

DAVID SCOTT LAWRENCE

ORCID: 0000-0002-0901-1617

PROFESSIONAL EXPERIENCE

- 2011- Chair, Division of Chemical Biology & Medicinal Chemistry, UNC Eshelman School of Pharmacy, University of North Carolina at Chapel Hill
- 2007- Fred Eshelman Distinguished Professor, University of North Carolina; Department of Chemistry (College of Arts & Sciences), Division of Chemical Biology & Medicinal Chemistry (Eshelman School of Pharmacy), Department of Pharmacology (School of Medicine), and the Lineberger Comprehensive Cancer Center
- 1997-06 Member, Albert Einstein Comprehensive Cancer Center
- 1996-06 Professor of Biochemistry
Albert Einstein College of Medicine of Yeshiva University
- 1995-96 Professor of Chemistry
State University of New York at Buffalo
- 1992-95 Associate Professor of Chemistry and Medicinal Chemistry; Adjunct Professor of Biological Sciences; Member, Center for Advanced Molecular Biology and Immunology
- 1991-95 Associate Professor of Chemistry
State University of New York at Buffalo
- 1985-91 Assistant Professor of Chemistry
State University of New York at Buffalo
- 1982-85 Postdoctoral Fellow
Research Director: Professor E. Thomas Kaiser
The Rockefeller University and The University of Chicago

EDUCATION

- Ph.D. Organic Synthesis
Research Director: Professor Robert V. Stevens
University of California, Los Angeles June 1982
- B.S. Biological Sciences
University of California, Irvine June 1976

HONORS AND AWARDS

John Gabriel Award (1973), Bank of America Award in Science (1973), Alpha Gamma Sigma (1974), Faculty award (1974), Department of Mathematics Award (1974), Arthur J. Baum Award (1974), Summa cum laude (1976), Phi Beta Kappa (1976), Chancellor's Intern Fellowship (1976), DuPont Teaching Prize (1979), Chancellor's Dissertation Fellowship (1980), NIH Postdoctoral Fellow (1982-1984), Marion Merrell Dow Lecture/Colorado State University (1995), Merck/American Association for the Advancement of Science Lecture/Allegheny College (1996), Sam Rosen Award (2000); Leo M. Davidoff Society (2000); Olympia Dukakis/Richard Zorich Award Grant for A-T Research (2000); AAAS Fellow (2005); UNC Distinguished Teaching Award (2020).

PROFESSIONAL ACTIVITIES

2022 Member, NIH Special Emphasis Panel on Highly Innovative Technologies for Cancer Research

2021 - present Consultant, American Chemical Society, online education

2018 External Reviewer, College of Pharmacy, Virginia Commonwealth University

2016 External Reviewer, College of Pharmacy, University of Texas at Austin

2016 Austrian Science Fund, External Reviewer

2015-2021 Council, American Peptide Society

2015-2016 Member, The Protein Society

2015 Scientific Founder, Iris BioMed, LLC

2013 Co-organizer, 23rd American Peptide Symposium and the 6th International Peptide Symposium

2012 Member, du Vigneaud award committee; American Peptide Society

2012 International Advisory Board, The 7th International Conference on Inhibitors of Protein Kinases, Warsaw, Poland

2012-2018 Member, NIH Macromolecular Structure and Function E Study Section, National Institutes of Health

2011 External Reviewer, Purdue University Cancer Center
External Reviewer, Department of Medicinal Chemistry, University of Utah

2010 Macromolecular Structure and Function E Study Section, National Institutes of Health

2009 International Advisory Board, The 6th International Conference on Inhibitors of Protein Kinases, Warsaw, Poland

2008 Chemical and Analytical Sciences Study Section, National Institutes of Health

2007 International Advisory Board, The 5th International Conference on Inhibitors of Protein Kinases, Warsaw, Poland

2006-2008 Consultant, Sigma-Aldrich

2006-2008 Member, American Society for Cell Biology

2005-2007 Member, The Harvey Society

2005 International Advisory Board, The 4th International Conference on Inhibitors of Protein Kinases, Warsaw, Poland

2004- The American Peptide Society

2004-2007 Member, New York Academy of Science

2004 Scientific Cofounder, OnsetThera, Inc.

2004-2016 Editorial Advisory Board, *Accounts of Chemical Research*

2003-2007 Editorial Advisory Board, *Current Organic Synthesis*

2003-2007 Scientific Advisory Board, Panomics, Inc.

2003 International Advisory Board, The 3rd International Conference on Inhibitors of Protein Kinases, Warsaw, Poland

2003 Guest Editor, Accounts of Chemical Research, Special Issue on Signal Transduction

2002-2006 Member, American Society for Biochemistry and Molecular Biology

2001 International Advisory Board, The 2nd International Conference on Inhibitors of Protein Kinases, Warsaw, Poland

2000-2002 Scientific Advisory Board, Keyrx Biopharmaceuticals

2000-2004 Bioorganic and Natural Products Chemistry Study Section, National Institutes of Health

1999 Biochemistry Study Section, National Institutes of Health.

1999 Organizer of Symposium on “Biosensors: Visualizing the Chemistry of Living Cells”, American Chemical Society Western Regional Meeting, Ontario, California.

1998 International Advisory Board, The International Conference on Inhibitors of Protein Kinases, Warsaw, Poland

1997 Chemical and Related Sciences Special Emphasis Study Section, National Institutes of Health

1997 Clinical and Experimental Therapeutics Study Section, The USAMRMC Breast Cancer Research Program

1996-1997 Scientific Advisory Committee on Cancer Drug Development, American Cancer Society

1991-1996 Scientific Advisory Committee on Biochemistry and Endocrinology, American Cancer Society

1994 Chemical and Related Sciences Special Emphasis Study Section, National Institutes of Health

1982- Member, American Association for the Advancement of Science

1977- Member, American Chemical Society

PUBLICATIONS

1. Kenneth N. Trueblood, Carolyn B. Knobler, David S. Lawrence, and Robert V. Stevens, "Structures of the 1:1 Complexes of 18-Crown-6 with Hydrazinium Perchlorate, Hydroxylammonium Perchlorate, and Methylammonium Perchlorate". *Journal of the American Chemical Society*, **1982**, *104*, 1355 - 1362.
2. Robert V. Stevens, Fred C. Gaeta, and David S. Lawrence, "Camphorae: Chiral Intermediates for the Enantiospecific Total Synthesis of Steroids. Part 1". *Journal of the American Chemical Society*, **1983**, *105*, 7713 - 7719.
3. Emil Thomas Kaiser and David Scott Lawrence, "Chemical Mutation of Enzyme Active Sites". *Science*, **1984**, *226*, 505 - 511.
4. Catherine A. O'Brian, David S. Lawrence, E. Thomas Kaiser, and I. Bernard Weinstein, "Protein Kinase C Phosphorylates the Synthetic Peptide Arg-Arg-Lys-Ala-Ser-Gly-Pro-Pro-Val in the Presence of Phospholipid Plus Either Ca²⁺ or a Phorbol Ester Tumor Promoter". *Biochemical and Biophysical Research Communications*, **1984**, *124*, 296 - 302.
5. Robert V. Stevens and David S. Lawrence, "Camphorae: Chiral Intermediates for the Total Synthesis of Steroids". Part 2. An Enantiospecific Approach Toward Vitamin D Metabolites". *Tetrahedron* **1985**, *41*, 93 - 100.
6. Michael B. Doughty and David S. Lawrence, "On the Intramolecular Cyclization of a Thiazolium Salt". *Journal of the Chemical Society, Chemical Communications*, **1985**, 454 - 455.
7. Emil Thomas Kaiser, David Scott Lawrence, and Steven Edward Rokita, "The Chemical Modification of Enzymatic Specificity". *Annual Reviews in Biochemistry*, **1985**, *54*, 565 - 595.
8. Emil Thomas Kaiser and David S. Lawrence in "Frontiers in the Chemical Sciences", W. Spindel and R. M. Simon, eds., Westview Press, Boulder, Colorado, **1986**, 425 - 439.
9. Mary Prorok and David S. Lawrence, "Intrasubstrate Steric Interactions in the Active Site Control the Substrate Specificity of the cAMP-Dependent Protein Kinase". *Biochemical and Biophysical Research Communications*, **1989**, *158*, 136 - 140.
10. Mary Prorok and David S. Lawrence, "Cryopreservation of the Cyclic 3'-5'-Adenosine Monophosphate-Dependent Protein Kinase from Bovine Cardiac Muscle". *Journal of Biochemical and Biophysical Methods*, **1989**, *18*, 167 - 176.
11. Mary Prorok, Dinesh Sukumaran, and David S. Lawrence, "The Cyclic AMP-Dependent Protein Kinase from Bovine Cardiac Muscle is a Homoserine Kinase". *Journal of Biological Chemistry*, **1989**, *264*, 17727 - 17733.

12. Mary Prorok and David S. Lawrence, "Multiple Arginine Residues Contribute to the Increased Efficacy of Peptide Substrates for the cAMP-Dependent Protein Kinase". *Biochemical and Biophysical Research Communications*, **1989**, *165*, 368 - 371.
13. John S. Manka and David S. Lawrence, "High Yield Synthesis of 5,15-Diarylporphyrins". *Tetrahedron Letters*, **1989**, *30*, 6989 - 6992.
14. John S. Manka and David S. Lawrence, "Self-Assembly of a Hydrophobic Groove". *Tetrahedron Letters*, **1989**, *30*, 7341-7344.
15. John S. Manka and David S. Lawrence, "The Template-Driven Self-Assembly of a Heme-Containing Supramolecular Complex". *Journal of the American Chemical Society*, **1990**, *112*, 2440-2442.
16. Tata Venkata S. Rao and David S. Lawrence, "The Template-Driven Self-Assembly of a Threaded-Molecular Loop". *Journal of the American Chemical Society*, **1990**, *112*, 3614-3615.
17. Allen Salerno, Marianne Mendelow, Mary Prorok, and David S. Lawrence, "Noncovalent Active Site Interactions Enhance the Affinity and Control the Binding Order of Reversible Inhibitors of the cAMP-Dependent Protein Kinase". *Journal of Biological Chemistry*, **1990**, *265*, 18079-18082.
18. John S. Manka, Dennis S. Chugh, and David S. Lawrence, "The Free Base of Tetraphenylporphine Serves as a Host for Alkali Metal Salts". *Tetrahedron Letters* **1990**, *31*, 5873-5876.
19. Mary Prorok and David S. Lawrence, "An Affinity Label of Absolute Peptidic Origin", *Journal of the American Chemical Society*, **1990**, *112*, 8626-8627.
20. Dinesh K. Sukumaran, Mary Prorok, and David S. Lawrence, "A Molecular Constraint that Generates a Cis Peptide Bond", *Journal of the American Chemical Society*, **1991**, *113*, 706-707.
21. Diane Dick, Tata Venkata S. Rao, Dinesh Sukumaran, and David S. Lawrence, "Molecular Encapsulation: Cyclodextrin-Based Analogs of Heme-Containing Proteins", *Journal of the American Chemical Society*, **1992**, *114*, 2664-2669.
22. Diane Dick, Scott Pluskey, Dinesh K. Sukumaran, and David S. Lawrence, "NMR Spectral Analysis of Cytotoxic Ether Lipids", *Journal of Lipid Research* **1992**, *33*, 605-609.
23. Diane L. Dick and David S. Lawrence, "The Physicochemical Behavior of Cytotoxic Ether Lipids". *Biochemistry* **1992**, *31*, 8252-8257.
24. Young-Guen Kwon, Jaya Srinivasan, Marianne Mendelow, Tae Ryong Lee, Scott Pluskey, Allen Salerno, and David S. Lawrence, "The Active Site Substrate Specificity of the cAMP-Dependent Protein Kinase". *Journal of Biological Chemistry*, **1993**, *268*, 10713-10716.
25. Marianne Mendelow, Mary Prorok, Allen Salerno, and David S. Lawrence, "ATPase Promoting Dead End Inhibitors of the cAMP-Dependent Protein Kinase". *Journal of Biological Chemistry*, **1993**, *268*, 12289-12296.

26. Allen Salerno and David S. Lawrence, "Covalent Modification and Concomitant Inactivation of the cAMP-Dependent Protein Kinase by Affinity Labels Containing only L-Amino Acids". *Journal of Biological Chemistry* **1993**, *268*, 13043-13049.
27. Young-Guen Kwon, Jaya Srinivasan, Marianne Mendelow, Scott Pluskey, and David S. Lawrence, "Stereochemistry Specifies the Regiochemistry of Phosphorylation in Two cAMP-Dependent Protein Kinase Substrates". *Journal of Biological Chemistry*, **1993**, *268*, 16725-16729.
28. Young-Guen Kwon, Jaya Srinivasan, Marianne Mendelow, Scott Pluskey, and David S. Lawrence, "The cAMP-Dependent Protein Kinase Discriminates Between Prochiral Hydroxyl Groups". *Journal of the American Chemical Society* **1993**, *115*, 7527-7528.
29. Tae Ryong Lee, Marianne Mendelow, Jaya Srinivasan, Young-Guen Kwon, and David S. Lawrence, "The Molecular Basis for the Substrate Specificity of a Serine/Threonine-Specific Protein Kinase". *Journal of the American Chemical Society* **1993**, *115*, 9888-9891.
30. Young-Guen Kwon, Marianne Mendelow, and David S. Lawrence, "The Active Site Substrate Specificity of Protein Kinase C". *Journal of Biological Chemistry* **1994**, *269*, 4839-4844.
31. Tae Ryong Lee, Jinkui Niu, and David S. Lawrence, "The Phenol Kinase Activity of the cAMP-Dependent Protein Kinase: Steric and Electronic Effects". *Biochemistry* **1994**, *33*, 4245-4250.
32. Jungsook Cho Lee, Young-Guen Kwon, David S. Lawrence, and Arthur M. Edelman, "Both Basic and Hydrophobic Residues are Important Substrate Recognition Determinants of Ca²⁺-Calmodulin-dependent Protein Kinase Ia". *Proc. Natl. Acad. Sci. USA* **1994**, *91*, 6413-6417.
33. Tao Jiang, Dinesh K. Sukumaran, Sunil-Dutta Soni, and David S. Lawrence, "The Synthesis and Characterization of a Pyridine-Linked Cyclodextrin Dimer". *Journal of Organic Chemistry*, **1994**, *59*, 5149-5155.
34. Tao Jiang and David S. Lawrence, "Sugar-Coated Metallated-Macrocycles". *Journal of the American Chemical Society*, **1995**, *117*, 1857-1858.
35. Tae Ryong Lee, Jinqi Niu, and David S. Lawrence, "The Extraordinary Active Site Substrate Specificity of pp60^{c-src}: A Multiple Specificity Protein Kinase". *Journal of Biological Chemistry*, **1995**, *270*, 5375-5380.
36. Jaya Srinivasan, Mary Koszelak, Young-Guen Kwon, and David S. Lawrence, "The Design of Peptide-Based Substrates for the CDC2 Protein Kinase". *Biochemistry Journal*, **1995**, *309*, 927-931.
37. Tao Jiang, Michael Levett, and David S. Lawrence, "Self-Assembling Supramolecular Complexes". *Chemical Reviews*, **1995**, *95*, 2229-2260.
38. Tae Ryong Lee, Jeffrey H. Till, David S. Lawrence, and W. Todd Miller "Precision Substrate Targeting of Protein Kinases: v-Abl and c-Src". *Journal of Biological Chemistry*, **1995**, *270*, 27022-27026.

39. Tao Jiang and David S. Lawrence, "The Synthesis and Molecular Recognition Properties of a Cyclodextrin Tetramer". *Journal of Organic Chemistry*, **1995**, *60*, 7293-7297.
40. Derek Dunn, Li Chen, David S. Lawrence, and Zhong-Yin Zhang, "The Active Site Specificity of the *Yersinia* Protein Tyrosine Phosphatase". *Journal of Biological Chemistry*, **1996**, *271*, 168-173.
41. Douglas S. Werner, Tae Ryong Lee, and David S. Lawrence, "Is Protein Kinase Substrate Efficacy a Reliable Barometer for Successful Inhibitor Design?" *Journal of Biological Chemistry*, **1996**, *271*, 180-185.
42. Jason S. Wood, Xiongwei Yan, Marianne Mendelow, Jackie D. Corbin, Sharron H. Francis, and David S. Lawrence, "Precision Substrate Targeting of Protein Kinases: The cGMP- and cAMP-dependent Protein Kinases". *Journal of Biological Chemistry*, **1996**, *271*, 174-179.
43. Xiongwei Yan, Jackie D. Corbin, Sharron H. Francis, and David S. Lawrence "Precision Targeting of Protein Kinases: An Affinity Label that Inactivates the cGMP- but not the cAMP-dependent Protein Kinase". *Journal of Biological Chemistry*, **1996**, *271*, 1845-1848.
44. Chengqian Wang, Tae Ryong Lee, David S. Lawrence, and Joseph A. Adams, "Rate-Determining Steps for Tyrosine Phosphorylation by the Kinase Domain of v-fps". *Biochemistry*, **1996**, *35*, 1533-1539.
45. Javier Montserat, Li Chen, David S. Lawrence, and Zhong-Yin Zhang, "Potent Low Molecular Weight Protein Phosphatase Substrates". *Journal of Biological Chemistry*, **1996**, *271*, 7868-7872.
46. Li Chen, Javier Montserrat, David S. Lawrence, and Zhong-Yin Zhang, "The PTP1 and VHR Protein Phosphatases Exhibit Different Preferences for Nonpeptidic Substrates". *Biochemistry*, **1996**, *35*, 9349-9354.
47. Xiongwei Yan, David S. Lawrence, Jackie D. Corbin, and Sharron H. Francis, "Distinguishing Between Closely Related Protein Kinases: A Variation on the Bisubstrate Inhibitor Theme". *Journal of the American Chemical Society*, **1996**, *118*, 6321-6322.
48. Xiongwei Yan, David S. Lawrence, Jackie D. Corbin, and Sharron H. Francis, "*Journal of the American Chemical Society*, **1996**, *118*, 11684-11685.
49. Scott Pluskey, Mohammad Mahroof-Tahir, Debbie C. Crans, and David S. Lawrence, "Vanadium Oxidation-Induced Inhibition Of and Cofactor Substitution In the cAMP-Dependent Protein Kinase". *Biochemical Journal*, **1997**, *321*, 333-339.
50. Jinkui Niu and David S. Lawrence "Nonphosphorylatable Tyrosine Surrogates: Implications for Protein Kinase Inhibitor Design" *Journal of Biological Chemistry*, **1997**, *272*, 1493-1499.
51. Jinkui Niu and David S. Lawrence "L-Dopa: A Potent Nonphosphorylatable Tyrosine Mimetic for pp60^{c-src}". *Journal of the American Chemical Society*, **1997**, *119*, 3844-3845.

52. Varda Lev-Ram, Tao Jiang, Jason Wood, David S. Lawrence, and Roger Y. Tsien, "Synergies and Coincidence Requirements Between NO, cGMP, and Ca²⁺ in the Induction of Cerebellar Long-Term Depression" *Neuron*, **1997**, *18*, 1025-1038.
53. Yoram A. Puius, Yu Zhao, Michael Sullivan, David S. Lawrence, Steven C. Almo, and Zhong-Yin Zhang "Identification of a Second Phosphotyrosine-Binding Site in PTP1B: A Paradigm for Inhibitor Design". *Proc. Natl. Acad. Sci. USA*, **1997**, *94*: 13420-13425.
54. David S. Lawrence and Jinkui Niu "Protein Kinase Inhibitors: The Tyrosine-Specific Protein Kinases". *Pharmacology & Therapeutics*, **1998**, *77*, 81-114.
55. Ronald R. White, Young-Guen Kwon, Meng Taing, David S. Lawrence, and Arthur M. Edelman "Definition of Optimal Substrate Recognition Motifs of Ca²⁺-Calmodulin-Dependent Protein Kinases IV and II Reveals Shared and Distinctive Features". *Journal of Biological Chemistry*, **1998**, *273*, 3166-3172.
56. Jason S. Wood, Mary Koszelak, Judy Liu, and David S. Lawrence "A Caged Protein Kinase Inhibitor" *Journal of the American Chemical Society*, **1998**, *120*, 7145-7146.
57. Kieran Curley and David S. Lawrence "Photoactivation of a Signal Transduction Pathway in Living Cells". *Journal of the American Chemical Society*, **1998**, *120*, 8573-8574.
58. Adam A. Profit, Tae Ryong Lee, and David S. Lawrence "Bivalent Inhibitors of Protein Tyrosine Kinases". *Journal of the American Chemical Society*, **1999**, *121*, 280-283.
59. Kieran Curley and David S. Lawrence "Light-Activated Proteins" *Current Opinion Chemical Biology*, **1999**, *3*, 84-88.
60. Kieran Curley and David S. Lawrence "Caged Regulators of Signaling Pathways" *Pharmacology & Therapeutics*, **1999**, *82*, 347-354.
61. Meng Taing, Yen-Fang Keng, Kui Shen, David S. Lawrence, and Zhong-Yin Zhang "Potent and Highly Selective Inhibitors of the PTP1B Protein Tyrosine Phosphatase". *Biochemistry*, **1999**, *38*, 3793-3803.
62. Tae Ryong Lee and David S. Lawrence "Acquisition of Selective High-Affinity, SH2-Targeted Ligands via a Spatially-Focused Library". *Journal of Medicinal Chemistry*, **1999**, *42*, 784-787.
63. Stefan W. Vetter, Y.-F. Keng, David S. Lawrence, and Zhong-Yin Zhang "Substrate Specificity of Protein Tyrosine Phosphatase 1B Determined By A Novel Combinatorial Approach" *Journal of Biological Chemistry*, **2000**, *275*, 2265-2268.
64. Tae Ryong Lee, and David S. Lawrence "SH2-Directed Ligands of the Lck Tyrosine Kinase", *Journal of Medicinal Chemistry*, **2000**, *43*, 1173-1179.
65. Mauro Sarmiento, Yoram A. Puius, Stefan W. Vetter, Yen-Fang Keng, Li Wu, Yu Zhao, David S. Lawrence, Steven C. Almo, and Zhong-Yin Zhang "Structural Basis of Plasticity in Substrate Recognition by Protein Tyrosine Phosphatase 1B", *Biochemistry*, **2000**, *39*, 8171-8179.

66. Xiongwei Yan, Kieran Curley, and David S. Lawrence "The Specificity of the PKC α , β , and γ isoforms As Assessed By An Unnatural Alcohol-Appended Peptide Library", *Biochemical Journal*, **2000**, 349, 709-715.
67. Nouredine Zebda, Ora Bernard, Susan Welti, Maryse Bailly, David S. Lawrence, and John S. Condeelis "Phosphorylation of ADF/Cofilin Abolishes EGF-Induced Actin Nucleation at the Leading Edge and Subsequent Lamellipod Extension", *Journal of Cell Biology*, **2000**, 151, 1119-1127.
68. Ottavio Arancio, Irina Antonova, Stepan Gambaryan, Suzanne M. Lohmann, Jason S. Wood, David S. Lawrence, and R. D. Hawkins "Presynaptic Role of cGMP-Dependent Protein Kinase During Long-Lasting Potentiation", *Journal of Neuroscience*, **2001**, 21, 143-149.
69. Bo Zhou, Li Wu, Kui Shen, Jialin Zhang, David S. Lawrence, and Zhong-Yin Zhang "Recognition of and Activation by ERK2 Involves Multiple Regions of MKP3", *Journal of Biological Chemistry*, **2001**, 276, 6506-6515.
70. Adam A. Profit, Tae Ryong Lee, Jinkui Niu, and David S. Lawrence "Molecular Rulers: An Assessment of Distance and Spatial Relationships of Src Tyrosine Kinase SH2 and Active Site Regions", *Journal of Biological Chemistry*, **2001**, 276, 9446-9451.
71. Ren-Hwa Yeh, Tae Ryong Lee, and David S. Lawrence "From Consensus Sequence Peptide to High Affinity Ligand: A "Library-Scan" Strategy", *Journal of Biological Chemistry*, **2001**, 276, 12235-12240.
72. David S. Lawrence "Functional Proteomics: Large Scale Analysis of Protein Kinase Activity", *GenomeBiology*, **2001**, 2, 1007.1 - 1007.3.
73. John S. Condeelis, Jeffrey B. Wyckoff, Maryse Bailly, Richard Pestell, David Lawrence, Jonathan S. Backer, and Jeffrey E. Segall "Lamellipodia in Invasion", *Seminars Cancer Biology*, **2001**, 11, 119-128.
74. Kui Shen, Yen-Fang Keng, Li Wu, Xiao-Ling Guo, David S. Lawrence, and Zhong-Yin Zhang "Acquisition of A Specific and Potent PTP1B Inhibitor from a Novel Combinatorial Library and Screening Procedure" *Journal of Biological Chemistry*, **2001**, 276, 47311-47319.
75. Ren-Hwa Yeh, Tae Ryong Lee, and David S. Lawrence "From Consensus Sequence to High-Affinity Ligands: Acquisition of Signaling Protein Modulators" *Pharmacology & Therapeutics*, **2002**, 93, 179-191.
76. Ren-Hwa Yeh, Xionwei Yan, Michael Cammer, Anne R. Bresnick, and David S. Lawrence "Real Time Visualization of Protein Kinase Activity in Living Cells" *Journal of Biological Chemistry*, **2002**, 277, 11527-11532.
77. Mousumi Ghosh, Ilia Ichetovkin, Xiaoyan Song, John S. Condeelis, and David S. Lawrence "A New Strategy for Caging Proteins Regulated by Kinases" *Journal of the American Chemical Society*, **2002**, 124, 2440-2441.

78. Chien-An Chen, Ren-Hwa Yeh, and David S. Lawrence "Design and Synthesis of a Fluorescent Reporter of Protein Kinase Activity" *Journal of the American Chemical Society*, **2002**, *124*, 3840-3841.
79. Weiyang Lin and David S. Lawrence "Photolabile Protecting Group" *Journal of Organic Chemistry*, **2002**, *67*, 2723-2726.
80. Xiao-Ling Guo, Kui Shen, Fang Wang, David S. Lawrence, and Zhong-Yin Zhang "Probing the Molecular Basis for Potent and Selective PTP1B Inhibition" *Journal of Biological Chemistry*, **2002**, *277*, 41014-41022.
81. Weiyang Lin, Chris Albanese, Richard G. Pestell, and David S. Lawrence "Spatially-Discrete Light-Driven Protein Expression", *Chemistry & Biology*, **2002**, *9*, 1347-1353.
82. Limin Shang, Young-Guen Kwon, Sandip K. Nandy, David S. Lawrence, and Arthur M. Edelman, "Catalytic and Regulatory Domains of Doublecortin Kinase-1", *Biochemistry*, **2003**, *42*, 2185-2194.
83. David S. Lawrence "Chemical Biology of Signal Transduction", *Accounts of Chemical Research*, **2003**, *39*, 353-354.
84. David S. Lawrence "Chemical Probes of Signal Transducing Enzymes", *Accounts of Chemical Research*, **2003**, *36*, 401-409.
85. Fabo Liang, Zhinghui Huang, Seung-Yub Lee, Jiao Liang, Maya I. Ivanov, Andres Alonso, James B. Bliska, David S. Lawrence, Tomas Mustelin, and Zhong-Yin Zhang "Aurintricarboxylic Acid Blocks *in vitro* and *in vivo* Activity of YopH, an Essential Virulent Factor of *Yersinia Pestis*, the Agent of Plague" *Journal of Biological Chemistry*, **2003**, *278*, 41734-41741.
86. Jin-Peng Sun, Alexander A. Federov, Seung-Yub Lee, Xiao-Ling Guo, Kui Shen, David S. Lawrence, Steven C. Almo, and Zhong-Yin Zhang "Crystal Structure of PTP1B Complexed with a Potent and Selective Bidentate Inhibitor" *Journal of Biological Chemistry*, **2003**, *278*, 41734-41741.
87. Laiping Xie, Seung-Yun Lee, Jannik N. Andersen, Steve Waters, Kui Shen, Xiao-Ling Guo, Niels Peter H. Moller, Jerrold M. Olefsky, David S. Lawrence, and Zhong-Yin Zhang "Cellular Effects of Small Molecule PTP1B Inhibitors on Insulin Signaling" *Biochemistry*, **2003**, *42*, 12792-12804.
88. Willem F. Veldhuyzen, Quan Nguyen, Gary McMaster, and David S. Lawrence "A Light-Activated Probe of Intracellular Protein Kinase Activity" *Journal of the American Chemical Society*, **2003**, *125*, 13358-13359.
89. Jung Hwan Lee, Sandip K. Nandy, and David S. Lawrence "A Highly Potent and Selective PKC α Inhibitor Generated Via Combinatorial Modification of a Peptide Scaffold", *Journal of the American Chemical Society*, **2004**, *126*, 3394-3395.

90. Biao Xi, Fangxia Guan, and David S. Lawrence “Enhanced Production of Functional Protein From Defective Genes”, *Journal of the American Chemical Society*, **2004**, *126*, 5660-5661.
91. Chien-An Chen, Ren-Hwa Yeh, and David S. Lawrence “Biosensors of Protein Kinase Action: From *In Vitro* Assays to Living Cells” *Biochimica Biophysica Acta*, **2004**, *1697*, 39-51.
92. Mousumi Ghosh, Xiaoyan Song, Ghassan Mouneimne, Mazen Sidani, David S. Lawrence, and John S Condeelis “Cofilin Promotes Actin Polymerization and Defines the Direction of Cell Motility”, *Science*, **2004**, *303*, 743-746.
93. David S. Lawrence “New Design Strategies for Ligands That Target Protein Kinase-Mediated Protein-Protein Interactions” in *Handbook of Experimental Pharmacology: Inhibitors of Protein Kinases and Protein Phosphatases*, editors: Lorenzo A. Pinna and Patricia W. Cohen, Springer-Verlag, **2005**, *167*, 11-44.
94. Sanjai Kumar, Fubo Liang, David S. Lawrence, and Zhong-Yin Zhang “Small Molecule Approach to Studying Protein Tyrosine Phosphatase” *Methods* **2005**, *35*, 9-21.
95. Seung-Yub Lee, Fubo Liang, Xiao-Ling Guo, Laiping Xie, David S. Lawrence, and Zhong-Yin Zhang “Cell Penetrating Peptides: An Assessment of Intracellular Release of Active Cargo”, *Angewandte Chemie International Edition*, **2005**, *44*, 2-4.
96. John S. Condeelis and David S. Lawrence “The Application of Caged Proteins to Cell-Based Systems” in *Dynamic Studies in Biology: Phototriggers, Photoswitches, and Caged Compounds*, editors: Maurice Goeldner and Richard Givens, **2005**, 325-340.
97. Robert H. Singer, David Lawrence, Ben Ovryn, and John Condeelis “Light-Activated Imaging of Gene Expression in Living Cells”, *Journal of Biomedical Optics*, **2005**, *10*, 051406-1 – 051406-9.
98. Haishan Li and David S. Lawrence “Acquisition of Fyn-Selective SH3 Domain Ligands via A Combinatorial Library Strategy”, *Chemistry & Biology*, **2005**, *12*, 905-12.
99. Qunzhao Wang and David S. Lawrence “Phosphorylation-Driven Protein-Protein Interactions: A New Protein Kinase Sensing System”, *Journal of the American Chemical Society*, **2005**, *127*, 7684-5.
100. Fubo Liang, Seung-Yub Lee, Jiao Liang, David S. Lawrence, and Zhong-Yin Zhang “The Role of Protein Tyrosine Phosphatase 1B in Integrin Signaling”, *Journal of Biological Chemistry*, **2005**, *280*, 24857-63.
101. David S. Lawrence “Signaling Protein Inhibitors via the Combinatorial Modification of Peptide Scaffolds”, *Biochimica Biophysica Acta*, **2005**, *1754*, 50-57.
102. David S. Lawrence “*In vivo* Applications of Caged Proteins and Peptides”, *Current Opinion Chemical Biology*, **2005**, *9*, 570-575.

103. Hyangkyu Lee, Laiping Xie, Yong Luo, Seung-Yub Lee, David S. Lawrence, Xiao Bo Wang, Federica Sotgia, Michael P. Lisanti, and Zhong-Yin Zhang “Identification of Phospho-Caveolin-1 as a Novel PTP1B Substrate” *Biochemistry*, **2006**, *45*, 234-40.
104. Qunzhao Wang, Sean M. Cahill, Michael Blumenstein, and David S. Lawrence “Self-Reporting Fluorescent Substrates of Protein Tyrosine Kinase”, *Journal of the American Chemical Society*, **2006**, *128*, 1808-9.
105. Jung-Mi Hah, Vyas Sharma, Haishan Li, and David S. Lawrence “Acquisition of a “Group A”-Selective Tyrosine Kinase Inhibitor via a Global Targeting Strategy”, *Journal of the American Chemical Society*, **2006**, *128*, 5996-7.
106. Qunzhao Wang, Zhaohua Dai, Sean M. Cahill, Michael Blumenstein, and David S. Lawrence “Light Regulated Sampling of Protein Tyrosine Kinase Activity”, *Journal of the American Chemical Society*, **2006**, *128*, 14016-7.
107. Christopher D. Morrison, Christy White, Zhong Wang, Seung-Yub Lee, David S. Lawrence, William T. Cefalu, Zhong-Yin Zhang, and Thomas W. Gettys “Increased Hypothalamic PTP1B Contributes to Leptin Resistance with Age”, *Endocrinology*, **2007**, *148*, 433-40.
108. Qunzhao Wang and David S. Lawrence “Seeing is Believing: Peptide-Based Fluorescent Sensors of Protein Tyrosine Kinase Activity”, *ChemBioChem*, **2007**, *8*, 373-8.
109. Vyas Sharma, Richard A. Agnes, and David S. Lawrence “Deep Quench: Extending the Dynamic Range of Protein Kinase Sensors”, *Journal of the American Chemical Society*, **2007**, *129*, 2742-3.
110. Sheng Zhang, Lan Chen, Sanjai Kumar, Li Wu, David S. Lawrence, and Zhong-Yin Zhang “An Affinity-Based Fluorescence Polarization Assay for Protein Tyrosine Phosphatases”, *Methods* **2007**, *42*, 261-7.
111. Sandip K. Nandy, Richard A. Agnes, and David S. Lawrence “Photochemically-Activated Probes of Protein-Protein Interactions”, *Organic Letters* **2007**, *9*, 2249-52.
112. Steven C. Almo, Jeffrey B. Bonanno, J. Michael Sauder, Spencer Emtage, Teresa P. Dilorenzo, Vladimir Malashkevich, Steven R. Wasserman, S. Swaminathan Subramaniam Eswaramoorthy, Rakhi Agarwal, Desigan Kumaran, Mahendra Madegowda, Sugadev Ragumani, Yury Patskovsky, Johnjeff Alvarado, Udipi A. Ramagopal, Joana Faber-Barata, Mark R. Chance, Andrej Sali, Andras Fiser, Zhong-Yin Zhang, David S. Lawrence, & Stephen K. Burley “Structural genomics of protein phosphatases” *J. Struct. Funct. Genomics* **2007**, *8*, 121-40.
113. Zhaohua Dai, Natalya G. Dulyaninova, Sanjai Kumar, Anne R. Bresnick, and David S. Lawrence “Visual Snapshots of Intracellular Kinase Activity at the Onset of Mitosis”, *Chemistry & Biology*, **2007**, *14*, 1254-60.
114. Vyas Sharma, Qunzhao Wang, and David S. Lawrence “Peptide-Based Fluorescent Sensors of Protein Kinase Activity: Design and Applications” *Biochimica Biophysica Acta*, **2008**, *1784*, 94-9.

115. Jung Hwan Lee, Sanjai Kumar, and David S. Lawrence “Stepwise Combinatorial Evolution of An Akt Bisubstrate Inhibitor”, *ChemBioChem*, **2008**, *9*, 507 - 9.
116. Aya Wakata, Sean M. Cahill, Michael Blumenstein, Rosalind H. Gunby, Steffen Jockusch, Angel A. Marti, Barbara Cimbrotto, Carlo Gambacorti-Passerini, Arianna Donella-Deana, Lorenzo A. Pinna, Nicholas J. Turro, and David S. Lawrence “A Mechanistic Design Principle for Protein Tyrosine Kinase Sensors: Application to a Validated Cancer Target” *Organic Letters* **2008**, *10*, 301 - 4.
117. Sarah C. Garrett, Natalie Turner, A. Rybin, Alexei Touthkine, Klaus M. Hahn, David S. Lawrence, and Anne R. Bresnick “A Biosensor of S100A4 Metastasis Factor Activation – Inhibitor Screening and Cellular Activation Dynamics” *Biochemistry*, **2008**, *47*, 986 - 96.
118. Haishan Li, Jung-Mi Hah, and David S. Lawrence “Light-Mediated Liberation of Enzymatic Activity: “Small Molecule” Caged Protein Equivalents” *Journal of the American Chemical Society* **2008**, *130*, 10464 - 5.
119. Hsien-ming Lee, Daniel R. Larson, and David S. Lawrence “Illuminating the Chemistry of Life: Design, Synthesis, and Applications of “Caged” and Related Photoresponsive Compounds” *ACS Chemical Biology* **2009**, *4*, 409-27.
120. Vyas Sharma and David S. Lawrence “Uber-Responsive Peptide-Based Sensors of Signaling Proteins” *Angewandte Chemie International Edition* **2009**, *48*, 7290 - 2.
121. Sheng Zhang, Lan Chen, Yong Luo, Andrea Gunawan, David S. Lawrence, and Zhong-Yin Zhang “Acquisition of a Potent and Selective TC-PTP Inhibitor via a Stepwise Fluorophore-tagged Combinatorial Synthesis and Screening Strategy” *Journal of the American Chemical Society* **2009**, *131*, 13072 - 3.
122. Melanie A. Priestman and David S. Lawrence “Light-Mediated Remote Control of Signaling Pathways” *Biochim. Biophys. Acta* **2010**, *1804*, 1547 - 58.
123. Aya Wakata, Hsien-Ming Lee, Alexei Touthkine, Marion Schmidt, and David S. Lawrence “Simultaneous Fluorescent Monitoring of Proteasomal Subunit Catalysis” *Journal of the American Chemical Society*, **2010**, *132*, 1578 -82.
124. Hsien-ming Lee, Melanie A. Priestman, and David S. Lawrence “Light-Mediated Spatial Control Via Photolabile Fluorescently Quenched Peptide Cassettes” *Journal of the American Chemical Society* **2010**, *132*, 1446 - 7.
125. Vyas Sharma, Finith Jernigan, Jennifer R. Shell, Richard A. Agnes, and David S. Lawrence “Suborganelle Sensing of Mitochondrial cAMP-Dependent Protein Kinase Activity”, *Journal of the American Chemical Society*, **2010**, *132*, 6075 - 80.
126. Qunzhao Wang, Eric I. Zimmerman, Alexei Touthkine, Timothy D. Martin, Lee M. Graves, and David S. Lawrence “Multicolor Monitoring of Dysregulated Protein Kinases in Chronic Myelogenous Leukemia”, *ACS Chemical Biology*, **2010**, *5*, 887 - 95.
127. Thomas A. Shell and David S. Lawrence “A New Trick (Hydroxyl radical Generation) for An Old Vitamin (B₁₂)”, *Journal of the American Chemical Society*, **2011**, *133*, 2148 – 50.

128. Melanie A. Priestman, Liang Sun, and David S. Lawrence “Dual Wavelength Photoactivation of cAMP- and cGMP-Dependent Protein Kinase Signaling Pathways”, *ACS Chemical Biology*, **2011**, *6*, 377 - 84.
129. Hsien-Ming Lee, Weichen Xu, and David S. Lawrence “Construction of a Photoactivatable Profluorescent Enzyme Via Proximity Labeling”, *Journal of the American Chemical Society* **2011**, *133*, 2331 - 3.
130. Jennifer R. Shell and David S. Lawrence “Proteolytic Regulation of the Mitochondrial cAMP-Dependent Protein Kinase”, *Biochemistry*, **2012**, *51*, 2258 - 64.
131. Angela Proctor, Qunzhao Wang, David S. Lawrence, and Nancy L. Allbritton “Metabolism of Peptide Reporters in Cell Lysates and Single Cells”, *Analyst*, **2012**, *137*, 3028 – 38.
132. Melanie A. Priestman, Thomas A. Shell, Liang Sun, Hsien-Ming Lee, and David S. Lawrence "Merging of Confocal and Caging Technologies: Selective Three Color Communication with Profluorescent Reporters", *Angewandte Chemie International Edition*, **2012**, *51*, 7684 - 7.
133. Shen Zhang, Lan Chen, L., David S. Lawrence, and Zhong-Yin Zhang. "A Combinatorial Strategy for the Acquisition of Potent and Specific Protein Tyrosine Phosphatase Inhibitors", *Methods in Molecular Biology*, **2012**, *928*, 53 - 65.
134. Angela Proctor, Qunzhao Wang, David S. Lawrence, and Nancy L. Allbritton “Development of a Peptidase-Resistant Substrate for Single-Cell Measurement of Protein Kinase B Activation”, *Analytical Chemistry*, **2012**, *84*, 7195 – 202.
135. Weichen Xu, Nancy L. Allbritton, and David S. Lawrence “Src Kinase Regulation in Progressively Invasive Cancer”, *PLoS One*, **2012**, *7*, e48867.
136. Qunzhao Wang and David S. Lawrence “Multicolor Visualization of Protein Arginine Deiminase-Catalyzed Citrullination”, *Angewandte Chemie International Edition*, **2013**, *52*, 2323 – 5.
137. Finith Jernigan and David S. Lawrence “A Broad Spectrum Dark Quencher: Construction of Multiple Colour Protease and Photolytic Sensors” *Chemical Communications*, **2013**, *49*, 6728 - 30.
138. Daniel R. Larson, Christoph Fritsch, Liang Sun, Xiuhau Meng, David Lawrence, and Robert H. Singer “Light-Activated Receptor-Mediated Transcription in Single Cells”, *eLife*, **2013**, *2*: e00750.
139. Ryan M. Phillips, Eric Bair, David S. Lawrence, Christopher E. Sims, and Nancy L. Allbritton “Measurement of Protein Tyrosine Phosphatase Activity in Single Cells by Capillary Electrophoresis” *Analytical Chemistry*, **2013**, *85*, 6136 - 42.
140. Jennifer R. Shell and David S. Lawrence “Probes of Mitochondrial cAMP-Dependent Protein Kinase” *Biochim. Biophys. Acta* **2013**, *1834*, 1359 - 63.
141. Luong T. Nguyen, Nathan P. Oien, Nancy L. Allbritton, and David S. Lawrence “Lipid Pools as Photolabile Protecting Groups”: Design of Light-Activatable Bioagents” *Angewandte Chemie International Edition*, **2013**, *52*, 9936 - 9. *Received VIP designation.*
142. Thomas A. Shell, Jennifer R. Shell, Zachary L. Rodgers, and David S. Lawrence “Tunable Visible and Near IR Photoactivation of Light-Responsive Compounds” *Angewandte Chemie International Edition*, **2014**, *53*, 875 - 8. *Received VIP designation.*

143. Nathan P. Oien, Luong T. Nguyen, Finith E. Jernigan, Melanie A. Priestman, and David S. Lawrence "Long Wavelength Monitoring of Protein Kinase Activity" *Angewandte Chemie International Edition*, **2014**, *53*, 3975 - 8.
144. Angela Proctor, Gabriela Herrera, Qunzhao Wang, David S. Lawrence, Jen Jen Yeh, and Nancy L. Allbritton "Measurement of Protein Kinase B Activity in Single Primary Human Pancreatic Cancer Cells", *Analytical Chemistry*, **2014**, *86*, 4573 - 80.
145. Weston J. Smith, Nathan P. Oien, Robert M. Hughes, Christina M. Marvin, Zachery L. Rodgers, Junghyun Lee, and David S. Lawrence "Cell-Mediated Assembly of Phototherapeutics" *Angewandte Chemie International Edition*, **2014**, *53*, 10945 - 8.
146. Robert M. Hughes and David S. Lawrence "Optogenetic Engineering: Light-Directed Cell Motility" *Angewandte Chemie International Edition*, **2014**, *53*, 10904 - 7.
147. Melanie A. Priestman, Qunzhao Wang, Finith E. Jernigan, Ruma Chowdhury, Marion Schmidt, and David S. Lawrence "Multicolor Monitoring of the Proteasome's Catalytic Signature" *ACS Chemical Biology*, **2015**, *10*, 433 - 40.
148. Zachary L. Rodgers, Robert M. Hughes, Laura M. Doherty, Jennifer R. Shell, Brian P. Molesky, Alexander M. Brugh, Malcolm D. E. Forbes, Andrew M. Moran, and David S. Lawrence "B₁₂-Mediated, Long Wavelength Photo-polymerization of Hydrogels" *Journal of the American Chemical Society* **2015**, *137*, 3372 - 80.
149. Robert M. Hughes, David J. Freeman, Kelsey N. Lamb, Rebecca M. Pollet, Weston J. Smith, and David S. Lawrence, "Optogenetic Apoptosis: Light-Triggered Cell Death", *Angewandte Chemie International Edition*, **2015**, *54*, 12064 - 8.
150. Thomas A. Shell and David S. Lawrence, "Vitamin B₁₂: A Tunable, Long Wavelength, Light-Responsive Platform for Launching Therapeutic Agents", *Accounts of Chemical Research*, **2015**, *48*, 2866 - 74.
151. Colin P. O'Banion, Luong T. Nguyen, Qunzhao Wang, Melanie A. Priestman, Stephen P. Holly, Leslie V. Parise, and David S. Lawrence, "The Plasma Membrane as a Reservoir, Protective Shield, and Light-Triggered Launch Pad for Peptide Therapeutics", *Angewandte Chemie International Edition*, **2016**, *55*, 950 - 54.
152. Abigail H. Turner, Michael S. Lebhar, David S. Lawrence, and Nancy L. Allbritton, "Rational Design of a Dephosphorylation-Resistant Reporter Enables Single-Cell Measurement of Tyrosine Kinase Activity", *ACS Chemical Biology*, **2016**, *11*, 355 - 62.
153. Zachary L. Rodgers, Thomas A. Shell, Alexander M. Brugh, Hannah L. Nowotarski, Malcolm D.E. Forbes, and David S. Lawrence, "Fluorophore Assisted Photolysis of Thiolato-Cob(III)alamins", *Inorganic Chemistry*, **2016**, *55*, 1962 - 9.
154. Emilie R. Mainz, Qunzhao Wang, David S. Lawrence, and Nancy L. Allbritton, "An Integrated Chemical Cytometry Method: Shining a Light on Akt Activity in Single Cells", *Angewandte Chemie International Edition*, **2016**, *55*, 13095 - 8.
155. Angela Proctor, Imola G. Zigoneanu, Qunzhao Wang, Christopher E. Sims, David S. Lawrence, and Nancy L. Allbritton, "Development of a protease-resistant reporter to quantify BCR-ABL activity in intact cells", *Analyst*, **2016**, *141*, 6008 - 17.
156. Robert M. Hughes, Christina M. Marvin, Zachary L. Rodgers, Song Ding, Nathan P. Oien, Weston J. Smith, and David S. Lawrence, "Photo-Triggered Secretion of Membrane Compartmentalized

- Bioactive Agents”, *Angewandte Chemie International Edition*, **2016**, *55*, 16080 - 3. Received “Hot Paper” designation.
157. Chao Wang, Yanqi Ye, Wujin Sun, Jicheng Yu, Jingqiang Wang, David S. Lawrence, John B. Buse, and Zhen Gu, “Red Blood Cells for Glucose Responsive-Insulin Delivery”, *Advanced Materials*, **2017**, *29*, 1606617.
 158. Colin P. O’Banion, Melanie A. Priestman, Robert M. Hughes, Laura E. Herring, Stephen J. Capuzzi, and David S. Lawrence, “Design and Profiling of a Subcellular Targeted Optogenetic cAMP-Dependent Protein Kinase”, *Cell Chemical Biology*, **2018**, *25*, 100 - 9.
 159. Song Ding, Colin P. O’Banion, Joshua Welfare, and David S. Lawrence “Cellular Cyborgs: On the Precipice of a Drug Delivery Revolution” *Cell Chemical Biology*, **2018**, *25*, 648 - 58.
 160. Brianna M. Vickerman, Brae V. Peterson, Matthew M. Anttila, David S. Lawrence, and Nancy L. Allbritton “Design and Application of Sensors for Chemical Cytometry”, *ACS Chemical Biology*, **2018**, *13*, 1741 - 51.
 161. Colin P. O’Banion and David S. Lawrence “Optogenetics: A Primer for Chemists”, *ChemBioChem*, **2018**, *19*, 1201 - 16.
 162. Marissa L. Cann, Laura E. Herring, Lauren L. Haar, Thomas S. K. Gilbert, Dennis Goldfarb, Kristy L. Richards, Lee M. Graves, and David S. Lawrence “Dasatinib is preferentially active in the activated B-cell subtype of diffuse large B-cell lymphoma”, *Journal of Proteome Research*, **2019**, *18*, 522 - 34.
 163. Colin P. O’Banion, Brianna M. Vickerman, Lauren Haar, and David S. Lawrence “Local cAMP Generation by Compartmentalized cAMP Generation by Engineered Photoactivated Adenylyl Cyclases”, *Cell Chemical Biology*, **2019**, *26*, 1393 - 406.
 164. Lauren L. Haar, David S. Lawrence, and Robert M. Hughes “Optogenetic Perturbation of the Biochemical Pathways that Control Cell Behavior”, *Methods in Enzymology: Chemical and Synthetic Biology Approaches to Understand Cellular Functions*, **2019**, *621*, 310 - 328.
 165. Colin P. O’Banion, Anwasha Goswami, David S. Lawrence “Design, Construction, and Validation of Optogenetic Proteins”, *Methods in Enzymology: Chemical and Synthetic Biology Approaches to Understand Cellular Functions*, **2019**, *621*, 171 - 90.
 166. Angela Proctor, Qunzhao Wang, David S. Lawrence, and Nancy L. Allbritton “Selection and Optimization of Enzyme Reporters for Chemical Cytometry”, *Methods in Enzymology: Chemical and Synthetic Biology Approaches to Understand Cellular Functions*, **2019**, *621*, 221 - 248.
 167. David J. Hill, Olivia F. Williams, Dorianne P. Mizzy, Therese F. Triumph, Catherine R. Brennan, Dawn C. Mason, and David S. Lawrence “Introduction to Laboratory Safety for Graduate Students: An Active Learning Endeavor”, *Journal of Chemical Education*, **2019**, *96*, 652 - 9.
 168. Victoria A. Wickenheisser, Emilia M. Zywtot, Emily M. Rabjohns, Hyun H. Lee, David S. Lawrence, and Teresa K. Tarrant “Low-Level Laser Therapy in Inflammatory, Musculoskeletal, and Autoimmune Disease”, *Current Allergy and Asthma Reports*, **2019**, *19*, doi: 10.1007/s11882-019-0869-z.
 169. Christina M. Marvin, Song Ding, Rachel E. White, Natalia Orlova, Qunzhao Wang, Emilia M. Zywtot, Lauren Haar, Teresa K. Tarrant, Paul A. Dayton, and David S. Lawrence “On Command Drug Delivery via Cell-Conveyed Phototherapeutics”. *Small*, **2019**, e1901442, doi: 10.1002/sml.201901442.

170. Kshitij Parag-Sharma, Colin P. O'Banion, Erin C. Henry, Adele M. Musicant, John L. Cleveland, David S. Lawrence, and Antonio L. Amelio "Engineered BRET-Based Biologic Light Sources Enable Spatio-Temporal Control Over Diverse Optogenetic Systems", *ACS Synthetic Biology*, **2020**, 9, 1 - 9.
171. Brianna M. Vickerman, Colin P. O'Banion, Xianming Tan, and David S. Lawrence "Light-Controlled Release of Therapeutic Proteins from Red Blood Cells using a Photoactivatable Hemolytic Peptide", *ACS Central Science*, **2021**, 7, 93 - 103.
172. Brianna M. Vickerman, Emilia M. Zywoot, Teresa K. Tarrant, and David S. Lawrence "Taking Phototherapeutics from Concept to Clinical Launch", *Nature Reviews Chemistry*, **2021**, 5, 816 - 34.
173. Matthew M. Anttila, Brianna M. Vickerman, Qunzhao Wang, David S. Lawrence, and Nancy L. Allbritton, "Photoactivatable Reporter to Perform Multiplexed and Temporally Controlled Measurements of Kinase and Protease Activity in Single Cells", *Analytical Chemistry*, **2021**, 93, 16664 - 72.
174. Emilia M. Zywoot, Natalia Orlova, Song Ding, Rishi R. Rampersad, Emily M. Rabjohns, Victoria A. Wickenheisser, Qunzhao Wang, Joshua G. Welfare, Lauren Haar, Amanda M. Eudy, Teresa K. Tarrant, and David S. Lawrence "Light-Triggered Drug Release from Red Blood Cells Suppresses Arthritic Inflammation", *Advanced Therapeutics*, **2022**, 5, 2100159.
175. Joshua G. Welfare, Michael J. Mortelliti, Caylie A. McGlade, Timothy W. Hartman, Jillian L. Dempsey, and David S. Lawrence, "On the Photolytic Behavior of Substituted Alkyl-Cobalamins", *Journal of Organic Chemistry*, **2022**, *in press*.
176. Christopher I. Kong, Joshua G. Welfare, Hannah Shenouda, Olivia R. Sanchez-Felix, Joel B. Floyd, Jr, Robert C. Hubal, Jerry S. Heneghan, and David S. Lawrence, "Virtually Bridging the Safety Gap Between the Lecture Hall and the Research Laboratory", *Journal of Chemical Education*, **2022**, *in press*.

BOOK REVIEWS

1. Protein Kinase C. Current Concepts and Future Perspectives. David S. Lester and Richard M. Epand, eds. *Journal of the American Chemical Society*, **1994**, 116, 8859-8860.
2. Methods in Enzymology. Volume 267. Combinatorial Chemistry. John S. Abelson, ed. *Analytical Biochemistry*, **1997**, 252, 215-216.

MEETING ABSTRACTS

1. Dick, D., and Lawrence, D.S. (1988). An Expedient Assay For A Pterin-Dependent, Alkyl-Ether Lipid Cleavage Enzyme. Abstracts of Papers of the American Chemical Society 195, 119-BIOL.
2. Dick, D., and Lawrence, D.S. (1988). Expedient Assay For A Pterin-Dependent, Alkyl Ether Lipid Cleavage Enzyme. *Biochemistry* 27, 3101-3101.
3. Prorok, M., and Lawrence, D.S. (1988). Substrate-Specificity Of cAMP-Dependent Protein-Kinase. Abstracts of Papers of the American Chemical Society 195, 120-BIOL.

4. Prorok, M., and Lawrence, D.S. (1988). Substrate-Specificity Of cAMP-Dependent Protein-Kinase. *Biochemistry* 27, 3101-3101.
5. Lawrence, D.S., Manka, J., and Venkata, T. (1989). The Template-Driven Self-Assembly Of A Prototype For A Heme-Dependent Protein Mimic. Abstracts of Papers of the American Chemical Society 198, 195-ORGN.
6. Lawrence, D.S., and Prorok, M. (1989). cAMP-Dependent Protein-Kinase - Substrate-Specificity Of The Catalytic Subunit. Abstracts of Papers of the American Chemical Society 197, 51-BIOL.
7. Lawrence, D.S., and Prorok, M. (1989). cAMP-Dependent Protein-Kinase - Substrate-Specificity Of The Catalytic Subunit. *Biochemistry* 28, 1942-1942.
8. Manka, J.S., Chugh, D.B., and Lawrence, D.S. (1990). Bimetallic Complexes Of Unionized Tetraphenylporphine. Abstracts of Papers of the American Chemical Society 199, 53-INOR.
9. Manka, J.S., and Lawrence, D.S. (1990). The Self-Assembly Of A Hydrophobic Groove. Abstracts of Papers of the American Chemical Society 199, 186-ORGN.
10. Prorok, M., Mendelow, M., Salerno, A., and Lawrence, D.S. (1990). Probes Of Protein-Kinase Specificity. Abstracts of Papers of the American Chemical Society 199, 113-BIOL.
11. Prorok, M., Mendelow, M., Salerno, A., and Lawrence, D.S. (1990). Probes Of Protein-Kinase Specificity. *Biochemistry* 29, 2200-2200.
12. Dick, D.L., Pluskey, S.T., and Lawrence, D.S. (1991). Physicochemical Characterization Of Cytotoxic Ether Lipids. Abstracts of Papers of the American Chemical Society 202, 31-MEDI.
13. Tata, V.S., and Lawrence, D.S. (1991). Studies Toward Heme-Dependent Protein Mimics. Abstracts of Papers of the American Chemical Society 202, 186-INOR.
14. Edelman, A.M., Lee, J.C., Kwon, Y.G., and Lawrence, D.S. (1994). A Requirement Of Hydrophobic And Basic-Amino-Acid Residues For Substrate Recognition By Ca²⁺-Calmodulin-Dependent Protein Kinase-Ia. *FASEB Journal* 8, A1328-A1328.
15. Lawrence, D.S., Lee, T.R., and Niu, J. (1994). How To Make A Serine Threonine-Specific Protein-Kinase Exhibit Tyrosine Kinase-Like Behavior. *FASEB Journal* 8, A1238-A1238.
16. Koszelak, M.E., and Lawrence, D.S. (1996). cAMP-dependent protein kinase inhibitor study. Abstracts of Papers of the American Chemical Society 212, 36-BIOL.
17. Koszelak, M.E., and Lawrence, D.S. (1996). cAMP-dependent protein kinase inhibitor study. *Biochemistry* 35, 36-36.
18. Zhang, Z.Y., Chen, L., Dunn, D., Montserat, J., and Lawrence, D.S. (1996). The comparative substrate specificity of protein-tyrosine phosphatases. *Faseb Journal* 10, P18-P18.

19. Zhang, Z.Y., Puius, Y.A., Zhao, Y., Sullivan, M., Lawrence, D.S., and Almo, S.C. (1997). Identification of a novel aryl phosphate-binding site in PTP1B: Implications for inhibitor design. *Faseb Journal* *11*, A834-A834.
20. Zhang, Z.Y., Puius, Y.A., Zhao, Y., Sullivan, M., Lawrence, D.S., and Almo, S.C. (1997). Identification of a novel aryl phosphate-binding site in PTP1B: Implications for inhibitor design. *Faseb Journal* *11*, A1186-A1186.
21. Zebda, N., Bernard, O., Welti, S., Bailly, M., Lawrence, D.S., and Condeelis, J. (1999). Phosphorylation of cofilin abolishes EGF-induced actin nucleation at the leading edge and subsequent lamellipod extension. *Molecular Biology of the Cell* *10*, 156A-156A.
22. Zhang, Z.Y., Lawrence, D.S., Vetter, S.W., and Keng, Y.F. (2000). Substrate specificity of protein tyrosine phosphatase 1B determined by a novel combinatorial approach. *Abstracts of Papers of the American Chemical Society* *219*, U128-U128.
23. Ghosh, M., Song, X.Y., Grant, W.M., Ichetovkin, I., Zebda, N., Lawrence, D.S., and Condeelis, J.S. (2001). Development of caged cofilin for use in acute, localized activation in vivo. *Molecular Biology of the Cell* *12*, 290A-290A.
24. Ghosh, M., Song, X., Ichetovkin, I., Lawrence, D.S., and Condeelis, J.S. (2002). Photomodulation of cofilin's activity in vivo: Defining the function of cofilin in actin dynamics. *Molecular Biology of the Cell* *13*, 45A-45A.
25. Lawrence, D.S. (2003). From consensus sequence to high affinity ligand: Acquisition of powerful inhibitors for signal transducing proteins. *Abstracts of Papers of the American Chemical Society* *226*, U460-U460.
26. Lawrence, D.S., Ghosh, M., and Condeelis, J.S. (2003). Caged signal transducing proteins: Design, preparation, and phenotypic consequences of intracellular uncaging. *Faseb Journal* *17*, A365-A365.
27. Lawrence, D.S. (2005). From simple consensus peptides to high affinity ligands: A stepwise diversity-oriented strategy for the acquisition of potent signaling inhibitors. *Biopolymers* *80*, 492-492.
28. Morrison, C.D., White, C.L., Wang, Z., Cefalu, W.T., Lee, S.Y., Lawrence, D.S., Zhang, Z.Y., and Gettys, T.W. (2006). Increased hypothalamic PTP1B contributes to leptin resistance with age. *Diabetes* *55*, A402-A402.
29. Wakata, A., Schmidt, M., Touthkine, A., and Lawrence, D.S. (2009). Design, synthesis, and characterization of light-activatable fluorescent sensors of the proteasome. *Abstracts of Papers of the American Chemical Society* *237*, 471-471.
30. Lee, H.M., Xu, W.C., and Lawrence, D.S. (2011). Light Activatable, Fluorescence Reporting Kinase (PKA). *Biopolymers* *96*, 505-505.

31. Priestman, M.A., Sun, L., and Lawrence, D.S. (2011). Orthogonal Dual Wavelength Photoactivation of cAMP and cGMP-dependent Protein Kinase Signaling Pathways. *FASEB Journal* 25.
32. Phillips, R.M., Lawrence, D.S., and Allbritton, N.L. (2012). Analysis of EGFR Signaling in Single Cells using Capillary Electrophoresis. *Biophysical Journal* 102, 666A-667A.
33. Proctor, A., Wang, Q.Z., Lawrence, D.S., and Allbritton, N.L. (2012). Construction of Peptidase-Resistant Substrates for Kinases. *Biophysical Journal* 102, 273A-273A.
34. Nguyen, L., Oien, N., and Lawrence, D.S. (2013). A New Strategy of Light-modulated Activity by Membrane Localization. *Biopolymers* 100, 256-257.
35. O'Banion, C.P., and Lawrence, D.S. (2013). A small optogenetic tool for spatiotemporal control of intracellular cAMP. *FASEB Journal* 27.
36. Oien, N.P., Jernigan, F.E., Priestman, M.A., and Lawrence, D.S. (2013). Monitoring Erythrocyte Endogenous cAMP Dependent Protein Kinase Activity using Fluorescently Labeled Peptide Substrates. *Biopolymers* 100, 296-296.
37. Turner, A.H., Lawrence, D.S., and Allbritton, N.L. (2013). Combinatorial Modification of Peptide Scaffolds with High Diversity Carboxylic Acid Libraries: Generation of Optimal Substrate Reporters of HER Family Kinase Activity. *Biopolymers* 100, 271-272.

CURRENT RESEARCH SUPPORT

Design and Application of Photoresponsive Modules in Circulating Erythrocytes. NIH. 1 R01 HL153744. Period: July 1, 2020 – June 30, 2025. P.I.: D. S. Lawrence. The use of light to activate therapeutic agents at diseased sites offers the advantage of aggressive treatment with exquisite spatial and temporal control, thereby reducing potential deleterious side effects at unintended sites. Although photo-activated pro-drugs have been reported, these species require short wavelengths (<450 nm) for activation. However, maximal tissue penetrance by light occurs within the “optical window of tissue” (600 – 900 nm), well beyond the wavelength range of existing photo-cleavable functional groups. We’ve developed a new technology that transforms drugs into light responsive “phototherapeutics” that are conveyed by circulating erythrocytes. The proposed research program seeks to address three fundamental questions associated with light responsive therapeutics: (1) Do phototherapeutics furnish an enhanced therapeutic window relative to the standard of care? (2) What is the relationship between the activation wavelength and the therapeutic window? (3) What is the scope of therapeutic agents that are amenable to photo-technology? Annual Direct: \$340,000

Spatiotemporal Control of Migratory Cellular Behavior. NIH, 1R01NS103486. Period: June 15, 2018 – March 31, 2023. P.I.: D. S. Lawrence. There is keen interest in identifying the biochemical pathways that mediate cytoskeletal remodeling, motility, migration, and phenotype switching since members of these pathways serve as potential therapeutic targets. Unfortunately, the spatiotemporal nature of these pathways renders the application of conventional tools (over/under-expression of the proteins of interest, inhibitory compounds, etc.) inadequate for studying dynamic cell behavior. We seek to engineer and evaluate optogenetic analogs of cofilin, cofilin’s upstream activators (slingshot and chronophin), and cofilin’s upstream negative regulators (LIM protein kinase, the cAMP-dependent protein kinase, the p21 activated protein kinase, and rho-associated protein kinase). These species offer a means to correlate spatially-focused biochemical activity with dynamic cellular behavior including F-actin remodeling activity as well as migratory aptitude. Annual Direct: \$218,750.

Profiling signaling activity and gene expression in single, pancreatic adenocarcinoma cells using CE-RNA-Seq. NIH, R01CA224763 Period: April 1, 2018 – March 31, 2023. Multi-PI grant with N. Allbritton and J. J. Yeh. Pancreatic ductal adenocarcinoma is a devastating disease in dire need of improved therapies targeted at specific signaling pathways. Strategies to molecularly profile aberrant pancreatic tissue and inform targeted therapeutic decisions would be of immense value in patient treatment. However, molecular profiling is extremely challenging since biopsied patient tissue is a complex mixture of normal and malignant pancreatic cells. Furthermore, there is a growing understanding that mutations and gene expression alone do not tightly correlate with clinical response. In the current application, a multidisciplinary research team proposes to develop a state-of-the-art, single-cell, platform technology to measure the catalytic activity of sentinel kinases within the KRAS pathway and gene expression through RNA sequencing. The investigators will optimize and validate microsampling and microelectrophoresis methods to assay single cells, simultaneously overcoming the challenges of cellular heterogeneity and sample-size limits. Novel reporters of kinase activity within KRAS-outflow signaling pathways will be designed and new methods and instrumentation combining single-cell capillary electrophoresis with efficient RNA capture will be pioneered. Human tumor samples maintained in murine xenografts will be assayed to gain unique insights into tumor properties not currently addressable. The work will directly link mRNA production with the catalytic activity of kinases in individual tumor cells derived from patients. The

technology will enable questions such as which kinase signaling patterns drive the classical vs the basal phenotypes of pancreatic adenocarcinoma and whether a single tumor possesses a mixture of classical and basal-type cells. The data and the insights gained from implementation of this technology will provide a new approach for clinical assays with the potential for a profound impact on therapeutic strategies in the emerging field of precision medicine. Annual Direct: \$408,773.

Towards Glucose Transporter-Mediated Glucose-Responsive Insulin Delivery with Fast Response. NIH, 1R01DK112939-01A1 Period: June 15, 2018 – May 31, 2023. P.I.: Z. Gu. Consortium P.I.: J. Buse. Co-I: D. S. Lawrence. Glucose-responsive delivery of insulin mimicking the function of pancreatic β -cells to achieve meticulous control of blood glucose (BG) would revolutionize type 1 and advanced type 2 diabetes care. However, it is extremely challenging to demonstrate a system which would combine fast response, reversible activation, ease of administration and excellent biocompatibility. We aim to establish an innovative glucose-responsive insulin delivery system based on the interaction between the glucose derivative- modified insulin (Glu-insulin) and glucose transporters (GLUTs) on red blood cells (RBCs). This binding interaction is reversible in the setting of hyperglycemia, resulting in fast release of insulin and subsequent drop of blood glucose levels. We will exploit two conjugation formulations of Glu-insulin and glucose transporters (GIGTer): 1) polymeric nanoparticles (NPs; ~100 nm in diameter) coated with the RBC membrane (with GLUTs) and loaded with Glu-insulin; and 2) liposomal NPs integrated with exogenously expressed glucose transporters and Glu-insulin. The proposed goal, when successfully realized, will be a significant upgrade over the current insulin-dependent diabetes therapy options and have a profound impact to improve health and quality of life of diabetic patients. Annual Direct: \$308,595.

Creation of a Suite of XR Experiences in Laboratory Safety. The Eshelman Institute for Innovation (RX03912129), Department of Chemistry, and the College of Arts & Sciences. Period: November 2019 – June 2022. P.I.: D. S. Lawrence. We have developed a full-semester safety course (CHEM 701) required of all first-year graduate students in the Division of Chemical Biology and Medicinal Chemistry and the Department of Chemistry (see attachment). Although the students appreciate the case study-based nature of the course, evaluations at the semester's end revealed a desire to introduce practical exercises into the class. However, exposure to authentic laboratory conditions in all fields of the Pharmaceutical and Chemical Sciences for 60+ first-year graduate students is not realistic. With support from the Eshelman Institute for Innovation, we developed a first-in-its-kind, proof-of-concept, virtual laboratory experience for (1) the laptop⁹ and (2) the Oculus Go VR (virtual reality) headset. We now seek to dramatically extend this concept by creating a suite of laboratory experiences that provide entering graduate students with virtual, yet practical, exposure to various subdisciplines in the general fields of Pharmaceutical and Chemical Sciences. These modules are designed to provide an immersive lab environment for active learning. Direct Costs Total: \$100,000

Photothrombolytics: Illuminating a Safe and Efficacious Thrombolytic Therapy. The Eshelman Institute for Innovation (RX03212101). Period: July 1, 2021 – June 30, 2023. P.I.: D. S. Lawrence. Myocardial infarction and stroke are the first and second leading causes of death in the world, respectively. Stroke is the leading cause of disability. The formation of a thrombolytic clot is responsible for 85% of all stroke episodes. The only pharmacological therapeutics approved as thrombolytic agents are serine proteases (e.g., recombinant versions of tissue plasminogen activator “tPA”). However, tPA has an exceedingly short vascular half-life (minutes). Consequently, massive doses (1 mg/kg or ~80 mg for the average male!) are required for efficacy. Unfortunately, serious side

effects include life threatening cerebral hemorrhages and life altering neurotoxicity due to tPA action at sites other than the thrombus. In short, the drug dose range between efficacy and toxicity (therapeutic window) of these therapeutics is exceptionally narrow, which explains, in part, the limited percentage of stroke patients eligible for this therapy in the United States (~4%). In a recent review, Omid and colleagues emphasized that “The most restricting limitation of thrombolytic therapy by tPA in the clinic is its short therapeutic window. It should be noted that any investigation addressing this limitation is of exceptional importance”. Our technology furnishes the ability to specifically activate tPA at the thrombus site, and with exceptional temporal control so that the thrombolytic is delivered up until the time the clot is dissolved. Direct Costs Total: \$300,000

GRANT APPLICATIONS UNDER REVIEW

Phototherapeutic Manipulation and Photoacoustic Monitoring of the Diseased Vasculature. NIH. P.I.: T. K. Tarrant. Co-Is: D. S. Lawrence and J. Yao. Period: July 1, 2022 – June 30, 2027. Light, as an external targeting agent to activate and deploy drug release, has many unique advantages. Activating wavelengths have the characteristics of low toxicity with spatial and temporal control, the ability to tune the power or duration, and the option to employ discrete wavelengths to signal a drug-triggering event. Light can also be used as a means to assess in vivo vascular biologic responses. Photoacoustic imaging (PAI) and tomography (PAT) utilize the light-activation of hemoglobin to visualize deep tissue assessment of diseased and healthy vasculature. Critical to our vascular-centered phototherapeutic imaging and drug-delivery design is the use of biologic red blood cell (RBC) carriers. RBCs serve as a drug-depot for our internally loaded phototherapeutics and also contain hemoglobin (Hgb), which serves as a natural imaging contrast agent for PAI/PAT. Our strategy combines these phototherapeutic and photoacoustic technologies to create a noninvasive biomedical tool that offers precision targeting of drug activation through the vasculature by optimizing the timing and dosing of the therapeutic, and subsequent monitoring of the extent and efficacy of drug action. This strategy is well suited to diseases where neovascularization and angiogenesis are critical components of disease pathogenesis. Thus, our innovation is to comparatively test these complementary modalities first as Liposome Conveyed Phototherapeutic Antiangiogenics in Aim 1, then as RBC Conveyed Phototherapeutic Antiangiogenics in Aim 2 as a complementary strategy of drug delivery. Aim 3 will take the lead performing phototherapeutic constructs from Aim 1 and 2 and test in vivo for efficacy using PAI/PAT as a real time assessment tool.

A Light Shield for Protecting Sensitive Organs Against Cytotoxic Therapeutics. NIH. P.I.: Zibo Li, Co-I: David Lawrence. Period: 12/01/2022 – 11/30/2024. Widely overexpressed on prostate cancer tissues, Prostate Specific Membrane Antigen (PSMA) has become an attractive target for both imaging and radionuclide-based therapy of prostate cancer. Despite exciting progress, PSMA targeted therapeutic agents could pose high radiation exposure towards normal organs that express the receptor. In fact, salivary glands (SGs) are often the dose-limiting organ that determines how much radioactivity can be administered, patient eligibility and the treatment outcome thereafter. Therapeutic isotope labeled PSMA inhibitors often result in high SG uptake and high absorbed doses can lead to irreparable damage, presenting as severe xerostomia. This application addresses critical needs to reduce radiation exposure to normal organs while maintaining tumor uptake. Previously, PSMA-617 has been developed as a unique ligand to efficiently reduce kidney uptake of PSMA targeted radiopharmaceuticals. We therefore focus on using a “light-shield” approach to protect SGs from radiolabeled PSMA-617-B12 ligands. In our preliminary research, we have used HPLC-MS to demonstrate that PSMA-B12-Cy5 can be efficiently cleaved to PSMA + B12-Cy5 upon 650 nm light exposure, thereby separating B12-Cy5

from the targeting ligand. Indeed, initial optical imaging of a prostate cancer mouse model demonstrated the feasibility to selectively reduce SG uptake in a light-dependent fashion with minimal impact on PC3-PSMA tumor uptake. With these promising results in hand, we propose to construct radiolabeled analogs of PSMA-B12-Cy5. Cy5 (and other fluorophores) will serve as an antenna to capture long wavelength photons that trigger the cleavage of the B12-radiopharmaceutical from the PSMA-targeting ligand.

INVITED LECTURES

- 1986** Department of Medicinal Chemistry, SUNY Buffalo
Department of Chemistry, State University College at Buffalo
Department of Chemistry, Canisius College
Department of Chemistry, Niagara University
Department of Biochemistry, School of Medicine, SUNY Buffalo
- 1987** Department of Medicinal Chemistry, SUNY Buffalo
Department of Chemistry, Alfred University
- 1988** Department of Chemistry, St. Bonaventure University
Undergraduate Biochemistry Club, School of Medicine, SUNY Buffalo
- 1989** Department of Physiology, School of Medicine, SUNY Buffalo
Department of Chemistry, State University College at Buffalo
Department of Chemistry, Rensselaer Polytechnic Institute
- 1990** Department of Chemistry, State University of New York at Stony Brook
Department of Chemistry, University of California at Santa Barbara
Department of Chemistry, University of California at Irvine
Department of Chemistry, University of California at Riverside
Department of Biophysics, Roswell Park
Department of Biochemistry, McMaster University
Department of Chemistry, State University of New York at Buffalo
Department of Biophysics, School of Medicine, State University of New York at Buffalo
Signal Transduction in Biological Membranes, SUNY Buffalo
National Science Foundation Workshop on Natural Products, Denver, Colorado
- 1991** Tanabe Research Laboratories, San Diego, Ca
Department of Chemistry, University of Delaware
Department of Chemistry, Rutgers University (Newark)
Department of Biological Sciences, State University of New York at Buffalo
Department of Biochemical Pharmacology, State University of New York at Buffalo
American Chemical Society Joint Central - Great Lakes Regional Meeting, Division of
Medicinal Chemistry, Indiana University - Purdue University at Indianapolis
Novel Chemical Probes of Biology Symposium
Federation of Analytical Chemistry and Spectroscopy Societies and Pacific Conference on
Chemistry and Spectroscopy, Anaheim, California
- 1992** Department of Biophysics, State University of New York at Buffalo
Department of Chemistry, Rensselaer Polytechnic Institute
Gordon Research Conference; Bioorganic Chemistry
Signal Transduction, Keystone, Colorado
- 1993** The Buffalo Medical Foundation, Buffalo, NY
Parke-Davis Pharmaceuticals, Ann Arbor, MI

The Grace Cancer Drug Center, Roswell Park Cancer Institute
Indiana University of Pennsylvania, Department of Chemistry

- 1994** Department of Chemistry and Biochemistry, Wayne State University
Department of Biochemistry, Albert Einstein School of Medicine, Yeshiva University
Department of Chemistry, City University of New York, Queens College
Abbott Labs, Abbott Park, IL.
Department of Biochemistry, Albert Einstein College of Medicine
Department of Chemistry, Canisius College
Department of Biochemistry, Iowa State University
American Chemical Society Great Lakes Regional Meeting
Gordon Research Conference; Enzymes, Coenzymes, and Metabolic Pathways
- 1995** Department of Chemistry and Biochemistry, University of Maryland
Department of Chemistry, Johns Hopkins University
Department of Chemistry and Biochemistry, University of Colorado at Boulder
Department of Chemistry, University of Wyoming
Department of Chemistry, Colorado State University
Department of Chemistry, University of Utah
Department of Chemistry and Biochemistry, University of California at San Diego
Merck, Inc., West Point, Pa.
Vth International Symposium on Molecular Aspects of Chemotherapy; Gdansk, Poland
9th International Conference on Second Messengers and Phosphoproteins (Signal Transduction in Health & Disease); Nashville, Tennessee
- 1996** Department of Medicinal Chemistry, University of Kansas
Department of Biochemistry, Iowa State University
Department of Biological Sciences, Allegheny College
Cellular and Molecular Biodynamics Program, Rutgers University
- 1997** The Department of Chemistry, Furman University
The Department of Chemistry, University of South Florida
The Department of Physiology and Biophysics, SUNY at Stony Brook
Wyeth Ayerst Research, Pearl River, New York
The Department of Biology, Canisius College
The Departments of Chemistry and Biology, Reed College
- 1998** Aurora Pharmaceuticals, San Diego, California
Student Affiliates of the ACS, University of South Florida
Department of Chemistry, Florida Southern College
Department of Chemistry, University of Central Florida
Department of Molecular Pharmacology, University of Vermont
Department of Chemistry, University of California at San Diego
Department of Chemistry, Harvey Mudd College
1st International Conference on Protein Kinase Inhibitors; Warsaw, Poland
- 1999** Department of Chemistry, University of Wisconsin at Oshkosh
Department of Chemistry, Trinity College

Department of Chemistry, University of Wisconsin at La Crosse
Department of Chemistry, The University of Wisconsin at Stevens Point
Department of Chemistry, Wesleyan University
Department of Chemistry, University of California at Irvine
Department of Chemistry, University of California at Riverside
Department of Chemistry, University of California at Los Angeles
Department of Chemistry, Indiana University
Department of Medicinal Chemistry, Purdue University
Department of Chemistry, University of Notre Dame
Hoechst Marion Roussel Protein Kinase Workshop; Tucson, Arizona
American Chemical Society Western Regional Meeting and the Pacific Conference on
Chemistry and Spectroscopy Symposium on Biosensors: Visualizing the Chemistry of Living
Cells
The Molecular Neurobiology of ATM, Cold Spring Harbor, New York

2000 Department of Chemistry, Hampton University
Colby College, Maine
Tripos, Inc., St. Louis, Missouri
IGEN, Gaithersburg, Maryland
Department of Chemistry; College of Charleston
Department of Chemistry, Florida Atlantic University
PacifiChem 2000; Photoprotecting Groups and Caged Compounds Symposium, Honolulu,
Hawaii

2001 Department of Medicinal Chemistry and Molecular Pharmacology, Purdue University
Merck, Inc., Rahway, New Jersey
Department of Medicinal Chemistry, Purdue University
Department of Biochemistry, Wayne State University
ArQule, Burlington, MA
Department of Chemistry, University of Georgia
2nd International Conference on Protein Kinase Inhibitors; Warsaw, Poland

2002 New York Blood Center
Promega Corporation
Department of Chemistry, University of Wisconsin

2003 OSI Corporation
Department of Molecular Pharmacology, The Johns Hopkins University
GenoSpectra, Fremont, CA
Department of Chemistry, University of Michigan
Department of Chemistry, University of Delaware
Annual Meeting of the American Society for Biochemistry and Molecular Biology
3rd International Conference on Protein Kinase Inhibitors; Warsaw, Poland

2004 Department of Medicinal Chemistry, The University of Michigan
The Walther Cancer Center, University of Notre Dame
Department of Chemistry, The University of Illinois at Chicago
Department of Chemistry, Columbia University
Department of Chemistry, Emory University

Molecular and Cell Biology Seminar Series, Scripps Research Institute
New York Academy of Sciences
Cellular Regulation in Health and Disease, Weizmann Institute of Science

- 2005** Venetian Institute of Molecular Medicine, University of Padova
Department of Chemistry, Oakland University
Department of Medicinal and Biological Chemistry, University of Toledo
American Peptide Society Symposium, San Diego, CA
4th International Conference on Protein Kinase Inhibitors; Warsaw, Poland
- 2006** Sigma-Aldrich
Department of Chemistry, University of Texas at Dallas
Biophysics Program, Cornell University
Department of Medicinal Chemistry, University of Texas at Austin
University of Texas, Southwestern
Departments of Biochemistry & Biology, Life Sciences Seminar Series, Brandeis
Department of Biochemistry, CUNY
Departments of Chemistry and Medicinal Chemistry & Natural Products, University of North Carolina
American Society for Cell Biology National Meeting; San Diego, California
- 2007** Department of Biochemistry, Mt. Sinai School of Medicine
Department of Chemistry, Duke
Department of Chemistry and Biochemistry, University of Pennsylvania
Department of Chemistry and Biochemistry, UCLA
5th International Conference on Protein Kinase Inhibitors; Warsaw, Poland
Howard Hughes Medical Institute, Janelia Farm “Chemistry in Neuroscience”
Howard Hughes Medical Institute, Janelia Farm “Fluorescent Proteins and Biological Sensors”
American Society for Cell Biology, Washington DC
- 2008** Department of Chemistry, University of South Florida
Department of Medicinal Chemistry & Natural Products, University of North Carolina
Department of Biochemistry, University of North Carolina
Chinese Chemical Society, Tianjin, China
- 2009** Department of Chemistry, North Carolina State University
School of Pharmacy, UC San Diego
6th International Conference on Protein Kinase Inhibitors, Warsaw, Poland
Florida Center of Excellence for Biomolecular Identification & Targeted Therapeutics
Symposium on Drug Design, Discovery and Delivery, Tampa, FL
- 2010** Department of Chemistry, University of Illinois at Urbana Champaign
Gordon Research Conference; Chemistry & Biology of Peptides, Ventura California
BIT’s 8th Annual Congress of International Drug Discovery Science and Technology (IDDST),
Beijing, China
- 2011** Department of Chemistry, Wake Forest University
Department of Biochemistry and Molecular Biology, Indiana University School of Medicine

Department of Chemistry, Scripps Florida
Department of Chemistry, Purdue University
Department of Chemistry, Rose-Hulman Institute of Technology
Gordon Research Conference; Bioorganic Chemistry
Southeast Regional Meeting of the American Chemical Society; Chemical Biology Session

- 2012** Department of Pharmaceutical and Biomedical Sciences, University of Georgia
Drug Discovery Program, National Cancer Institute
Biophysics Symposium, Academia Sinica, Taiwan
Bioimaging Symposium, Academia Sinica, Taiwan
Institute of Chemical Biology & Drug Discovery Symposium, SUNY Stony Brook
- 2013** Department of Medicinal Chemistry, University of Connecticut
Department of Medicinal Chemistry, University of Minnesota
Division of Integrative Bioscience and Biotechnology, POSTECH, Pohang, Korea
AmorePacific Corp., Seoul, Korea
School of Pharmacy, Hanyang University, Ansan, Korea
Department of Biomedical Engineering, Duke University
Department of Chemistry, Wayne State University
Korean Chemical Society National Meeting, Seoul Korea
- 2014** Department of Chemistry, University of Nebraska
Department of Chemistry, Appalachian State University
CNRS, Montpellier, France
Department of Cell Biology, University of Texas @ Dallas
Research Triangle Park Chemical Biology Symposium
4th Biosensor Meeting, Bordeaux France
EMBO Conference Series: Chemical Biology, Heidelberg Germany
International Chemical Biology Society Symposium, San Francisco
- 2015** Department of Chemistry, Johns Hopkins University
School of Pharmacy, University of Houston
Department of Chemistry, Northeastern University
- 2016** Department of Chemistry, University of North Carolina, Asheville
Institute for Structural Biology, Drug Discovery and Development (ISB3D), Virginia Commonwealth University
- 2017** Department of Medicinal Chemistry, Purdue University
Department of Chemistry, Lehigh University
Integrating New Technologies into Entrepreneurial Projects: Gamification, AR, VR and AI, University of North Carolina at Chapel Hill
Conference on Chemistry & Metabolism, Cold Spring Harbor Laboratory Symposium
Conference on Chemical Tools for Complex Biological Systems, Janelia Farm Conference
Holy Grails in Chemistry Symposium, American Chemical Society National Meeting, San Francisco
Symposium on Light-Responsive Organic Chemistry for Biological Applications, American Chemical Society National Meeting

- 2018** Emil T. Kaiser Memorial Symposium, Boston
Complex Control with Light Symposium, Goethe University, Lake Konstanz, Germany
- 2019** Department of Pharmacological Sciences, Mt. Sinai School of Medicine
Department of Chemistry, Elon University
Photochemistry Gordon Research Conference
- 2020** Photochemically-Activated Molecules to Study Physiology, BIOL Division, ACS National Symposium, Virtual
Biological Photochemistry and Chemical Biology, ChemistsLive, Virtual
- 2021** International Conference on Porphyrins and Phthalocyanines (2020 ICPP), Virtual
American Chemical Society National Meeting, Virtual
International Photodynamic Association, Masterclass Series, Virtual
Caged Compounds Symposium, PacifiChem 2020, Virtual
Teaching with Technology Symposium, PacifiChem 2020, Virtual
- 2022** American Society for Photobiology, Albuquerque, NM
International Conference on Porphyrins and Phthalocyanines (2022 ICPP), Madrid, Spain

NATIONAL MEETINGS

Mary Prorok* and David S. Lawrence; American Chemical Society National Meeting, Biological Chemistry Division (1998)

John S. Manka and David S. Lawrence*; American Chemical Society National Meeting, Organic Chemistry Division (1989)

John S. Manka and David S. Lawrence*; Gordon Research Conference: "Metals in Biology" (1990)

John S. Manka*, Dennis Chugh, and David S. Lawrence; American Chemical Society National Meeting, Inorganic Chemistry Division (1990)

John S. Manka and David S. Lawrence*; American Chemical Society National Meeting, Organic Chemistry Division (1990)

Mary Prorok, Marianne Mendelow, Allen Salerno, Deborah Hermance, and David S. Lawrence*; American Chemical Society National Meeting, Biological Chemistry Division (1990)

Mary Prorok, Marianne Mendelow, Allen Salerno, Deborah Hermance, and David S. Lawrence*; SUNYAB 31st Annual Medicinal Chemistry Symposium (1990)

Diane Dick*, Scott Pluskey, and David S. Lawrence; North East Regional Meeting of the American Chemical Society (1990)

Scott Pluskey*, Diane Dick, and David S. Lawrence; North East Regional Meeting of the American Chemical Society (1990)

Deborah Hermance*, Mariannne Mendelow, and David S. Lawrence; North East Regional Meeting of the American Chemical Society (1990)

Mary Prorok* and David S. Lawrence; North East Regional Meeting of the American Chemical Society (1990)

Allen Salerno*, Marianne Mendelow, Mary Prorok, and David S. Lawrence; North East Regional Meeting of the American Chemical Society (1990)

Mary Prorok and David S. Lawrence*; 12th Enzyme Mechanisms Conference (1991)

Allen Salerno* and David S. Lawrence; North East Regional Meeting of the American Chemical Society (1992)

Young-Guen Kwon, Marianne Mendelow, Jaya Srinivasan, Tae Ryong Lee, Scott Pluskey, and David S. Lawrence*; "Enzymes, Coenzymes, and Metabolic Pathways" Gordon Research Conference (1993)

Scott Pluskey, Debbie Crans*, and David S. Lawrence; 45th Southwest Regional Meeting of the American Chemical Society (1993)

David S. Lawrence, Tae Ryong Lee, and Jinqi Niu; ASBMB National Meeting (1993)

A. M. Edelman*, J. C. Lee, Y.-G. Kwon, and D. S. Lawrence; ASBMB National Meeting (1994)

Michelle Sanders* and David S. Lawrence; American Chemical Society National Meeting (1996)

Mary Koszalek* and David S. Lawrence; American Chemical Society National Meeting (1996)

Kieran Curley, Jason Wood, and David S. Lawrence; Bioorganic Gordon Research Conference (1998)

Tae Ryong Lee* and David S. Lawrence; Miami Biotechnology Winter Symposia on Signal Transduction (1999)

Adam Profit and David S. Lawrence; Miami Biotechnology Winter Symposia on Signal Transduction (1999)

Kieran Curley, Jason Wood, and David S. Lawrence; Miami Biotechnology Winter Symposia on Signal Transduction (1999)

Zachary L. Rodgers, Robert M. Hughes, Laura M. Doherty, Jennifer R. Shell, Alexander M. Brugh, Thomas A. Shell, Malcolm D.E. Forbes, and David S. Lawrence, "Red Photo-activation of Hydrogel Initiators". *2nd Annual Triangle Student Research Competition*, Research Triangle Park, Durham, NC, September 3rd, 2014.

Zachary L. Rodgers, Alexander M. Brugh, Laura M. Doherty, Thomas A. Shell, Jennifer R. Shell, and David S. Lawrence, “Red and Near Infrared Photo-activation of Biomolecules and Hydrogel Initiators Using Alkyl Cob(III)alamin-fluorophore Conjugates”. *The RTP Chemical Biology and Biotechnology Symposium*, GlaxoSmithKline, Research Triangle Park, NC, May 28, 2014.

Zachary L. Rodgers, Brian Molesky, Alexander, M. Brugh, Thomas A. Shell, Malcom D. Forbes, and David S. Lawrence, “Detection of Radicals from Photoactivation of Fluorophore Augmented Cob(III)alamins”. *Inter-American Photochemical Society Meeting*, Sarasota, FL, January 2-5, 2014.

Marvin, C., Smith, W., Oien, N., Hughes, R., Rogers, Z., and Lawrence, D. “NIR Mediated Release of Therapeutic Agents from Erythrocyte Drug Carriers” Presented at the 2014 AAPS Annual Meeting and Exposition, San Diego CA, 2014 (November 6, 2014).

RESEARCH STUDENTS

Undergraduate Students

Joseph Accurso	1986
Carol Bezio	1988
Russell Bird	1988
Dennis Chugh	1989
Michael Cristofaro	1986
Laura Doherty	2014-15
Tim Hartman	2017-18
Christopher Kong	2020-present
Tom Kuhlman	1987
Nathan Levy	2010
Meredith Mau	1986
Louise Mahoney	1988
Marianne Mendelow	1988
David Montesanti	1986
Jeffrey Nonemaker	1992-93
Jett Primm	2020
Elizabeth Redding	2021-present
Tammy Russell	1990
Kanishka Shah	2021-present
Alexandra Whicker	2015-16
Mamadi Yilla	1986

Graduate Students

Masters (research) - completed

Derek Dunn	1994-1995
David Freeman	2015-2016
Marianne Mendelow	1989-1991

Michelle Sanders	1995-1996
Douglas Werner	1994-1996

Doctoral - completed

Marissa Caan	2012-2017
Diane Dick	1986-1992
Finith Jernigan	2008-2013
Tao Jiang	1991-1995
Mary Koszelak	1993-1998
Young-Guen Kwon	1991-1994
Tae Ryong Lee	1992-1996
John Manka	1986-1990
Christina Marvin	2014-2018
Luong Nguyen	2010-2014
Jinkui Niu	1993-1997
Colin O'Banion	2011-2016
Nathan Oien	2010-2014
Scott Pluskey	1988-1993
Mary Prorok	1986-1990
Zach Rodgers	2012-2015
Al Salerno	1989-1993
Kui Shen	1995-2001
Weston Smith	2009-2015
Tata Venkata	1986-1992
Brianna Vickerman	2017-2021
Jason Wood	1993-1998
Weichen Xu	2008-2012
Xiongwei Yan	1992-1996
Emilia Zywt	2017-2021

Doctoral - current

Ju-Sung Kim	2019-
Caylie McGlade	2020-
Joshua Welfare	2017-

Postdoctoral Fellows - completed

Richard Agnes	2003-2007
Angela Brown	1999-2001
Maria Cabal	1995-1996
Chien-an Chen	1998-2001
Kieran Curley	1996-1998
Zhaohua Dai	2004-2006
Song Ding	2015-2019
Mousumi Ghosh	2000-2005
Anwasha Goswami	2016-2019

Fangxia Guan	2001-2003
Jung-Mi Hah	2003-2005
Qing “Sunny” Huang	2007
Sanjai Kumar	2005-2007
Hsienming Lee	2004-2010
Jung-Hwan Lee	2001-2006
Seung-Yub Lee	2001-2004
Tae Ryong Lee	1996-1999
Weiyang Lin	2000-2004
Haishan Li	2002-2008
Fei Lou	2019-2020
Javier Montserat	1995-1996
Sandip Nandy	2002-2006
Jinkui Niu	1998-2001
Colin O’Banion	2017-2018
Natalia Orlova	2018-2019
James Parise	2007-2008
Adam Profit	1997-2000
Huimin Shang	2004-2007
Vyas Sharma	2004-2011
Jaya Srinivasan	1994-1995
Liang Sun	2008-2011
Meng Taing	1995-1998
Willem Veldhuyzen	2002-2004
Stefan Vetter	1997-1998
Xiaodong Wang	2008
Xiongwei Yan	1996-1999
Jiade Yang	2002-2004
Ren-Hwa Yeh	1996-2001
Biao Xi	1999-2006

Former Research Faculty

Robert Hughes	2015-2016
Melanie Priestman	2011-2017
Vyas Sharma	2008-2011
Jennifer Shell	2008-2014
Thomas Shell	2008-2014

Postdoctoral - current

Jacob Ford	2021-
William Kinney	2019-
Brianna Vickerman	2021-

Research Faculty – current

Lauren Haar	2018-
-------------	-------

TEACHING (SUNY @ Buffalo)

Fall 1985	Chemistry 301	(Intermediate Organic Chemistry)
	Chemistry 501	(Organic Chemistry, Graduate Level Core Course)
Spring 1986	Chemistry 514	Bioorganic Chemistry (new course)
Fall 1986	Chemistry 301	(Intermediate Organic Chemistry)
	Chemistry 501	(Organic Chemistry, Graduate Level Core Course)
Spring 1987	Chemistry 252	(Honors Organic Chemistry, 2nd Semester)
Fall 1987	Chemistry 301	(Intermediate Organic Chemistry)
	Chemistry 501	(Organic Chemistry, Graduate Level Core Course)
Spring 1988	Chemistry 252	(Honors Organic Chemistry, 2nd Semester)
Fall 1988	Chemistry 501	(Organic Chemistry, Graduate Level Core Course)
Spring 1989	Chemistry 514	(Bioorganic Chemistry, Special Topics Graduate Level)
Fall 1989	Chemistry 301	(Intermediate Organic Chemistry)
Fall 1990	Chemistry 301	(Intermediate Organic Chemistry)
Spring 1991	Chemistry 202	(Introductory Organic Chemistry, 2nd Semester)
Fall 1991	Chemistry 301	(Intermediate Organic Chemistry)
Spring 1992	Chemistry 202	(Introductory Organic Chemistry, 2nd Semester)
Fall 1992	Chemistry 501	(Organic Chemistry, Graduate Level Core Course)
Fall 1993	Chemistry 501	(Organic Chemistry, Graduate Level Core Course)
Spring 1994	Chemistry 202	(Introductory Organic Chemistry, 2nd Semester)
Fall 1994	Chemistry 501	(Organic Chemistry, Graduate Level Core Course)
Spring 1995	Chemistry 252	(Honors Organic Chemistry; 2nd Semester)
Fall 1995	Chemistry 301	(Intermediate Organic Chemistry)

DEPARTMENTAL ACTIVITIES (SUNY @ Buffalo)

Ad Hoc Faculty Advisement, Policies, and Procedures Committee (1990)
 Admissions Committee (1991-1992)
 Advisor to Student Affiliates of the American Chemical Society (1985-1986)
 Central Construction Fund Planning Committee (1990-1995)
 Chairman and Coordinator: Chemistry Department Open House (November 1985)
 Chairman: 1986 Departmental September Welcome
 Chairman: 1987 Departmental September Welcome
 Chairman, Recruitment for Organic Faculty (1991 and 1992)
 Coeditor, Departmental Brochure 1988
 Convener, Graduate Recruitment Committee (1994-1995)
 Convener, Organic Committee (1994-1995)
 Curriculum, Advisement, and Petitions Committee (1991-1995)
 Editor, Departmental Brochure 1990
 Executive Committee (1993-1995)
 Facilities Committee (1987-1989)
 Graduate Recruitment Committee (1985-1995)
 Library Liaison Committee (1985-1995)
 Organic Committee (1985-1995)
 Personnel Committee (1991 and 1992)

Tenure Committee (1991-1995)

UNIVERSITY ACTIVITIES (SUNY @ Buffalo)

Member, Biomembranes Group
Member, Faculty of Natural Sciences & Mathematics Graduate Divisional Panel
Member, Faculty of Natural Sciences & Mathematics Undergraduate Divisional Panel
Member, Faculty of Natural Sciences & Mathematics Advisory Committee to the Science and Engineering Library
Mentor, University Honors Program
Howard Hughes Biological Sciences Undergraduate Educational Initiative
Member, Structural Biology Committee

TEACHING (AECOM)

Molecular and Cellular Foundations of Medicine (1997; 9 lectures)
Molecular and Cellular Foundations of Medicine (1998; 10 lectures)
Molecular and Cellular Foundations of Medicine (1999; 10 lectures)
Molecular and Cellular Foundations of Medicine (2000; 10 lectures + 4 summer introductory lectures)
Molecular and Cellular Foundations of Medicine (2001; 10 lectures + 4 summer introductory lectures)
Molecular and Cellular Foundations of Medicine (2002; 10 lectures + 4 summer introductory lectures)
Molecular and Cellular Foundations of Medicine (2003; 10 lectures + 4 summer introductory lectures)
Molecular and Cellular Foundations of Medicine (2004; 10 lectures + 4 summer introductory lectures)
Molecular and Cellular Foundations of Medicine (2005; 10 lectures + 4 summer introductory lectures)
Molecular and Cellular Foundations of Medicine (2006; 10 lectures + 4 summer introductory lectures)
Graduate Biochemistry (2006; 3 lectures)
Graduate Biophysics (2006; 1 lecture)

DEPARTMENTAL ACTIVITIES (AECOM)

Biochemistry Appointments and Promotion Committee (1996 - present)
Mass Spectrometry Staff Position Search Committee (Fall 1996)
Departmental Seminar Coordinator (1998 – present)
Departmental Faculty Search Committee (2001)

COLLEGE ACTIVITIES (AECOM)

Academic Affairs Committee (2005 – 2007)
Chemical Hazards Committee (1998 - 2007)
Co-Chair of Chemical Biology and Chemical Genomics Strategic Planning (2006)
Committee of Professors (1997- present)
Committee on Computer-Based Education (1999 - present)
Committee on Patents (2006 – 2006)
Division of Research (advisory committee to the Dean) (1998 - 2001)
Faculty Senate (1996 - 1998; 2000 – 2001; 2005-2006)
Graduate Recruitment Committee (2002 – 2004)

Head, Graduate Recruitment (1997 - 2000)
LCME General Facilities Subcommittee (2005 – 2006)
Promotions Committee (1997- 1998)
Preclerkship Committee (2001 – present)
Sue Golding Graduate Division Admissions Committee (1996 – 2000)

TEACHING (UNC)

Chemistry 465. Organic and Inorganic Reaction Mechanisms.

Fall 2007 – 28 lectures

Fall 2008 – 28 lectures

Fall 2009 – 28 lectures

(note: 50% of full semester course 4 unit course team-taught with Professor Joe Templeton)

Medicinal Chemistry 807/Chemistry 733. Molecular Foundations of Chemical Biology. I. Organic and Medicinal Chemistry (New Course)

Fall 2010 – 40 lectures

Fall 2011 – 40 lectures

Fall 2012 - 40 lectures

Pharmaceutical Science First Year Group

Fall 2011

1 lecture

Chemistry 799. Introduction to Laboratory Safety (new course).

Fall 2013

Fall 2014

Fall 2015

Fall 2016

Fall 2017

Fall 2018

Fall 2019

Fall 2020

Fall 2021

Computer Science 585. Serious Games. Role: Facilitator

Spring 2018

STUDENT COMMITTEES

Pharmaceutical Sciences Student Advisory Committee/Defense

Kim Barnash

Jon Bogart

Laura Bonifacio

Josh Brattlie

Tanya Burch

Joyce Chandarajoti
Adam Friedman
Tory Haberman
Courtney Jones
Nick Klus
Christina Marvin (Advisor)
Luong Nguyen (Advisor)
Colin O'Banion (Advisor)
Nathan Oien (Advisor)
Mike Perfetti
Rima Hajjo
Wei Sun
Caleb Vogt
Jarod Waybright
Weichen Xu (Advisor)
Menghan Zhang
Emilia Zywot (Advisor)

Current: Caroline Foley, Samantha Ottavi, Dongbo Lu, Alex Woodell

Chemistry Student Advisory Committee/Defense

Matt Anttila
Joshua Beaver
Michael Bertucci
Michael Corbett
Anne Marie Dechert
Zach Dunn
Samantha Ervin
Timothy Fazekas
Leila Flagg
Ryan Felix
Ben Giglio
Isaiah Gober
Tien Guyen
Kalulani Houston
Colin Hughes
Lindsey Ingerman
Nick Jenkins
Finith Jernigan (Advisor)
Kate Lavoie
Emilie Mainz
Justin Malinowski
Hannah Nowotarski
Elizabeth O'Bryan
Brendan Peacor
Brae Peterson
Nick Pinkin

Angela Proctor
Abby Pulsipher
Gregg Rice
Zach Rodgers (Advisor)
Hannah Shenouda
Weston Smith (Advisor)
Amanda Stewart
Abigail Turner
Chris Turlington
Brianna Vickerman (Advisor)

Current: Rachel Johnson, Adam Lescallete, Nicholas Tay

Pharmacology Student Advisory Committee/Defense

Marissa Caan (Advisor)
Ryan Phillips
Eric Zimmerman

Undergraduate Honors Thesis Committee

Lauren Burianek
Susie Choi
Spencer Maingi
Robin Muller

DEPARTMENTAL/DIVISIONAL ACTIVITIES (UNC)

Previous

Department of Chemistry Faculty Search Committee (Fall 2007)
School of Pharmacy Faculty Development/Mentoring Committee (Fall 2007)
School of Pharmacy Campbell Faculty Mentoring Program (2008 - 2012)
Divisional Director of Graduate Studies, Division of Medicinal Chemistry & Natural Products, School of Pharmacy (Fall 2009 - 2011)
Nanomedicine Faculty Search Committee, Department of Chemistry (Fall 2010)
Division of Medicinal Chemistry & Natural Products Faculty Search, School of Pharmacy (Fall 2010)
Administrative Review of Leaf Huang, School of Pharmacy (Summer 2010)
ACPE Self-Study Organizational and Administration Committee, School of Pharmacy (Spring 2010)
Tenure Committee, Department of Chemistry (Mohammed Yousef; 2010)
School of Pharmacy Strategic Initiatives Working Group (Spring 2011)
Interim Chair – Division of Medicinal Chemistry & Natural Products (Spring 2011)
Co-Chair, Ad hoc Safety Committee, Department of Chemistry (Spring 2012)
Tenure Committee, Department of Chemistry (Eric Alexanian; 2013)
Promotion to Full Professor Committee, Department of Chemistry (Chair; David Nicewicz; 2017)
Promotion to Full Professor Committee, Department of Chemistry (Eric Alexanian; 2018)
School of Pharmacy Dean Search (2018 and 2019)
Tenure Committee, Department of Chemistry (Bo Li; 2010)

Morehead Building Committee, Department of Chemistry (2017 - 2020)
DPET Chair Search Committee, School of Pharmacy (2019- 2020)
Nominations Committee Chair, School of Pharmacy (2019 – 2020)

Current

School of Pharmacy Full Professors Committee (2007 - present)
Department of Chemistry Full Professors Committee (2007 - present)
Executive Committee, School of Pharmacy (2011 - present)
Chair, Division of Chemical Biology & Medicinal Chemistry, School of Pharmacy (Summer 2011 - present)
Chair, Safety Committee, Department of Chemistry (Fall 2012 - present)
Student and Postdoc Wellness Committee (2019 – present)

UNIVERSITY ACTIVITIES (UNC)

Scientific Advisory Board, Center for Integrative Chemical Biology and Drug Discovery (Fall 2007 - 2012)
Advisory Group Member, Carolina Counts (2010)
College of Arts & Sciences Interdisciplinary Initiatives Proposals Committee (2011)
Eshelman Institute for Innovation Reviewer (student and postdoctoral proposals) (2016)
Lineberger Comprehensive Cancer Center, UCRF, Reviewer (2015 - 2016)