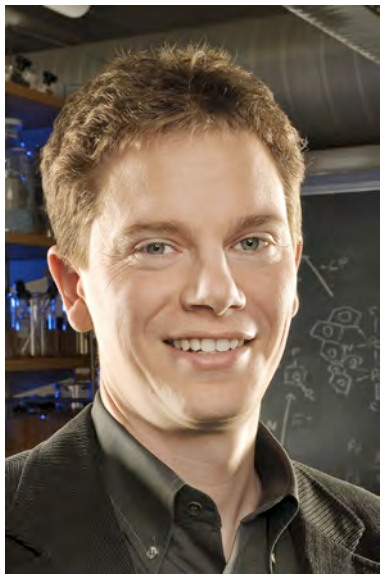

2014-2015 POCC Lecture Series

October 30, 2014, 8:00 PM

≈ POCC Student Choice Lecture ≈

Prof. Tobias Ritter

Harvard University

Late-stage Fluorination for PET Imaging

Carolyn Hoff Lynch Lecture Hall
Chemistry Building, University of Pennsylvania

The Philadelphia Organic Chemist's Club

POCClub.org

Tobias Ritter was born in 1975 in Lübeck, Germany. He received his undergraduate education in Braunschweig, Germany, Bordeaux, France, Lausanne, Switzerland, and Stanford, US, and received a master of science from Braunschweig University in 1999. He has performed undergraduate research with Prof. Barry M. Trost at Stanford, obtained his PhD working with Prof. Erick M. Carreira at ETH Zurich in 2004, and was a postdoc with Prof. Robert H. Grubbs at Caltech. In 2006, Tobias was appointed as Assistant Professor in the Department of Chemistry and Chemical Biology at Harvard, promoted to Associate Professor in 2010, and to Professor of Chemistry and Chemical Biology in 2012. His research program is based on synthetic organic and organometallic chemistry. The Ritter lab currently focuses on fluorination chemistry for late-stage functionalization of complex natural and unnatural products. In the past three years he has received the following awards: RSC Fluorine Chemistry Prize, Klung-Wilhelmy-Weberbank Preis, Berlin, Germany, Popular Science Brilliant 10 Award, Camille Dreyfus Teacher Scholar Award, BASF Catalysis Award, Roslyn Abramson Award for Excellence in Teaching Undergraduates, AstraZeneca Excellence in Science Award, Amgen Young Investigator Award, Alfred P. Sloan Research Fellowship, NSF Career Award, Air Force Young Investigator Award, Eli Lilly Grantee Award, Bayer Early Excellence in Science Award. In 2011 he founded the company SciFluor Fife Sciences in Cambridge, MA, USA.

Abstract: The unnatural isotope fluorine–18 (^{18}F) is used as a positron emitter in molecular imaging. Currently, many potentially useful ^{18}F-labeled probe molecules are inaccessible for imaging, because no fluorination chemistry is available to make them. Syntheses must be rapid on account of the 110-minute half-life of ^{18}F and benefit from using [^{18}F]fluoride due to practical access and suitable isotope enrichment. But [^{18}F]fluoride chemistry has been limited to nucleophilic fluorination reactions. I will describe the development of a palladium-based electrophilic fluorination reagent derived from fluoride and its application to the synthesis of aromatic ^{18}F-labeled molecules via late-stage fluorination. In addition, I will discuss new reaction chemistry for introduction of fluorine into functionalized molecules. Late-stage fluorination enables the synthesis of conventionally unavailable positron emission tomography (PET) tracers for anticipated applications in pharmaceutical development as well as pre-clinical and clinical PET imaging..