

# Celebrating RACI and academy of science awards 2020–2022

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It is a pleasure to present this year's special issue featuring the recipients of awards and medals issued by the Royal Australian Chemical Institute (RACI) and the Australian Academy of Science (AAS).

Brad E. Sleebs (The Walter and Eliza Hall Institute of Medical Research and The University of Melbourne), the recipient of the 2021 Peter Andrews award in Medicinal Chemistry, contributes a review on drug discovery with particular emphasis on Australian contributions to the urgently needed development of new antimalarials.<sup>[1]</sup>

Debbie S. Silvester (Curtin University) was awarded the 2021 Physical Chemistry Division's Lectureship. Together with her associates, she reports on a cation effect on the electrochemical reduction of polyoxometalates in room temperature ionic liquids. Measurements of formal potentials and peak-to-peak separations for different reduction processes were used to evaluate thermodynamics and kinetics of the electron transfer processes.<sup>[2]</sup>

Yuning Hong (La Trobe University), the 2022 winner of the Le Fèvre Medal from the AAS, and students Marie-Claire Giel and Tze Cin Owyong describe the synthesis of a small molecule fluorescent probe bearing the unique  $\beta$ -arylethenesulfonyl fluoride unit for fluorescence colour switching and its application in the labelling and detection of bovine serum albumin.<sup>[3]</sup>

Craig M. Williams (The University of Queensland) received the 2022 Arthur Birch Medal of the Organic Chemistry Division of RACI. Together with Tyler Fahrenhorst-Jones and G. Paul Savage, he contributes a communication on the photochemical generation of the interesting 2-azabicyclo[4.2.0]octa-4,7-diene skeleton (a tetrahydro-cyclobutapyridine derivative), which involves a cascade of three electrocyclic reactions ( $6\pi-8\pi-4\pi$ ).<sup>[4]</sup>

Amir Karton (University of Western Australia) is the recipient of a 2020 RACI Citation. Together with Dylan Jayatilaka, he authors a highlight on the *duhka* of DFT: a noble path to better functionals via a point electron approximation for the exchange-correlation hole.<sup>[5]</sup> While DFT methods are highly popular, methods allowing further improvement are desirable. The paper provides an overview of the exchange-correlation (XC) hole and how it may be used in developing new density functionals.

Another highlight, on stable organic radicals and their untapped potential in ionic liquids, is provided by Rebecca O. Fuller (University of Tasmania), who received the 2021 Rita Cornforth Lectureship of the RACI. In collaboration with Theo A. Ellingsen, Natasha Hoffmann, Wesley J. Olivier, Stuart C. Thickett and Debbie S. Silvester, Fuller's paper describes how stabilisation of the unpaired electron of free radicals and fine-tuning of the structure-property relationships will facilitate the construction of functional materials with useful magnetic, electronic, and/or optoelectronic properties.<sup>[6]</sup>

Christopher Barner-Kowollik (Queensland University of Technology) was awarded the 2022 David Craig medal of the AAS. Together with Vinh X. Truong, he contributes an account on tuning the photoreactivity of photocycloaddition by halochromism. This research resulted in catalyst-free, red-shifted photochemical reactions with remarkably low-energy (up to 550 nm) [2 + 2] photo-cycloadditions. Moreover, changing the pH allowed an exploitation of halochromic effects on the photoreactivity of such [2 + 2] cycloaddition reactions.<sup>[7]</sup>

David A. Winkler (La Trobe and Monash Universities) is a recipient of a 2020 Distinguished Fellowship of the RACI. He provides an account on probing the properties of molecules and complex materials using the rather new methodology of improved cheminformatics and machine learning.<sup>[8]</sup> The topic is illustrated with applications in drug design, regenerative medicine, biomaterials, porous and 2D materials, catalysts,

**Received:** 27 October 2022

**Accepted:** 27 October 2022

**Published:** 23 November 2022

**Cite this:**

Wentrup C (2022)  
*Australian Journal of Chemistry*  
75(11), 847–848. doi:[10.1071/CH22228](https://doi.org/10.1071/CH22228)

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biomarkers, surface science, physicochemical and phase properties, nanomaterials, electrical and optical properties, corrosion, and battery research.

Stephen G. Pyne (University of Woollongong) received a 2020 Distinguished Fellowship of the RACI and contributes an account of his 37 years of working with nitrogen heterocycles and alkaloids – a very readable and informative select review of heterocyclic synthesis under keywords such as structural correction, sulfoximine, sulfoxide, vinyl epoxides, 1,2-amino alcohols, borono-Mannich reaction, cycloaddition, and metal catalysis.<sup>[9]</sup>

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**Conflicts of interest.** The author declares no conflict of interest.

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## Biography



**Curt Wentrup** graduated *Cand. scient.* under K. A. Jensen, University of Copenhagen and *PhD* at the Australian National University with W. D. Crow, undertook post-doctorates with Hans Dahn (Université de Lausanne), W. M. Jones (Gainesville) and Maitland Jones, Jr (Princeton), became Maître-Assistant and Privat-Docent at Lausanne and Professor at Universität Marburg before returning to The University of Queensland as Chair of Organic Chemistry in 1985. He received a *DSc* from Copenhagen, a *Dr. h.c.* from Pau, France, a Fellowship of the Australian Academy of Science, and the Australian Centenary, Craig, Birch, and Leighton Medals. As emeritus professor he continues research in organic, physical, and historical chemistry.