

## Frontiers in Organic Chemistry—Recent Advances, Future Directions, Multidisciplinary Interactions

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Descriptions of a bottom-up approach to molecular electronic devices by Stoddart<sup>[1]</sup> and coworkers (Fig. 1) and catalytically active molecular machines by Thordarson and coworkers<sup>[2]</sup> are just some of the highlights of this special issue of the *Australian Journal of Chemistry* devoted to articles by researchers who attended the 19th Royal Australian Chemical Institute Organic Conference (19RACIOC), held at Lorne, Victoria, during July 6–11, 2003 (Figs 2–4). This issue also contains several papers describing synthetic methodology, including articles by Loughlin on the preparation of bicyclo[*n*.2.0]alkan-1-ols<sup>[3]</sup> and the use of cyclic analogues of Hendrickson's 'POP' reagent in dehydration reactions,<sup>[4]</sup> such as those that form esters. In addition, approaches to C-5 fluorinated D-glucose derivatives are described by Stick and coworkers.<sup>[5]</sup> Natural product synthesis is the subject of Giles' article,<sup>[6]</sup> which discusses diastereoselective approaches to enantiopure benzo- and naphtho-pyrans related to aphid pigments. The key step in these synthetic sequences are intramolecular cyclizations of tethered phenolic lactaldehydes. Modern 'non-natural' product synthesis, as well as the properties of cavitand dimers, is the focus of Sherburn and coworkers.<sup>[7]</sup> Solid-phase organic chemistry is the subject of Abell and Le Sann's communication,<sup>[8]</sup> who describe the preparation and uses of mesylated ArgoGel-OH. Enzymology, organic synthesis, and green chemistry are brought together in the research of Sheldon who has coauthored a review with van Rantwijk on the use of biocatalysis in organic synthesis.<sup>[9]</sup> The strong emphasis on organic synthesis contained in this issue of the *Australian Journal of Chemistry* is appropriate, as synthesis is still the main 'staple' for organic chemists the world over, and organic chemists skilled in the art of organic synthesis have never been in higher demand. This largely results from the boom in the biotech sector, where highly active and selective small molecule bioactives are still the primary targets.

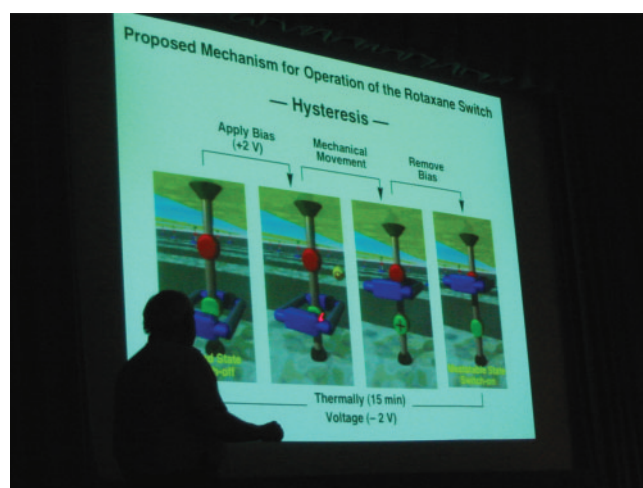


Fig. 1. Part of Fraser Stoddart's plenary lecture on molecular electronic devices.



Fig. 2. View from the balcony of the conference venue over the town of Lorne.



Peter Duggan spent his first 17 years in Yongala, which is a tiny town in the mid-north of South Australia. He obtained his B.Sc.(Hons) from Flinders University and his Ph.D. in 1990 from the Australian National University. After postdoctoral work at Columbia University in the USA and Cambridge University in the UK, he took up his first academic position at James Cook University in 1994. He has held an academic position at Monash University since late 1996.



**Fig. 3.** 19RACIOC Plenary and Keynote Lecturers with the conference chair. From left to right: standing: Laurence Harwood, Bill Adcock, Stephen Glover, Roger Sheldon, Don Tomalia, Richard Furneaux, Nicos Petasis, Robin Giles, Wendy Loughlin, Peter Duggan, Roger Read, Mick Sherburn, Brian Yates, Michael Perkins, Peter Gill, Andrew Abell; genuflecting: Bob Stick, Craig Hawker; inset: J. Fraser Stoddart, Miguel Garcia-Garibay.

On a more biological front, an article describing the interactions of *N*-acyloxy-*N*-alkoxyamide with DNA, including mutagenesis studies, and the development of QSAR, that relate properties such as hydrophobicity and chemical reactivity to biological activity, is presented by Glover and coworkers.<sup>[10]</sup>

The influence of theoretical studies on the practice of organic chemistry continues to expand, thus communications describing theoretical predictions of molecular vibrational frequencies by Gill and coworkers,<sup>[11]</sup> and investigations of heterocyclic carbene stability by Yates and Graham<sup>[12]</sup> are also contained in this issue. Industrial applications of organic chemistry are highlighted in an article on membrane-based sugar separations, which describes my research group's efforts to develop boronic acid carriers that promote high fluxes, are resistant to leaching, and are highly selective for fructose over other sugars.<sup>[13]</sup>

We are very grateful to all of the conference sponsors, especially our major sponsors Alchemia, Sigma-Aldrich, and Starpharma. A special thanks goes to Alison Green and the editorial staff at the *Australian Journal of Chemistry* for putting together this 'Frontiers in Organic Chemistry' issue, as well as the people who contributed papers. As this issue demonstrates, 19RACIOC, although having a strong emphasis on organic synthesis, also addressed more interdisciplinary and emerging areas of organic chemistry. Chemists from a wide array of subdisciplines will find something to attract their attention in this issue.

Enjoy!  
Peter Duggan



**Fig. 4.** 19RACIOC organizing committee. From left to right: Jack Ryan (CSIRO), Peter Duggan (chair, Monash University), Jonathan White (University of Melbourne), Steven Langford (Monash University).

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