2017-2018 POCC Lecture Series

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Prof. Tehshik Yoon

University of Wisconsin–Madison

Stereocontrol in Photochemical Reactions

Carolyn Hoff Lynch Lecture Hall
Chemistry Building, University of Pennsylvania

The Philadelphia Organic Chemist's Club

POCClub.org

Tehshik Yoon is a Professor of Chemistry at the University of Wisconsin–Madison. His formal training was obtained under the mentorship of some of the leading figures in synthetic organic chemistry, including Ph.D. research with Prof. David MacMillan, first at Berkeley and then at Caltech, followed by an NIH postdoctoral fellowship in the laboratory of Prof. Eric Jacobsen at Harvard. Tehshik has been on the faculty at UW–Madison since 2005. His research group has broad interests in organic synthesis and catalysis. In particular, the Yoon group has been pioneering the use of transition metal photocatalysts in synthetically useful transformations promoted by visible light. Tehshik's efforts in teaching and research have earned him a variety of prestigious of awards, including an NSF CAREER Award (2007), the Research Corporation Cottrell Scholar Award (2008), the Beckman Young Investigator Award (2008), the Amgen Young Investigator Award (2009), an Alfred P. Sloan Research Fellowship (2009), an Eli Lilly Grantee Award (2011), the William H. Kiekhofer Distinguished Teaching Award (2013), and a Friedrich Wilhelm Bessel Award from the Humboldt Foundation (2015).

Abstract: Photochemistry is intriguing as a synthetic tool because the absorption of light by an organic molecule results in the formation of exceptionally energetic reactive intermediates that can react in ways that are inaccessible to ground-state molecules. However, this high reactivity is also a challenge for stereoselective synthesis: control over the stereochemistry of photochemical reactions, particularly using enantioselective catalysts, has been a long-standing challenging synthetic problem with few general solutions. We recently developed a method for highly enantioselective [2+2] photocycloaddition reactions using a combination of chiral Lewis acid and transition metal photocatalysis. This dual catalyst approach offers a robust strategy to control the reactivity of a wide range of reactive intermediates that can easily be generated using photoredox catalysis.