

Highlights From the Career of Matthew J. Gaunt

Dongqi Wang
Zhao Group Meeting
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M. J. Gaunt: Biography

- **Graduated University of Birmingham, 1995**

- **Ph. D from University of Cambridge, 1999**

Advisor: Professor Jonathan B. Spencer

- **Postdoctoral Fellow at University of Pennsylvania, 1999 - 2001**

Advisor: Professor Amos B. Smith

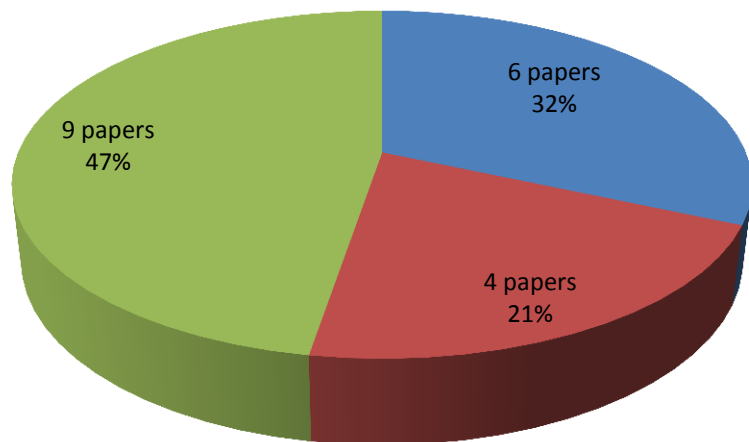
- **Junior Research Fellow at University of Cambridge, 2001**

Promoted to Professor in October 2012



Matthew J. Gaunt
University of Cambridge

M. J. Gaunt: Significant Research Areas



■ **Enantioselective Organocatalytic**

■ **Nature Product Synthesis**

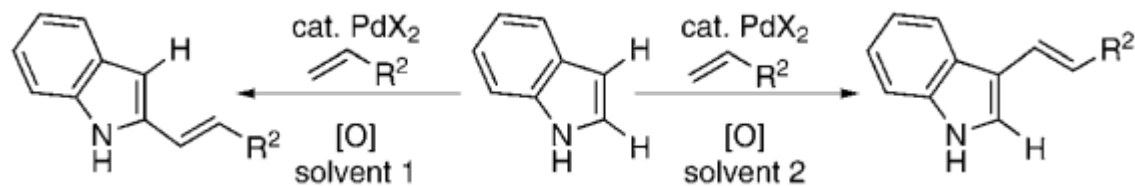
■ **TM-Catalyzed C-H Activation**

➤ **Site Selective C-H Activation**

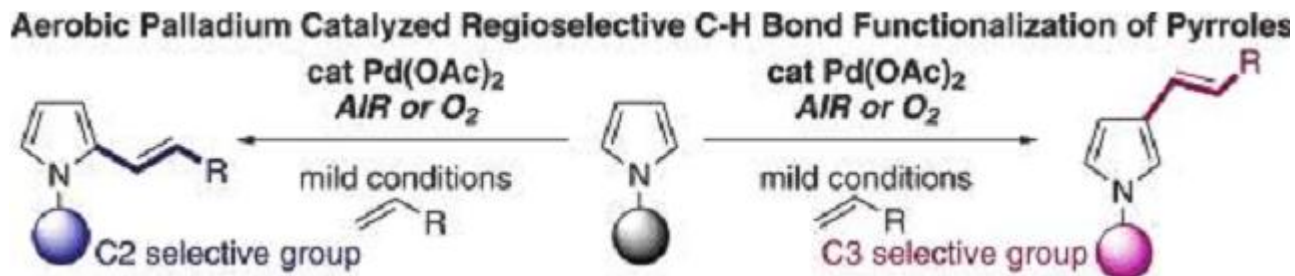
➤ **Hypervalent Iodine Reagents**

Site Selective C-H Activation

■ Pd-Catalyzed Alkenylation of Indoles by Solvent-Controlled Regioselective

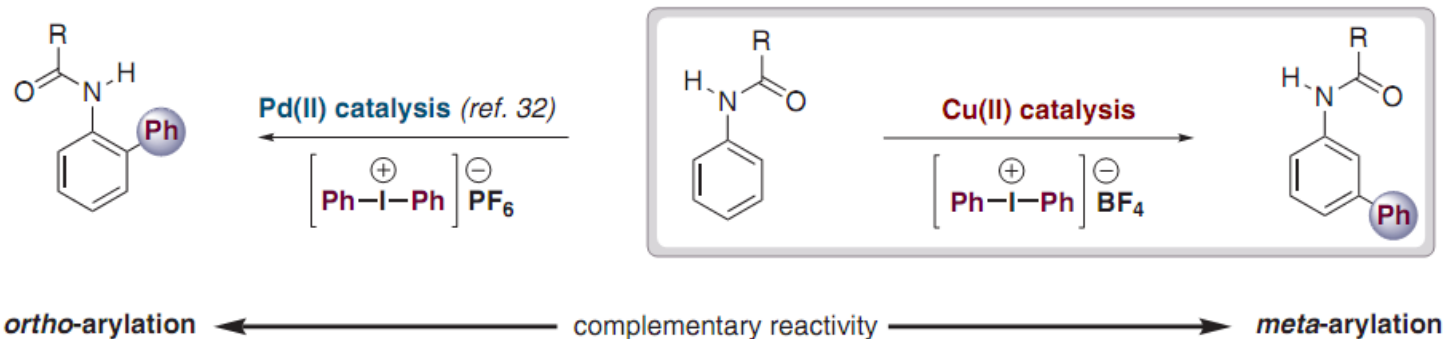
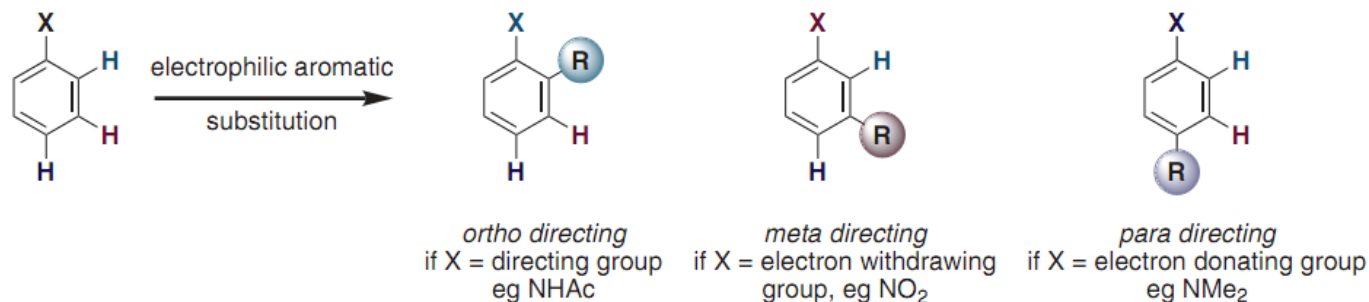


■ Pd-Catalyzed Regioselective C-H Alkenylation of Pyrroles



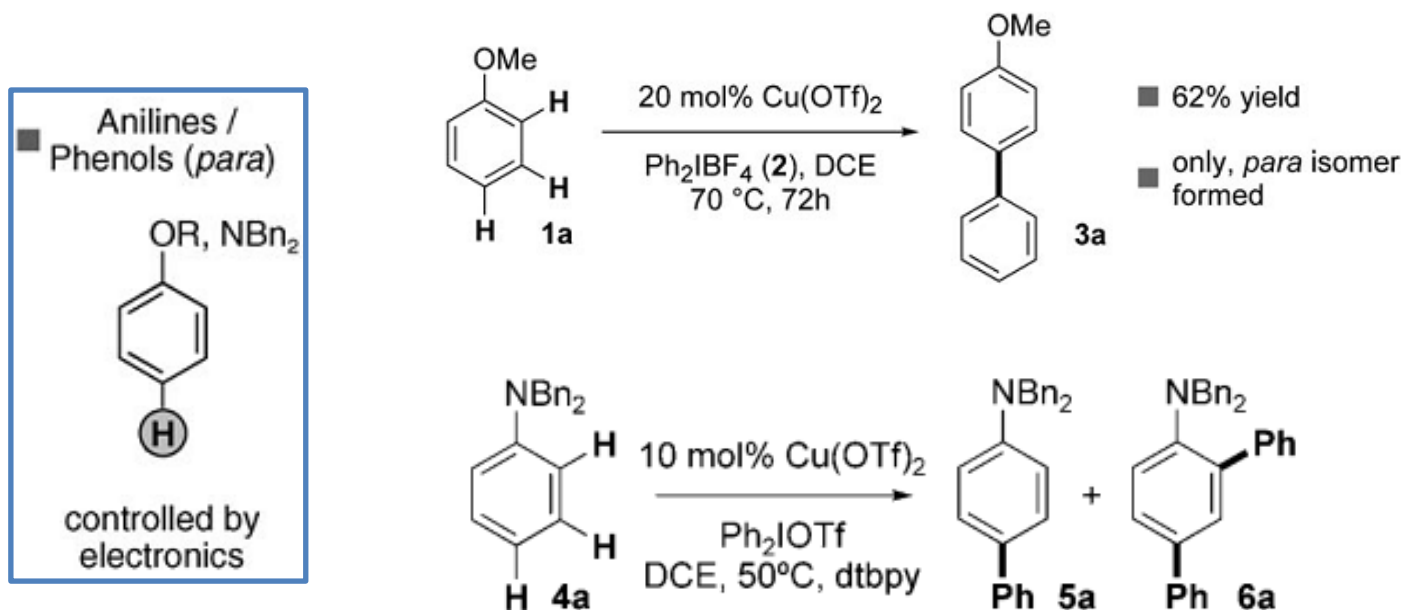
Site Selective C-H Activation

■ A Meta-Selective Copper-Catalyzed C-H Bond Arylation



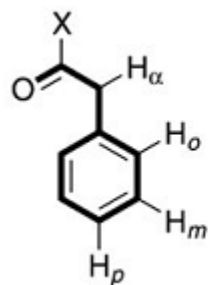
Site Selective C-H Activation

- The first highly para-selective arylation of phenol and aniline derivatives



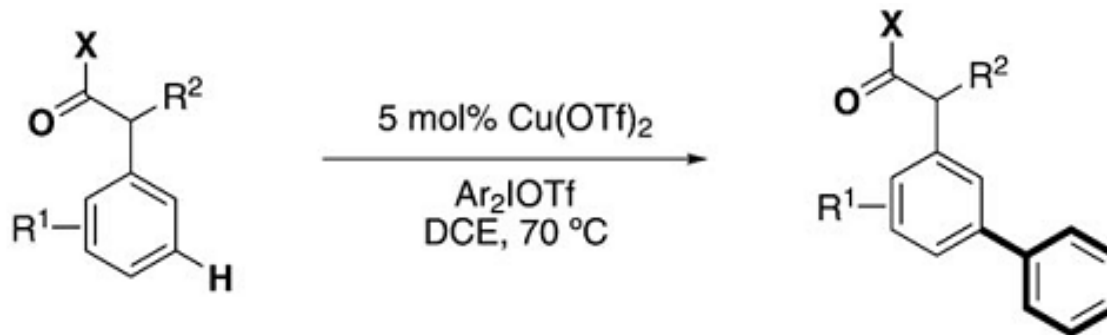
Site Selective C-H Activation

■ meta-Selective Direct Arylation of α -Aryl Carbonyl Compounds



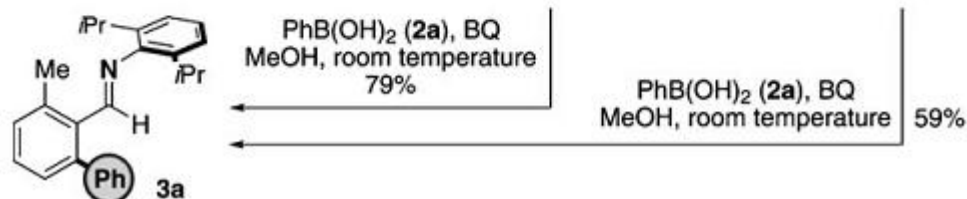
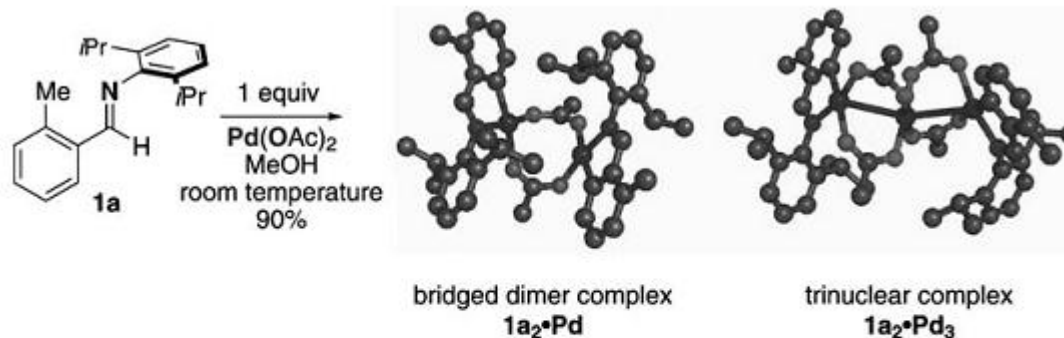
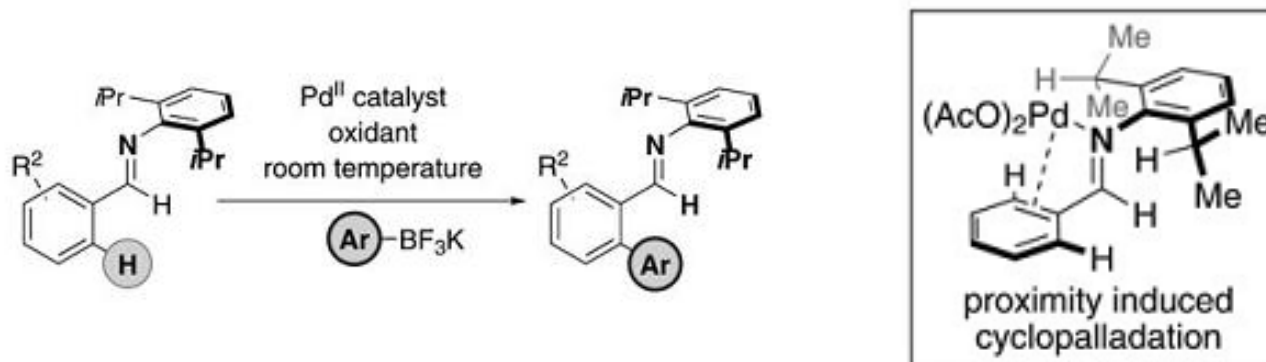
X nucleophilic additions
H_α enolate chemistry
H_o Pd^{II} C-H functionalization
H_p limited S_EAr chemistry

H_m unmet need in synthesis



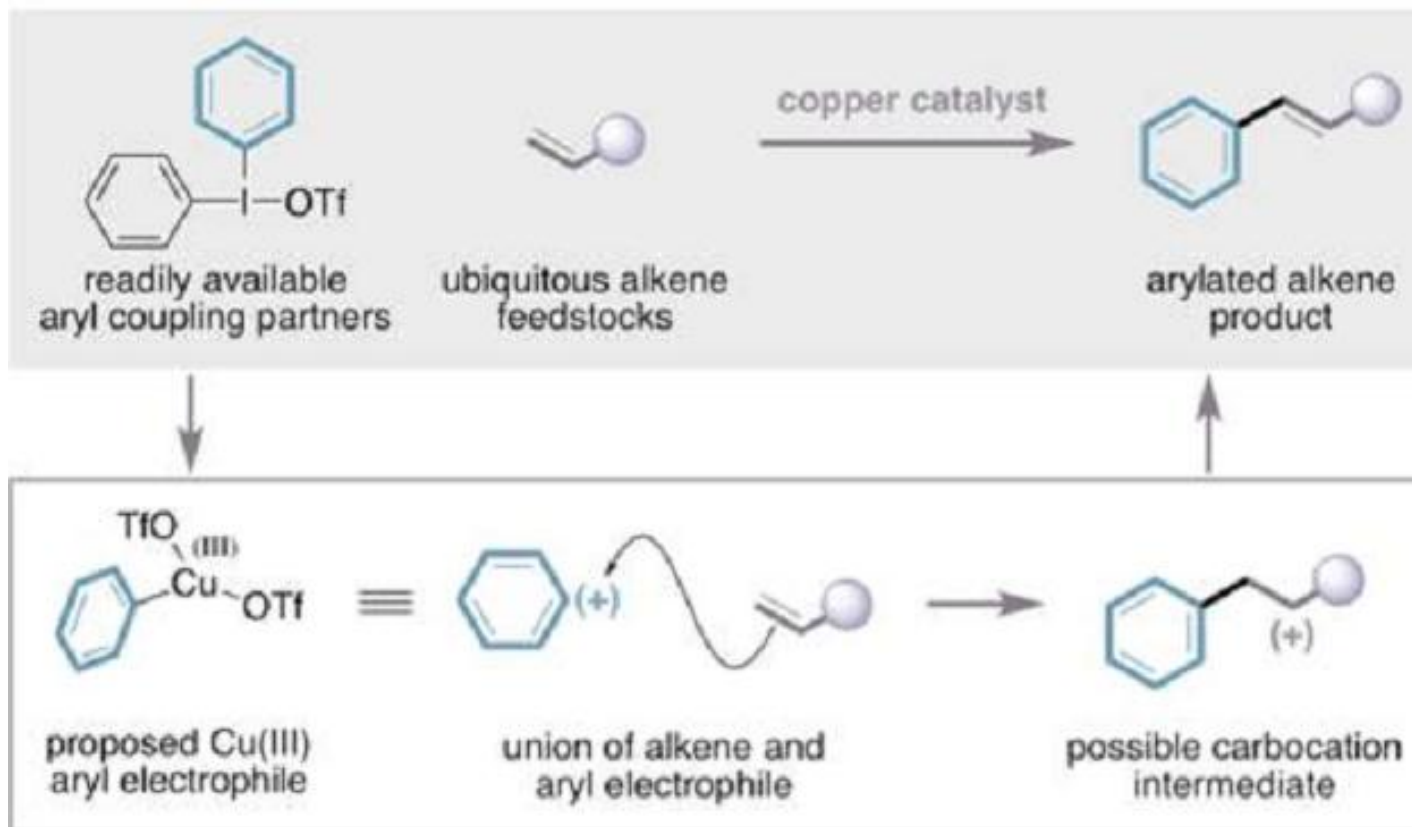
Site Selective C-H Activation

■ meta-Selective Direct Arylation of α -Aryl Carbonyl Compounds



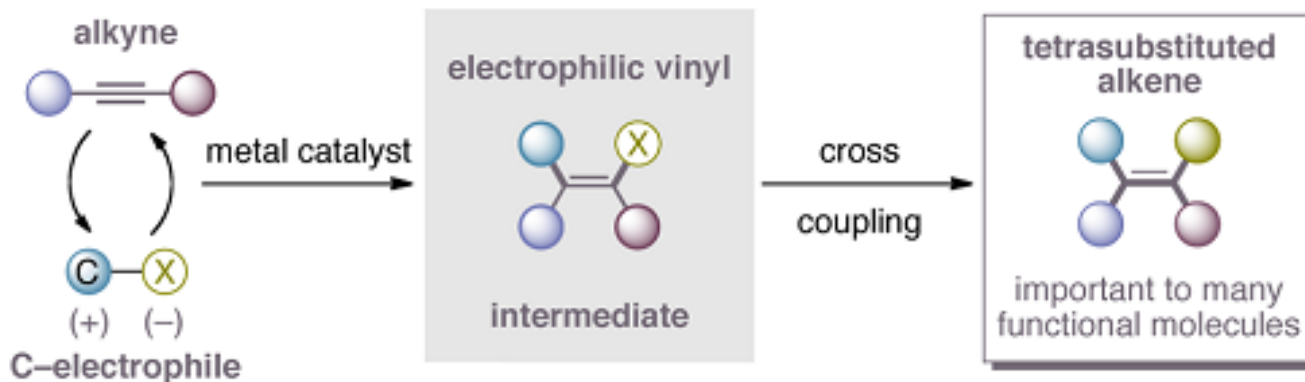
C-H Activation Using a Hypervalent Iodine Reagent

■ Copper-Catalyzed Alkene Arylation with Diaryliodonium Salts

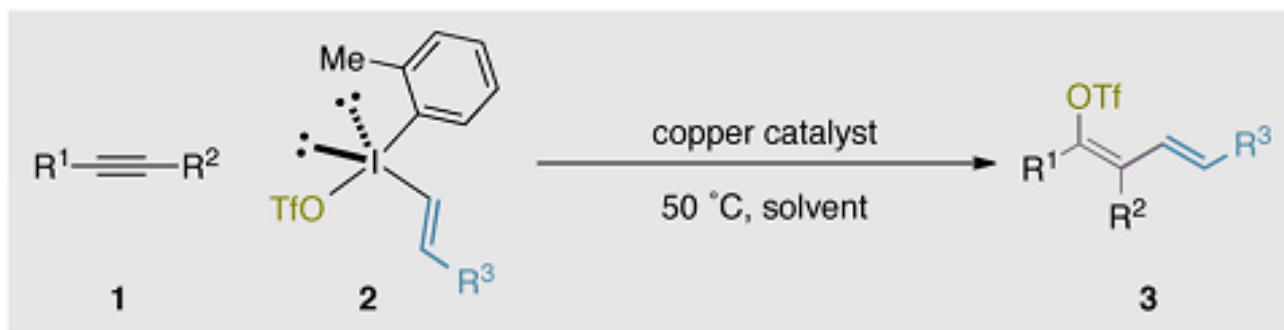


C-H Activation Using a Hypervalent Iodine Reagent

- Copper-Catalyzed Electrophilic Carbofunctionalization of Alkynes to Highly Functionalized Tetrasubstituted Alkenes



(3) Copper-catalyzed carbotriflation of alkynes





Looking further ahead, the next challenge will be translating our Chemistry into practical applications. A fundamental question is This: can we use our chemical understanding to manipulate carbon Hydrogen bonds in the structure of a protein or DNA, a new medicine Or a polymer?

Thank You