

# Curriculum Vitae – Lei Jiao, Ph.D.

(As of June 2026)

Associate Professor  
Center of Basic Molecular Science,  
Department of Chemistry, Tsinghua University

## PERSONAL DATA

Gender Male  
Nationality China  
Date and Place of Birth January 8, 1983, Beijing, China  
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## ACADEMIC TRAINING

**2012-2013** Postdoctoral Research Fellow, Technical University of Munich  
Advisor: Prof. Thorsten Bach  
**2010-2012** Alexander von Humboldt Research Fellow, Technical University of Munich  
Advisor: Prof. Thorsten Bach  
**2005-2010** Ph.D. in Organic Chemistry, Peking University  
Advisor: Prof. Zhi-Xiang Yu  
**2001-2005** B.Sc. in Chemistry, Peking University

## PROFESSIONAL EXPERIENCE

**2014-2022** Tenure-track associate professor (PI), Tsinghua University  
**2022-present** Tenured associate professor, Tsinghua University

## HONORS AND AWARDS

Asian Core Program Lectureship Award, 2025  
Chinese Chemical Society Young Investigator Award in Physical Organic Chemistry, 2023  
Chinese Chemical Society Newcomer Award in Physical Organic Chemistry, 2017  
Qiu Shi Outstanding Young Scholar Award, 2015  
Thieme Chemistry Journals Award, 2014  
National Excellent Graduate Thesis Award of China, 2012  
Eli Lilly Asia Outstanding Graduate Thesis Award, 2010  
Roche Chemical Innovation Award, 2008

## RESEARCH INTERESTS

- *N*-boryl pyridyl anion chemistry
- Cooperative olefin ligand for palladium catalysis
- Mechanistic study of organic reactions combining experimental and computational methods

## COMMITTEE SERVICE

2023-present Advisory Board, SYNTHESIS

2019-present Professional Committee of Physical Organic Chemistry, Chinese Chemical Society

## INVITED TALKS

- 2026.06 2026 Qiu Shi Science & Technologies Foundation Symposium, Hangzhou, China
- 2026.05 19th National Synthetic Organic Chemistry Symposium, Suzhou, China
- 2026.04 35th Chinese Chemical Society Congress, Physical Organic Chemistry Session, Chongqing, China
- 2025.11 18th International Conference on Cutting-Edge Organic Chemistry in Asia (ICCEOCA-18), Sanya, China
- 2025.10 Lecture at School of Chemistry and Chemical Engineering, Huazhong University of Science & Technology, China
- 2025.10 2025 International Conference on Photochemistry and Industry, Wuhan, China
- 2025.09 16th National Conference on Physical Organic Chemistry, Zhengzhou, China
- 2025.08 13th National Conference on Organic Chemistry, Lanzhou, China
- 2025.07 Lecture at Department of Chemistry, Technical University of Munich, Germany
- 2025.07 Lecture at Department of Chemistry, Ludwig-Maximilians-University Munich, Germany
- 2025.05 Lecture at Institute of Advanced Study, Wuhan University, China
- 2025.04 Lecture at Department of Chemistry, Lanzhou University, China
- 2024.12 Hainan Organic Chemistry Outlooks (HOCO-2024), Haikou, China
- 2024.12 1st Symposium on Theoretical and Computational Organic Chemistry, Nanjing, China
- 2024.10 2024 International Conference on Photochemistry and Industry, Wuhan, China
- 2024.06 Lecture at School of Petrochemical Engineering, Changzhou University, China
- 2024.06 Lecture at Wuxi STA (Changzhou site), China
- 2024.06 Lecture at College of Chemistry, Chemical Engineering and Materials Science, Soochow University, China
- 2024.06 34th Chinese Chemical Society Congress, Organometallic Session, Guangzhou, China
- 2024.05 Long Feng Science Forum on Orbital Interactions in Chemistry, Shenzhen, China
- 2024.05 Lecture at Department of Chemistry, Sun Yat-Sen University
- 2024.04 4th National Organic Radical Chemistry Conference, Xiamen, China
- 2023.10 2023 International Conference on Photochemistry and Industry, Wuhan, China
- 2023.09 4th Chinese Chemical Society Conference on Boron Chemistry, Fuzhou, China
- 2023.09 Annual Meeting of Japanese Photochemistry Association, Hiroshima, Japan
- 2023.09 3rd Workshop on Radical and Electron Transfer Reactions, Osaka, Japan
- 2023.07 15th National Conference on Physical Organic Chemistry, Lanzhou, China
- 2023.06 10th Pacific Symposium on Radical Chemistry (PSRC10), Kyoto, Japan

- 2023.04 Lecture at Department of Chemistry, SUSTech (2023/04)
- 2022.09 12th National Conference on Organic Chemistry, Hefei, China
- 2022.08 3rd National Conference on Organic Radical Chemistry, Wuhan, China
- 2022.07 25th IUPAC International Conference on Physical Organic Chemistry (ICPOC-25), Hiroshima, Japan (online)
- 2021.09 NTU Chemistry Virtual Seminar, Nanyang Technological University, Singapore (online)
- 2019.12 9th China-Korea Symposium on Organic Chemistry, Kunming, China
- 2019.10 1st International Symposium on Molecular Recognition and Synthesis, Shanghai, China
- 2019.09 10th National Conference on Organic Chemistry, Shanghai, China
- 2018.05 2nd International Symposium on Organic Reaction Mechanism, Shenzhen, China
- 2018.05 31th Chinese Chemical Society Congress, Physical Organic Session, Hangzhou, China
- 2017.12 10th National Conference on Organic Chemistry, Shenzhen, China
- 2017.10 12th National Conference on Physical Organic Chemistry, Wuhan, China
- 2016.08 6th Sino-German Frontiers of Chemistry Symposium, Shanghai, China
- 2016.07 30th Chinese Chemical Society Congress, Physical Organic Session, Dalian, China

## PUBLICATION LIST

### Publications of independent research

62. "Palladium-Catalyzed ortho-Alkylation of Bromoarenes Enabled by Imidazole-Olefin Ligands." Wang, X.-X.; Jiao, L.\* *J. Am. Chem. Soc.* **2026**, doi:10.1021/jacs.6c02010.
61. "Pyridinium(Boron) Fluorophores as Versatile Photocatalysts" Bai, L.; Qi, J.-Q.; Liu, X.; Yang, J.\*; Guo, X.\*; Jiao, L.\* *J. Am. Chem. Soc.* **2026**, doi:10.1021/jacs.6c04010.
60. "Visible-Light-Induced Annulative Ring Expansion of Amino-Oxetane/Azetidin/Thietane Derivatives." Tang, Y.-Q.; Zhang, M.-T.\*; Jiao, L.\* *Org. Lett.* **2026**, *28*, 5183–5188.
59. "Palladium-Catalyzed Radical Reactions via Pd(I) Pathway: A Brief Summary of Reaction Patterns and Recent Progress" (invited review). Tan, Y.-F.; Jiao, L.\* *Chin. J. Org. Chem.* **2026**, *46*, 1303–1319.
58. "Complementary Site Selectivity in Ortho-Alkylative Vicinal Difunctionalization Reactions of Iodoarenes Enabled by Palladium–Olefin Catalysis." Li, Y.-X.; Zong, C.-H.; Meng, Y.; Jiao, L.\* *Nat. Synth.* **2026**, *5*, 240–250.
57. "Nitrogen-Centered Radical Cyclization Initiated by Proton-Coupled Electron Transfer: A Mechanistic Study of 5-Exo-trig and 6-Endo-trig Cyclization Pathways." Tang, Y.-Q.; Zhang, M.-T.\*; Jiao, L.\* *J. Org. Chem.* **2025**, *90*, 11162-11171.
56. "An Aryl Radical Reservoir Based on the Activation of Organoboronic Acids by Polytelluroxane." Guan, J.; Zhou, R.; Shi, H.; Xheng, S.; He, C.; Cao, M.; Jiao, L.\*; Xu, H.\* *Chem. Catal.* **2025**, *5*, 101429.
55. "Palladium-Catalyzed ortho-Alkylation of Iodoarenes Enabled by a Cooperative Cycloolefin Ligand and a Bulky Trialkylphosphine" (Synfacts). Wang, X.-X.; Jiao, L.\* *Synlett* **2025**, *36*, 956-962.
54. "N-Boryl Pyridyl Anion Chemistry." Zhang, L.; Zhou, F.-Y.; Jiao, L.\* *Acc. Chem. Res.* **2025**, *58*, 1023-1035.

53. "Chiral Ligands for Palladium-Catalyzed Coordination-Assisted Enantioselective C(sp<sup>3</sup>)-H Functionalization Reactions" (invited review). Yuan, C.-H.; [Jiao, L.](#)\* *Chin. J. Org. Chem.* **2025**, *45*, 602-619.
52. "Overestimated Halogen Atom Transfer Reactivity of  $\alpha$ -Aminoalkyl Radicals." Suo, W.; Qi, J.-Q.; Sun, S.; [Jiao, L.](#)\*, Guo, X.\* *J. Am. Chem. Soc.* **2024**, *146*, 25860-25869.
51. "Dual Ligand Enabled Pd-Catalyzed *Ortho*-Alkylation of Iodoarenes." Wang, X.-X.; [Jiao, L.](#)\* *J. Am. Chem. Soc.* **2024**, *146*, 25552-25561.
50. "4-Pyridyl Perfluoroalkyl Sulfide as a Practical Nucleophilic Perfluoroalkylation Reagent." Zhou, F.-Y.; [Jiao, L.](#)\* *Chem* **2024**, *10*, 2311-2323.
49. "Unveiling the Mechanistic Role of Chiral Palladacycles in Pd(II)-Catalyzed Enantioselective C(sp<sup>3</sup>)-H Functionalization." Yuan, C.; Wang, X.-X.; Huang, K.; [Jiao, L.](#)\* *Angew. Chem. Int. Ed.* **2024**, *63*, e202405062.
48. "Characterization and Monitoring of Transient Enamine Radical Intermediates in Photoredox/Chiral Primary Amine Synergistic Catalytic Cycle." Zhang, S.; Cheng, L.; Qi, J.-Q.; Jia, Z.; Zhang, L.; [Jiao, L.](#)\*, Guo, X.\*; Luo, S.\* *CCS Chem.* **2024**, *6*, 2420-2426.
47. "Direct Observation of All Open-Shell Intermediates in a Photocatalytic Cycle." Qi, J.-Q.; Suo, W.; Liu, J.; Sun, S.; [Jiao, L.](#)\*, Guo, X.\* *J. Am. Chem. Soc.* **2024**, *146*, 7140-7145.
46. "Photoinduced Radical Borylation of Alkyl Chlorides." Bai, Lutao; [Jiao, L.](#)\* *Eur. J. Org. Chem.* **2024**, e202400043.
45. "Ligand-Enabled Palladium(II)-Catalyzed  $\gamma$ -C(sp<sup>3</sup>)-H Arylation of Primary Aliphatic Amines." Yuan, C.-H.; [Jiao, L.](#)\* *Org. Lett.* **2024**, *26*, 29-34.
44. "Modular Photoredox System with Extreme Reduction Potentials Based on Pyridine Catalysis." Bai, L.; Jiao, L.\* *Chem* **2023**, *9*, 3245-3267.
43. "The Stereochemistry of the Reactions between Palladacycle Complexes and Primary Alkyl Iodides." Xu, X.; [Jiao, L.](#)\* *Organometallics* **2023**, *42*, 606-614.
42. "Ligand-Enabled Pd(II)-Catalyzed Enantioselective  $\beta$ -C(sp<sup>3</sup>)-H Arylation of Aliphatic Tertiary Amides." Yuan, C.-H.; Wang, X.-X.; [Jiao, L.](#)\* *Angew. Chem. Int. Ed.* **2023**, *62*, e202300854.
41. "Functionalized Cycloolefin Ligand as a Solution to *Ortho*-Constraint in the Catellani-Type Reaction." Wang, F.-Y.; Li, Y.-X.; [Jiao, L.](#)\* *J. Am. Chem. Soc.* **2023**, *145*, 4871-3881.
40. "Asymmetric Defluoroallylation of 4-Trifluoromethylpyridines Enabled by Umpolung C-F Bond Activation." Zhou, F.-Y.; [Jiao, L.](#)\* *Angew. Chem. Int. Ed.* **2022**, *61*, e202201102.
39. "Hybrid Cycloolefin Ligands for Palladium/Olefin Cooperative Catalysis." Zheng, Y.-X.; [Jiao, L.](#)\* *Nat. Synth.* **2022**, *1*, 180-187.
38. "Divergent Synthesis of Indolenine and Indoline Ring Systems by Palladium-Catalyzed Asymmetric Dearomatization of Indoles." Gao, D.; [Jiao, L.](#)\* *Angew. Chem. Int. Ed.* **2022**, *61*, e202116024.
37. "Total Synthesis of (-)-Arborisidine." Wang, F.-Y.; [Jiao, L.](#)\* *Angew. Chem. Int. Ed.* **2021**, *60*, 12732-12736.

36. "Construction of Indoline/Indolenine Ring Systems by a Palladium-Catalyzed Intramolecular Dearomative Heck Reaction and the Subsequent Aza-Semipinacol Rearrangement." Gao, D.; [Jiao, L.](#)\* *J. Org. Chem.* **2021**, *86*, 5727-5743.
35. "Recent Developments in Transition-Metal-Free Functionalization and Derivatization Reactions of Pyridines." Zhou, F.-Y.; [Jiao, L.](#)\* *Synlett* **2021**, *32*, 159-178.
34. "DFT Study on the Mechanism of 4,4'-Bipyridine-Catalyzed Nitrobenzene Reduction by Diboron(4) Compounds." Qi, J.-Q.; [Jiao, L.](#)\* *J. Org. Chem.* **2020**, *85*, 13877-13885.
33. "Regiocontrol in the Oxidative Heck Reaction of Indole by Ligand-Enabled Switch of the Regioselectivity-Determining Step." Wang, Y.-J.; Yuan, C.-H.; Chu, D.-Z.; [Jiao, L.](#)\* *Chem. Sci.* **2020**, *11*, 11042-11054.
32. "Photoinduced Radical Borylation of Alkyl Bromides Catalyzed by 4-Phenylpyridine." Zhang, L.; Wu, Z.-Q.; [Jiao, L.](#)\* *Angew. Chem. Int. Ed.* **2020**, *11*, 2095-2099.
31. "An Umpolung Approach to the Hydroboration of Pyridines: A Novel and Efficient Synthesis of *N*-H 1,4-Dihydropyridines." Yang, H.; Zhang, L.; Zhou, F.-Y.; [Jiao, L.](#)\* *Chem. Sci.* **2020**, *11*, 742-747.
30. "Pd-Catalyzed Carbonylation of Acyl Azides." Li, Z.; Xu, S.; Huang, B.; Yuan, C.; Chang, W.; Fu, B.; [Jiao, L.](#)\*; Wang, P.; Zhang, Z.\* *J. Org. Chem.* **2019**, *84*, 9497-9508.
29. "Visible-Light-Induced Organocatalytic Borylation of Aryl Chlorides." Zhang, L.; [Jiao, L.](#)\* *J. Am. Chem. Soc.* **2019**, *141*, 9124-9128.
28. "A Convenient Method for the Direct Acquisition of Kinetic Rate Data for Catalytic Organic Reactions by Gas Uptake Measurements." Wang, Y.-J.; Li, W.-T.; [Jiao, L.](#)\* *Asian J. Org. Chem.* **2018**, *7*, 570-578.
27. "Cobalt-Catalyzed Regioselective Olefin Isomerization under Kinetic Control." Liu, X.; Zhang, W.; Wang, Y.; Zhang, Z.-X.; [Jiao, L.](#)\*; Liu, Q.\* *J. Am. Chem. Soc.* **2018**, *140*, 6873-6882.
26. "Redox-Active Ligand Assisted Multielectron Catalysis: A Case of Co<sup>III</sup> Complex as Water Oxidation Catalyst." Du, H.-Y.; Chen, S.-C.; Su, X.-J.; [Jiao, L.](#)\*; Zhang, M.-T.\* *J. Am. Chem. Soc.* **2018**, *140*, 1557-1565.
25. "Super Electron Donors Derived from Diboron." Zhang, L.; [Jiao, L.](#)\* *Chem. Sci.* **2018**, *9*, 2711-2722.
24. "Aromatization Modulates the Activity of Small Organic Molecules as Promoters for Carbon-Halogen Bond Activation." Yang, H.; Chu, D.-Z.; [Jiao, L.](#)\* *Chem. Sci.* **2018**, *9*, 1534-1539.
23. "Asymmetric Total Synthesis of (+)-Minfiensine by an Asymmetric Cascade Cyclization Strategy." Zhang, Z.-X.; Chen, S.-C.; [Jiao, L.](#)\* *Synlett* **2017**, *28*, 2199-2204.
22. "*N*-Methylanilines as Simple and Efficient Promoters for Radical-Type Cross-Coupling Reactions of Aryl Iodides." Yang, H.; Zhang, L.; [Jiao, L.](#)\* *Chem. Eur. J.* **2017**, *23*, 65-69.
21. "Pyridine-Catalyzed Radical Borylation of Aryl Halides." Zhang, L.; [Jiao, L.](#)\* *J. Am. Chem. Soc.* **2017**, *139*, 607-610.
20. "Revisiting the Radical Initiation Mechanism of the Diamine-Promoted Transition-Metal-Free Cross-Coupling Reaction." Zhang, L.; Yang, H.; [Jiao, L.](#)\* *J. Am. Chem. Soc.* **2016**, *138*, 7151-7160.

19. "Total Synthesis of (+)-Minfiensine: Construction of the Tetracyclic Core Structure by an Asymmetric Cascade Cyclization." Zhang, Z.-X.; Chen, S.-C.; Jiao, L.\* *Angew. Chem. Int. Ed.* **2016**, *55*, 8090-8094.

#### Publications prior to Tsinghua

18. "Regioselective Direct C-H Alkylation of NH Indoles and Pyrroles by a Palladium/Norbornene-Cocatalyzed Process." Jiao, L.; Bach, T.\* *Synthesis* **2013**, *46*, 35-41.
17. "Vinylcyclopropane Derivatives in Transition-Metal-Catalyzed Cycloadditions for the Synthesis of Carbocyclic Compounds." Jiao, L.; Yu, Z.-X.\* *J. Org. Chem.* **2013**, *78*, 6842-6848 (*JOCSynopsis*).
16. "Palladium-Catalyzed Direct C-H Alkylation of Electron-Deficient Pyrrole Derivatives." Jiao, L.; Bach, T.\* *Angew. Chem., Int. Ed.* **2013**, *52*, 6080-6083.
15. "Pd(II)-Catalyzed Regioselective 2-Alkylation of Indoles via a Norbornene-Mediated C-H Activation: Mechanism and Applications." Jiao, L.; Herdtweck, E.; Bach, T.\* *J. Am. Chem. Soc.* **2012**, *134*, 14563-14572.
14. "Palladium-Catalyzed Direct 2-Alkylation of Indoles by Norbornene-Mediated Regioselective Cascade C-H Activation." Jiao, L.; Bach, T.\* *J. Am. Chem. Soc.* **2011**, *133*, 12990-12993.
13. "Density Functional Theory Study of the Mechanisms and Stereochemistry of the Rh(I)-Catalyzed Intramolecular [3+2] Cycloadditions of 1-Ene- and 1-Yne-Vinylcyclopropanes." Jiao, L.; Lin, M.; Yu, Z.-X.\* *J. Am. Chem. Soc.* **2011**, *133*, 446-461.
12. "Formal Total Synthesis of (±)-Hirsutic Acid C Using the Tandem Rh(I)-Catalyzed [(5+2)+1] Cycloaddition/Aldol Reaction." Yuan, C.; Jiao, L.; Yu, Z.-X.\* *Tetrahedron Lett.* **2010**, *51*, 5674-5676.
11. "Rh(I)-Catalyzed [(3+2)+1] Cycloaddition of 1-Yne/Ene-Vinylcyclopropanes and CO: Homologous Pauson-Khand Reaction and Total Synthesis of (±)-α-Agarofuran." Jiao, L.; Lin, M.; Zhuo, L.-G.; Yu, Z.-X.\* *Org. Lett.* **2010**, *12*, 2528-2531.
10. "Rh(I)-Catalyzed Intramolecular [3+2] Cycloadditions of 1-Ene-, 1-Yne- and 1-Allene-Vinylcyclopropanes." Jiao, L.; Lin, M.; Yu, Z.-X.\* *Chem. Commun.* **2010**, *46*, 1059-1061.
9. "New Insights into the Torquoselectivity of the Staudinger Reaction." Liang, Y.; Jiao, L.; Zhang, S.; Yu, Z.-X.\*; Xu, J.\* *J. Am. Chem. Soc.* **2009**, *131*, 1542-1549.
8. "Rh(I)-Catalyzed Intramolecular [3+2] Cycloaddition of trans-Vinylcyclopropane-Enes." Jiao, L.; Ye, S.; Yu, Z.-X.\* *J. Am. Chem. Soc.* **2008**, *130*, 7178-7179.
7. "Tandem Rh(I)-Catalyzed [(5+2)+1] Cycloaddition/Aldol Reaction for the Construction of Linear Triquinane Skeleton: Total Syntheses of (±)-Hirsutene and (±)-1-Desoxyhypnophilin." Jiao, L.; Yuan, C.; Yu, Z.-X.\* *J. Am. Chem. Soc.* **2008**, *130*, 4421-4430.
6. "Nitrene Equivalent Mediated Metal-Free Ring Expansions of Alkylidenecyclopropanes and an Alkylidenecyclobutane." Liang, Y.; Jiao, L.; Wang, Y.; Chen, Y.; Ma, L.; Xu, J.; Zhang, S.; Yu, Z.-X.\* *Org. Lett.* **2006**, *8*, 5877-5879.
5. "Origin of the Relative Stereoselectivity of the β-Lactam Formation in the Staudinger Reaction." Jiao, L.; Liang, Y.; Xu, J.\* *J. Am. Chem. Soc.* **2006**, *128*, 6060-6069.

4. "Catalyst-Free, High-Yield, and Stereospecific Synthesis of 3-Phenylthio  $\beta$ -Lactam Derivatives." Jiao, L.; Liang, Y.; Zhang, Q.; Zhang, S.; Xu, J.\* *Synthesis* **2006**, 659-665.
3. "A Versatile Method for the Synthesis of 3-Alkoxyacetyl  $\beta$ -Lactam Derivatives." Jiao, L.; Zhang, Q.; Liang, Y.; Zhang, S.; Xu, J.\* *J. Org. Chem.* **2006**, *71*, 815-818.
2. "Reactions of Imidates with Phenoxyacetyl Chloride." Jiao, L.; Liang, Y.; Wu, C.; Huang, X.; Xu, J.\* *Chem. Res. Chin. Univ.* **2005**, *21*, 59-64.
1. "Microwave- and Photoirradiation-Induced Staudinger Reactions of Cyclic Imines and Ketenes Generated from  $\alpha$ -Diazoketones. A Further Investigation into the Stereochemical Process." Liang, Y.; Jiao, L.; Zhang, S.; Xu, J.\* *J. Org. Chem.* **2005**, *70*, 334-337.