BIOGRAPHICAL SKETCH

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NAME	POSITION TITLE
William Esco (W. E.) Moerner, Ph. D.	Harry S. Mosher Professor of Chemistry and Professor, by courtesy, of Applied Physics
eRA COMMONS USER NAME (credential, e.g., agency login)	
Moerner.William	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	MM/YY	FIELD OF STUDY
Washington University, St. Louis, MO	B.S. (Final Honors)	1975	Physics
Washington University, St. Louis, MO	A. B. summa cum laude	1975	Mathematics
Washington University, St. Louis, MO	B.S. (Final Honors)	1975	Electrical Engineering
Cornell University, Ithaca, NY	M. S.	1978	Physics
Cornell University, Ithaca, NY	Ph. D.	1982	Physics

A. Personal Statement

I have a broad background in single-molecule detection, spectroscopy, and imaging, having been the first to detect and measure a single molecule in condensed matter at IBM Research in 1989. My laboratory has studied single molecules from low temperature to room temperature, and in a wide range of host materials ranging from crystals to polymers, to living bacterial and eukaryotic cells. We sense conformational changes probed by FRET and fluorescence quenching as well as diffusional properties in membranes and cytoplasm. As PI or co-Investigator on several previous university- and NIH-funded grants, I have developed not only specific cellular imaging protocols capable of imaging single FP fusions, but also a new trap for single biomolecules in solution. In the imaging arena, my laboratory is expert on new photoswitchable fluorophores for superresolution imaging as well as new methods for extracting three-dimensional protein localizations in cells far below the optical diffraction limit. Notably, we have recently tracked the detailed motions of single mRNA particles in living yeast cells in 3D. In addition, I successfully administered previous collaborative projects (e.g. staffing, assay development, budget), collaborated with other researchers, and produced several peer-reviewed publications from each project. As a result of these previous experiences, I am aware of the importance of frequent communication among collaborators and of constructing a realistic research plan, timeline, and budget. In summary, I have a demonstrated record of successful and productive research projects in several areas of biomedical science and biophysics, and my expertise and experience have prepared me to supervise graduate students in this training grant.

B. Positions and Honors

Positions and Employment

1981-1995	Research Staff Member, IBM Research Division
1988-1989	Manager, Laser Materials Interactions, IBM Research Division
1989-1995	Project Leader, Photorefractive Materials, IBM Research Division
1993-1994	Visiting Guest Professor, Swiss Federal Institute of Technology (ETH), Department of Physical Chemistry
1995-1998	Distinguished Professor, University of California, San Diego, Department of Chemistry and Biochemistry
1997-1998	Robert Burns Woodward Visiting Professor, Harvard University, Department of Chemistry and Chemical Biology
1998-	Professor and Member of Biophysics Program Faculty, Stanford University, Department of Chemistry
2001-	Member, BioX Program, Stanford University
2002-	Harry S. Mosher Professor, Department of Chemistry, Stanford University
2005-	Associate Member, Molecular Imaging Program, Stanford University
2005-	Professor, by courtesy, of Applied Physics, Stanford University

Other Experience and Professional Memberships

Member, Biophysical Society, Protein Society, IEEE, APS, ACS, OSA
Associate Editor, ChemPhysChem and Chemical Physics Letters
National Research Council FAMOS Update Committee Member (1999-2002)
NSF-Intelligence Community Workshop on Approaches to Combat Terrorism, 2002.
Member, NIH-NIGMS Workshop on Single Molecule Detection and Manipulation, 2000
NIH-NIDA Workshop on Emerging Technologies: Analysis of Endogeneous Biomaterials and Single Molecules, 2002.
Member, DOE Workshop on Single-Molecule Research in the New Millenium, 2005.
Member, Advisory Board, Center for Biological Imaging at Stanford, 2010-
NIBIB Board of Scientific Counselors, 2010-

Honors

National Winner of the Roger I. Wilkinson Outstanding Young Electrical Engineer Award for 1984, given by the national Electrical Engineering honorary society, Eta Kappa Nu, April 22, 1985
IBM Outstanding Technical Achievement Award (with R.M. Macfarlane and R.M. Shelby) for Photon-Gated Spectral Hole-Burning, July 11, 1988
Fellow, Optical Society of America, May 28, 1992; American Physical Society, November 16, 1992
IBM Outstanding Technical Achievement Award for Single-Molecule Detection and Spectroscopy, November 22, 1992
Samuel L. McElvain Lecturer, Department of Chemistry, University of Wisconsin, 1993
Ehrenfest Colloquium Lecturer, University of Leiden, The Netherlands, March 1994
Arthur D. Little Lecturer, Department of Chemistry, Massachusetts Institute of Technology, 1995
William Draper Harkins Lecturer, Department of Chemistry, University of Chicago, 2001
Earle K. Plyler Prize in Molecular Spectroscopy, American Physical Society, 2001
Fellow, American Academy of Arts and Sciences, October 13, 2001
Geoffrey Frew Fellow, Australian Academy of Sciences, 2003
Fellow, American Association for the Advancement of Science, 2004
Member, National Academy of Sciences (USA), 2007
Wolf Prize in Chemistry, 2008
Irving Langmuir Prize in Chemical Physics, 2009

C. Selected Peer-Reviewed Publications (in chronological order) (selected from 287 publications)

1. R. M. Dickson, A. B. Cubitt, R. Y. Tsien, and W. E. Moerner, “On/off Blinking and Switching Behaviour of Single Molecules of Green Fluorescent Protein,” Nature, **1997**, *388*, 355-358
2. S. Brasselet and E. J. G. Peterman, A. Miyawaki, and W. E. Moerner, “Single-Molecule Fluorescence Resonant Energy Transfer in Calcium-Concentration-Dependent Cameleon,” J. Phys. Chem. B, **2000**, *104*, 3676-3682
3. B. Lounis, J. Deich, F. I. Rosell, S. G. Boxer, and W. E. Moerner, "Photophysics of *Ds*Red, a Red Fluorescent Protein, from the Ensemble to the Single-Molecule Level," J. Phys. Chem. B*,* **2001,** *105,* 5048-5054
4. H. Sosa, E. J. G. Peterman, W. E. Moerner, and L. S. B. Goldstein, "ADP-Induced Rocking of the Kinesin Motor Domain Revealed by Single-Molecule Fluorescence Polarization Microscopy," Nature Structural Biology, **2001,** *8,* 540-544
5. M. F. Paige, E. J. Bjerneld, and W. E. Moerner, "A Comparison of Through-the-Objective Total Internal Reflection Microscopy and Epi-fluorescence Microscopy for Single-Molecule Fluorescence Imaging," Single Molecules, **2001**, *2*, 191-201
6. W. E. Moerner, "A Dozen Years of Single-Molecule Spectroscopy in Physics, Chemistry, and Biophysics, **(invited feature article)**, J. Phys. Chem. B, **2002**, *106*, 910-927
7. W. E. Moerner, “Single-Molecule Optical Spectroscopy of Autofluorescent Proteins," **(invited review)** J. Chem. Phys.**, 2002,** *117,* 10925-10937
8. M. Vrljic, S. Y. Nishimura, S. Brasselet, W. E. Moerner, and H. M. McConnell, "Translational Diffusion of Individual Class II MHC Membrane Proteins in Cells," Biophys. J., **2002**, *83,* 2681-2692
9. W. E. Moerner, ”Optical Measurements of Single Molecules in Cells,” Trends Analyt. Chem., **2003,** *22*, 544-548
10. S. Y. Kim, Z. Gitai, A. Kinkhabwala, L. Shapiro, and W. E. Moerner, “Single Molecules of the Bacterial Actin MreB Undergo Directed Treadmilling Motion in *Caulobacter crescentus,*” Proc. Nat. Acad. Sci. (USA) **2006**, *103*, 10929-10934.
11. W. E. Moerner, “New Directions in Single-Molecule Imaging and Analysis,” **Invited Perspective**, Proc. Nat. Acad. Sci. (USA) **2007**, *104*, 12596-12602.
12. Jerod L. Ptacin, Steven F. Lee, Ethan C. Garner, Esteban Toro, Michael Eckart, Luis R. Comolli, W.E. Moerner, and Lucy Shapiro, “A spindle-like apparatus guides bacterial chromosome segregation,” Nature Cell Biology **2010**, *12*, 791-798.

13. J. S. Biteen, M. A. Thompson, N. K. Tselentis, G. R.Bowman, L. Shapiro, W. E. Moerner, "Superresolution Imaging in Live *Caulobacter Crescentus* Cells Using Photoswitchable EYFP," Nature Meth., **2008**, *5*, 947-949.
14. S. J. Lord, H.-L. D. Lee, and W. E. Moerner, "Single-Molecule Spectroscopy and Imaging of Biomolecules in Living Cells,' Perspective, Anal. Chem. **2010**, *82*, 2192-2203.
15. Michael A. Thompson, Jason M. Casolari, Majid Badieirostami, Patrick O. Brown, and W.E. Moerner, "Three-dimensional tracking of single mRNA particles in *S. cerevisiae* using a Double-Helix Point Spread Function," Inaugural Article, Proc. Nat. Acad. Sci. (USA) **2010**, *107*, 17864-17871.