Author Profile

M. J. Krische

*The author presented on this page has published more than **10 articles** since 2000 in Angewandte Chemie, most recently:* "Divergent Regioselectivity in the Synthesis of Trisubstituted Allylic Alcohols by Nickel- and Ruthenium-Catalyzed Alkyne Hydrohydroxymethylation with Formaldehyde": C. C. Bausch, R. L. Patman, B. Breit, M. J. Krische, *Angew. Chem.* **2011**, *123*, 5805–5808; *Angew. Chem. Int. Ed.* **2011**, *50*, 5687–5690.

Michael J. Krische

Date of birth: September 16, 1966

Position: Professor and Robert A. Welch Chair in Science, The University of Texas at Austin (USA)

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Education:
1986–1989 Undergraduate studies in Chemistry, University of California at Berkeley (USA)
1990–1996 PhD with Prof. Barry M. Trost, Stanford University (USA)
1997–1999 NIH Postdoctoral Fellow with Prof. Jean-Marie Lehn, Université Louis Pasteur, Strasbourg (France)

Awards: **2007** Presidential Green Chemistry Award; **2007** ACS Elias J. Corey Award; **2009** Tetrahedron Young Investigator Award; **2010** Mukaiyama Award, Society of Synthetic Organic Chemistry, Japan (SSOCJ); **2011** GlaxoSmithKline Scholar Award

Current research interests: Our research focuses on catalytic reaction development and organic synthesis. A central theme involves the identification of new reactivity patterns, the evolution of related catalytic processes, and, ultimately, the design of new synthetic strategies. One major body of work involves the discovery and development of hydrogen-mediated C–C bond formations. In such processes, hydrogenation conditions promote by-product-free reductive C–C coupling of π-unsaturated reactants to carbonyl compounds and imines, thus offering an alternative to stoichiometric organometallic reagents in diverse C=X (X = O, NR) addition processes. This concept is extended further by "C–C-bond-forming transfer hydrogenations". Here, alcohol dehydrogenation triggers reductive generation of organometallic nucleophiles from π-unsaturated reactants, thus enabling carbonyl addition directly from the alcohol oxidation level. These processes represent the first C–C-bond-forming hydrogenations beyond hydroformylation.

Hobbies: Travel in combination with adventurous dining, blues piano, and freshwater aquariums

My favorite place on earth is … with friends and family.

The greatest scientific advance in the next decade will be … the union of directed evolution and metal catalysis.

If I won the lottery, I would … host annual chemistry symposia at UT Austin catered with great Texas-style BBQ!

The most important thing I learned from my parents is … that native ability and creativity must be focused by tenacity and discipline.

In my opinion, the word "scientist" means … one who creatively and intuitively uncovers important new phenomena that manifest in a technology of benefit to society.

Guaranteed to make me laugh is … my soon to be 6-year-old daughter, Thea.

My 5 top papers:

1. "Catalytic Carbonyl Addition through Transfer Hydrogenation: A Departure from Preformed Organometallic Reagents": J. F. Bower, I. S. Kim, R. L. Patman, M. J. Krische, *Angew. Chem.* **2009**, *121*, 36–48; *Angew. Chem. Int. Ed.* **2009**, *48*, 34–46. (This review describes a broad, new class of "C–C-bond-forming transfer hydrogenations" developed in our group.)
2. "1,*n*-Glycols as Dialdehyde Equivalents in Iridium-Catalyzed Enantioselective Carbonyl Allylation and Iterative Two-Directional Assembly of 1,3-Polyols": Y. Lu, I. S. Kim, A. Hassan, D. J. Del Valle, M. J. Krische, *Angew. Chem.* **2009**, *121*, 5118–5121; *Angew. Chem. Int. Ed.* **2009**, *48*, 5018–5021. (The catalytic processes described in this paper allowed us to dramatically simplify the syntheses of some very complex polyketide natural products, including roxaticin and bryostatin 7.)
3. "Iridium-catalysed direct C–C coupling of methanol and allenes": J. Moran, A. Preetz, R. A. Mesch, M. J. Krische, *Nature Chem.* **2011**, *3*, 287–290. (This study describes the first catalytic C–C coupling of methanol, a vastly abundant chemical feedstock, to provide discrete products of hydrohydroxymethylation in the absence of stoichiometric byproducts.)
4. "Diastereo- and Enantioselective Hydrogenative Aldol Coupling of Vinyl Ketones: Design of Effective Monodentate TADDOL-Like Phosphonite Ligands": C. Bee, S. B. Han, A. Hassan, H. Iida, M. J. Krische, *J. Am. Chem. Soc.* **2008**, *130*, 2746–2747. (Our very first hydrogen-mediated C–C coupling was the reductive aldol reaction of vinyl ketones. This unexpected union of catalytic hydrogenation and the aldol reaction culminated in the diastereo- and enantioselective aldol process described in this study.)
5. "Total Synthesis of (+)-Roxaticin via C–C Bond Forming Transfer Hydrogenation: A Departure from Stoichiometric Chiral Reagents, Auxiliaries, and Premetalated Nucleophiles in Polyketide Construction": S. B. Han, A. Hassan, I. S. Kim, M. J. Krische, *J. Am. Chem. Soc.* **2010**, *132*, 15559–15561. (This work represents the first application of our hydrogenative C–C coupling methodology in complex molecule synthesis.)

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