

# Curriculum Vitae – Lei Jiao, Ph.D.

(As of Jan. 2024)

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  
Address RM S907, Mong Man Wai Building of Science  
and Technology, Tsinghua University  
Beijing 100084, China  
Telephone +86-10-6278-8874  
E-mail lejiao@mail.tsinghua.edu.cn  
ORCID 0000-0002-8465-1358  
Group website www.jiaolei.group



## 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

**2022-present** Associate professor with tenure, Tsinghua University  
**2014-2022** Tenure-track associate professor (PI), Tsinghua University

## HONORS AND AWARDS

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

## RESEARCH INTERESTS

- Mechanistic study of organic reactions: experimental and computational studies
- Reactive intermediates: *N*-boryl pyridyl anion chemistry and palladacycle chemistry

## COMMITTEE SERVICE

2023- Advisory Board, SYNTHESIS

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

## INVITED TALKS

- 2023.10 2023 International Conference on Photochemistry and Industry, Wuhan, China
- 2023.9 4th Chinese Chemical Society Conference on Boron Chemistry, Fuzhou, China
- 2023.9 Annual Meeting of Japanese Photochemistry Association, Hiroshima, Japan
- 2023.9 3rd Workshop on Radical and Electron Transfer Reactions, Osaka, Japan
- 2023.7 15th National Conference on Physical Organic Chemistry, Lanzhou, China
- 2023.6 10th Pacific Symposium on Radical Chemistry (PSRC10), Kyoto, Japan
- 2023.4 Lecture at Department of Chemistry, SUSTech (2023/04)
- 2022.9 12th National Conference on Organic Chemistry, Hefei, China
- 2022.8.3 3rd National Conference on Organic Radical Chemistry, Wuhan, China
- 2022.7.11 25th IUPAC International Conference on Physical Organic Chemistry (ICPOC-25), Hiroshima, Japan (online)
- 2021.9.17 NTU Chemistry Virtual Seminar, Nanyang Technological University, Singapore (online)
- 2019.12.1 9th China-Korea Symposium on Organic Chemistry, Kunming, China
- 2019.10.12 1st International Symposium on Molecular Recognition and Synthesis, Shanghai, China
- 2019.9.3 10th National Conference on Organic Chemistry, Shanghai, China
- 2018.5.15 2nd International Symposium on Organic Reaction Mechanism, Shenzhen, China
- 2018.5.6 31th Chinese Chemical Society Congress, Physical Organic Session, Hangzhou, China
- 2017.12.19 10th National Conference on Organic Chemistry, Shenzhen, China
- 2017.10.19 12th National Conference on Physical Organic Chemistry, Wuhan, China
- 2016.8.29 6th Sino-German Frontiers of Chemistry Symposium, Shanghai, China
- 2016.7.2 30th Chinese Chemical Society Congress, Physical Organic Session, Dalian, China

## PUBLICATION LIST

### Publications of independent research

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**, doi:10.1021/acs.orglett.3c03186.
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." Gao, D.; [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 β-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-Alkoxy carbonyl β-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 α-Diazoketones. A Further Investigation into the Stereochemical Process." Liang, Y.; Jiao, L.; Zhang, S.; Xu, J.\* *J. Org. Chem.* **2005**, *70*, 334-337.