

JMU Chemistry and Biochemistry Seminar  
Friday, March 30, 2018  
3:33pm in ISAT 159



# Finding a Transition State: The Mechanism of Carbonyl-Olefin Metathesis



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The rapid construction of complex carbon-carbon double bonds via olefin-olefin metathesis has revolutionized the synthesis of biologically active organic molecules. Conversely, the analogous carbon-olefin metathesis reaction has received little attention until very recently. The mechanistic studies presented herein will focus on understanding and improving Fe(III)-catalyzed carbonyl-olefin metathesis—a new approach for the construction of cycloalkenes. It is our hypothesis that the success of this reaction hinges upon Fe(III)-mediated formation of intermediate oxetane via a [2+2]-cycloaddition followed by Fe(III)-mediated cycloreversion to the metathesis product, and that the characterization of this reactivity will reveal new avenues of reactivity. Synthetic, spectroscopic, kinetic, and computational techniques will be presented which facilitate characterization of the role of Fe(III), the resting state of the catalytic cycle, and the turnover-limiting step. These data will be used to determine the interplay of Lewis acid catalyst, solvent, and substrate necessary for effective ring-closing metathesis. Overall, these rigorous mechanistic studies catalogue the factors critical to concise reaction design, enhancing the use of carbonyl-olefin metathesis in the construction of medicinally important molecules.

**Meet the Speaker, 2:15 – 3:00pm, Student Lounge, 3144**