Report on 2018 Royal Society of Chemistry Australasian lecture tour:

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Professor Alan Bond (Monash University) invited me in December 2017 to undertake the 2018 Australasian lecture tour on behalf of the Royal Society of Chemistry. I consulted with the 2017 lecturer, Professor Neil Barnett from Deakin University, whose advice and general good humour was well received.

A modular lecture entitled "Game of Terpenes: Structures, Stereochemistry and Chemical Ecology of Nudibranch Metabolites" was prepared, and including as its central component some research on the chemistry of a phyllidiid nudibranch that involved a collaboration with the group of Professor Chris Vanderwal from UC Irvine, USA. In this way, the integration of computational chemistry and the total synthesis of a diterpene metabolite (pustulosaisonitrile) into a natural product detective story could be explained to the audience.

I first road-tested the lecture at the Research School of Chemistry, Australian National University, in Canberra on March 17. In common with my 2017 predecessor, the actual building proved elusive until I was rescued from my taxi by my host Martin Banwell. This was my first visit to the new RSC building. A social highlight was eating lunch with an international group of higher degree students and postdoctoral staff representing the organic chemistry research groups.

During June, I travelled to Perth, Darwin and Adelaide to present the lecture. First up was Curtin University on 14 June, hosted by Mauro Mocerino, then the University of Western Australia (15 June) hosted by Heng Chooi. I travelled to Darwin on 17 June for the lecture at Charles Darwin University, hosted the following day by Vinuthaa Murthy. The audience in Darwin was nicely mixed, including school teachers as well as colleagues from the NT branch of the Australian Institute of Marine Science. A particular pleasure was the presence at the lecture of CDU staff member Barbara White, the mother of the Honours student who had isolated pustulosaisonitrile in my lab in 2014. I reached Adelaide on June 19, and visited Adelaide University the next day, well hosted by Jonathan George.

The next sectors of the lectureship took place from August onwards. Combining the lecture with attendance at the Southern Highlands heterocyclic meeting (August 26-28) in

Moss Vale, NSW, I visited the University of Wollongong on August 29, meeting up with many colleagues from my former time there (1986-1990), notably Roger Truscott, Garry Mockler and Stephen Pyne. The next day, I lectured at the University of New South Wales, and this provided an opportunity to deal with some IUPAC-related business (David Black, Martina Stenzel) as well as explore options for hosting a natural products meeting in Australia with David and Naresh Kumar. Then I travelled to Hobart, and after a relaxing weekend exploring the city, I gave the RSC lecture at the University of Tasmania on 3 September, hosted by Alex Bissember.

In mid-September, I undertook the main component of the tour, starting in Townsville with a lecture at James Cook University of North Queensland on 13 September. This enabled me to visit the laboratories in which I had first undertaken marine-related research after my arrival in Australia in 1986. Peter Junk and George Vamvounis looked after the arrangements for my visit. I then travelled from Townsville via Brisbane to Florence in Italy, to attend the 16th International Conference on Organic Synthesis, and then again transiting through Brisbane, flew directly onto Auckland to undertake the New Zealand component of the lecture tour. James Hutchinson provided excellent advice and arranged the lecture schedule on my behalf. After a lecture at the University of Auckland (Johannes Reynisson/Ivan Leung) on 24 September that was followed by a reception arranged by the local NZIC section, I then successively visited University of Otago (Nigel Perry/Bill Hawkins), University of Canterbury (Vladimir Golovko), Victoria University of Wellington (Marcus Cole/Rob Keyzers/Joanne Harvey) and finally Waikato University (James Hutchinson/Michele Prinsep) on September 28. Five lectures in five days, including air travel on four successive mornings, was quite tiring, and by this stage I had developed a heavy cold; the final evening in NZ was spent in the company of a former postdoc, now professor of marine sciences, Chris Battershill in Tauranga. The next day I travelled back to Auckland by road, and flew directly to Melbourne, spending the remainder of the weekend getting fitter for the next round of lectures.

On Tuesday October 2, I delivered the Lady Masson Memorial lecture at the University of Melbourne hosted by the Head of School Professor Evan Bieske; this was different lecture presentation to the RSC lecture series. Next, Alan Bond hosted the RSC lecture and a reception at Monash University on October 3; we were joined for dinner by Alison Funston, Kelly Tuck and Philip Marriott, during the evening, Kelly and I scanned our phones with great

delight when news came through during the meal that Frances Arnold had been awarded one half of the Nobel Prize for Chemistry. The final two RSC lectures in this part of the tour were given at The University of Melbourne (hosted by Jonathan White) and at the Waurn Ponds campus of Deakin University; at this latter venue, it was an absolute pleasure to meet Neil Barnett at last, as well as catching up with Madeleine Schultz.

The final sector of the lecture tour was a visit to Sydney, presenting at Macquarie University (Andrew Piggott) on October 23 and then the University of Sydney (Chris MacErlean) the following day.

The lecture tour provided an excellent opportunity to gauge the skill sets, educational climate and research opportunity at the various chemistry centres that I visited; it is gratifying to record that all the smaller centres that I visited were visibly dynamic and moving ahead, while in contrast two of the larger university departments surprised me with a small participation for the lecture. A vibrant seminar program across the entire discipline of chemistry is an important quality measure, not just of scholarship, but also of the academic community within an individual institution.

I have much enjoyed the privilege of travelling around Australia and New Zealand describing our recent marine natural products chemistry research to these audiences. Memories of the warm welcomes, excellent research discussions, and hospitality will remain with me long after the frequent and mostly unremarkable episodes of air travel linked to the lecture tour have been forgotten.

I thank Alan Bond and the members of RSC Australasian Section for honouring me with this prestigious lectureship. Thanks are due also to the Royal Society of Chemistry for generously providing the funding for this lectureship. Finally, I would like to congratulate the 2019 RSC lecturer from New Zealand and to wish them well in their travels later this year.

Royal Society of Chemistry Australasian Lecture Series 2018

GAME OF TERPENES: STRUCTURES, STEREOCHEMISTRY AND CHEMICAL ECOLOGY OF NUDIBRANCH METABOLITES

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Nudibranchs, the "butterflies" of the ocean, are a group of brightly-coloured marine molluscs that are the source of diverse bioactive natural products. This talk will describe how an ecological study on chemical defense in nudibranchs led to the isolation and characterization of new terpene metabolites with extensively-rearranged carbon skeletons. Case studies that will be discussed include new isocyanoterpenes from *Phyllidia ocellata* and from *Phyllidiella pustulosa*, and epoxy-substituted norditerpenes from *Goniobranchus splendidus*. NOESY data run at 700 or 900 MHz, together with detailed conformational analysis informed by molecular modeling, DFT calculations, and in one example total synthesis in collaboration with a USA laboratory, enables assignment of individual configurations. The antimalarial, antifungal and cytotoxic activities of selected metabolites have been explored. The chemistry data are reviewed in an ecological context.

Selected Publications:

Winters, A. E., White, A. M., Dewi, A. S., Mudianta, I. M., Wilson, N. G., Forster, L. C., Garson, M. J., Cheney, K. L. *J. Chem. Ecol.*, 44, 384-396. 2018.

White, A. M., Dao, K., Vrublauskas, D., Könst, Z., Pierens, G. K., Mándi, A., Andrews, K. T., Skinner-Adams, T., Clarke, M. S., Narbutas, P. T., Sim, D. C.-M., Cheney, K. L., Kurtán, T., Garson, M. J., Vanderwal, C. D. *J. Org. Chem.*, *82*, 13313-13323. 2017.

Forster, L. C., Pierens, G. K., White, A. M., Cheney, K. L., Dewapriya, P., Capon, R. J., Garson, M. J. *ACS Omega.*, *2*, 2672-2677. 2017.

Cheney, K. L., White, A. M., Mudianta, I. M., Winters, A. E., Quezada, M., Capon, R. J., Mollo, E., Garson, M. J. *PLoSOne*, e0145134. 2016.

White, A. M., Pierens, G. K., Skinner-Adams, T., Andrews, K. T., Bernhardt, P. V., Krenske, E. A., Mollo, E., Garson, M. J. *J. Nat. Prod.*, *78*, 1422-1427. 2015.