

John Hoskin

Foreward by Ximing Li

Introduction by E. J. Sorensen

**THE CAREER  
PATH OF  
LASZLO KURTI  
(SO FAR)**

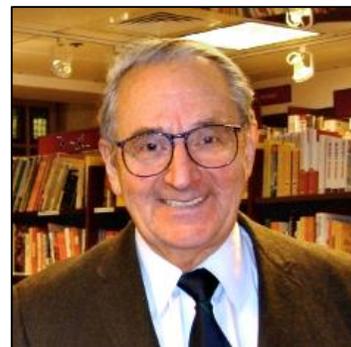
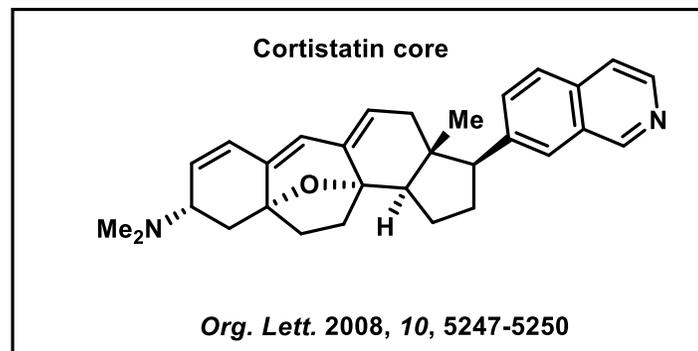
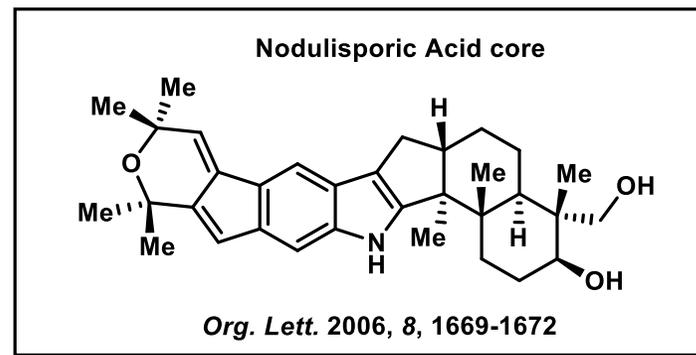
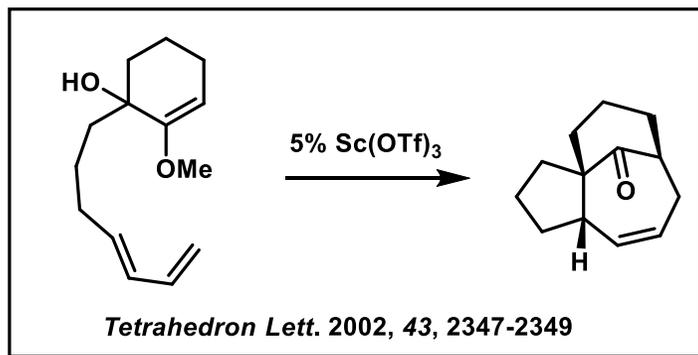
Background and Detailed Mechanisms

# Biography of László Kürti



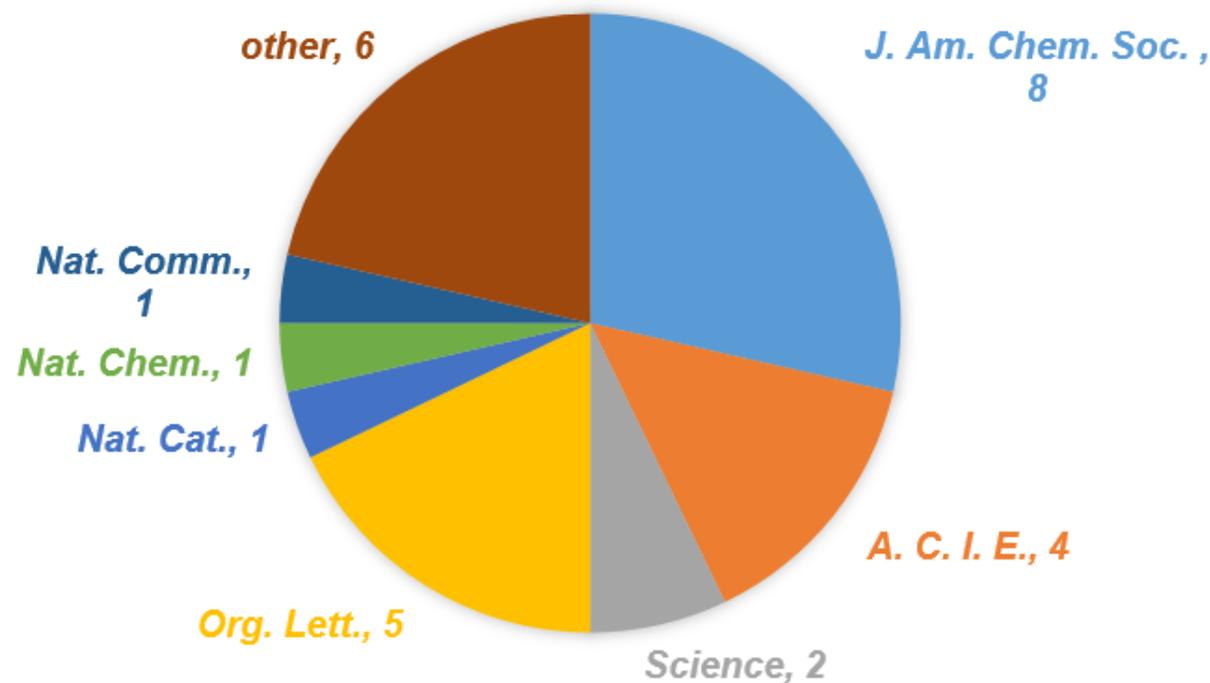
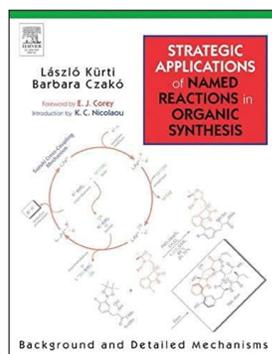
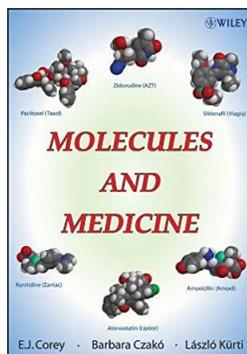
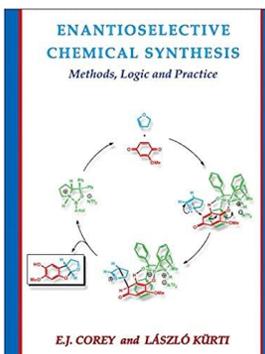
- Born and raised in Hungary
- 1998 – Diploma, Lajos Kossuth University
- 2001 – M.Sc., University of Missouri, Columbia (Michael Harmata)
- 2006 – Ph. D., University of Pennsylvania (Amos Smith)
- 2010 – Postdoc, Harvard University (E. J. Corey)
- 2010-2015 – Assistant Prof., UT Southwestern Medical Center
- 2015-present – Associate Prof., Rice University

# Supervised Work



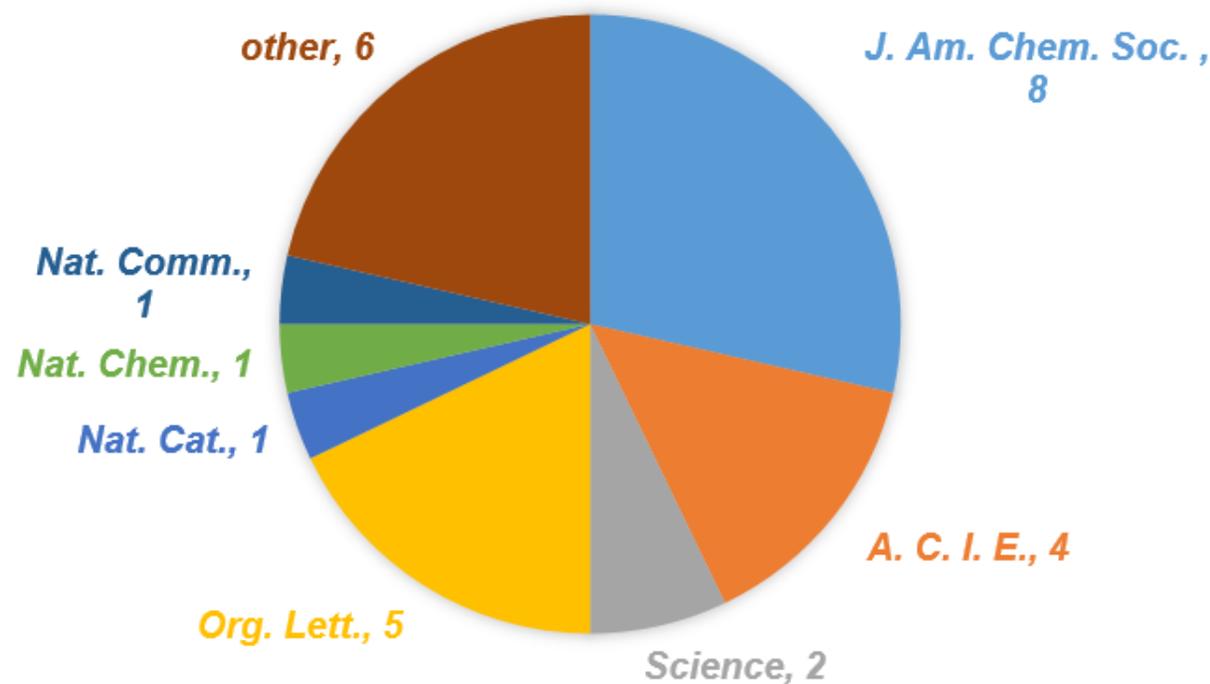
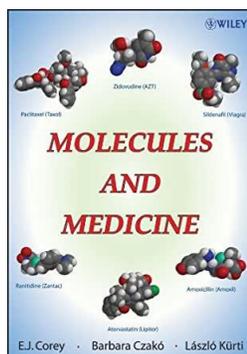
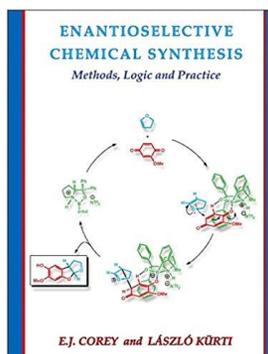
# Independent Career

- NSF CAREER Award, 2015-2020
- Amgen Young Investigators' Award, 2014
- Author of 3 books



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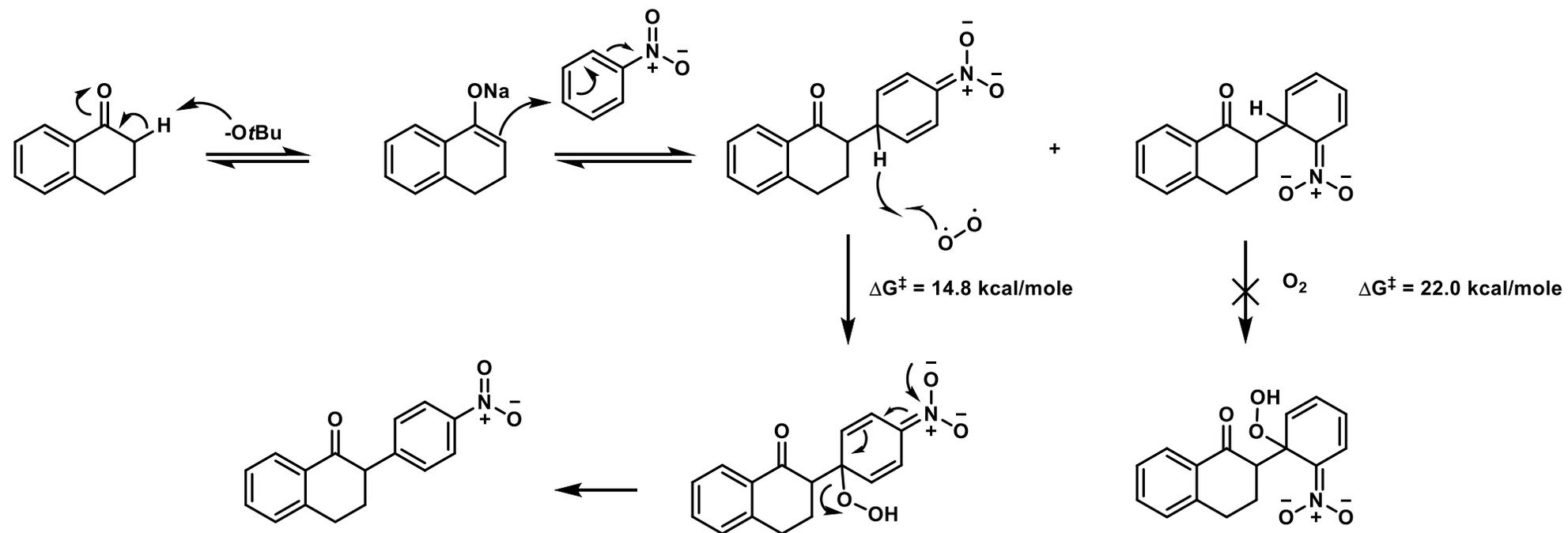
"There are several books on 'named reactions,' but this one is already my favorite. I am convinced that this reader-friendly book will contribute to the chemical education of many graduate students of organic chemistry.

-- Erik J. Sorensen

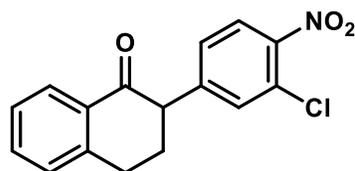
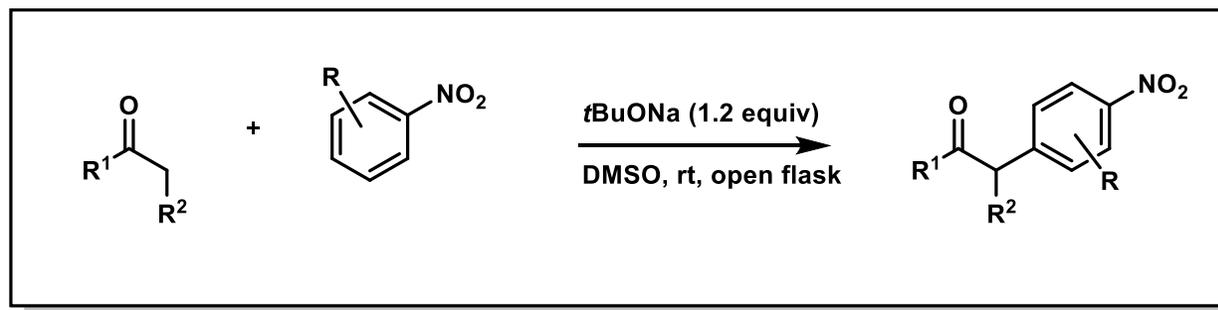
# Literature Highlights

## 2013 – Metal-Free $\alpha$ -Arylation of Ketones

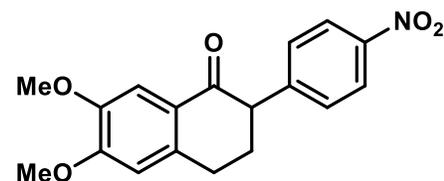




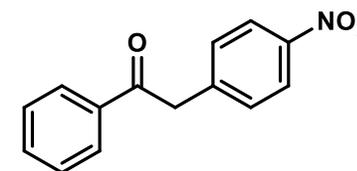
## 2013 – Metal-Free $\alpha$ -Arylation of Ketones



54%



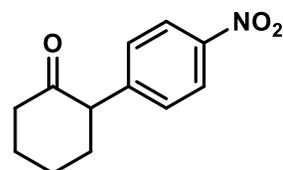
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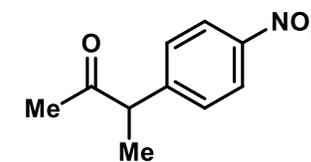
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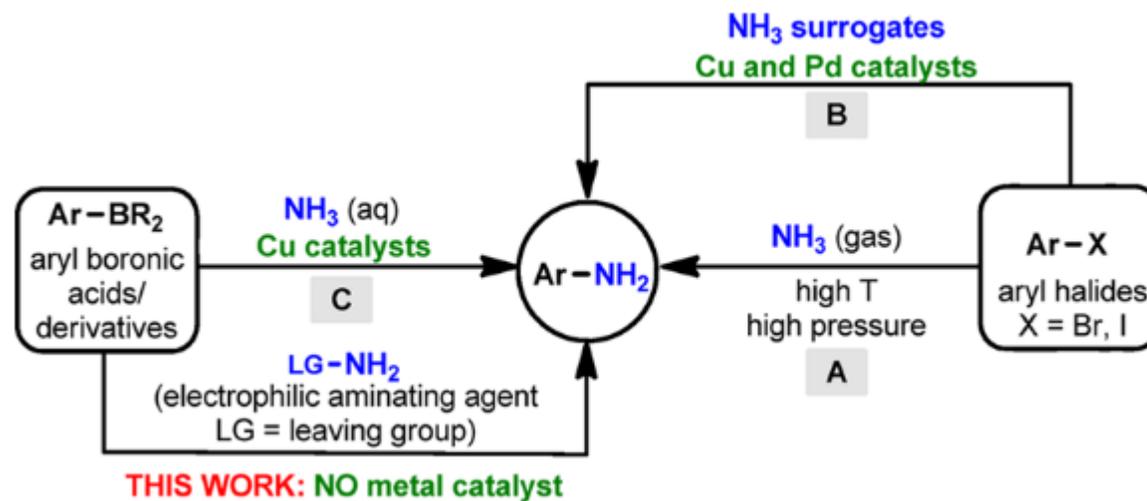


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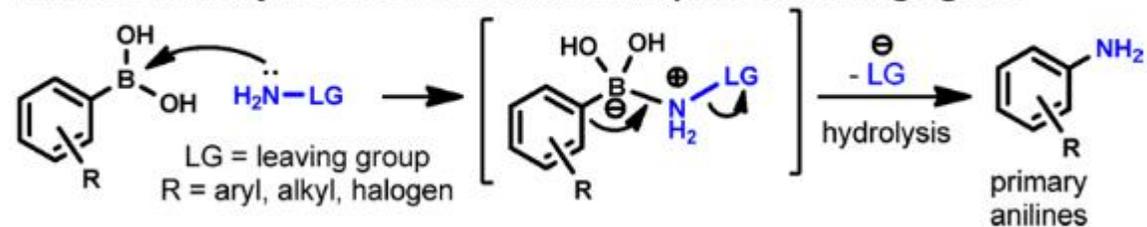


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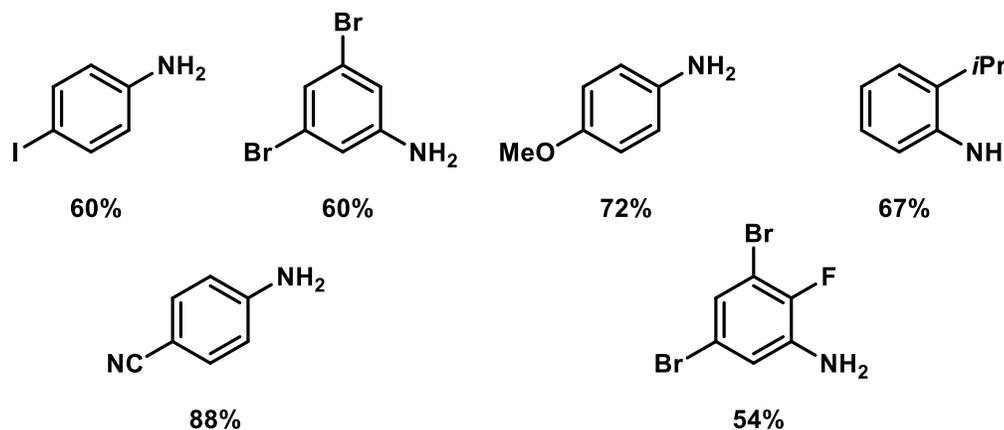
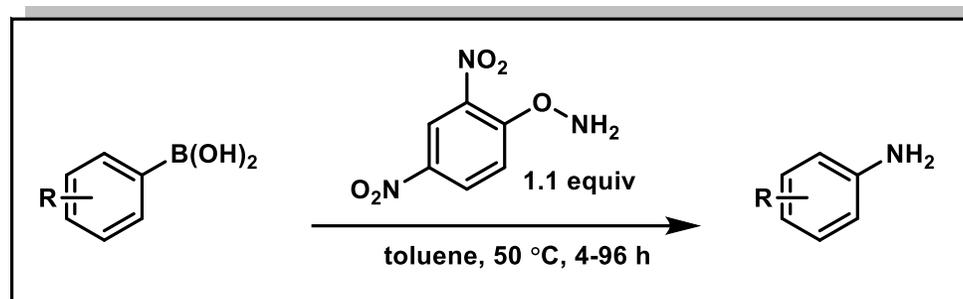
## 2012: Metal-Free Primary Amination of Arylboronic Acids



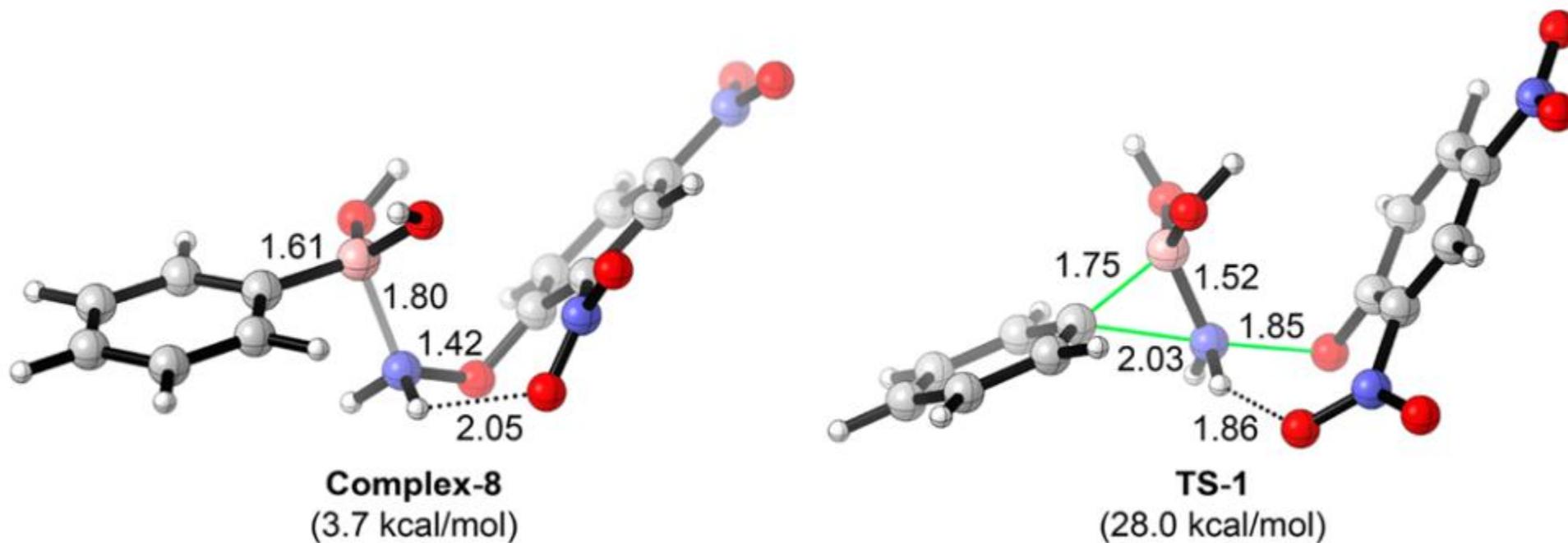
### Amination of Arylboronic Acids with Electrophilic Aminating Agents



## Metal-Free Primary Amination of Arylboronic Acids



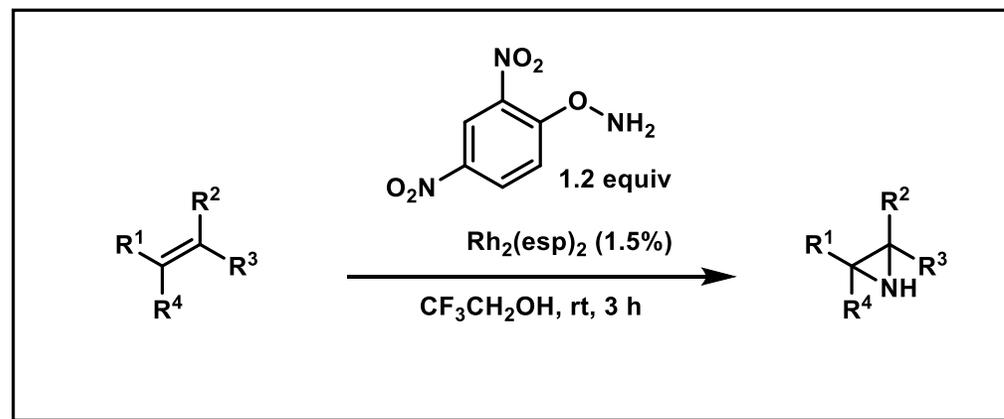
## Metal-Free Primary Amination of Arylboronic Acids



## 2014 – Stereospecific N-H Aziridination of Olefins



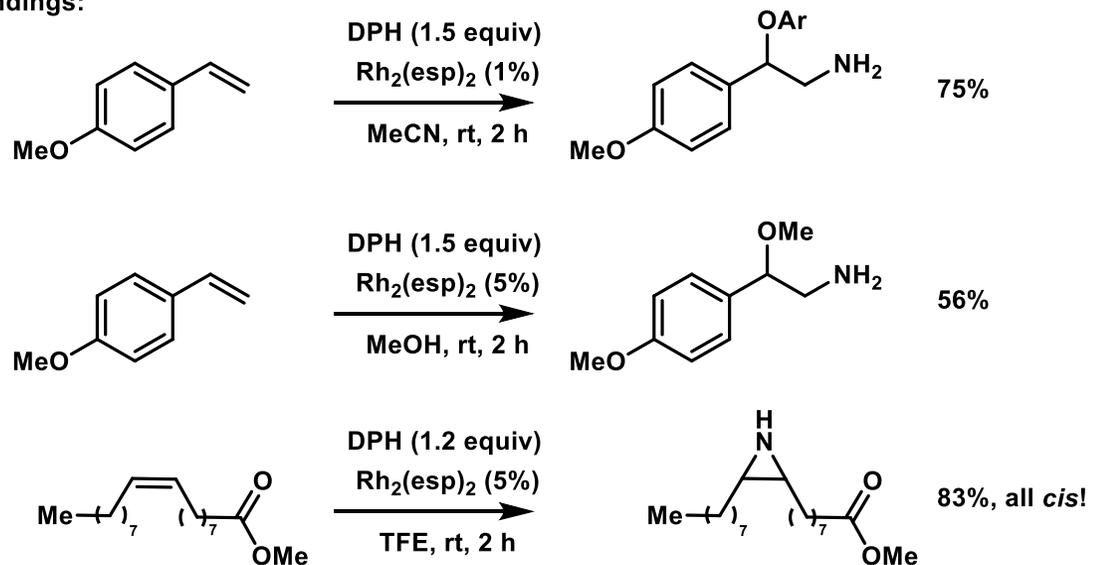
with John Falck,  
UT Southwestern  
Medical Center



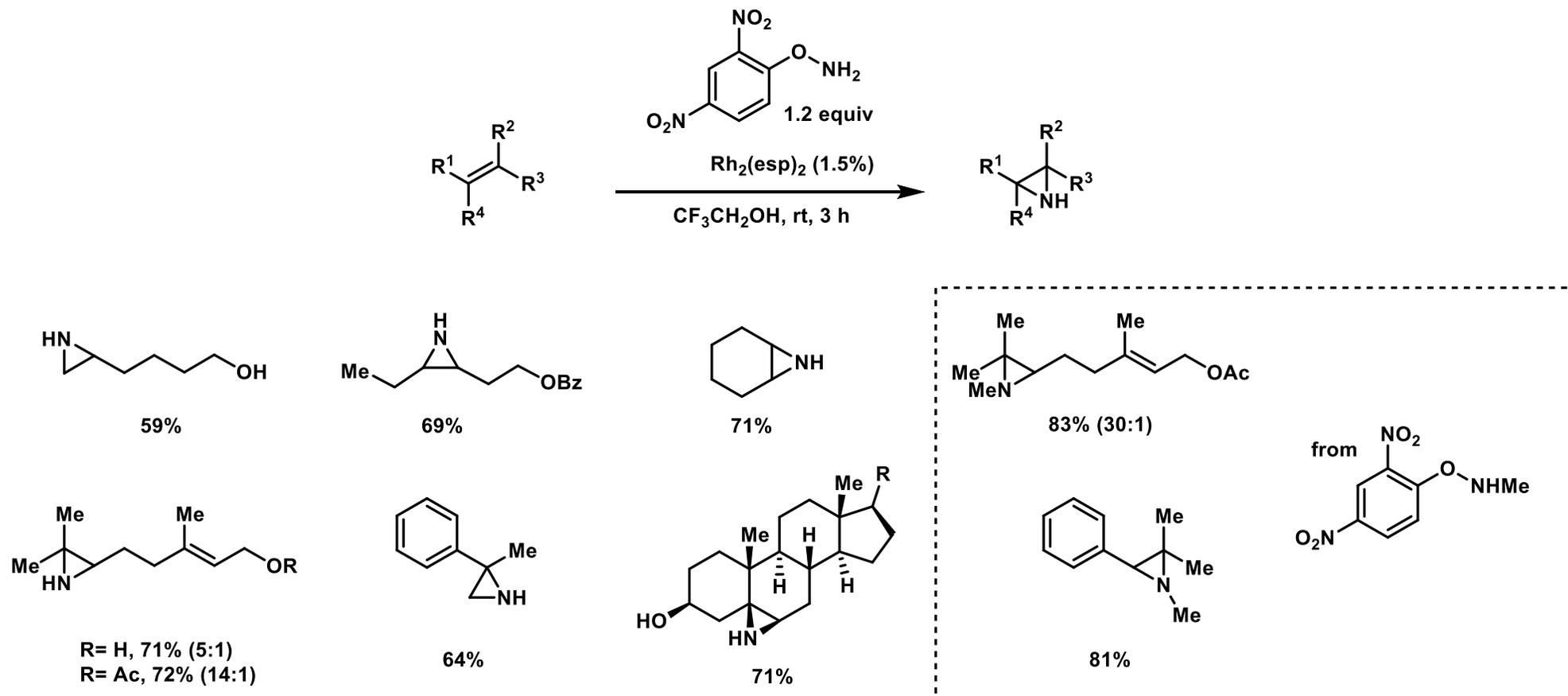
- stereospecific
- very mild conditions
- highly chemoselective

## 2014 – Stereospecific N-H Aziridination of Olefins

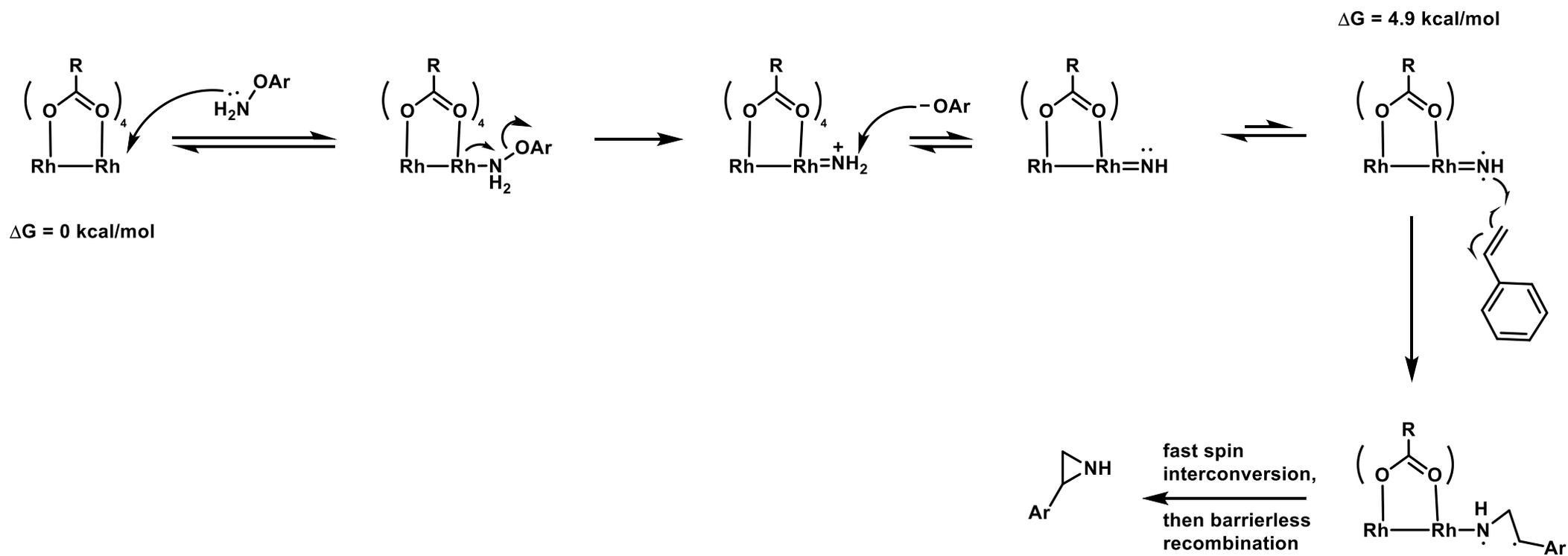
Initial findings:



# Science



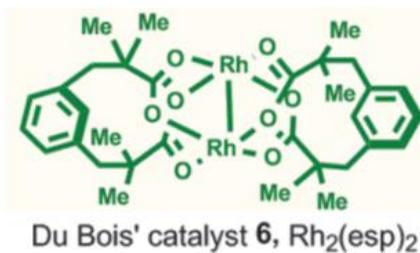
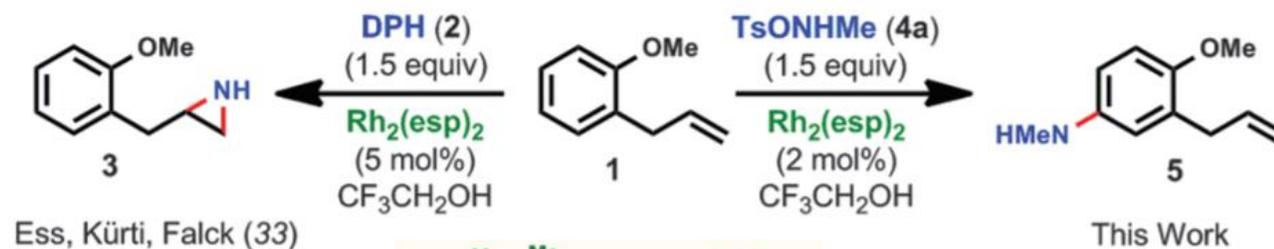
# Science

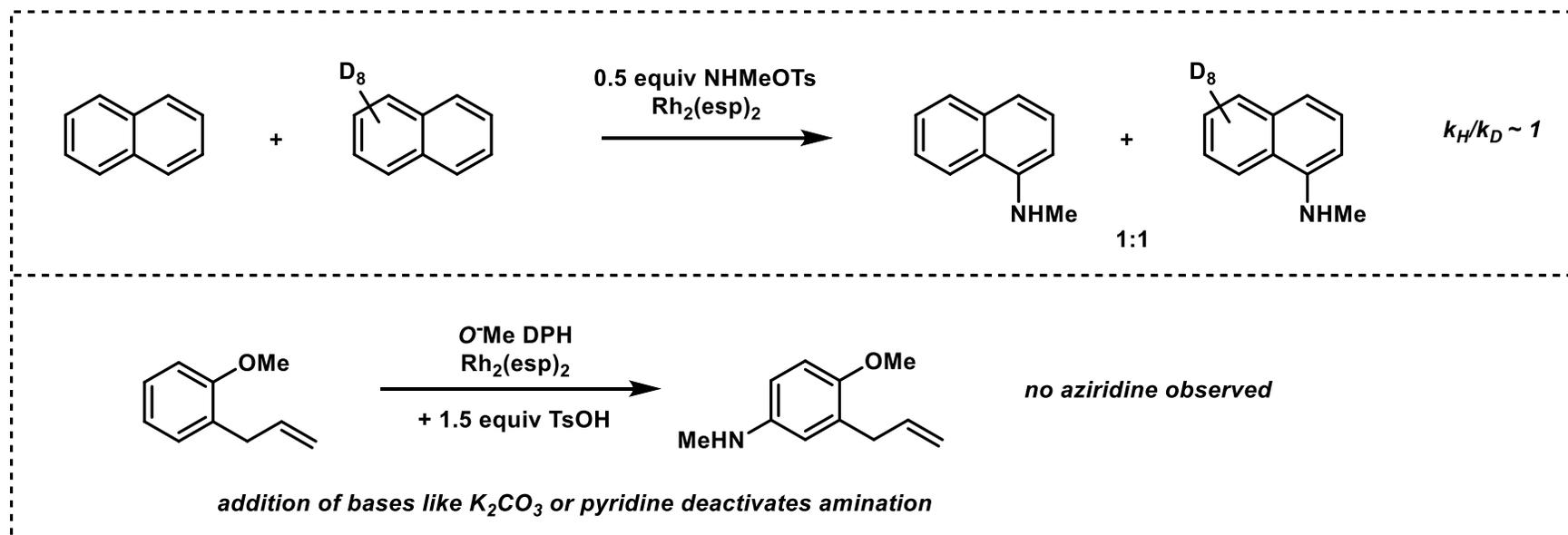
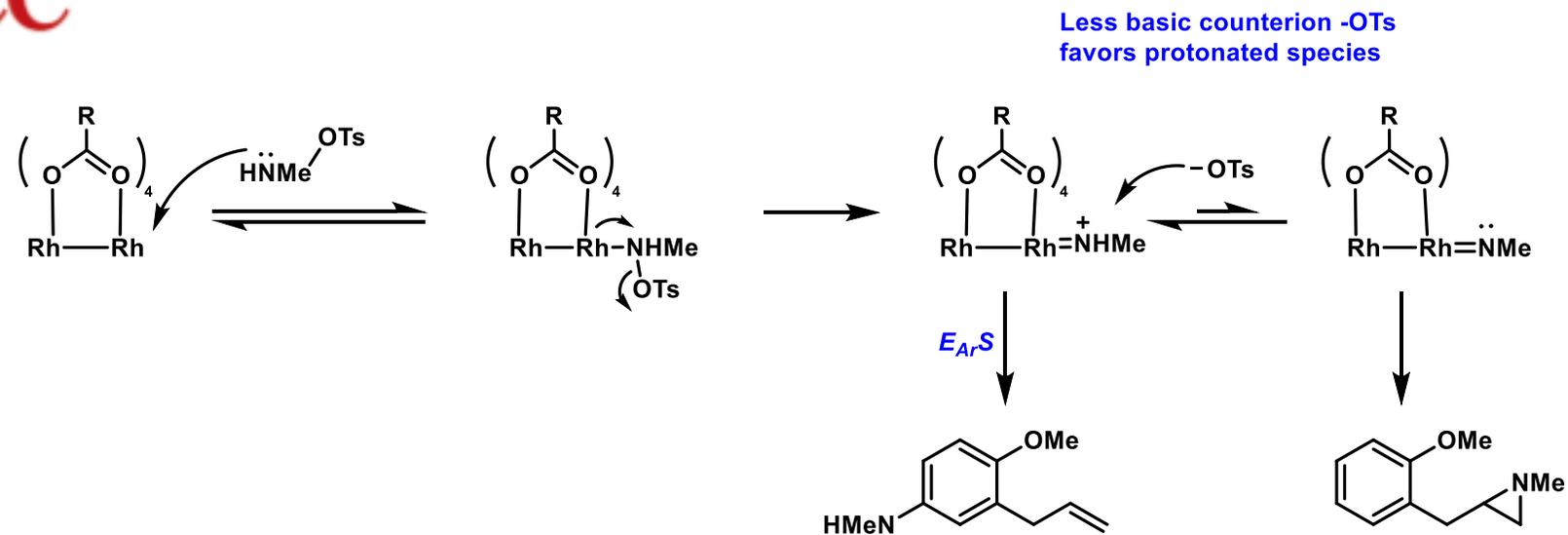


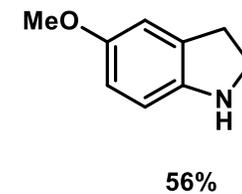
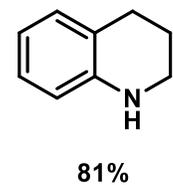
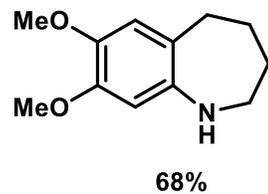
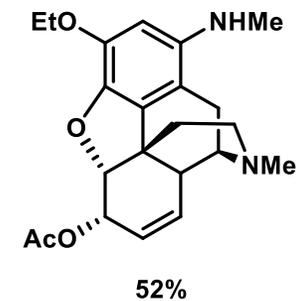
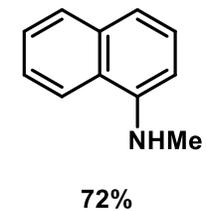
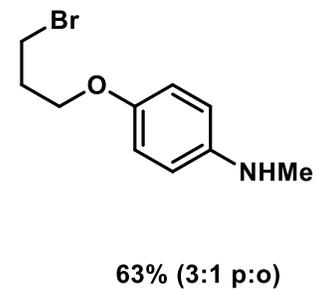
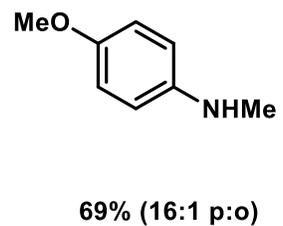
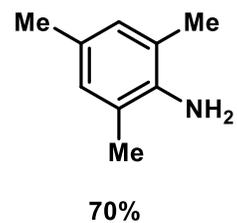
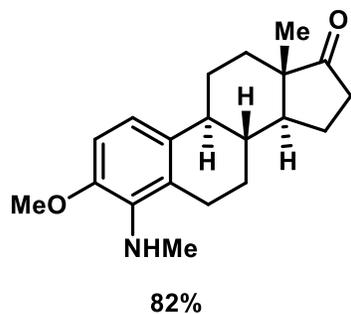
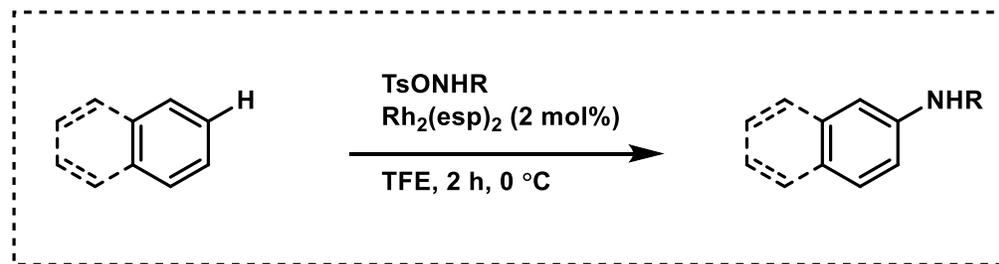
## 2016 – Direct C-H Amination of Arenes



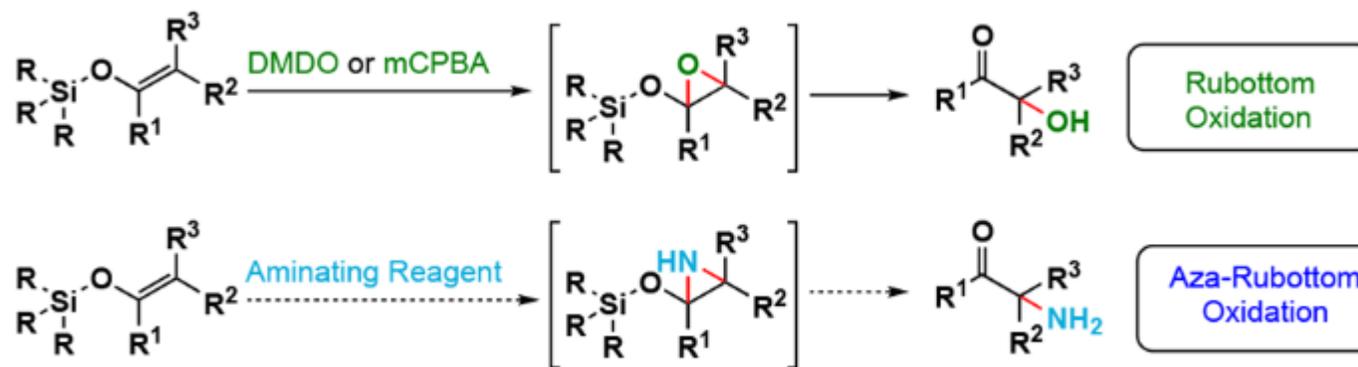
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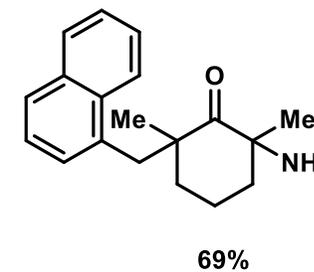
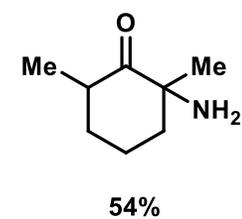
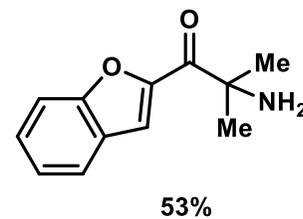
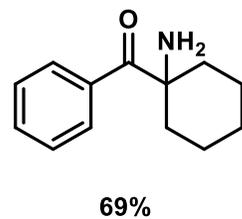
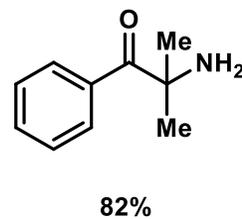
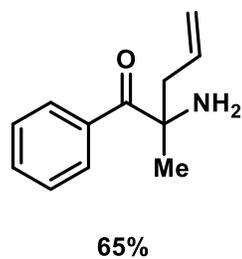
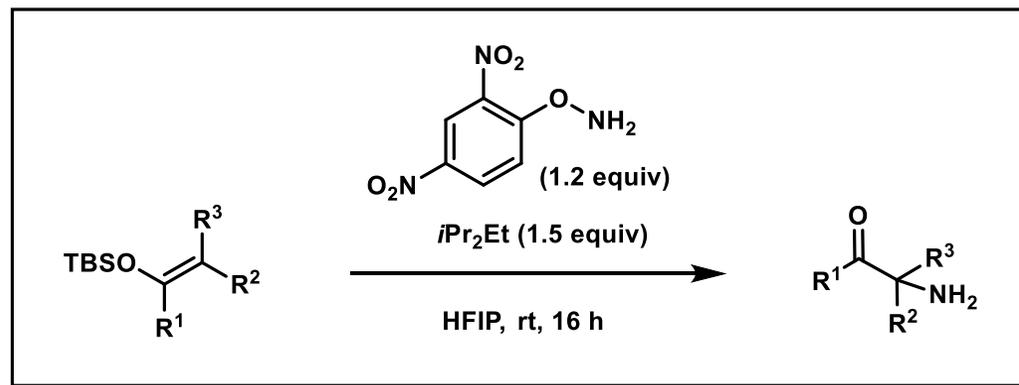




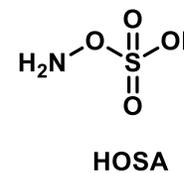
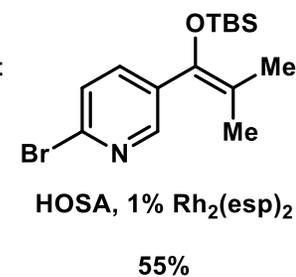
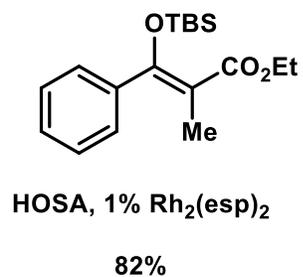
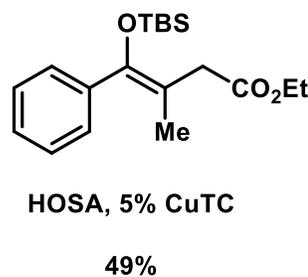


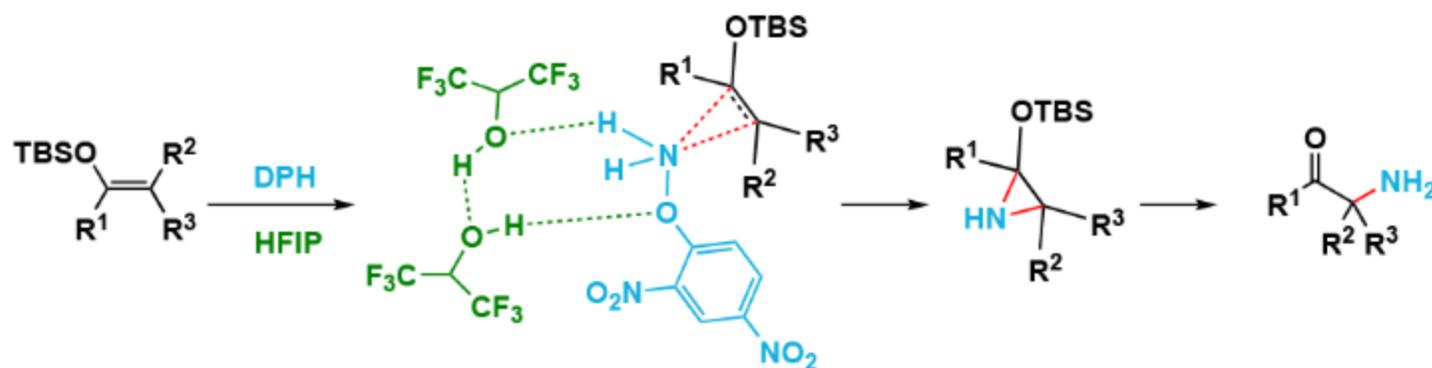
## 2019: The Aza-Rubottom Amination





some substrates required a TM catalyst



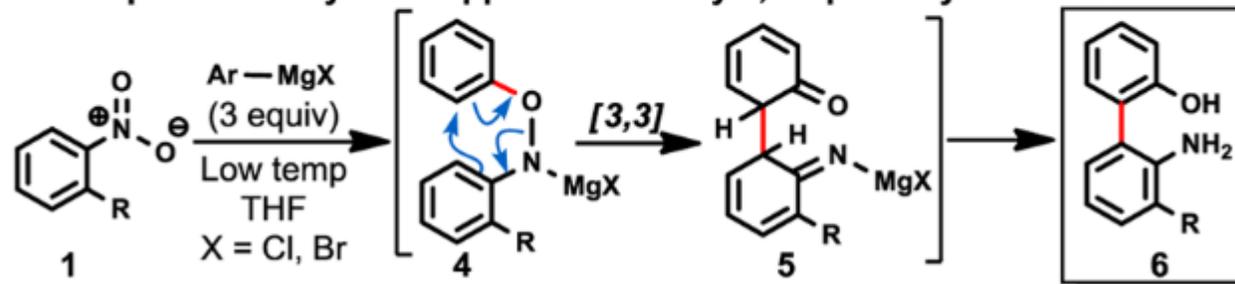


## 2013: Transition Metal-Free Arylation of Nitroarenes

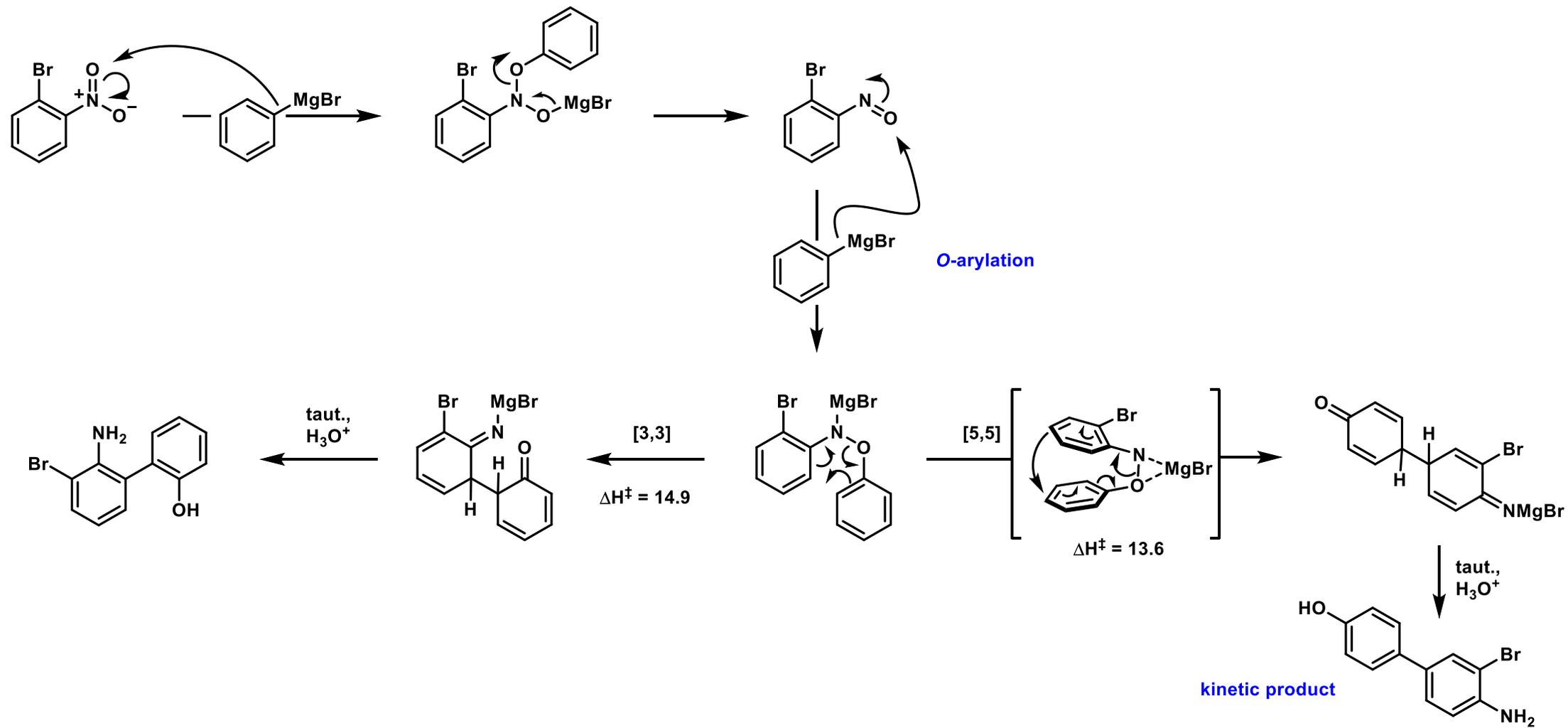
### I. The Bartoli indole synthesis: a one-pot process to 7-substituted indoles:



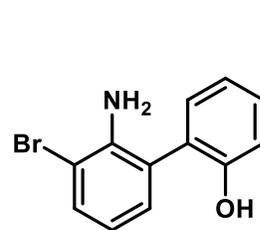
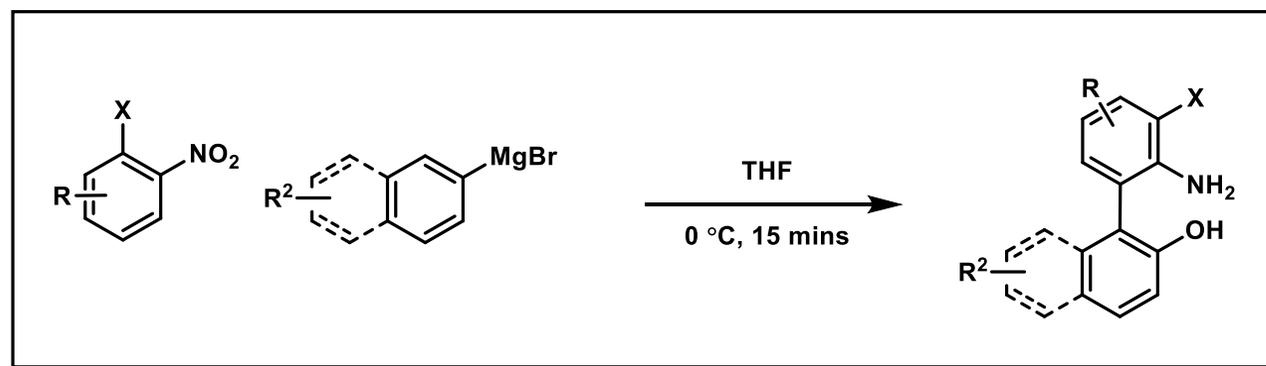
### II. One-pot direct arylation approach to biaryls, inspired by Bartoli's method:



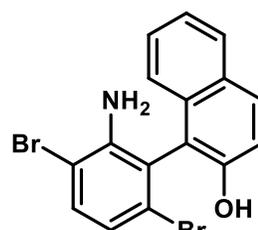
**THIS WORK:**  
 NO TM catalyst  
 Low Temp  
 NO oxidant



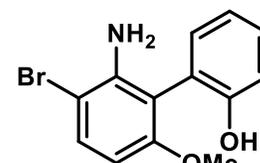
## Transition Metal-Free Arylation of Nitroarenes



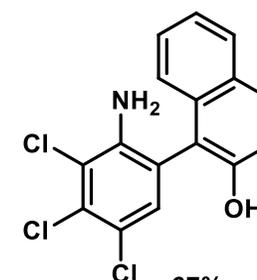
68%



49%



68%



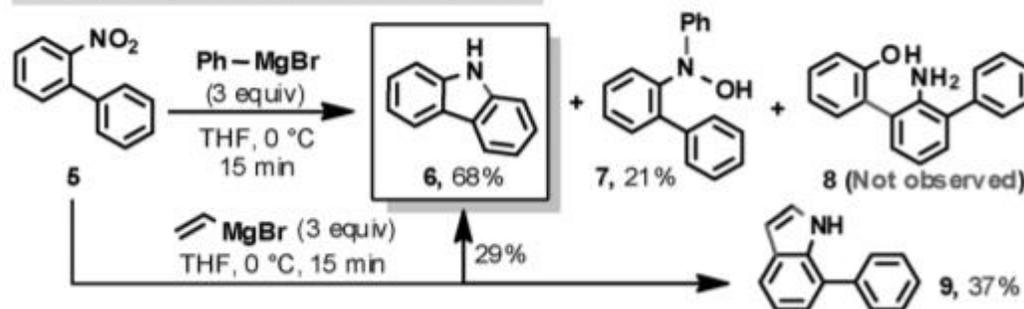
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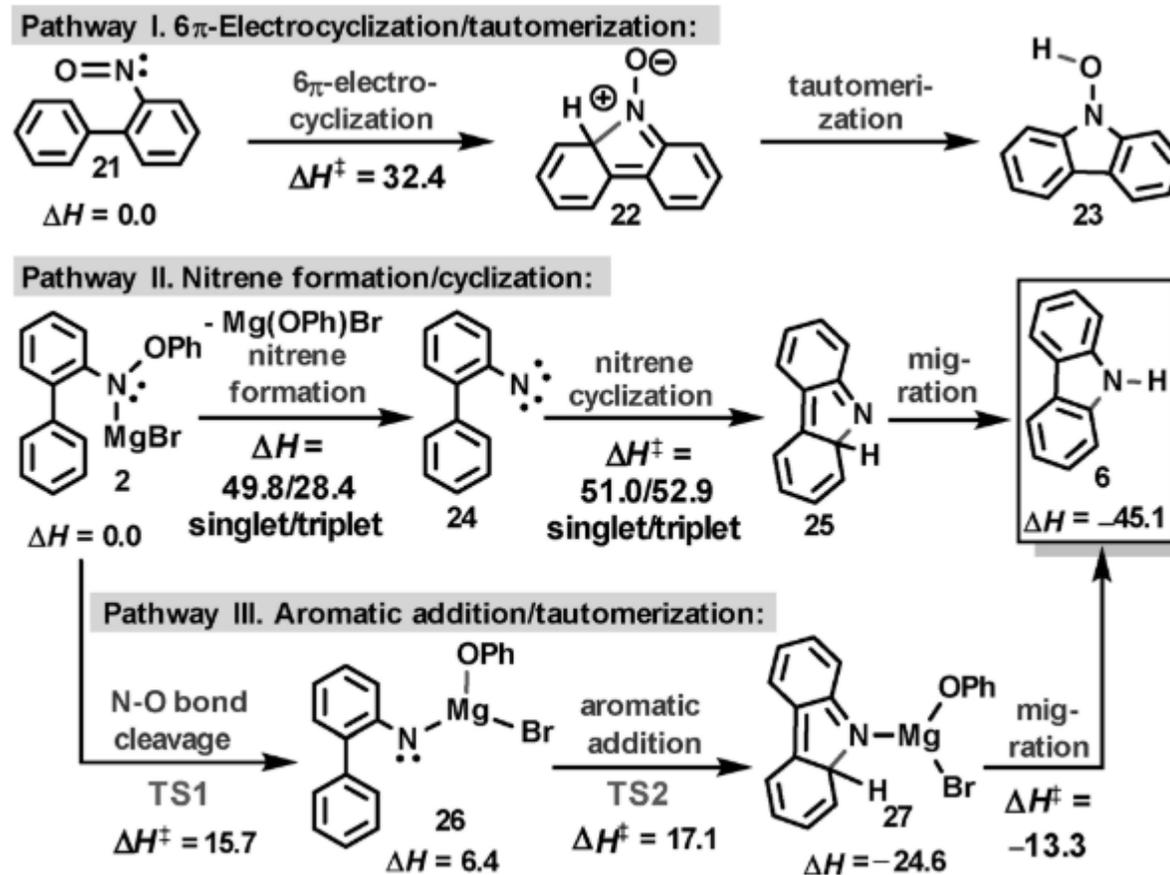


## 2014: Transition Metal-Free Carbazole Synthesis

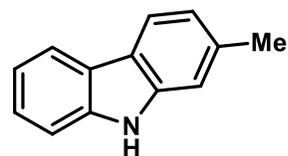
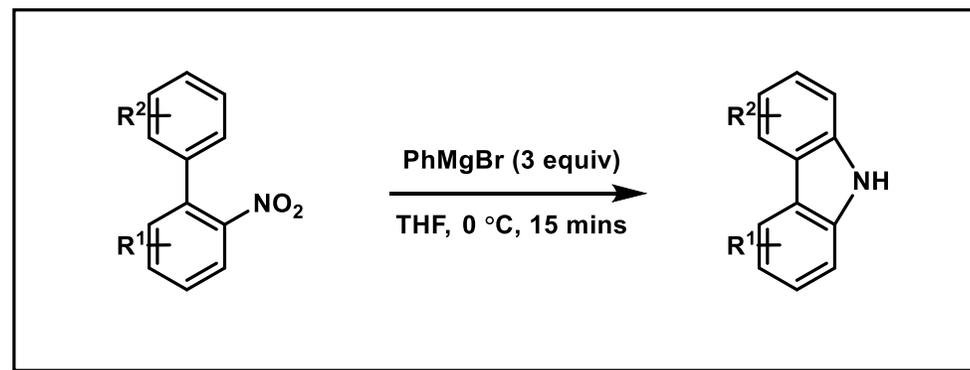


### B. Surprising reactivity of 2-nitrobiphenyl:

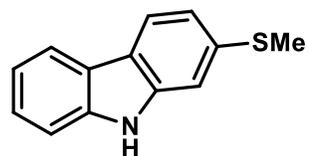




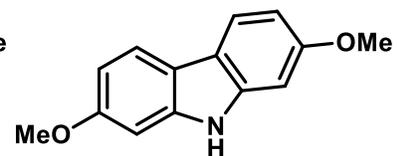
**Scheme 4.** Possible mechanistic pathways (energies in kcal mol<sup>-1</sup>).



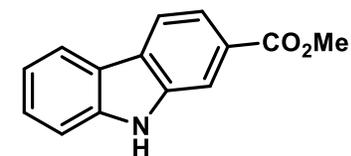
60%



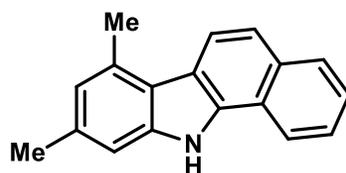
63%



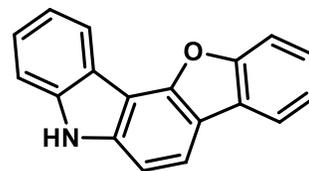
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Clausine V



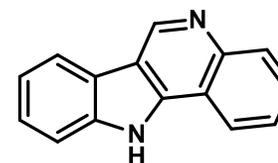
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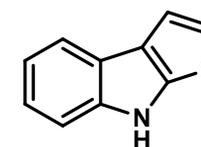
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59%



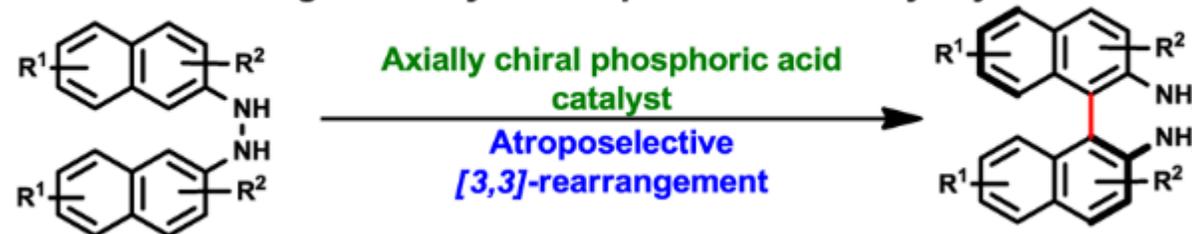
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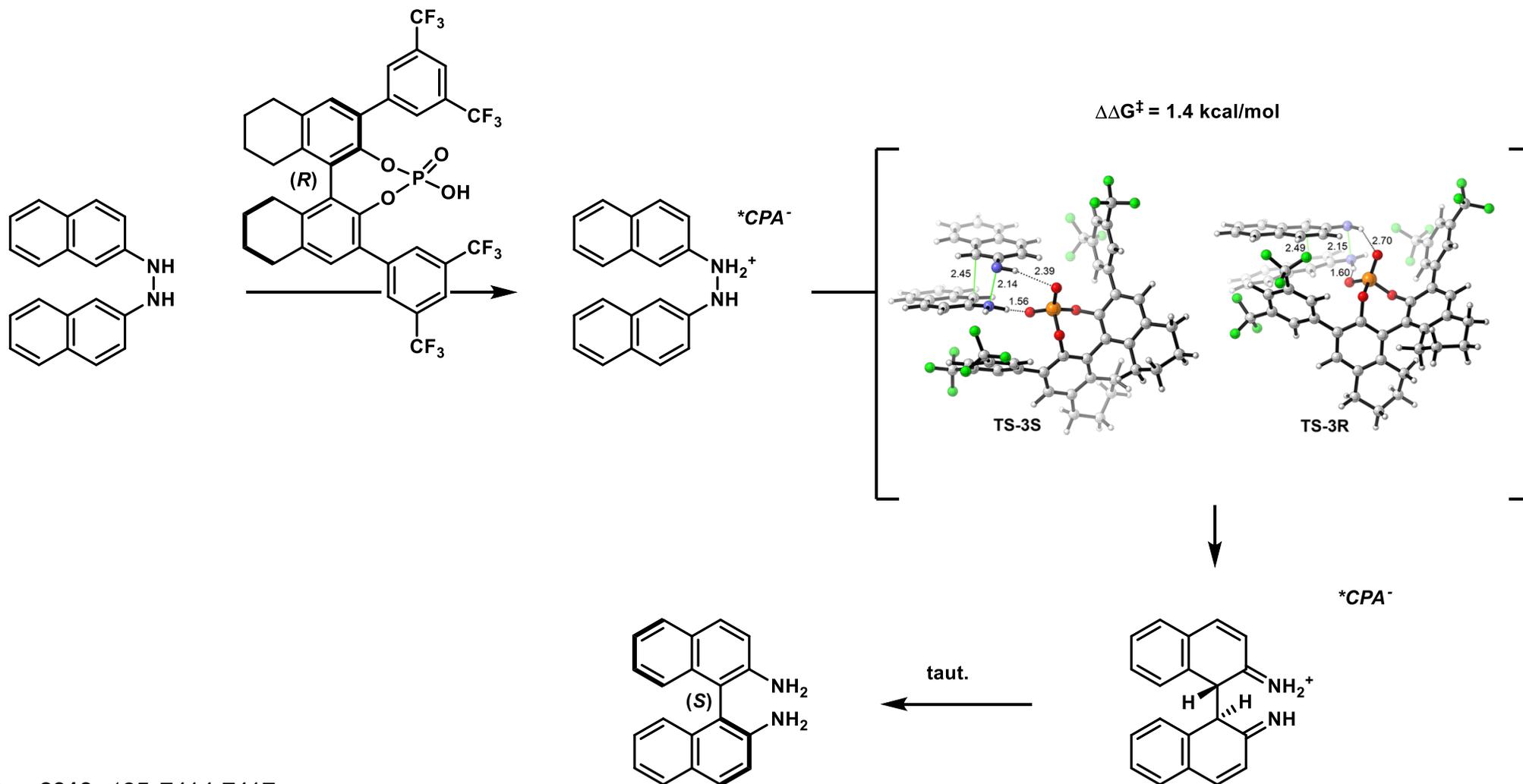


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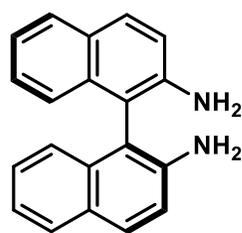
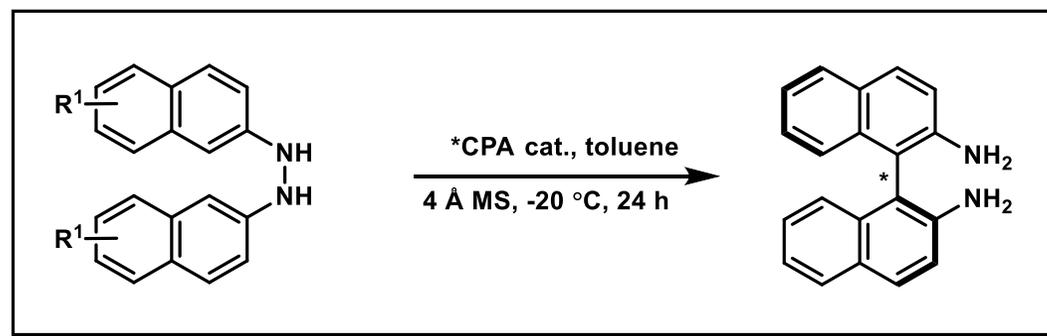
## 2013 – Metal-Free Atroposelective Synthesis of BINAM Derivatives

### **B. This work:** Organocatalytic Atroposelective Biaryl Synthesis

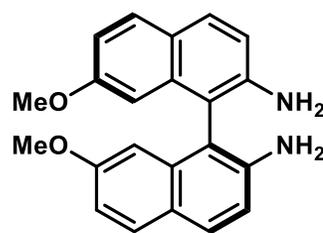




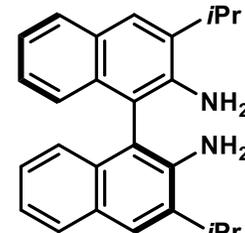
## Metal-Free Atroposelective Synthesis of BINAM Derivatives



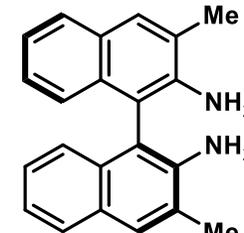
89%, 93:7 *er*



70%, 87.5:12.5 *er*



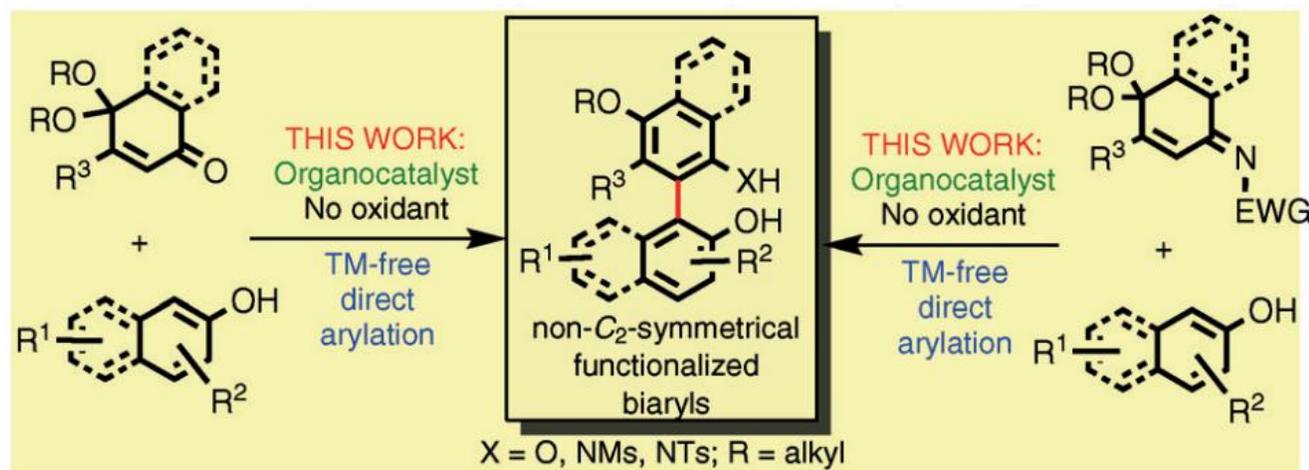
69%, 85.5:14.5 *er*

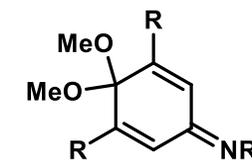
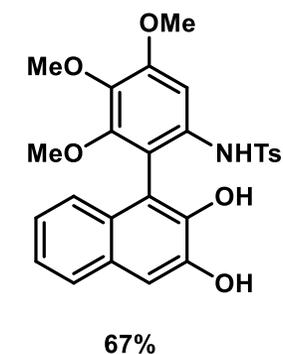
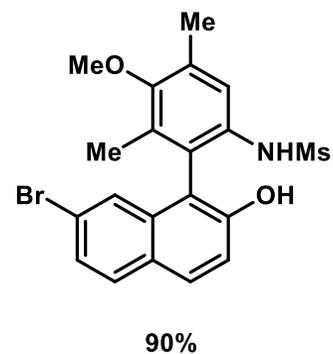
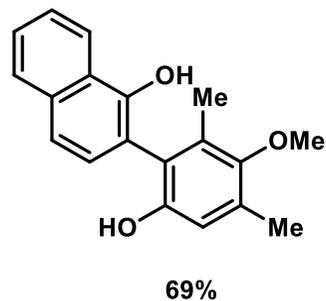
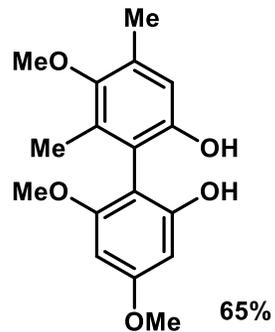
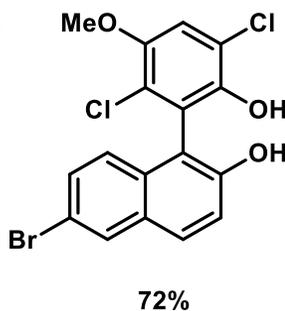
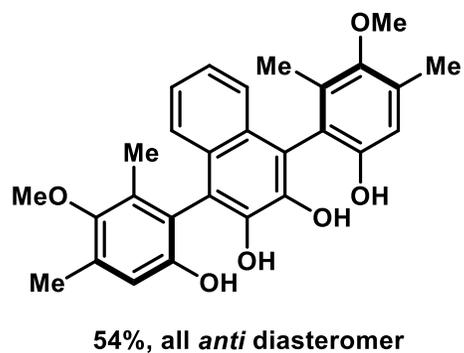
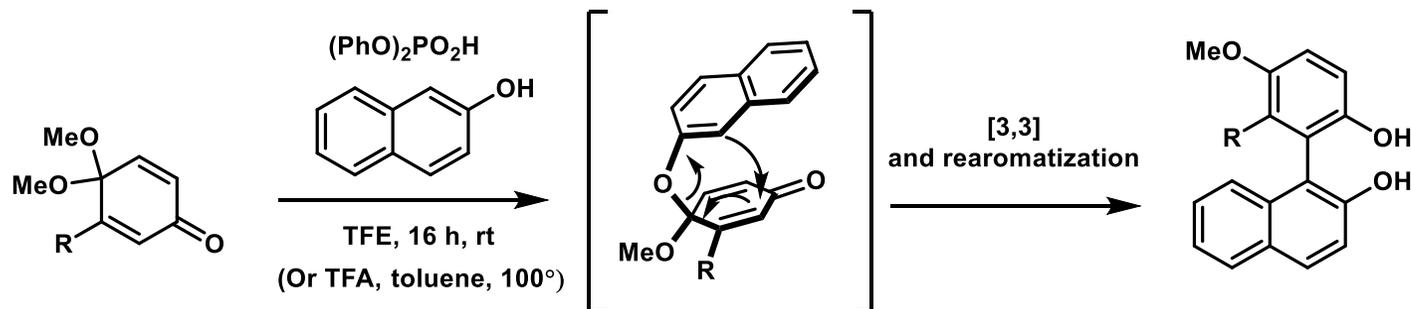


85%, 85:15 *er*

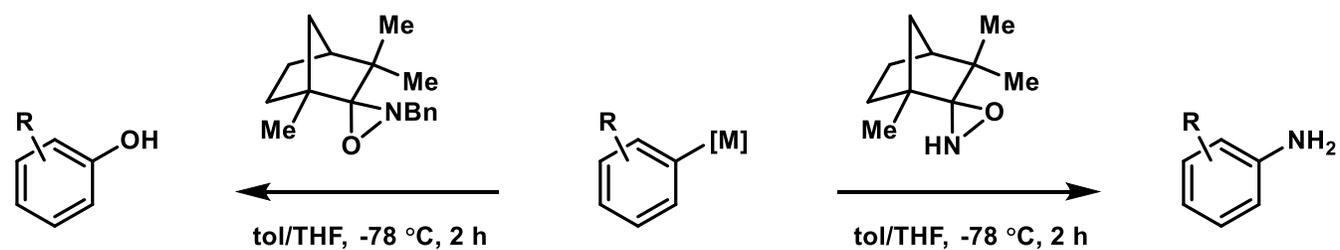


## 2016 – Organocatalytic Synthesis of Biaryls





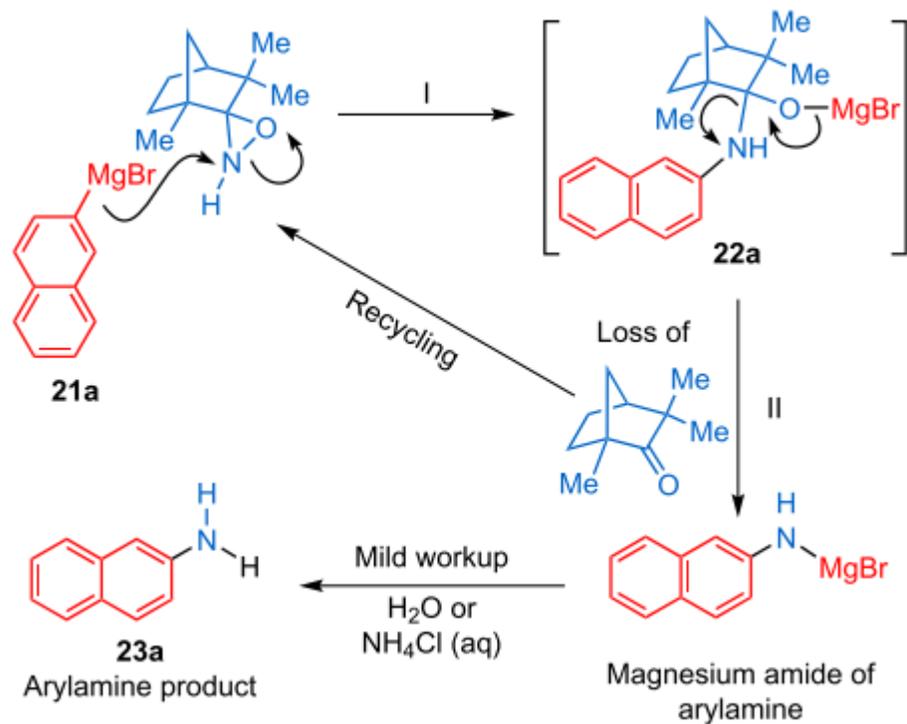
## 2017 – Hydroxylation and Amination of Arylmetals

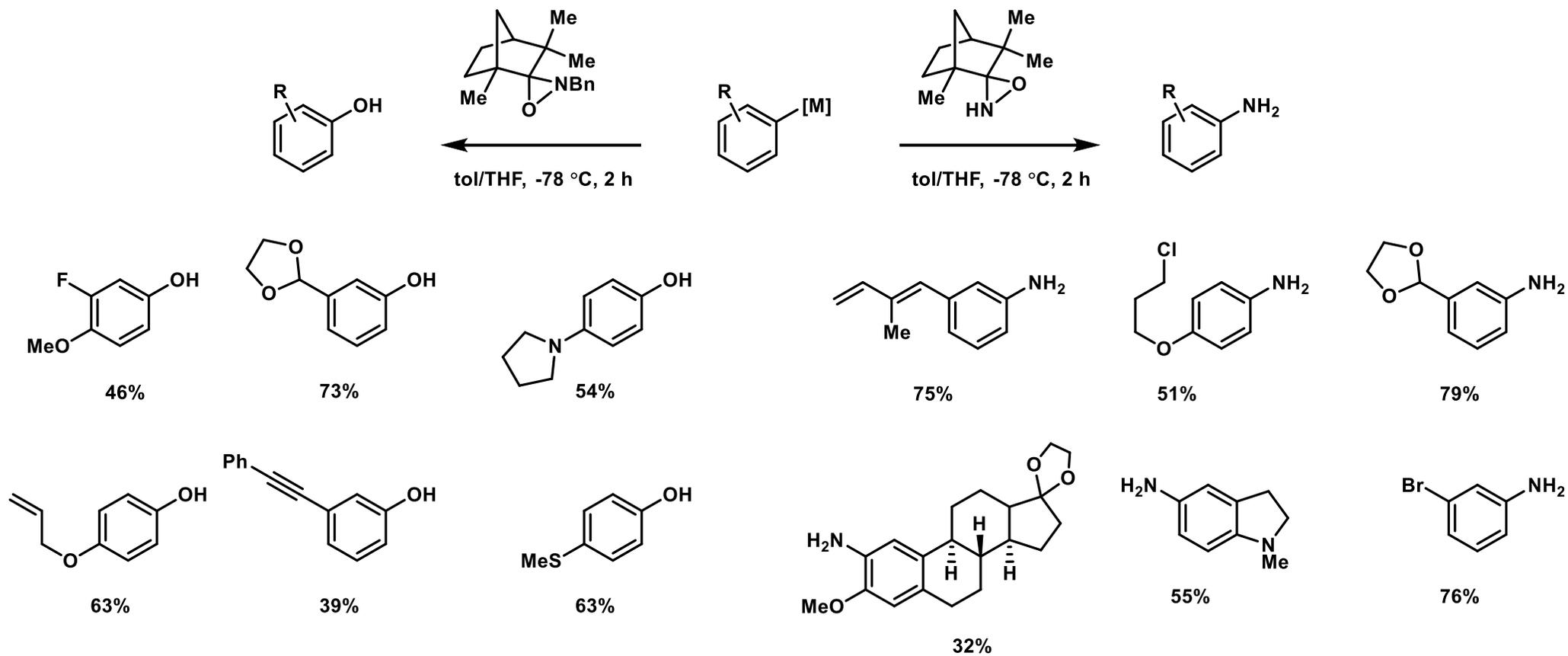


N-O bond = 44 kcal/mol

N-H pKa = 34

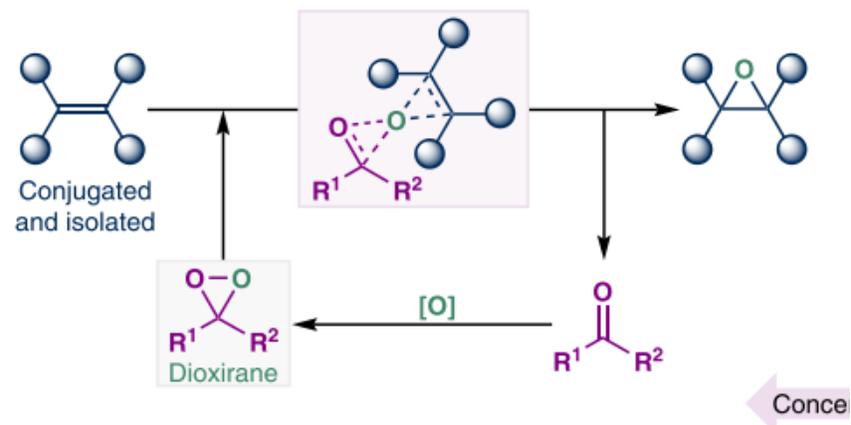
$\Delta G$ , PT = -13 kcal/mol



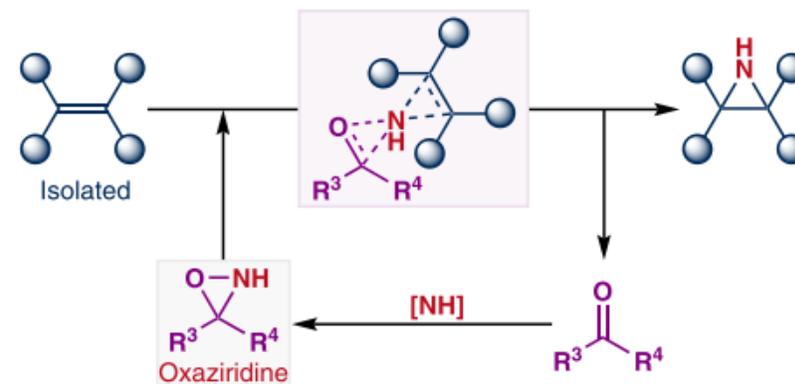


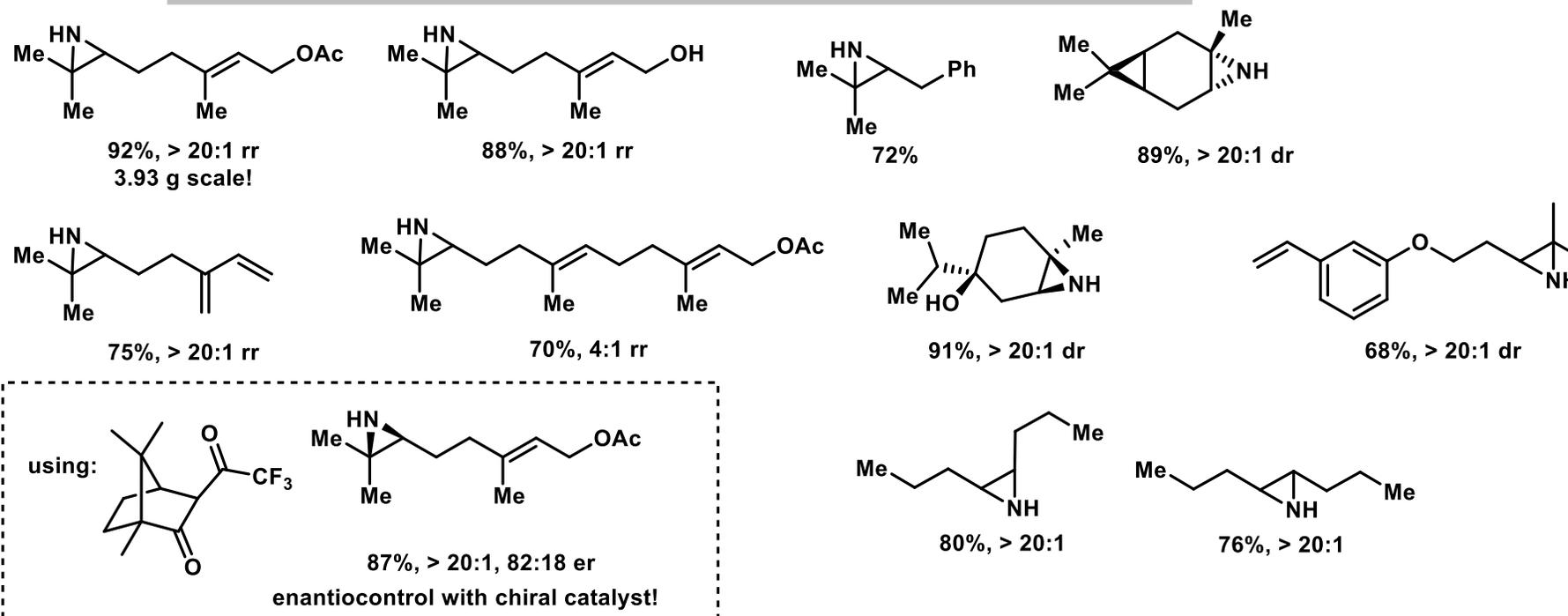
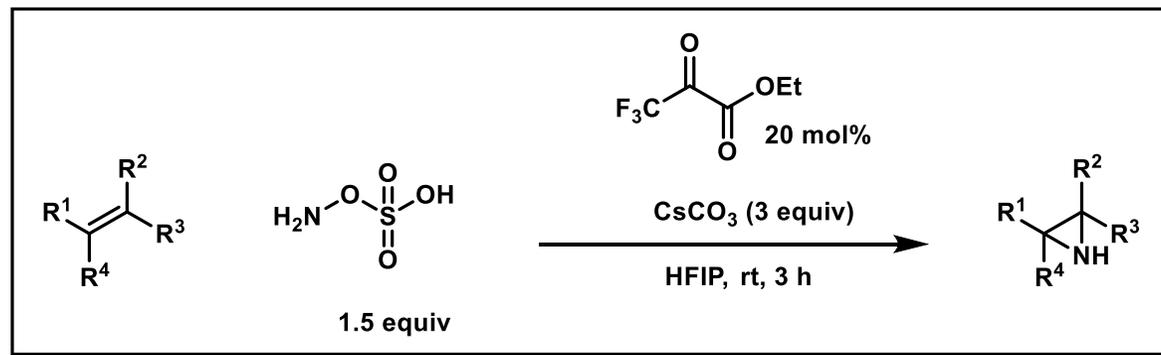
## 2020: The Aza-Shi Aziridination

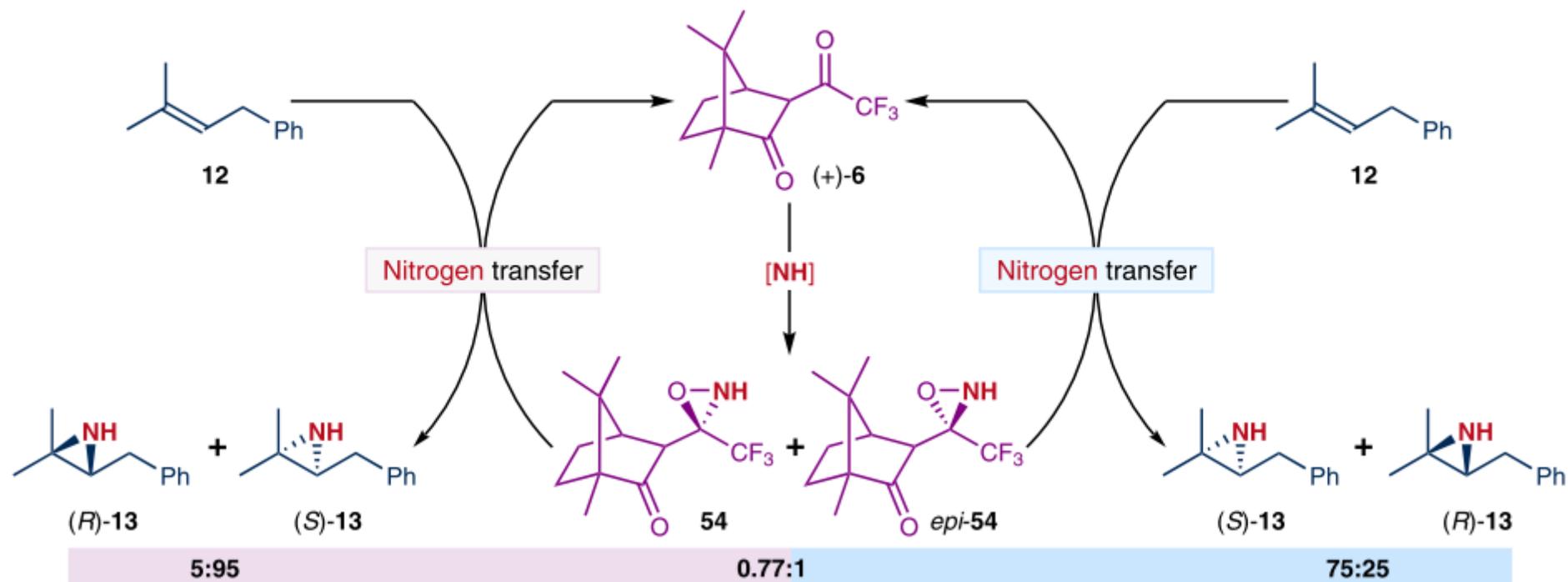
### a Oxygen transfer (Shi epoxidation)



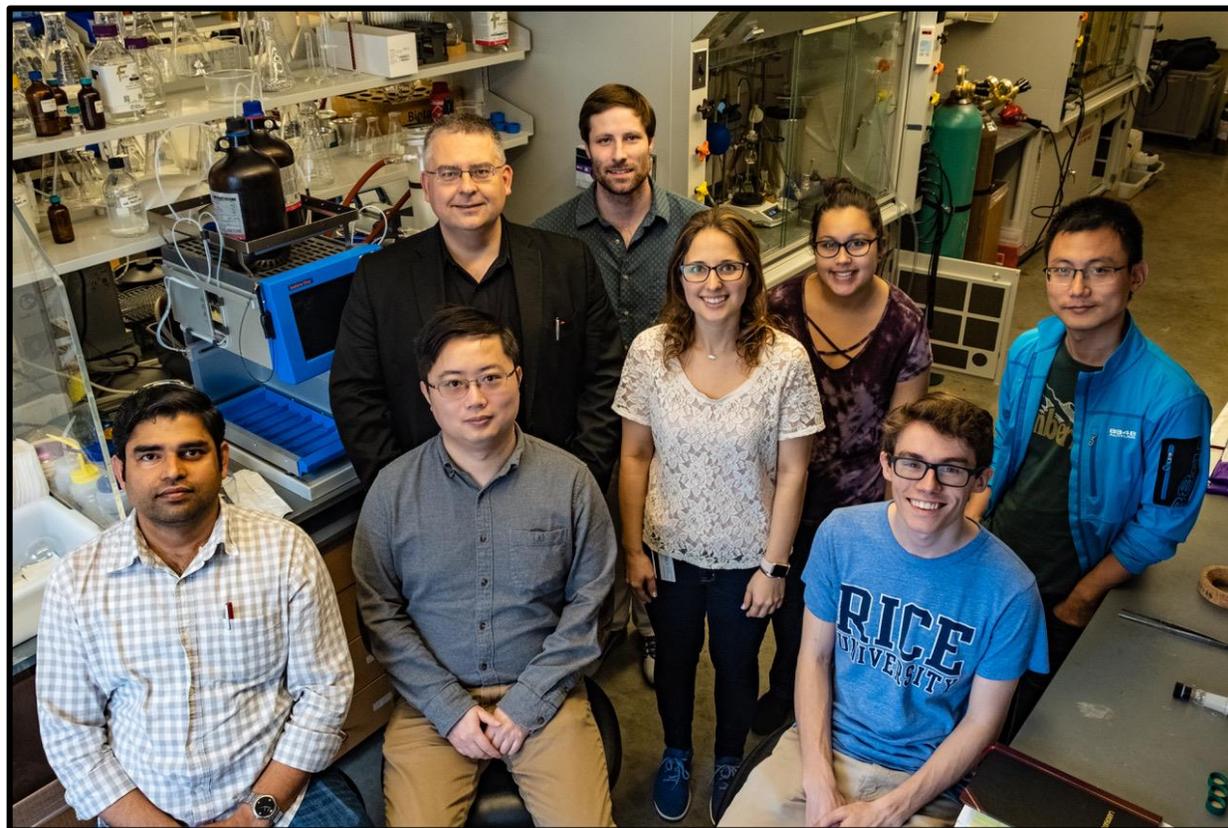
### d Nitrogen transfer (this work)







nature  
catalysis



nature  
chemistry