

CURRICULUM VITAE

William Esco (W. E.) Moerner
Harry S. Mosher Professor and Professor, by courtesy, of Applied Physics
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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

Career Summary

2014-	Faculty Fellow, 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, Stanford University
1995-1998	First Holder, Distinguished Chair in Physical Chemistry, Department of Chemistry and Biochemistry, University of California San Diego
1989-1995	Research Staff Member and Project Leader, IBM Almaden Research Center San Jose, California
1993-1994	Visiting Guest Professor, Laboratory for Physical Chemistry, ETH Zentrum (Swiss Federal Institute of Technology), Zürich, Switzerland
1988-1989	Manager, Laser-Materials Interactions, IBM Almaden Research Center San Jose, California
1981-1988	Research Staff Member, IBM Almaden Research Center, San Jose, California
1975-1981	Graduate Research Assistant and NSF Graduate Fellow Laboratory for Atomic and Solid State Physics, Cornell University, Ithaca, New York

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

Honors and Awards

Wu Zheng Kai Chemistry Prize, Fudan University, 2018
Distinguished Eagle Scout Award, 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, IEEE, 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

Moscow State Pedagogical University, August 2018
Fudan University, July 2018

Named Lectureships

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 3^{ème} 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: "Apparatuses and Methods for Three-Dimensional Imaging of an Object," January 22, 2019, Provisional filed April 10, 2015.

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:

Member, Scientific Advisory Board, Welch Foundation, 2017-

Member, World Laureates Association, 2017-

Member, Board of Trustees of the Society for Science and the Public, 2018

Journals:

International Advisory Board, *Angewandte Chemie*, 2017-

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.

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 Millennium, 2005.
Member, Advisory Board, Institute of Atomic and Molecular Sciences (IAMS) of Academia Sinica, Taiwan, 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