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Born:

Dayton, Ohio
 US Citizen

Education:

Earlham College	Richmond, IN	BA	Chemistry	1978
California Institute of Technology	Pasadena, CA	PhD	Chemistry	1984
University of California, Berkeley	Berkeley, CA	PD	Biochemistry	1984-1987

Professional Experience:

Harvard University, Department of Biological Chemistry:
 1977 **Undergraduate Thesis Research**, (with Professor D. Bing)

California Institute of Technology, Department of Chemistry:
 1979 - 1984 **Doctoral Thesis Research**, (with Professor S. Chan)
 1982 - 1984 **Staff Spectroscopist**, Caltech Chemistry NMR Facility

University of California, Berkeley, Department of Biochemistry:
 1985 - 1987 **NIH Postdoctoral Fellow**, (with Professor D. Koshland, Jr.)
 1986 - 1987 **Manager and Spectroscopist**, Biochemistry Fluorescence Facility

University of Colorado, Boulder, Department of Chemistry and Biochemistry
 1987 - 1994 **Assistant Professor**
 1994 - **Associate Professor**
 1999 - **Full Professor, Director NIH/CU Molecular Biophysics Program**

Selected Honors and Awards:

1974 - 1978 National Merit Scholar
 1978 Phi Beta Kappa Honor Society
 1979 - 1982 NSF Predoctoral Fellow
 1984 H. N. McKoy Award for Outstanding Caltech Ph. D. Thesis in Chemistry
 1985 - 1987 NIH Postdoctoral Fellow
 1997 - Ad Hoc and Regular Member of NIH Study Sections – PB, BBM, TWD-B
 1997 Chair, Bacterial Locomotion & Signal Transduction Conference, Cuernavaca
 1999 - Co-Organizer, Annual Receptor Fest Conference (with Dahlquist & Parkinson)
 2001 Conference Chair, Annual Meeting of the Biophysical Society, Boston
 2001 - 2002 Member, Executive Board, Biophysical Society
 2003 Conference Chair, Keystone Conference on Membrane Proteins, Taos
 2003 17th Annual Feigen Lecturer, Dept. Mol. Cell. Physiol., Stanford
 2003 - 2004 University of Colorado CRCW Faculty Fellowship
 2006 Conference Co-Chair, Ann. Meeting Soc. Gen. Physiologists, Woods Hole
 2007 - 2008 President, Biophysical Society
 2013 - Regular Member, NIH TWD-B Study Section
 2014 - Editorial Board, Biophysical Journal
 2015 Fellow of the Biophysical Society, Class of 2015
 2013 - Speaker at UC Berkeley, U Penn, Cornell U, U Illinois, Cambridge U, FASEB, U Camerino, GRC, Biophysical Society, Telluride Membrane Meeting, Aspen Center for Physics, Santa Fe Membrane Meeting, ReceptorFest, others
 2018 *CU Boulder, Arts & Sciences College Scholar Award*
 2018 *Reviewer of Applications for DFG Excellence Centers, Bonn, Germany*
 Career To Date 120+ Publications (See Below)
 Career To Date 150+ Presentations at Universities and Conferences (See Below)

Professional Organizations:

Biophysical Society, American Chemical Society, Phi Beta Kappa, Protein Society

Publications in Peer-Reviewed Journals (124+):

1. Chloride binding to band 3 transport sites: A ^{35}Cl NMR study. J.J. Falke, R.J. Pace and S.I. Chan. *J. Biol. Chem.* 259, 6472-6480 (1984).
2. Direct observation of transmembrane recruitment of band 3 transport sites by competitive inhibitors: A ^{35}Cl NMR study. J.J. Falke, R.J. Pace and S.I. Chan. *J. Biol. Chem.* 259, 6481-6491 (1984)
3. Ion channels within ion transport proteins: Evidence in the band 3 system. J.J. Falke and S.I. Chan. *Biophys. J.* 45, 91-92 (1984).
4. Halide binding by the purified halorhodopsin chromoprotein. II. New chloride binding sites revealed by ^{35}Cl NMR. J.J. Falke, S.I. Chan, M. Steiner, P. Oesterhelt, P. townner and J.K. Lanyi. *J. Biol. Chem.* 259, 2185-2189 (1984).
5. Evidence that anion transport by band 3 proceeds via a ping-pong mechanism: A ^{35}Cl NMR study. J.J. Falke and S.I. Chan. *J. Biol. Chem.* 260, 9537-9544 (1985).
6. The kinetic equation for the band 3 anion chloride transport cycle: A ^{35}Cl NMR study. J.J. Falke, K.J. Kanes and S.I. Chan. *J. Biol. Chem.* 260, 9545-9551 (1985).
7. The minimal structure containing the band 3 anion transport site: A ^{35}Cl NMR study. J.J. Falke, K.J. Kanes and S.I. Chan. *J. Biol. Chem.* 260, 13294-13303 (1985).
8. A ^1H NMR study of glucose binding to the glucose transporter of red cell membranes. J.F. Wang, J.J. Falke and S.I. Chan. *PNAS* 83, 3277-3281 (1986).
9. Inhibitors of band 3. I. Transport site inhibitors: A ^{35}Cl NMR study. J.J. Falke and S.I. Chan. *Biochem.* 25, 7888-7894 (1986).
10. Inhibitors of band 3. II. Translocation inhibitors: A ^{35}Cl NMR study. J.J. Falke and S.I. Chan. *Biochem.* 25, 7895-7898 (1986).
11. Inhibitors of band 3. III. Channel blockers: A ^{35}Cl NMR study. J.J. Falke and S.I. Chan. *Biochem* 25, 7899-7906 (1986).
12. Global flexibility in a sensory receptor: A site-directed disulfide bond study. J.J. Falke and D.E. Koshland, Jr. *Science* 237, 1596-1600 (1987).
13. Structure of a bacterial sensory receptor: A site-directed sulfhydryl study. J.J. Falke, A.F. Dernburg, D.A. Sternberg, N. Zalkin and D.E. Koshland, Jr. *J. Biol. Chem.* 263, 14850-14858 (1988).
14. Calcium-site specificity: effect of size and charge on metal ion binding to an EF-hand-like site. E.E. Snyder, B.W. Buoscio and J.J. Falke. *Biochem.* 29, 3937-3943 (1990).
15. ^{19}F NMR studies of the D-galactose chemosensory receptor. 1. Sugar binding yields a global structural change. L.A. Luck and J.J. Falke *Biochem.* 30, 4248-4256 (1991).
16. ^{19}F NMR studies of the D-galactose chemosensory receptor. 2. Calcium binding yields a

- local structural change. L.A. Luck and J.J. Falke *Biochem.* 30, 4257-4261 (1991).
17. Open conformation of a substrate binding cleft: ¹⁹F NMR studies of cleft angle in the D-galactose chemoreceptor. L.A. Luck and J.J. Falke. *Biochem.* 30, 6484-6490 (1991).
 18. Quantitating and engineering the ion specificity of an EF-hand-like calcium binding site. J.J. Falke, E.E. Snyder, K.C. Thatcher, and C.S. Voertler. *Biochem.* 30, 8690-8696 (1991).
 19. Structure and dynamics of *E. coli* chemosensory receptors: Engineered sulfhydryl studies. C.L. Careaga and J.J. Falke. *Biophys. J.* 62, 209-220 (1992).
 20. ¹⁹F NMR studies of aqueous and transmembrane receptors: Examples from the *E. coli* chemosensory pathway. J.J. Falke, L.A. Luck, and J. Scherrer. *Biophys. J.* 62, 82-87 (1992).
 21. Thermal motions of surface α -helices in the D-galactose chemosensory receptor: Detection by disulfide trapping. C.L. Careaga and J.J. Falke. *J. Mol. Biol.* 226, 1219-1235 (1992).
 22. Novel ion specificity of a carboxylate cluster magnesium binding site in CheY: Strong charge selectivity and weak size selectivity. J.V. Needham, T.Y. Chen and J.J. Falke. *Biochem.* 32, 3363-3367 (1993).
 23. Activation of the phosphosignaling protein CheY. I. Analysis of the phosphorylated conformation by ¹⁹F NMR and protein engineering. S.K. Drake, R.B. Bourret, L.A. Luck, M.I. Simon, and J.J. Falke. *J. Biol. Chem.* 268, 13081-13088 (1993).
 24. Activation of the phosphosignaling protein CheY. II. Analysis of activated mutants by ¹⁹F NMR and protein engineering. R.B. Bourret, S.K. Drake, S.A. Chervitz, M.I. Simon, and J.J. Falke. *J. Biol. Chem.* 268, 13089-13096 (1993).
 25. Kinetic control of calcium signaling: Tuning the ion dissociation rates of EF-hand calcium binding sites. M. Renner, M.A. Danielson, and J.J. Falke. *PNAS* 90, 6493-6497 (1993).
 26. Ligand- and disulfide-induced conformational changes in the periplasmic domain of the chemotaxis aspartate receptor: A ¹⁹F NMR study. M.A. Danielson, H.-P. Biemann, D.E. Koshland, Jr., and J.J. Falke. *Biochemistry* 33, 6100-6109 (1994).
 27. EF-hand calcium signaling sites: Tuning metal ion affinity, specificity and kinetics. S.K. Drake and J.J. Falke. *Quart. Rev. of Biophys.* 34, 219-290 (1994).
 28. Thermal hinge-twisting motions of protein domains in the D-galactose chemosensory receptor: detection by disulfide trapping. C.L. Careaga, J. Sutherland, J. Sabeti, and J.J. Falke. *Biochemistry* 34, 3048-3055 (1995).
 29. BLAST 1995: International conference on bacterial locomotion and signal transduction. J.J. Falke, D.F. Blair, T.J. Silhavy, and R. Schmitt. *Molecular Microbiology* 16, 1037-1050 (1995).
 30. Transmembrane signaling by the aspartate receptor: Engineered disulfides reveal static regions of the subunit interface. S.A. Chervitz, C. Lin, and J.J. Falke. *Biochemistry* 34, 9722-9733 (1995).
 31. Lock on/off disulfides identify the transmembrane signaling helix of the aspartate receptor. S.A. Chervitz and J.J. Falke. *J. Biol. Chem.* 270, 24043-24053 (1995).
 32. Molecular mechanism of transmembrane signaling by the aspartate receptor: A model. S.A. Chervitz and J.J. Falke. *P.N.A.S.* 93, 2545-2550 (1996)
 33. Kinetic tuning of the EF-hand calcium binding motif: The gateway residue independently adjusts

- barrier height and equilibrium. S.K. Drake and J.J. Falke. *Biochemistry* 35, 1753-1760 (1996).
34. Tuning the equilibrium ion affinity and selectivity of the EF-hand calcium binding motif: Substitutions at the gateway position. S.K. Drake, K.L. Lee, and J.J. Falke. *Biochemistry* 35, 6697-6705 (1996).
 35. ¹⁹F NMR as a tool for probing protein conformational changes. M.A. Danielson and J.J. Falke. *Annual Review of Biophysics and Biomolecular Structure* 25, 163-195 (1996).
 36. Effect of protein stabilizing agents on thermal backbone motions: A disulfide trapping study. Scott L. Butler and J.J. Falke. *Biochemistry* 35, 10595-10600 (1996). (*Accelerated*).
 37. The C2 domain calcium binding motif: structural and functional diversity. *Protein Science* 5, 2375-2390 (1996).
 38. Intermolecular tuning of calmodulin by target peptides and proteins: Differential effects on Ca²⁺ binding and implications for kinase activation. Olve Peersen, Travis Madsen, and J.J. Falke. *Protein Science* 6, 794-807 (1997).
 39. Molecular tuning of the EF-hand calcium binding motif: contributions of the third EF-loop position. S.K. Drake, M.A. Zimmer, Craig Kundrot, and J.J. Falke. *J. Gen. Physiol.* 110, 173-184 (1997).
 40. The EF-hand calcium binding motif: Effects of EF-loop torsion angle constraints on metal binding equilibria and kinetics. S.K. Drake, M.A. Zimmer, C.L. Miller, and J.J. Falke. *Biochemistry* 36: 9917-9926 (1997).
 41. The Ca²⁺-signaling cycle of a membrane-docking C2 domain. E.A. Nalefski, M.M. Slazacs and J.J. Falke. *Biochemistry* 36, 12011-12018 (1997). (*Accelerated*).
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 45. Cysteine and disulfide scanning reveals two amphiphilic helices in the linker region of the aspartate chemoreceptor. S.B. Butler and J.J. Falke. *Biochemistry* 37, 10746-10756 (1998).
 46. The kinetic cycle of cardiac troponin C: Calcium binding and dissociation at site II trigger slow conformational rearrangements. A.L. Hazard, S.C. Kohout, N.L. Stricker, J.A. Putkey, and J.J. Falke. *Protein Science* 7, 2451-1459 (1998).
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65. Bornhorst, J.A. and J.J. Falke (2003) Quantitative analysis of the two-state model for aspartate receptor signaling reveals additional signaling states. *J. Mol. Biol.* 326:1597-614.
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84. John H. Evans and Joseph J. Falke (2007) Ca²⁺ influx is an essential component of the positive feedback loop that maintains leading edge structure and activity in macrophages. *PNAS USA*, 104:16176-81.
85. Robert G. Endres, Joseph J. Falke, and Ned S. Wingreen (2007) Chemotaxis receptor complexes: from signaling to assembly. *PLoS Comput Biol.*, 3(7):e150.
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90. Jefferson D. Knight and Joseph J. Falke (2009) Single-molecule fluorescence studies of a PH domain: New insights into the membrane docking reaction. *Biophysical Journal*, 96:566-82.
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93. MR Hutchinson, KE Landgraf, JJ Falke, LR Watkins et al (2009) Evidence that opioids may have toll-like receptor 4 and MD-2 effects. *Brain Behav Immun.*, 24:83-95.
94. Kalin E. Swain, Miguel A. Gonzalez, and Joseph J. Falke (2009) Engineered socket study of signaling through a 4-helix bundle: Evidence for a Yin-Yang mechanism in the kinase control module of the aspartate receptor. *Biochemistry*, 48:9266-77. (Selected for ***Faculty of 1000 Biology***).
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118. Falke JJ. (2014) Piston versus Scissors: Chemotaxis Receptors versus Sensor His-Kinase Receptors in Two-Component Signaling Pathways. *Structure* 22:1219-20.
119. Falke JJ, Piasta KN (2014) Architecture and Signal Transduction Mechanism of the Bacterial Chemosensory Array: Progress, Controversies, & Challenges. *Curr Opin Struct Biol*, 29:85-94.
120. Parkinson JS, Hazelbauer GL, Falke JJ (2015) Signaling and Sensory Adaptation in *E. coli* Chemoreceptors: 2015 Update. *Trends in Microbiol Sci.*, 23:257-66.
121. Ziemba BP, Burke JE, Masson G, Williams RL, Falke JJ (2016) Regulation of PI3K by PKC & MARCKS: Single Molecule Analysis of a Reconstituted Signaling Pathway. *Biophys. J*, 110:1811-1825. (Selected by BJ as ***New & Notable***, and for its ***Single Molecule Biophysics Collection - Top 12 Articles of 2016***).
122. Ziemba BP, Burke JE, Masson G, Williams RL, Falke JJ (2016) Regulation of a Coupled MARCKS-PI3K Lipid Kinase Circuit by Calmodulin: Single Molecule Analysis of a Membrane-Bound Signaling Module. *Biochemistry*, 55:6395-6405.
123. Buckles TC, Ziemba BP, Masson GR, Williams RL, Falke JJ (2017) Single-Molecule Study Reveals How Receptor and Ras Synergistically Activate PI3K α and PIP3 Signaling. *Biophys J*, 113:2396-2405.
124. Ziemba BP, Falke JJ (2018) A PKC-MARCKS-PI3K Regulatory Module Links Ca²⁺ and PIP3 signals at the leading edge of polarized macrophages. *PloS One*, 13(5):e0196678 (20 pgs)

Thomas Buckles*, Brian P. Ziemba*, and Joseph J. Falke (2019) A Live Cell Assay for Quantifying the Effects of Pharmaceuticals on the Leukocyte Chemosensory Pathway, In Preparation.

Moshe Gordon*, Brian P. Ziemba*, and Joseph J. Falke (2019) Stable Interactions of PDK1 with PKC α and AKT1 on a Target Membrane Surface: Single Molecule Analysis, In Preparation.

G. Hayden Swisher, Justin Martyr, Nicholas Cordaro, and Joseph J. Falke (2019) Effects of Disease-Linked Ras Mutations on Ras Binding to PI3K Ras Binding Domain, In Preparation.

Patent Applications Filed

Provisional US Patent Application "Compositions and Methods for One-Sample FRET"
Invention Disclosure CU2652B-PPA1

Invited Seminars at Universities, Conferences, and Corporations (selected from 150+ total)

A. "Molecular Mechanisms of Receptor-Kinase Signaling in Bacterial Chemotaxis"

Gordon Conference on Sensory Transduction in Microorganisms, Ventura, January 1996

University of Wyoming, Department of Molecular Biology, February 1996

FASEB Meeting on Receptors & Signal Transduction, Copper Mountain, July 1996

International Conference on Magnetic Resonance in Biological Systems, Keystone, August 1996

Chan Symposium, Department of Chemistry, Caltech, September 1996

University of Nagoya, Department of Microbiology and Biophysics, Japan, November 1996

Brandeis University, Department of Biochemistry, December 1996

Massachusetts Institute of Technology, Department of Chemistry, December 1996

Harvard Medical School, Department of Microbiology and Molecular Genetics, January 1997

Chair, International Symposium on Bacterial Signal Transduction, Cuernavaca, January 1997

Baxter Biotech-Hyland, Inc., Los Angeles, February 1997

Annual Symposium of the Biophysical Society, New Orleans, March 1997

Genentech, Inc., South San Francisco, April 1997

UC Berkeley, Department of Molecular and Cellular Biology, April 1997

Annual Symposium of the American Society of Microbiologists, Miami, May 1997

Gordon Conference on Molecular Recognition & TM Signaling, Plymouth, June 1997

Purdue University, Department of Biological Sciences, September 1997

Colorado State University, Department of Biochemistry, December 1997

Gordon Conference on Sensory Transduction, Ventura, January 1998

University of Oregon Medical School, Department of Biochemistry, May 1998

FASEB Conference on Membrane Biophysics, Saxtons River, August 1998

International Symposium on Bacterial Signal Transduction, Cuernavaca, January 1999

University of California at Berkeley Department of Chemistry, April 1999

Texas A&M Department of Biology, September 1999

Princeton University Department of Molecular Biology, December 1999
Gordon Conference on Sensory Transduction, Ventura, January 2000
International Symposium on Bacterial Signal Transduction, Cuernavaca, January 2001
Keystone Conference on Transmembrane Proteins, Tahoe, March 2001
ReceptorFest 2001, Boulder CO, August 2001
Gordon Conference on Sensory Transduction, Ventura CA, January 2002
Biophysical Society Annual Meeting, San Francisco CA, February 2002
FASEB Conference on Membrane Biophysics, Saxtons River VT, July 2002
Keystone Conference on Membrane Proteins, Taos NM, February 2003
Stanford University, Department of Cellular & Molecular Physiology, April 2003
ReceptorFest Conference on Bacterial Chemotaxis, Boulder CO, August 2003
Academia Sinica Department of Structural Biology, Taipei, Taiwan, September 2003
University of Nagoya, Department of Biology, Japan, November 2003
University of Osaka, Panasonic Research Division, Keihanna, Japan, November 2003
Gordon Conference on Sensory Transduction, Ventura CA, January 2004
Johns Hopkins University, Department of Cell Biology, April 2004
Stockholm University, Department of Biochemistry, Sweden, November 2004
Bacterial Locomotion and Signal Transduction Conference, Miami FL, January 2005
ReceptorFest Annual Meeting, Boulder CO, August 2005
University of California, Los Angeles, Dept. of Biology, January 2006
Gordon Conference on Sensory Transduction, Ventura CA, January 2006
ReceptorFest Annual Meeting, University of Utah, Salt Lake City, July 2006
Annual Meeting of Society General Physiologists, Woods Hole MA, September 2006
Membrane Symposium, Biophysical Society Annual Meeting, Baltimore MD, March 2007
ReceptorFest Annual Meeting, University of Colorado, Boulder, July 2007
Univ, Penn. School Medicine, Dept. Biochem. & Biophys., Philadelphia, October 2007
Gordon Conference on Sensory Transduction, Ventura CA, January 2008
ReceptorFest Annual Meeting, University of Utah, Salt Lake City, August 2008
National Institutes of Health, December 2008

ReceptorFest Annual Meeting, University of Colorado, Boulder, August 2009

Oxford University, UK, Department of Biochemistry, October 2009

Gordon Conference on Sensory Transduction, Ventura CA, January 2010

Brandeis University, Department of Biochemistry, May 2010

ReceptorFest Annual Meeting, UC Santa Barbara, August 2010

Massachusetts Institute of Technology, Dept. of Biology, November 2010

California Institute of Technology, Dept. of Chemistry, April 2011

ReceptorFest Annual Meeting, Salt Lake City, August 2011

Methods & Applications of Fluorescence, Strasbourg, September 2011

Gordon Conference on Sensory Transduction, Ventura, January 2012

University of Bristol, Dept of Biochemistry, UK March 2012

ReceptorFest Annual Meeting, Boulder, August 2012

ReceptorFest Annual Meeting, UC Santa Barbara, August 2013

Gordon Conference on Sensory Transduction, Ventura, January 2014

ReceptorFest Annual Meeting, U. Utah, July 2014

University of Illinois Champaign-Urbana, Dept of Computational Biology, March 2015

ReceptorFest Annual Meeting, Boulder, August 2015

B. "Tales of Two Pathways: Prokaryotic and Eukaryotic Chemotaxis"

University of Florence, Italy, Department of Cell Physiology, May 2006

University of Perugia, Italy, Department of Biochemistry, May 2006

University of Chicago, Department of Biochemistry, September 2006

C. "Eukaryotic Chemotaxis – Membrane-Targeting and Surface Signaling Reactions"

Gordon Conference on Metals in Biology, Ventura, January 1996

Case Western Reserve University, Department of Physiology and Biophysics, April 1996

American Chemical Society, Denver, June 1997

Stanford Medical School, Department of Molecular & Cellular Biology, April 1997

Tenth International Symposium on Calcium Binding and Function, Lund, Sweden, June 1997

Purdue University, Department of Biological Sciences, September 1997

Stanford University, Department of Biological Sciences, November 1997

University of Colorado Health Sciences Center, Dept. of Pharmacology, March 1998

University of Illinois at Chicago, Department of Biochemistry, March 1998

Biophysical Society Meeting, Baltimore, February 1999 (Symposium Chair, Speaker)

International Conference on Phospholipase A2, Berlin Germany, May 1999

International Symposium on Calcium Binding Proteins, Kisarazu Japan, October 1999

University of Colorado Health Sciences Center Department of Biochemistry, November 1999

University of Murcia, Department of Structural Biology, Spain, May 2000

University of Utah, Department of Biology, September 2000

Univ. Texas, San Antonio, Neurosciences Program. October 2001

Trinity College, Department of Chemistry San Antonio TX. October 2001

University of Colorado, Boulder, Neurosciences Program, November 2001

Earlham College, Departments of Chemistry and Biology, Richmond IN, November 2001

Colorado State University, Neurosciences Program, Fort Collins CO, February 2002

Brandeis University, Department of Biochemistry, Boston MA, March 2002

University Camerino, Department of Biology, Camerino Italy, May 2002

University of Illinois, Department of Biochemistry, October 2002

Colorado State University, Department of Biochemistry, October 2002

Stanford University, Dept. Cellular & Molecular Physiology, April 2003

Academia Sinica Department of Chemistry, Taipei, Taiwan, September 2003

University of Nagoya, Department of Biology, Japan, November 2003

California Institute of Technology, Biophysics Program, January 2004

Carlsberg Research Institute, Division of Biochemistry, Copenhagen, November 2004

University of California Irvine, Department of Biophysics, December 2004

University of Milano, Inst. Cell. & Mol. Pharmacol., Milano Italy, May 2005

Georgia Institute of Technology, Department of Biochemistry, November 2005

Iowa State University, Department of Biochemistry, December 2005

California State University, Los Angeles, Department of Chemistry, January 2006

Gordon Conference on Gradient Sensing and Directed Migration, Ventura CA, January 2007

University Padova, Italy, Department of Cell Physiology, May 2007
Park City Membranes Meeting, Park City UT, June 2007
University of Pittsburgh Medical School, Department of Biophysics, December 2007
University of Siena, Siena, Italy, September 2008
University of Colorado Health Sciences Center, Denver, November 2008
American Chemical Society National Meeting, Salt Lake City, March 2009
Univ Kansas, Department of Biochemistry, September 2009
Babraham Cell Signaling Institute, Cambridge Univ., UK October 2009
Annual Meeting of the Biophysical Society, San Francisco, February 2010
Conference on New Horizons in Calcium Signaling, Beijing Univ. PRC, October 2010
Snowmass Membrane Conference, Snowmass, June 2011
Methods & Applications of Fluorescence, Strasbourg, September 2011
Colorado Single Molecule Membrane Meeting, Boulder, December 2011
Cutting Edge Biophysics Conference, University of Denver, April 2012
Univ Washington Seattle, Department of Physiology and Biophysics, October, 2012
Univ North Carolina, Chapel Hill, Dept Biochemistry & Biophysics, November 2012
Colorado Single Molecule Membrane Meeting, Fort Collins, December 2012
Aspen Meeting on Single Molecule Biology, Aspen, January 2013
Snowmass Conference on Membrane Biophysics, Aspen, July 2013
Worcester Polytechnic Inst, Dept Chemistry & Biochemistry, September 2013
Univ Pennsylvania, Dept Chemistry, October 2013
Univ Cambridge UK, MRC Laboratory of Molecular Biology, November 2013
Colorado Single Molecule Membrane Meeting, Denver, January 2014
UC Berkeley, Dept of Molecular & Cell Biology, September 2014
University of Camerino, Italy, Department of Biology, October 2014
Colorado Single Molecule Membrane Meeting, Denver, January 2015
Aspen Center for Physics Meeting on Single Molecule Biology, January 2015
Telluride Membrane Meeting, Telluride Science Research Center, July 2015

San Francisco State University, Depts. of Biology & Chemistry, October 2015
Cornell University, Biophysics Colloquium, April 2016
FASEB Membrane Biophysics Conference, Snowmass, July 2016
Cambridge University / MRC-Laboratory of Molecular Biology, November 2016
Santa Fe Biophysics of Membranes Conference, Santa Fe, June 2017
UC Denver, Biochemistry/Biophysics Seminar, September 2017
U Wyoming, Biochemistry Seminar, September 2017
CSMMM Single Molecule Conference, Denver, January 2018
Relay Therapeutics, Boston, May 2018
FASEB Phospholipid Meeting, Steamboat Springs, July 2018
San Francisco State University, Undergraduate Research Seminar, September 2018
Brandeis University, Biophysics/Biochemistry Seminar, October 2018
Single Molecule Biology Conference, Aspen Physics Center, January 2019
Santa Fe Biophysics of Membranes Conference, Santa Fe, June 2019

Research Grants Awarded and Pending:

Principal Investigator – Current Awards

National Institutes of Health, “Mechanisms of Signaling on Membrane Surfaces”, NIH R01 GM063235 17-21, TDC \$900,000, May 2018 - Mar 2022, ADC \$225,000

National Institutes of Health, “Equipment Supplement for Above Grant”, NIH R01 GM063235 17A1S1, TDC \$73,900 (one payment) May 2018 - Mar 2022

National Institute of General Medical Sciences, Institutional Graduate Training Program in Biophysics, T32 GM065103-06, \$1,001,230 TDC, Jul 2017 – Jun 2022, ADC \$218,734

Principal Investigator – Pending Awards

(None currently but planning an application on cyanobacterial chemosensing in lichen formation with CU collaborators)

Principal Investigator – Completed Awards

National Institutes of Health, “Activation and Dynamics of Receptors and Signaling Proteins”, NIH R01 GM040731, TDC \$693,000, April 2010-March 2014.

National Institutes of Health, “Mechanisms of Signaling on Membrane Surfaces”, NIH R01 GM063235, funded \$814,000 TDC, April 2009 - March 2013.

National Institutes of Health, Request for a Shared CW X-Band EPR Spectrometer”, NIH S10 RR024539, \$313,077 TDC, March 2008 – April 2010.

National Institutes of Health, "Activation and Dynamics of Receptors and Signaling Proteins", NIH R01 GM040731, funded TDC \$725,000, April 2006 - March 2010.

National Institutes of Health, "Mechanisms of Membrane Targeting by C2 and PH Domains", NIH R01 GM063235, funded \$814,000 TDC, April 2005 - March 2009.

National Institutes of Health, "Annual SGP Woods Hole Conference" Funding for the 2006 Annual Meeting of the Society of General Physiologists, \$5,000 TDC, September 2006.

National Institute of General Medical Sciences, Institutional Graduate Training Program in Molecular Biophysics, T32 GM65103-01, \$736,766 TDC, July 2002 – June 2007

CRCW Faculty Fellowship for Sabbatical Leave 2003-2004

National Institute of General Medical Sciences, Conference Support for Keystone Meeting on Membrane Proteins, \$10,000 TDC, February 2003

National Institutes of Health, "Calcium-Activated Targeting by C2 Domains", R01 GM63235, \$850,000 TDC, April 2001 - March 2005.

National Institutes of Health, "Activation and Dynamics of Receptors and Kinases", R01 GM40731, \$670,000, July 2001 - June 2005.

National Institutes of Health, "Activation and Dynamics of Receptors and Kinases", R01 GM40731, \$556,286 TDC, July 1997 - June 2001

National Institutes of Health, Physical Biochemistry Study Section, R01 GM48203, \$416,895 TDC, April 1997 - March 2001

National Institutes of Health, Scientific Meeting: BLAST IV, NIAID R13 AI/GM 41086, \$4,500 TDC, March 1997 - Feb. 1998

National Science Foundation, Scientific Meeting: BLAST IV, Cell Biology 9603198, \$5,000 TDC, Jan. - June, 1997

National Institutes of Health, Biophysical Chemistry Study Section, R01 GM40731, \$417,504 TDC, July 1993 - June 1997

Co-Investigator – Completed Awards

National Institutes of Health, Shared 600 MHz NMR & NMR Upgrade Grant, RR-11969, \$400,000, 1998

Group Members (2018)

Postdoctoral Trainees (1):
Dr. Brian Ziembra

PhD Students (3):
Tom Buckles
Moshe Gordon
Hayden Swisher

Undergraduate Honors Students (2):
Nicolas Cordaro
Justin Martyr

Past Postdoctoral Associates (9 Total)

Dr. Linda Luck	(Professor, SUNY Plattsburgh)
Dr. Eric Nalefski	(Senior Scientist, US Genomics, Inc., Woburn MA)
Dr. Olve Peersen	(Professor, Department of Biochemistry, Col. State Univ.)
Dr. John Corbin	(Senior Scientist, XOMA Inc., Berkeley CA)
Dr. John Evans	(Senior Scientist, National Renewable Energy Lab, Golden, CO)
Dr. Jeff Knight	(Assistant Professor, CU Denver)
Dr. Huai-Chun Chen	(Professional Research Associate, University of Tennessee, Nashville)
Dr. Annette Erbse	(Staff Scientist, Biochemistry Program, CU Boulder)
Dr. Kene Piasta	(Instructor and PRA, Brandeis Univ., Boston)

Past Doctoral Students (13 Total)

Dr. Randal Bass	(Senior Scientist, Amgen, Seattle WA)
Dr. Joshua Bornhorst	(Assistant Professor, Clinical Chemistry Program, Univ. Arkansas)
Dr. Scott Butler	(Senior Scientist, Div. Of Virology, Pfizer Inc., La Jolla CA)
Dr. Claire Careaga	(Assistant Professor, Dept. of Chemistry, Linfield College OR)
Dr. Stephen Chervitz	(Senior Scientist, Div. of Genome Analysis, Affymetrix Inc., Berkeley CA)
Dr. Steven Drake	(Senior Scientist, Celera, Inc., Rockville MD)
Dr. Mark Danielson	(Postdoctoral Fellow, Raines Laboratory, University of Wisconsin)
Dr. Susan Kohout	(Postdoctoral Fellow, Isacoff Lab, UC Berkeley/ Asst. Prof. Montana St. U.)
Dr. Kyle Landgraf	(Postdoctoral Fellow, Genentech, San Francisco)
Dr. Nathan Malmberg	(Associate Professor, Oklahoma Baptist University)
Dr. Aaron Miller	(Senior Scientist, Genentech, San Francisco)
Dr. Peter Slivka	(Senior Scientist, Abvie Inc, Massachusetts)
Dr. Ka Lin Swain	(Research Associate, National Jewish Denver)

Past Masters Students (1 Total)

Diane Starrett	(Research Assistant, University Munster, Germany)
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Past Undergraduate Students (29 Total)

Stephanie Boehme	(PhD Program in Biochemistry, University of Regensburg, Germany)
Adam Berlinberg	(Medical School, U Colorado Health Sciences)
Devin Brandt	(PhD Program in Chemistry, Penn State University)
Brian Buoscio	(Medical School, University of Indiana)
Duncan Chadley	(Research Assistant in Neurology, Northwestern U)
Anna Chase	(PhD Program in Biophysics, Yale University)
Theodore Chen	(Senior Programmer, Sun Microsystems, Boulder)
Matthew Coleman	(Medical School, University of Utah, Salt Lake City)
Jane Duplantis	(MD-PhD Program, U Iowa)
Kaye Grandbois	(Medical School, Loyola Strich, Chicago)
Nicole Gill	(Laboratory Technician, Nexagen Incorporated, Boulder)
Louise Ingalls	(School of Veterinary Medicine, Colorado State University)
Keith Lee	(Medical School, University of California, San Francisco)
Christina Lin	(Laboratory Technician, Gasgoine Lab, Scripps Inst., La Jolla)
Travis Madsen	(PhD Program in Biophysics, Stanford University)
Iain Miller	(Laboratory Technician, Spencer Lab, University of Colorado, Boulder)
Andrew Natale	(PhD Program in iPQB, UCSF)
John Needham	(PhD Program in Biochemistry, Harvard University)
Carissa Pilling	(NSF Fellow & PhD Program in Biomedicine, University of Washington)
Katrina Robida	(PhD Program in Biochemistry, University Colorado Boulder)
Eric Snyder	(PhD Program in MCD Biology, University of Colorado)
Jesse Sutherland	(Laboratory Technician, Genentech Incorporated, San Francisco)
Nicole Stricker	(PhD Program in Neurobiology, Johns Hopkins University, Baltimore)

Ashesh Thaker	(M.D./Ph.D. Program, National Institutes of Health)
Matthew Trammel	(PhD Program in Biophysics, Univ. of California at San Francisco)
Caleb Ulliman	(High School Teacher, JF Kennedy American School, Queretaro, Mexico)
Stephan Voertler	(PhD Program in Biochemistry, University of Regensburg, Germany)
Gina Westhoff	(Medical School, Johns Hopkins University)
Michael Zimmer	(PhD Program in Biochemistry, University of Illinois, Champaign)

Formal Courses Taught:

1987-1988

CHEM 486: Biochemistry Laboratory
CHEM 588: Protein Structure, Folding and Dynamics

1988-1989

CHEM 4431: **Physical Chemistry with Biological Applications II** (New)
CHEM 5781: Protein Structure, Folding and Dynamics
CHEM 7691: Seminar: Protein Dynamics and the Mechanism of Sensory Proteins

1989-1990

CHEM 4431: Physical Chemistry with Biological Applications II
CHEM 5781: Biochemistry CORE, Protein Section
CHEM 7691: Seminar: Protein Dynamics and the Mechanism of Sensory Proteins

1990-1991

CHEM 4431: Physical Chemistry with Biological Applications II
CHEM 5781: Biochemistry CORE, Protein Section
CHEM 7691: Seminar: Protein Dynamics and the Mechanism of Sensory Proteins

1991-1992

CHEM 4431: Physical Chemistry with Biological Applications II
CHEM 5561: Biophysical Methods
CHEM 7691: Seminar: Protein Dynamics and the Mechanism of Sensory Proteins

1992-1993

CHEM 4431: Physical Chemistry with Biological Applications II
CHEM 7691: Seminar: Protein Dynamics and the Mechanism of Sensory Proteins

1993-1994

CHEM 4411: Physical Chemistry with Biological Applications I
CHEM 7691: Seminar: Protein Dynamics and the Mechanism of Sensory Proteins

1994-1995

CHEM 4411: Physical Chemistry with Biological Applications I
CHEM 6731: Molecular Mechanisms of Cellular Signaling
CHEM 7691: Seminar: Protein Dynamics and the Mechanism of Sensory Proteins

1995-1996

CHEM 4411: Physical Chemistry with Biological Applications I
CHEM 7691: Seminar: Protein Dynamics and the Mechanism of Sensory Proteins
Sabbatical Leave Spring

1997-1998

CHEM 4431: Physical Chemistry with Biological Applications II
CHEM 5561: **Molecular Biophysical Techniques** (New)
CHEM 7691: Seminar: Protein Dynamics and the Mechanism of Sensory Proteins

1998-1999

- CHEM 4431: Physical Chemistry with Biological Applications II
- CHEM 5661: **Advances in Molecular Biophysics** (New)
- CHEM 7691: Seminar: Protein Dynamics and the Mechanism of Sensory Proteins

1999-2000

- CHEM 1171: Honors General Chemistry II
- CHEM 5561: Molecular Biophysical Techniques
- CHEM 7691: Seminar: Protein Dynamics and the Mechanism of Sensory Proteins

2000-2001

- CHEM 4431: Physical Chemistry with Biological Applications II
- CHEM 7691: Seminar: Protein Dynamics and the Mechanism of Sensory Proteins

2001-2002

- CHEM 4431: Physical Chemistry with Biological Applications II
- CHEM 5661: Advances in Molecular Biophysics (team)
- CHEM 7691: Seminar: Protein Dynamics and the Mechanism of Sensory Proteins

2002-2003

- CHEM 4431: Physical Chemistry with Biological Applications II
- CHEM 5561: Molecular Biophysical Techniques
- CHEM 7691: Seminar: Protein Dynamics and the Mechanism of Sensory Proteins

2003-2004

- CHEM 5561: Molecular Biophysical Techniques
- Sabbatical Leave

2004-2005

- CHEM 5561: Molecular Biophysical Techniques
- CHEM 5781: Biochemistry CORE

2005-2006

- CHEM 6601: Biophysics Seminars (Developed this new course)
- CHEM 5781: Biochemistry CORE (Developed curriculum for this new course)

Spring-Fall 2007

- CHEM 6601: Biophysics Seminars
- CHEM 4431: Physical Chemistry with Biological Applications II

Spring-Fall 2008

- CHEM 6601: Biophysics Seminars
- CHEM 4431: Physical Chemistry with Biological Applications II

Spring-Fall 2009

- CHEM 6601: Biophysics Seminars
- CHEM 4431: Physical Chemistry with Biological Applications II

Spring-Fall 2010

- CHEM 6601: Biophysics Seminars
- CHEM 4431: Physical Chemistry with Biological Applications II
- CHEM 5561: Methods of Molecular Biophysics (Organizer of team-taught course)

Spring-Fall 2011

- CHEM 6601: Biophysics Seminars (both semesters)
- CHEM 4431: Physical Chemistry with Biological Applications II (Spring)
- Fall 2011: Sabbatical

Spring-Fall 2012

CHEM 5561: Methods of Molecular Biophysics (Spring)

CHEM 6601: Biophysics Seminars (both semesters)

Spring-Fall 2013

CHEM 4431: Physical Chemistry with Biological Applications II (Spring)

CHEM 6601: Biophysics Seminars (both semesters)

Spring-Fall 2014

CHEM 4431: Physical Chemistry with Biological Applications II (Spring)

CHEM 6601: Biophysics Seminars (both semesters)

Spring-Fall 2015

CHEM 4431: Physical Chemistry with Biological Applications II (Spring)

CHEM 6601: Biophysics Seminars (both semesters)

Spring-Fall 2016

CHEM 6601: Biophysics Seminars (both semesters)

CHEM 4761: Biochemistry Laboratory (Spring)

CHEM 5491: Biophysical Methods (New Course, Fall)

Spring-Fall 2017

CHEM 6601: Biophysics Seminars (both semesters)

CHEM 4400: Physical Chemistry for Biochemists (New Course for this Instructor, Fall)

Spring-Fall 2018

CHEM 6601: Biophysics Seminars (both semesters)

(Sabbatical, no undergraduate course)

Other Teaching 2018:

Organizer of Biophysics Supergroup Meeting

Director, Interdepartmental Molecular Biophysics Training Program

Supervised 2 undergraduate honors projects, 3 doctoral projects, 1 postdoctoral project

Service to University and Professional Organizations

Departmental Service:

Director, Molecular Biophysics Training Program, 1998-present

Submitted Successful NIH Molecular Biophysics T32 Grants, May 2001, 2006, 2011, 2016

Submitted NIH Molecular Biophysics T32 Annual Progress Reports, 2002-present

Chair, Biophysics Seminar Program, 1998-present

Supervisor, Departmental Fluorescence Spectroscopy Facility, 1989-2013

Chair, Departmental Instructional Improvement Committee, 1994-1996

Member, Executive Committee, 1998-2000

Chair, Departmental Undergraduate Honors Committee, 1998-2003

Chair, Successful Biochemistry Senior Search Committee (Charles McHenry), 2005-2006

Submitted Successful NIH Shared Equipment Grant for Departmental EPR, funded 2008

Supervisor, Departmental EPR Facility, 2008-present

Voluntarily waived paternity leave while teaching CHEM 4431/5431 in Spring 2008

Co-Chair Departmental Honors Program, 2013-2016

Reviewer, Biochemistry Internal NIH Study Section, 2007-present

University Service:

Director, Molecular Biophysics Training Program, 1998-present

Submitted Successful NIH Molecular Biophysics T32 Grants, May 2001, 2006, 2011, 2016

Submitted NIH Molecular Biophysics T32 Annual Progress Reports, 2002-present

Chair, Biophysics Seminar Program, 1998-present

CU Committee on NIH RCR Course Planning, 2017-2018

Member, Council on Research & Creative Work, 2000 – 2003

Co-Organized NIH Responsible Conduct of Research Refresher Training, 2013, 2015

Hosted Frank Bayless (SFSU) Visit and Discussion of URM Prep Training, 2013

Reviewer of Proposals, Undergraduate Research Opportunities Program, 1992-present

Service to Other Professional Organizations and Universities:

Editorial Board Member, Biophysical Journal, July 2014 – present

Regular Member/Reviewer, NIH Study Section TWD-B, 2013-present

Reviewer, DFG German Excellence Strategy, Bonn Germany, June 2018

Board of Directors, Bacterial Locomotion & Signal Transduction, Inc., 1993-2016

Chair, 1997 Int. Conference on Bacterial Locomotion & Signal Transduction, Cuernavaca

Symposium Chair, 1999 Biophysical Society Annual Meeting, Baltimore

Editorial Board, *Journal of General Physiology*, 1996-2011

Editorial Board, *Biotechnology and Applied Biochemistry*, 1997-2011

Editorial Board, *Protein Science*, 1998-2003

Elected Member, Advisory Council, Biophysical Society, 1998-2001

Chair, 2001 Annual Meeting of the Biophysical Society, Boston (attendance at meeting was approx. 20% higher than previous meeting, set new attendance record for the society)

Appointed Member, Executive Board, Biophysical Society, 2001-2002

Symposium Chair, 2001 Keystone Symposium on Membrane Proteins, Tahoe

Reviewed Applications for Promotion to Full Professor, Univ. Utah, Brandeis Univ. 2001

Chair, 2003 Keystone Conference on Membrane Protein Structure & Function (attendance at meeting 50% higher than previous meeting held 2 years earlier at Lake Tahoe)

Member, NIH Study Section on Biophysics and Biochemistry (BBCB), 2003- 2004

Member, NIH Study Section on Biophysics and Biochemistry of Membranes (BBM), 2005-2007

Conference Co-Chair, 2006 Ann. Meeting of Gen. Physiologists, Woods Hole MA

Biophysical Society President-elect 2006, President 2007, Past-president 2008

Highlights of BPS Presidency 2007:

- 1) Presided over evaluation and negotiation of new agreement with Cell Press to publish the society journal, Biophysical Journal, thereby enhancing the future quality, status, readership and impact of this strong journal
- 2) Presided over council and board meetings where the Cell Press agreement was approved
- 3) Recruited over 2000 volunteers for NIH study section membership, most of any society
- 4) Provided suggestions to NIH in response to request for feedback on its scientific review and funding processes, some of which were included in the current official NIH draft report recommending changes at CSR

Chair, Carbon Mitigation Committee, Biophysical Society 2009-2012

Symposium Chair "Signaling at the Leading Edge", 2010 Annual Meeting of Biophysical Society, San Francisco

Reviewed papers for:

Biochemistry
Journal of the American Chemical Society
Journal of Biological Chemistry
Proceedings of the National Academy of Sciences
Nature
Structure

Science
Biophysical Journal
Protein Science
Journal of General Physiology
Biotechnology & Applied Science
Journal of Molecular Biology

Reviewed grant proposals for:

National Institutes of Health, National Science Foundation

Public Outreach and Service:

*Mentor, Longmont High SMART Science Club, 2015-present
(Help club develop 3D molecular model - in silico and printed - poster and slide presentation)*

Volunteer Raptor Monitor, Boulder County Open Space, 2018-present

Chair, Travel Carbon Mitigation Committee, Biophysical Society, 2009-2012

(Committee donated ~ \$30 K annually to organizations, such as Climate Trust, City of San Francisco Carbon Fund, and University Park Solar LLC, that are developing novel approaches to atmospheric carbon sequestration and mitigation)