



## PERSONAL INFORMATION

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## EDUCATION & PROFESSIONAL EXPERIENCE

- ❖ **Postdoc.** | California Institute of Technology, USA Jan. 2021–present  
Advisor: Prof. Frances H. Arnold
- ❖ **Postdoc.** | Swiss Federal Institute of Technology, Lausanne, Switzerland Oct. 2020–Dec. 2020  
Advisor: Prof. Xile Hu
- ❖ **Ph.D.** | Chemistry | Swiss Federal Institute of Technology, Lausanne, Switzerland Jul. 2016–Sep. 2020  
Advisor: Prof. Xile Hu | *Doctoral Program Thesis Distinction*
- ❖ **M.S.** | Chemical Biology | Peking University, China Sep. 2013–Jul. 2016  
Advisor: Prof. Xin-Shan Ye | *Graduate Excellence Award*
- ❖ **B.S.** | Chemistry | Henan Normal University, China Sep. 2009–Jul. 2013  
Advisors: Profs. Gui-Rong Qu & Hai-Ming Guo | *Undergraduate Excellence Award*

## FIRST-AUTHOR PUBLICATIONS

15. **Mao, R.**; Gao, S.; Qin, Z.; Wu, S. J.; Li, Z. Q. Arnold, F. H. Biocatalytic, Enantioenriched Primary Amination of Tertiary C–H Bonds. *Nat. Catalysis*. **2024**, *7*, 585.
14. **Mao, R.**; Arnold, F. H. **Research briefing:** An Engineered Enzyme Enables Stereoconvergent Alkylation of Alkene Mixtures. *Nat. Synth.* **2024**, *3*, 160.
13. **Mao, R.**; Taylor, D. M.; Wackelin, D. J.; Wu, S. J.; Sicinski, K. M.; Arnold, F. H. Biocatalytic, Stereoconvergent Alkylation of (Z/E)-Trisubstituted Silyl Enol Ethers. *Nat. Synth.* **2024**, *3*, 256.
  - Highlighted in Synfacts **2024**, *20*, 0191.
12. †Wackelin, D. J.; †**Mao, R. (co-first)**; Sicinski, K. M.; Zhao, Y.; Chen, K.; Arnold, F. H. Enzymatic Assembly of Diverse Lactone Structures: An Intramolecular C–H Functionalization Strategy. *J. Am. Chem. Soc.* **2024**, *146*, 1580. (†**Equal contribution**).
  - Highlighted in Synfacts **2024**, *20*, 0301.
11. **Mao, R.**; Wackelin, D. J.; Jamieson, C. S.; Rogge, T.; Gao, S.; Das, A.; Taylor, D. M.; Houk, K. N.; Arnold, F. H. Enantio- and Diastereoenriched Enzymatic Synthesis of 1,2,3-Polysubstituted Cyclopropanes from (Z/E)-Trisubstituted Enol Acetates. *J. Am. Chem. Soc.* **2023**, *145*, 16176.
  - Highlighted in Synfacts **2023**, *19*, 1138.
10. **Mao, R.**; Bera, S.; Turla, A. C.; Hu, X. Copper-Catalyzed Intermolecular Functionalization of Unactivated C(sp<sup>3</sup>)-H Bonds and Aliphatic Carboxylic Acids. *J. Am. Chem. Soc.* **2021**, *143*, 14667.
9. †Bera, S.; †**Mao, R. (co-first)**; Hu, X. Enantioselective C(sp<sup>3</sup>)-C(sp<sup>3</sup>) Cross-Coupling of Non-Activated Alkyl Electrophiles via Nickel Hydride Catalysis. *Nat. Chem.* **2021**, *13*, 270. (†**Equal contribution**).
  - Highlighted in Synfacts **2021**, *17*, 0402.
8. **Mao, R.**; Bera, S.; Cheseaux, A.; Hu, X. Deoxygenative Trifluoromethylthiolation of Carboxylic Acids. *Chem. Sci.* **2019**, *10*, 9555.
7. **Mao, R.**; Balon, J.; Hu, X. Decarboxylative C(sp<sup>3</sup>)-O Cross-Coupling. *Angew. Chem., Int. Ed.* **2018**, *57*, 13624.
6. **Mao, R.**; Balon, J.; Hu, X. Cross-Coupling of Alkyl Redox-Active Esters with Benzophenone Imines: Tandem Photoredox and Copper Catalysis. *Angew. Chem., Int. Ed.* **2018**, *57*, 9501.
5. **Mao, R.**; Frey, A.; Balon, J.; Hu, X. Decarboxylative C(sp<sup>3</sup>)-N Cross-Coupling via Synergetic Photoredox and Copper Catalysis. *Nat. Catal.* **2018**, *1*, 120.
4. **Mao, R.**; Sun, L.; Wang, Y.-S.; Zhou, M.-M.; Xiong, D.-C.; Li, Q.; Ye, X.-S. N-9 Alkylation of Purines via Light-Promoted and Metal-Free Radical Relay. *Chin. Chem. Lett.* **2018**, *29*, 61.
3. **Mao, R.**; Xiong, D.-C.; Guo, F.; Li, Q.; Duan, J.; Ye, X.-S. Light-Driven Highly Efficient Glycosylation Reactions. *Org. Chem. Front.* **2016**, *3*, 737.
2. **Mao, R.**; Guo, F.; Xiong, D.-C.; Li, Q.; Duan, J.; Ye, X.-S. Photoinduced C–S Bond Cleavage of Thioglycosides and Glycosylation. *Org. Lett.* **2015**, *17*, 5606.



1. Guo, H.-M.\*; **Mao, R. (first contributing author)**; Wang, Q.-T.; Niu, H.-Y.; Xie, M.-S.; Qu, G.-R. Pd(II)-Catalyzed One-Pot, Three-Step Route for the Synthesis of Unsymmetrical Acridines. *Org. Lett.* **2013**, *15*, 5460.

#### OTHER PUBLICATIONS

7. Zhang, J.; Maggiolo, A. O.; Alfonzo, E.; **Mao, R.**; Porter, N. J.; Abney, N. M.; Arnold, F. H. Chemodivergent C(sp<sup>3</sup>)-H and C(sp<sup>2</sup>)-H Cyanomethylation Using Engineered Carbene Transferases. *Nat. Catal.* **2023**, *6*, 152.
6. Yi, X.; **Mao, R.**; Lavrencic, L.; Hu, X. Photocatalytic Decarboxylative Coupling of Aliphatic N-Hydroxyphthalimide Esters with Polyfluoroaryl Nucleophiles. *Angew. Chem., Int. Ed.* **2021**, *60*, 23557.
5. Cao, Y.; Zhou, M.; **Mao, R.**; Zou, Y.; Xia, F.; Liu, D. K.; Liu, J.; Li, Q.; Xiong, D. C.; Ye, X. S. Visible-Light-Promoted 3,5-Dimethoxyphenyl Glycoside Activation and Glycosylation. *Chem. Commun.* **2021**, *57*, 10899.
4. Barzano, G.; **Mao, R.**; Garreau, M.; Waser, J.; Hu, X. Tandem Photoredox and Copper-Catalyzed Decarboxylative C(sp<sup>3</sup>)-N Coupling of Anilines and Imines Using an Organic Photocatalyst. *Org. Lett.* **2020**, *22*, 5412.
3. Yu, Y.; Xiong, D.-C.; **Mao, R.**; Ye, X.-S. Visible Light Photoredox-Catalyzed O-Sialylation Using Thiosialoside Donors. *J. Org. Chem.* **2016**, *81*, 7134.
2. Guo, H.-M.\*; Jiang, L.-L.; Niu, H.-Y.; Rao, W.-H.; Liang, L.; **Mao, R.**; Li, D.-Y.; Qu, G.-R. Pd(II)-Catalyzed *Ortho*-Arylation of 6-Arylpurines with Aryl Iodides via Purine-Directed C-H Activation: A New Strategy for Modification of 6-Arylpurine Derivatives. *Org. Lett.* **2011**, *13*, 2008.
1. Guo, H.-M.\*; Yuan, T.-F.; Niu, H.-Y.; Liu, J.-Y.; **Mao, R.**; Li, D.-Y.; Qu, G.-R. Highly Enantioselective Synthesis of Designed Chiral Acyclonucleosides and Acyclonucleotides by Organocatalytic Aza-Michael Addition. *Chem. Eur. J.* **2011**, *17*, 4095.

#### AWARDS AND ACADEMIC HONORS

- ❖ **2020 Chinese Government Award for Outstanding Self-Financed Students Abroad.** 2020  
*Selected as one of the 500 awardees from all Chinese graduate students overseas.*
- ❖ **2020 Laureate for Doctoral Program Thesis Distinction, EPFL.** 2020  
*Recognized as the best 8% doctoral thesis.*
- ❖ **2019 Reaxys Ph.D. Prize, Finalist, Elsevier.** 2019  
*Selected as one of the 45 finalists from almost 4,000 submissions from over 50 countries.*
- ❖ **Chemistry Travel Award, Swiss Academy of Sciences (SCNAT).** 2018  
*Selected as one of the Ph.D. students to attend international conferences.*
- ❖ **Marie Skłodowska-Curie Ph.D. fellowship** 2016  
*Scholarship to fully fund outstanding doctoral candidates.*
- ❖ **Clarendon scholarship, Oxford University (declined).** 2016  
*Scholarship to fully fund outstanding doctoral candidates.*
- ❖ **Excellence Graduate Award, Peking University, China.** 2016  
*Awarded to the top graduate students of the graduating class.*
- ❖ **National Scholarship for Graduate Students, Peking University, China.** 2016  
*Awarded to outstanding full-time graduates.*
- ❖ **National Scholarship for Undergraduate Students, Henan Normal University, China.** 2013  
*Awarded to outstanding full-time undergraduates.*
- ❖ **National Science and Technology competition (second prize), China** 2011  
*Science and technology competition for Chinese university students and awards outstanding individuals.*
- ❖ **Youth Technology Innovation Award, Henan, China** 2011  
*Selected as one of the best undergraduate students from Henan province, China.*
- ❖ **4<sup>th</sup> Toshiba Cup Contest of Teaching Skills and Innovation (second place), China** 2011  
*Ranked 2<sup>nd</sup> place in the chemistry section.*

#### CONFERENCES

- ❖ **Invited lecture Engineering Cytochromes P450 to Navigate the New-to-Nature Reaction.** Aug. 2023  
2023 ACS Fall Meeting (NUS sub-venue). San Francisco, USA.



- ❖ **Poster presentation** *Enantioenriched Primary Amination of Tertiary C–H Bonds*.  
GRC Natural Products and Bioactive Compounds. Andover, USA. Aug. 2023
- ❖ **Poster presentation** *Cross-Coupling via Synergetic Photoredox and Copper Catalysis*.  
Reaxys Ph.D. Prize Symposium. Amsterdam, Netherlands. Oct. 2019
- ❖ **Poster presentation** *Cross-Coupling via Synergetic Photoredox and Copper Catalysis*.  
XXII International Conference on Organic Synthesis (22-ICOS). Florence, Italy. Sep 2019
- ❖ **Poster presentation** *Cross-Coupling via Synergetic Photoredox and Copper Catalysis*.  
The Swiss Chemical Society Fall Meeting. Bern, Switzerland. Sep. 2017
- ❖ **Poster presentation** *Photoinduced C–S Bond Cleavage of Thioglycosides and Glycosylation*.  
16<sup>th</sup> Tetrahedron Symposium Asia Edition. Shanghai, China. Nov. 2015

## SECONDMENTS

- ❖ **Syngenta AG**, Switzerland | Supervisor: Dr. Chris Scarborough Apr. 2019–Jul. 2019  
*Project: Electrochemical Chlorination of C(sp<sup>3</sup>)–H Bonds.*
- ❖ **Universitat de Girona**, Spain | Supervisor: Prof. Miquel Costas Mar. 2019–Apr. 2019  
*Project: C(sp<sup>3</sup>)–N Cross-Coupling for Strained Rings.*
- ❖ **Leibniz Institute for Catalysis**, Germany | Supervisor: Dr. Henrik Junge Aug. 2018–Sep. 2019  
*Project: Inexpensive Photocatalysts for Decarboxylative Cross Coupling.*
- ❖ **University of Bern**, Switzerland | Supervisor: Prof. Martin Albrecht Aug. 2017–Sep. 2017  
*Project: Mechanistic Study of Decarboxylative C(sp<sup>3</sup>)–N Cross Coupling.*

## MENTORING EXPERIENCE

- ❖ **Caltech** | Ms. Sophia J. Wu | Caltech Undergraduate Research Jan. 2021–Jul. 2022  
*Project: Biocatalytic, Enantioenriched Primary Amination of Tertiary C–H Bonds.*
- ❖ **EPFL** | Ms. Aurélya Christelle Turla | Swiss Apprenticeship Program Apr. 2019–Jun. 2020  
*Project: Synthesis of N-Fluoro Compounds and Their Applications in C–H activation.*
- ❖ **EPFL** | Mr. Alexis Cheseaux | Swiss Apprenticeship Program Apr. 2018–Jun. 2019  
*Project: Iron-Catalyzed alkyl radical addition.*
- ❖ **EPFL** | Mr. Jonathan Balon | Swiss Apprenticeship Program Apr. 2017–Jun. 2018  
*Project: Applications of Redox-Active Esters in Cross-Coupling Reactions.*
- ❖ **EPFL** | Mr. Adrian Frey | Master Project | EPFL, Switzerland Feb. 2017–Jun. 2017  
*Project: Synthesis of Redox-Active Esters.*

## TEACHING ACTIVITIES

- |  | academic year |
|--|---------------|
| ❖ <b>Advanced General Chemistry (I)</b>   EPFL, Switzerland        | 2019–2020     |
| ❖ <b>Structural Analysis</b>   EPFL, Switzerland                   | 2018–2019     |
| ❖ <b>General and Analytical Chemistry (II)</b>   EPFL, Switzerland | 2018–2019     |
| ❖ <b>Organic Chemistry</b>   EPFL, Switzerland                     | 2018–2019     |
| ❖ <b>Biooriented Chemistry</b>   EPFL, Switzerland                 | 2017–2018     |
| ❖ <b>Organic Chemistry (I)</b>   EPFL, Switzerland                 | 2017–2018     |
| ❖ <b>Project in Molecular Sciences</b>   EPFL, Switzerland         | 2016–2017     |

## REFERENCES

1. Postdoctoral Advisor: **Prof. Frances H. Arnold** | Caltech | [frances@cheme.caltech.edu](mailto:frances@cheme.caltech.edu)
2. Doctoral Advisor: **Prof. Xile Hu** | Swiss Federal Institute of Technology, Lausanne (EPFL) | [xile.hu@epfl.ch](mailto:xile.hu@epfl.ch)
3. Master's Advisor: **Prof. Xin-Shan Ye** | Peking University | [xinshan@bjmu.edu.cn](mailto:xinshan@bjmu.edu.cn)