

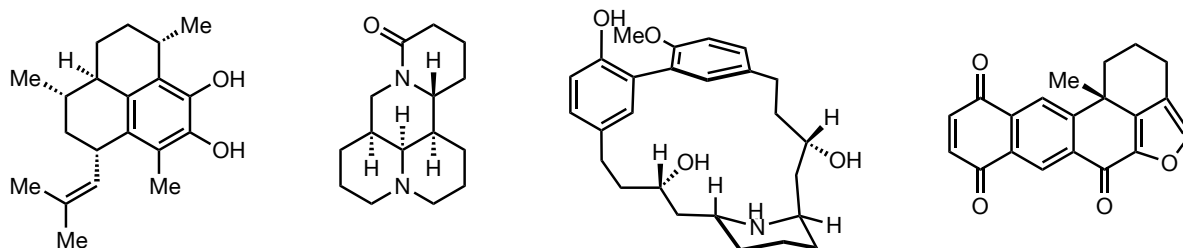
Total Synthesis with Designed Hydrocarbons

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We try to design the simplest unsaturated molecules, synthesise them and figure out what makes them tick. We also try to work out how they might be useful as small building blocks in the total synthesis of natural products. In a sense, we're uniting fundamental hydrocarbon research with natural products synthesis. We use sequences of cross-couplings and sequences of pericyclic reactions to keep step counts of target syntheses to a minimum. While there are many notable exceptions, in general, the smaller the amount of target-relevant complexity that you need to generate, the shorter the synthesis. Our syntheses buck the trend, with low step counts in target syntheses despite starting with very simple precursors and creating more structural complexity than other approaches. We have a few original twists on cross-coupling and cycloaddition reaction themes that you might find interesting. After presenting the conceptual framework and methodological developments of the work, the talk will focus on total synthesis applications. I will also speculate on how this chemistry might develop and evolve in the future.



References

Short review: M. S. Sherburn *Acc. Chem. Res.* **2015**, *48*, 1961–1970; recent papers: Z. Pei, N. L. Magann, M. J. Sowden, R. L. Murphy, M. G. Gardiner, M. S. Sherburn, M. L. Coote, *J. Am. Chem. Soc.* **2023**, *145*, 16037–16044; N. L. Magann, E. Westley, M. J. Sowden, M. G. Gardiner, M. S. Sherburn *J. Am. Chem. Soc.* **2022**, *144*, 19695–19699; Y.-M. Fan, M. J. Sowden, N. L. Magann, E. J. Lindeboom, M. G. Gardiner, M. S. Sherburn, *J. Am. Chem. Soc.* **2022**, *144*, 20090–20098; Y.-M. Fan, L.-J. Yu, M. L. Coote, M. S. Sherburn *Angew. Chem. Int. Ed.*, **2022**, *61*, e202204872; J.-Y. Wang, M. Blyth, M. S. Sherburn, M. L. Coote, *J. Am. Chem. Soc.* **2022**, *144*, 1023–1033; E. Westley, M. J. Sowden, N. L. Magann, K. L. Horvath, K. P. E. Connor, M. S. Sherburn, *J. Am. Chem. Soc.* **2022**, *144*, 977–986.



Short CV: Mick was born and raised in England but has lived and worked for most of his life in Australia. He received his B.Sc. and Ph.D. degrees from the University of Nottingham, UK where he conducted research in free radical chemistry in the laboratory of Prof. John Murphy (now at the University of Strathclyde, Scotland). He carried out postdoctoral research in natural product chemistry (gibberellins) with Prof Lew Mander at the Australian National University (ANU) in Canberra. He began his independent career as Lecturer (Assistant Professor) in the Department of Chemistry and Biochemistry at Massey University in New Zealand. In 1997 he joined the chemistry faculty at the University of Sydney before returning to the Research School of Chemistry, ANU in 2003 as Senior Fellow (Associate Professor), where he is now a Full Professor. The Sherburn group focuses on total synthesis, the design and study of new hydrocarbons (particularly acyclic π -bond-rich ones) and rapid polycycle construction.