



Australian Government

THE PRIME MINISTER'S PRIZES FOR SCIENCE



GEOFF ROGERS PRIZE FOR NEW INNOVATORS



A steerable guidewire to improve the treatment of heart disease

Dr Geoff Rogers has created a robotic guidewire that cardiologists can steer with a joystick through the body to reach a damaged artery.

The use of guidewires has replaced open heart surgery for many cardiac patients. However, about 20 per cent of cardiac patients can't be treated using current guidewire technology, which the cardiologist has to twist and turn by hand to guide it through the arteries. The guidewires can't always get through.

As an undergraduate engineering student, Geoff heard a clinician express his frustration with the technology. So, for his undergraduate project and PhD, Geoff invented a steerable guidewire with a diameter of just two human hairs. Following his PhD, he co-founded a company and worked with cardiologists at the Epworth and Melbourne Private Hospitals to develop the IntelliWire.

In 2017 the guidewire and the company were purchased by Merit Medical Systems, a global leader in surgical devices, which is now working to bring the guidewire to market.

Now Geoff is leading two new initiatives: the first as CEO of a biomedical start-up company developing new solutions to antibiotic resistance; the second is a real-time system to adjust car wheel alignment. He's also mentoring future biomedical entrepreneurs.

For creating and commercialising his pioneering biomedical engineering, Dr Geoff Rogers receives the \$50,000 Prize for New Innovators.

Geoff's passion for engineering was sparked by his mechanic father, and his interest in fast cars. It was not until his final undergraduate year, following a talk by a visiting surgeon, he realised that engineering could save lives. To explore the limits

of engineering and solve problems which hadn't been solved through traditional large-scale engineering, he set off on his PhD in micro-and-nanotechnology.

Guidewires have transformed cardiac surgery, replacing major surgery with a day procedure. The cardiologist puts a bend in the guidewire, inserts it via your groin, and tries to guide it through your blood vessels by pushing, while watching progress on an X-ray machine. If the clinician can't manage to push and rotate the guidewire to the right location, they can try with a new wire. In about 20 per cent of patients the wire can't be manoeuvred through, and the patient is referred for either open-heart surgery or pharmaceuticals—which "aren't ideal at all," Geoff says.

Geoff's guidewires, however, are complex devices that can be steered through the blood vessel system by remote control.

"They're the thickness of two human hairs, and they contain 15 components—all of which are custom-manufactured, and assembled by hand," Geoff says.

"At that small scale, materials behave differently. For example, everything's sticky. So it was quite a challenge, spanning four years of intensive research followed by five years of further refinement and preclinical trials."

He and his team made about 100 wires. But they realised they needed a partner to scale up: to make hundreds of thousands of wires, and to get them in the hands of cardiologists around the world in the fastest possible way.

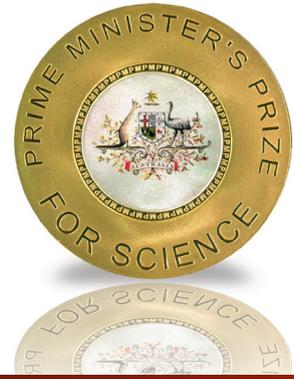
"We went to Merit Medical Systems in Utah, the leading manufacturer of guidewires," Geoff says.

"Presenting to their board and seeing their reaction to this device we'd been quietly developing back in Australia, was just amazing. They too see it as the future of minimally-invasive medicine."

In 2017 Merit acquired the technology and the company.

"I'm not one to sit still. My next challenge is antibiotic resistance," Geoff says.

"I've joined Wintermute Biomedical in the US who have a novel antibiotic formulation. We're establishing labs here in Melbourne and we're planning to start Phase I clinical trials at the end of 2019 or early 2020.



"All the ingredients are considered safe by the FDA, and the drug has had startling results in all of the testing we've done so far."

While Geoff revels in the science and engineering challenges of his work, the most important part is seeing it translated so it can make a difference to real people. He's encouraging other scientists to pursue the same kind of translation for their work, both through his investment company and by mentoring projects.

Further reading

<https://www.merit.com>

<https://www.wintermutebiomedical.com>

Career profile: Geoff Rogers

QUALIFICATIONS

- | | |
|------|--|
| 2012 | PhD, Monash University |
| 2008 | Bachelor of Mechanical Engineering,
Monash University |

CAREER HIGHLIGHTS

- | | |
|--------------|---|
| 2017–ongoing | CEO and Executive Director,
Wintermute Biomedical |
| 2017–ongoing | Director and Co-Founder, DOFTEK |
| 2017–ongoing | Co-Owner and Investor, Upstart Innovations |
| 2012–2017 | Director and Co-Founder, IntelliMedical |
| 2015–2016 | Member, Commercial Academy, National
Health and Medical Research Council |
| 2014 | 30 under 30 Global Medtech Innovators,
QMed Corporation, USA |
| 2014 | 10 Technologies Designed by Medtech's Next
Generation, QMed, USA |
| 2012 | European Young Technology Award, People's
Choice, Norway |
| 2004 | Premier's Award (Victoria) |