

CURRICULUM VITAE: Kevin H. Gardner

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ACADEMIC POSITIONS

<u>Inaugural Director (2013-present)</u>	Structural Biology Initiative CUNY Advanced Science Research Center City University of New York
<u>Professor (2013-present)</u>	Einstein Professor Department of Chemistry and Biochemistry City College of New York
<u>Professor (2009-2013; adjunct 2013-present)</u> <u>Associate Professor (2004-2009)</u> <u>Assistant Professor (1998-2004)</u>	Departments of Biophysics and Biochemistry UT Southwestern Medical Center
<u>Chairman (2004-2010)</u>	Graduate Program in Molecular Biophysics Division of Basic Sciences, Southwestern Graduate School of Biomedical Sciences UT Southwestern Medical Center

TRAINING

<u>Postdoctoral Research (1995-1998)</u>	University of Toronto Advisor: Lewis E. Kay, Ph.D. <i>Research Area: Development of biophysical and biochemical methods to obtain structural models of 30-50 kDa proteins and protein complexes using solution NMR</i>
<u>Ph. D. (1989-1995)</u>	Molecular Biophysics and Biochemistry Yale University Advisor: Joseph E. Coleman, M.D., Ph.D. <i>Thesis title: "Cadmium-113 Heteronuclear NMR Studies of Zn₂Cys₆ DNA Binding Domains"</i>
<u>B.S. (1985-1989, with Highest Honors):</u>	Biochemistry, University of California, Davis

AWARDS AND HONORS

Keynote, Larock Undergraduate Research Symposium	2017, UC Davis
Einstein Professor of Chemistry & Biochemistry	2013-present, City College of New York
Excellence in Education Awards	2010, 2012 UT Southwestern Medical Center
GRC Chairs' Hall of Fame	2011, Gordon Research Conferences
Excellence in Postdoctoral Mentoring Award	2011, UT Southwestern Postdoctoral Association
Virginia Lazenby O'Hara Chair in Biochemistry	2006-2013, UT Southwestern Medical Center
Outstanding Teacher Award	2004-2005, Dept. of Biochemistry, UT Southwestern
Meloche Lecturer	2004, Dept. of Chemistry, University of Wisconsin
CHS Hall of Fame	2000, Cupertino High School, Cupertino CA
Searle Scholar	1999-2002, The Chicago Community Trust
W.W. Caruth Jr. Scholar in Biomedical Research	1998-2013, UT Southwestern Medical Center
Helen Hay Whitney Postdoctoral Fellow	1996-1998, Helen Hay Whitney Foundation
NIH/NRSA Postdoctoral Fellow	1995-1996, National Institutes of Health
HHMI Predoctoral Fellow	1989-1994, HHMI
B.S. with Highest Honors (Biochemistry)	1989, UC Davis

Departmental Citation for Excellence
Phi Beta Kappa

1989, UC Davis, Department of Biochemistry
1989, UC Davis

INDUSTRIAL AFFILIATIONS

2014-2018 Co-founder and CSO, Optologix, Inc.

Optologix was a spinoff company from EL222 optogenetic light-regulated gene expression technology developed in my group, covered in Gardner et al. 2016 and 2019 patents. I developed business plan within eLabNYC program with co-founder Laura Motta-Mena (2014-2015), jointly planned business and scientific strategy, and explored new product areas. Company operated 2015-2018, funded via sales of optogenetic tool kits, Health Wildcatters accelerator program (Dallas, TX), friends & family support.

2011-2019 Founding Consultant, Peloton Therapeutics, Inc.

Peloton Therapeutics was a spinoff company developing small molecule HIF-2 α inhibitors initially pioneered in my research group in collaboration with Rick Bruick's lab, covered in Bruick et al. 2017 patent with technology pioneered in Gardner et al. 2010 patent. I assisted with spinoff process, helping recruit personnel and funding at early stages, and maintained scientific advisory role throughout. Company operated 2011-2019, successfully starting from academic lead compounds with nanomolar potency to improve both efficacy and suitability for clinical trials; two HIF-2 α inhibitors proceeded through phase I, II clinical trials for clear cell renal cell carcinoma. Raised over \$300M venture capital, spearheaded by The Column Group, with additional support by CPRIT. Company purchased in May 2019 for over \$1.1B by Merck, Inc., where HIF-2 α inhibitor belzutifan/MK-6482 is currently in Phase III clinical trials as single agent and combination therapies for kidney cancers.

PUBLICATIONS – PEER-REVIEWED RESEARCH AND REVIEW ARTICLES

95. Gagné, D., Azad, R., Edupuganti, U.R., Williams, J., Aramini, J.M., Akasaka, K. and Gardner, K.H. (2021) Use of high pressure NMR spectroscopy to rapidly identify proteins with internal ligand-binding voids. Manuscript under review; available at bioRxiv (DOI: 10.1101/2020.08.25.267195)
94. Dikiy, I., Swingle, D., Toy, K., Edupuganti, U.R., Rivera-Cancel, G. and Gardner, K.H. (2021) Conservation of function with diversification of higher-order structure within sensor histidine kinases. Manuscript under review; available at bioRxiv (DOI: 10.1101/2020.07.08.194225)
93. Hart, J.E. and Gardner, K.H. (2021) Lighting the way: Recent progress on the structure and function of phototropin blue light receptors. *J. Biol. Chem.*, in press (DOI: 10.1016/j.jbc.2021.100594).
92. Xu, X., Dikiy, I., Evans, M.R., Marcelino, L.P. and Gardner, K.H. (2021) Fragile protein folds: Sequence and environmental factors affecting the equilibrium of two interconverting, stably folded protein conformations. *Magn. Reson.*, **2**: 63-76.
91. LaBelle, J., Ramos-Martinez, A., Shen, K., Motta-Mena, L.B., Gardner, K.H., Materna, S.C. and Woo, S. (2021) TAEI 2.0: An improved optogenetic expression system for zebrafish. *Zebrafish*, **18**: 20-28.
90. Xu, X., Gagné, D., Aramini, J.M. and Gardner, K.H. (2021) Volume and compressibility differences between protein conformations revealed by high-pressure NMR. *Biophys J.*, **120**: 924-935. (covered by Sprangers in *New and Notable* article in same issue, 749-751).
89. Iuliano, J.N., Collado, J.T., Gil, A.A., Ravindran, P.T., Lukacs, A., Shin, S., Woroniecka, H.A., Adamczyk, K., Aramini, J.M., Edupuganti, U.R., Hall, C.R., Greetham, G.M., Sazanovich, I.V., Clark, I.P., Daryaei, T., Toettcher, J.E., French, J.B., Gardner, K.H., Simmerling, C.L., Meech, S.R. and Tonge, P.J. (2020) Unraveling the mechanism of a LOV domain optogenetic sensor: A glutamine lever induces unfolding of the J α helix. *ACS Chem. Biol.*, **15**: 2752-2765. PMID: PMC7572778.
88. Dikiy, I. and Gardner, K.H. (2019) Shining light on the Alphaproteobacterial general stress response. *Mol. Micro.*, **112**: 438-441. PMID: PMC6703917.

87. Dikiy, I., Edupuganti, U.R., Abzalimov, R.R., Borbat, P.B., Srivastava, M., Freed, J.H. and Gardner, K.H. (2019) Insights into histidine kinase activation mechanisms from the monomeric blue light sensor EL346. *Proc. Natl. Acad. Sci.*, **116**: 4963-4972. PMID: PMC6421462.
86. Clark, L., Dikiy, I., Rosenbaum, D.M.[†] and Gardner, K.H.[†] (2018) On the use of *Pichia pastoris* for isotopic labeling of human GPCRs for NMR studies. *J. Biomol. NMR*, **71**: 203-211. (†: *corresponding authors*) PMID: PMC7282444.
85. Glantz, S.T., Berlew, E.E., Jaber, Z., Schuster, B.S., Gardner, K.H. and Chow, B.Y. (2018) Directly light-regulated binding of RGS-LOV photoreceptors to anionic membrane phospholipids. *Proc. Natl. Acad. Sci.*, **115**: E7720-E7727. PMID: PMC6099885.
84. Losi, A.[†], Gardner, K.H.[†] and Möglich, A.[†] (2018) Blue-light receptors for optogenetics. *Chem. Res.*, **118**: 10659-10709. (†: *corresponding authors*) PMID: PMC6500593.
83. Clark, L.* , Dikiy, I.* , Chapman, K., Rödström, K.E., Aramini, J., LeVine, M., Khelashvili, G., Rasmussen, S.G.F., Gardner, K.H.[†] and Rosenbaum, D.M.[†] (2017) Ligand modulation of sidechain dynamics in a wild-type human GPCR. *eLife*, **6**: e28505. PMID: PMC5650471. (*: *equal contributors*, †: *corresponding authors*)
82. Reade, A., Motta-Mena, L.B., Gardner, K.H., Stanier, D.Y., Weiner, O.D. and Woo, S. (2017) TAE1: A zebrafish-optimized optogenetic gene expression system with fine spatial and temporal control. *Development*, **144**: 345-355. PMID: PMC5394756.
81. Corrêa, F., Key, J., Kuhlman, B. and Gardner, K.H. (2016) Computational repacking of HIF-2 α cavity replaces water-based stabilized core. *Structure*, **24**: 1918-1927.
80. Chen, W., Hill, H., Christie, A., Kim, M.S., Holloman, E., Pavía-Jiménez, A., Homayoun, F., Ma, Y., Patel, N., Yell, P., Hao, G., Yousuf, Q., Joyce, A., Pedrosa, I., Geiger, H., Zhang, H., Chang, J., Gardner, K.H., Bruick, R.K., Reeves, C., Hwang, T.H., Courtney, K., Frenkel, E., Sun, X., Zojwalla, N., Wong, T., Rizzi, J.P., Wallace, E.M., Josey, J.A., Xie, Y., Xie, X.-J., Kapur, P., McKay, R.M. and Brugarolas, J. (2016) Targeting renal cell carcinoma with a HIF-2 antagonist. *Nature*, **539**: 112-117. PMID: PMC5340502.
79. Corrêa, F. and Gardner, K.H. (2016) Basis of mutual domain inhibition in a bacterial signaling switch. *Cell Chem. Biol.*, **23**: 945-954. PMID: PMC5159254.
78. Glantz, S.T., Carpenter, E.J., Melkonian, M., Gardner, K.H., Boyden, E.S., Wong, G.K-S. and Chow, B.Y. (2016) Functional and topological diversity of LOV domain photoreceptors. *Proc. Natl. Acad. Sci. USA*, **113**: E1442-E1451. PMID: PMC4801262.
77. Scheuermann, T.H., Padrick, S.B., Gardner, K.H. and Brautigam, C.A. (2016) On the acquisition and analysis of microscale thermophoresis data. *Anal. Biochem.*, **496**: 79-93. PMID: PMC4873313.
76. Scheuermann, T.H., Stroud, D., Sleet, C., Bayeh, L., Shokri, C., Wang, H., Caldwell, C.G., Longgood, J., MacMillan, J.B., Bruick, R.K., Gardner, K.H. and Tambar, U.K. (2015) Isoform-selective and stereoselective inhibition of hypoxia inducible factor-2. *J. Med. Chem.*, **58**: 5930-5941.
75. Clark, L., Zahm, J.A., Ali, R., Kukula, M., Bian, L., Gardner, K.H., Rosen, M.K. and Rosenbaum, D.M. (2015) Methyl labeling and TROSY NMR spectroscopy of proteins expressed in the eukaryote *Pichia pastoris*. *J. Biomol. NMR*, **62**: 239-245. PMID: PMC4496254.
74. Guo, Y., Scheuermann, T.H., Partch, C.L., Tomchick, D.R. and Gardner, K.H. (2015) Coiled-coil coactivators play a structural role mediating interactions in hypoxia inducible factor heterodimerization. *J. Biol. Chem.*, **290**: 7707-7721. PMID: PMC4367273.

73. Ocasio, V., Corrêa, F. and Gardner, K.H. (2015) Ligand-induced folding of a two component signaling receiver domain. *Biochemistry*, **54**: 1353-1363. PMID: PMC4423417. (*Recommended in F1000 Prime; selected as featured article by journal*)
72. Rivera-Cancel, G., Ko, W.-H., Tomchick, D.R., Corrêa, F. and Gardner, K.H. (2014) Full-length structure of a monomeric histidine kinase reveals basis for sensory regulation. *Proc. Natl. Acad. Sci USA*, **111**: 17839-17844. PMID: PMC4273353. (*Recommended in F1000 Prime*)
71. Motta-Mena, L.B., Reade, A., Mallory, M.J., Glantz, S., Weiner, O.D., Lynch, K.W. and Gardner, K.H. (2014) An optogenetic gene expression system with rapid activation and deactivation kinetics. *Nat. Chem. Biol.*, **10**: 196-202. PMID: PMC3944926.
70. Salomon, D., Guo, Y., Kinch, L.N., Grishin, N.V., Gardner, K.H. and Orth, K. (2013) Effectors from animal and plant pathogens use a common domain to bind host phosphoinositides. *Nature Communications*, **4**: 2973.
69. Zoltowski, B.D., Motta-Mena, L.B. and Gardner, K.H. (2013) Blue-light induced dimerization of a bacterial LOV-HTH DNA-binding protein. *Biochemistry*, **52**: 6653-6661. PMID: PMC3813961.
68. Corrêa, F., Ko, W.-H., Ocasio, V., Bogomolni, R.A. and Gardner, K.H. (2013) Blue light regulated two-component systems: Enzymatic and functional analysis of light-oxygen-voltage (LOV)-histidine kinases and downstream response regulators. *Biochemistry*, **52**: 4656-4666. (*Selected as featured article by journal*) PMID: PMC3830641.
67. Freddolino, P.L., Gardner, K.H.[†] and Schulten, K.[†] (2013) Signaling mechanisms of LOV domains: New insights from molecular dynamics studies. *Photochem. Photobiol. Sci.*, **12**: 1158-1170 ([†]: *corresponding authors*) PMID: PMC3679247.
66. Rogers, J.L.*, Bayeh, L.*, Scheuermann, T.H.*, Longgood, J., Caldwell, C., Key, J., Naidoo, J., Melito, L., Shokri, C., Frantz, D.E., Bruick, R.K., Gardner, K.H.[†], MacMillan, J.B.[†] and Tambar, U.K.[†] (2013) Development of inhibitors of the PAS-B domain of the HIF-2 α transcription factor. *J. Med. Chem.*, **56**: 1739-1747. (*: *equal contributors*, [†]: *corresponding authors*) PMID: PMC3676484.
65. Moon, T.M., Corrêa, F., Kinch, L.N., Piala, A., Gardner, K.H.[†] and Goldsmith, E.J.[†] (2013) Solution structure of the WNK1 autoinhibitory domain, a WNK-specific PF2 domain. *J. Mol. Biol.*, **425**: 1245-1252. ([†]: *corresponding authors*)
64. Scheuermann, T.H., Li, Q., Ma, H.-W., Key, J., Zhang, L., Chen, R., Garcia, J.A., Naidoo, J., Longgood, J., Frantz, D.E., Tambar, U.K., Gardner, K.H.[†] and Bruick, R.K.[†] (2013) Allosteric inhibition of Hypoxia Inducible Factor 2 with small molecules. *Nat. Chem. Biol.*, **9**: 271-276. ([†]: *corresponding authors*) PMID: PMC3604136.
63. Guo, Y., Partch, C.L., Key, J., Card, P.B., Pashkov, V., Patel, A., Bruick, R.K., Wurdak, H. and Gardner, K.H. (2013) Regulating the ARNT-TACC3 axis: Multiple approaches to manipulating protein-protein interactions with small molecules. *ACS Chem. Biol.*, **8**: 626-635. PMID: PMC3600089.
62. Rivera-Cancel, G.*, Motta-Mena, L.B.* and Gardner, K.H. (2012) Identification of natural and artificial DNA substrates for the light-activated LOV-HTH transcription factor EL222. *Biochemistry*, **51**: 10024-10034. (*: *equal contributors*) PMID: PMC3531242.
61. Chollangi, S., Thompson, J.W., Ruiz, J.C., Gardner, K.H. and Bruick, R.K. (2012) The hemerythrin-like domain within F-box and leucine-rich repeat protein 5 communicates cellular iron and oxygen availability by distinct mechanisms. *J. Biol. Chem.*, **287**: 23710-23717. PMID: PMC3390645.
- 60 Zoltowski, B.D., Nash, A.I. and Gardner, K.H. (2011) Variations in protein/flavin hydrogen bonding in a LOV domain produce non-Arrhenius kinetics of adduct decay. *Biochemistry*, **50**: 8771-8779. (*Accelerated Publication, selected as featured article by journal*) PMID: PMC3381950.

59. Yuan, H., Dragnea, V., Wu, Q., Gardner, K.H. and Bauer, C.E. (2011) Mutational and structural studies of the PixD BLUF output signal that affects light-regulated interactions with PixE. *Biochemistry*, **50**, 6365-6375. PMID: PMC3139782.
58. Nash, A.I.* , McNulty, R.* , Shillito, M.E., Swartz, T.E., Bogomolni, R.A., Luecke, H.[†] and Gardner, K.H.[†] (2011) Structural basis of photosensitivity in a bacterial LOV-HTH DNA binding protein. *Proc. Natl. Acad. Sci.*, **108**: 9449-9454. (*: equal contributors, [†]: corresponding authors) PMID: PMC3111320.
57. Partch, C.L. and Gardner, K.H. (2011) Coactivators necessary for transcriptional output of the hypoxia inducible factor, HIF, are directly recruited by ARNT PAS-B. *Proc. Natl. Acad. Sci.*, **108**, 7739-7744. PMID: PMC3093465.
56. Song, S.-H., Freddolino, P.L., Nash, A.I., Carroll, E.C., Schulten, K., Gardner, K.H. and Larsen, D.S. (2011) Modulating LOV domain photodynamics with a residue alteration outside the chromophore binding site. *Biochemistry*, **50**, 2411-2423. (Accelerated Publication) PMID: PMC3068209.
55. Zoltowski, B.D. and Gardner, K.H. (2011) Tripping the light fantastic: Blue light photoreceptors as examples of environmentally-modulated protein:protein interactions. *Biochemistry*, **50**: 4-16. (selected as a featured article by journal) PMID: PMC3137735.
54. Akella, R., Min, X., Wu, Q., Gardner, K.H. and Goldsmith, E.J. (2010) The third stable conformation p38 α MAP kinase observed in phosphorylated p38 α and in solution. *Structure*, **18**: 1571-1578.
53. Strickland, D., Yao, X., Gawlak, G., Rosen, M.K., Gardner, K.H. and Sosnick, T.R. (2010) Rationally increasing the dynamic range of genetically-encoded, optically-controlled proteins. *Nature Methods*, **7**: 623-626. (covered in News and Views article, "Hold me tightly LOV" by K.M. Hahn and B. Kuhlman, *Nat. Methods* **7**(2010): 595-596; recommended in *F1000 Prime*) PMID: PMC2914111.
52. Lehotzky, R.E.* , Partch, C.L.* , Mukherjee, S., Cash, H., Goldman, W.E., Gardner, K.H.[†] and Hooper, L.V.[†] (2010) Molecular basis for peptidoglycan recognition by a bactericidal lectin. *Proc. Natl. Acad. Sci.*, **107**, 7722-7727. (*: equal contributors, [†]: corresponding authors; recommended in *F1000 Prime*) PMID: PMC2867859.
51. Key, J.* , Scheuermann, T.H.* , Anderson, P.C., Daggett, V. and Gardner, K.H. (2009) Principles of ligand binding within a completely buried cavity in HIF-2 α PAS-B. *J. Am. Chem. Soc.*, **131**: 17647-17654. (*: equal contributors) PMID: PMC2819816.
50. Evans, M.R. and Gardner, K.H. (2009) Slow transition between β -strand registers is dictated by protein unfolding. *J. Am. Chem. Soc.*, **131**: 11306-11307. PMID: PMC2739125.
49. Partch, C.L., Card, P.B., Amezcuca, C.A. and Gardner, K.H. (2009) Molecular basis of coiled coil coactivator recruitment by the aryl hydrocarbon receptor nuclear translocator (ARNT) *J. Biol. Chem.*, **284**: 15184-15192. PMID: PMC2685699.
48. Wu, Q. and Gardner, K.H. (2009) BlrP1 BLUF domain: Structure and insight into light-induced changes. *Biochemistry*, **48**: 2620-2629. (Recommended in *F1000 Prime*)
47. Evans, M.R., Card, P.B. and Gardner, K.H. (2009) ARNT PAS-B has a fragile native state structure with an alternative beta-sheet register nearby in sequence space. *Proc. Natl. Acad. Sci.*, **106**: 2617-2622. PMID: PMC2650313.
46. Mukherjee, S.* , Partch, C.L.* , Lehotzky, R.E., Whitham, C.V., Chu, H., Bevins, C., Gardner, K.H.[†] and Hooper, L.V.[†] (2009) Regulation of C-type lectin antimicrobial activity by a flexible N-terminal prosegment. *J. Biol. Chem.*, **284**: 4881-4888. (*: equal contributors, [†]: corresponding authors) PMID: PMC2643518.

45. Scheuermann, T.H., Tomchick, D.R., Machius, M., Guo, Y., Bruick, R.K. and Gardner, K.H. (2009) Artificial ligand binding within the HIF-2 α PAS-B domain of the HIF2 transcription factor. *Proc. Natl. Acad. Sci.*, **106**: 450-455. PMID: PMC2626723.
44. Nash, A.I.*, Ko, W.-H.*, Harper, S.M. and Gardner, K.H. (2008) A conserved glutamine plays a central role in LOV domain signal transmission and duration. *Biochemistry*, **47**: 13842-13849. (*: equal contributors; selected as featured article by journal) PMID: PMC2630409.
43. Wu, Q., Ko, W.-H. and Gardner, K.H. (2008) Structural requirements for key residues and auxiliary portions of a BLUF domain. *Biochemistry*, **47**: 10271-10280.
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41. Yao, X., Rosen, M.K. and Gardner, K.H. (2008) Estimation of the available free energy in a LOV-J α photoswitch. *Nat. Chem. Biol.*, **4**: 491-497. (covered in News and Views article, "Protein dynamics under light control" by M. Vendruscolo, *Nat. Chem. Biol.* **4**(2008): 449-450; recommended in F1000 Prime) PMID: PMC2597337.
40. Lee, J., Tomchick, D.R., Brautigam, C.A., Machius, M., Kort, R., Hellingwerf, K.J. and Gardner, K.H. (2008) Changes at the KinA PAS-A dimerization interface influence histidine kinase function. *Biochemistry*, **47**: 4051-4064. (chosen as Hot Article by Biochemistry)
39. Kajimura, J., Rahman, A., Hsu, J., Evans, M.R., Gardner, K.H. and Rick, P.D. (2006) O-acetylation of the enterobacterial common antigen (ECA) polysaccharide is catalyzed by the product of the *yiaH* gene of *Escherichia coli* K-12. *J. Bacteriology*, **188**: 7542-7550. PMID: PMC1636290.
38. Colbert, C.L., Wu, Q., Erbel, P.J.A., Gardner, K.H. and Deisenhofer, J. (2006) Mechanism of substrate specificity in *Bacillus subtilis* ResA, a thioredoxin-like protein involved in cytochrome c maturation. *Proc. Natl. Acad. Sci.*, **103**: 4410-4415. PMID: PMC1400588.
37. Yang, J., Zhang, L., Erbel, P.J.A., Gardner, K.H., Ding, K.M., Garcia, J.A. and Bruick, R.K. (2005) Functions of the Per/ARNT/Sim (PAS) domains of the hypoxia inducible factor (HIF) *J. Biol. Chem.*, **280**: 36047-36054.
36. Card, P.B., Erbel, P.J.A. and Gardner, K.H. (2005) Structural basis of ARNT PAS-B dimerization: Use of a common β -sheet interface for hetero- and homodimerization. *J. Mol. Biol.*, **353**: 664-677.
35. Socolich, M., Lockless, S.W., Russ, W.P., Lee, H., Gardner, K.H. and Ranganathan, R. (2005) Evolutionary information for specifying a protein fold. *Nature*, **437**: 512-518. (Recommended in F1000 Prime)
34. Jung, A., Domratcheva, T., Tarutina, M., Wu, Q., Ko, W.-H., Shoeman, R.L., Gomelsky, M., Gardner, K.H. and Schlichting, I. (2005) Structure of a bacterial BLUF photoreceptor: Insights into blue light-mediated signal transduction. *Proc. Natl. Acad. Sci. USA*, **102**: 12350-12355.
33. Best, J.L., Amezcua, C.A., Mayr, B., Flechner, L., Murawsky, C.M., Emerson, B., Zor, T., Gardner, K.H. and Montminy, M. (2004) Identification of small molecule antagonists that inhibit an activator:coactivator interaction. *Proc. Natl. Acad. Sci.*, **101**: 17622-17627. (Recommended in F1000 Prime) PMID: PMC539725.
32. Harper, S.M., Christie, J.M. and Gardner, K.H. (2004) Disruption of LOV/J α helix interaction activates phototropin kinase activity. *Biochemistry*, **43**: 16184-16192.

31. Erbel, P.J.A., Seidel, R., Macintosh, S.E., Gentile, L.N., Amor, J.C., Kahn, R.A., Prestegard, J.H., McIntosh, L.P. and Gardner, K.H. (2004) Cyclic enterobacterial common antigen: Potential contaminant of bacterially expressed protein preparations. *J. Biomolecular NMR*, **29**: 199-204.
30. Harper, S.M., Neil, L.C., Day, I.J., Hore, P.J. and Gardner, K.H. (2004) Conformational changes in a photosensory LOV domain monitored by time-resolved NMR spectroscopy. *J. Am. Chem. Soc.*, **126**: 3390-3391.
29. Erbel, P.J.A., Card, P.B., Karakuzu, O., Bruick, R.K. and Gardner, K.H. (2003) Structural basis for PAS domain heterodimerization in the bHLH-PAS transcription factor HIF. *Proc. Natl. Acad. Sci.*, **100**: 15504-15509. PMID: PMC307597.
28. Harper, S.M., Neil, L.C. and Gardner, K.H. (2003) Structural basis of a phototropin light switch. *Science*, **301**: 1541-1544. (Recommended in *F1000 Prime*)
27. Erbel, P.J.A., Barr, K., Chen, N., Gerwig, G.J., Rick, P.D. and Gardner, K.H. (2003) Identification and biosynthesis of cyclic ECA in *Escherichia coli*. *J. Bact.*, **185**: 1995-2004. PMID: PMC150143.
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24. He, Q., Cheng, P., Yang, Y., Wang, L., Gardner, K.H. and Liu, Y. (2002) White collar-1, a DNA binding transcription factor as a light sensor. *Science*, **297**: 840-843. (Recommended in *F1000 Prime*)
23. Cheng, P., Yang, Y., Gardner, K.H. and Liu, Y. (2002) PAS domain-mediated WC-1/WC-2 interaction is essential for maintaining the steady-state level of WC-1 and the function of both proteins in circadian clock and light responses of *Neurospora*. *Mol. Cell. Biol.*, **22**: 517-524. PMID: PMC139750.
22. Holdeman, T.C. and Gardner, K.H. (2001) ¹H, ¹³C and ¹⁵N chemical shift assignments of the N-terminal PAS domain of mNPAS2. *J. Biomolecular NMR*, **21**: 383-384.
21. Usher, K.C., Özkan, E., Gardner, K.H. and Deisenhofer, J. (2001) The plug domain of FepA, a TonB-dependent transport protein from *E. coli*, binds its siderophore in the absence of the transmembrane barrel domain. *Proc. Natl Acad. Sci.*, **98**: 10676-10681. PMID: PMC58525
20. Rutter, J., Michnoff, C.H., Harper, S.M., Gardner, K.H. and McKnight, S.L. (2001) PAS kinase: an evolutionarily conserved PAS domain-regulated serine/threonine kinase. *Proc. Natl Acad. Sci.*, **98**: 8991-8996. PMID: PMC55361. PMID: PMC55361
19. Schweitzer, B.I., Foti, M., Keertikar, K., Kumar, S., Gardner, K.H. and Tucker-Kellogg, G. (1999) The use of ³¹P relaxation experiments to probe the effects of nucleoside analogs on DNA dynamics. *Phosphorus, Sulfur and Silicon*, **144**: 301-304.
- Postdoctoral research – University of Toronto (1995-1998)*
18. Goto, N.K., Gardner, K.H., Mueller, G.A., Willis, R.C. and Kay, L.E. (1999) A robust and cost-effective method for the production of Val, Leu and Ile (δ^1) methyl-protonated ¹⁵N, ¹³C, ²H-labeled proteins. *J. Biomol. NMR*, **13**: 369-374.
17. Gardner, K.H., Zhang, X., Gehring, K. and Kay, L.E. (1998) Solution NMR studies of a 42 kDa maltose binding protein/ β -cyclodextrin complex: chemical shift assignments and analysis. *J. Am. Chem. Soc.*, **120**: 11738-11748.

16. Zwahlen, C., Gardner, K.H., Sarma, S.P., Horita, D.A., Byrd, R.A. and Kay, L.E. (1998) An NMR experiment for measuring methyl-methyl NOEs in ^{13}C labeled proteins with high resolution. *J. Am. Chem. Soc.*, **120**: 7617-7625.
 15. Yang, D., Gardner, K.H. and Kay, L.E. (1998) A sensitive pulse scheme for measuring the backbone dihedral angle ψ based on cross-correlation between $^{13}\text{C}\alpha$ - $^1\text{H}\alpha$ dipolar and carbonyl chemical shift anisotropy relaxation interactions. *J. Biomol. NMR*, **11**: 213-220.
 14. Zwahlen, C., Vincent, S.J.F., Gardner, K.H. and Kay, L.E. (1998) Significantly improved resolution for NOE correlations from valine and isoleucine ($\text{C}\gamma 2$) methyl groups in ^{15}N , ^{13}C and ^{15}N , ^{13}C , ^2H -labeled proteins. *J. Am. Chem. Soc.*, **120**: 4825-4831.
 13. Shan, X., Gardner, K.H., Muhandiram, D.R., Kay, L.E. and Arrowsmith, C.H. (1998) Subunit-specific backbone NMR assignments of a 64 kDa *trp* repressor/DNA complex: a role for N-terminal residues in tandem binding. *J. Biomol. NMR*, **11**: 307-318.
 12. Gardner, K.H. and Kay, L.E. (1997) Production and incorporation of ^{15}N , ^{13}C , ^2H (^1H - $\delta 1$ methyl) isoleucine into proteins for multidimensional NMR studies. *J. Am. Chem. Soc.*, **119**: 7599-7600.
 11. Gardner, K.H., Rosen, M.K. and Kay, L.E. (1997) Global folds of highly deuterated, methyl protonated proteins by multidimensional NMR. *Biochemistry*, **36**: 1389-1401.
 10. Gardner, K.H., Konrat, R., Rosen, M.K. and Kay, L.E. (1996) A (H)C(CO)NH-TOCSY pulse scheme for sequential assignment of protonated methyl groups in otherwise deuterated ^{15}N , ^{13}C labeled proteins. *J. Biomol. NMR*, **8**: 351-356.
 9. Rosen, M.K., Gardner, K.H., Willis, R.C., Parris, W.E., Pawson, T. and Kay, L.E. (1996) Selective methyl group protonation of perdeuterated proteins. *J. Mol. Biol.*, **263**: 627-636.
 8. Shan, X., Gardner, K.H., Muhandiram, D.R., Rao, N.S., Arrowsmith, C.H. and Kay, L.E. (1996) Assignment of the ^{15}N , $^{13}\text{C}\alpha$, $^{13}\text{C}\beta$ and HN resonances in an ^{15}N , ^{13}C , ^2H labeled 64 kDa *trp* repressor-operator complex using triple resonance NMR spectroscopy and ^2H -decoupling. *J. Am. Chem. Soc.*, **118**: 6570-6579.
- Graduate research – Yale University (1989-1995) and Undergraduate research – UC Davis (1985-1989)
7. Gardner, K.H., Anderson, S.F. and Coleman, J.E. (1995) Solution structure of the *K. lactis* LAC9 Cd₂Cys₆ DNA-binding domain. *Nat. Struct. Biol.*, **2**: 898-905.
 6. Schweitzer, B.I., Gardner, K.H. and Tucker-Kellogg, G. (1995) HeteroTOCSY-based experiments for measuring heteronuclear relaxation in nucleic acids and proteins. *J. Biomol. NMR*, **6**: 180-188.
 5. Klemba, M., Gardner, K.H., Marino, S., Clarke, N.D. and Regan, L. (1995) A novel family of designed metal-binding proteins. *Nat. Struct. Biol.*, **2**: 368-373 (addendum and correction: *NSB* **2**: 912)
 4. Gardner, K.H. and Coleman, J.E. (1994) ^{113}Cd - ^1H heteroTOCSY: a method for determining metal-protein connectivities. *J. Biomol. NMR*, **4**: 761-774.
 3. Schweitzer, B.I., Mikita, T., Kellogg, G.W., Gardner, K.H. and Beardsley, G.P. (1994) Solution structure of a DNA dodecamer containing the anti-neoplastic agent arabinosylcytosine: combined use of NMR, restrained molecular dynamics, and full relaxation matrix refinement. *Biochemistry*, **33**: 11460-11475.
 2. Gardner, K.H., Pan, T., Narula, S., Rivera, E. and Coleman, J.E. (1991) Structure of the binuclear metal-binding site in the GAL4 transcription factor. *Biochemistry*, **30**: 11292-11302.
 1. Sekiguchi, J.M., Cole, A.D., Gardner, K.H. and Kmiec, E.B. (1990) Transcription factor TFIIIA stimulates DNA supercoiling promoted by a fractionated cell-free extract from *Xenopus laevis*. *Eur. J. Biochem.*, **192**: 311-320.

PUBLICATIONS – NON-PEER REVIEWED SURVEYS AND OTHER ARTICLES

15. Dikiy, I., Clark, L., Gardner, K.H.[†] and Rosenbaum, D.M.[†] (2019) Isotopic labeling of eukaryotic membrane proteins for NMR studies of interactions and dynamics. *Meth. Enz.*, **614**: 37-65. ([†]: *corresponding authors*)
PMCID: PMC7309954.
14. Markley, J.L., Akutsu, H., Asakura, T., Baldus, M., Boelens, R., Bonvin, A., Kaptein, R., Bax, A., Bezsonova, I., Gryk, M.R., Hoch, J.C., Korzhnev, D.M., Maciejewski, M.W., Case, D., Chazin, W.J., Cross, T.A., Dames, S., Kessler, H., Lange, O., Madl, T., Reif, B., Sattler, M., Eliezer, D., Fersht, A., Forman-Kay, J., Kay, L.E., Fraser, J., Gross, J., Kortemme, T., Sali, A., Fujiwara, T., Gardner, K.H., Luo, X., Rizo-Rey, J., Rosen, M.K., Gil, R.R., Ho, C., Rule, G., Gronenborn, A.M., Ishima, R., Klein-Seetharaman, J., Tang, P., van der Wel, P., Xu, Y., Grzesiek, S., Hiller, S., Seeling, J., Laue, E.D., Mott, H., Nietlispach, D., Barsukov, I., Lian, L.Y., Middleton, D., Blumenschein, T., Moore, G., Campbell, I., Schnell, J., Vakonaski, I.J., Watts, A., Conte, M.R., Mason, J., Pfuhl, M., Sanderson, M.R., Craven, J., Williamson, M., Dominguez, C., Roberts, G.C.K., Günther, U., Overduin, M., Werner, J., Williamson, P., Blindauer, C., Crump, M., Driscoll, P., Frenkiel, T., Golovanov, A., Matthews, S., Parkinson, J., Uhrin, D., Williams, M., Neuhaus, D., Oschkinat, H., Ramos, A., Shaw, D.E., Steinbeck, C., Vendruscolo, M., Vuister, G.W., Walters, K.J., Weinstein, H., Wüthrich, K. and Yokoyama, S. (2012) In support of the BMRB. *Nat. Struct. Mol. Biol.*, **19**: 854-860.
13. Rizo, J., Rosen, M.K. and Gardner, K.H. (2012) Enlightening molecular mechanisms through study of protein interactions. *J. Mol. Cell. Biol.*, **4**: 270-283. PMCID: PMC3464395.
12. Gardner, K.H. and Corrêa, F. (2012) How plants see the invisible. *Science*, **335**: 1451-1452.
11. Gardner, K.H., Mittermaier, A. and Mulder, F.A.A. (2011) A tribute to Lewis Kay on his 50th birthday. *J. Biomol. NMR*, **51**: 3-4.
10. Motta-Mena, L.B., Partch, C.L. and Gardner, K.H. (2010) The three Rs of transcription: Recruit, retain and recycle. *Mol. Cell*, **40**: 855-858. PMCID: PMC3012270.
9. Partch, C.L. and Gardner, K.H. (2010) Coactivator recruitment: A new role for PAS domains in transcriptional regulation by the bHLH-PAS family. *J. Cell. Physiol.*, **223**: 553-557. PMCID: PMC2872778.
8. Gardner, K.H. (2008) Molecular Biophysics at UT Southwestern Medical Center: Strength through breadth. *Biopolymers*, **89**: 244-247.
7. Ko, W.-H., Nash, A.I. and Gardner, K.H. (2007) A LOVely view of blue light photosensing. *Nature Chem. Biol.*, **3**: 372-374.
6. Scheuermann, T.H., Yang, J., Zhang, L., Gardner, K.H. and Bruick, R.K. (2007) Hypoxia-Inducible Factor PAS domains: Structure and function. *Meth. Enz.*, **435**: 3-24.
5. Gardner, K.H. and Montminy, M. (2005) Can you hear me now: Regulation of transcriptional activators by phosphorylation. *Science STKE*, **2005**: pe 44.
4. Card, P.B. and Gardner, K.H. (2005) Identification and optimization of protein domains for NMR studies. *Meth. Enz.*, **394**: 3-16.
3. Gardner, K.H. and Kay, L.E. (1998) The use of ²H, ¹³C, ¹⁵N multidimensional NMR to study the structure and dynamics of proteins. *Ann. Rev. Biophys. Biomol. Struct.*, **27**: 357-406.
(reprinted as Gardner, K.H. and Kay, L.E. (1999) Multidimensional ²H-based NMR methods for resonance assignment, structure determination and the study of protein dynamics in Biological Magnetic Resonance: Modern Techniques in Protein NMR, **16**: 27-74)

2. Hardy, B.J., Doughty, S., Parretti, M., Tennison, J., Finn, B., Gardner, K.H. (1997) Internet conferences in nuclear magnetic resonance spectroscopy. *Prog. NMR Spec.*, **31**: 107-117.

1. Kay, L.E. and Gardner, K.H. (1997) Solution NMR spectroscopy beyond 25 kDa. *Curr. Op. Struct. Biol.*, **7**: 722-731.

PATENTS

6. Gardner, K.H., Motta-Mena, L.B. and Zoltowski, B.D. (2019) Blue-light inducible system for gene expression. US Patent Number 10,221,422 (issued March 5, 2019)

5. Bruick, R.K., Caldwell, C.J., Frantz, D.E., Gardner, K.H., MacMillan, J.B., Scheuermann, T.H. and Tambar, U.K. (2017) Inhibition of HIF-2 α heterodimerization with HIF-1 β (ARNT) US Patent Number 9,757,379 (issued September 12, 2017)

4. Gardner, K.H., Motta-Mena, L.B. and Zoltowski, B.D. (2016) Blue-light inducible system for gene expression. US Patent Number 9,506,073 (issued November 29, 2016)

3. Gardner, K.H., Amezcua, C.A., Erbel, P.J.A. and Card, P.B. (2010) NMR detection of foreign PAS domain ligands. US Patent Number 7,645,569 (issued January 12, 2010)

1,2. McKnight, S.L., Gardner, K.H., Harper, S., Rutter, J., Michnoff, C. and Amezcua, C. (2001) PAS kinase. US Patent Number 6,319,679 (issued November 20, 2001) and Patent Number 7,132,278 (issued November 7, 2006)

BOOK REVIEW

review of **Carbon-13 NMR Spectroscopy of Biological Systems** (Nicolau Beckmann, editor; 1995) *J. Magn. Reson. B* **111**(1996): 103-104.

RESEARCH FUNDING

Current

2013-2025: NIH R01 GM-106239: "Photosensory LOV proteins: Study and application of signaling mechanisms" (PI)

2020-2021: NIH R01 GM-106239-09S1: "AKTA PURE FPLC System for Macromolecular Purification and Characterization" (PI)

2018-2021: NSF MCB-1818148: "Protein Structural Defects: Sites for Small Molecule Binding and Regulation" (PI)

2021-2022: MSKCC-CCNY Partnership Pilot Grant: "Structural and Chemical Probing of A New Anticancer Target: HIF-Coactivator Complexes" (PI)

Prior

2019-2020: NIH R01 GM-106239-08S1: "Helium Recovery System for CUNY ASRC/CCNY NMR Facilities" (PI)

2013-2017: CPRIT Individual Investigator Award RP130513, "Discovery and Optimization of Natural and Artificial Ligands Regulating Hypoxia Inducible Factor" (PI when awarded; subsequently switched to collaborator upon move from Texas)

1999-2014: Robert A. Welch Foundation I-1424: "Comparative studies of the signaling mechanisms of flavin-based protein photosensors" (PI)

2013-2016: CPRIT High Impact, High Risk RP130312: "Development of optogenetic tools for cellular and in vivo manipulation of cancer pathways" (PI when awarded; subsequently switched to collaborator upon move from Texas)

2012-2013: NIH S10 OD018027: "Acquisition of upgrades for 800MHz NMR console" (co-PI, with PI Jose Rizo-Rey)

2002-2013: NIH P01 CA095471: "A concerted chemical, biophysical and molecular biological attack on intracellular pathways relevant to cancer" (coinvestigator with PI: Steve McKnight)

2001-2012: NIH R01 GM081875: "Structural studies of PAS domain signaling mechanisms" (PI)

2009-2012: NIH R21 NS067624: "High Throughput Screen Development for Modulators of PAS/coactivator

- Interactions" (PI, with coinvestigator Rick Bruick)
- 2010: NIH R13 GM093350-01: "2010 Photosensory Receptors and Signal Transduction GRC/GRS Meetings" (PI)
- 2010-2013: CPRIT Individual Investigator Award RP100846, "Discovery and Optimization of Natural and Artificial Ligands Regulating Hypoxia Inducible Factor" (PI, with coinvestigators Rick Bruick, John MacMillan and Uttam Tambar)
- 2004-2014: NIH T32 GM-008297: "Molecular Biophysics Predoctoral Training Program" (PI, renewed and transferred to Dr. Yuh Min Chook upon departure from UT Southwestern)
- 2004-2005: Advanced Technology Program (Texas Higher Education Coordinating Board) 010019-0124-2003: "Photoregulated enzymes: A novel and general approach to control function *in vitro* and *in vivo*" (PI, with coinvestigator Michael Rosen)
- 2002-2003: NIH S10 RR-17270 (High End Instrumentation Grant): "800 MHz NMR spectrometer" (coinvestigator with PI: Jose Rizo-Rey)
- 1998-2002: Endowed Scholar in Biomedical Research Program, UT Southwestern Medical Center
- 1999-2002: Searle Scholar Program, Chicago Community Trust

TRAINEES

Postdoctoral researchers:

- Dr. Jaynee Hart (2019-2020) – *Postdoctoral Researcher, Robert Last Laboratory, Michigan State University*
- Dr. Meiling Zhang (2019-present)
- Dr. Igor Dikiy (NIH NRSA Postdoctoral Fellow 2015-2020; Finalist, Blavatnik Regional Young Scientist Award – Chemistry; NIH K22 awardee) – *Scientist, Regeneron Pharmaceuticals, Tarrytown, NY*
- Dr. Donald Gagné (Fonds de Recherche Québec Nature et Technologies Postdoctoral Fellow, 2015-2018) – *Scientist, Kisoji Biotechnology, Laval, QC*
- Dr. Laura Motta-Mena (2010-2014; Senior Research Associate 2014-2016) – *Director of Community and Public Relations, Methodist Dallas Medical Center*
- Dr. Giomar Rivera-Cancel (2009-2014) – *Senior Research Associate, Deepak Nijhawan laboratory, UT Southwestern*
- Dr. Brian Zoltowski (NIH NRSA Postdoctoral Fellow 2008-2011) – *Associate Professor, Dept of Chemistry, Southern Methodist University*
- Dr. Fernando Corrêa (2008-2014; Senior Research Associate 2014-2016) – *Staff Scientist, Kodiak Sciences, Palo Alto, CA*
- Dr. Jason Key (2007-2011; Assistant Instructor 2011-2012) – *Associate Director of Technology and Innovation, SBGrid, Harvard Medical School*
- Dr. Carrie Partch (NIH NRSA Postdoctoral Fellow 2006-2011) – *Professor, Dept. of Chemistry and Biochemistry, UC Santa Cruz*
- Dr. Thomas Scheuermann (American Cancer Society Postdoctoral Fellow 2004-2010; Instructor 2010-2013) – *Senior Applications Engineer, Wyatt Technologies*
- Dr. Qiong Wu (2003-2009) – *Director, Biomolecular NMR Facility, UT Southwestern*
- Dr. Paul Erbel (2000-2004) – *Research Investigator (Structural Sciences Unit), Novartis Institutes for Biomedical Research, Basel, CH*
- Dr. Carlos Amezcua (1999-2003) – *Associate Global R&D Fellow, FMC, Newark, DE*

Graduate students:

- James Siclari (2020-present; CUNY GC – Biology/MCD Ph.D. Program)
- Danielle Swingle (2019-present; CUNY GC – Biochemistry Ph.D. Program)
- Roksana Azad (2018-present; CUNY GC – Biochemistry Ph.D. Program)
- Matthew Cleere (2018-present; CUNY GC – Biology/MCD Ph.D. Program)
- Xingjian Xu (2018-present; CUNY GC – Biochemistry Ph.D. Program)
- Uthama Edupuganti (2016-present; CUNY GC – Biochemistry Ph.D. Program)
- Zaynab Jaber (2016-present; CUNY GC – Biochemistry Ph.D. Program)
- Victor Ocasio-Ramirez (2010-2014; Ph.D. 2014) – *Field Applications Scientist, Nexcelcom, Lawrence, MA*
- Yirui Guo (2010-2014; Ph.D. 2014) – *Co-founder and CEO, Ligo Analytics (Dallas, TX) & MBA candidate, UT Dallas*

Abigail Nash (MSTP, 2005-2009; completed Ph.D. portion of M.D./Ph.D. program 2009) – *Medical Director, Janssen Pharmaceuticals, Malvern, PA*
 Matthew Evans (2005-2009 - Ph.D. 2009; postdoc 2009-2010) – *Revenue Cycle Consultant, Acclaim Physician Group, Fort Worth, TX*
 Wen-Huang (Lisa) Ko (2004-2009; Ph.D. 2009) – *Head of Clinical Trial Monitoring, Dava Oncology, Dallas, TX*
 James Lee (MSTP, 2002-2006; completed Ph.D portion of M.D./Ph.D. program 2006) – *Pathologist in private practice, Alhambra, CA*
 Terra (Holdeman) Caudill (2000-2001) – *M.D. degree from UTMB; psychiatrist in private practice, Boca Raton, FL*
 Paul Card (2000-2005 - Ph.D. 2005; postdoc 2005-2006)
 Shannon Harper (2000-2004; Ph.D. 2004)
 (also mentored over 50 additional rotation students during first-year rotations in lab, 1999-present)

Undergraduate students: (both summer and academic-year work; home campus identified)

Leandro Pimentel (2019-present, CCNY – honors dissertation), Nichelle Camden (2019, Ausburg University), Kaitlyn Toy (2018-present, CCNY/Macaulay – honors dissertation), Chyana Woodyard (2018, Hampton University), Nora Jaber (2018-2019, Hunter College); Megan Rodriguez (2018-present, CCNY – honors dissertation); Mahmoud Soliman (2018, CCNY); Kenan Redzematovic (2018, CCNY); Sara Wiener (2017, Yeshiva University); Katie Bunde (2017, CCNY); Casey Sniffin (2017-2018, Macaulay Honors College/CCNY); Andrew Palacios (2016-2018, Macaulay Honors College/CCNY and Columbia University), Aqib Muneer (2016, CCNY); Yun Young Kim (2016, Vassar College); Lucy Hovanisayan (2015, Univ. Pennsylvania); Kyle Ireton (2010, Oregon State Univ.); Laura Salguero (2008, New Mexico State Univ.); Leanna Steier (2007, Notre Dame); Aaron Maeng (2005, UT Austin); Daniel Buehler (2004, Univ. New Mexico); Brad Holmes (2001, Texas A&M Univ.); Mark Chan (1999, Harvard Univ.)

Sabbatical/Independent Scientist visitors:

Prof. Murray Whitelaw (Fall 2018, University of Adelaide)
 Dr. Arati Ramesh (2011-2014, Winkler Laboratory, Univ. Maryland – College Park)
 Dr. Susan Alguindigue (Summer 2002, Dept. of Chemistry, Univ. of Oklahoma)
 Prof. Ernest Blakeney (Fall 1999, Dept. of Chemistry, Centenary College)

PROFESSIONAL SERVICE – COMMUNITY

2021	<i>Ad hoc</i> member, NIH COBRE Review Study Section
2020-2024	Member, SAB – iNEXT Discovery, European Union
2019-2022	Member, Steering Committee, Chemical Biology Discussion Group, NY Academy of Sciences
2019	Member, DFG SFB review panel
2018-present	Member, External Advisory Board, Molecular Education, Technology and Research Innovation Center (METRIC), NC State University
2018	Member, NSF MCB review panel
2017-present	Member, LifeSciNYC – Mayor’s Life Sciences Advisory Council, City of New York
2017-2018	Member, CUNY Life Science Network
2017-2022	Member, Editorial Board, <i>Journal of Biological Chemistry</i>
2016-2021	Member, ACERT National Biomedical Center for Advanced ESR Technology External Advisory Board, Cornell University
2015-present	Member, Center for Biomolecular NMR Data Processing and Analysis BTTR External Advisory Board, UConn Health Science Center and University of Wisconsin
2015-present	Member, Editorial Board, <i>Structure</i>
2015	Member, DFG SFB review panel
2014-present	ICMRBS Council – Member (2014-present); Treasurer (2020-present)
2014-2020	Permanent Member, NIH MSFC study section
2014-present	Member, Board of Directors, New York Structural Biology Center
2014	Chair, XXVI International Conference for Magnetic Resonance in Biological Systems (ICMRBS), Dallas, TX
2012	Organizer, Symposium on Biomolecular Structure, Dynamics and Function, Memphis, TN
2012	<i>Ad hoc</i> member, NIH MSFC study section; NCI Intramural Review Group
2011-2013	Member, HHMI International Student Research Fellowship Review Committee

2011-2016	Member, Center for Biomolecular Structure and Dynamics CoBRE External Advisory Board, University of Montana
2011	<i>Ad hoc</i> member, NIH P01 Special Emphasis Panel
2008, 2010	Vice-chair (2008) and Chair (2010) of Photosensory Receptors and Signal Transduction Gordon Research Conference
2009-2012	Member and Chair (2010-2012), NMRFAM (NMR Facility at Madison) External Advisory Board, University of Wisconsin, Madison
2009	<i>Ad hoc</i> member, NIH Stimulus panels, NIH/NCI Molecular Oncology P01 Special Emphasis Panel, NIH BBM Study Section
2008	<i>Ad hoc</i> member, NIH Shared Instrumentation Special Emphasis Panel and NIH MSFB Study Section
2006	<i>Ad hoc</i> member, NIH MSFB Study Section
2004	<i>Ad hoc</i> member, NIH BBKA Study Section
2001, 2002	lecturer: Woods Hole Marine Biology Laboratory – Physiology course
2001	<i>Ad hoc</i> member, NIH BBKA Special Study Section
2001	lecturer: NRC/HHMI course “Determination of high-resolution structures for the post-genomic age”, Warsaw, Poland
ongoing	<i>Ad hoc</i> reviewer for <i>Science</i> , <i>Nature</i> , <i>Proc. Natl. Acad. Sci.</i> (editing and reviewing), <i>eLife</i> (editing and reviewing), <i>Biochemistry</i> , <i>Journal of the American Chemical Society</i> , <i>Journal of Molecular Biology</i> , and <i>Journal of Biomolecular NMR</i> and other journals. Also serving as an <i>ad hoc</i> reviewer for several funding agencies not noted above.

PROFESSIONAL SERVICE & TEACHING – CUNY

Teaching:

2016-2020	CCNY Chemistry 32002 – Biochemistry I; 30 hr lecture, 50-90 undergraduate students
2016	CCNY Chemistry 80541 – Molecular Biophysics Graduate Seminar; semester long, 8 Ph.D.
2015, 2018	GC Chemistry 86900 – Biomolecular NMR Spectroscopy; 3-6 hr lecture, 8 Ph.D. students
2015	GC Biochemistry 88800 – Hybrid Methods in Structural Biology; 3 hr lecture, 12 Ph.D. students

Service:

2015-2019	CUNY ASRC: Member, Biosafety Committee
2014-2017	CUNY ASRC: Chair, Faculty Search Committees (multiple) – ASRC Structural Biology Initiative
2017-2020	CUNY Graduate Center: Member, Executive Committee, Ph.D. Program in Biochemistry
2017-2020	CUNY Graduate Center: Member, Admissions and Awards Committee, Ph.D. Program in Biochemistry
2017-2020	CUNY Graduate Center: Member, Curriculum and Examination Committee, Ph.D. Program in Biochemistry
2015-present	CUNY Graduate Center: Faculty Member, Ph.D. Programs in Biochemistry, Chemistry and Biology

PROFESSIONAL SERVICE & TEACHING – UT SOUTHWESTERN

Service:

2013-2014	Department of Biophysics: Faculty Senate Representative
2012	Department of Biophysics: Faculty Search Committee
2002-2005	Department of Biochemistry: Computing Committee member
1999-2012	Department of Biochemistry: Faculty Search Committee member (7 committees)
1999-2012	Department of Biochemistry: Seminar and Events Committee member (chair: 1999-2002)
2004-2010	Molecular Biophysics: Graduate Program Chairman
2004-2014	PI, NIH T32 GM008297: Molecular Biophysics Predoctoral Training Program
2001-2005	Molecular Biophysics: Retreat Chairman
2000-2014	Molecular Biophysics: Steering Committee member
1999-2014	Ph.D. dissertation committees (38 total in five graduate programs)

- 1999-2014 Ph.D. qualifying exam committees (22 total in two graduate programs)
- 2012-2014 member, Magnetic Resonance Safety Committee
- 2010 Faculty Chair, UTSW Postdoctoral Association Symposium
- 2007-2014 Inservice teaching and tour leader, STARS (Science Teacher Access to Resources at Southwestern) program
- 2007-2010 member, search committee – Radiology Department chair

Teaching:

- 2010 DBS Core Course Biophysics Thread – co-director and 6 60' lectures, 15 Ph.D. topics: Biomolecular NMR Spectroscopy, Scattering Methods, Integration of Techniques
- 2009 Biological Chemistry: Literature Discussion Group – 6 60' sessions, 10 Ph.D. students topics: Environmental sensing and signaling
- 2008-2014 Molec. Biophysics: Advanced Biomolecular NMR – 4 90' lectures, 5 Ph.D./postdoc topics: NMR theory, pulse sequence development
- 2008-2014 Molec. Biophysics: Modern Methods in Structural Biology – 4-6 90' lectures, 10 Ph.D. Course organizer and director topics: solution NMR – chemical shift assignment, structure determination
- 2007-2013 Molec. Biophysics: Physical Biochemistry I – 1 90' lecture, 10-12 Ph.D. students topics: biophysical properties of proteins as polymers
- 2003-2008 Molec. Biophysics: Enzymology / Physical Biochemistry II – 1-2 90' lectures, 4-10 Ph.D. topics: time-resolved biophysical methods; role of dynamics in catalysis
- 2001-2006 Molec. Biophysics: Biomolecular NMR – 3-5 90' lectures, 12 Ph.D. students topics: several topics in NMR theory and practice
- 2000-2014 Medical Biochemistry – 5-6 60' lectures, 200-230 M.D. students topics: protein structure/function; allostery; hemoglobin
- 1999-2007 DBS Core Course – 1-2 90' lectures, 60-95 Ph.D. students topics: protein NMR spectroscopy
- 1999-2011 DBS Core Course – 5-6 90' literature review sessions, 8-10 Ph.D. students topics: protein structure and function

SOCIETY MEMBERSHIPS

American Chemical Society, Biophysical Society, AAAS, ASBMB, New York Academy of Sciences

ADVOCACY AND OUTREACH ACTIVITIES

- 2020 Participant, Virtual Rally for Biomedical Research
- 2018 Capitol Hill Visit – Reps. Espillat (NY-13), Maloney (NY-12), Serrano (NY-15)
- 2017 Host – ASRC Structural Biology Initiative, Rep. Adriano Espillat (NY-13)

INVITED LECTURES (2017 – present)2022:

221. NMR – A Tool for Biology, Pasteur Institute, Paris, France
222. Gordon Research Conference – Photosensory Receptors & Signal Transduction, Ventura, CA

2021(*: postponed or cancelled by COVID-19):

- . NMR – A Tool for Biology, Pasteur Institute, Paris, France*
218. 20th International Symposium in Flavins and Flavoproteins, Graz, Austria
219. Pitt/CMU Molecular Biophysics/Structural Biology Seminar Series, Pittsburgh, PA
220. Pacificchem 2021, Honolulu, HI

2020 (*: postponed or cancelled by COVID-19):

213. Gordon Research Conference – Signal Transduction in Microorganisms, Ventura, CA
214. Secret Science Club, Brooklyn, NY
215. Emerging Topics in Biomolecular Magnetic Resonance, online webinar series
216. Department of Biochemistry, University of Illinois – Champaign-Urbana, IL online webinar
217. SFB 1078 Protonation Dynamics in Protein Function colloquium, online webinar
- . Complex Carbohydrate Research Center, University of Georgia, Athens, GA*

- . Department of Chemistry, Berry College, Rome, GA*
- . Laboratory of Chemical Physics, NIH-NIDDK, Bethesda, MD*
- . Canadian Chemistry Conference and Exhibition 2020, Winnipeg, MB*
- . Gordon Research Conference – Photosensory Receptors & Signal Transduction, Ventura, CA*
- . 20th International Symposium in Flavins and Flavoproteins, Graz, Austria*
- . Center for Membrane Biology / Dept. of Biochemistry & Molecular Biology, UT Health, Houston, TX
- . Pacificchem 2020, Honolulu, HI*

2019:

- 207. Department of Chemistry, Goethe University, Frankfurt, Germany
- 208. Joint 17th International Congress on Photobiology & 18th Congress of the European Society for Photobiology, Barcelona, Spain
- 209. Department of Physics, City College of New York, NY
- 210. Sydney Protein Group – Thompson Prize Symposium, Sydney, Australia
- 211. 12th ANZMAG Conference, Bunker Bay, Australia (Plenary Speaker)
- 212. Optogenetic Technologies and Applications Conference, Boston, MA

2018:

- 198. Department of Biochemistry, Einstein College of Medicine, New York, NY
- 199. Department of Molecular Medicine, Hospital for Sick Children, Toronto, Canada
- 200. Symposium in Honor of Winslow Briggs, Carnegie Institution for Science, Stanford, CA
- 201. Department of Chemistry and Biochemistry, UC Santa Cruz, CA
- 202. Riverside Chat, Harlem Biospace, New York, NY
- 203. Summer Science Research Talks, Wesleyan University, Middletown, CT
- 204. XXVIIIth International Conference on Magnetic Resonance in Biological Systems, Dublin, Ireland (Plenary Speaker)
- 205. Institute of Molecular, Cell & Systems Biology, University of Glasgow, Glasgow, Scotland
- 206. Next Generation Optogenetics – Tools and Applications, Bonn, Germany

2017:

- 181. Department of Pharmacological Sciences, Stony Brook University, Stony Brook, NY
- 182. Department of Physiology & Biophysics, Weill Cornell Medical Center, New York, NY
- 183. 42nd Lorne Conference on Protein Structure and Function, Lorne, Australia
- 184. Department of Chemistry, Temple University, Philadelphia, PA
- 185. NIST-Institute for Bioscience and Biotechnology Research, Rockville, MD
- 186. Department of Biochemistry, Medical College of Wisconsin, Milwaukee, WI
- 187. Department of Biochemistry & NMRFAM, University of Wisconsin, Madison, WI
- 188. Larock Undergraduate Research Symposium, Department of Chemistry, UC Davis, Davis, CA (Keynote Speaker)
- 189. 40 Years of Sailing the Biomolecular NMR World –Symposium in Honor of Rolf Boelens, Utrecht University, Netherlands.
- 190. Gordon Research Conference – Bioorganic Chemistry, Andover, NH
- 191. TSRC Designing Biomolecular Switches Workshop, Telluride, CO
- 192. CUNY Research Scholars Conference, New York, NY
- 193. Design and Light Control Conference, CEF/CLiC Programs, Frankfurt, Germany
- 194. Structure Across Scales – NCBS 25th Anniversary Symposium, Bangalore, India
- 195. Molecular Biophysics Unit, IISc, Bangalore, India
- 196. Center for Cellular and Molecular Biology, Hyderabad, India
- 197. Tata Center for Interdisciplinary Science, Hyderabad, India