Title:
Unlocking, Controlling and Structurally Authenticating Reactive Species in Chemical Synthesis

Abstract:
Chemical synthesis is facilitated by the selective activation of molecules by external stimuli and/or chemical reactants, which often creates kinetically unstable intermediates that subsequently engage in further processes. Studying, understanding, and controlling the interplay and overall reaction of these transient species is crucial to the creation of efficient synthetic methodology. Elucidating the structures of these fleeting reaction intermediates underpins the development of comprehensive mechanistic proposals and the discovery of new chemical reactions.

This presentation discusses our efforts striving to unlock, control and structurally authenticate reactive species across a range of synthetic platforms. More specifically, commentary will be provided on our research: deploying electrochemistry to harness the latent electrophilicity of alkoxyamines;[1] exploiting the temporal control afforded by pulsed irradiation protocols to influence the outcome of photoredox-catalyzed reactions and photopolymerizations;[2–4] and using a substrate–ligand tethering strategy to kinetically stabilize and crystallographically characterize fundamental pre-transmetalation intermediates in the Suzuki–Miyaura reaction for the first time.[5–7]

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Bio:
Alex Bissember received his PhD in Chemistry in 2010 from the ANU (Australia) working with Prof. Martin Banwell. He then undertook postdoctoral research with Prof. Greg Fu at MIT and Caltech (USA). In 2013, Alex commenced his independent career at the University of Tasmania where he is currently a Professor of Chemistry. His lab has broad interests in organic/inorganic chemistry, including metal-based catalysis, photochemistry, electrosynthesis, and natural product synthesis and isolation chemistry.