

# TALL POPPY CAMPAIGN

*Investing in Australia's Future*

## Young Tall Poppy Profile: Dr Pall Thordarson

**Name:** Pall Thordarson (Palli)

**Title** Dr.

**Research Field:** Chemistry and Nanotechnology

**More Specifically:** Bio-mimetic and bio-organic chemistry

**In other words:** Self-assembled materials and devices for application in medicine and bioelectronics

**Abbreviated Qualifications:** BSc. (Chemistry), PhD (Organic Chemistry)

**Current position:** Senior Lecturer and Australian Research Council Australian Research Fellow

**University/Institution:** School of Chemistry, The University of New South Wales

### What do you do?

Our research group is making novel bio-mimetic self-assembled materials and devices. The unifying theme of our work is nanotechnology inspired by or mimicking biological systems. Currently we are focusing our work on two research programs: i) Self-assembled organogels for biomedical applications, especially local anti-cancer drug delivery in chemotherapy. ii) Light-activated bioconjugates between synthetic molecules and biological ones which will then use to make solar biofuel cells and light-switchable biosensors.

### Why is this research important? How is it relevant to society at large?

New methods for drug delivery are likely to improve the survival rate and quality of life for patients undergoing chemotherapy by improving the efficiency of the drugs used while suppressing side-effects. Our bioelectronics research is aimed at making better biosensor for medical applications as well as combining waste treatment with renewable energy production from sun-light addressing some of our most pressing environmental challenges.

### What's difficult about it?

Designing and making self-assembled materials in its own right is still a challenge. We are also only starting to understand how these materials interact with living cells but this understanding will be essential for their use in medicine. The key challenge in the bioelectronics work is to chemically modify biological molecules in such a way that they can be used in devices and harsh environments without losing their biological function.

### Why are you passionate about it?

At the core of our work is our desire to understand how self-assembly works – the very mechanism nature uses to build life – and if we can grasp its power we should be able to tackle some of the key medicinal and environmental challenges in our society. The emerging area of regenerative medicine alone builds heavily on this type of research and is already showing great promise for tissue engineering, spinal cord regeneration and advanced drug delivery.

### Why share your research with high school students?

I would like to introduce the wonder and excitement of science to high school students by presenting to them the big unknowns in science, including perhaps one of the biggest unanswered questions in science: the chemical origin of life. I found that there are few other subjects better suited to stimulate critical thinking about how science works and what we can learn and benefit from science, than talking about all the wonderful exciting questions that remain unanswered in the area of pre-biotic chemistry.

### Why study sciences?

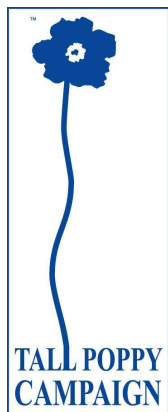
Most people I know that work in science really enjoy their work. I think that a lot of people are curious about the world around us and working in science gives us opportunity to use this curiosity to solve pressing issues. Scientific research is for instance at the heart of both understanding climate change, and most attempts to address the problem. Another often forgotten benefit for young people studying science is that it teaches us valuable skills for future jobs of all kinds. Chemistry for instance is very good at teaching people how to think critically and analytically about problems and then go about solving these in practice – a skill that a lot of chemistry graduates utilise in other fields including finance, administration and consulting businesses.

Founded by the Australian Institute of Policy and Science

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### **Is it what you've always wanted to do?**

I had always been fascinated about nature ever since growing up on a farm in Iceland but I was actually more interested in becoming a farmer than a scientist. I did though decide to give University studies a try, and I soon realised that research was something I really liked doing.

### **What else are you into?**

Cruising the country-side with my wife, history, politics, current affairs, jogging, golf and snorkeling.

### **Public profile:**

I have taught various chemistry classes at both high school and University levels, taken part in Open School days and had a couple of media interviews about my research work, including interviews by the Icelandic National Radio and the largest newspaper in Iceland.

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

**Your HSC subjects:** I grew up in Iceland which has a different secondary school system: I took the "Natural Science" stream, focusing on physics, maths, chemistry, biochemistry (my favourite) mixed in with languages (English, Icelandic, Danish and German), literature, history and sociology.

**Degrees:** BSc (Chemistry) the University of Iceland, PhD (Science), The University of Sydney.

### **Some of your previous position/s:**

Marie Curie Fellow, University of Nijmegen, The Netherlands.

Sesqui Fellow, Australian Key Centre for Microscopy and Microanalysis, The University of Sydney.  
Australian Research Council Australian Research Fellow, School of Chemistry, The University of Sydney.

### **Current position:**

Senior Lecturer and Australian Research Council Australian Research Fellow

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

Four times winner of the Agnes Campbell price for excellence in Organic Chemistry at The University of Sydney.

Winner of the Royal Australian Chemical Institute Division of Organic Chemistry Feutrill Prize for an oral presentation by a student at the 11<sup>th</sup> National Convention in Canberra in 2000.

Three prestigious and highly competitive fellowships:

The Marie Curie Fellowship from the European Union

The Sesqui Research Fellowship from The University of Sydney

The Australian Research Fellowship from the Australian Research Council

Membership of the Royal Australian Chemical Institute (RACI) and the American Chemical Society (ACS).

### **Summary of published works:**

I have published over 25 articles (including a paper in the prestigious journal *Nature*), two reviews on invitation and three book chapters as well as two patents. I have also recently been appointed associate editor commissioning, of the *Australian Journal of Chemistry*.

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