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Education and Training

1995–1997	Vienna University of Technology, 1st Diploma in Chemistry (B.S. equivalent, 1998)
1997–1998	University of North Carolina, Chapel Hill. Undergraduate Exchange Student under the TASSEP Program (Chemistry)
1998–2003	Massachusetts Institute of Technology, Ph.D. (2003) Advisor: Gregory C. Fu (Organic Chemistry)
2003-2006	Massachusetts Institute of Technology, Postdoctoral. Advisor: Daniel G. Nocera (Inorganic Chemistry)

Professional Experience

Professional Appointments

2019–2024	International Guest Chair, the Energy and Environment Solutions Initiative at University of Pau and Pays de l'Adour (E2S-UPPA)
2013–	Full Professor of Chemistry, Boston College
2012–2013	Associate Professor of Chemistry, University of Oregon
2010–2013	Cofounder and Chief Science Officer of QE Chemicals, Inc.
2010–2013	Director, Master's industrial internship program in organic synthesis at the University of Oregon
2006–2012	Assistant Professor of Chemistry, University of Oregon

Professional Service

2022–2023	*Chem. Soc. Rev.* guest editor for a themed issue on the Applications of Main Group Chemistry in Synthesis, Catalysis, and Biomedical and Materials Research
2022	2021 Top 10% reviewer for *Angew. Chem. Int. Ed.* Journal
2021	Co-organizer, Pacifichem 2021, Symposium "Unusual Structure and Reactivity in the Main Group: From Fundamental to Functional Materials (#222)"
2018–2019	*Chem. Soc. Rev.* guest editor for a themed issue on Contemporary Research in Boron Chemistry
2018	Chair of the organizing committee for the 16th Boron Chemistry Meeting in the Americas (BORAM XVI) at Boston College
2016–	Advisory Board Member for Boron in the Americas Organization
2015	Co-organizer, Pacifichem 2015, Symposium "Organo-Main Group Avenues toward Advanced Materials (#16)"
2012–	Editorial Advisory Board Member for Organic & Biomolecular Chemistry (OBC) (2017 Outstanding Reviewer for OBC)
2012–2016	Project leader for the collaborative DOE EERE project "Novel Carbon(C)-Boron(B)-Nitrogen(N)-Containing H_2 Storage Materials"
2010–2016	US representative to the International Energy Agency (IEA), Hydrogen Implementing Agreement (HIA) Hydrogen Storage Task

2009	Local Co-organizer, "Hydrogen Road Tour '09" Eugene Stop
2008–2013	Academic Advisor and Lead Contact at University of Oregon, Trans Atlantic Science Student Exchange Program (TASSEP)

Awards

2010	NSF Career Award (declined due to overlap with NIH funding)
2012	Journal of Physical Organic Chemistry Award for Early Excellence
2012	Camille Dreyfus Teacher-Scholar Award
2014	ACS Organometallics Young Investigator Fellow
2016	Friedrich Wilhelm Bessel Research Award of the Alexander von Humboldt Foundation
2018	Boron in the Americas Award in recognition for Distinguished Achievement in Boron Chemistry

Research Interests

Synthetic organic, inorganic, and organometallic chemistry, boron heterocycles, novel aromatic compounds, hydrogen storage, optoelectronic materials, boron-containing biomimetics

Publications

As Independent Faculty:
(† denotes undergraduate coauthor)

103. Alvarado, M.; Tran, L.;† Tönshoff, C.; Li, B.; Darrigan, C.; Preud'homme, H.; Chrostowska, A.; Bettinger, H.; Liu, S.-Y. "A Nitrilium-Type *N*-Heterocyclic Aryne" *J. Am. Chem. Soc.* **2025**, *147*, 19465-19471. [10.1021/jacs.5c05146]
102. Liu J; Dai, Y.; Robsinson, D.;† Li, B.; Miqueu, K.; Liu, S.-Y. " Synthesis of Chiral δ-Aminoboronic Esters by Enantioselective Hydrogenation of 1,2-Azaborines" *Angew. Chem. Int. Ed.* **2025**, *64*, e202504419. [10.1002/anie.202504419]
101. Ozaki T.; Liu, S.-Y. "Boron-Nitrogen-Containing Benzene Valence Isomers" *Chem. Eur. J.* **2024**, e202402544. [10.1002/chem.202402544]
    *Contribution as a response to an editorial invitation by the Editor-in-Chief.
100. Ozaki T.; Bentley S. K.; Rybansky, N.†; Li, B.; Liu, S.-Y. "A BN-Benzvalene*″ J. Am. Chem. Soc.* **2024**, *146*, 24748-24753. [10.1021/jacs.4c08088]
    * Selected for a Supplementary Journal Cover.
    * Highlighted in *SYNFACTS* **2024**, *20(12)*, 1260.
99. Lin, H.; Yang, X.; Liu, S.-Y., Jäkle, F. "Ring Opening Metathesis Polymerization (ROMP) of the Dewar Isomer of 1,2-Azaborinine, a B-N Isostere of Benzene" *ACS Macro Lett.* **2024**, *13*, 21-27. DOI: 10.1021/acsmacrolett.3c00601.
98. Eaton, M.; Zhang, Y.; Liu, S.-Y. "Borataalkenes and the eta-2-B,C Coordination Mode in Coordination Chemistry and Catalysis" *Chem. Soc. Rev.* **2024**, *53*, 1915-1935. DOI: 10.1039/D3CS00730H.
97. Eaton, M.; Dai, Y.; Wang, Z.; Li, B.; Lamine, W.; Miqueu, K.; Liu, S.-Y. "Synthesis of Allenes by Hydroalkylation of 1,3-Enynes with Ketones Enabled by Cooperative Catalysis" *J. Am. Chem. Soc.* **2023**, *145*, 21638-21645. DOI: 10.1021/jacs.3c08151.
96. Lee, H.; Alvarado, M.; Ingram, S.†; Liu, S.-Y. "*N*-Functionalization of 1,2-Azaborines" *Synlett* **2023**, *34*, 2169-2174. DOI: 10.1055/a-2108-9895.
95. Zhang, C.; Chrostowska, A.; Liu S.-Y.; Karamanis,* P.; Otero N. "Between Electron Delocalization and Low-Lying Excited States of BN-Doped Aromatic Hydrocarbons" *Chem. Phys. Lett.* **2023**, 140615. DOI: 10.1016/j.cplett.2023.140615.
94. Ishibashi, J. S. A.; Lamine, W.; Miqueu, K. ; Liu, S.-Y. "The Aromatic Claisen Rearrangement of a 1,2-Azaborine" *Org. Biomol. Chem.* **2023**, *21*, 3778-3783. DOI: 10.1039/D2OB02186B.
    * Invited as part of the special issue "Celebrating the 20th anniversary of Organic and Biomolecular Chemistry".
93. Wang, Z.; Zhang, C.; Wu, J.†; Li, B.; Liu, S.-Y. "*trans*-Hydroalkynylation of Internal 1,3-Enynes Enabled by Cooperative Catalysis" *J. Am. Chem. Soc.* **2023**, *145*, 5624-5630. DOI: 10.1021/jacs.3c00514.
92. Wang, Z.; Lamine, W.; Miqueu, K.; Liu, S.-Y. "A Syn Outer-Sphere Oxidative Addition: The Reaction Mechanism in Pd/Senphos-Catalyzed Carboboration of 1,3-Enynes" *Chem. Sci.* **2023**, *14*, 2082-2090. DOI: 10.1039/D2SC05828F.
91. Zhang, Y.; Wang, Z.; Lamine, W.; Xu, S.; Li, B.; Chrostowska, A.; Miqueu, K.; Liu, S.-Y. "Mechanism of Pd/Senphos-Catalyzed trans-Hydroboration of 1,3-Enynes: Experimental and Computational Evidence in Support of the Unusual Outer-Sphere Oxidative Addition Pathway" *J. Org. Chem.* **2023**, *88*, 2415-2424. DOI: 10.1021/acs.joc.2c02841.

90. Giustra, Z. X.; Chen, G.; Vasiliu, M.; Karkamkar, A.; Autrey, T.; Dixon, D. A.; Liu, S.-Y. "A Comparison of Hydrogen Release Kinetics from 5- and 6-Membered 1,2-BN-Cycloalkanes" *RSC Adv.* **2021**, *11*, 34132-34136. DOI: 10.1039/D1RA07477F2.
89. Liu, Y.; Puig de la Bellacasa, R.; Li, B.; Cuenca, A. B.; Liu, S.-Y. "The Versatile Reaction Chemistry of An Alpha-Boryl Diazo Compound" *J. Am. Chem. Soc.* **2021**, *143*, 14059-14064. DOI: 10.1021/jacs.1c06112.
88. Wang, Z.; Wu, J.[†]; Lamine, W.; Li, B.; Sotiropoulos, J.-M.; Chrostowska, A.; Miqueu, K.; Liu, S.-Y. "C-Boron Enolates Enable Palladium Catalyzed Carboboration of Internal 1,3-Enynes" *Angew. Chem. Int. Ed.* **2021**, *60*, 21231-21236. DOI: 10.1002/anie.202108534.
    * Selected by the editors as a "Hot Paper".
87. Chen, M.; Unikela, K. S.; Ramalakshmi, R.; Li, B.; Darrigan, C.; Chrostowska, A.; Liu, S.-Y. "A BN-Doped Cycloparaphenylene Debuts" *Angew. Chem. Int. Ed.* **2021**, *60*, 1556-1560. DOI: 10.1002/anie.202010556.
    * Highlighted in *SYNFACTS* **2021**, *17(02)*, 149.
86. Zhang, Y.; Li, B.; Liu, S.-Y. "Pd-Senphos Catalyzed trans-Selective Cyanoboration of 1,3-Enynes" *Angew. Chem. Int. Ed.* **2020**, *59*, 15928-15932. DOI: 10.1002/anie.202005882.
85. Boknevitz, K.; Darrigan, C.; Chrostowska, A.; Liu, S.-Y. "Cation-pi Binding Ability of BN Indole" *Chem. Commun.* **2020**, *56*, 3749-3752. DOI: 10.1039/D0CC00869A.
84. Giustra, Z. X.; Yang, X.; Chen, M.; Bettinger, H. F.; Liu, S.-Y. "Accessing 1,2-Substituted Cyclobutanes through 1,2-Azaborine Photoisomerization" *Angew. Chem. Int. Ed.* **2019**, *58*, 18918-18922. DOI: 10.1002/anie.201912132.
    * Highlighted in *SYNFACTS* **2020**, *16(02)*, 178.
83. Liu, Y.; Liu, S.-Y. "Exploring the Strength of a Hydrogen Bond as a Function of Steric Environment using 1,2-Azaborine Ligands and Engineered T4 Lysozyme Receptors" *Org. Biomol. Chem.* **2019**, *17*, 7002-7006. DOI: 10.1039/C9OB01008D.
    * Selected as part of the 2019 Org. Biomol. Chem. HOT Article Collection.
    * Invited as part of a special issue on "Trends in Organoboron Chemistry" (refereed).
82. Lin, H.; McConnell, C. R.; Jilus, B.; Liu, S.-Y.; Jäkle, F. "Changing up BN-Polystyrene: Effect of Substitution Pattern on the Free-Radical Polymerization and Polymer Properties" *Macromolecules* **2019**, *52*, 4500-4509. DOI: 10.1021/acs.macromol.9b00466.
81. McConnell, C. R.; Liu, S.-Y. "Late-Stage Functionalization of BN-Heterocycles" *Chem. Soc. Rev.* **2019**, *48*, 3436-3453. DOI: 10.1039/C9CS00218A.
    * Invited as part of a special issue on "Contemporary Research in Boron Chemistry" (refereed).
    * For the editorial to the special issue, see: Liu, S.-Y.; Stephan, D. W. "Contemporary Research in Boron Chemistry" *Chem. Soc. Rev.* **2019**, *48*, 3434-3435.
80. McConnell, C. R.; Haeffner, F.; Baggett, A. W.; Liu, S.-Y. "1,2-Azaborine's Distinct Electronic Structure Unlocks Two New Regioisomeric Building Blocks via Resolution Chemistry" *J. Am. Chem. Soc.* **2019**, *141*, 9072-9078. DOI: 10.1021/jacs.9b03611.
79. Boknevitz, K.; Italia, J. S.; Chatterjee, A.; Liu, S.-Y. "Synthesis and Characterization of an Unnatural Boron and Nitrogen-containing Tryptophan Analogue and its Incorporation into Proteins" *Chem. Sci* **2019**, *10*, 4994-4998. DOI: 10.1039/C8SC05167D.
    * Selected as part of the 2019 Chemical Science HOT Article Collection.

78. Ishibashi, J. S. A.; Darrigan, C.; Chrostowska, A.; Li, B.; Liu, S.-Y. "A BN Anthracene Mimics the Electronics Structure of more Highly Conjugated Systems" *Dalton Trans.* **2019**, *48*, 2807-2812. DOI: 10.1039/c9dt00481e.
77. Brown, A. N.; Li, B.; Liu, S.-Y. "Expanding the functional group tolerance of cross-coupling in 1,2-dihydro-1,2-azaborines: Installation of alkyl, alkenyl, aryl, and heteroaryl substituents while maintaining a B–H bond" *Tetrahedron* **2019**, *75*, 580-583. DOI: 10.1016/j.tet.2018.12.039.
    * Invited as part of a themed issue dedicated to "Frustrated Lewis Acids and Organoboranes" (refereed).
76. Edel, K.; Ishibashi, J. S. A.; Liu, S.-Y.; Bettinger, H. F. "Superelectrophilicity of 1,2-Azaborine: Formation of Xenon and Carbon Monoxide Adducts" *Angew. Chem. Int. Ed.* **2019**, *58*, 4061-4064. DOI: 10.1002/anie.201813503.
75. Edel, K.; Yang, X.; Ishibashi, J. S. A.; Lamm, A. N.; Maichle-Mössmer, C.; Giustra, Z. X.; Liu, S.-Y.; Bettinger, H. F. "The Dewar Isomer of 1,2-dihydro-1,2-azaborinines: Isolation, Fragmentation, and Energy Storage" *Angew. Chem. Int. Ed.* **2018**, *57*, 5296-5300. DOI: 10.1002/anie.201712683.
74. Giustra, Z. X.; Liu, S.-Y. "The State of the Art in Azaborine Chemistry: New Synthetic Methods and Applications" *J. Am. Chem. Soc.* **2018**, *140*, 1184-1194. DOI: 10.1021/jacs.7b09446.
73. Baggett, A. W.; Liu, S.-Y. "A Boron Protecting Group Strategy for 1,2-Azaborines" *J. Am. Chem. Soc.* **2017**, *139*, 15259-15264. DOI: 10.1021/jacs.7b09491.
72. Ishibashi, J. S. A.; Dargelos, A.; Darrigan, C.; Chrostowska, A.; Liu, S.-Y. "BN Tetracene: Extending the Reach of BN/CC Isosterism in Acenes" *Organometallics* **2017**, *36*, ASAP. DOI: 10.1021/acs.organomet.7b00296.
71. Liu, Z.; Ishibashi, J. S. A.; Darrigan, C.; Dargelos, A.; Chrostowska, A.; Li, B.; Vasiliu, M.; Dixon, D. A.; Liu, S.-Y. "The Least Stable Isomer of BN Naphthalene: Toward Predictive Trends for the Optoelectronic Properties of BN Acenes" *J. Am. Chem. Soc.* **2017**, *139*, 6082-6085. DOI: 10.1021/jacs.7b02661.
70. Lee, H.; Liu, S.-Y. "Synthesis of 1,2-Azaborines and the Preparation of Their Protein Complexes with T4 Lysozyme Mutants" *J. Vis. Exp.* **2017**. A video protocol. DOI: 10.3791/55154.
69. McConnell, C. R.; Campbell, P. G.; Fristoe, C. R.[†]; Memmel, P.; Zakharov, L. N.; Li, B.; Darrigan, C.; Chrostowska, A.; Liu, S.-Y. "Synthesis and Characterization of 1,2-Azaborine-Containing Phosphine Ligands: A Comparative Electronic Structure Analysis" *Eur. J. Inorg. Chem.* **2017**, 2207-2210. DOI: 10.1002/ejic.201700242.
68. Zhao, P.; Nettleton, D. O.; Karki, R.; Zecri, F. J.; Liu, S.-Y. "Medicinal Chemistry Profiling of Monocyclic 1,2-Azaborines" *ChemMedChem* **2017**, *12*, 358-361. DOI: 10.1002/cmdc.201700047.
67. Beniwal, S.; Hooper, J.; Miller, D. P.; Costa, P. S.; Chen, G.; Liu, S.-Y.; Dowben, P. A.; Sykes C. H.; Zurek, E.; Enders A. "Graphene-like Boron-Carbon-Nitrogen Monolayers" *ACS Nano* **2017**, *11*, 2486-2493. DOI: 10.1021/acsnano.6b08136.
66. Wan, W.-M.; Baggett, A. W.; Cheng, F.; Lin, H.; Liu, S.-Y.; Jäkle, F. "Synthesis by Free Radical Polymerization and Properties of BN-Polystyrene and BN-Poly(vinylbiphenyl)" *Chem. Commun.* **2016**, *52*, 13616-13619. DOI: 10.1039/C6CC07332H.
65. Xu, S.; Zhang, Y.; Li, B.; Liu, S.-Y. "Site- and Stereo-selective trans-Hydroboration of 1,3-Enynes Catalyzed by 1,4-Azaborine-Based Phosphine-Pd Complex" *J. Am. Chem. Soc.* **2016**, *138*, 14566-14569. DOI: 10.1021/jacs.6b09759.

64. Lee, H; Fischer, M.; Shoichet, B. K.; Liu, S.-Y. "Hydrogen Bonding of 1,2-Azaborines in the Binding Cavity of T4 Lysozyme Mutants: Structures and Thermodynamics" *J. Am. Chem. Soc.* **2016**, *138*, 12021-12024. DOI: 10.1021/jacs.6b06566.
63. Giustra, Z. X.; Chou, L.-Y.; Tsung, C.-K.; Liu, S.-Y. "Kinetics of $-CH_2CH_2-$ Hydrogen Release from a BN-cyclohexene Derivative" *Organometallics* **2016**, *35*, 2425-2428. DOI: 10.1021/acs.organomet.6b00412.
62. Liu, X.; Zhang, Y.; Li, B.; Zakharov, L. N.; Vasiliu, M.; Dixon, D. A.; Liu, S.-Y. "A Modular Synthetic Approach to Monocyclic 1,4-Azaborines" *Angew. Chem. Int. Ed.* **2016**, *55*, 8333-8337. DOI: 10.1002/anie.201602840.
61. Murphy, C. J.; Miller, D. P.; Simpson, S.; Baggett, A. W.; Pronschinske, A.; Liriano, M. L.; Therrien, A. J.; Enders, A.; Liu, S.-Y.; Zurek, E.; Sykes, E. C. H. "Charge Transfer Induced Magic Cluster Formation of Azaborine Heterocycles on Noble Metal Surfaces" *J. Phys. Chem. C* **2016**, *120*, 6020-6030. DOI: 10.1021/acs.jpcc.5b11970.
60. Whittemore, S. M.; Bowden, M.; Karkamkar, A.; Parab K.; Neiner, D.; Autrey T.; Ishibashi, J. S. A.; Chen, G.; Liu, S.-Y.; Dixon, D. A. "Blending Materials Composed of Boron, Nitrogen and Carbon to Transform Approaches to Liquid Hydrogen Stores" *Dalton Trans*. **2016**, *45*, 6196-6203. DOI: 10.1039/c5dt04276c.
    * Invited as part of a themed issue dedicated to "Main Group Transformations" (refereed).
59. Giustra, Z. X.; Ishibashi, J. S. A.; Liu, S.-Y. "Homogeneous Metal Catalysis for Conversion Between Aromatic and Saturated Compounds" *Coord. Chem. Rev.* **2016**, *314*, 134-181. DOI: 10.1016/j.ccr.2015.11.006.
58. Kumar, A.; Ishibashi, J. S. A.; Hooper, T. N.; Mikulas, T. C.; Dixon, D. A.; Liu, S.-Y.; Weller, A. S. "The Synthesis, Characterization and Dehydrogenation of Sigma-Complexes of BN-Cyclohexanes" *Chem. Eur. J.* **2016**, *22*, 310-322. DOI: 10.1002/chem.201502986
57. Kukolich, S. G.; Sun, M.; Daly, A. M.; Luo, W.; Zakharov, L. N.; Liu, S.-Y. "Identification and Characterization of 1,2-BN Cyclohexene Using Microwave Spectroscopy" *Chem. Phys. Lett.* **2015**, *639*, 88-92. DOI: 10.1016/j.cplett.2015.09.009.
56. Baggett, A. W.; Guo, F.; Liu, S.-Y.; Jäkle, F. "Regioregular Synthesis of Azaborine Oligomers and Polymer with a syn-Conformation that is Stabilized by N-H...π Interactions" *Angew. Chem. Int. Ed.* **2015**, *54*, 11191-11195. DOI: 10.1002/anie.201504822.
    * Selected by the editors as a "Hot Paper".
    * Highlighted in *SYNFACTS* **2015**, *11(10)*, 1048.
55. Brown, A. N.; Li, B.; Liu, S.-Y. "Negishi Cross-Coupling is Compatible with a Reactive B-Cl Bond: Development of a Versatile Late-Stage Functionalization of 1,2-Azaborines and its Application to the Synthesis of New BN Isosteres of Naphthalene and Indenyl" *J. Am. Chem. Soc.* **2015**, *137*, 8932-8935. DOI: 10.1021/jacs.5b05879.
54. Saif, M.; Widom, J. R.; Xu, S.; Abbey, E. R.; Liu, S.-Y.; Marcus, A. H. "Electric Dipole Transition Moments and Solvent-Dependent Interactions of Fluorescent Boron-Nitrogen Substituted Indole Derivatives" *J. Phys. Chem. B* **2015**, *119*, 7985-7993. DOI: 10.1021/acs.jpcb.5b03485.
53. Burford, R. J.; Li, B.; Vasiliu, M.; Dixon, D. A.; Liu, S.-Y. "Diels-Alder Reactions of 1,2-Azaborines" *Angew. Chem. Int. Ed.* **2015**, *54*, 7823-7827. DOI: 10.1002/anie.201503483.
52. Edel, K.; Brough, S.; Lamm, A. N.; Liu, S.-Y.; Bettinger, H. F. "1,2-Azaborine, the BN derivative of ortho-benzyne" *Angew. Chem. Int. Ed.* **2015**, *54*, 7819-7822. DOI: 10.1002/anie.201502967.
51. Baggett, A. W.; Vasiliu, M.; Li, B.; Dixon, D. A.; Liu, S.-Y. "Late-Stage Functionalization of 1,2-Dihydro-1,2-azaborines via Regioselective Iridium-Catalyzed C−H Borylation: The Development of a New N,N-Bidentate Ligand Scaffold" *J. Am. Chem. Soc.* **2015**, *137*, 5536-5541. DOI: 10.1021/jacs.5b01916.

50. Murphy, C. J.; Baggett, A. W.; Miller, D. P.; Simpson, S.; Marcinkowski, M. D.; Mattera, M. F. G.; Pronschinske, A.; Therrien, A.; Liriano, M. L.; Zurek, E.; Liu, S.-Y.; Sykes, E. C. H. "Effect of BN/CC Isosterism on the Thermodynamics of Surface and Bulk Binding: 1,2-dihydro-1,2-azaborine vs Benzene" *J. Phys. Chem. C* **2015**, *119*, 14624-14631. DOI: 10.1021/jp5126427.
49. Chen, G.; Zakharov, L. N.; Bowden, M. E.; Karkamkar, A. J.; Whittemore, S. E.; Garner, E. B, III.; Mikulas, T. C.; Dixon, D. A.; Autrey, T.; Liu, S.-Y. "Bis-BN Cyclohexane: A Remarkably Kinetically Stable Chemical Hydrogen Storage Material" *J. Am. Chem. Soc.* **2015**, *137*, 134-137. DOI: 10.1021/ja511766p.
*Highlighted in C&EN online - [http://cen.acs.org/articles/93/web/2015/01/New-Hydrogen-Storage-Material-Take.html] and in JACS Spotlights (*J. Am. Chem. Soc.* **2015**, *137*, 551-552.)
48. Ishibashi, J. S. A.; Marshall, J. L.; Maziere, A.; Lovinger, G. J.; Li, B.; Zakharov, L. N.; Dargelos, A.; Graciaa, A.; Chrostowska, A.; Liu, S.-Y. "Two BN Isosteres of Anthracene: Synthesis and Characterization" *J. Am. Chem. Soc.* **2014**, *136*, 15414-15421. DOI: 10.1021/ja508813v.
47. Chrostowska, A.; Xu, S.; Maziere, A.; Boknevitz, K.; Li, B.; Abbey, E. R.; Dargelos, A.; Graciaa, A.; Liu, S.-Y. "UV-Photoelectron Spectroscopy of BN Indoles: Experimental and Computational Electronic Structure Analysis" *J. Am. Chem. Soc.* **2014**, *136*, 11813-11820. DOI: 10.1021/ja5063899.
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44. Harlow, G. P.[†]; Zakharov, L. N.; Wu, G.; Liu, S.-Y. "Thermodynamically Controlled, Dynamic Binding of Diols to a 1,2-BN Cyclohexane Derivative" *Organometallics* **2013**, *32*, 6650-6653. DOI: 10.1021/om400697r.
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43. Abbey, E. R.; Lamm, A. N.; Baggett, A. W.; Zakharov, L. N.; Liu, S.-Y. "Protecting Group-Free Synthesis of 1,2-Azaborines: A Simple Approach to the Construction of BN-Benzenoids" *J. Am. Chem. Soc.* **2013**, *135*, 12908-12913. DOI: 10.1021/ja4073436.
42. Rudebusch, G. E.; Zakharov, L. N.; Liu, S.-Y. "Rhodium-Catalyzed B-Arylation of 1,2-Azaborines" *Angew. Chem. Int. Ed.* **2013**, *52*, 9316-9319. DOI: 10.1002/anie.201304443.
* Highlighted in *SYNFACTS* **2013**, *9(11)*, 1226.
41. Campbell, P. G.; Ishibashi, J. S. A.; Zakharov, L. N.; Liu, S.-Y. "B-Methyl Amine Borane Derivatives: Synthesis, Characterization and Hydrogen Release" *Aust. J. Chem.* **2014**, *67*, 521-524. DOI: 10.1071/CH13198.
* Invited as part of the "6th Heron Island Conference" themed issue (refereed).
40. Xu, S.; Mikulas, T. C.; Zakharov, L. N.; Dixon, D. A.; Liu, S.-Y. "Boron-Substituted 1,3-Dihydro-1,3-azaborines: Synthesis, Structure, and Evaluation of Aromaticity" *Angew. Chem. Int. Ed.* **2013**, *52*, 7527-7531. DOI: 10.1002/anie.201302660.
39. Abbey, E. R.; Liu, S.-Y. "Indole and its BN Isosteres" *Org. Biomol. Chem.* **2013**, *11*, 2060-2069. DOI: 10.1039/C3OB27436E.

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37. Luo, W.; Neiner, D.; Karkamkar, A.; Parab, K.; Garner, E. B., III.; Dixon, D. A.; Matson, D.; Autrey, S. T.; Liu S.-Y. "3-Methyl-1,2-BN-Cyclopentane: A Promising H_2 Storage Material?" *Dalton Trans.* **2013**, *42*, 611-614. DOI: 10.1039/C2DT31617J.
    * Invited as part of a themed issue dedicated to "Boranes and Borohydrides" (refereed).
36. Brough, S. A.; Lamm, A. N.; Liu, S.-Y.; Bettinger, H. F. "Photoisomerization of 1,2-Dihydro-1,2-Azaborine: A Matrix Isolation Study" *Angew. Chem. Int. Ed.* **2012**, *51*, 10880-10883. DOI: 10.1002/anie.201203546.
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    * Highlighted in *JACS Spotlights* (*J. Am. Chem. Soc.* **2012**, *134*, 11051-11052).
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23. Glass, A. C.; Klonoski, S.†; Zakharov, L. N.; Liu, S.-Y. "Pushing the limits of steric demand around a biaryl axis: synthesis of tetra-*ortho*-substituted biaryl naphthalenes" *Chem. Commun.* **2011**, *47*, 286-288. DOI: 10.1039/C0CC02170A.
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22. Marwitz, A. J. V; Jenkins, J. T.†; Zakharov, L. N.; Liu, S.-Y. "1,2-Azaborine Cations" *Angew. Chem. Int. Ed.* **2010**, *49*, 7444-7447. DOI: 10.1002/anie.201004084.
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20. Campbell, P.; Zakharov, L.; Grant, D.; Dixon, D. A.; Liu, S.-Y. "Hydrogen Storage by Boron-Nitrogen Heterocycles: A Simple Route for Spent Fuel Regeneration" *J. Am. Chem. Soc.* **2010***, 132*, 3289-3291. DOI: 10.1021/ja9106622.
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17. Marwitz, A. J. V.; McClintock, S. P.; Zakharov, L. N.; Liu, S.-Y. "BN benzonitrile: an electron-deficient 1,2-dihydro-1,2-azaborine featuring linkage isomerism" *Chem. Commun.* **2010**, *46*, 779-781. DOI: 10.1039/B919632C.
16. Liu, L.; Marwitz, A. J. V.; Matthews, B. W.; Liu, S.-Y. "Boron Mimics: 1,2-Dihydro-1,2-azaborines Bind inside a Non-polar Cavity of T4 Lysozyme" *Angew. Chem. Int. Ed.* **2009**, *48*, 6817-6819. DOI: 10.1002/anie.200903390.
    * Selected by the editors as a "Hot Paper".
15. Lamm, A. N.; Liu, S.-Y. "How Stable Are 1,2-Dihydro-1,2-azaborines toward water and oxygen?" *Mol. Biosyst.* **2009**, *5*, 1303-1305. DOI: 10.1039/B904120F.
    * Invited as part of an "Emerging Investigators" themed issue (refereed).
14. Marwitz, A. J. V.; Matus, M. H.; Zakharov, L. N.; Dixon, D. A.; Liu, S.-Y. "A Hybrid Organic/Inorganic Benzene" *Angew. Chem. Int. Ed.* **2009**, *48*, 973-977. DOI: 10.1002/anie.200805554.
    * Selected by the editors as a "Hot Paper". Highlighted in *Chemical & Engineering News* (C&EN) (2009, January 5, page 11), and in *Nature* **2009**, *457*, 239.
13. Glass, A. C.; Morris, B. B.†; Zakharov, L. N.; Liu, S.-Y. "Synthesis of Substituted Naphthalenes via a Catalytic Ring-Expansion Rearrangement" *Org. Lett.* **2008**, *10*, 4855-4857. DOI: 10.1021/ol8019617.
12. Abbey, E. R.; Zakharov, L. N.; Liu, S.-Y. "Crystal Clear Structural Evidence for Electron Delocalization in 1,2-Dihydro-1,2-azaborines" *J. Am. Chem. Soc.* **2008**, *130*, 7250-7252. DOI: 10.1021/ja8024966.
    * Highlighted in *Chemical & Engineering News* (C&EN) (2008, June 16, page 12).
11. Marwitz, A. J. V.; Abbey, E. R.; Jenkins, J. T.†; Zakharov, L. N.; Liu, S.-Y. "Diversity through Isosterism: The Case of Boron-Substituted 1,2-Dihydro-1,2-azaborines" *Org. Lett.* **2007**, *9*, 4905-4908. DOI: 10.1021/ol702383u.

Previous Publications:

10. Yang, J. Y.; Liu, S.-Y.; Korendovych, I. V.; Rybak-Akimova, E. V.; Nocera, D. G. "Hangman Salen Platforms Containing Dibenzofuran Scaffolds" *ChemSusChem.* **2008**, *1*, 941-949.
9. Liu, S.-Y.; Soper, J. D.; Yang, J. Y.; Rybak-Akimova, E. V.; Nocera, D. G. "Mechanistic Studies of Hangman Salophen-Mediated Activation of O—O Bonds" *Inorg. Chem*. **2006**, *45*, 7572-7574.
8. Liu, S.-Y.; Lo, M. M.-C.; Fu, G. C. "The Synthesis of an Enantiopure Planar-Chiral Lewis Acid Complex via Kinetic Resolution and its Application in Stereoselective Additions to Imines" *Tetrahedron* **2006**, *62*, 11343-11349.
7. Liu, S.-Y.; Nocera, D. G. "A Simple and Versatile Method for Alkene Epoxidation using Aqueous H_2O_2 and Manganese Salophen Catalysts" *Tetrahedron Lett.* **2006**, *47*, 1923-1926.
6. Liu, S.-Y.; Hills, I. D.; Fu, G. C. "Synthesis, Resolution, and Aldol Reactions of a Planar-Chiral Lewis Acid Complex" *J. Am. Chem. Soc.* **2005**, *127*, 15352-15353.
5. Liu, S.-Y.; Nocera, D. G. "Hangman Salophens" *J. Am. Chem. Soc.* **2005**, *127*, 5278-5279.
4. Liu, S.-Y.; Hills, I.D.; Fu, G. C. "The First General Method for the Synthesis of Transition Metal π Complexes of an Electronically Diverse Family of 1,2-Azaborolyls" *Organometallics* **2002**, *21*, 4323-4325.

3. Liu, S.-Y.; Lo, M. M.-C.; Fu, G. C. "1,2-Azaborolyls, Isoelectronic Analogues of the Ubiquitous Cyclopentadienyl Ligand: The First Synthesis of B-Heteroatom-Substituted 1,2-Azaborolyl Complexes and an Assessment of their Electronic Features" *Angew. Chem. Int. Ed.* **2002**, *41*, 174-176.
2. Liu, S.-Y.; Choi, M. J.; Fu, G.C. "A Surprisingly Mild and Versatile Method for Palladium-Catalyzed Suzuki Cross-Couplings of Aryl Chlorides in the Presence of a Triarylphosphine" *Chem. Commun.* **2001**, 2408 2409.
1. Mascarenhas, C. M.; Duffey, M. O.; Liu, S.-Y.†; Morken, J. P. "Simple Metal Alkoxides as Effective Catalysts for the Hetero-Aldol-Tishchenko Reaction" *Org. Lett.* **1999**, *1*, 1247-9.

Teaching Experience

Sophomore Level Organic Chemistry. This is a course developed for sophomore-level undergraduates. It focuses on three key concepts: 1) basic and some advanced stereochemistry to help students capture the three-dimensionality of molecules; 2) energy diagrams analysis for rationalization/prediction of chemical reactivity and spectroscopic analysis of organic molecules to help students sharpen their analytical and critical thinking skills; 3) chemical synthesis and retrosynthetic analysis to foster creative thinking. These three concepts have been covered in the context of reactivity of alkanes, haloalkanes, alcohols, ethers, alkenes, alkynes, redox reactions, radical reactions, and properties and reactivity of conjugated and aromatic molecules.

Organometallic Chemistry. This is a course developed for advanced undergraduates, masters and graduate students that focuses on the versatility and utility of organometallic chemistry in organic synthesis. In the first part of the course I introduce fundamental concepts of organotransition metal chemistry, which is then followed by in depth discussions of metal-mediated catalytic transformations that are pertinent to organic synthesis. The course material has been developed to emphasize the fundamental mechanistic and physical organic aspects of organometallic chemistry using recent developments in this area (e.g., olefin metathesis and cross-coupling chemistry). The diverse mechanistic patterns that metal-mediated reactions exhibit are well suited for an understanding-based teaching emphasis.

Physical Organic Chemistry. This is a course developed for advanced undergraduates and first-year graduate students. The lectures first introduce fundamental concepts of physical organic chemistry (e.g., molecular orbital theory, transition state theory, kinetics, isotope effects, advanced stereochemistry, and linear free energy relationships). These basic concepts are then applied to understand the properties of molecules as well as to elucidate reaction mechanisms of organic transformations. I provide numerous practice problems to help students understand the theoretical concepts. A centerpiece of the course is elucidating reaction mechanisms using the contents developed in the earlier stages of the course. One goal of this course is to foster problem solving skills, independent critical thinking, and logical reasoning using physical organic chemistry.

Honors General Chemistry. This is a course developed for freshman undergraduates. It is developed as an accelerated general chemistry course that directly begins with the quantum mechanical view of atomic structure and an exploration of the nature and description of chemical bonding that underlies all chemical reactions. It is then followed by an in-depth discussion of thermodynamic laws (1st, 2nd, and 3rd law of thermodynamics), chemical equilibria, and acid-base chemistry. It concludes with chemical kinetics that includes rate-laws, reaction mechanisms, and reaction rate theory. The course is intended to help the students develop problem-solving skills and prepare them for organic chemistry.

External Research Support

- National Institutes of Health (R35-NIGMS) 2024-2029
- 5E Advanced Materials, Inc. 2022-2023
- National Institutes of Health (R01-NIGMS) 2020-2024
- International Guest Chair, E2S Initiative, Université Pau et Pays de l'Adour 2019-2024
- National Institutes of Health (R01-NIGMS) 2010-2020
- National Science Foundation 2016-2019
- The Camille & Henry Dreyfus Foundation, Inc. 2012-2017
- Department of Energy, EERE 2012-2016
- National Science Foundation 2012-2015
- Defense Threat Reduction Agency 2011-2014
- National Institutes of Health (STTR) 2012-2013
- Oregon Nanoscience and Microtechnologies Institute 2012-2013
- Department of Defense – Tactical Energy Systems Program 2011-2012
- Department of Energy, EERE 2008-2012
- American Chemical Society, Petroleum Research Fund DNI 2009-2011
- Medical Research Foundation of Oregon 2007-2008

Seminars and Presentations

Invited Lectures

- University of Idaho, Moscow ID, 2007
- Anacor Pharmaceuticals, Inc., Palo Alto CA, 2007
- University of Washington, Seattle WA, 2008
- Idaho State University, Pocatello ID, 2008
- University of Alabama, Tuscaloosa AL, 2008
- Pacific Lutheran University, Tacoma WA, 2008
- *American Chemical Society National Meeting 238 Symposium* "Advances in Experimental and Computational Studies of Materials for Hydrogen Storage", Washington DC, 2009
- Anacor Pharmaceuticals, Inc., Palo Alto CA, 2009
- San Francisco State University, San Francisco CA, 2009
- International Energy Agency, Hydrogen Implementing Agreement, Death Valley NV, *Task 22 Expert Meeting*, 2010
- National Taiwan University, Taipei, Taiwan, 2010
- *American Chemical Society National Meeting 240 Symposium* "Young Academic Investigators", Boston MA, 2010
- University of St. Andrews, St. Andrews, UK, 2010
- Oregon State University, Corvallis OR, 2010
- University of Victoria, Victoria BC, Canada, 2010
- University of British Columbia, Vancouver BC, Canada, 2010
- University of Calgary, Calgary AB, Canada, 2010
- University of Pennsylvania, Philadelphia PA, 2010
- University of Delaware, Newark DE, 2010
- Rutgers University, Newark NJ, 2010
- University of Nevada, Reno, Reno NV, 2010
- University of California, Berkeley, Berkeley CA, 2010
- *Pacifichem 2010 Symposium #69* "Advances in Chemistry and Materials for Hydrogen Storage", Honolulu HI, 2010
- *Pacifichem 2010 Symposium #35* "Organoboron, Organosilicon and Organophosphorous as Optoelectronic and Energy-Related Materials", Honolulu HI, 2010
- Ohio State University, Columbus OH, 2011
- University of Conneticut, Storrs CT, 2011
- Boston College, Chestnut Hill MA, 2011
- University of New Hampshire, Durham NH, 2011
- Dartmouth College, Hanover NH, 2011
- Tufts University, Somerville MA, 2011
- Technische Universität Wien, Vienna, Austria, 2011
- Technische Universität Clausthal, Clausthal, Germany, 2011
- University of Bielefeld, Bielefeld, Germany, 2011
- University of Tübingen, Tübingen, Germany, 2011
- University of Frankfurt, Frankfurt, Germany, 2011
- ETH Zürich, Zürich, Switzerland, 2011
- University of Würzburg, Würzburg, Germany, 2011
- International Energy Agency, Hydrogen Implementing Agreement, Kopenhagen, Denmark, *Task 22 Expert Meeting*, 2011
- *IMEBoron XIV International Boron Conference*, Niagara Falls, Canada, 2011

- University of Arizona, Tucson AZ, 2011
- Université de Pau, Pau, France, 2011
- Université Paul Sabatier, Toulouse, France, 2011
- 6th *International Green Elements Science Symposium*, Okayama University of Science, Okayama, Japan, 2011
- Nagoya University, Nagoya, Japan, 2011
- Tokyo University of Agriculture and Technology, Tokyo, Japan, 2011
- University of Tokyo, Tokyo, Japan, 2011
- Kyoto University, Kyoto, Katsura Campus, Japan, 2011
- Kyoto University, Kyoto, Uji Campus, Japan, 2011
- Osaka University, Osaka, Japan, 2011
- Hiroshima University, Higashihiroshima, Japan, 2011
- Kyushu University, Fukuoka, Japan, 2011
- *American Chemical Society National Meeting 243 Session* "ACS Award for Creative Work in Synthetic Organic Chemistry: Symposium in Honor of Gregory C. Fu", San Diego CA, 2012
- *National Meeting of the Canadian Society for Chemistry Session* "Recent Advances in Hydrogen Activation, Production and Storage", Calgary Alberta, Canada, 2012.
- *Middle Atlantic Regional Meetings of the American Chemical Society*, Remsen Symposium in Honor of Daniel G. Nocera, Baltimore MD, 2012
- Texas A&M University, College Station TX, 2012
- *Dreyfus Foundation Teacher-Scholar Symposium*, New York NY, 2012
- Queen's University, Kingston ON, Canada, 2012
- Plenary Lecture at *40th Ontario-Quebec Physical-Organic Mini-Symposium (POMS)*, Kingston ON, Canada, 2012
- Western Washington University, Bellingham WA, 2013
- *American Chemical Society National Meeting 245*, Symposium "Atypical Elements in Medicinal Chemistry", New Orleans LA, 2013
- *2013 Canadian Chemistry Conference and Exhibition*, Symposium "Pushing the Boundaries: Progressive Developments in Main Group Chemistry", Quebec City, Quebec, Canada, 2013
- *6th Heron Island Conference on Reactive Intermediates and Unusual Molecules: Synthesis and Mechanism*, Heron Island, Queensland, Australia, 2013
- *2013 Northwest Regional American Chemical Society Meeting*, *Session* "Cope Scholar Symposium in Honor of Jin-Quan Yu", Corvallis OR, 2013
- *15th Asian Chemical Congress,* Session "Functional Coordination Complexes", Singapore, 2013
- *15th Asian Chemical Congress,* Session "Asia America Chemical Symposium (A2CS) on Advanced Materials", Singapore, 2013
- University of Rhode Island, Kingston RI, 2013
- Memorial University of Newfoundland, St. John's NL, 2013
- University of Florida, Gainesville FL, 2013
- Baylor University, Waco TX, 2014
- *American Chemical Society National Meeting 247 Session* "Albert Cotton Award in Synthetic Inorganic Chemistry: Symposium in Honor of Larry G. Sneddon", Dallas TX, 2014
- *Boron in the Americas (BORAM) Meeting XIV*, Newark NJ, 2014
- *American Chemical Society National Meeting 248 Session* "Organometallics Symposium", San Francisco CA, 2014

- *Elemento Organic Chemistry Symposium*, Kunshan, China, 2014
- Shanghai Institute of Organic Chemistry, Shanghai, China 2014
- West Virginia University, Morgantown WV, 2014
- *13th International Symposium for Chinese Organic Chemists (ISCOC-13)*, Xiamen, China, 2014
- *Organometallic Chemistry Gordon Research Conference*, Newport RI, 2015
- 2015 *WuXi AppTec Science Seminars*, Shanghai, China 2015
- 2015 *Pacifichem Session #16* Organo-Main Group Avenues toward Advanced Materials, *Session #100* Organoboron Chemistry: Applications in Organic Synthesis, Biology, and Materials
- Eberhard Karls Universität Tübingen, Tübingen, Germany, 2016
- Friedrich Alexander Universität Erlangen-Nürnberg, Erlangen, Germany, 2016
- Karlsruhe Institute of Technology, Karlsruhe, Germany, 2016
- Julius-Maximilians-Universität Würzburg, Würzburg, Germany, 2016
- Westfälische Wilhelm-Universität Münster, Münster, Germany, 2016
- Justus-Liebig-Universität Giessen, Giessen, Germany, 2016
- Johann Wolfgang Goethe-Universität Frankfurt am Main, Frankfurt, Germany, 2016
- Ruprech-Karls-Universität Heidelberg, Heidelberg, Germany, 2016
- BASF, Ludwigshafen, Germany, 2016
- *Boron in the Americas (BORAM) Meeting XV*, Kingston, ON, Canada, 2016
- *7th Heron Island Conference on Reactive Intermediates and Unusual Molecules,* Heron Island, Queensland, Australia, 2016
- University of Massachusetts Dartmouth, Dartmouth MA, 2016
- *Boston Regional Inorganic Colloquium*, Harvard University, Cambridge MA, 2017
- *2017 Canadian Chemistry Conference and Exhibition*, Symposium *"Boron in Modern Organic Synthesis and Catalysis"*, Toronto ON, Canada, 2017
- Keynote Lecture at *12th International Conference of Heteroatom Chemistry*, Vancouver BC, Canada, 2017.
- *16th International Meeting on Boron Chemistry*, Hong Kong, China, 2017
- *American Chemical Society National Meeting 254 Session* "Personal and Global Energy Conversion in Chemistry and Biology", Washington DC, 2017
- Inception Sciences, Montreal, Canada, 2017
- Wuhan University, Wuhan, China, 2018
- Lanzhou Institute of Chemical Physics, CAS, Suzhou, China, 2018
- Fudan University, Shanghai, China, 2018
- Shandong University, State Key Laboratory of Crystal Materials, Jinan, China, 2018
- Tianjin University of Technology, Tianjin, China, 2018
- Truman State University, Kirksville MO, 2018
- Brown University, Providence RI, 2019
- Perkin Elmer, Boston MA, 2019
- MIT (Chemistry Student Seminars), Cambridge MA, 2019
- Université de Pau et des Pays de L'Adour, Cycle de Conférences E2S UPPA, 2019, Pau, France, 2019
- 2nd *International Conference on Boron Chemistry*, Taiyuan, China, Keynote lecture, 2019
- California State University, Long Beach, Long Beach, CA, 2021(virtual)
- *3rd Chinese Chemical Society Conference on Boron Science,* Souzhou, China, Keynote lecture, 2021 (virtual)
- EMD Serono Medicinal Chemistry Department Retreat, Boston, MA, 2021 (virtual)

- *Pacifichem 2021 Symposium #222* "Unusual Structure and Reactivity in the Main Group: From Fundamental to Functional Materials", Honolulu HI, 2021 (virtual)
- University of New South Wales (UNSW) Sydney, Sydney, Australia, 2022 (virtual)
- Harvard-MIT Inorganic Seminar Series, MIT, Cambridge MA, 2022
- Center for Green Technology (CGT) Seminar Series, University of Technology Sydney (UTS), Sydney, 2022 (virtual)
- *17th International Meeting on Boron Chemistry*, Rennes, France, Plenary lecture, 2023
- Howard University, Washington, DC, 2024
- *American Chemical Society National Meeting Spring 2024, Session "Symposium in Honor of Holger Braunschweig"*, New Orleans, LA, 2024
- Shanghai Jiaotong University, Shanghai, China, 2024
- Soochow University, Suzhou, China, 2024
- Peking University, Beijing, China, 2024
- *14th International Conference of Heteroatom Chemistry*, Tianjin, China, Keynote lecture, 2024
- Tianjin University of Technology, Tianjin, China, 2024
- *Boron in the Americas (BORAM) Meeting XVIII*; UCLA, Los Angeles, CA, 2024
- *Telluride Science Workshop* "Main Group Chemistry in Molecules, Materials, and Interfaces, Telluride, CO, 2025
- *2025 Canadian Chemistry Conference and Exhibition*, Symposium *"Main Group Magic with Molecules and Macromolecules"*, Ottawa ON, Canada, 2025
- University of Alberta, Edmonton, Canada, 2025
- *5th Chinese Chemical Society Conference on Boron Science,* Xi'An, China, Plenary lecture, 2025
- Adesis, Wilmington, DE, 2025