

CURRICULUM VITAE

Kevin H. Gardner

Departments of Biophysics and Biochemistry
University of Texas Southwestern Medical Center
5323 Harry Hines Boulevard, Dallas, TX 75390-8816
phone [FAX]: 1-(214)645-6365 [-6353] / email: Kevin.Gardner@utsouthwestern.edu

ACADEMIC POSITIONS

Professor (2009-present)

Associate Professor (2004-2009)

Assistant Professor (1998-2004)

Virginia Lazenby O'Hara Chair in Biochemistry
W.W. Caruth Jr. Scholar in Biomedical Research
Departments of Biophysics and Biochemistry
UT Southwestern Medical Center

Chairman (2004-2010)

Graduate Program in Molecular Biophysics
Division of Basic Sciences, Southwestern Graduate
School of Biomedical Sciences
UT Southwestern Medical Center

TRAINING

Postdoctoral Research (1995-1998)

University of Toronto

Advisor: Lewis E. Kay, Ph.D.

Research Area: Development of biophysical and biochemical methods to obtain structural models of 30-50 kDa proteins and protein complexes using solution NMR

Ph. D. (1989-1995)

Molecular Biophysics and Biochemistry

Yale University

Advisor: Joseph E. Coleman, M.D., Ph.D.

Thesis title: "Cadmium-113 Heteronuclear NMR Studies of Zn₂Cys₆ DNA Binding Domains"

B.S. (1985-1989, with Highest Honors):

Biochemistry, University of California, Davis

AWARDS AND HONORS

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-present, UT Southwestern

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-present, 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, Yale University

Bachelor's Degree with Highest Honors

1989, UC Davis

Departmental Citation for Excellence

1989, UC Davis

Phi Beta Kappa

1989, UC Davis

PUBLICATIONS – PEER-REVIEWED ARTICLES

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.*, in press ([†]: corresponding authors).
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: PMC Journal – In Process.
65. Moon, T.M., Correa, F., Kinch, L.N., Pinal, 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. PMID: PMC Journal – In Process.
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 Web-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 Web-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). 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) 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., Amezcua, 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. (reviewed in *Faculty of 1000*).
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 Web 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.
42. Sakiyama, H., Wynn, R.M., Lee, W.-R., Fukasawa, M., Mizuguchi, H., Gardner, K.H., Repa, J. and Uyeda, K. (2008) Regulation of nuclear import/export of carbohydrate response element-binding protein (ChREBP): interaction of an alpha-helix of ChREBP with the 14-3-3 proteins and regulation by phosphorylation. *J. Biol. Chem.*, **283**: 24899-24908.
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; reviewed in *Faculty of 1000*.
PMCID: 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. PMCID: 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. PMCID: 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. (reviewed in *Faculty of 1000*).

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. (reviewed in *Faculty of 1000*). PMCID: PMC539725.

32. Harper, S.M., Christie, J.M. and Gardner, K.H. (2004b) 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. (2004a) 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. PMCID: PMC307597.

28. Harper, S.M., Neil, L.C. and Gardner, K.H. (2003) Structural basis of a phototropin light switch. *Science*, **301**: 1541-1544. (reviewed in *Faculty of 1000*).

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. PMCID: PMC150143.

26. Amezcua, C.A., Harper, S.M., Rutter, J. and Gardner, K.H. (2002) Structure and interactions of PAS kinase N-terminal PAS domain: Model for intramolecular kinase regulation. *Structure*, **10**: 1349-1361.

25. Xiao, T., Gardner, K.H. and Sprang, S.R. (2002) Cosolvent-induced transformation of a death domain tertiary structure. *Proc. Natl. Acad. Sci.*, **99**: 11151-11156. PMID: PMC123225.
 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. (reviewed in *Faculty of 1000*).
 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 , ^{13}C and ^{15}N 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 ^{31}P 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 ^{15}N , ^{13}C , ^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 - δ^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 ¹⁵N, ¹³C 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 ¹⁵N, ¹³C α , ¹³C β and HN resonances in an ¹⁵N, ¹³C, 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) ¹¹³Cd-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 – REVIEWS

12. 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. PMID: PMC3464395.

11. Gardner, K.H. and Correa, F. (2012) How plants see the invisible. *Science*, **335**: 1451-1452.

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. PMID: 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. PMID: 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 , ^{13}C , ^{15}N 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., Tension, 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

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.

TRAINEES

Postdoctoral researchers:

- Dr. Carlos Amezcua (1999-2003) – *Research Scientist (Physical Chemistry Sciences), Baxter Health Care, Naperville, IL*
- Dr. Paul Erbel (2000-2004) – *Research Investigator (Structural Sciences Unit), Novartis Institutes for Biomedical Research, Basel, CH*
- Dr. Qiong Wu (2003-2009) – *Director, Biomolecular NMR Facility, UT Southwestern*
- Dr. Thomas Scheuermann (American Cancer Society Postdoctoral Fellow; 2004-2010) – *Instructor (Research Investigator), Gardner laboratory, UT Southwestern*
- Dr. Carrie Partch (NIH NRSA Postdoctoral Fellow; 2006-2011) – *Assistant Professor, Dept. of Chemistry and Biochemistry, UC Santa Cruz*
- Dr. Jason Key (2007-2011) – *Staff Member, SBGrid, Harvard Medical School*
- Dr. Fernando Corrêa (2008-present)
- Dr. Brian Zoltowski (NIH NRSA Postdoctoral Fellow; 2008-2011) – *Assistant Professor, Dept of Chemistry, Southern Methodist University*
- Dr. Giomar Rivera-Cancel (2009-present)

Dr. Laura Motta-Mena (2010-present)

Graduate students:

Shannon Harper (2000-2004; Ph.D. 2004) – *editor, BMC Biology, London, UK*

Paul Card (2000-2005 - Ph.D. 2005; postdoc 2005-2006) – *Operations Coordinator, E.O. Wood Inc.*

Terra Holdeman (2000-2001) – *M.D. degree from UTMB; surgery fellow, University of Missouri*

James Lee (MSTP, 2002-2006; completed Ph.D portion of M.D./Ph.D. program 2006) – *Medical resident, Huntington Memorial Hospital, Pasadena, CA*

Wen-huang (Lisa) Ko (2004-2009; Ph.D. 2009) – *postdoctoral researcher, Dan Rosenbaum laboratory, UT Southwestern*

Matthew Evans (2005-2009 - Ph.D. 2009; postdoc 2009-2010) – *postdoctoral researcher, Michael Roth laboratory, UT Southwestern*

Abigail Nash (MSTP, 2005-2009; completed Ph.D. portion of M.D./Ph.D. program 2009) – *medical resident, Dept. of Psychiatry, Emory University*

Yirui Guo (2010-present)

Victor Ocasio-Ramirez (2010-present)

(also mentored 35 additional rotation students during first-year rotations in lab, 1999-present)

Undergraduate students: (summer undergraduates via UT Southwestern SURF program)

Mark Chan (1999, Harvard Univ.); Brad Holmes (2001, Texas A&M Univ.); Daniel Buehler (2004, Univ.

New Mexico); Aaron Maeng (2005, UT Austin); Leanna Steier (2007, Notre Dame); Laura Salguero (2008, New Mexico State Univ.); Kyle Ireton (2010, Oregon State Univ.)

Sabbatical visitors:

Dr. Ernest Blakeney (Fall 1999, Dept. of Chemistry, Centenary College)

Dr. Susan Alguindigue (Summer 2002, Dept. of Chemistry, Univ. of Oklahoma)

PROFESSIONAL SERVICE & TEACHING – UT SOUTHWESTERN

Service:

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-present	PI, NIH T32 GM008297: Molecular Biophysics Predoctoral Training Program
2001-2005	Molecular Biophysics: Retreat Chairman
2000-present	Molecular Biophysics: Steering Committee member
1999-present	Ph.D. dissertation committees (38 total in five graduate programs)
1999-present	Ph.D. qualifying exam committees (22 total in two graduate programs)
2012-present	member, Intellectual Property Safety Committee
2012-present	member, Magnetic Resonance Safety Committee
2010	Faculty Chair, UTSW Postdoctoral Association Symposium
2009-present	Advisory Board, NIH T32 programs for Psychiatry and Mechanisms of Drug Addiction
2007-present	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. students
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-present Molec. Biophysics: Advanced Biomolecular NMR – 4 90' lectures, 5 Ph.D./postdoc
topics: NMR theory, pulse sequence development
- 2008-2010 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-present 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-present 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-present DBS Core Course – 5-6 90' literature review sessions, 8-10 Ph.D. students
topics: protein structure and function

PROFESSIONAL SERVICE – COMMUNITY

- 2014 Chair, XXVI International Conference for Magnetic Resonance in Biological Systems (ICMRBS)
- 2012 Organizer, Symposium on Biomolecular Structure, Dynamics and Function, Memphis, TN
- 2012 *Ad hoc* member, NIH MSFC study section; NCI Intramural Review Group
- 2011-2014 Member, Center for Biomolecular Structure and Dynamics CoBRE External Advisory Board, University of Montana
- 2011 *Ad hoc* 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 *Ad hoc* member, NIH Stimulus panels, NIH/NCI Molecular Oncology P01 Special Emphasis Panel, NIH BBM Study Section
- 2008 *Ad hoc* member, NIH Shared Instrumentation Special Emphasis Panel and NIH MSFB Study Section
- 2006 *Ad hoc* member, NIH MSFB Study Section
- 2004 *Ad hoc* member, NIH BBKA Study Section
- 2001, 2002 lecturer: Woods Hole Marine Biology Laboratory – Physiology course
- 2001 *Ad hoc* member, NIH BBKA Special Study Section
- 2001 lecturer: NRC/HHMI course "Determination of high-resolution structures for the post-genomic age", Warsaw, Poland
- ongoing *Ad hoc* reviewer for *Science*, *Nature*, *Proc. Natl. Acad. Sci.* (editing and reviewing), *Biochemistry*, *Journal of the American Chemical Society*, *Journal of Molecular Biology*, and *Journal of Biomolecular NMR* and other journals. Also serving as an *ad hoc* reviewer for several funding agencies, including NSF.

SOCIETY MEMBERSHIPS

American Chemical Society, Biophysical Society, American Association for the Advancement of Science

INVITED LECTURES (2010 - present)

2013:

138. Keystone Symposium – Frontiers of NMR in Biology
139. CIHR Program in Protein Folding and Interaction Dynamics, University of Toronto, Toronto, Canada
140. Department of Biochemistry, Molecular Biology and Biophysics, University of Minnesota, Minneapolis, MN
141. 52nd Annual Meeting of the Nuclear Magnetic Resonance Society of Japan, Kanazawa, Japan
142. 69th South West Regional Meeting of the American Chemical Society, Waco, TX

2012:

128. Gordon Research Conference – Biomolecular Interactions and Methods, Galveston, TX
129. Gordon Research Conference – Photosensory Receptors & Signal Transduction, Galveston, TX (Session Chair)
130. Biophysical Society 56th Annual Meeting, San Diego, CA (Session Chair)
131. Department of Biochemistry & Molecular Biology, University of Chicago, IL
132. NMR Symposium, Vanderbilt University, Nashville, TN
133. American Society of Photobiology Annual Meeting, Montreal, Canada
134. 19th International Methods in Protein Structure Analysis Conference, Ottawa, Canada
135. International Conference for Magnetic Resonance in Biological Systems, Lyon, France
136. Innovations in Cancer Prevention and Research Conference, Austin, TX
137. 6th International Symposium on Fluctuations towards Biological Functions, Kyoto, Japan

2011:

118. Biophysical Society 55th Annual Meeting, Baltimore, MD
119. Frontiers in Nuclear Magnetic Resonance Spectroscopy: Biomolecular Structure, Dynamics and Interactions, City College of New York, New York, NY
120. CUNY Advanced Science Seminar Series, City University of New York, New York, NY
121. Department of Chemistry, University of Akron, Akron, OH
122. 52nd Experimental NMR Conference, Asilomar, CA
123. Center for Vascular Biology Research, Harvard Medical School, Boston, MA
124. Department of Chemistry, Princeton University, Princeton, NJ
125. Vielberth Foundation Visiting Professorship, University of Regensburg, Regensburg, Germany
126. 35th Steenbock Symposium, University of Wisconsin, Madison, WI (Keynote Lecturer)
127. GRASP-NMR 2011 Symposium, University of Kansas, Lawrence, KS (Plenary Lecturer)

2010:

108. NMRS 2010, Lucknow, India
109. Undergraduate Research Festival, Abilene Christian University, Abilene, TX (Plenary Lecturer)
110. Gordon Research Conference – Photosensory Receptors & Signal Transduction, Il Ciocco, Italy (Meeting Chair)
111. Plant Signalling Mechanisms, Freiburg, Germany
112. Gulf Coast Consortium Magnetic Resonance Conference, Houston, TX
113. International Conference for Magnetic Resonance in Biological Systems, Cairns, Australia (Keynote Speaker)
114. School of Molecular and Biomedical Science, University of Adelaide, Adelaide, Australia
115. 49th Annual Meeting of the Nuclear Magnetic Resonance Society of Japan, Tokyo, Japan
116. Department of Molecular and Cell Biology, UT Dallas, Richardson, TX
117. Pacifichem 2010, Honolulu, HI