

TALL POPPY CAMPAIGN

Investing in Australia's Future

Young Tall Poppy Profile: Dr Mal McLeod

Name: Malcolm (Mal) McLeod

Title: Dr

Research Field: Organic Chemistry

More Specifically: Organic synthesis of biologically active compounds, catalysis with genetically engineered enzymes and sports drug testing chemistry

In other words: We make compounds isolated from nature and their analogues that might be useful as drugs. We modify enzymes so that they can be used to make organic compounds. We identify compounds that arise from taking drugs, such as steroids and make them so we can sports catch drug cheats.

Abbreviated Qualifications: B.Sc. (Chemistry, Hons 1) Monash, D.Phil. (Chemistry) Cantab.

Current position: Senior Lecturer

University/Institution: Research School of Chemistry, Australian National University.

What do you do? My research group is focused on three related areas of organic chemistry: the synthesis of biologically active natural compounds, the development of new catalysts for efficient synthesis and the chemistry of sports drug testing.

Our current work aims at the synthesis of compounds from sponges that show significant anti-fungal activity and could one day serve as drugs for treating fungal infections.

We are also developing new genetically engineered enzymes from *E. coli* bacteria as catalysts for the synthesis of drug metabolites. Once synthesised the compounds can be used to combat the use of drugs in sport.

Why is this research important? How is it relevant to society at large? The science of organic synthesis underpins many of the technological advances made by our society. Most drugs in use today are the products of organic synthesis even if they are based on the structure of naturally occurring compounds. It is my hope that our synthesis will provide new compounds to treat diseases like fungal infections and provide new methods for drug detection in sport to improve the health and wellbeing of animals in the racing industry.

What's difficult about it? Much of the chemistry we do is done on small scale so working out the molecular structure can be a big challenge. This is particularly the case for some of our sports drug testing work where compounds isolated are available in only nanogram amounts – one billionth of a gram. Most techniques routinely used by chemists for structure determination are not sensitive enough at this level.

Why are you passionate about it? It is so interesting! We can take an enzyme from a bacteria and change its structure so that it can be used to synthesise a compound that is then used to catch a sports drug cheat – I think that is pretty cool.

Why share your research with high school students? I think it is very hard for secondary school students to imagine what it is like to work as a scientist on a research project and why they might want that job. This is not just because of the technical details of the science but also because the process of doing research is very different from what they usually do in the classroom. Talking about science is good but participating in it through programs like the CSIRO Student Research Scheme is even better.

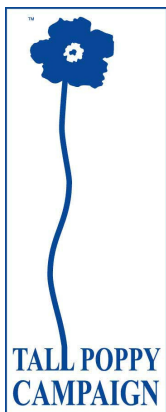
Why study sciences? Science is endlessly challenging and fascinating. There is always something new to learn or discover. It is also a truly international language. For me it has opened the door to interaction with other people and lots of international travel.

Is it what you've always wanted to do? Not really. When I first went to university I thought I was going to be an engineer but it became clear during my degree that chemistry was my greatest passion. Once I started my research project in 4th year university I was hooked.

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The Tall Poppy is a metaphor for excellence and endeavour and symbolises Australia's pride in its outstanding achievers – in all fields.



What else are you into? Bushwalking, reading and playing with my 6 month old son.

Public profile I routinely participate in the open University Open Day as it helps prospective students chart their future studies. This year I have been involved in the ASISTM Cool Chemistry project which involves helping primary school teachers develop simple chemistry experiments for the classroom. I have also participated in the CSIRO Student Research Scheme which gives secondary school students a taste of the university research environment.

My research has been highlighted in Sydney's Daily Telegraph and in the Royal Society of Chemistry magazine Chemical Science.

Your achievements - How did you get where you are today?

Your HSC subjects: English, Chemistry, Physics, Mathematics A and Mathematics B in the Victorian HSC.

Degrees: Bachelor of Science (Chemistry, Hons 1) from Monash University; Doctor of Philosophy (Chemistry) from Cambridge University, UK.

Some of your previous position/s: Postdoctoral Research Fellow at the Australian National University; Lecturer and Senior Lecturer at the School of Chemistry, University of Sydney.

Current position: Senior Lecturer at the Research School of Chemistry at the Australian National University.

Relevant awards and prizes you have received as part of your studies/research/work:

- 2008 Elected Fellow of the Royal Australian Chemical Institute
- 2007 Biota Medal for Medicinal Chemistry of the Royal Australian Chemical Institute
- 2005 Rennie Memorial Medal of the Royal Australian Chemical Institute
- 2003 Royal Australian Chemical Institute Organic Division Lectureship for Recently Appointed Staff
- 2001 Tasmanian Alkaloids Visiting Lectureship
- 1997 Australian National University Postdoctoral Research Fellowship
- 1995 Pfizer Organic Poster Symposium prize
- 1993 Cambridge Commonwealth Trust Scholarship

Summary of published works: Total of 40 publications, 1 book chapter, 1 major review and 1 patent application.

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