

# ZHAO Yu

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## Appointment

August 2011- Assistant Professor & National Research Foundation Fellow  
Department of Chemistry  
National University of Singapore  
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## Education and Professional Experience

2008- 2011 Postdoctoral associate with Prof. Richard R. Schrock  
**Massachusetts Institute of Technology**, Cambridge, MA, USA

2002- 2008 Ph.D. in Organic Chemistry with Prof. Marc L. Snapper & Prof. Amir H. Hoveyda  
**Boston College**, Chestnut Hill, MA, USA

1998- 2002 B.S. in Chemistry with Prof. Limin Qi  
**Peking University**, Beijing, P. R. China

## Awards

- 2016 **Thieme Chemistry Journal Award**
- 2015 **Young Scientist Award**, Faculty of Science, NUS
- 2015 **Young Chemist Award**, Department of Chemistry, NUS
- 2015 **Asian Core Program Lectureship Award** from Japan and Hong Kong
- 2014 **Asian Core Program Lectureship Award** from Taiwan and Thailand
- 2013 **Asian Core Program Lectureship Award** from China and South Korea
- 2011-2016 **Singapore National Research Foundation Fellowship**, Singapore
- 2006-2007 **John LaMattina Graduate Student Fellowship**, Boston College
- 1998-1999 **Guanghua Scholarship**, Peking University

## Publications

1. "Enantioselective Synthesis of Tetrahydroquinolines Using Borrowing Hydrogen: Cooperative Catalysis by Achiral Iridacycle and Chiral Phosphoric Acid," Lim, C. S.; Quach, T. T.; Zhao, Y. *Angew. Chem. Int. Ed.* accepted as VIP.
2. "Divergent Reactivities in Fluorination of Allylic Alcohols: Synthesis of Z-Fluoroalkenes via Carbon-Carbon Bond Cleavage," Liu, T.-L.; Wu, J.; Zhao, Y. *Chem. Sci.* in press.
3. "Rhodium-Catalyzed Enantioselective Isomerization of Secondary Allylic Alcohols," Liu, T.-L.; Ng, T. W.; Zhao, Y. *J. Am. Chem. Soc.* **2017**, 139, 3643-3646.
4. "Construction of Nine-Membered Heterocycles through Palladium-Catalyzed Formal [5 + 4] Cycloaddition,"

- Yang, L.-C.;<sup>†</sup> Rong, Z.-Q.;<sup>†</sup> Wang, Y.-N.; Tan, Z. Y.; Wang, M. Zhao, Y. *Angew. Chem. Int. Ed.* **2017**, *56*, 2927-2931.
5. "Access to Enantiopure Triarylmethanes and 1,1-Diarylalkanes by NHC-Catalyzed Acylative Desymmetrization," Lu, S.;<sup>†</sup> Song, X.;<sup>†</sup> Poh, S. B.; Yang, H.; Wong, M. W.;\* Zhao, Y.\* *Chem. Eur. J.* **2017**, *23*, 2275-2281).
  6. "Acid-Assisted Ru-Catalyzed Enantioselective Amination of 1,2-Diols through Borrowing Hydrogen," Yang, L.-C.; Wang, Y.-N.; Zhang, Y.;\* Zhao, Y.\* *ACS Catal.* **2017**, *7*, 93-97.
  7. "Access to Acyclic (Z)-Enediyne via Alkyne Trimerization: Cooperative Bimetallic Catalysis Using Air as the Oxidant," Lee, J. T. D.; Zhao, Y. *Angew. Chem. Int. Ed.* **2016**, *55*, 13872-13876.
  8. "Stereoselective 1,6-Conjugate Addition/Annulation of Para-Quinone Methides with Vinyl Epoxides/Cyclopropanes," Ma, C.;<sup>†</sup> Huang, Y.;<sup>†</sup> Zhao, Y. *ACS Catal.* **2016**, *6*, 6408-6412.
  9. "Asymmetric Transfer Hydrogenation of Imines using Alcohol: Efficiency and Selectivity Are Affected by the Hydrogen Donor," Pan, H.-J.; Zhang, Y.; Shan, C.; Yu, Z.; Lan, Y.;\* Zhao, Y.\* *Angew. Chem. Int. Ed.* **2016**, *55*, 9615-9619.
  10. "Cobalt-Catalyzed Enantioselective Vinylation of Activated Ketones and Imines," Huang, Y.;<sup>†</sup> Huang, R.-Z.;<sup>†</sup> Zhao, Y. *J. Am. Chem. Soc.* **2016**, *138*, 6571-6576.
  11. "Catalyst-Enabled Diastereodivergent aza-Diels-Alder Reaction: Complementarity of N-Heterocyclic Carbene and Chiral Amine," Rong, Z. Q.;<sup>†</sup> Wang, M.;<sup>†</sup> Chow, C. H. E.; Zhao, Y. *Chem. Eur. J.* **2016**, *22*, 9483-9487.
  12. "Iron-catalyzed transfer hydrogenation of imines assisted by an iron-based Lewis acid," Pan, H.-J.; Ng, T. W.; Zhao, Y. *Org. Biomol. Chem.* **2016**, *14*, 5490-5493 (Invited article for "New Talent Issue").
  13. "Cobalt-Catalyzed Allylation of Heterobicyclic Alkenes: Ligand-Induced Divergent Reactivities," Huang, Y.; Ma, C.; Lee, Y. X.; Huang, R.-Z.; Zhao, Y. *Angew. Chem. Int. Ed.* **2015**, *54*, 13696-13700.
  14. "Iron-catalyzed amination of alcohols assisted by Lewis acid," Pan, H.-J.; Ng, T. W.; Zhao, Y. *Chem. Comm.* **2015**, *51*, 11907-11910.
  15. "Phase-Transfer-Catalyzed Enantioselective  $\alpha$ -Hydroxylation of Acyclic and Cyclic Ketones with Oxygen," Sim, S. B. D.; Wang, M.; Zhao, Y. *ACS Catal.* **2015**, *5*, 3609-3612.
  16. "Dynamic Kinetic Asymmetric Amination of Alcohols: From A Mixture of Four Isomers to Diastereo- and Enantiopure  $\alpha$ -Branched Amines," Rong, Z. Q.;<sup>†</sup> Zhang, Y.;<sup>†</sup> Chua, R. H. B.; Pan, H.-J.; Zhao, Y. *J. Am. Chem. Soc.* **2015**, *137*, 4944-4947.
  17. "Catalytic Divergent Synthesis of 3*H* or 1*H* Pyrroles by [3+2] Cyclization of Allenates with Activated Isocyanides," Liao, J.-Y.;<sup>†</sup> Shao, P.-L.;<sup>†</sup> Zhao, Y. *J. Am. Chem. Soc.* **2015**, *137*, 628-631.
  18. "Stereoselective Synthesis of  $\epsilon$ -Lactones or Spiro-Heterocycles through NHC-Catalyzed Annulation: Divergent Reactivity by Catalyst Control," Wang, M.;<sup>†</sup> Rong, Z.-Q.;<sup>†</sup> Zhao, Y. *Chem. Comm.* **2014**, *50*, 15309-15312.
  19. "Kinetic Resolution of 1,1'-Biaryl-2,2'-Diols and Amino Alcohols through NHC-Catalyzed Atroposelective Acylation," Lu, S.; Poh, S. B.; Zhao, Y. *Angew. Chem. Int. Ed.* **2014**, *53*, 11041-11045.
  20. "Highly Diastereo- and Enantioselective Ag-Catalyzed Double [3+2] Cyclization of  $\alpha$ -Imino Esters with Isocyanoacetate," Shao, P.-L.; Liao, J.-Y.; Ho, Y. A.; Zhao, Y. *Angew. Chem. Int. Ed.* **2014**, *53*, 5435-5439.

21. "Enantioselective Oxidation of 1,2-Diols with Quinine-derived Urea Organocatalyst," Rong, Z.-Q.; Pan, H.-J.; Yan, H.-L.; Zhao, Y. *Org. Lett.* **2014**, *16*, 208–211.
22. "Catalytic Enantioselective Amination of Alcohols by the Use of Borrowing Hydrogen Methodology: Cooperative Catalysis by Iridium and a Chiral Phosphoric Acid," Zhang, Y.; Lim, C.-S.; Sim, D. S. B.; Pan, H.-J.; Zhao, Y. *Angew. Chem. Int. Ed.* **2014**, *53*, 1399–1403.
23. "Practical, Highly Stereoselective Allyl- and Crotylsilylation of Aldehydes Catalyzed by Readily Available Cinchona Alkaloid Amide," Huang, Y.; Yang, L.; Shao, P.; Zhao, Y. *Chem. Sci.* **2013**, *4*, 3275–3281.
24. "Kinetic Resolution of 3-Hydroxy-3-Substituted Oxindoles through NHC-Catalyzed Oxidative Esterification," Lu, S.; Poh, S. B.; Siau, W.-Y.; Zhao, Y. *Synlett*, **2013**, *24*, 1165–1169.
25. "Kinetic Resolution of Tertiary Alcohols: Highly Enantioselective Access to 3-Hydroxy-3-Substituted Oxindoles," Lu, S.; Poh, S. B.; Siau, W.-Y.; Zhao, Y. *Angew. Chem. Int. Ed.* **2013**, *52*, 1731–1734.
26. "Stereoselective Synthesis of Z-Alkenes," Siau, W.-Y.; Zhang, Y.; Zhao, Y. *Top. Curr. Chem.* **2012**, *327*, 33–58.

#### PhD and Postdoc Periods:

27. "Preparation of Highly Pure Disubstituted *E* Olefins through Mo-Catalyzed *Z*-Selective Ethenolysis of Stereoisomeric Mixtures," Marinescu, S. C.; Levine, D. S.; Zhao, Y.; Schrock, R. R.; Hoveyda, A. H. *J. Am. Chem. Soc.* **2011**, *133*, 11512–11514.
28. "Regiodivergent Reactions through Catalytic Enantioselective Silylation of Chiral Diols. Synthesis of Sapinofuranone A," Rodrigo, J.; Zhao, Y.; Hoveyda, A. H.; Snapper, M. L. *Org. Lett.* **2011**, *13*, 3778–3781.
29. "*Endo*-Selective Enyne Ring-Closing Metathesis Promoted by Stereogenic-at-W Mono-Pyrrolide Complexes," Zhao, Y.; Hoveyda, A. H.; Schrock, R. R. *Org. Lett.* **2011**, *13*, 784–787.
30. "Highly *Z*-Selective Metathesis Homocoupling of Terminal Olefins," Jiang, A. J.; Zhao, Y.; Hoveyda, A. H.; Schrock, R. R. *J. Am. Chem. Soc.* **2009**, *131*, 16630–16631.
31. "Kinetic Resolution of 1,2-Diols through Highly Site- and Enantioselective Catalytic Silylation," Zhao, Y.; Mitra, A. W.; Hoveyda, A. H.; Snapper, M. L. *Angew. Chem. Int. Ed.* **2007**, *44*, 8471–8474.
32. "Enantioselective Silyl Protection of Alcohols Catalysed by an Amino-Acid-Based Small Molecule," Zhao, Y.; Rodrigo, J.; Hoveyda, A. H.; Snapper, M. L. *Nature* **2006**, *443*, 67–70.
33. "Proline-Based *N*-Oxides as Readily Available and Modular Chiral Catalysts. Enantioselective Reactions of Allyltrichlorosilane with Aldehydes," Traverse, J. F.; Zhao, Y.; Hoveyda, A. H.; Snapper, M. L. *Org. Lett.* **2005**, *7*, 3151–3154.

<sup>†</sup>Equal contribution.

#### Patents

1. "Highly *Z*-Selective Olefin Metathesis," Schrock, R. R.; Hoveyda, A. H.; Jiang, A. J.; Zhao, Y.; Flook, M. M. Publication **2011**, # US-2011-0077421-A1.
2. "Catalytic Enantioselective Silylations of Substrates," Snapper M. L.; Hoveyda A. H.; Rodrigo, J.; Zhao, Y. PCT Int. Appl. **2007**, # WO2007082026.

## **Funding as PI**

1. NRF-NRFF2011-10: \$2,998,500; 08/2011 – 08/2016
2. MOE2014-T2-2-156: \$692,123; 08/2015 – 07/2018
3. A\*STAR SERC PSF: \$583,253; 04/2016 – 03/2019