



veski  
innovation  
fellow

Dr  
Luke Connal

#### research project

**Design and synthesis of enzyme mimics: Materials of the future**

#### project summary

Nature's complex and detailed systems which support the production of energy or immune defences, among other things, demonstrate amazing control of chemistry.

This elegant control of biochemical processes relies on the efficiency and specificity of biology's catalysts, known as enzymes. Enzymes are amazing biomolecules that control complex functions, from digestion in mammals, to photosynthesis in plants. If even a small portion of these remarkable macromolecules can be replicated, the result will be new and paradigm-shifting technologies.

Dr Connal's project will develop enzyme mimicry technologies with a number of potential applications including low temperature detergents, renewable production of biodiesel, and anti-bacterial coatings that stem the spread of disease.

Dr Connal's group will engineer, synthesize and evaluate molecules for enzyme mimicry. Initially, he will focus research efforts on one specific class of enzymes – protease mimics – and he will develop methods similar to nature to control their primary, secondary and tertiary structure.

The main avenue he will be investigating is the application of enzyme mimics in detergents. In the near future, he aims to further develop the chemistry with regard to many other diverse applications.

He will also endeavour to provide proof-of-concept experiments to attract, for this avenue of research, supporting funding from commercial and government sources.

In addition, he will apply this chemistry to develop antibacterial coatings that could stem the flow of diseases.

The chemistry Dr Connal is developing will be a platform for a range of applications, from pharmaceutical synthesis to energy production.

He will also continue to draw on his connections with large multinational chemical companies, including DOW Chemical and Unilever.

#### personal history

Dr Connal accepted a **veski** innovation fellowship worth \$150,000 over three years. The funding will be matched in cash and in-kind by his host organisation The University of Melbourne.

Prior to returning to Victoria, Dr Connal was a post doctoral researcher at the Materials and Research Laboratory at the University of California Santa Barbara. He was part of the Hawker Laboratory in Santa Barbara from 2009.

During his time with the Hawker Laboratory, he was supported by a Sir Keith Murdoch Fellowship from the American Australian Association and an Australian Linkage International Fellowship from the Australian Research Council.

Luke completed a Bachelor of Engineering at the University of Melbourne as well as a PhD in polymer chemistry under the guidance of Professors Greg Qiao and David Solomon.

Prior to relocating to Santa Barbara, he held a postdoctoral position with Professor Frank Caruso developing new methodologies for the self-assembly of polymers.

## Dr Luke Connal

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**“There are many great challenges for a new academic ... finding the right people, finding the right infrastructure and obviously funding as well to get your research done and veski has really been able to help out on all of those counts”**

Throughout his career, he has received several fellowships including a 2007 Victoria Fellowship which allowed him to travel to Spain and undertake research alongside Professor Luis M. Liz-Marzán at the Universidad de Vigo.

Luke has developed a range of industry collaborations and through the American Australian Association he has been able to meet CEOs from world-leading companies including DOW Chemicals and Unilever.

On his most recent return to Victoria, he took up a senior research position at the University of Melbourne in the department of Chemical and Biomolecular Engineering.

Luke returns to Victoria with his wife, who is also involved in the Victorian science and innovation communities, and their young daughter.

### other innovation fellowship recipients

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Professor Andrew Holmes AM FRS FAA FTSE  
Professor Marcus Pandy  
Dr Gareth Forde  
Dr Alyssa Barry  
Professor Michael Cowley FTSE  
Professor Sarah Hosking  
Professor Ygal Haupt  
Dr Ross Dickins  
Dr Mark Shackleton  
Professor Edwin van Leeuwen FTSE  
Dr Matthew Call  
Dr Christopher McNeill  
Dr Seth Masters  
Associate Professor Tiffany Walsh  
Professor Cameron Simmons  
Professor Colette McKay  
Dr Ethan Goddard-Borger

### fellows in an ambassadorial role include

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Professor Adrienne Clarke AC  
Professor Peter Doherty AC  
Professor Alan Trounson  
Mr Brian Jamieson  
Dr Janine Kirk AM  
Professor Christina Mitchell  
Professor John Denton

### further information

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[veski.org.au](http://veski.org.au)  
+613 9635 5700  
[info@veski.org.au](mailto:info@veski.org.au)

### background information

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**veski** delivers three of Victoria's most prestigious fellowship programs including the **veski** innovation fellowships which bring world-leading scientists and researchers back to Victoria.

Since 2004, **veski** has awarded 18 **veski** innovation fellowships worth more than \$3.7 million delivering a return on investment in excess of \$45 million of funds brought into Victoria for research and infrastructure and attracting a range of globally competitive individuals to Victoria to work on important research into areas such as dengue and malaria, cancer, inflammatory diseases, musculoskeletal health and obesity.

**veski** is supported by the State Government of Victoria.

