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EDUCATION

Cornell University, Ithaca, NY	A.B.	1985	Chemistry
Yale University, New Haven, CT	S.M.	1988	Chemistry
Harvard University, Cambridge, MA	Ph.D.	1992	Chemistry

RESEARCH AND PROFESSIONAL EXPERIENCE

2005–present	Staff Scientist, Oak Ridge National Laboratory
2001–2005	Associate Professor of Chemistry, University of Illinois at Chicago
1995–2001	Assistant Professor of Chemistry, Texas A&M University
1992–1995	Postdoctoral Fellow, Harvard University
2011–present	Joint Associate Professor, Biochemistry & Molecular and Cellular Biology, University of Tennessee, Knoxville

RESEARCH INTERESTS

Biomembranes (neutron scattering; lipid domains; membrane models; isotopic labeling; molecular dynamics, lipidomics)

Secondary metabolism, metabolomics and microbial communication

Bioenergy, Biotechnology, Bioengineering, Biomedicine and Biosecurity

AREAS OF EXPERTISE

Organic chemistry (synthesis; modeling/simulation; separations; mechanism; structural analysis by NMR, IR, mass and other spectroscopies; biosynthesis; peptides; surface modification; natural products; secondary metabolites)

Biochemistry (proteins; biophysics; bioconjugates; molecular interactions; assays)

Radiochemistry and stable isotope research (tagging, imaging, separations, analysis)

Exceptional breadth of knowledge across physical and life sciences

SELECTED PEER-REVIEWED PUBLICATIONS

1. Hurst, G. B.; Asano, K. G.; Doktycz, C. J.; Consoli, E. J.; Doktycz, W. L.; Foster, C. M.; Morrell-Falvey, J. L.; Standaert, R. F.; Doktycz, M. J. Proteomics-based tools for evaluation of cell-free protein synthesis. *Anal. Chem.* **2017**, in press. dx.doi.org/10.1021/acs.analchem.7b02555
2. Nickels, J. D.; Chatterjee, S.; Mostofian, B.; Stanley, C. B.; Ohl, M.; Zolnierczuk, P.; Schulz, R.; Myles, D. A. A.; Standaert, R. F.; Elkins, J. G.; Cheng, X.; Katsaras, J.

Bacillus subtilis lipid extract, a branched-chain fatty acid model membrane. *J. Phys. Chem. Lett.* **2017,** 8, 4214–4217.

3. Li, L.; Shukla, S.; Meilleur, F.; Standaert, R. F.; Pierce, J.; Myles, D. A. A.; Cuneo, M. J. Neutron crystallographic studies of T4 lysozyme at cryogenic temperature. *Protein Sci.* **2017**.
4. Nickels, J. D.; Chatterjee, S.; Stanley, C. B.; Qian, S.; Cheng, X.; Myles, D. A. A.; Standaert, R. F.; Elkins, J. G.; Katsaras, J. The in vivo structure of biological membranes and evidence for lipid domains. *PLoS Biol.* **2017**, 15: e2002214.
5. Jelenska, J.; Davern, S. M.; Standaert, R. F.; Mirzadeh, S.; Greenberg, J. T. Flagellin peptide flg22 gains access to long-distance trafficking in *Arabidopsis* via its receptor, FLS2. *J. Exp. Bot.* **2017,** 68, 1769–1783.
6. Marquardt, D.; Heberle, F. A.; Greathouse, D. V.; Koeppe, R. E.; Standaert, R. F.; Van Oosten, B. J.; Harroun, T. A.; Kinnun, J. J.; Williams, J. A.; Wassall, S. R.; Katsaras, J. Lipid bilayer thickness determines cholesterol's location in model membranes. *Soft Matter* **2016,** 12, 9417–9428.
7. Chowdhury, S.; Standaert, R. F. Deoxygenation of unhindered alcohols via reductive dealkylation of derived phosphate esters. *J. Org. Chem.* **2016,** 81, 9957–9963.
8. Heberle, F. A.; Marquardt, D.; Doktorova, M.; Geier, B.; Standaert, R. F.; Heftberger, P.; Kollmitzer, B.; Nickels, J. D.; Dick, R. A.; Feigenson, G. W.; Katsaras, J.; London, E.; Pabst, G. Subnanometer structure of an asymmetric model membrane: interleaflet coupling influences comain properties. *Langmuir* **2016,** 32, 5195-5200.
9. Davern, S. M.; McKnight, T. E.; Standaert, R. F.; Morrell-Falvey, J. L.; Shpak, E. D.; Kalluri, U. C.; Jelenska, J.; Greenberg, J. T.; Mirzadeh, S. Carbon nanofiber arrays: a novel tool for microdelivery of biomolecules to plants *PLoS One* **2016,** 11:e0153621
10. Wang, J.; Mojumder, D. K.; Yan, J.; Xie, A.; Standaert, R. F.; Qian, H. H.; Pepperberg, D. R.; Frishman, L. J. *In vivo* electroretinographic studies of the role of $GABA_C$ receptors in retinal signal processing. *Exp. Eye Res.* **2015,** 139, 48-63.
11. Nickels, J. D.; Cheng, X. L.; Mostofian, B.; Stanley, C.; Lindner, B.; Heberle, F. A.; Perticaroli, S.; Feirgenson, M.; Egami, T.; Standaert, R. F.; Smith, J. C.; Myles, D. A. A.; Ohl, M.; Katsaras, J. Mechanical properties of nanoscopic lipid domains. *J. Am. Chem. Soc.* **2015,** 137, 15772-15780.
12. Millet, L. J.; Lucheon, J. D.; Standaert, R. F.; Retterer, S. T.; Doktycz, M. J. Modular microfluidics for point-of-care protein purifications. *Lab Chip* **2015,** 15, 1799-1811.
13. Sangha, A. K.; Davison, B. H.; Standaert, R. F.; Davis, M.; Smith, J. C.; Parks, J. M. Chemical factors that control lignin polymerization. *J. Phys. Chem. B* **2014,** 118, 164-170.
14. Heberle, F. A.; Doktorova, M.; Goh, S. L.; Standaert, R. F.; Katsaras, J.; Feigenson, G. W. Hybrid and nonhybrid lipids exert common effects on membrane raft size and morphology. *J. Am. Chem. Soc.* **2013,** 135, 14932-14935.
15. Heberle, F. A.; Petruzielo, R. S.; Pan, J.; Drazba, P.; Kucerka, N.; Standaert, R. F.; Feigenson, G. W.; Katsaras, J. Bilayer thickness mismatch controls domain size in model membranes. *J. Am. Chem. Soc.* **2013,** 135, 6853-6859.

16. Tomanicek, S. J.; Standaert, R. F.; Weiss, K. L.; Ostermann, A.; Schrader, T. E.; Ng, J. D.; Coates, L. Neutron and X-ray crystal structures of a perdeuterated enzyme inhibitor complex reveal the catalytic proton network of the Toho-1 β-lactamase for the acylation reaction. *J. Biol. Chem.* **2013,** 288, 4715-4722.

17. Heberle, F. A.; Pan, J.; Standaert, R. F.; Drazba, P.; Kucerka, N.; Katsaras, J. Model-based approaches for the determination of lipid bilayer structure from small-angle neutron and X-ray scattering data. *Eur. Biophys. J.* **2012,** 41, 875-890.

18. Sangha, A. K.; Parks, J. M.; Standaert, R. F.; Ziebell, A.; Davis, M.; Smith, J. C. Radical coupling reactions in lignin aynthesis: a density functional theory study. *J. Phys. Chem. B* **2012,** 116, 4760-4768.

19. Tschaplinski, T. J.; Standaert, R. F.; Engle, N. L.; Martin, M. Z.; Sangha, A. K.; Parks, J. M.; Smith, J. C.; Samuel, R.; Jiang, N.; Pu, Y.; Ragauskas, A. J.; Hamilton, C. Y.; Fu, C.; Wang, Z.-Y.; Davison, B. H.; Dixon, R. A.; Mielenz, J. R. Down-regulation of the caffeic acid *O*-methyltransferase gene in switchgrass reveals a novel monolignol analog. *Biotechnol. Biofuels* **2012,** 5.

20. Buchanan, R. L.; Baker, R. C.; Charlton, A. J.; Riviere, J. E.; Standaert, R. Pet food safety: a shared concern. *Br. J. Nutr.* **2011,** 106, S78-S84.

21. Xie, A.; Yan, J.; Yue, L.; Feng, F.; Mir, F.; Abdel-Halim, H.; Chebib, M.; Le Breton, G. C.; Standaert, R. F.; Qian, H.; Pepperberg, D. R. 2-Aminoethyl methylphosphonate, a potent and eapidly acting antagonist of GABA(A)-rho 1 receptors. *Mol. Pharmacol.* **2011,** 80, 965-978.

22. Woodward, J. D., Kennel, S. J., Stuckey, A., Osborne, D. Wall, J. S., Rondinone, A. J., Standaert, R. F., Mirzadeh, S. (2011). $LaPO_4$ nanoparticles doped with actinium-225 that partially sequester daughter radionuclides. *Bioconj. Chem.* **22**, 766–776.

23. Greene, D. L., Boudreaux, P. R., Dean, D. J., Fulkerson, W., Gaddis, A. L., Graham, R. L., Graves, R. L., Hopson, J. L., Hughes, P., Lapsa, M. V., Mason, T. E., Standaert, R. F., Wilbanks, T. J., Zucker, A. (2010). The importance of advancing technology to U.S. energy goals. *Energy Pol*. **38**, 3886–3890.

24. Edwards, A.N., Fowlkes J.D., Owens E.T., Standaert R.F., Pelletier D.A., Hurst G.B., Doktycz M.J., Morrell-Falvey J.L. (2009). An *in vivo* imaging-based assay for detecting protein interactions over a wide range of binding affinities. *Anal. Biochem.* **395**, 166–177

25. Chowdhury, S., Muni, N. J., Greenwood, N. P. Pepperberg, D. R. and Standaert, R. F. (2007). Phosphonic acid analogs of GABA through reductive dealkylation of phosphonic diesters with lithium trialkylborohydrides. *Bioorg. Med. Chem. Lett.* **17**, 3745–3748.

26. Park, S. B. and Standaert, R. F. (2006). Abc Amino Acids: Design, Synthesis, and Properties of New Photoelastic Amino Acids. *J. Org. Chem.* **71**, 7952–7966

27. Fontes, M. R. M., Teh, T., Riell, R. D., Park, S. B., Standaert, R. F. and Kobe, B. (2005) Crystallization and preliminary X-ray diffraction analysis of importin-α complexed with NLS peptidomimetics. *Biochim. Biophys. Acta* **1750**, 9–13.

28. Vu, T. Q., Chowdhury, S., Muni, N. J., Qian, H., Standaert, R. F. and Pepperberg, D. R. (2005). Activation of membrane receptors by a neurotransmitter conjugate designed for surface attachment. *Biomaterials* **26**, 1895–1903.

29. Jayathilaka, L. P., Deb, M. and Standaert, R. F. (2004). Asymmetric synthesis and translational competence of L-α-(1-cyclobutenyl)glycine. *Org. Lett.* **6**, 3659–3662.

30. Nehilla, B. J., Popat, K. C., Vu, T. Q., Chowdhury, S., Standaert, R. F., Pepperberg, D. R. and Desai, T. (2004). Neurotransmitter analog tethered to a silicon platform for neuro-bioMEMS applications. *Biotechnol. Bioeng.* **87**, 669–674.

31. Park, S.B., Ho, T.H., Reedy, B.M.T, Connolly, M.D. & Standaert, R.F. (2003). A simple mimetic of a nuclear localization signal (NLS). *Org. Lett.*, **5**, 2437–2440.

32. Park, S.B. & Standaert, R.F. (2001). A photo-regulated ligand for the nuclear import receptor karyopherin α. *Bioorg. Med. Chem.* **9**, 3515–3523.

33. Kopytek, S.J., Standaert, R.F., Dyer, J. & Hu, J.C. (2000). Chemically induced dimerization of dihydrofolate reductase by a dimer of methotrexate. *Chem. Biol.* **7**, 313–321.

34. VanBrunt, M.P. & Standaert, R.F. (2000). A short total synthesis of furanomycin. *Org. Lett.* **2**, 705–708.

35. Connolly, M.D., Park, S.B., Reedy, B.M. & Standaert, R.F. (2000). A simple, solid-phase binding assay for the nuclear import receptor karyopherin α. Part I: Direct Binding. *Bioorg. Med. Chem. Lett.* **10**, 951–954.

36. Park, S.B., Reedy, B.M. & Standaert, R.F. (2000). A simple, solid-phase binding assay for the nuclear import receptor karyopherin α. Part 2: Competitive binding. *Bioorg. Med. Chem. Lett.* **10**, 955–956.

37. Park, S.B. & Standaert, R.F. (1999). α,α-Difluorophosphonomethyl azobenzene derivatives as photoregulated phosphoamino acid analogs. Part 1: design and synthesis. *Tetrahedron Lett.* **40**, 6557–6560.

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39. Galat, A., Lane, W. S., Standaert, R. F. & Schreiber, S. L. A Rapamycin-Selective 25-kDa Immunophilin. (1992) *Biochemistry* **31**, 2427–2434.

40. Van Duyne, G.D., Standaert, R.F., Karplus, P.A., Schreiber, S.L. & Clardy, J. (1991). Atomic structure of FKBP–FK506, an immunophilin-immunosuppressant complex. *Science* **252**, 839–842.

41. Standaert, R. F., Galat, A., Verdine, G. L. & Schreiber, S. L. (1990) Molecular cloning and overexpression of the human FK506-binding protein FKBP. *Nature* **346**, 671–674.

42. Rosen, M. K., Standaert, R. F., Galat, A., Nakatsuka, M. & Schreiber, S. L. (1990) Inhibition of FKBP rotamase activity by immunosuppressant FK506: twisted amide surrogate. *Science* **248**, 863–866.

OTHER PUBLICATIONS AND PATENTS:

1. Pan, J.; Cheng, X.; Heberle, F. A.; Mostofian, B.; Kucerka, N.; Drazba, P.; Standaert, R. F.; Katsaras, J. (2013). Backbone moiety of phospholipids determines cholesterol disposition. Abstracts of Papers, 245th ACS National Meeting, New Orleans, LA, April 7–11, PHYS-49
2. Heberle, F. A.; Petruzielo, R. S.; Pan, J.; Drazba, P.; Kucerka, N.; Standaert, R. F.; Feigenson, G. W.; Katsaras, J. Membrane RAFT mixtures investigated with small-angle neutron scattering (2013). Abstracts of Papers, 245th ACS National Meeting, New Orleans, LA, April 7–11, PHYS-419
3. Heberle, F. A.; Drazba, P.; Pan, J.; He, J.; Weiss, K. L.; O'Neill, H. M.; Katsaras, J.; Standaert, R. F. (2013). Sterol transfer rates measured by small-angle neutron scattering (SANS) and fluorescence resonance energy transfer (FRET). Abstracts of Papers, 245th ACS National Meeting, New Orleans, LA, April 7–11, PHYS-419
4. Sangha, A. K.; Parks, J. M.; Ziebell, A.; Davis, M.; Standaert, R. F.; Smith, J. C. (2012). Radical coupling reactions in lignin biosynthesis: A quantum chemical study. Abstracts of Papers, 243rd ACS National Meeting, San Diego, CA, March 25–29, CELL-105
5. Woodward, J. D.; Kennel, S. J.; Stuckey, A.; Osborne, D.; Wall, J.; Rondinone, A. J.; Standaert, R. F.; Mirzadeh, S. (2010). $LaPO_4$ nanoparticles doped with actinium-225 that partially sequester daughter radionuclides. Book of Abstracts, 240th ACS National Meeting, Boston, MA, August 22–26, NUCL-92.
6. Xie, A., Feng, F., Yan, J., Standaert, R.F. Pepperberg, D.R., Qian, H. (2009). Comparison of inhibitory mechanism for 2-aminoethyl methylphosphonate (2-AEMP) and TPMPA at $GABA_C$ receptors. *Invest. Ophthalmol. Vis. Sci. 50*, ARVO E-Abstract 1016.
7. Wang, J., Xie, A., Yan, J., Standaert, R.F., Qian, H., Pepperberg, D.R. Frishman, L.J. (2009). *In vivo* effects of 2-AEMP analog of GABA, a $GABA_C$ receptor antagonist, on dark-adapted mouse ERG. *Invest. Ophthalmol. Vis. Sci. 50*, ARVO E-Abstract 2179.
8. Jayathilaka, L.P., VanBrunt, M.P., and Standaert, R.F. (2006). Functional analogs of isoleucine for peptide and protein engineering. Book of Abstracts, 58th ACS Southeast Regional Meeting, Augusta, GA, November 1-4, Abstract 500.
9. Pepperberg, D.R., Vu, T.Q., Chowdhury, S., Standaert, R.F., Qian, H. (2004). GABA receptor activation by a tetherable analog of muscimol for application in a neuromodulating molecular device. *Invest. Ophthalmol. Vis. Sci. 45*, ARVO E-Abstract 4196.
10. Nehilla, B.J., Popat, K.C., Chowdhury, S., Standaert, R.F., Pepperberg D.R., and Desai, T.A. (2004). Assembly and Characterization of a Muscimol-Immobilized Silicon Surface. *Invest. Ophthalmol. Vis. Sci. 45*, ARVO E-Abstract 4194.
11. Schreiber, S.L., Standaert, R.F., Fenteany, G., and Jamison, T.F. (2003). Lactacystin analogs for diagnosis and treatment of proteasome-mediated disorders. U.S. Patent 6645999.
12. Standaert, R.F. Photoisomerizable amino acids for the control of protein localization with light. (2001). Book of Abstracts, 53th ACS Southeast Regional Meeting, Savannah, GA, September 23–26, Abstract 424.

13. Park, S. B., and Standaert, R. F. (1999). Synthesis and evaluation of photoregulated phosphoamino acid mimics. Book of Abstracts, 218th ACS National Meeting, New Orleans, Aug. 22-26, ORGN-383.
14. Connolly, M. D., and Standaert, R. F. (1999). Nonpeptide nuclear localization signal (NLS) mimics: Synthesis and importin binding assay. Book of Abstracts, 218th ACS National Meeting, New Orleans, Aug. 22-26, ORGN-382.
15. Standaert, R., and VanBrunt, M. P. (1999). Synthetic studies toward furanomycin. Book of Abstracts, 218th ACS National Meeting, New Orleans, Aug. 22-26, ORGN-378.
16. Lai, Z., and Standaert, R. F. (1999). Noncysteine β-mercapto-a-amino acids: Prospective tools for peptide chemistry. Book of Abstracts, 218th ACS National Meeting, New Orleans, Aug. 22-26, MEDI-142.
17. Park, S. B., and Standaert, R. F. (1999). Novel photochemically switchable amino acids and their application to the nuclear localization signal. Book of Abstracts, 217th ACS National Meeting, Anaheim, Calif., March 21-25, ORGN-097.
18. Park, S. B., and Standaert, R. F. (1999). Novel photochemically switchable amino acids and their application to the nuclear localization signal (NLS). Book of Abstracts, 217th ACS National Meeting, Anaheim, Calif., March 21-25, ORGN-094.
19. Schreiber, S.L., Standaert, R.F., Fenteany, G., and Jamison, T.F. (1996). Lactacystin analogs for inhibition of proteasomes and treatment of proteasome-mediated diseases. *PCT Int. Appl.*, WO 9632105 A1.
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22. Schreiber, S. L., Liu, J., Albers, M. W., Karmacharya, R., Koh, E., Martin, P. K., Rosen, M. K., Standaert, R. F., and Wandless, T. J. (1991). Immunophilin-ligand complexes as probes of intracellular signaling pathways. *Transplant. Proc. 23*, 2839-2844.
23. Schreiber, S.L, Ragan, J.A., and Standaert, R.F. (1991). Total synthesis of the FK506/FKBP complex. In Strategies and Tactics in Organic Synthesis (vol. 3), T. Lindquist, ed. (San Diego, CA: Academic Press), pp. 417–461.

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