

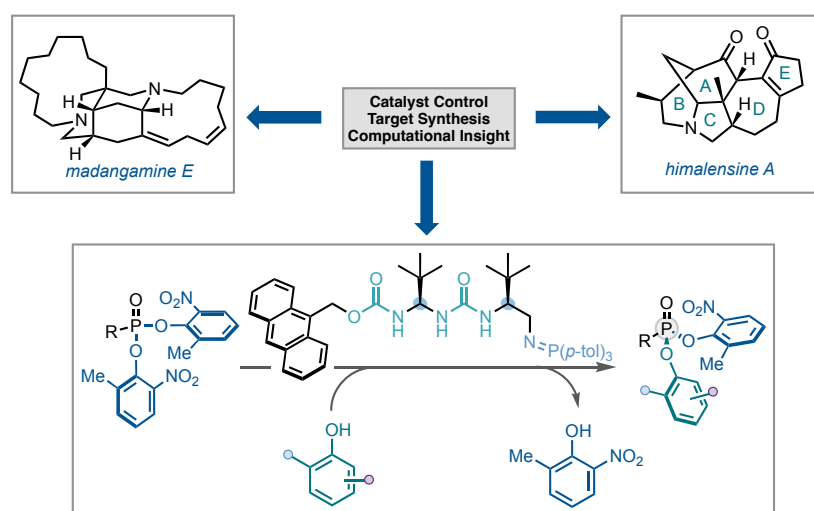
Catalyst Control in Complex Molecule Synthesis

Darren J. Dixon

Department of Chemistry, University of Oxford, Oxford, United Kingdom

e-mail: Darren.dixon@chem.ox.ac.uk

New catalysts are key for unlocking previously unknown molecular reactivity and unexplored chemical space, as well as governing the 3-dimensional structure of product molecules of interest to chemistry, biology and medicine. In this lecture, new synthetically relevant chemistry linked to two distinct types of catalyst systems will be presented. In the first part, recent developments from our group for the direct synthesis of alpha and beta-functionalised amines from amides and lactams via highly chemoselective reductive activation using known and new iridium catalysts will be described. In the second part, recent findings employing bifunctional chiral organosuperbases for accessing chiral phosphorous (V) compounds, as well as other medically relevant motifs and building blocks, with high enantioselectivity will be presented. Across both topics, details of the newly arising methodologies as well as their provenance and applications in natural product or drug molecule total synthesis, will be discussed.^[1-5]



References

- [1] S. Shiomi, B. D. Shennan, K. Yamazaki, A. L. Fuentes de Arriba, D. Vasu, T. A. Hamlin and D. J. Dixon, *J. Am. Chem. Soc.*, **2022**, *144*, 1407.
- [2] R. Kucěra, S. R. Ellis, K. Yamazaki, J. Hayward Cooke, N. Chekshin, K. E. Christensen, T. A. Hamlin, D. J. Dixon, *J. Am. Chem. Soc.* **2023**, *145*, 5422.
- [3] G. Su, M. Formica, K. Yamazaki, T. A. Hamlin and D. J. Dixon, *J. Am. Chem. Soc.* **2023**, *145*, 12771.
- [4] M. Formica, T. Rogova, H. Shi, N. Sahara, B. Ferko, A. J. M. Farley, K. E. Christensen, F. Duarte, K. Yamazaki, D. J. Dixon, *Nat. Chem.* **2023**, *15*, 714.
- [5] D. Rozsar, A. J. M. Farley, I. McLauchlan, B. D. A. Shennan, K. Yamazaki, D. J. Dixon *Angew. Chem. Int. Ed.* **2023**, e202303391.



Speaker Biography: Professor Darren J. Dixon studied Chemistry at the University of Oxford, where he received his Master's degree in 1993, and his DPhil in 1997 for work supervised by Prof Stephen G. Davies. After postdoctoral work with Professor Steven V. Ley CBE FRS, he joined the faculty at the Department of Chemistry in Cambridge in 2000. In 2004 he took a Senior Lecturership at The University of Manchester and in 2007 he was promoted to Reader. In 2008 he moved to his current post at the University of Oxford where he is Professor of Chemistry and is the Knowles-Williams Fellow in Organic Chemistry at Wadham College. His research programme is centred on catalysis and synthetic organic chemistry, and focuses on the development of new catalyst-enabled (enantioselective) synthetic methodologies and their application in complex molecule synthesis. He is the recipient of various awards including the RSC's Catalysis in Organic Chemistry Award, the 2023 Tilden Prize, the 2024 Charles Rees Award and the 2026 Arthur C. Cope Distinguished Scholars Award.