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Highlights of the 2009 New South Wales Southern Highlands Conference on Heterocyclic Chemistry

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Heterocyclic chemistry remains an astoundingly rich platform from which new reactions are discovered, new reagents developed, and new molecular architecture derived. It is as relevant to esoteric theoretical investigations as to the practical search for new drugs and therapies for disease and infection. Moreover, practitioners' command of an increasing breadth of chemistry across the whole of the periodic table means that modern heterocyclic chemistry crosses the traditional boundaries of organic, inorganic, and physical definitions and is highly relevant to interdisciplinary fields at the cutting edge of science.

The unique flora of Australia, the country's early dependence upon agriculture in a hostile environment, and Australia's globally recognised expertise in biomedical fields have placed its science at the forefront of developments in heterocyclic chemistry. Interest in drawing this expertise together inspired the establishment in 1990 of the New South Wales Southern Highlands Conference on Heterocyclic Chemistry. This conference series has brought academic and industry experts, including Nobel laureates, together annually from all over the globe in an informal setting for two full days of invited lectures, contributed posters, and discussions. The program is set each year by an elected Conference President, and the emphasis has always been on quality, up to date, as it is happening research. Since 2003, the Conference has also supported, with the Royal Australian Chemical Institute Organic Division, a small number of senior postgraduate awards through which aspiring leaders in heterocyclic chemistry present their work.

In this special issue of the *Australian Journal of Chemistry – an International Journal for Chemical Science*, we highlight some of the frontier research presented at the 2009 Southern Highlands Conference, 30 August–1 September 2009 (Fig. 1). The meeting was presided over by Professor Barbara Messerle, University of New South Wales, who herself is an international leader in organometallic catalysis. The Conference elicited papers on *N*,*S*-heterocyclic carbene complexes (Hor et al.[1]), and doubly pyrazine-bridged side-by-side complexes of conjugated bis-bidentate ligands (Brooker et al.[2]). These demonstrated conventional elements of heterocyclic chemistry within the context of efficient catalysis and coordination chemistry. Other papers featured more methodological work that illustrated the capacity of *N*,*N*-dialkyl-*N*′-chlorosulfonyl chloroformamidines to take part in heterocyclic synthesis in the form of novel ring-fused thiatriazoles and oxathiazines (Francis et al.[3]). The utilization of heterocycles for various purposes has often been studied. Their use as potential fluorinated surfactants drove a study of methods for polyfluoroalkylation methods in which the Mitsunobu reaction proved advantageous (Read et al.[4]). Elsewhere, it was shown that a cysteine-derived thiazolidine could be used as a traceless turn-inducer to facilitate the cyclization of small peptides (Jolliffe et al.[5]). Templated macrocyclic tetralactams have also been used to permanently encapsulate a novel class of hydroxy-substituted squaraine dyes to generate rotaxanes with unusual fluorescent properties (Smith et al.[6]). In yet another application of heterocycles, acid-catalyzed reactions of 3-substituted 4,6-dimethoxyindoles has provided novel macrocyclic and other molecular frameworks (Black et al.[7]). Heterocyclic natural products and their analogues have also attracted much interest for their unusual structures and as challenges in design and synthesis for studies of biological activity. For example, structural analogues of the thaxtomin natural products have been synthesized and evaluated for phytotoxicity (Smith et al.[8]), and a new family of constrained azabicyclic homocholine analogues have been synthesized and evaluated for nicotinic acetylcholine receptor antagonist activity (McLeod et al.[9]). In contrast, a study of the subtleties of the three-dimensional structure of vhl-2, a leaf-specific cyclotide, and its surface hydrophobicity has provided evidence for membrane binding and a relationship to haemolytic activity (Craik et al.[10]). The synthetic challenge associated with complex and novel structures is often sufficient to drive research programs and these efforts then make available larger quantities of material for biological studies. This has been the motivation behind

Roger Read was a co-founder of the New South Wales Southern Highlands Conference on Heterocyclic Chemistry, with Professor David StC. Black and Associate Professor Michael J. Gallagher. He has been Secretary of the Conference Organising Committee since its inception and has enjoyed two terms as its President, in 1996 and 2004. He received his B.Sc. and Ph.D. degrees from Sydney University, and after postdoctoral appointments at Imperial College, London, the University of Auckland and the University of Melbourne, and a period as Research Scientist in the Materials Research Laboratories, Maribyrnong, a Defence support facility, he joined the University of New South Wales in 1985, where he is currently an Associate Professor in the School of Chemistry. His research contributions have been in the broad area of heterocyclic chemistry, and they have ranged from natural product chemistry through energetic materials research and applied chemistry of various classes of heterocycles, including perhydrobipyrimidines, indoles, biisoquinolines, cyclic acetals, and fluorous heterocycles.

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Fig. 1. Group photograph of 2009 Southern Highland Conference delegates outside the meeting venue in Moss Vale.

the successful yet elegant total synthesis of the Galbulimima alkaloid (±)-GB13 (Mander et al.[11]).

With ever increasing sophistication in the tools for measurement and characterization of molecules and the growing understanding of biological systems at the molecular level, heterocyclic chemistry will expand in its relevance and will continue to provide exciting new challenges for chemists into the future. As the New South Wales Southern Highlands Conference on Heterocyclic Chemistry celebrates its 21st year of meetings, I am confident that it will remain relevant to a wide spectrum of the international chemical community and will provide a focus in Australia, especially through partnership with the *Australian Journal of Chemistry – an International Journal for Chemical Science*, for what is well known as a vibrant field of study.

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