10, 2015).
U. S. Patent 10,341,640 B2: "Multi-Wavelength Phase Mask," Issued July 2, 2019.
U. S. Patent 10,638,112 B2: "Apparatuses and Methods for Three-Dimensional Imaging of an Object" Issued April 28, 2020 (amendment filed January 17, 2019).
U. S. Patent 10,791,318 B2: "Multi-Wavelength Phase Mask," Issued September 29, 2020.

Application: "Firefly Luciferin Analogues, Methods of Making Firefly Luciferin Analogues, and Methods of Imaging," Provisional filed March 10, 2009.

Additional published disclosures in optics, frequency domain optical storage, single-molecule applications, microscopy, and photorefractive materials.

Professional Societies and Positions

Boards:

Director, Board of Directors, Bay Area Science and Innovation Consortium, 2024-
Member, Scientific Advisory Board, Syncell, 2023-
Member, Advisory Board, Double Helix Optics, 2019-
Trustee, Board of Trustees of the Society for Science, 2018-
Member, Advisory Board, Institute of Atomic and Molecular Sciences (IAMS) of Academia Sinica, Taiwan, 2005-2025
Member, Scientific Advisory Board, Max-Planck Institute for Biochemistry Martinsried, 2019-2023
Member, Scientific Advisory Board, Welch Foundation, 2017-2021
Member, World Laureates Association, 2017-2018, 2020

Journals:

International Advisory Board, *Angewandte Chemie*, 2017-2020
Associate Editor, *Quarterly Reviews of Biophysics-Discovery* 2015-2016
Advisory Editor, *ChemPhysChem* 2004-2018
Advisory Editor, *Chemical Physics Letters* 1998-2016
Editorial Advisory Board, *Journal of Physical Chemistry* 2013-2015
Advisory Editor, *Single Molecules* 2000-2002

American Academy of Arts and Sciences
American Association for the Advancement of Science
American Chemical Society
- Program Committee, Symposium on Optical Properties of Polymers, August 1996
- Single-Molecule Symposium Organizer, Physical Chemistry Division, April 1997
- Co-Editor, Special Issue of *Accounts of Chemical Research* on Single Molecules and Ions, December 1996

American Physical Society
- Chair, Herbert P. Broida Prize Committee 2000
- Member, Earle K. Plyler Prize Committee 2001
- Member, Irving Langmuir Prize Committee 2010
- Symposium Organizer for Laser Science Topical Group, 1992 March Meeting
- Symposium Organizer for Laser Science Topical Group, 1993 March Meeting

Institute of Electrical and Electronic Engineers, Lasers and Electro-Optics Society
- Assistant Treasurer, 1988 Annual Meeting
- Treasurer and Program Committee Member, 1989 Annual Meeting
- Symposium Organizer, LEOS 1989 Annual Meeting on Optical Memory and Storage

Materials Research Society
National Academy of Sciences
Optical Society of America
- Chair, Fundamental and Applied Spectroscopy Technical Group, 1992-1994
- General Chair and Founder, OSA Topical Conference on Persistent Spectral

Hole-Burning Science and Applications, 1991
Co-Editor, 2 Special Issues of J. Opt. Soc. America B on Persistent Spectral Hole-Burning
Advisory Chair and Program Committee Member, Topical Meeting on Spectral Hole-Burning and Luminescence, 1993-1994
Assistant Chair, Fundamental and Applied Spectroscopy Technical Group, 1992

Society of Photo-Optical Instrumentation Engineers
Program Co-Chair, Symposium on Organic Photorefractive Materials, 1996, 1997, 1998
Program Committee, 1999-2003

Conference on Quantum Electronics and Laser Science
Program Committee, 1992 and 1993

Conference on Lasers and Electro-Optics
Program Committee, 1999

International Conference on Hole-Burning and Single-Molecule Spectroscopies
Program Committee, 1996, 1999, 2003

Gordon Research Conference on Single-Molecule Approaches to Biology,
Co-Vice Chair, 2008; Co-Chair, 2010.

Task Forces and Major University Committees

Chairman, IBM Task Force on Frequency Domain Optical Storage, 1984.
Physics and Mechanisms Member, IBM Task Force on Holographic Optical Storage, 1986.
Co-Chair, Systems and Applications, IBM Optical Storage Initiative, 1988.
Member, Appointments and Promotions Committee, Division of Humanities and Sciences, Stanford University, 2002-2004.
Member, Nanoinitiative Committee, Stanford University, Winter 2006
Member, NSF Center for Probing the Nanoscale Executive Committee, Fall 2007
Member, Stanford University Committee on Health and Safety, 2007-2008
Chair, Stanford University Committee on Health and Safety, 2008-2009, 2009-2010
Member, Stanford University Emergency Management Steering Committee, 2009-2010
Member, Advisory Board, Center for Biological Imaging at Stanford, 2010-2015
Member, Corporation Visiting Committee, Department of Chemistry, Massachusetts Institute of Technology, 2013-2017.
Member, Review Panel, HHMI Janelia Research Campus, 2020

Study Panels and Governmental Committees

Member, NSF SBIR Study Panel, September, 1996.
Member, NIH Bioengineering Symposium Panel on Imaging at the Molecular and Cellular Levels, February 27-28, 1998.
Co-Chair, Toward Molecular Scale Devices Subgroup, NSF Integrating Themes Workshop for Physical Chemists, September 18-20, 1998, Keystone, Colorado.
Member, NIH Review Panel, November 1999; September 2000.
Member, FAMOS Update Panel, National Research Council, 1999-2002.
Member, NIH-NIGMS Workshop on Single Molecule Detection and Manipulation, 2000
Member, NSF-Intelligence Community Workshop on Approaches to Combat Terrorism, 2002.

Subgroup Chair, NIH-NIDA Workshop on Emerging Technologies: Analysis of Endogeneous Biomaterials and Single-Molecule Studies, 2002.

Member, International Review Committee for the Institute of Atomic and Molecular Sciences (IAMS) of Academia Sinica, Taiwan, 2003-2004

Member, NIH-BST Molecular Imaging Study Section, 2004.

Member, Pacific Northwest National Laboratory DOE-BES Review Panel, 2005.

Member, DOE Workshop on Single-Molecule Research in the New Millenium, 2005.

Session Chair: NIH Frontiers in Live Cell Imaging Conference, April 19-21, 2006

Member, NIH-NHGRI Study Section, July, 2006

Member, Board of Scientific Counselors, National Institute of Biomedical Imaging and Bioengineering, 2010-2014

Publications: William Esco (W. E.) Moerner

1. Richard G. Domey and William E. Moerner, "Cooperative Studies of the Kuroshio and Adjacent Regions, Part I: A Factor Analysis," *Indian J. Marine Sciences* **2**, 69 (1973).
2. H. I. Ringermacher, W. E. Moerner, and J. G. Miller, "Improved Transducer Correction for Standing Wave Ultrasonic Velocity Measurements," *J. Appl. Phys.* **45**, 549 (1974).
3. H. I. Ringermacher, W. E. Moerner, and J. G. Miller, "Two Transducer Formula for More Precise Determination of Ultrasonic Phase Velocity from Standing Wave Measurements," Proc. IEEE Ultrasonics Symposium, IEEE Cat. No. PD74CH0896-1SU, 555 (1974).
4. W. E. Moerner and J. G. Miller, "Ultrasonic Dispersion ($\Delta v/v$) Determined from Mechanical Resonance Frequency Shifts," Proc. IEEE Ultrasonics Symposium, IEEE Cat. No. PD74CH0896-1SU, 478 (1974).
5. V. E. Stubblefield, W. E. Moerner, P. A. Fedders, J. G. Miller, and D. I. Bolef, "Ultrasonic Determination of Magnetoelastic and Anisotropy Constants of Single Crystal Ni," Proc. IEEE Ultrasonics Symposium, IEEE Cat. No. PD74CH0896-1SU, 474 (1974).
6. L. H. Greene, R. T. Warner, W. E. Moerner, and A. J. Sievers, "Passive Mode Locking of a TEA CO_2 Laser with Matrix Isolated SF_6," Eleventh International Quantum Electronics Conference Digest of Technical Papers, IEEE Cat. No. PD80CH1561-O, 640 (1980).
7. A. R. Chraplyvy, W. E. Moerner, and A. J. Sievers, "High-Resolution Spectroscopy of Matrix-Isolated ReO_4^- Molecules," *Opt. Lett*. **6**, 254 (1981).
8. A. R. Chraplyvy, W. E. Moerner, and A. J. Sievers, "Infrared Hole Burning Spectroscopy of Matrix-Isolated ReO_4^- Molecules," *Opt. Lett*. **6**, 431 (1981).
9. W. E. Moerner, A. J. Sievers, and A. R. Chraplyvy, "Anharmonic Relaxation Times of Molecular Vibrational Modes in Alkali Halide Crystals," *Phys. Rev. Lett.* **47**, 1082 (1981).
10. W. E. Moerner, A. J. Sievers, R. H. Silsbee, A. R. Chraplyvy, and D. K. Lambert, "Persistent Holes in the Spectra of Localized Vibrational Modes in Crystalline Solids," *Phys. Rev. Lett.* **49**, 398 (1982).
11. W. E. Moerner, F. M. Schellenberg, and G. C. Bjorklund, "Photochemical Hole Burning at GaAs Laser Wavelengths," *Appl. Phys.* **B28**, 263 (1982).
12. M. D. Levenson, W. E. Moerner, and D. E. Horne, "FM Spectroscopy Detection of Stimulated Raman Gain," *Opt. Lett.* **8**, 108 (1983).
13. P. Pokrowsky, W. E. Moerner, F. Chu, and G. C. Bjorklund, "Reading and Writing of Photochemical Holes Using GaAlAs Diode Lasers," *Opt. Lett.* **8**, 280 (1983).
14. W. E. Moerner, A. R. Chraplyvy, A. J. Sievers, and R. H. Silsbee, "Persistent Nonphotochemical Spectral Hole Dynamics for an Infrared Vibrational Mode in Alkali Halide Crystals," *Phys. Rev.* **B28**, 7244 (1983).
15. P. Pokrowsky, W. E. Moerner, F. Chu, and G. C. Bjorklund, "Reading and Writing of Photochemical Holes Using GaAlAs Diode Lasers," *Proc. Soc. Photo-Opt. Instrum. Engineers* **382**, 202 (1983).
16. B. H. Schechtman, G. C. Bjorklund, and W. E. Moerner, "A Horse of a Different Color:

Frequency Domain Optical Storage," IBM Research Report # RJ4128, 1983.

17. W. E. Moerner, "Organic Materials for Frequency Domain Optical Storage," Proc. Lasers '83, R. C. Powell, editor, (STS Press, McLean, Virginia, 1983), p. 489.
18. W. E. Moerner, A. R. Chraplyvy, and A. J. Sievers, "Anharmonic Vibrational Relaxation Dynamics for a Molecular Impurity Mode in Alkali Halide Crystals," *Phys. Rev*. **B29**, 6694 (1984).
19. A. L. Huston and W. E. Moerner, "Detection of Persistent Spectral Holes Using Ultrasonic Modulation," *J. Opt. Soc. Am. B: Opt. Phys.* **1**, 349 (1984).
20. M. Romagnoli, W. E. Moerner, F. M. Schellenberg, M. D. Levenson, and G. C. Bjorklund, "Beyond the Bottleneck: Submicrosecond Hole-Burning in Phthalocyanine," *J. Opt. Soc. Am. B: Opt. Phys.* **1**, 341 (1984).
21. W. E. Moerner, M. Gehrtz, and A. L. Huston, "Measurement of Quantum Efficiencies for Persistent Spectral Hole-Burning," *J. Phys. Chem.* **88**, 6459 (1984).
22. W. E. Moerner, "The Spectroscopic Search for Single-Photon Materials," *Photonics Spectra* **19**, 59 (February 1985).
23. H. W. H. Lee, A. L. Huston, M. Gehrtz, and W. E. Moerner, "Photochemical Hole-Burning in a Protonated Phthalocyanine with GaAlAs Diode Lasers," *Chem. Phys. Lett.* **114**, 491 (1985).
24. W. E. Moerner and M. D. Levenson, "Can Single-Photon Processes Provide Useful Materials for Frequency Domain Optical Storage?" *J. Opt. Soc. Amer. B: Opt. Phys.* **2**, 915 (1985).
25. W. E. Moerner, F. M. Schellenberg, G. C. Bjorklund, P. Kaipa, and F. Lüty, "High Efficiency Photochemical Hole-Burning for an Infrared Color Center," *Phys. Rev.* **B32**, 1270 (1985).
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36. Pierre Jouchet, Anish R. Roy, and W. E. Moerner, "Simultaneous position and orientation measurements of single molecules using deep learning and PSF engineering approaches," *Biophysical Journal* **121**, Issue 3 Supplement, p412a-413a (2022).

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38. Roy, Anish R., Jiarui Wang, Mengting Han, Haifeng Wang, Leonhard Möckl, Leiping Zeng, William E. Moerner, and Lei S. Qi. "Multicolor super-resolution imaging to study human coronavirus RNA during cellular infection." Biophysical Journal **122**, no. 3 (2023): 16a.

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Peter D. Dahlberg, David F. Savage, and William E. Moerner. "Ratiometric sensing of redox environments inside individual carboxysomes trapped in solution." Biophysical Journal **122**, no. 3 (2023): 304a.

Invited Presentations: William Esco (W. E.) Moerner

1. "Conductivity and Optical Properties of Glow-Discharge Deposited Amorphous Silicon - A Promising New Semiconductor," Solid State Seminar, Cornell University Physics Department, November 15, 1977.
2. "Progress in Frequency Domain Optical Memories," Conference on Lasers and Electro-Optics (CLEO '82), Phoenix, Arizona, April 14-16, 1982. With G. C. Bjorklund and F. M. Schellenberg.
3. "Recent Progress in PHB Optical Memories," Symposium on Unconventional Photoactive Solids, Wasserschloss Mitwitz, Mitwitz, West Germany, June 28 - July 1, 1982. With G. C. Bjorklund, F. M. Schellenberg, and P. Pokrowsky.
4. "Persistent Spectral Hole Burning for a Molecular Vibrational Mode in a Crystalline Solid," Universität Bayreuth, Bayreuth, West Germany, July 2, 1982.
5. Progress in Frequency Domain Optical Memories," Chemical Physics Institute, ETH-Zürich, Switzerland, July 8, 1982. With G. C. Bjorklund.
6. "Progress in Frequency Domain Optical Memories," Institute for Inorganic Chemistry, Universität Bern, Switzerland, July 9, 1982. With G. C. Bjorklund.
7. "Progress in Frequency Domain Optical Memories and Hole-Burning at GaAlAs Laser Wavelengths," IBM Zürich Research Laboratory, Rüschlikon, Switzerland, July 12, 1982. With G. C. Bjorklund.
8. "Materials for Frequency Domain Optical Memories," Research Seminar, IBM Thomas J. Watson Research Center, October 13, 1982.
9. "Materials for Frequency Domain Optical Memory Applications: Progress and Remaining Problems," NRL - ONR Photochemistry Conference, Washington, D.C., October 15, 1982. With G. C. Bjorklund.
10. "Materials for Frequency Domain Optical Memory Applications: Progress and Outlook," SRI International, Menlo Park, California, November 3, 1982. With G. C. Bjorklund.
11. "Frequency Domain Optical Memories: An Important Application of Laser Spectroscopy," Physics Colloquium, University of Santa Clara, Santa Clara, California, April 18, 1983.
12. "Photochemical and Photophysical Spectral Hole Dynamics in Organic and Inorganic Systems," Chemical Physics Seminar, Stanford University, Stanford, California, April 21, 1983.
13. "Materials Requirements for Frequency Domain Optical Memories," Quantum Electronics Seminar on Experimental Techniques in Lasers and Optics, Stanford University, Stanford, California, October 24, 1983.
14. "Materials for Frequency Domain Optical Memories," 1983 Office of Naval Research and Naval Research Laboratory Photochemistry Conference, University of California at Los Angeles, Los Angeles, California, November 11, 1983.
15. "Hole-Burning Materials for Frequency Domain Optical Memories," March Meeting of the American Physical Society, Detroit, Michigan, March 28, 1984.

16. "Frequency Domain Optical Storage: The Quest for the Ultimate Material," Solid State Physics Seminar, Cornell University, Ithaca, New York, April 3, 1984.

17. "Frequency Domain Optical Storage: A Potentially Exciting Application of Laser Spectroscopy," Physics Colloquium, San Jose State University, San Jose, California, April 12, 1984.

18. "Organic Photoreactions for Frequency Domain Optical Storage," Gordon Research Conference on Electron Donor Acceptor Interactions, Plymouth, New Hampshire, August 13-17, 1984.

19. "A Challenge for Laser Spectroscopy of Solids: Frequency Domain Optical Storage," Lasers '84, San Francisco, California, November 26, 1984.

20. "Photochemical Hole-Burning," IBM Scientific Advisory Committee Meeting on Optical Storage, Boulder, Colorado, February 14, 1985.

21. "Laser-Light-Induced Physical Processes in Optical Materials: Persistent Spectral Hole-Burning," SPIE Critical Review on Radiation Effects in Optical Materials, Southwest Conference on Optics, Albuquerque, New Mexico, March 6, 1985.

22. "Persistent Spectral Hole-Burning: Dynamical Requirements for Frequency Domain Optical Storage," Gordon Research Conference on Molecular Electronic Spectroscopy, Wolfeboro, New Hampshire, August 12-16, 1985.

23. "Dynamical Hole-Burning Requirements for Frequency Domain Optical Storage," Second International Conference on Unconventional Photoactive Solids, Cleveland, Ohio, September 9-12, 1985.

24. "Materials for Photon-Gated Spectral Hole-Burning," Hewlett-Packard Laboratories, Palo Alto, California, February 11, 1986.

25. "Mechanisms for Photon-Gated Spectral Hole-Burning," Physical Chemistry Seminar, University of California, Santa Cruz, California, February 13, 1986.

26. "Frequency Domain Optical Storage Using Persistent Spectral Hole-Burning: Photon Gating," Society of Photographic Scientists and Engineers Annual Meeting, Minneapolis, Minnesota, May 19, 1986.

27. "Frequency Domain Optical Storage: Photon-Gated Materials," Xerox Palo Alto Research Center ICL Seminar, Palo Alto, California, August 18, 1986.

28. "Spectroscopy of Inhomogeneously Broadened Zero-Phonon Transitions in Solids: Persistent Spectral Hole-Burning and Beyond," Chemistry Department Colloquium, Indiana University, Bloomington, Indiana, September 24, 1987.

29. "Statistical Fine Structure in Inhomogeneously Broadened Absorption Lines in Solids," International Laser Science Conference ILS-III, Atlantic City, New Jersey, November 1-5, 1987. With T. P. Carter.

30. "Spectroscopy of Inhomogeneously Broadened Zero-Phonon Transitions in Solids: Persistent Spectral Hole-Burning and Beyond," Chemistry Colloquium, University of California, Riverside, California, November 11, 1987.

31. "Statistical Fine Structure in Inhomogeneously Broadened Spectral Lines," American Physical Society March Meeting, New Orleans, Lousiana,March 21-25, 1988.

32. "Statistical Fine Structure of Inhomogeneously Broadened Absorption Lines," Condensed Matter Seminar, University of California, Santa Cruz, California, May 8, 1988.

33. "Photon-Gating and High-Density Frequency Domain Optical Storage," IEEE Vail Computer Elements Workshop, Vail, Colorado, June 28, 1988.

34. "Statistical Fine Structure in Inhomogeneously Broadened Spectral Lines," AT&T Bell Laboratories, Murray Hill, New Jersey, July 1, 1988.

35. "New Developments in Laser Spectroscopy of Solids: Statistical Fine Structure," Cornell University Optical Science Seminar, Ithaca, New York, September 19, 1988.

36. "New Developments in Laser Spectroscopy of Solids--Statistical Fine Structure," Physical Chemistry Seminar, Iowa State University, Ames, Iowa, November 18, 1988.

37. "How to Use Inhomogeneous Broadening to Your Advantage: Statistical Fine Structure and Single Molecule Spectroscopy in Solids," American Physical Society March Meeting, St. Louis, Missouri, March 20-24, 1989.

38. "Statistical Properties of Inhomogeneously Broadened Lines in Solids," American Chemical Society Annual Meeting, Dallas, Texas, April 9-14, 1989.

39. "Photon-Gated Persistent Spectral Hole-Burning," International Symposium on Optical Memory, ISOM 89, Kobe, Japan, September 26-28, 1989.

40. "Ultrasensitive Laser Spectroscopy in Solids: Single-Molecule Detection," Fourth International Conference on Unconventional Photoactive Solids, The Almaden Symposium, San Jose, California, October 15-18, 1989.

41. "Fundamental Aspects of Persistent Spectral Hole-Burning: Photon-Gating, Statistical Fine Structure, and Absorption Spectra of Single Dopant Centers in Solids," invited talk presented at:

    (i) The Research Center for Advanced Science and Technology, University of Tokyo, Tokyo, Japan, October 23, 1989;
    (ii) SONY Corporation Central Research Center, Yokohama, Japan, October 24, 1989;
    (iii) Nikon Corporation Research Laboratory, Tokyo, Japan, October 25, 1989;
    (iv) Mitsubishi Central Research Laboratory, Hyogo, Japan, October 26, 1989;
    (v) Toray Industries Electronic and Imaging Materials Research Laboratory, Otsu, Japan, October 27, 1989.

42. "Organic Optoelectronic Materials," IBM 1989 Computer Science Symposium on Novel Computing, Gotemba, Japan, October 29, 1989. With G. C. Bjorklund.

43. "Persistent Spectral Hole-Burning: Photon-Gating and Fundamental Statistical Limits," International Symposium on Polymers for Microelectronics Science and Technology (PME '89), University of Tokyo, Tokyo, Japan, October 29 - November 2, 1989.

44. "Laser Spectroscopy of Solids: From Sqrt(N) to N = 1," U. S. - Japan Exchange Seminar on Dynamics of Excited States, East-West Center, University of Hawaii, Honolulu, Hawaii, November 6-10, 1989.

45. "Laser Spectroscopy of Solids: From Sqrt(N) to N = 1," Stanford Chemical Physics Seminar, Stanford, California, November 30, 1989.

46. "How to Find a Single Molecule in a Haystack: Optical Detection and Spectroscopy of a Single Molecule in a Solid," Chemistry Department Colloquium, Columbia University, New York, New York, December 14, 1989.

47. "Finding a Single Molecule in a Haystack: Single-Absorber Optical Spectroscopy in Molecular Solids," Western Spectroscopy Association Thirty-Seventh Annual Conference, Asilomar, California, January 25, 1990.

48. "New Observations in Laser Spectroscopy of Solids: From Sqrt(N) to N = 1," Washington University Physics Department Colloquium, St. Louis, Missouri, February 7, 1990.

49. "Finding a Needle in a Haystack: Optical Detection and Spectroscopy of Single Absorbers in Molecular Crystals," Physical Chemistry Colloquium, University of California, San Diego, San Diego, California, April 24, 1990.

50. "Finding a Needle in a Haystack: Optical Detection and Spectroscopy of Single Absorbers in Solids," International Quantum Electronics Conference IQEC 90, Anaheim, California, May 22, 1990. With L. Kador.

51. "Finding a Single Molecule in a Haystack: Laser Spectroscopy of Solids from Sqrt(N) to N = 1," University of Oregon, Chemical Physics Institute Retreat, Charleston, Oregon, September 22, 1990.

52. "Finding a Single Molecule in a Haystack: Laser Spectroscopy of Solids from Sqrt(N) to N = 1," University of Utah Physics Department Colloquium, Salt Lake City, Utah, October 18, 1990.

53. "Demonstration of Photorefractivity in Organic Polymers," Postdeadline Paper Optical Society of America Annual Meeting, Boston, Massachusetts, November 5-9, 1990. With S. Ducharme, J. C. Scott, and R. J. Twieg.

54. "Finding a Single Molecule in a Haystack: Laser Spectroscopy of Solids from Sqrt(N) to N = 1," SPIE Conference 1435 on Ultrasensitive Laser Spectroscopy, Los Angeles, California, January 21-23, 1991. With W. P. Ambrose.

55. "Finding a Single Molecule in a Haystack: Laser Spectroscopy of Solids from Sqrt(N) to N = 1," Simon Fraser University Physics Department Colloquium, Vancouver, British Columbia, April 3, 1991. With W. P. Ambrose.

56. "Finding a Single Molecule in a Haystack: Laser Spectroscopy of Solids from Sqrt(N) to N = 1," Physics Department Colloquium, University of British Columbia, Vancouver, British Columbia, April 4, 1991. With W. P. Ambrose.

57. "Observation of the Photorefractive Effect in Doped Nonlinear Polymers," Materials Research Society Spring Meeting, Anaheim, California, April 30 - May 1, 1991. With S. Ducharme, J. C. Scott, and R. J. Twieg.

58. "Observation of the Photorefractive Effect in Doped Nonlinear Polymers," Quantum Electronics and Laser Science QELS 91, Baltimore, Maryland, May 13-17, 1991. With S. Ducharme, J. C. Scott, and R. J. Twieg.

59. "Photorefractivity in Doped Nonlinear Organic Polymers," Soc. Photo-Opt. Instrum. Engr. Conference on Nonlinear Optical Properties of Organic Materials IV, San Diego, California, July 24-26, 1991. With S. Ducharme, J. C. Scott, and R. J. Twieg.

60. "The Photorefractive Effect in Nonlinear Polymers," International Topical Conference on Optical Probes of Conjugated Polymers, Snowbird, Utah, August 19-22, 1991. With J. C. Scott, S. Ducharme, and R. J. Twieg.

61. "The Photorefractive Effect in Nonlinear Polymers," ACS Symposium on Polymeric Materials for Photonic and Optical Applications, New York, New York, August 25-30, 1991. With J. C. Scott, S. Ducharme,and R. J. Twieg.

62. "Single Molecule Spectral Diffusion in a Solid Detected by Fluorescence Spectroscopy," 1991 International Conference on Dynamical Processes in the Excited States of Solids, Leiden, The Netherlands, August 27-30, 1991. With W. P. Ambrose and Th. Basché.

63. "Properties of Photorefractive Polymers," Observatoire Francais des Techniques Avancees Molecular Electronics Group Meeting, Paris, France, September 13, 1991.

64. "Observations of Spectral Diffusion in Solids on the Single Molecule Level," Fourth Congress of the French Chemical Society Colloquium on Perspectives in Molecular Electronics, Strasbourg, France, September 19, 1991.

65. "Optical Spectra of Single Impurity Molecules in a Polymer: Spectral Diffusion and Persistent Spectral Hole-Burning," Postdeadline Paper, First International Topical Meeting on Persistent Spectral Hole-Burning Science and Applications, Monterey, California, September 26-28, 1991. With Th. Basché.

66. "Photorefractivity in Doped Nonlinear Polymers," University of Arizona Optical Sciences Center Colloquium, Tucson, Arizona, October 24, 1991.

67. "Observations of Spectral Diffusion and Hole-Burning for a Single Molecule in a Solid," Physical Chemistry Seminar, University of California, Santa Barbara, California, January 14, 1992.

68. "Optical Spectroscopy of Single Impurity Molecules in Solids," Laser Applications in Chemical Analysis OSA Topical Meeting LACA III, Salt Lake City, Utah, January 27-30, 1992.

69. "A Solid as a Single-Molecule Trap: Observations of Spectral Diffusion and Hole-Burning of a Single Impurity Molecule," American Physical Society March Meeting, Indianapolis, Indiana, March 16-20, 1992.

70. "Characterization of Photorefractive Polymers: Proving Photorefractivity," American Chemical Society Symposium on Organic Optoelectronic Materials, Monterey, California, March 31 - April 3, 1992.

71. "Nonlinear Optical Properties of Organic Photorefractive Polymers," Materials Research Society Symposium V, San Francisco, California, April 27-May 1, 1992. With C. A. Walsh, S. M. Silence, R. J. Twieg, T. J. Matray, J. C. Scott, V. Y. Lee, R. D. Miller, F. Hache, D. M. Burland, and G. C. Bjorklund.

72. "A Solid as a Single-Molecule Trap: Spectral Diffusion, Hole-Burning, and Photon Antibunching," Quantum Electronics and Laser Science QELS 92, Anaheim, California, May 10-15, 1992. With Th. Basché, W. P. Ambrose, and M. Orrit.

73. "Photoconduction and Photorefraction in Molecularly Doped Polymers," European Materials Research Society Meeting, Strasbourg, France, June 8-12, 1992. With J. C. Scott, and L. Th. Pautmeier.

74. "Photorefractivity in Doped Nonlinear Polymers: Shifted Phase Gratings, Higher Speed, and Sensitization," Gordon Research Conference on Electronic Processes in Organic Materials, Andover, New Hampshire, July 27-31, 1992.

75. "Photorefractive Polymers: Visions and Present Status," Institute for Experimental Physics Colloquium, University of Bayreuth, Bayreuth, Germany, September 9, 1992.

76. "Photorefractive Polymers - A New Class of Materials for Optical Processing," Institute for Physical Chemistry Seminar, University of Munich, Munich, Germany, September 11, 1992.

77. **Plenary Lecture**, "A Solid as a Single-Molecule Trap: Optical Spectroscopy of Single Impurity Centers in a Solid," OSA Topical Meeting on Spectral Hole-Burning and Luminescence Line-Narrowing, Ascona, Switzerland, September 14-18, 1992.

78. "Photorefractivity in Nonlinear Organic Polymers," Optical Society of America Annual Meeting, Albuquerque, New Mexico, September 21, 1992. With S. Silence, J. C. Scott, C. A. Walsh, F. Hache, R. J. Twieg, T. Matray, V. Y. Lee, D. M. Burland, and G. C. Bjorklund.

79. "Optical Spectroscopy Using a Solid as a Single-Molecule Trap," Optical Society of America Annual Meeting, Albuquerque, New Mexico, September 21, 1992. With Th. Basché, and M. Orrit.

80. "Probing a Single Molecule Hidden Deep Inside a Solid," DOE Workshop on Advanced Laser Techniques for Chemical Measurements, Santa Fe, New Mexico, October 19-21, 1992.

81. "Physical Studies in Solids at the Single-Molecule Level," CLS-2 Seminar, Los Alamos National Laboratory, Los Alamos, New Mexico, October 21, 1992.

82. "Nonlinear Optical Properties of Photorefractive Polymers," OE-LASE Conference, Los Angeles, California, January 19-21, 1993. With S. M. Silence, F. Hache, M. Donckers, C. A. Walsh, D. M. Burland, G. C. Bjorklund, and R. J. Twieg.

83. **Samuel M. McElvain Lecture**, "Recent Developments in the Optical Spectroscopy of Single Molecular Impurities in Solids," Chemistry Department, University of Wisconsin, Madison, Wisconsin, March 2, 1993.

84. "New Developments in Photorefractive Polymers," American Physical Society March Meeting, Seattle, Washington, March 22-26, 1993.

85. "Optical Spectroscopy of Single Molecules in Solids," American Chemical Society Annual Meeting, Denver, Colorado, March 29 - April 2, 1993.

86. "New Developments in Organic Photorefractive Polymers," Materials Research Society Spring Meeting Symposium on Organic Materials for Nonlinear Optical Applications, San Francisco, California, April 14-16, 1993. With S. M. Silence, M. Donckers, F. Hache, C. A. Walsh, E. Ginsburg, P. K. Jenkner, G. C. Bjorklund, D. M. Burland, R. D. Miller, J. C. Scott, and R. J. Twieg.

87. "Optical Spectroscopy of a Single Impurity Molecule in a Solid: Spectral Diffusion, Photon Antibunching, and Single-Spin Magnetic Resonance," Condensed Matter Seminar, University of California, Berkeley, California, April 21, 1993.

88. "Optical Spectroscopy of a Single Impurity Molecule in a Solid," Physical Chemistry Seminar, University of Pittsburg, Pittsburg, Pennsylvania, April 29, 1993.

89. "Recent Progress in Photorefractive Polymers," Quantum Electronics and Laser Science Conference (QELS 93), Baltimore, Maryland, May 2-7, 1993. With S. M. Silence, M. C. J. M. Donckers, C. A. Walsh, F. Hache, E. J. Ginsburg, P. K. Jenkner, J. C. Scott, R. J. Twieg, R. D. Miller, G. C. Bjorklund, and D. M. Burland.

90. "Single-Molecule Spectral Diffusion in Crystals and Polymers," Ninth International Conference on Dynamical Processes in Excited States of Solids, Cambridge, Massachusetts, August 2-6, 1993.

91. "Overview of Single-Molecule Spectroscopy in Condensed Media," 1993 International Conference on Luminescence and Optical Spectroscopy in Condensed Matter, Storrs, Connecticut, August 9-13, 1993.

92. "Spectral Hole-Burning and Quantum Effects of Single Impurity Molecules in a Solid," 1993 International Conference on Luminescence and Optical Spectroscopy in Condensed Matter, Storrs, Connecticut, August 9-13, 1993. With Th. Basché.

93. "Examining the Components of the Ensemble Average Using Single-Molecule Spectroscopy in Solids: Spectral Diffusion, Phototransformations, and Single-Spin Experiments," Stanford University Physical Chemistry Seminar, Stanford, California, September 30, 1993.

94. "Recent Advances in Photorefractive Polymers: High Efficiency, Improved Speed, and Net Two-Beam Coupling Gain," ACS/OSA Topical Meeting on Organic Thin Films for Photonic Applications, Toronto, Ontario, Canada, October 6-8, 1993. With G. C. Bjorklund, D. M. Burland, P. K. Jenkner, R. D. Miller, J. C. Scott, S. M. Silence, R. J. Twieg, and C. A. Walsh.

95. "Recent Developments in Single-Molecule Spectroscopy in Solids: Spectral Diffusion, Vibrational Spectroscopy, and Magnetic Resonance of a Single Molecular Spin," Physical Chemistry Seminar, University of Munich, Munich, Germany, 10 November 1993.

96. "Recent Developments in Single-Molecule Spectroscopy in Solids: Spectral Diffusion, Vibrational Spectroscopy, and Magnetic Resonance of a Single Molecular Spin," Laser Seminar, Max Planck Institute for Quantum Optics, Garching, Germany, 11 November 1993.

97. “Recent Developments in the Spectroscopy of Single Molecules in Solids," Inorganic Chemistry Seminar, University of Bern, Bern, Switzerland, 18 November 1993.

98. "Recent Developments in Single-Molecule Spectroscopy in Solids: Spectral Diffusion, Vibrational Spectroscopy, and Magnetic Resonance of a Single Molecular Spin," Laser Seminar, IBM Zürich Research Laboratory, Rüschlikon, Switzerland, 6 December 1993.

99. "Recent Developments in Single-Molecule Spectroscopy in Solids: Spectral Diffusion, Vibrational Spectroscopy, and Magnetic Resonance of a Single Molecular Spin," Organic Chemistry Seminar, ETH Zürich, Zürich, Switzerland, 15 December 1993.

100. "Recent Developments in the Spectroscopy of Single Molecules in Solids," Physics Colloquium, University of Ulm, Ulm, Germany, January 21, 1994.

101. "New Frontiers in Single-Molecule Spectroscopy in Solids: Spectral Diffusion, Vibrational Modes, and Magnetic Resonance of a Single Molecular Spin," Laboratory for Physical Chemistry Colloquium, ETH-Zürich, Zürich, Switzerland, February 15, 1994.

102. **Ehrenfest Colloquium**, "Spectroscopy of Individual Molecules in Solids," University of Leiden, Leiden, The Netherlands, March 16, 1994.

103. "Photorefractive Polymers," Philips Research Laboratories, Eindhoven, The Netherlands, March 17, 1994.

104. "Detection and Spectroscopy of Single Molecules in Solids," Conference on Development of Sensors for Environmental Microbes, Logan, Utah, April 11, 1994.

105. "New Frontiers in Solids at the Level of a Single Impurity Molecule," Physics Seminar, University of Utah, Salt Lake City, Utah, April 12, 1994.

106. "Photorefractive Polymers," Laser Seminar, ETH-Hönggerberg, Zürich, Switzerland, April 25, 1994.

107. "Recent Advances in Single-Molecule Spectroscopy in Solids: Vibrational Modes and Near-Field Excitation at Low Temperatures," Optical Spectroscopy and Magnetic Resonance on Single Molecules, WE-Heraeus-Seminar 130, Physikzentrum Bad Honnef, Germany, May 30 – June 1, 1994.

108. "New Frontiers in Single Molecule Spectroscopy in Solids," Gordon Research Conference on Electronic Processes in Organic Materials, Proctor Academy, New Hampshire, July 24-29, 1994.

109. "Spectroscopy of Individual Molecules Trapped in Solids," 14th International Conference on Atomic Physics, Boulder, Colorado, July 31-August 5, 1994.

110. "Photorefractive Polymers **Tutorial**," ACS/OSA Symposium on Polymeric Thin Films for Photonic Applications, Washington, D. C., August 21-24, 1994. With S. M. Silence, G. C. Bjorklund, D. M. Burland, R. D. Miller, J. J. Stankus, and R. J. Twieg.

111. "New Frontiers in Single-Molecule Spectroscopy in Solids: Resonance Frequency Shifts, Vibrational Modes, and Magnetic Resonance of a Single Molecular Spin," American Chemical Society National Meeting, Washington, D. C., August 21-24, 1994.

112. "Science and Applications of Photorefractive Polymers," OSA Topical Meeting on Spectral Hole-Burning and Related Spectroscopies, Tokyo, Japan, August 24-26, 1994. With S. M. Silence, G. C. Bjorklund, D. M. Burland, R. D. Miller, J. J. Stankus, and R. J. Twieg.

113. "Spectroscopy of Individual Molecules in Solids," NRC-CNRC Gerhard Herzberg Honorary Conference on The Future of Spectroscopy, Ste-Adèle, Quebec, September 26-28, 1994.

114. "Photorefractive Polymers and Their Applications," Optical Society of America Annual Meeting - ILS IX, Dallas, Texas, October 2-7, 1994. With G. C. Bjorklund, S. M. Silence, and J. J. Stankus.

115. "New Frontiers in Single-Molecule Spectroscopy in Solids," Chemistry Department Colloquium, University of Chicago, Chicago, Illinois, October 24, 1994.

116. "Probing Nanoenvironments in Solids with Individual Impurity Molecules," Physical Chemistry Seminar, University of California, Berkeley, California, November 1, 1994.

117. "New Frontiers in Single-Molecule Spectroscopy in Solids," Condensed Matter Seminar, University of California, Davis, California, November 10, 1994.

118. "Guacamoles as Probes of Local Environments in Solids," Aspen 1995 Winter Conference on Condensed Matter Physics, Aspen, Colorado, January 15-21, 1995.

119. "New Frontiers in the Spectroscopy of Individual Molecules in Solids," Physical Chemistry Seminar, University of Illinois, Urbana, Illinois, January 25, 1995.

120. "Dynamics and Vibrational Spectra of Individual Molecules in Polymer Glasses," Photonics West Conference on Advanced Optical Methods for Ultrasensitive Detection, San Jose, California, February 6-7, 1995. With Anne B. Myers and P. Tchénio.

121. "Guacamoles, Shpol'skii Matrices, and Subwavelength Optical Spectroscopy," Science Colloquium, IBM Almaden Research Center, San Jose, California, February 10, 1995.

122. **Arthur D. Little Lecture in Physical Chemistry**,"Science and Applications of Photorefractive Polymers," Massachusetts Institute of Technology, Boston, Massachusetts, March 7, 1995.

123. **Arthur D. Little Lecture in Physical Chemistry**, "Probing Nanoenvironments in Solids with Single Impurity Molecules," MIT/Harvard Physical Chemistry Seminar, Massachusetts Institute of Technology, Boston, Massachusetts, March 9, 1995.

124. **Tutorial Lecture**, "Science and Applications of Photorefractive Polymers," March Meeting of the American Physical Society, San Jose, California, March 19, 1995.

125. "Near-Field Optical Spectroscopy of Single Molecules in Solids," Joint U. S.-European Conference on Nanostructures, University of California, Santa Barbara, March 27-28, 1995.

126. **Plenary Lecture**, "Magnetic Resonance Spectroscopy of A Single Molecular Spin," 36th Experimental Nuclear Magnetic Resonance Conference, Boston, Massachusetts, March 26-30, 1995. With J. Köhler, E. J. J. Groenen, and J. Schmidt.

127. "Photorefractivity in Organic Polymeric Materials," SPIE Conference on Xerographic Photoreceptors and Photorefractive Polymers, San Jose, California, July 10-11, 1995. With C. Poga, D. M. Burland, T. Hanemann, C. R. Moylan, S. M. Silence, and R. J. Twieg.

128. "Photon-Gated Spectral Hole-Burning Materials," Conference on Material Requirements for Persistent Spectral Hole Burning and Time-Domain Optical Storage and Processing, Bozeman, Montana, August 3-4, 1995.

129. "Photorefractive Polymer Composites: A New Class of Optical Holographic Materials," Society for Applied Spectroscopy and Golden Gate Polymer Forum, Menlo Park, California, September 7, 1995.

130. "Near-Field Optical Spectroscopy of Single Molecules in Solids," Seventh International Conference on Unconventional Photoactive Systems, Palo Alto, California, September 5-8, 1995. With D. Pohl, and U. P. Wild.

131. "Near-Field Excitation and Stark Effect of Single Molecules in Solids," Optical Society of America Annual Meeting/ILS-XI, Portland, Oregon, September 10-15, 1995. With U. P. Wild, and D. Pohl.

132. "Photorefractive Polymers for Holographic Optical Storage," OSA/ACS Topical Meeting on Organic Thin Films for Photonics Applications, Portland, Oregon, September 11-14, 1995. With C. Poga, Y. Jia, and R. J. Twieg.

133. "Probing Nanoenvironments in Solids with Single Impurity Molecule Spectroscopy," Condensed Matter Physics Seminar, UCSD, La Jolla, California, October 4, 1995.

134. "Probing Nanoenvironments in Solids Using Single Impurity Molecule Spectroscopy," University of Arizona Optical Sciences Center Colloquium, Tucson, Arizona, October 26, 1995.

135. "Probing Nanoenvironments in Solids with Single Impurity Molecules," Todai Institute of Solid State Physics Symposium 1995, Tokyo, Japan, November 8-10, 1995.

136. "Fundamentals of Single-Molecule Spectroscopy," International Workshop on Single Molecule Spectroscopy: New Systems and Methods, Monte Verita, Ascona, Switzerland, March 10-15, 1996.

137. "Mechanisms of Photorefractivity in Polymer Composites," ACS Annual Meeting Symposium on Charge Transfer Interactions in Polymers, New Orleans, Louisiana, March 24-29, 1996. With D. M. Burland, C. R. Moylan, and R. J. Twieg.

138. "High-Resolution Spectroscopy of Single Molecules in Solids," (**Plenary)** 51st Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, June 10-14, 1996.

139. "Optical Spectroscopy of Individual Molecules in Solids," Gordon Research Conference on Atomic and Molecular Interactions, Colby-Sawyer College, New London, New Hampshire, June 30 - July 5, 1996.

140. "Mechanisms of Photorefractivity in Polymer Composites," SPIE Conference on Organic Photorefractive Materials and Xerographic Photoreceptors, Denver, Colorado, August 7-8, 1996.

141. "High-Density Digital Data Storage in Organic Photorefractive Materials," SPIE Conference on Organic Photorefractive Materials and Xerographic Photoreceptors, Denver, Colorado, August 7-8, 1996. With P. M. Lundquist, C. Poga, R. G. Devoe, R. M. Shelby, and R. J. Twieg.

142. "Fundamentals of Single-Molecule Spectroscopy in Solids," Fifth International Meeting on Hole Burning and Related Spectroscopies, Brainerd, Minnesota, September 13-17, 1996. With D. J. Norris.

143. "Single-Molecule Nanophotonics: Gels and Molecular Motors," Physical Chemistry Seminar, University of California San Diego, La Jolla, California, October 8, 1996.

144. "Single-Molecule Nanophotonics," Sixth NEC Symposium on Fundamental Approaches to New Material Phases: Quantum Optical Phenomena in Spatially Confined Materials, Karuizawa, Japan, October 13-17, 1996.

145. "Single-Molecule Nanophotonics," University of Texas Organic Chemistry Seminar, Austin, Texas, October 25, 1996.

146. "Probing Nanoenvironments in Condensed Media with Single Fluorophores," Chemistry Division Seminar, Argonne National Laboratory, Argonne, Illinois, December 2, 1996.

147. "Mechanisms of Photorefractivity in Polymer Composites," Third International Conference on Organic Nonlinear Optics, Marco Island, Florida, December 16-20, 1996. With A. Grunnet-Jepsen, and C. Thompson.

148. "Observation of Beam Fanning in a Photorefractive Polymer," Materials Research Society 1997 Spring Meeting, San Francisco, California, March 31- April 4, 1997. With A. Grunnet-Jepsen, and C. L. Thompson.

149. "Polyacrylamide Gels for Single-Molecule Biophysics," Symposium on Chemistry of Single Molecules, American Chemical Society Annual Meeting, San Francisco, California, April 13-17, 1997. With R. M. Dickson.

150. "Single-Molecule Nanophotonics," La Jolla Interfaces in Science Conference, April 18, 1997.

151. "Recent Advances in Photorefractive Polymer Materials," SPIE Symposium 3147, Nonlinear Optical Properties of Organic Materials X, San Diego, California, July 30 – August 1, 1997. With A. Grunnet-Jepsen, and C. L. Thompson.

152. "Single-Molecule Spectroscopy in Chemistry and Biophysics: Peeling Back the Ensemble Average," R. B. Woodward Lecture, Department of Chemistry and Chemical Biology, Harvard University, Cambridge, Massachusetts, September 15, 1997.

153. "Mechanisms and Applications of Photorefractivity in New Polymer Composites," R. B. Woodward Lecture, Department of Chemistry and Chemical Biology, Harvard University, Cambridge, Massachusetts, September 18, 1997.

154. "Recent Advances in High Gain Photorefractive Polymers," IEEE Lasers and Electro-Optics Society Annual Meeting, San Francisco, California, November 10-13, 1997. With A. Grunnet-Jepsen.

155. "Optical Probes of Single Molecules and Proteins in Gels," Advances in Cellular Imaging, Cambridge Healthtech Institute, San Diego, California, November 13-14, 1997. With R. M. Dickson and S. Kummer.

156. "Single-Molecule Nanophotonics in Solids, Liquids, and Proteins," Japan-U. S. Information Exchange Seminar on Photophysics and Photoconversion in Small domains by Near-Field Scanning Optical Microscopy," Napa Valley, California, January 10-14, 1998. With R. M. Dickson and S. Kummer.

157. "Understanding Photorefractivity in Polymers: Materials for an Optical Transistor?" Physical Chemistry Colloquium, University of California, Berkeley, Berkeley, California, January 27, 1998.

158. "Photorefractive Polymers: Materials for Optical Processing Applications," Weissberger-Williams Lecture, Eastman Kodak Company, Rochester, New York, February 6, 1998.

159. "Optical Studies of Individual Molecules, One at a Time—What Can We Learn?", Physical Chemistry Seminar, University of California Irvine, Irvine, California, February 17, 1998.

160. "Optical Studies of Single Molecules and Proteins in Biocompatible Gels," Annual Meeting, Biophysical Society, Kansas City, Missouri, February 22-26, 1998. With R. M. Dickson and S. Kummer.

161. "Optical Properties of Single Small Fluorophores and Single Green Fluorescent Protein Molecules in Poly(acrylamide) Gels," March Meeting, American Physical Society, Los Angeles, California, March 16-20, 1998.

162. "Recent Advances in Photorefractive Polymer Composites," Dallas National Meeting, American Chemical Society, Dallas, Texas, March 29 – April 2, 1998. With A. Grunnet-Jepsen, B. Smith, and D. Wright.

163. "Single-Molecule Optical Probes of Local Environments in Gels and Proteins," Dallas National Meeting, American Chemical Society, Dallas, Texas, March 29 – April 2, 1998. With R. M. Dickson and S. Kummer.

164. "Single-Molecule 'Astronomy' in Condensed Media: Peeling Back the Ensemble Average," Chemical Sciences and Technology Laboratory Colloquium, National Institute of Standards and Technology, Gaithersburg, Maryland, April 15, 1998.

165. "Recent Advances in High Gain Photorefractive Polymers," Conference on Lasers and Electro-Optics CLEO '98, San Francisco, California, May 3-8, 1998. With A. Grunnet-Jepsen, D. A. Wright, and B. R. Smith.

166. "High-Speed Photorefractive Polymer Composites," Postdeadline Paper, Conference on Lasers and Electro-Optics CLEO '98, San Francisco, California, May 3-8, 1998. With M. A. Diaz-Garcia, D. Wright, M. DeClue, J. Casperson, B. R. Smith, and R. J. Twieg.

167. "Recent Advances in Single-Molecule Spectroscopy in Chemistry and Biophysics: Peeling Back the Ensemble Average", Gordon Conference on Electronic Processes in Organic Materials, Salve Regina University, Newport, Rhode Island, July 26-31, 1998.

168. "Mechanisms of Photorefractivity in Polymer Composites," Summer School on Molecular Optoelectronics, Cursos de Verano, San Lorenzo de El Escorial, Madrid, Spain, August 3-7, 1998.

169. "Applications of Photorefractive Polymers," Summer School on Molecular Optoelectronics, Cursos de Verano, San Lorenzo de El Escorial, Madrid, Spain, August 3-7, 1998.

170. "Fast and Efficient Photorefractivity in Polymer Composites," American Chemical Society Annual Meeting Symposium on Organic Thin Films for Photonic Applications, Boston, Massachusetts, August 23-27, 1998. With M. A. Diaz-Garcia, A. Grunnet-Jepsen, D. Wright, M. Bratcher, M. DeClue, J.S. Siegel, and R.J. Twieg.

171. "Optical Probes of Single Molecules and Proteins in Aqueous Environments," 4th International Workshop on Single Molecule Detection and Ultrasensitive Analysis in the Life Sciences, Berlin Adlershof, September 30-October 2, 1998. With R. M. Dickson, S. Kummer, and E. J. Peterman.

172. "Optical Detection of Single Molecules and Individual Proteins in Poly(Acrylamide)

Gels," Optical Society of America Annual Meeting, Baltimore, Maryland, October 4-9, 1998. With R. M. Dickson, S. Kummer, E. J. Peterman, J. Deich and J. Frazier.

173. "Mechanisms for High Gain in Photorefractive Polymers," Optical Society of America Annual Meeting, Baltimore, Maryland, October 4-9, 1998. With M. A. Diaz-Garcia, A. Grunnet-Jepsen, and D. Wright.

174. "Optical Spectroscopy of Individual Molecules in Solids and Biological Environments," Physics Research Conference Colloquium, California Institute of Technology, October 15, 1998.

175. "Those Blinking Single Molecules!" Science and Technology Colloquium, IBM Almaden Research Center, October 23, 1998.

176. "Optical Spectroscopy of Individual Molecules in Solids and Biological Environments," Chemical Physics Seminar, California Institute of Technology, November 3, 1998.

177. "Single-Molecule Spectroscopy," Frontiers in Spectroscopy Lectures, Ohio State University, Columbus, Ohio, January 20-22, 1999.

178. "Single-Molecule Optical Probes in Physical Chemistry and Biophysics," Optics and Quantum Electronics Seminar, Stanford University, Stanford, California, February 8, 1999.

179. "Single-Molecule Studies of Fluorescent Proteins and Enzymes," Biophysical Society Annual Meeting, Baltimore, Maryland, February 13-17, 1999. With E. J. Peterman, H. Sosa, S. Brasselet, R. M. Dickson, S. Kummer, R. Sakowicz, and L. S. B. Goldstein.

180. "Single-Molecule Spectroscopy and Detection and Low and Room Temperature," Seventh Japan Science and Technology Corporation International Symposium on Molecular Processes and Biosystems, Tokyo, Japan, February 24-25, 1999. With S. Brasselet, and E. J. Peterman.

181. "New Insights into Trapping and Compensation in Photorefractive Polymers," Material Research Society Spring Meeting Symposium F, San Francisco, California, April 5-9, 1999. With D. Wright, M. Diaz-Garcia, A. Goonesekera, J. Casperson, B. Smith, M. S. DeClue, E. Glazer, J. S. Siegel, and R. J. Twieg.

182. "Understanding Trapping in Photorefractive Polymer Composites for Optical Processing Applications," Conference on Lasers and Electro-Optics CLEO '99, Baltimore, Maryland, May 23-28, 1999. With A. Grunnet-Jepsen, D. Wright, J. Casperson, E. Glazer, M. DeClue, J. S. Siegel, and R. J. Twieg.

183. "Single-Molecule Optical Science in Physical Chemistry and Biophysics," Nobel Conference on Single-Molecule Spectroscopy in Physics, Chemistry, and Biology, Lindigo, Sweden, June 5-9, 1999.

184. "Understanding Photorefractivity in High-Performance Polymer Composites," Seventh Topical Meeting on Photorefractive Materials, Effects, and Devices, PR'99, Elsinore, Denmark, June 27-30, 1999. With A. Grunnet-Jepsen, D. Wright, M. S. DeClue, J. S. Siegel, and R. J. Twieg.

185. P**lenary Lecture**, "Single-Molecule Optical Imaging and Spectroscopy Can Probe Hidden Complexity," International Conference on Photochemistry ICP'99, Duke University, Durham, North Carolina, August 2-6, 1999.

186. **Critical Review**, “Single Molecules Under an Optical Spotlight,” Interdisciplinary Laser Science Conference ILS-XV, Santa Clara, California, September 26-October 1, 1999.

187. “Trap Dynamics in Photorefractive Polymer Composites,” Materials Research Society Fall Meeting, Boston, Massachusetts, November 29 - December 3, 1999. With D. Wright, A. Goonesekera, M. A. Diaz-Garcia, and R. J. Twieg.

188. “Shedding Light on Single Biomolecules,” *Frontiers in Biosciences Series*, Stanford University, Stanford, California, January 13, 2000.

189. “Single Molecules Under an Optical Spotlight,” Special Seminar, Laboratoire de Photonique Quantique et Moléculaire, Ecole Normale Supérieure de Cachan, France, January 28, 2000.

190. “Single-Molecule Optical Spectroscopy in Condensed Matter,” 6th French-Israeli Symposium on Nonlinear Quantum Optics, FRISNO6, Ecole de Physique, Les Houches, France, January 30 – February 4, 2000.

191. "Single Molecules Under an Optical Spotlight," Third Flory Conference on Physical and Macromolecular Chemistry, Stanford University, Stanford, CA, February 11-12, 2000.

192. "Single Photons on Demand from Individual Molecules," Quantum Entanglement Symposium, Stanford University, Stanford, CA, March 20-22, 2000. With B. Lounis.

193. "Optical Studies of Single Biomolecules in Aqueous Environments," American Chemical Society Annual Meeting, Washington, DC, August 20-24, 2000. With S. Brasselet, B. Lounis, E. J. G. Peterman, H. Sosa, and L. S. B. Goldstein.

194. "Single-Molecule Studies of Fluorescent Proteins and Molecular Motors," Third European Biophysics Congress, Munich, Germany, September 9-13, 2000.

195. "Advanced Microscopy for Protein Localization in Caulobacter," DARPA Biofutures Meeting, Hilton Washington Dulles, November 1-2, 2000. With M. Paige, S. Nishimura, E. Judd, and L. Shapiro.

196. "Mechanisms of Photorefractivity in Polymer Composites," Northwestern University Organic Materials Symposium, Evanston, Illinois, November 17, 2000.

197. "Trap Dynamics in Photorefractive Polymers: Mechanisms and Applications," Symposium on Field-Responsive Polymers, American Chemical Society POLY Millenial 2000, Waikoloa, Hawaii, December 9-13, 2000. With D. Wright, A. Goonesekera, M. DeClue, J. S. Siegel, and R. J. Twieg.

198. "Recent Progress in Photorefractive Polymers: Mechanisms and Applications," International Congress of Pacific Basin Societies, Pacifichem 2000, Honolulu, Oahu, Hawaii, December 14-19, 2000. With D. Wright, U. Gubler, A. Goonesekera, M. DeClue, J. S. Siegel, M. He, and R. J. Twieg.

199. "Single-Molecule Spectroscopy, from Quantum Optics to Molecular Motors," Aspen Winter Workshop on Single Molecule Biophysics, Aspen, Colorado, January 14-20, 2001.

200. **Public Lecture**, "Visualizing Single Molecules with Lasers," Aspen Center for Physics Winter Conference 2001, Aspen, Colorado, January 17, 2001.

201. "Single-Molecule Spectroscopy: From Biophysics to Quantum Optics," Physical Chemistry Seminar, University of California, Berkeley, California, January 23, 2001.

202. “Single-Molecule Spectroscopy to Explore Fluorescent Proteins and Molecular Motors,” Chemistry Department Seminar, Boston College, Boston, Massachusetts, February 22, 2001.

203. “Single-Molecule Spectroscopy, from Molecular Motors to Quantum Optics,” Physics Department Colloquium, University of Chicago, Chicago, Illinois, March 1, 2001.

204. **William Draper Harkins Lecture**, “Pushing Back Ensemble Averaging with Single-Molecule Spectroscopy,” Chemistry Department, University of Chicago, Chicago, Illinois, March 5, 2001.

205. “Single-Molecule Spectroscopy and Imaging: History, Fundamentals, and Recent Examples,” Tutorial Lecture, T6: Single Molecule Imaging in Condensed Matter and Biology, American Physical Society March Meeting, Seattle, Washington, March 11, 2001.

206. **Earle K. Plyler Prize Lecture**, “Single-Molecule Spectroscopy: From 2K, to Molecular Motors, to Quantum Optics,” American Physical Society March Meeting, Seattle, Washington, March 12-16, 2001.

207. “Single-Molecule Spectroscopy: From Quantum Optics to Molecular Motors,” American Chemical Society Annual Meeting, April 1-5, 2001. With B. Lounis, H. Sosa, E. J. G. Peterman, and L. S. B. Goldstein.

208. "Photorefractive Polymers: What They Are and What You Can Do With Them," Quantum Electronics Seminar, Department of Applied Physics, Stanford University, Stanford, California, April 16, 2001.

209. "Photorefractive Polymer Design Strategies," Society of Photo-Optical Instrumentation Engineers Annual Meeting, San Diego, California, July 29 - August 3, 2001. With D. Wright, U. Gubler, M. He, R. J. Twieg, M. DeClue, and J. S. Siegel.

210. "Single-Biomolecule Optical Detection and Spectroscopy, from Molecular Motors to MHCII in Live Cells," Fourth International Conference on Biological Physics, ICBP 2001, Kyoto, Japan, July 30 - August 3, 2001. With M. Vrljic, S. Nishimura, H. M. McConnell, H. Sosa, E. Peterman, and Larry Goldstein.

211. **Moses Gomberg Lecture**, "Single-Molecule Spectroscopy, from Quantum Optics to Molecular Motors," Department of Chemistry, University of Michigan, September 6, 2001.

212. "Optical Spectroscopy of Single Biomolecules," Optical Society of America Annual Meeting / Interdisciplinary Laser Science XVII, Long Beach, California, October 14-18, 2001. With M. Vrjlic, S. Nishimura, and H. McConnell.

213. “Single-Molecule Spectroscopy: From Low-Temperature Physical Chemistry to Biophysics,” Nobel Jubilee Centennial Symposium: “Frontiers in Molecular Science,” Friiberghs Herdegaard, Stockholm, Sweden, December 4-7, 2001.

214. “Recent Advances in the Understanding and Development of Photorefractive Polymers and Glasses,” Sixth International Conference on Organic Nonlinear Optics, ICONO’6, Tucson, Arizona, December 16-20, 2001. With D. Wright, U. Gubler, O. Ostroverkhova, M. He, A. Sastre-Santos, and R. J. Twieg.

215. “Single-Molecule Spectroscopy, from Quantum Optics to Molecular Motors,” Chemistry

Colloquium, Department of Chemistry, Cornell University, Ithaca, New York, February 14, 2002.

216. "Single-Molecule Spectroscopy: From Molecular Motors to Quantum Optics," Physical Chemistry Seminar, Colorado State University, Ft. Collins, Colorado, March 21, 2002.

217. "Single-Molecule Spectroscopy, from Biophysics to Quantum Optics," Chemical Physics Seminar, Department of Chemistry and Biochemistry, University of Colorado and JILA, Boulder, Colorado, March 22, 2002.

218. "High-Performance Photorefractive Organic Glasses: Understanding Mechanisms and Limitations," Society of Photo-Optical Instrumentation Engineers Annual Meeting, Seattle, Washington, July 7-11, 2002. With O. Ostroverkhova, U. Gubler, D. Wright, M. He, and R. J. Twieg.

219. "Emerging Frontiers in Single-Molecule Spectroscopy," Volkswagen Stiftung Third International Symposium on Physics, Chemistry, and Biology with Single Molecules, Tutzing, Germany, September 22-25, 2002.

220. "Emerging Frontiers in Single-Molecule Spectroscopy," Eighth International Workshop on Single Molecule Detection and Ultrasensitive Analysis in Life Sciences," Berlin-Adlershof, Germany, September 25-27, 2002.

221. "Emerging Frontiers in Single-Molecule Spectroscopy," Physics Colloquium, University of Illinois at Urbana-Champaign, Urbana, IL, October 10, 2002.

222. "Single-Molecule Biophysics," Biophysics Seminar, University of Illinois at Urbana-Champaign, Urbana, IL, October 11, 2002.

223. "Optical Measurements of Single Molecules in Cells," NIH-NIDA Workshop on Emerging Technologies: Analysis of Endogeneous Biomaterials and Single-Molecule Studies, Rockville, MD, December 4-5, 2002.

224. "New Fluorophores and Analyses for Single-Molecule Spectroscopy and Enzymology," Second Aspen Conference on Single-Molecule Biophysics, Aspen, CO, January 5-11, 2003.

225. "High Performance Photorefractive Polymers and Glasses: Mechanisms and Applications," IBM Almaden Science and Technology Colloquium, San Jose, CA, February 7, 2003.

226. "Single Molecules as Nanophotonic Probes and Sources," March Meeting of the American Physical Society, Austin, TX, March 3-7, 2003.

227. "Single Molecules as Local Nanoscopic Probes," Nanoscience and Technology Conference, Groningen, The Netherlands, May 18-21, 2003.

228. "Optically Sensing the State of a Single Molecule," Quantum Electronics and Laser Science Conference, Baltimore, MD, June 1-6, 2003. With K. A. Willets and O. Ostroverkhova.

229. "Lighting the Way with Single Molecules," DC to Daylight: A Symposium Honoring Prof. A. J. Sievers, Cornell University, Ithaca, NY, June 14, 2003.

230. "Single Molecules as Local Nanophotonic Probes and Sources", a series of lectures presented in the Conference Universitaire de Suisse Occidentale du 3ème Cycle en

Chimie:

(a) "Single-Molecule Spectroscopy as a Local Nanoscopic Probe," University of Basel, June 18, 2003

(b) "Optical Spectroscopy of Single Molecules in Condensed Phases," University of Bern, June 19, 2003

(c) "Biophysical Studies Using Single-Molecule Local Probes," EPFL Lausanne, June 20, 2003

(d) "Fundamentals of Single-Molecule Spectroscopy and Nanophotonics," University of Geneva, June 23, 2003

(e) "Applications of Single Molecules as Nanophotonic Probes and Sources," University of Geneva, June 24, 2003

229. "Observing Single Molecules in Cells, and a New Class of Single-Molecule Fluorophores," Gordon Research Conference on Electronic Spectroscopy and Dynamics, Bates College, Lewiston, ME, July 6-11, 2003.

230. "Single Molecules as Local Nanoscopic Probes," Eighth International Meeting on Hole Burning, Single Molecule, and Related Spectroscopies: Science and Applications, Bozeman, MT, July 27-31, 2003.

231. "Emerging Frontiers in Single-Molecule Fluorescence Imaging," American Chemical Society Annual Meeting, New York, NY, September 7-11, 2003.

232. "A Single Molecule as a Nanoscale Probe," Nanoscale Science and Technology Workshop 2003, University of Washington Center for Nanotechnology, Seattle, WA, September 22-23, 2003. With S. Y. Nishimura.

233. "Optical Probing of Single Molecules: Examples from Physics, Chemistry, and Biophysics," Physics Department, University of Queensland, Brisbane, Queensland, Australia, November 25, 2003.

234. "Single Molecules March to Different Drummers: Jellyfish, Cholesterol, and Quantum Communication," Toyota Lecture, Australian National University, Canberra, Australian Capital Territory, Australia, November 26, 2003.

235. "Optical Probing of Single Molecules: Examples from Physics, Chemistry, and Biophysics," Swinburne Institute of Technology, Melbourne, Victoria, Australia, November 27, 2003.

236. "Single Molecules as Nanophotonic Probes and Sources," Geoffrey Frew Fellowship Lecture, Australian Conference on Optics, Lasers, and Spectroscopy ACOLS03, University of Melbourne, Melbourne, Victoria, Australia, December 1, 2003.

237. "Single Molecules and Defect Centers in Solids as Nanophotonic Probes and Sources," Stanford-ENS Quantum Entanglement Symposium, Stanford University, Stanford, California, December 15-18, 2003.

238. "Single Molecules as Nanophotonic Probes and Sources," Chemistry Department Colloquium, University of California, Davis, California, February 4, 2004.

239. "Single Molecules as Local Nanoscopic Probes," Department of Chemistry and

Biochemistry Seminar, Arizona State University, Tempe, Arizona, March 12, 2004.

240. "Single-Molecule Fluorescence Imaging of Biomolecular Dynamics," Minerva-Gentner Symposium on Optical Spectroscopy of Biomolecular Dynamics, Kloster Banz, Germany, March 21-25, 2004.

241. "Single-Molecule Fluorophores from Nonlinear Optical Chromophores," Materials Research Society Spring Meeting, San Francisco, California, April 12-16, 2004. With K. A. Willets, P. Callis, and R. J. Twieg.

242. "Single Molecules as Nanophotonic Probes and Sources," Gordon Research Conference on Electronic Processes in Organic Materials, Mount Holyoke College, South Hadley, Massachusetts, July 25-30, 2004.

243. "Optical Explorations of Single Molecules, *in vitro* and *in vivo*," 5th International Conference on Biological Physics ICBP2004, Gothenburg, Sweden, August 23-27, 2004.

244. "Visualizing Single-Molecule Dynamics in Cells," Symposium on Biophysical Chemistry and Novel Imaging of Single Molecules and Single Cells, American Chemical Society Annual Meeting, Philadelphia, Pennsylvania, August 22-26, 2004.

245. "Nanophotonics with Single Molecules and Small Metallic Nanostructures," FACSS 31st Annual Meeting, Nanomaterials for Photonics Symposium, Portland, Oregon, October 3-7, 2004. With D. P. Fromm, A. Sundaramurthy, P. J. Schuck, K. Willets, and G. Kino.

246. "Single Photon Sources Based on Single Molecules and Nanocrystals," Optical Society of America Annual Meeting, Frontiers in Optics 2004 / Laser Science XX, Rochester, New York, October 10-14, 2004.

247. "Nanophotonics with Single Molecules and Small Metallic Nanostructures," First MIT-ENS Cachan Workshop on Molecular Photonics and Biophotonics at the Micro and Nano-scale," Boston, Massachusetts, October 12-13, 2004. With D. P. Fromm, A. Sundaramurthy, P. J. Schuck, K. Willets, and G. Kino.

248. "Single-molecule emitters as nanoscale probes and sources," NIST Quantum Information Program Distinguished Lectureship, National Institute of Standards and Technology, Gaithersburg, Maryland, November 4, 2004.

249. "Single Molecules as Nanoscale Reporters, in vitro and in vivo," Plenary Lecture, Western Spectroscopy Association Annual Meeting, Asilomar, California, January 26-28, 2005.

250. "Single-Molecule Biophysics and Nanophotonics," Nanotechnology Symposium, American Association for the Advancement of Science Annual Meeting, Washington, DC, February 17-21, 2005.

251. "Single-Molecule Biophysics, Nanophotonics, and Trapping," Chemistry Colloquium, University of Washington, Seattle, Washington, April 6, 2005.

252. "Single-Molecule Biophysics, Nanophotonics, and Trapping," DOE Workshop on Single-Molecule Research in the New Millenium," Rockville, Maryland, April 10-12, 2005.

253. "Single-Molecule Biophysics, Nanophotonics, and Trapping," Molecular Science Institute Seminar, Berkeley, California, April 28, 2005.

254. "Single-Molecule Biophysics, Nanophotonics, and Trapping," Applied Physics Department, Stanford University, Stanford, California, May 16, 2005.

255. "Single-Molecule Biophysics, Nanophotonics, and Trapping," Institute for Atomic and Molecular Sciences, Academia Sinica, Taipei, Taiwan, June 17, 2005.

256. "Single-Molecule Imaging: Challenges in Living Cells," Bio-Image Summer School, Ecole Normale Supérieure, Paris, France, July 19, 2005.

257. "Novel Approaches to Single-Molecule Detection and Trapping," Bio-Image Summer School, Ecole Normale Supérieure, Paris, France, July 12, 2005

258. "Recent Progress in Single-Molecule Spectroscopy and Imaging," Telluride Workshop on Single-Molecule Measurements: Theory and Experiment, Telluride, Colorado, August 9-12, 2005. With Stefanie Nishimura, Jaesuk Hwang, SoYeon Kim, Sam Lord, and Kallie Willets.

259. "Single-Molecule Biophysics, Nanophotonics, and Trapping," American Chemical Society Annual Meeting, Washington, DC, August 28 – September 1, 2005. With Adam Cohen, David Fromm, So Yeon Kim, Stefanie Nishimura, P. James Schuck, and Harden McConnell.

260. "Nanophotonics and Single Molecules," Optical Society Annual Meeting, Frontiers in Optics 2005 - Laser Science XXI, Tucson, Arizona, October 16-20, 2005.

261. Single-Molecule Biophysics, Nanophotonics, and Trapping," Physics Department Colloquium, Washington University, St. Louis, Missouri, November 16, 2005.

262. "Measuring, Trapping, and Controlling Single Molecules and Nanoparticles," Pacifichem International Conference 2005, Honolulu, Hawaii, December 15-20, 2005. With Adam Cohen, David Fromm, Hanshin Hwang, Soyeon Kim, Stefanie Nishimura, Samuel Lord, P. James Schuck, Arvind Sundaramurthy, Katherine A. Willets, Harden McConnell, Gordon Kino, and Robert J. Twieg.

263. "Single-Molecule Spectroscopy at High Resolution and Low Temperature: The Early Years," A. R. Gordon Lecture, Department of Chemistry, University of Toronto, January 4, 2006.

264. "Single-Molecule Biophysics: From Proteins to Cells," A. R. Gordon Lecture, Department of Chemistry, University of Toronto, January 5, 2006.

265. **A. R. Gordon Lecture**, "Novel Approaches to Single-Molecule Studies: Local Reporters, Nanoantennas, and Trapping," Department of Chemistry, University of Toronto, January 6, 2006.

266. "Pumping, Probing, Grabbing, and Manipulating Single Molecules," University of California, Berkeley, Workshop on Advanced Imaging Methods, Berkeley, California, January 19-20, 2006.

267. "Single-Molecule Biophysics, Nanophotonics, and Trapping," Chemistry Department Colloquium, Northwestern University, Evanston, Illinois, February 17, 2006.

268. "Probing, Imaging, and Trapping Single Biomolecules," Imaging Focus Group Seminar Series, University of Texas Southwestern Medical School, Dallas, Texas, February 27, 2006.

269. "Single Molecules as Nanoscale Reporters in Biophysics, Chemistry, and Materials Science," IUPAC XXI International Symposium on Photochemistry, Kyoto Japan, April 2-7, 2006.

270. "Single-Molecule Emitters as Reporters of Dynamics and Function in Living Cells," NIH Frontiers in Live Cell Imaging Conference, Bethesda, Maryland, April 19-21, 2006.

271. "Optical Observations of Single Biomolecules," Gordon Research Conference on Single-Molecule Approaches to Biology, Colby-Sawyer College, New London, New Hampshire, June 18-23, 2006.

272. Single-molecule fluorescence tracking probes membrane dynamics," American Chemical Society Annual Meeting, Surface Chemistry Symposium in honor of Gabor Somorjai, San Francisco, California, September 10-14, 2006. With Hanshin Hwang, So Yeon Kim, Anika Kinkhabwala, and Stefanie Nishimura.

273. "Single-molecule fluorescence imaging reports on biomolecular dynamics," American Chemical Society Annual Meeting, Symposium on Frontiers in Single-Molecule Biophysical Chemistry and Imaging, San Francisco, California, September 10-14, 2006. With Adam Cohen, Nicholas R. Conley, So Yeon Kim, Anika Kinkhabwala, Marcelle Koenig, Andrea H. Kurtz, Samuel J. Lord, Zhikuan Lu, Hui Wang, and Robert J. Twieg.

274. "Single-Molecule Biophysics, Nanophotonics, and Trapping," Herbert H. King Lecture, Department of Chemistry, Kansas State University, Manhattan, Kansas, October 26, 2006.

275. "Visualizing Single Molecules with Lasers," Yunker Lecture, Department of Physics, Oregon State University, Corvallis, Oregon, November 6, 2006.

276. "Single-Molecule Fluorescence Imaging Reports on Biomolecular Dynamics," Workshop on Single-Molecule Fluorescence, PicoQuant GMBH and the Center for Biophotonics, UC Davis, Sacramento, California, January 18-19, 2007

277. "Fluorescence and Single-Molecule Studies of Chaperonin Nanomachines: Overview," Nanomedicine Center for Protein Folding Machinery Nanomedicine Lecture, Webex, February 22, 2007.

278. "Observing Dynamics of Individual Biomolecules with Single-Molecule Microscopy," Symposium on Nanomachines and Nanotechnologies, Biophysical Society Annual Meeting, Baltimore, Maryland, March 3-7, 2007.

279. "Refining Single-Molecule Fluorescence Imaging for Chaperonin Studies," 21st Annual Symposium of the Protein Society, Boston, Massachusetts, July 21-25, 2007.

280. "Recent Progress in Single-Biomolecule Fluorescence Imaging," Symposium on Single-Molecule Spectroscopy, Imaging, and Manipulation of Biomolecular Systems," American Chemical Society Annual Meeting, Boston, Massachusetts, August 19-23, 2007.

281. **Invited Tutorial,** "Single-Molecule Biophysical Imaging, Superresolution, and Trapping," Optical Society of America Annual Meeting, Frontiers in Optics/Laser Science, San Jose, California, September 16-20, 2007.

282. "Single-Molecule Superresolution Imaging and Trapping," BIOS 2008 Hot Topics Plenary Event, San Jose, California, January 19, 2008

283. **Keynote Lecture**, "Recent Progress in Single-Biomolecule Fluorescence Imaging," BIOS 2008 Conference 6862 on Single Molecule Spectroscopy and Imaging, San Jose, California, January 19-24, 2008

294. "Recent Progress in Single-Biomolecule Fluorescence Imaging, In and Out of Cells," PULSE Seminar, Stanford Linear Accelerator Center, April 10, 2008.

295. **Wolf Prize Lecture,** "Single-Molecule Optical Spectroscopy and Imaging: Early Steps to Recent Advances," Tel-Aviv Symposium in Chemical Physics on Single-Molecule Spectroscopy in Chemistry, Physics, and Biology, Tel-Aviv University, Tel-Aviv, Israel, May 27, 2008.

296. **Wolf Prize Lecture and Pathway Seminar,** "Single-Molecule Optical Spectroscopy and Imaging: Early Steps to Recent Advances," Hebrew University of Jerusalem, Jerusalem, Israel, May 28, 2008.

297. "Single-Molecule Optical Spectroscopy and Imaging: Early Steps to Recent Advances," Wolf Prize Mini-Symposium, Weizmann Institute of Science, Rehovot, Israel, May 29, 2008.

298. "Single-Molecule Spectroscopy and Imaging: Early Steps to Recent Advances," Nobel Symposium on Single-Molecule Spectroscopy in Chemistry, Physics, and Biology, Sanga-Saby, Sweden, June 1-6, 2008.

299. "Single-Molecule Biophysical Imaging, Superresolution, and Trapping," Hitachi Global Storage Technology Resarch Colloquium, San Jose, California, July 2, 2008.

300. **DuPont-Marshall Lecture,** "Single-Molecule Optical Spectroscopy and Imaging: From Early Steps to Recent Advances," Department of Chemistry, University of Pennsylvania, Philadelphia, Pennsylvania, October 7, 2008.

301. "Single-Molecule Optical Spectroscopy and Imaging: Early Steps to Recent Advances," Science Colloquium, IBM Almaden Research Center, San Jose, California, January 16, 2009.

302. **Arthur S. Noyes Lecture,** "Single-Molecule Optical Spectroscopy and Imaging: From Early Steps to Recent Advances," Department of Chemistry and Biochemistry, University of Texas at Austin, Austin, Texas, February 5, 2009.

303. **Neil Gordon Frontiers in Chemistry Lecture,** "Single-Molecule Optical Spectroscopy and Imaging: From Early Steps to Recent Advances," Department of Chemistry, Wayne State University, Detroit, Michigan, March 9, 2009

304. **Langmuir Prize Lecture**, "Single-Molecule Fluorescence Imaging: Nanoscale Emitters with Photoinduced Switching Enable Superresolution," American Physical Society March Meeting, Pittsburgh, Pennsylvania, March 17, 2009.

305. "Imaging Beyond the Diffraction Limit in Cells Using Single-Molecule Active Control," American Chemical Society Annual Meeting, Salt Lake City, Utah, March 22, 2009.

306. "Single-Molecule Optical Spectroscopy and Imaging: Early Steps to Recent Advances," Kavli Nanoscience Colloquium, California Institute of Technology, Pasadena, California, April 14, 2009.

307. "Single-Molecule Optical Spectroscopy and Imaging: Early Steps to Recent Advances," Physical Chemistry Seminar, University of California, Berkeley, Berkeley, California, April 21, 2009.

308. "Imaging and Trapping Single Biomolecules, In and Out of Cells," TSRI Distinguished Lecture, The Scripps Research Institute, La Jolla, California, May 10, 2009.

309. "Single-Molecule Biophysical Imaging, Superresolution, and Trapping," Leica Scientific Forum Lecture, Heidelberg, Germany, May 25, 2009.

310. **Karl Friedrich Bonhoeffer Lecture**, "Single-Molecule Biophysical Imaging, Superresolution, and Trapping," Max Planck Institute for Biophysical Chemistry, Göttingen, Germany, May 27, 2009.

311. "Nanoscale Single-Molecule Emitters with Photoinduced Switching Enable Superresolution in Three Dimensions (and other topics)," 10th International Conference on Hole-Burning, Single-Molecule, and Related Spectroscopies (HBSM 2009), Palm Cove, Queensland, Australia, June 22-27, 2009.

312. "Single-Molecule Optical Spectroscopy and Imaging: From Early Steps to Superresolution Imaging in Living Cells," Single-Molecule Imaging, Spectroscopy, and Manipulation of Biological Systems, Fragrant Hill Science Conference, Beijing, China, July 8-10, 2009.

313. "Single-Molecule Biophysical Imaging, Superresolution, and Trapping," Kavli Institute of Theoretical Physics Lecture, Beijing, China, July 13, 2009.

314. "Molecules and Methods for Superresolution Imaging by Single-Molecule Photoswitching (and other topics)," 15th International Workshop on Single-Molecule Spectroscopy and Ultrasensitive Analysis in Life Sciences, SMD15, Berlin-Adlershof, Germany, September 15-18, 2009.

315. "Lighting Up Single Molecules to Probe Complex Environments, From Crystals to Cells," Evans Award Public Lecture, The Ohio State University, Columbus, Ohio, October 8, 2009.

316. "Single-Molecule Superresolution Imaging and Trapping," **The Evans Award Lecture**, The Ohio State University, Columbus, Ohio, October 9, 2009.

317. "Three-Dimensional Superresolution Using Single-Molecule Photoswitches and a Double-Helix PSF," 2009 Computational Optical Sensing and Imaging (COSI) Conference, San Jose, California, October 13-15, 2009. With Michael Thompson, Matthew Lew, Majid Badieirostami, Samuel J. Lord, Nicholas R. Conley, Hsiao-lu D. Lee, Sri Rama Prasanna Pavani, and Rafael Piestun.

318. "Single-Molecule Biophysical Imaging, Superresolution, and Trapping," 2009 Frontiers in Optics (FiO)/Laser Science XXV (LS) Conference, San Jose, California, October 11-15, 2009.

319. **Keynote Lecture**, "Single-Molecule Approaches to Biomolecular Dynamics and Imaging of Cellular Superstructures," Keystone Symposium on Structural Biology/Structural Genomics, Breckenridge, Colorado, January 8-13, 2010.

320. "Lighting Up Single Molecules to Probe Complex Environments, from Crystals to Cells," BioMedSci 231 Fluorescence Guest Lecture, University of California San Diego, La Jolla, California, January 21, 2010.

321. "Recent Progress in Single-Molecule Biophysical Imaging, Superresolution, and Trapping," Pharmacology Department Seminar, University of California San Diego, La Jolla, California, January 21, 2010.

322. "Single-Molecule Biophysical Imaging, Superresolution, and Trapping," Physics Colloquium, Washington University, St. Louis, Missouri, February 3, 2010.

323. "Superresolution Imaging and Trapping Single Biomolecules, In and Out of Cells," Biophysics and Chemistry/Chemical Biology Seminar, University of California, San Francisco, California, February 25, 2010.

324. **Joe L. Franklin Lecture**, "Three Single-Molecule Stories: 3D Superresolution, Trapping, and Nanophotonic Enhancement," Department of Chemistry, Rice University, Houston, Texas, March 10, 2010.

325. "Two Single-Molecule Stories: 3D Superresolution Imaging and Nanophotonic Enhancements," Stanford University Photonics Retreat, Napa, California, April 10, 2010.

326. "Single-Molecule Biophysical Imaging, Superresolution, and Trapping," Physical Chemistry Seminar, University of California, Irvine, California, May 4, 2010.

327. **Tutorial Lecture**, "Single-Molecule Approaches for Superresolution Imaging, Trapping, and Nanophotonics," Conference on Lasers and Electro-Optics (CLEO) 2010, San Jose, California, May 16-21, 2010.

328. "Molecules and Methods for Superresolution Imaging in Living Cells", American Chemical Society Annual Meeting, Boston, Massachusetts, August 22-26, 2010.

329. "Single Molecules as Nanoscopic Probes of 3D Structure and Metallic Nanoantennas," American Chemical Society Annual Meeting, Boston, Massachusetts, August 22-26, 2010.

330. "Single-molecule and super-resolution microscopy of cells, nanoantennas, and biomolecules in solution," Aarhus University iNANO Summer School N7 on Nanooptics, Fuglsoecentret, Aarhus, Denmark, September 3-7, 2010.

331. "Molecules and Methods for Super-Resolution Optical Imaging in Living Cells," Recent Advances and Future Prospects for Visualizing Macromolecular Complexes and Cellular Structures Conference, National Institute of Health, Bethesda, Maryland, October 12-13, 2010.

332. "Extracting Superresolution and 3D Information from Cells with Single Fluorescent Molecules," MIT/Harvard Physical Chemistry Seminar, Cambridge, Massachusetts, October 14, 2010.

333. "Examples, Molecules, and Methods for Superresolution Imaging in Cells," Advanced Imaging Methods Workshop, University of California, Berkeley, January 19-21, 2011.

334. "Optical Localization and Super-Resolution Studies of Biological Systems with Single Molecules," Computational Optical Science and Imaging Seminar, Department of Electrical Engineering, University of Colorado, Boulder, Colorado, February 14, 2011.

335. "Three-Dimensional Tracking of Single mRNA Particles in S. cerevisiae Using a Double-Helix Point Spread Function," Biophysical Society Annual Meeting New and Notable, March 5-9, 2011.

336. **Willis H. Flygare Memorial Lecture**, "New Insights from Single Molecules as Nanoscale Points of Light," Department of Chemistry, University of Illinois at Urbana-Champaign, Urbana, Illinois, March 14, 2011.

337. "Single Fluorescent Molecules as Nano-Illuminators for Biological Structure and Function," American Physical Society March Meeting, Dallas, Texas, March 21-24, 2011.

338. "Examples, Molecules, and Methods for Super-Resolution Imaging in Cells with Single Molecules," a series of lectures presented in the **Leica Scientific Forum** at:

    (a) Institute of Integrated Biology, University of Liverpool, June 27, 2011

    (b) Department of Pharmacology, University of Oxford, June 28, 2011

    (c) Department of Chemistry, University of Cambridge, June 29, 2011

    (d) Department of Physics, Imperial College London, June 30, 2011

339. "Super-Resolution Imaging in Cells with Single Molecules: Examples and Methods," Single Molecule Spectroscopy: Current Status and Perspectives, W.E. Hereaus Symposium 488, Chemnitz, Germany, July 12-15, 2011.

340. "Single Fluorescent Molecules as Nano-Illuminators for Biological Structure and Function," American Chemical Society Annual Meeting, Denver, Colorado, August 29, 2011.

341. "Single-Molecule Studies of Biomolecular Dynamics in Solution and Fluorescence Enhancements by Metallic Nanoantennas," Paul Barbara Memorial Symposium on Forces Driving Contemporary Themes in Physical Chemistry, American Chemical Society Annual Meeting, Denver, Colorado, September 1, 2011.

342. "Super-Resolved Optical Microscopy: A New View of Bacterial Protein Superstructures," Society for General Microbiology Autumn Meeting, The University of York, York, UK, September 6, 2011.

343. "New Insights from Single Molecules: From 3D Super-Resolution in Cells to Biomolecular Diversity in Solution," Student-Hosted Colloquium Kickoff Lecture, Department of Chemistry, Stanford University, Stanford, California, October 6, 2011.

344. "Optical Explorations of Single Biomolecules and Enzymes in Solution with an Anti-Brownian Electrokinetic Trap," Frontiers in Optics/Laser Science Conference, San Jose, California, October 18, 2011.

345. "Single fluorescent molecules as nano-illuminators for biological structure and function in cells," Single Molecules Meet Systems Biology Symposium, HHMI Janelia Farm Research Campus, Ashburn, Virginia, October 26, 2011.

346. "Single fluorescent molecules as nano-illuminators for biological structure and function in cells," **Pittsburgh Conference Lecture**, Department of Chemistry, University of Pittsburgh, Pittsburgh, Pennsylvania, October 27, 2011.

347. "Single-molecule studies of biomolecular dynamics in solution and fluorescence enhancements by metallic nanoantennas," **Pittsburgh Conference Lecture**, Department of Chemistry, University of Pittsburgh, Pittsburgh, Pennsylvania, October 28, 2011.

348. "Photodynamics of Single Antenna Proteins and Redox Enzymes in Solution by

Suppression of Brownian Motion," DOE-BES Photosynthetic Systems Research Meeting, Baltimore, Maryland, November 8, 2011.

349. "Single-Molecule Active-Control Microscopy for Nanoscale 3D Cell Images," Nano/Biophotonics **Plenary Lecture**, BiOS/Photonics West, San Francisco, California, January 24, 2012.

350. "Single-Molecule Studies of Trapped Biomolecules in Solution with the ABEL Trap," Nanoscience Subgroup, Biophysical Society Annual Meeting, San Diego, California, February 25, 2012.

351. "Single Molecules as Light Sources for Super-Resolution Imaging and Probes for Single Biomolecules in Solution," Pittsburgh Spectroscopy Award Lecture, Pittcon 2012, Orlando, Florida, March 13, 2012.

352. "Watching Dynamical Processes for Single Biomolecules in Solution with the ABEL Trap," American Chemical Society Spring National Meeting, San Diego, California, March 25, 2012.

353. "Breaking the Optical Diffraction Limit in Cells with Single Molecules and STED Microscopy," Stanford Symposium on Biomedical Imaging, Center for Biomedical Imaging at Stanford (CBIS), Stanford, California, April 6, 2012.

354. "Single Molecules as Light Sources for 3D Super-Resolution Imaging and Probes for Single Biomolecules in Solution," Biomedical Plenary Lecture, ICFO (Institute of Photonic Sciences), Barcelona, Spain, May 3, 2012.

355. "Single-Molecule Active-Control Microscopy Illuminates Cells Beyond the Diffraction Limit," Special Focus Lecture, International Symposium on Biomedical Imaging (ISBI) 2012, Barcelona, Spain, May 4, 2012.

356. "Single Molecules as Light Sources for 3D Super-Resolution Imaging and Probes for Single Biomolecules in Solution," Ehrenfest Colloquium, Leiden University, Leiden, The Netherlands, June 20, 2012.

357. "Super-Resolution Imaging of Protein and DNA Localization Patterns in Bacteria," Biology and Physics of Bacterial Chromosome Organization, Leiden, The Netherlands, June 21, 2012.

358. "What's New With Single Molecules: From Light Sources for 3D Super-Resolution Imaging in Cells to Biomolecular Photodynamics in Solution," Center for Nanoscale Science Special Seminar Honoring Prof. Dr. Chris Bräuchle, Ludwig Maximilian Universität München, Germany, July 6, 2012.

359. "Exploring Protein Superstructures in Bacteria Using Two- and Three-Dimensional Super-Resolution Imaging," CECAM Conference: Toward *in silico* bacterial cells, EPFL, Lausanne, Switzerland, July 9, 2012.

360. "Single-Molecule Active Control Microscopy for Optical 3D Cell Images to Sub-40 nm Resolution," International Conference on X-Ray Microscopy XRM 2012, Shanghai, China, August 9, 2012.

361. "Watching dynamical processes for single molecules in solution," (Keynote), Eleventh International Conference on Hole-Burning, Single-Molecule, and Related Spectroscopies: Science and Applications, University of Tübingen, Germany, August 27-30, 2012.

362. "Single Molecules as Light Sources for Super-Resolution Imaging and Probes for Single Biomolecules in Solution," (Keynote), Swiss Single-Molecule Localization Microscopy Symposium, EPFL, Lausanne, Switzerland, August 29-31, 2012.

363. "Single Molecules as Light Sources for Super-Resolution Imaging and Probes for Single Biomolecules in Solution," Symposium on Atomic, Molecular, and Optical Sciences, Institute for Atomic and Molecular Science, Academia Sinica, Taipei, Taiwan, November 12, 2012.

364. "Single Molecules as Light Sources for Super-Resolution Imaging and Probes for Single Biomolecules in Solution," 16th Future of Light Symposium, Boston University Photonics Center, Boston, Massachusetts, November 29, 2012.

365. "Recent Progress in Wide-Field 3D Super-Resolution Cellular Imaging Using Single Molecules," Symposium on Understanding Cell Behavior Through Single Cell and Single Molecule Biology, University of New Mexico, Albuquerque, New Mexico, January 10-12, 2013.

366. "Recent Progress in 3D Super-Resolution Imaging in Cells Using Single Molecules," Advanced Imaging Methods Workshop, University of California, Berkeley, California, January 30 – February 1, 2013.

367. "Biophysical Variables Which Are (Now) Available from Single-Molecule Optical Studies," American Physical Society March Meeting, Industrial Physics Forum, Baltimore, Maryland, March 19, 2013.

368. "Exploring Protein Superstructures in Bacterial and Mammalian Cells using Single-Molecule Active-Control Microscopy," Pittcon 2013 Conference, Philadelphia, Pennsylvania, March 21, 2013.

369. "Single-Molecule Spectroscopy and Imaging: 3D Nanoscopy and Biomolecular Dynamics," **Samuel Krimm Lecture** in Biophysics, University of Michigan, Ann Arbor, Michigan, April 5, 2013.

370. "Single-Molecule Spectroscopy and Imaging: 3D Nanoscopy and Biomolecular Dynamics," **Peter Debye Award Lecture**, American Chemical Society Annual Meeting, New Orleans, Louisiana, April 9, 2013.

371. "Lighting Up Nature with Single Molecules," Department of Electrical Engineering Seminar, Washington University, St. Louis, Missouri, April 18, 2013.

372. "Single-Molecule Spectroscopy and Imaging: 3D Nanoscopy and Biomolecular Dynamics," **E. K. C. Lee Lecture**, Chemistry Department, University of California at Irvine, Irvine, California, May 30, 2013.

373. "Applications of Single-Molecule Fluorophores to Observe Cellular Structures and Processes on the Nanoscale," American Association for the Advancement of Science Webinar, June 12, 2013.

374. "Actively-Controlled Single-Molecule Emitters Enable 3D Super-Resolution Imaging in Cells," Plenary, International Conference on Photochemistry, Leuven, Belgium, July 24, 2013.

375. "Challenges and opportunities for 3D single-molecule localization microscopy in cells," Cold Spring Harbor – Asia Conference on New Advances in Optical Imaging of Live

Cells and Organisms, Suzhou Dushu Lake Conference Center, August 22, 2013.

376. "Single-Molecule Spectroscopy and Imaging: 3D Nanoscopy and Biomolecular Dynamics," Molecular Foundry Seminar, Lawrence Berkeley National Laboratory, Berkeley, California, August 27, 2013.

377. "Quantitative Aspects of 3D Super-Resolution Imaging in Cells," Frontiers in Single-Cell Analysis Conference, Stanford University, Stanford, California, September 5, 2013.

378. "Recent Progress in 3D Super-Resolution Imaging in Cells Using Single Molecules (plus Observing Single-Molecule Photodynamics in Solution with the ABEL Trap)," Methods and Applications of Fluorescence 13, Genoa, Italy, September 10, 2013.

379. "Single-Molecule Spectroscopy and Imaging: 3D Nanoscopy and Biomolecular Dynamics," 2013 **Walter Kauzmann Lecture** in Biophysical Chemistry, Department of Chemistry, Princeton University, Princeton, New Jersey, September 25, 2013.

380. "Single-Molecule Spectroscopy and Imaging: 3D Nanoscopy and Biomolecular Dynamics," 2013 **John Gamble Kirkwood Award Lecture**, Department of Chemistry, Yale University, New Haven, Connecticut, September 27, 2013.

381. "Photodynamics of Single Photosynthetic Antenna Proteins in Solution," 23rd Western Photosynthesis Conference, Asilomar Conference Center, Pacific Grove, California, January 2-5, 2014.

382. "Single-Molecule Spectroscopy and Imaging: 3D Nanoscopy and Biomolecular Dynamics," Russell Berrie Nanotechnology Institute – Technion – Israel Institute of Technology Winter School, HaGoshrim Hotel, Israel, February 9-13, 2014.

383. "Single-Molecule Spectroscopy and Imaging: 3D Nanoscopy and Biomolecular Dynamics," Chemistry Department Seminar, University of Santa Clara, February 28, 2014.

384. "Single-Molecule Spectroscopy," Dreyfus Presidential Symposium on Chemical Instrumentation, American Chemical Society Spring National Meeting, Dallas, Texas, March 18, 2014.

385. "Single-Molecule Spectroscopy and Imaging: 3D Nanoscopy and Biomolecular Dynamics," Physical Chemistry Seminar, University of California, Berkeley, California, April 1, 2014.

386. "Single-Molecule Spectroscopy and Imaging: 3D Nanoscopy and Biomolecular Dynamics," Biological Sciences Seminar, University of Southern California, Los Angeles, California, April 25, 2014.

387. "James Skinner Turns 60, and the Theory of Single-Molecule Spectroscopy Turns 21," Skinner Symposium, University of Wisconsin, Madison, Wisconsin, May 20, 2014.

388. "Dual Roles for Single Molecules: Light Sources for 3D Nanoscopy and Reporters of Multivariate Dynamics in Solution," Physics Colloquium, University of Leipzig, Germany, July 11, 2014.

389. "Strategies for Precise and Accurate Single-Molecule Localizations for 3D Super-Resolution Microscopy," Gordon Research Conference on Single-Molecule Approaches to Biology," Renaissance Tuscany Il Ciocco Resort, Italy, July 13-19, 2014.

390. "3D Super-Resolution Imaging in Cells Using Single Molecules: Fluorophore Requirements and Applications," FB3 (Fluorescent Biomolecules & Building Blocks Design & Applications), University of California, San Diego, California, August 6-9, 2014.

391. "Multivariate Single-Molecule Dynamics in Solution by Suppression of Brownian Motion," Murray Goodman Award Symposium in honor of Steven G. Boxer, American Chemical Society National Meeting, San Francisco, California, August 13, 2014.

392. "Single-Molecule and High-Resolution Imaging of Developmental Signal Transducers in the Primary Cilium," with Lucien Weiss, Ljiljana Milenkovic, and Matthew Scott, BioX Interdisciplinary Initiatives Program Symposium, Stanford University, Palo Alto, California, August 27, 2014.

393. "Single Molecules as Nanoscale Light Sources for Super-Resolution Imaging and Probes for Biomolecular Dynamics in Solution," 20th International Anniversary Workshop on Single Molecule Spectroscopy and Ultra Sensitive Analysis in the Life Sciences, Berlin-Adlershof, Germany, September 2-5, 2014.

394. "Challenges and Opportunities for 3D Super-Resolution Imaging in Cells," National Cancer Institute Workshop on Multi-Scale Imaging for Cancer Biology, Houston Methodist Research Institute, Houston, Texas, September 18-19, 2014.

395. "Single Molecules as Nanoscale Light Sources for Super-Resolution Microscopy and Dynamical Reporters in Solution," Third International Workshop on Fundamentals of Light-Matter Interaction, Physics Department, UFPE, Recife, Brazil, October 5-8, 2014.

396. "Single-Molecule Detection and Spectroscopy: Foundations of Super-Resolution Microscopy," Frontiers in Optics/Laser Science Conference, OSA Annual Meeting, Tucson, Arizona, October 20, 2014.

397. "Dual Roles for Single Molecules: Light Sources for 3D Nanoscopy and Reporters of Multivariate Dynamics in Solution," Institute of Atomic and Molecular Science 2014 Symposium, Academia Sinica, Taipei, Taiwan, November 11, 2014.

398. "Single Molecules as Nanoscale Light Sources for Super-Resolution Microscopy and for Sensing Dynamics of Individual Biomolecules," Holland Research School of Molecular Chemistry, 20th Anniversary Lustrum Symposium, Amsterdam, The Netherlands, November 20, 2014.

399. "Pupil Plane Modulation for 3D and Orientational Imaging of Single Molecules," Special Seminar, SciLifeLab, Stockholm, Sweden, December 7, 2014.

400. "Single-Molecule Spectroscopy, Imaging, and Photocontrol: Foundations for Super-Resolution Microscopy," Nobel Prize in Chemistry Lecture, Aula Magna, Stockholm University, Stockholm, Sweden, December 8, 2014.

401. "Single Molecules and Super-Resolution Microscopy," High School Lecture, Tullinge Gymnasium, Tullinge, Sweden, December 9, 2014.

402. "Single Molecules and Super-Resolution Microscopy," High School Lecture, Kungsholmens Gymnasium/Stockholms Musikgymnasium, Stockholm, Sweden, December 12, 2014.

403. "Single-Molecule Spectroscopy, Imaging, and Photocontrol: Foundations for Super-

Resolution Microscopy," Nobel Lectures at Uppsala University, Uppsala, Sweden, December 13, 2014.

404. "Single-Molecule Spectroscopy, Imaging, and Photocontrol: Foundations for Super-Resolution Microscopy," Nobel Lectures at Örebro University, Örebro, Sweden, December 15, 2014.

405. "Single Molecules, Super-Resolution Microscopy, and Molecular Dynamics in Solution," special Nobel Laureate Lecture, Chalmers University of Technology, Gothenburg, Sweden, December 16, 2014.

406. "Single Molecules, Super-Resolution Microscopy, and Molecular Dynamics in Solution," special Nobel Laureate Lecture, Lund University, Lund, Sweden, December 17, 2014.

407. "The Story of Single Molecules, from Early Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," Special Nobel Seminar, National Institutes of Health, Bethesda, Maryland, February 5, 2015.

408. "The Story of Single Molecules, from Early Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," Uniformed Services University Health Sciences, USUHS Seminar, Bethesda, Maryland, February 6, 2015.

409. "Extracting Information from Single Molecules in 3D Super-resolution Imaging and from Dynamical Processes in Solution," Keynote Lecture, SPIE Symposium on Single-Molecule Spectroscopy and Superresolution Imaging VIII, BiOS/Photonics West, San Francisco, California, February 8, 2015.

410. "Single-Molecule Spectroscopy, Imaging, and Photocontrol: Foundations for Super-Resolution Microscopy," Nobel Night Plenary Lecture, SPIE BioOS/Photonics West, San Francisco, California, February 8, 2015.

411. "Single-Molecule Spectroscopy, Imaging, and Photocontrol: Foundations for Super-Resolution Microscopy," Nobel Celebration Seminar, IBM Almaden Research Center, San Jose, California, February 11, 2015.

412. "Single Molecules as Light Sources for Super-Resolution Imaging and Sensors of Nanoscale Transport Properties," Plenary Lecture, 80th Annual Meeting of the Israel Chemical Society, Tel Aviv, Israel, February 18, 2015.

413. "Single Molecules, Super-Resolution Microscopy, and Molecular Dynamics in Solution," Weizmann Institute for Science, Rehovot, Israel, February 19, 2015.

414. "Light and Single-Molecule Spectroscopy, Imaging, and Photocontrol: Foundations for Super-Resolution Microscopy," Plenary Lecture, Kavli Foundation Special Symposium: Frontiers of Light, American Physical Society March Meeting, San Antonio, Texas, March 4, 2015.

415. "Fun With Single Molecules - Tiny Nanoscale Points of Light Help Us See Inside Cells!," Thomas Jefferson High School, San Antonio, Texas, March 6, 2015.

416. "The Story of Single Molecules, from Early Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," George B. Kistiakowsky Prize Lecture, Department of Chemistry, Harvard University, Cambridge, Massachusetts, March 12, 2015.

417. "The Story of Single Molecules, from Early Spectroscopy in Solids, to Super-Resolution

Nanoscopy in Cells and Beyond," Biophysics Seminar, Massachusetts Institute of Technology, Cambridge, Massachusetts, March 13, 2015.

418. "Detecting Biomolecular Interactions and Photodynamics in Solution by Suppression of Brownian Motion," ACS Spring National Meeting, Denver, Colorado, March 25, 2015. With Quan Wang, Gabriela Schlau-Cohen, and Hsiang-Yu Yang.

419. "The Story of Single Molecules, from Early Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," Department of Chemistry and Biochemistry, University of California, Los Angeles, California, April 6, 2015.

420. "Fun With Single Molecules - Tiny Nanoscale Points of Light Help Us See Inside Cells!," Amador Valley High School, Pleasanton, California, April 8, 2015.

421. "The Story of Light and Single Molecules, from Early Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," Keynote, Stanford University Photonics Retreat, Asilomar, California, April 10, 2015.

422. "Pupil Plane Modulation to Extract Information from Single-Molecule Emitters for Super-Resolution Microscopy," Plenary, Optical Society of America Biomedical Optics and Photonics Congress: Optics in the Life Sciences, Vancouver, British Columbia, April 13, 2015.

423. "Single-Molecule Spectroscopy, Blinking, and Photocontrol: Foundations for Super-Resolution Microscopy," Nobel Workshop and Molecular Frontiers Symposium, Chalmers University of Technology, Gothenburg, Sweden, May 6, 2015.

424. "Light Paves the Way to Single-Molecule Detection and Photocontrol: Foundations of Super-Resolution Microscopy," Plenary, Conference on Lasers and Electro-Optics CLEO 2015, San Jose, California, May 11, 2015.

425. "The Story of Single Molecules, from Early Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," Paul C. Cross Lecture, Department of Chemistry, University of Washington, Seattle, Washington, May 20, 2015.

426. "FM Radio at 560 THz Enables Single-Molecule Detection and Spectroscopy, Paving the Way to the Nobel Prize," Special Lecture, Stanford Amateur Radio Club W6YX, Stnford, California, June 2, 2015.

427. "Light Paves the Way to Single-Molecule Detection and Photocontrol, Foundations of Super-Resolution Microscopy," IEEE-SCV Photonics Society, Intel Corporation, Santa Clara, California, June 4, 2015.

428. "Light Paves the Way to Single-Molecule Detection and Photocontrol, Foundations of Super-Resolution Microscopy," Plenary, Optical Society of America Imaging and Applied Optics Congress, Arlington, Virginia, June 10, 2015.

429. "Studying Biomolecules with Super-Resolution Fluorescence Microscopy," American Chemical Society Northeastern Section Meeting, Nova Biomedical, Waltham, Massachusetts, June 11, 2015.

430. "The Story of Single Molecules, from Early Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," UC Systemwide Bioengineering Symposium, University of California, Santa Cruz, California, June 22, 2015.

431. "Fun with Light and Single Molecules: Nanoscale Points of Light and Photocontrol Enable Super-Resolution Microscopy," 65th Lindau Nobel Laureate Meeting with Young Scientists, Lindau Island, Germany, July 2, 2015.

432. "Fun with Light and Single Molecules Opens Up an Amazing New View Inside Cells," Guest Speaker, Hollyhock Fellows Program, Stanford University, Stanford, California, July 15, 2015.

433. "Light Paves the Way to Single-Molecule Detection and Photocontrol, Foundations of Super-Resolution Microscopy," Optical Society Nonlinear Optics (NLO) Topical Meeting, Keynote Address, Kauai, Hawaii, July 29, 2015.

434. "The Story of Single Molecules, from Early Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," 12th International Conference on Hole Burning, Single Molecule, and Related Spectroscopies: Science and Applications, Tartu, Estonia, August 24, 2015.

435. "Light Paves the Way to Single-Molecule Detection and Photocontrol, Foundations of Super-Resolution Microscopy," Plenary Lecture, Mexican Optics and Photonics Meeting, Leon, Guanajuato, Mexico, September 9, 2015.

436. "The Road to A New World of Super-Resolution Microscopy in Cells and Beyond," Presidential Distinguished Lecture, University of Texas at San Antonio, San Antonio, Texas, September 11, 2015.

437. "The Road to A New World of Super-Resolution Microscopy in Cells and Beyond," Presidential Distinguished Lecture, University of Texas Health Science Center at San Antonio, San Antonio, Texas, September 11, 2015.

438. "Single-Molecule Spectroscopy and Imaging Over the Decades," Introductory Lecture, Faraday Discussion on Single-Molecule Microscopy and Spectroscopy, Royal Society of Chemistry, London, England, September 14, 2015.

439. "The Story of Single Molecules, from Early Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," Dutch Biophysics Conference, Veldhoven, The Netherlands, September 28, 2015.

440. "The Story of Single Molecules, from Early Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," The University of Amsterdam Science Park, Amsterdam, The Netherlands, September 30, 2015.

441. "My Life in Science and the Path to the Nobel Prize," Chemistry Tour, University of Amsterdam Science Park, Amsterdam, The Netherlands, September 30, 2015.

442. "The Story of Single Molecules, from Early Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," 2015 International Institute for Nanotechnology Symposium, Northwestern University, Evanston, Illinois, October 1, 2015.

443. "Seeing Single Molecules, from Early Spectroscopy in Solids, to Super-Resolution Microscopy in Cells and Beyond," Seeing is Believing Symposium, European Molecular Biology Organzation EMBO, European Molecular Biology Laboratory, Heidelberg, Germany, October 7, 2015.

444. "The Story of Single Molecules, from Early Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," University Seminar, University of Bayreuth, Bayreuth,

Germany, October 9, 2015.

445. "Light and Single Molecules Open a New Window into Super-Resolution Imaging in Cells," plenary lecture, 2nd Mediterranean Workshop of Young Researchers (French Chemical Society), Montpellier, France, October 12, 2015.

446. "The Story of Single Molecules, from Early Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," University of Marseilles, France, October 13, 2015.

447. "Light and Single Molecules – Tiny Nanoscale Beacons Help Us See Inside Cells Like Never Before," Lumière, Lumières, College de France, Paris, France, October 16, 2015.

448. "Super-resolution optical microscopy of mutant Huntingtin aggregates and fibrils," NINDS Satellite Symposium "How Can Understanding Protein Structure Help Us Unravel the Mysteries of Neurodegenerative Diseases?" Society for Neuroscience, Chicago, Illinois, October 18, 2015.

449. "Light and Single Molecules – My Path to the Nobel Prize," Frontiers in Optics, Division of Laser Science Banquet, San Jose, California, October 20, 2015.

450. "The Story of Single Molecules, from Early Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," American Chemical Society Santa Clara Valley Section Monthly Meeting, Mountain View, California, October 27, 2015.

451. "Fun with Light and Single Molecules Opens Up an Amazing New View Inside Cells," Samuel I. Weissman Memorial Public Lecture, Department of Chemistry, Washington University, St. Louis, Missouri, November 5, 2015.

452. "The Story of Single Molecules, from Early Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," Samuel I. Weissman Memorial Scientific Lecture, Department of Chemistry, Washington University, St. Louis, Missouri, November 6, 2015.

453. "The Story of Single Molecules, from Early Spectroscopy in Solids, to Super-Resolution Microscopy, to 3D Dynamics in Cells and Beyond," Epibiome/JLABS Seminar, Johnson and Johnson Labs, South San Francisco, November 11, 2015.

454. "The story of single molecules, from early spectroscopy in solids, to super-resolution microscopy, to 3D dynamics of biomolecules in cells," Sir Ernst Chain Lecture, Imperial College of London, London, England, November 16, 2015.

455. "Fun with Light and Single Molecules Opens Up an Amazing New View Inside Cells," 50th Anniversary Celebration of Faculty of Science, University of Chile, Santiago, Chile, December 9, 2015.

456. "The story of single molecules, from early spectroscopy in solids, to super-resolution microscopy, to 3D dynamics of biomolecules in cells," American Society of Cell Biology Annual Meeting, San Diego, California, December 13, 2015.

457. "The story of single molecules, from early spectroscopy in solids, to super-resolution nanoscopy in cells and beyond," Pacifichem 2015 Symposium on Single-Molecule Fluorescence Imaging (#208), Honolulu, Hawaii, December 16, 2015.

458. "Super-Resolution Imaging in Cells Using Single Molecules Places New Requirements on Fluorophore Labels," Pacifichem 2015 Symposium on Molecular Probes and

Fluorophores for Biological Imaging (#280), Honolulu, Hawaii, December 17, 2015.

459. "Quantitating Position and Orientation of Single-Molecule Emitters in Localization and Super-Resolution Microscopy," Keynote Lecture, Conference on Quantitative Biological Imaging 2016, Delft, The Netherlands, January 13, 2016.

460. "The Story of Single Molecules, from Early Spectroscopy in Solids, to Super-Resolution Microscopy in Cells and Beyond," Joint Chemistry and Physics Colloquium, Johannes Gutenberg University and the Max Planck Institute for Polymerforschung, Mainz, Germany, January 18, 2016.

461. "Thoughts from a Nobel Laureate," Basic Industries and Rethinking the State of the World with Nobel Laureates, World Economic Forum Annual Meeting, Davos, Switzerland, January 22, 2016.

462. "A Journey of Discovery with W. E. Moerner," World Economic Forum Annual Meeting Interview by Joe Palca, Davos, Switzerland, January 22, 2016.

463. "Single-Molecule Imaging and Super-Resolution Microscopy Provide an Unprecedented View of Structures, Dynamics, and Protein Aggregates in Cells," University of Texas MD Anderson Cancer Center Distinguished Speaker Seminar and NIH Nanomedicine Symposium Public Lecture, Houston, Texas, January 28, 2016.

464. "Fun With Single Molecules - Tiny Nanoscale Points of Light Help Us See Inside Cells!," Blach Middle School, Los Altos, California, February 1, 2016.

465. "Single-Molecule Nanoemitters, Blinking, and Photocontrol as Foundations for Super-Resolution Microscopy," International Conference on Nanoscience and Nanotechnology, ICONN 2016 Plenary, Canberra, Australia, February 8, 2016.

466. "The story of single molecules, from early spectroscopy in solids, to super-resolution nanoscopy in cells and beyond," Director's Distinguished Lecture, Research School of Physics and Engineering, Australia National University, Canberra, Australia, February 9, 2016.

467. "My Route to the Nobel Prize: Fun with Light and Single Molecules Leads to an Amazing New View Inside Cells!," University of New South Wales, Canberra, Australia, February 9, 2016.

468. "The story of single molecules, from early spectroscopy in solids, to super-resolution nanoscopy in cells and beyond," Australian Research Council Centre of Excellence in Advanced Molecular Imaging, Monash University, Melbourne, Australia, February 11, 2016.

469. "The Story of Single Molecules, from Early Spectroscopy in Solids, to Super-Resolution Microscopy, Opening Up an Amazing New Nanoscale View Inside Cells," Paul D. Gottlieb Lecture, Institute of Cellular and Molecular Biology, The University of Texas at Austin, February 22, 2016.

470. "Seeing single molecules, from early spectroscopy in solids, to super-resolution microscopy, to 3D dynamics of biomolecules in (and outside) cells," Nanoscale Subgroup, Biophysical Society Meeting, Los Angeles, California, February 27, 2016.

471. "How Optical Single-Molecule Detection in Solids Led to Super-Resolution Nanoscopy in Cells and Beyond," Wallace H. Coulter Lecture, Pittcon 2016 Conference, Atlanta,

Georgia, March 6, 2016.

472. "The Story of Photonics and Single Molecules, from Early Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," Keynote Lecture for Photonics Pioneer Award, 2016 Symposium on Frontiers in Photonics Science and Technology, Fitzpatrick Institute for Photonics, Duke University, Raleigh, North Carolina, March 14, 2016.

473. "The story of single molecules, from early spectroscopy in solids, to super-resolution microscopy, which opens up an amazing new view inside cells (and beyond)," Provost Lecture, Temple University, Philadelphia, Pennsylvania, March 16, 2016.

474. "Single Molecules as Nanoscale Probes in Biology and Nanophotonics," Molecular Foundry 10th Anniversary Symposium, Lawrence Berkeley National Laboratory, Berkeley, California, March 24, 2016.

475. "Fun With Single Molecules - Tiny Nanoscale Points of Light Help Us See Inside Cells!," Fred J. Robbins Public Lecture to high school students from 17 schools, Department of Chemistry, Pomona College, Claremont, California, March 28, 2016.

476. "The Story of Single Molecules, from Early Spectroscopy in Solids, to 3D Super-Resolution Microscopy with Its Promise and Challenges," Fred J. Robbins Lecture 2, Department of Chemistry, Pomona College, Claremont, California, March 29, 2016.

477. "Single-molecule approaches to cell biology based on imaging and tracking," Fred J. Robbins Lecture 3, Department of Chemistry, Pomona College, Claremont, California, March 30, 2016.

478. "Multivariate photodynamics of individual molecules in solution with the ABEL trap," Fred J. Robbins Lecture 4, Department of Chemistry, Pomona College, Claremont, California, March 31, 2016.

479. "Fun with Light and Single Molecules Started 27 Years Ago Opens Up an Amazing New View Inside Cells (and beyond)," 75th Anniversary of The Institute of Chemistry, UNAM, Mexico City, Mexico, April 5, 2016.

480. "My Route to the Nobel Prize: Fun with Light and Single Molecules Leads to an Amazing New View Inside Cells!," UNAM Preparatory School ENP 6, Mexico City, Mexico, April 6, 2016.

481. "The Story of Single Molecules, from Early Spectroscopy in Solids, to Super-Resolution Microscopy, Which Opens Up an Amazing New View Inside Cells," Nobel Lecture in Materials Science and Engineering, Georgia Institute of Technology, Atlanta, Georgia, April 11, 2016.

482. "The Story of Single Molecules, from Early Spectroscopy in Solids, to Super-Resolution Microscopy, Which Opens Up an Amazing New View Inside Cells," Hightower Lecture, Department of Physics, Emory University, Atlanta, Georgia, April 12, 2016.

483. "The Story of Single Molecules, from Early Spectroscopy in Solids, to Super-Resolution Microscopy Inside Cells, to Single Biomolecule Dynamics," Andreas C. Albrecht Lecture, Department of Chemistry and Chemical Biology, Cornell University, Ithaca, New York, April 14, 2016.

484. "The Story of Single Molecules: How Precise High-Resolution Spectroscopy at Low

Temperatures Led to Super-Resolution Microscopy and Beyond," Hong Kong University of Science and Technology, 25th Anniversary Distinguished Speaker, Hong Kong, May 16, 2016.

485. "The Story of Single Molecules: From Early Days, to Super-Resolution, to 3D Dynamics in Cells," Korean Society for Biochemistry and Molecular Biology International Conference 2016, Seoul, Korea, May 18, 2016.

486. "The Story of Single Molecules: How Precise High-Resolution Spectroscopy at Low Temperatures Led to Super-resolution Microscopy and Beyond," Center for Molecular Spectroscopy and Dynamics, Institute of Basic Science, Korea University, Seoul, Korea, May 19, 2016.

487. "The Story of Single Molecules: How Precise High-Resolution Spectroscopy at Low Temperatures Led to Super-Resolution Microscopy and Beyond," Department of Chemistry, Seoul National University, Seoul, Korea, May 20, 2016.

488. "Seeing Single Molecules: From Early Spectroscopy in Solids to Super-Resolution Microscopy, to 3D Dynamics of Biomolecules in Cells," 2016 World Congress on In Vitro Biology, San Diego, California, June 12, 2016.

489. "The Promise and Challenges of 3D Super-Resolution Microscopy and Single-Molecule Tracking in Cells," FASEB Symposium on the Molecular Biophysics of Membranes, Snowmass, Colorado, July 10, 2016.

490. "The story of single molecules and the surprises leading to super-resolution microscopy and beyond," Symposium in Memory of Richard Keller, American Chemical Society National Meeting, Philadelphia, Pennsylvania, August 22, 2016.

491. "The story of single molecules and the surprises leading to super-resolution microscopy and beyond," 31st William S. Johnson Symposium, Department of Chemistry, Stanford University, October 14, 2016.

492. "How My Life Has Changed Since I Became a Nobel Laureate," DOE-BES Physical Biosciences PI Meeting, Gaithersburg, Maryland, October 17, 2016.

493. "Single Molecules as Nanoscale Light Sources for Imaging and as Sentinels for 3D Dynamics," Frontiers of Imaging, 60th Welch Foundation Conference on Chemical Research, Houston, Texas, October 24, 2016.

494. "What Can You Learn from Watching Single Molecules? From Super-Resolution Imaging to Nanoscale Probes of 3D Dynamics in Cells, Imaging Science Seminar, Texas A&M University, College Station, Texas, October 26, 2016.

495. "The Promise and Challenges of 3D Super-Resolution Microscopy and Single-Molecule Tracking in Cells and in Solution," University Aix-Marseilles Medical Campus, Marseilles, France, November 9, 2016.

496. "What Can You Learn from Watching Single Molecules? From Super-Resolution Imaging to Nanoscale Probes of 3D Dynamics in Cells," Spotlight Lecture, Shaastra – Indian Institute of Technology Madras, Chennai, India, January 2, 2017.

497. "Science and Single Molecules: How Industrial Basic Research at Low Temperatures 30 Years Ago Led to Super-Resolution Microscopy and Beyond," Distinguished Invited Lecture, Indian Science Congress, Tirupati, India, January 3, 2017.

498. "What Can You Learn from Watching Single Molecules? From Super-Resolution Imaging to Nanoscale Probes of 3D Dynamics in Cells," Sree Vidyanikethan Engineering College, Tirupati, India, January 4, 2017.

499. "The Promise and Challenges of 3D Super-Resolution Microscopy and Single-Molecule Tracking in Cells and in Solution," Biophysics Seminar, Indian Institute of Science, Bangalore, India, January 5, 2017.

500. "What Can You Learn from Watching Single Molecules? From Super-Resolution Imaging to Nanoscale Probes of 3D Dynamics in Cells," Morris Travers Memorial Lecture, Indian Institute of Science, Bangalore, India, January 5, 2017.

501. "What Can You Learn from Watching Single Molecules? From Super-Resolution Imaging to Nanoscale Probes of 3D Dynamics in Cells," Indian Institute of Technology - Delhi, Delhi, India, January 12, 2017.

502. "The Promise and Challenges of 3D Super-Resolution Microscopy and Single-Molecule Tracking in Cells and in Solution," Student-hosted Johns Hopkins University Biophysics Seminar, Baltimore, Maryland, February 8, 2017.

503. "The Promise and Challenges of 3D Super-Resolution Microscopy and Single-Molecule Tracking in Cells and in Solution," Chemistry Department Seminar, Columbia University, New York, New York, February 9, 2017.

504. "The Story of Photonics and Single Molecules, from Early Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," Munushian Lecture, Ming Hsieh Department of Electrical Engineering, USC Viterbi School of Engineering, February 17, 2017.

505. "What Can You Learn from Watching Single Molecules? From Super-Resolution Imaging to Nanoscale Probes of 3D Dynamics in Cells," ACS-Young Chemists Committee Evening Seminar, San Francisco, California, February 21, 2017.

506. "The Promise and Challenges of 3D Super-Resolution Microscopy and Single-Molecule Tracking in Cells and in Solution," Physics Department, Bar-Ilan University, Tel Aviv, Israel, February 26, 2017.

507. "The Promise and Challenges of 3D Super-Resolution Microscopy and Single-Molecule Tracking in Cells," Plenary, The 6th OASIS International Conference and Exhibition on Optics and Electro-Optics, Tel Aviv, Israel, February 27, 2017.

508. "The Promise and Challenges of 3D Super-Resolution Microscopy and Single-Molecule Tracking in Cells," Technion Photonics Symposium, The Technion University, Haifa, Israel, March 2, 2017.

509. "What Can You Learn from Watching Single Molecules? From Super-Resolution Imaging to Nanoscale Probes of 3D Dynamics in Cells," 38th Nobel Laureate Lecture Series General Lecture, California State University, Long Beach, California, March 20, 2017.

510. "The Promise and Challenges of 3D Super-Resolution Microscopy and Single-Molecule Tracking in Cells," 38th Nobel Laureate Lecture Series Technical Lecture, California State University, Long Beach, California, March 20, 2017.

511. "The Promise and Challenges of 3D Super-Resolution Microscopy and Single-Molecule

Tracking in Cells," University Lecture, University of Texas Southwestern School of Biomedical Science, Dallas, Texas, March 22, 2017.

512. "What Can You Learn from Watching Single Molecules? From Super-Resolution Imaging to Nanoscale Probes of 3D Dynamics in Cells," Qizhen Global Vision Lecture, Zhejiang University, Hangzhou, China, March 27, 2017.

513. "What Can You Learn from Watching Single Molecules? From Super-Resolution Imaging to Nanoscale Probes of 3D Dynamics in Cells," Heaven and Earth Distinguished Lecture, Nanjing University, Nanjing, China, March 29, 2017.

514. "The Promise and Challenges of 3D Super-Resolution Microscopy and Single-Molecule Tracking in Cells and in Solution," LIFENERGY Distinguished Professorship and Lecture, Nanjing University, Nanjing, China, March 30, 2017.

515. "The story of single-molecule detection and spectroscopy, and the surprises leading to super-resolution microscopy and beyond," Symposium on Contributions from the IBM Almaden Research Center, American Chemical Society National Meeting, San Francisco, California, April 3, 2017.

516. "What Can You Learn from Watching Single Molecules? From Super-Resolution Imaging to Nanoscale Probes of 3D Dynamics in Cells," Plenary Lecture, Chemistry Honors Week, Kent State University, April 13, 2017.

517. "Super-Resolution Microscopy to Study Molecules Within Cells," Keynote Lecture, Cancer Metastasis in the Lymphatic System, San Francisco, California, April 20, 2017.

518. "My Route to the Nobel Prize: Fun with Light and Single Molecules Leads to an Amazing New View Inside Cells," Keynote Lecture, California State Science Fair 2017, California Science Center, Los Angeles, California, April 24, 2017.

519. "The Story of Photonics and Single Molecules, from Early Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond, Colloquium Lecture, National Institute of Standards and Technology, Gaithersburg, Maryland (presented remotely), May 2, 2017.

520. "The Story of Photonics and Single Molecules, from Early Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond, Optical Sciences and Engineering Lunch Seminar, University of New Mexico, Albuquerque, New Mexico, May 11, 2017.

521. "What Can You Learn from Watching Single Molecules? From Super-Resolution Imaging to Nanoscale Probes of 3D Dynamics in Cells," Physics/Astronomy Colloquium, University of New Mexico, Albuquerque, New Mexico, May 11, 2017.

522. "The Story of Photonics and Single Molecules, from Early Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," Photonics North 2017 Plenary Lecture, Ottawa, Canada, June 7, 2017.

523. "What Can You Learn from Watching Single Molecules? Nanoscale Points of Light and Photocontrol Enable Super-Resolution Microscopy," Lindau Meeting of Young Scientists and Nobel Laureates, Lindau, Germany, June 27, 2017.

524. "What Can We Learn from Single-Molecule Imaging and Trapping? From Super-Resolution Microscopy to Multivariate Photodynamics of Individual Pigment-Protein Complexes in Solution," Gordon Research Conference on Photosynthesis, Sunday River Grand Summit Hotel, Newry, Maine, July 15-21, 2017.

525. "The Story of Photonics and Single Molecules, and the Challenges and Promises of Super-Resolution Microscopy and Dynamical Tracking in Biological Imaging," CLEO-Pacific Rim, Singapore, 1-4 August 2017.

526. "Super-Resolution Microscopy to Study Normal and Diseased Cells," (with Colin Comerci), California Pacific Medical Center Research Institute Seminar, California Pacific Medical Center-Research Institute, San Francisco, California, 22 August 2017.

527. "The Promise and Challenges of 3D Super-Resolution Microscopy and Single-Molecule Tracking in Cells and in Solution," Max Planck Institute for Biochemistry Martinsried Distinguished Visitor Lecture, Martinsried, Germany, 8 September 2017.

528. "Light and Single Molecules Open a New Window Into the Nanoscale and Biomolecular Dynamics," Angewandte Chemie Symposium for GDCh 150th Anniversary Congress, Berlin, Germany, 11 September 2017.

529. "The Promise and Challenges of 3D Super-Resolution Microscopy and Single-Molecule Tracking in Cells and in Solution," Plenary Lecture, Methods and Applications of Fluorescence 2017, Bruge, Belgium, 12 September 2017.

530. "The Promise and Challenges of 3D Super-Resolution Microscopy and Single-Molecule Tracking in Cells and in Solution," 23rd Picoquant Workshop on Single-Molecule Spectroscopy, Berlin-Adlershof, Germany, 14 September 2017.

531. "The Promise and Challenges of 3D Super-Resolution Microscopy and Single-Molecule Tracking in Cells and in Solution," 20 Years of Nano-Optics, MPI Science of Light Erlangen, Germany, 18 September 2017.

532. "The Promise and Challenges of 3D Super-Resolution Microscopy, Single-Molecule Tracking in Cells, and Trapping of Biomolecules in Solution," University of Ulm Physics Seminar, Ulm, Germany, 6 November 2017.

533. "What Can You Learn from Watching Single Molecules? From Super-Resolution Imaging to Nanoscale Probes of 3D Dynamics in Cells," Ulm University 50 Year Anniversary Public Lecture, Ulm, Germany, 6 November 2017.

534. "Breaking the Wall of the Nanoscale," Falling Walls Conference, Berlin, Germany, 9 November 2017.

535. "What Can You Learn from Watching Single Molecules? From Super-Resolution Imaging to Nanoscale Probes of 3D Dynamics in Cells," Berlin Science Week, Humboldt University, Berlin-Adlershof, Germany, 10 November 2017.

536. "The Story of Photonics and Single Molecules, and the Challenges and Promises of Super-Resolution Microscopy and Dynamical Tracking in Biological Imaging", SPIE Fellows Lunch Keynote, San Francisco, California, January 29, 2018.

537. "The Promise and Challenges of 3D Super-Resolution Microscopy, Single-Molecule Tracking in Cells, and Trapping of Biomolecules in Solution," Physical Chemistry Seminar, Colorado State University, Fort Collins, Colorado, January 31, 2018.

538. "The Promise and Challenges of 3D Super-Resolution Microscopy, Single-Molecule Tracking in Cells, and Trapping of Biomolecules in Solution," E. U. Condon Lecture, University of Colorado, Boulder, Colorado, February 2, 2018.

539. "Single-Molecule and Super-Resolution Approaches to Biophysics," Kamal Shukla Memorial Symposium, Biophysical Society Annual Meeting, San Francisco, California, February 16, 2018.

540. "The Promise and Challenges of 3D Super-Resolution Microscopy, Single-Molecule Tracking in Cells, and Trapping of Biomolecules in Solution," ICON Europe 2018, Bielefeld, Germany, February 27, 2018.

541. "The Promise and Challenges of 3D Super-Resolution Optical Microscopy and Single-Molecule Tracking in Cells as Probes of Structure and Dynamics," DOE-BER Bioimaging Science PI Meeting, Tysons Corner, Virginia, March 1, 2018.

542. "Fun With Single Molecules - Tiny Nanoscale Points of Light Help Us See Inside Cells!," Georgina P. Blach Middle School, Los Altos, California March 13, 2018.

543. "What Can You Learn from Watching Single Molecules? From Super-Resolution Imaging to Nanoscale Probes of 3D Dynamics in Cells," Nelson Lecture, Department of Chemistry, University of Miami, Coral Cables, Florida, March 21, 2018.

544. "What Can You Learn from Watching Single Molecules? From Super-Resolution Imaging to Nanoscale Probes of 3D Dynamics in Cells," Public Lecture, Department of Physics, University of South Carolina, Columbia, South Carolina, March 23, 2018.

545. "The Promise and Challenges of 3D Super-Resolution Microscopy, Single-Molecule Tracking in Cells, and Trapping of Biomolecules in Solution," S. Town Stephenson Lecture, Physics and Astronomy Department, Washington State University, Pullman, Washington, April 3, 2018.

546. "The Story of Photonics and Single Molecules: From Early FM Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," Physics Colloquium, Montana State University, Bozeman, Montana, April 5, 2018.

547. "Single Molecules for 3D Super-Resolution Imaging and Single-Particle Tracking in Cells: Methods and Applications," Yale Biophysics Training Grant Invited Speaker, Yale University, New Haven, Connecticut, April 11, 2018.

548. "The Story of Photonics and Single Molecules: From Early FM Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," Hermann Anton Haus Lecture, Massachusetts Institute of Technology, Cambridge, Massachusetts, April 12, 2018.

549. "The Story of Photonics and Single Molecules: What Can we Learn About Structure and Dynamics in Complex Biological Systems?," Inaugural Harden M. McConnell Lecture, California Institute of Technology, Pasadena, California, April 24, 2018.

550. "What Can We Learn from Watching Single Molecules? The Promise and Challenges of Super Resolution Microscopy," Seminar for Leiden University Study Group, Stanford University, May 7, 2018.

551. "Nanophotonics Based on Individual Molecules and Light Gives Rise to 3D Super-Resolution Imaging and Beyond," 11th International Conference on Nanophotonics-2018 plenary, Wroclaw, Poland, 2 July 2018.

552. "Selected New Directions with Single Molecules: Methods and Biological Insights," Gordon Research Conference on Single-Molecule Approaches to Biology, Mt. Snow, Vermont, July 15-19, 2018.

553. "Single-Molecule Nanoscience in Cells Through (Chemistry, of course,) Optics and Imaging," ACS Publications Symposium, Innovations in Materials Science, ShanghaiTech University, Shanghai, China, July 29, 2018

554. "The Story of Single Molecules: From Early Spectroscopy in Solids, to Super-Resolution Microscopy Inside Cells, to Single Biomolecule Dynamics," Jin Si Lecture, Department of Chemistry, Fudan University, Shanghai, China, August 1, 2018.

555. "Single-Molecule Approaches to Cell Biology Based on (3D) Imaging and Tracking," Special Seminar, Institute of Biomedical Sciences, Fudan University Medical School, Shanghai, China, August 2, 2018.

556. "Brief Thoughts on Hole-Burning and Single Molecules Over the Years," 13th International Conference on Hole Burning, Single Molecule, and Related Spectroscopies HBSM 2018, Suzdal, Russia, August 6, 2018.

557. "Single Molecules Across the Decades, from Low Temperature, to 3D Imaging and Tracking in Cells, to Solution Photodynamics," 13th International Conference on Hole Burning, Single Molecule, and Related Spectroscopies HBSM 2018, Moscow State Pedagogical University, Moscow, Russia, August 11, 2018.

558. "Probes and methods for single-molecule tracking and super-resolution microscopy," ProbeFest 2018, HHMI Janelia Research Campus, Ashburn, Virginia, October 14-17, 2018.

559. "Single Molecules as Light Beacons for the Nanoscale," World Laureates Association Forum 2018, Crowne Plaza Shanghai Harbor City, Dishui Lake, Shanghai, China, October 29-31, 2018.

560. "The Story of Photonics and Single Molecules: From Early FM Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," Taiwan Physical Society Plenary Lecture, Hsinchu, Taiwan, January 25, 2019.

561. "The Story of Photonics and Single Molecules, from Early FM Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," Institute of Atomic and Molecular Sciences (IAMS) Symposium, Academia Sinica, Taipei, Taiwan, January 28, 2019.

562. "Single Molecules for Dynamics and Super-Resolution Microscopy," Chemistry Department Faculty Lunch Seminar, Stanford University, Stanford, California, January 31, 2019.

563. "Single-Molecule Tools for Super-Resolution Imaging and Biomolecular Dynamics in Cells," Regenerative Medicine Seminar, Stanford University, Stanford, California, February 14, 2019.

564. "Providing 3D for Super-Resolution Microscopy and Single-Particle Tracking in Cells with Single Molecules," Biophysical Society Annual Meeting, Baltimore, Maryland, March 5, 2019.

565. "What is a Single Molecule, and What Can You Do With It?" Telluride Town Talk, Telluride Science Research Center, Telluride, Colorado, June 25, 2019.

566. "Single-Molecule Dynamics and Super-Resolution Microscopy," Symposium on Emerging Methods in Single-Molecule Spectroscopy, Telluride Science Research Center, Telluride, Colorado, June 27, 2019.

567. "What Can You Learn From Single Molecules, Even When Trapped Without Optical Forces?" Lindau Nobel Laureate Meeting with Young Scientists LINO19, Lindau, Germany, July 1, 2019.

568. "Nanophotonics Based on Individual Molecules and Light Gives Rise to 3D Super-Resolution Imaging in Cells and Biomolecular Insights," plenary lecture, SPIE Conference on Optics and Photonics/Organic Photonics+Electronics, Molecular and Nanomachines II, San Diego, California, August 13, 2019.

569. "Trapping Single Molecules in Solution Without Optical Forces," SPIE Conference on Optics and Photonics/Nanoscience+Engineering, Optical Trapping and Optical Micromanipulation XVI, San Diego, California, August 14, 2019.

570. "Roger Tsien and Blinking Fluorescent Proteins in the mid-1990s, Plus What's New?", Roger Tsien Memorial Conference, Methods and Applications in Fluorescence 2019, UCSD La Jolla, California, August 24, 2019.

571. "Thirty Years of Single Molecules, from Early Low Temperatures to 3D Super-Resolution Nanoscopy and Tracking/Trapping: What's Next?" Keynote, 25th International Anniversary Workshop on "Single Molecule Spectroscopy and Super-resolution Microscopy in the Life Sciences," Berlin-Adlershof, Germany, September 5, 2019.

572. "The Story of Single Molecules, from Early High-Resolution Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," Plenary, XXI Mendeleev Congress on General and Applied Chemistry, 150th Anniversary of the Periodic Table, St. Petersburg, Russia, 9 September 2019.

573. "What is a Single Molecule, and What Can you Do With It?" J. T. Donald Public Lecture, McGill University, Montreal, Quebec, Canada, 23 September 2019.

574. "Providing 3D for Super-Resolution Microscopy and Single-Particle Tracking in Cells with Single Molecules: After 30 Years, What's Next?" J. T. Donald Science Lecture, McGill University, Montreal, Quebec, Canada, 24 September 2019.

575. "Providing 3D for Super-Resolution Microscopy and Single-Particle Tracking in Cells with Single Molecules: After 30 Years, What's Next?" Molecular Medicine Seminar, The Scripps Research Center, La Jolla, CA, 25 September 2019.

576. "Developments in 3D Super-Resolution Microscopy and Single-Particle Tracking in Cells with Single Molecules," Bridging Excellence Lecture, EMBL-SU Alliance, EMBL-Heidelberg, Germany, 7 October 2019.

577. "Selected Recent Advances in 3D Super-Resolution and Cryo-CLEM in Cells," Seeing is Believing-Imaging the Molecular Processes of Life, EMBL-EMBO Symposium, Heidelberg, Germany, 11 October 2019.

578. "What Is a Single Molecule, and What Can You Do With It?" HUST Masters Talk, Huazhong University of Science and Technology, Wuhan, China, 11 November 2019.

579. "Providing 3D for Super-Resolution Microscopy and Single-Particle Tracking in Cells with Single Molecules," Plenary Lecture, International Photonics and Optoelectronics Meeting, POEM 2019, Wuhan, China, 12 November 2019.

580. "Nanophotonics Based on Individual Molecules and Light Gives Rise to 3D Super-Resolution Imaging in Cells and Biomolecular Insights," Plenary Lecture, OVC-EXPO,

Optics Valley, Wuhan, China, 13 November 2019.

581. "Providing 3D for Super-Resolution Microscopy and Single-Particle Tracking in Cells with Single Molecules," Physical Chemistry Student Select Lecture, University of Illinois, Urbana-Champaign, Illinois, 4 December 2019.

582. "Single Molecules and 3D Super-Resolution, 3D Tracking, and Cryo-CLEM in Cells," Keynote Lecture, Microscopy Society of Ireland, Dublin, Ireland, 9 January 2020.

583. "Fun With Single Molecules - Tiny Nanoscale Points of Light Help Us See Inside Cells!" Casa Di Mir Montessori School, Campbell, California, 22 January 2020.

584. "Fun With Single Molecules - Tiny Nanoscale Points of Light Help Us See Inside Cells!" Chemistry 91 presentation to undergraduates interested in Chemistry, Stanford University, Stanford, California, 29 January 2020.

585. "Single-Molecule Imaging: A Window into the Biological Nanoscale from 3D Super-Resolution Microscopy and Neural Nets," Plenary Lecture with Leonhard Möckl, IBM Symposium on AI for Biomedical Imaging Across Scales, IBM Almaden Research Center, San Jose, California, 4 February 2020.

586. "Single Molecules and 3D Super-Resolution, 3D Tracking, and Cryo-CLEM in Cells," Purdue College of Engineering Distinguished Lecture, Purdue University, West Lafayette, Indiana, 26 February 2020.

587. "Fun with Single Molecules – My Life in Science with a Bit of Early Scouting Days," Virtual Meeting of the Moecomdws District Eagle Scout Group, Great Trails Council, Scouts BSA, Ohio, 25 June 2020.

588. "New developments in single-molecule super-resolution imaging (and tracking)," American Chemical Society Fall Meeting Virtual Symposium on Single-Molecule Microscopy, 18-20 August, 2020.

589. "The Story of Light and Single Molecules: From Early FM Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," Oliver Smithies Nobel Symposium Lecture, School of Medicine, University of North Carolina, Raleigh-Durham, North Carolina, 11 September 2020 (remote).

590. "What is a Single Molecule, and What Can You Do With It?" XV All-Russian Science Festival NAUKA 0+, Russia, Public Plenary Lecture, 11 October 2020.

591. "The Story of Light and Single Molecules: From Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," World Laureates Forum 3, Shanghai, China and Virtual (online), October 30-November 1, 2020.

592. "The Story of Light and Single Molecules: From Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," Plenary Lecture, Global Young Scientists Summit GYSS 2021, 13 January 2020 (online).

593. "The Story of Light and Single Molecules: From Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," Keynote Lecture, Advanced Imaging Methods Workshop AIM-2021, 10 February 2021 (online).

594. "What is a Single Molecule, and What Can You Do with It?" Imperial College London ChemSoc public lecture (remote), 17 February 2021.

595. "Single-Molecule Strategies for 3D Super-Resolution Imaging in Cells," Stanford Bio-X Imaging Workshop Lecture (remote), 28 February 2021.

596. "Single-Molecule Super-Resolution in 2D and 3D to Uncover Hidden Detail in Coronavirus Infection and in Cryo-ET Imaging," NIGMS Webinar/Videocast (remote), 18 May 2021. Part of the Division of Biophysics, Biomedical Technology, and Computational Biosciences (BBCB) seminar series on advanced biological imaging, also posted with an alternate subtitle: "Hidden Molecules in the *Caulobacter* Bacterium, Coronavirus, and Cells," highlighted in the NIGMS Feedback Loop blog: https://loop.nigms.nih.gov/2021/04/nobel-laureate-w-e-moerner-seminar-on-hidden-molecules-in-caulobacter-bacterium-coronavirus-and-cells/

597. "Single-Molecule Localization Microscopy Unites the Power of Fluorescence and Cryo-Electron Tomography Imaging," Lindau 70th Anniversary Agora session on New Methods for Biological Imaging (online), 1 July 2021.

598. "New Developments in Single-Molecule Super-Resolution Imaging," Second Symposium in Memory of Maxime Dahan (online), Institut Curie, Paris, France, 6 December 2021.

599. "The Story of Light and Single Molecules: From Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," Lecture, 13th HOPE Meeting with Nobel Laureates organized by the Japan Society for the Promotion of Science (online) 8 March 2022.

600. "NanoBioScience with Stanford Shared Facilities: Combining Cryo-ET and Super-Resolution Microscopy," Stanford Shared Facilities Summit (online), 17 March 2022.

601. "The Story of Light and Single Molecules: From Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," EE235B class guest lecture, 25 April 2022 (online).

602. "Recent Advances in Correlative Microscopy and Super-Resolution Imaging of Coronavirus Infection," First European Molecular Biology Laboratory (EMBL) Imaging Centre Symposium, 31 May 2022 (online).

603. "What is a Single Molecule, and What Can You Do With It To See the Nanoscale??" Special Lecture in Series "Lectures of the Future" from the UNESCO Center, Junior Academy of Sciences of Ukraine, 3 June 2022 (online).

604. "What Can Single Molecules Tell Us about Coronavirus RNA and Cryo-Electron Tomography?," Lindau 71st meeting of Nobel Laureates and Young Scientists, Lindau, Germany, 28 June 2022.

605. "Recent Progress in Super-Resolution Microscopy: Neural Net Background Estimation for 3D, Annotation of Hidden Proteins in Cryo-Electron Tomograms, and Imaging RNA Players in Coronavirus Infection," BioEng2022 Bioengineering Solutions for Biology and Medicine, Helmholtz Munich, Munich Germany, 4 July 2022.

606. "New Developments in Single-Molecule Super-Resolution Imaging and Tracking/Trapping, Plus Connections to Cryo-Electron Tomography," Distinguished Lecture, Max-Planck-Institute for the Science of Light, Erlangen, Germany, 7 July 2022.

607. "What Can What Can You Learn with Single Molecules and Light?" Curious 2022 Future Insight Conference, Darmstadt, Germany, 13 July 2022 (remote).

608. "Something Old, Something New: Single Molecules, from the Early Days, to Galaxies of Coronavirus RNA and Annotations of Cryo-Electron Micrograms," Plenary Lecture, Conference on Hole-Burning, Single Molecule, and Related Spectroscopies HBSM 2022, Bayreuth, Germany, 31 August 2022 (remote).

609. "The Story of Light and Single Molecules: From Spectroscopy in Solids, to Bowtie Nanoantennas, to Super-Resolution Nanoscopy in Cells and Beyond," Plenary Lecture, Metamaterials 2022, The 16th International Congress on Artificial Materials for Novel Wave Phenomena, Siena, Italy, 12-17 September 2022 (remote).

610. "What Can What Can You Learn with Single Molecules and Light? Beyond Ensemble Averaging, Super-Resolution Microscopy, and "Galaxies" of Coronavirus RNA Inside Cells," Keynote Lecture, Berkeley-China Summit, University of California, Berkeley, California, 1 October 2022.

611. "What Is a Single Molecule, and What Can You Do With It? The Road to the Nobel Prize, Super-Resolution Microscopy, "Galaxies" of Coronavirus RNA Inside Cells, and Cryo-ET," Physics Department Colloquium, Oregon State University, Corvallis, Oregon, 17 Oct 2022.

612. "Welch Conference 2022 Overview: Molecules and Sculpted Light," Kickoff Lecture, Welch Conference, Houston, Texas, 24 October 2022.

613. "What Can Single Molecules Tell Us About Coronavirus Infection and Cryo-Electron Tomography?" Keynote Lecture, 14th International Congress of Cell Biology & 9th Asian Pacific Organization for Cell Biology Joint Meeting, ICCB&APOCB 2022, Academia Sinica, Taipei, Taiwan, 8 November 2022 (remote).

614. "Single Molecules Provide a Nanoscale View of Cellular Coronavirus Infection and Annotate Cryo-Electron Tomograms", Symposium on Biophysics and Biotechnology, Institute of Atomic and Molecular Sciences, Academia Sinica, Taipei, Taiwan, 3 February 2023.

615. "The Story of Light and Single Molecules Providing a View into the Nanoscale," Symposium in Honor of Nader Engheta, Franklin Medal Laureate, 26 April 2023 (remote).

616. "Progress and Challenges with Single-Molecule and Super-Resolution Microscopy of Biological Systems," Workshop on Frontiers and Challenges in Laser-Based Biological Microscopy," Telluride Science Research Center, Telluride, Colorado, 24 July 2023.

617. "Single Molecules and Light: Opening a Window into the Biological Nanoscale," Plenary Lecture, Chey Scientific Innovation Series: Frontiers of Molecular Imaging Technologies in Life Sciences and Medicine, Chey Institute for Advanced Studies, Seoul, Korea (remote), 20 August 2023.

618. "The Story of Light and Single Molecules: From Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond", Bryce. L. Crawford, Jr. Memorial Lecture, Department of Chemistry, University of Minnesota, Minneapolis, Minnesota, 14 September 2023.

619. "Single Molecules and Light: Opening a Window into the Biological Nanoscale," Stanford-Seoul National University Symposium, 29-30 January 2024.

620. "Light and Single Molecules: From Spectroscopy in Solids, to Super-Resolution Imaging

in Cells, Nanocontainers in Solution, Plus a Little Stimulated Emission," AP483 Optics&Electronics Seminar, Applied Physics Department, Stanford University, 26 February 2024.

621. Keynote Lecture, New Eagles Recognition Ceremony, Pacific Skyline Council, Lucie Stern Center, Palo Alto, California, 27 February, 2024.

622. "Single Molecules and Light: Opening a Window into the Biological Nanoscale," SGMK University of the Future Lecture, SGMK Nicolaus Copernicus Superior School, Warsaw, Poland (remote), 20 April 2024.

623. "The Story of Light and Single Molecules: From Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond," Closs Lecture, Department of Chemistry, The University of Chicago, Chicago, Illinois, 29 April 2024.

624. "Adventures with Single Molecules and SARS-CoV-2 (plus a little early history of a geeky kid!)," Agora Lecture, Lindau Lino24 Meeting with Nobel Laureates and Young Scientists, Lindau, Germany, 4 July 2024.

625. "Lucy Shapiro: Lighting the Way Through the *Caulobacter* World (and Much More)," Lucy Shapiro Symposium, Stanford, California, 2 August 2024.

626. "A Brief Survey of Single-Molecule Optical Microscopy in My Laboratory: From Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells, to Photodynamics of Individual Complex Emitters," Special Keynote Lecture (remote), SMLMS-2024, Lisbon, Portugal, 28 August 2024.

627. Lay title: "What Can You Do with Single Molecules and Light to Study Bioscience?," Longer actual title: "Photonics and Single Molecules, with connections from super-resolution microscopy to SARS-CoV-2 viral infection of cells," Stanford Photonics Research Center Keynote Lecture, Stanford University, Stanford, CA, 16 September 2024.

628. "What Is a Single Molecule, and What Can You Do With It?" LeRoy Eyring Public Lecture, School of Molecular Sciences, Arizona State University, Tempe, Arizona, 24 October 2024.

629. "A Brief Survey of Single-Molecule Optical Microscopy in My Laboratory: From Early Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells, to Photodynamics of Individual Multi-Chromophore Emitters," LeRoy Eyring Scientific Lecture, School of Molecular Sciences, Arizona State University, Tempe, Arizona, 25 October 2024.

630. "The Power of Single-Molecule Optical Studies: Seeing/probing the nanoscale and exploring multiplexed photo physics of single biomolecules in aqueous solution with anti-Brownian traps," Nobel Lecture (remote), 16th International Conference on Frontiers of Polymers and Advanced Materials, ICFPAM Conference, Berhampur University, India, 9 November 2024.

631. "Science Policies, IDC, and Agency Layoffs: Recent Uncertainties and Disruptions to Federally-Funded Research," Bay Area Science and Innovation Consortium (BASIC) Board of Directors Meeting, Lawrence Berkeley National Laboratory, 3 March, 2025.

632. "Fun (and Science) with Single-Molecule Optical Microscopy Over the Last 36 Years," Henry Eyring Lecture of the Eyring-Miner Lecture Series, Department of Chemistry, University of Utah, Salt Lake City, Utah, 7 April 2025.

633. “Fun (and Science) with Single-Molecule Optical Microscopy Over the Last 36 Years,” Henry Eyring Lecture of the Eyring-Miner Lecture Series, Department of Chemistry, University of Utah, Salt Lake City, Utah, 7 April 2025.

634. “Single-molecule spins, fluorescent proteins blink/switch, and super-resolution in cells,” Quantum Sensing for Biological and Medical Research (Stanford Q-Farm Workshop), Stanford University, Stanford, California, 22 August 2025.

635. “Single-Molecule Detection, Spectroscopy, and Imaging Over the Years: From 1.4K, to SARS-CoV-2 Nanostructures in Cells,” Methods and Applications of Fluorescence MAF 2025, Keynote Lecture, Montreal, Canada, 24 August 2025.

636. “Single-Molecule Detection, Spectroscopy, and Imaging Over the Years: From 1.4K, to SARS-CoV-2 Nanostructures in Cells and More,” Plenary Lecture, NSM25 (Nanoscale, Single-Molecule, and Related Spectroscopies), Hokkaido, Japan (remote), 1 Sept 2025.

637. “A Brief Survey of Single-Molecule Optical Microscopy: From Early Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells, to a Wealth of New Applications” Keynote Lecture, Picoquant 30th Single-Molecule Spectroscopy and Super-resolution Microscopy Workshop, Berlin Adlershof, Germany, 24 September 2025.

638. “Memories of Many Great Research Teams at IBMARC: mid 1980s-mid 1990s,” 40 Year Celebration of the IBM Almaden Research Center, San Jose, California, 29 October 2025.

639. “Chasing Single Molecules Over the Years,” Farewell Retirement Celebration for Prof. Dr. Thomas Basché, Univ. Mainz (remote), 22 January 2026.

640. “The Story of Light and Single Molecules: From Spectroscopy in Solids, to Super-Resolution Nanoscopy in Cells and Beyond,” Laureate Lecture, 17th HOPE Meeting with Nobel Laureates organized by the Japan Society for the Promotion of Science, Tsukuba, Japan, 3 March 2026.