



**veski  
innovation  
fellow**

**Professor  
Benjamin  
Marsland**

#### research project

**Halting the atopic march:  
harnessing the skin  
microbiome in early life to  
prevent allergies**

#### project summary

Statistics show that the burden of allergic disease in Australia has skyrocketed to an all-time high, placing an unprecedented number of lives at risk.

Approximately one in five children develop “atopic dermatitis” – a skin disease causing an itchy and often painful rash – in their first two years of life. In a flow-on effect known as the “atopic march”, these children are then more likely to develop asthma – a life-threatening disease affecting one in 10 Australians.

With this in mind, **veski** innovation fellow Professor Benjamin Marsland's research goal is to prevent children from developing atopic dermatitis, and subsequently asthma.

In the days and months following birth, bodies are colonised by bacteria and fungi. These microbes, collectively referred to as the “microbiome”, dramatically influence how our immune systems and tissue barriers (such as skin) develop.

Professor Marsland's team recently discovered that a chemical (known as a “metabolite”), produced by certain healthy bacteria, prevented mice from developing atopic dermatitis and asthma in early life.

His research as a **veski** innovation fellow aims to build on this discovery by conducting further mouse studies, validating the findings in human babies, and moving towards translating his approach into the clinic by providing the foundation for a new Melbourne-based biotech company, or for engaging industry partners.

Professor Marsland believes that early life is really important to target, to prevent disease development. Babies are born essentially sterile so they have no microbiome, no bacteria on their skin or in their gut and that microbiome develops in a different way depending on the tissue so the skin microbiome develops differently to the gut microbiome.

In the first twelve months of life many children will develop skin rashes like atopic dermatitis and some children will also develop a wheeze which is a prelude to asthma. But many of those children grow out of it. They don't develop it later. So currently little is understood about what the signals are that mean that some children will develop asthma and maintain it or grow out of it.

Part of the research team's strategy is to establish either a spin off start-up company developing skin creams or skin probiotics which would ideally be given to young babies to improve their immune maturation and skin barrier function in the first year of life.

Professor Marsland explained that although it has been known for decades that our gut was full of bacteria, the lung was thought to be sterile and that's a dogma that is still taught in text-books.

However, around 10 years ago he realised at the same time as a number of other groups around the world that in fact the lungs are not sterile, that they have microbes in them and that is what really started the whole area of research for him, where he wanted to understand what those microbes were doing to respiratory diseases.

## Professor Benjamin Marsland

“Understanding ‘friendly microbes’ may well hold the key to preventing allergic diseases including asthma.”

### personal history

New Zealand born immunologist Professor Ben Marsland began his post-doctoral research in Switzerland in 2004 at the Swiss Federal Institute of Technology in Zurich, followed by establishing his own research group at the University Hospital in Lausanne where he and his team have gained international recognition.

Professor Marsland's wife and two young children have moved to Melbourne with him. His wife (Nicola Harris) is a professor of intestinal immunology and was also recruited to Monash. They both studied together in NZ and both went to Switzerland.

“Melbourne is an amazing centre for research and innovation. From the immunology view-point it is one of the best centres in the world. There are a huge number of great researchers around. So, I think being able to come back ‘down under’ being a kiwi to one of the great immunology powerhouses is a win-win situation for me.”

Over the last few years Professor Marsland has developed a number of strong collaborations internationally with human birth cohorts and the one that is most relevant to his **veski** work is called ‘PreventADALL’ based in Oslo. Through this consortium, the researchers receive skin swabs from babies at birth, and then at multiple timepoints during the first two years of life which allows the team to perform high throughput sequencing of the microbiota present on the babies’ skin. As a result of this collaboration a Norwegian pediatrician is joining his laboratory in Melbourne in 2019 for twelve months.

### other innovation fellowship recipients:

Professor Andrew Holmes AC FRS FTSE AAAS  
Professor Marcus Pandey  
Adjunct Assoc. Professor Gareth Forde  
Associate Professor Alyssa Barry  
Professor Michael Cowley FTSE  
Dr Sarah Hosking  
Professor Ygal Haupt  
Associate Professor Ross Dickins  
Professor Mark Shackleton  
Dr Edwin van Leeuwen FTSE  
Associate Professor Matthew Call  
Associate Professor Christopher McNeill  
Associate Professor Seth Masters  
Professor Tiffany Walsh  
Professor Cameron Simmons  
Dr Luke Connal  
Professor Colette McKay  
Dr Ethan Goddard-Borger  
Professor Mark Dawson  
Professor Kenneth Crozier  
Associate Professor Roger Pocock  
Professor Richard Sandberg  
Professor Colby Zaph  
Professor N. Jon Shah  
Dr Vihandha Wickramasinghe  
Professor Pierluigi Mancarella

### background information

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

Since 2004, 27 **veski** innovation fellows have returned to Victoria. Innovation fellows have secured research income upwards of \$68m to date delivering an 18.4:1 economic return on investment. Their research covers semiconductors, epigenetics, audiology, optics and nanotechnology, enzymes, dengue, malaria, cancer, inflammatory diseases, musculoskeletal health, geothermal energy, obesity, computational fluid dynamics, bio-medical imaging and immunology.

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

### further information

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