## DR ANDREW WOODS ⚛ INNOVATION: DEEP-WATER 3D IMAGING SYSTEM

Manager HIVE, Curtin University, PhD (Electronics), Curtin University

In 2015, a team from Curtin University, WA Museum and DOF Subsea conducted a detailed 3D imaging survey of the wrecks of *HMAS Sydney II* and *HSK Kormoran* – located in 2500 m of water, 200 km west of Shark Bay. The ships sunk each other during a battle in 1941 with the wrecks only discovered in 2008.

A custom deep-water lighting and camera package was developed for the project, which acquired 500,000 images and 300 hours of high-definition footage – much of that in 3D. The system allowed real-time download of much of the image and video data allowing real-time quality control of the data. The dataset is being processed to produce a range of cultural heritage outputs – early outputs include a small exhibition and short 3D film at Museum of Geraldton and a book *From Great Depths*.

Andrew Woods was the technology lead on the project. With input from colleagues he designed the overall system, worked closely with suppliers to deliver the required components, integrated the completed system, managed a team of three working on the technical systems, and modified some electronics systems to meet performance.

The engineering breakthrough was the development of a unique system to conduct detailed 3D surveys of underwater infrastructure, including: customisation of hardware and software allowing real-time download of images from digital cameras, integrating a range of equipment to meet overall project needs, development of 3D digital still cameras to collect unique underwater 3D views, development of surface control room hardware and software to operate the full system, and design of a data collection system to meet specific 3D imaging capture requirements.

"[The team] has pulled off something fantastic, singular in the history of Australian maritime archaeology," said Andy Viduka, Assistant Director Maritime Heritage, Department of Environment. ●

Andrew Woods in the Hub for Immersive Visualisation and eResearch (HIVE).

VOL. 3 NO. 6 JULY 2017

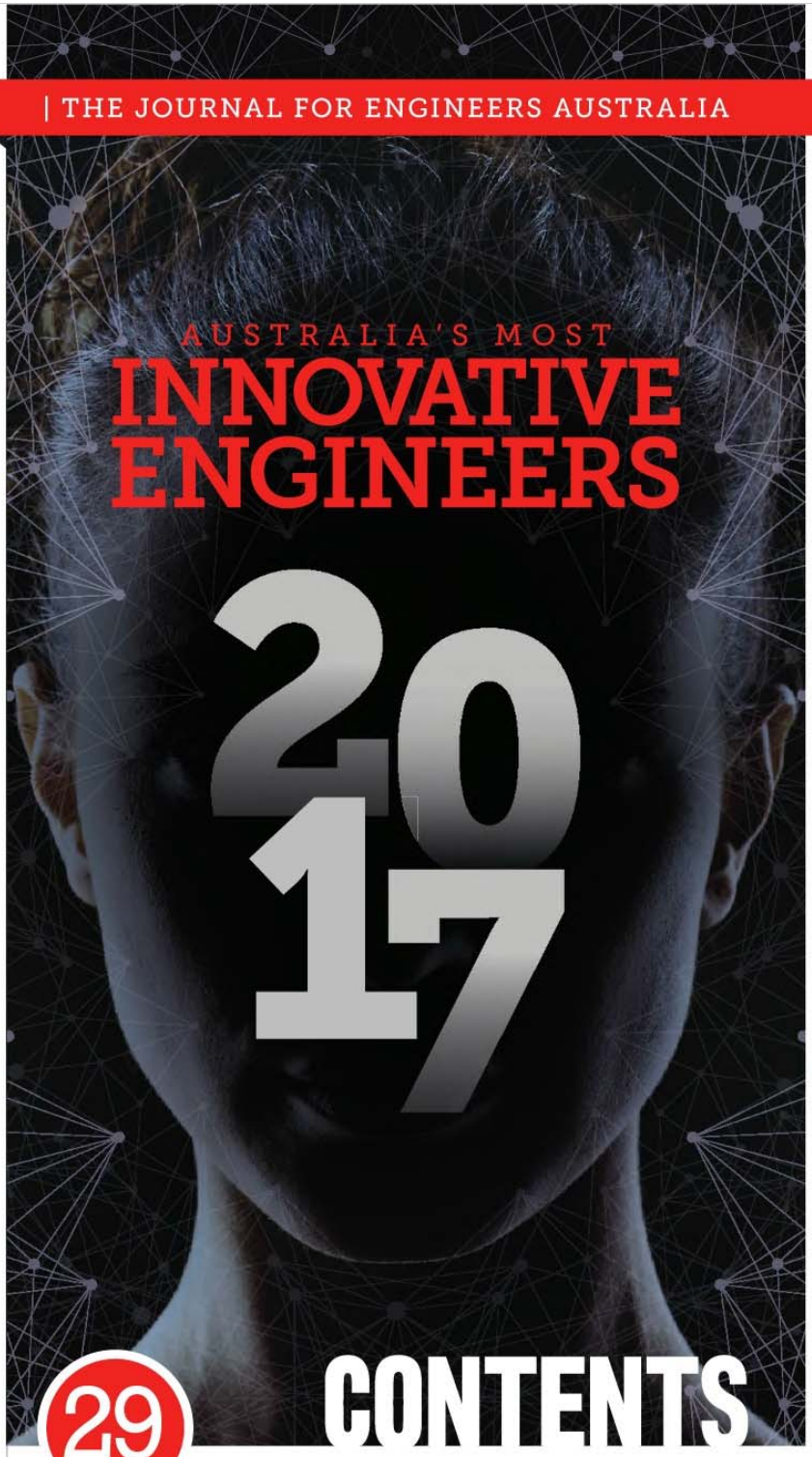
# create

ENGINEERING IDEAS INTO REALITY

ENGINEERS AUSTRALIA

# 2017

## AUSTRALIA'S MOST INNOVATIVE ENGINEERS



AUSTRALIA'S MOST

# INNOVATIVE ENGINEERS

# 2017

# CONTENTS

29

## Cover story

Engineers have brilliant ideas and turn them into reality. We highlight 30 of the best in our Most Innovative Engineers special.

*"I was five years old when I watched Apollo 11 unfold on television, and without any doubt it was a big contributor to my passions for science, engineering and exploration."*

- JEFF BEZOS, AMAZON

ENGINEERS AUSTRALIA

**The journal for Engineers Australia**

**ENGINEERS AUSTRALIA NATIONAL OFFICE**

11 National Circuit, Barton, ACT 2600
Phone 02 6270 6555
www.engineersaustralia.org.au
memberservices@engineersaustralia.org.au 1300 653 113

**NATIONAL PRESIDENT:** John McIntosh FIEAust CPEng EngExec NER IntPE(Aus) APEC Engineer

*create* is the official magazine for members of Engineers Australia

**Publisher:** Mahlab

**Managing Director:** Bobbi Mahlab

**Editor:** Kevin Gomez BS
kevin@mahlab.co

**Senior Writer:** Christopher Connolly BE
christopher@mahlab.co

**Group Managing Editor:** James Chalmers

**Advertising Sales Managers:**

Stuart Neish 02 9556 9122
sneish@mahlab.co

Peter Stephens 02 9556 9116
peter@mahlab.co

**Art Director:** Matt Caulfield

**Designer:** Sonia Blaskovic

**Production Manager:** Kathy Little

369a Darling Street, Balmain NSW 2041
www.mahlab.co

**Printed by:** BlueStar Group

**Mailed by:** D&D Mailing

**ISSN** 2205-5983



Mahlab

AUSTRALIA'S MOST

# INNOVATIVE ENGINEERS

2017

Engineers are acknowledged for their innovative ideas but, more importantly, they are known for turning those ideas into reality. In this special issue of *create*, we once again celebrate Australia's most innovative engineers, sorted into ten categories from across the profession.

CATEGORIES

# AWARDING ENGINEERING INNOVATION

## MEET THE JUDGES

### ALEX KINGSBURY

Alex Kingsbury is a chemical engineer who currently consults to industry on metal additive manufacturing, also known as 3D printing. Formerly Director of CSIRO's additive manufacturing centre 'Lab 22', Kingsbury has long worked at the nexus between industry and R&D. During her time at Lab 22 she implemented an industry initiative that gave manufacturing businesses access and training to metal 3D printers, and provided co-working lab space. She now consults to companies in Australia and overseas that are already active in 3D printing, are considering moving into that technology space, or looking at investing in it.

### JOHN WILSON

Professor John Wilson is Executive Dean of the Faculty of Science, Engineering and Technology at Swinburne University of Technology in Melbourne and has 30 years' experience in industry and academia. He has a research background in earthquake engineering and structural dynamics and has consulted widely in these fields. He is the past joint recipient of four Chapman Medals and one Warren Medal. He was the Victorian Division Chairman of Engineers Australia in 2002, spokesperson for the Victorian Infrastructure Report Cards since 2005, and Chairman of Judges for the Victorian Engineering Excellence Awards since 2011.

### IAN OPPERMAN

Dr Ian Oppermann is the NSW Government's Chief Data Scientist and CEO of the NSW Data Analytics Centre. With 25 years' experience in ICT, he has led organisations with more than 300 people, delivering products and outcomes that have impacted hundreds of millions of people globally. He has held senior management roles in Europe and Australia as Director for Radio Access Performance at Nokia, Global Head of Sales Partnering (network software) at Nokia Siemens Networks, and then Divisional Chief and Flagship Director at CSIRO. He is a Fellow of the Institute of Engineers Australia, the IEEE, and of the Australian Academy of Technological Sciences and Engineering.

## What's new this year?

The essence of this listing is the same as last year but there are a few notable changes.

The outstanding engineers who featured in last year's list were not eligible to be included for the same innovation this year. This resulted in the 2017 list being completely different to the one last year.

This year, the list features 30 of the most innovative engineers and includes more information about each person and their innovation.

Also, some of the categories have been redefined to reflect current trends in industry.

## How were they selected?

At the beginning of this year, engineering professionals were invited to nominate themselves or their peers. The number of entries this year was a substantial increase on last year. Of course this put additional pressure on the judges (profiled below) and we would like to thank them all for their invaluable contribution to the process.

If you're doing something innovative or know someone else who is, why not nominate next year? Details of how to enter next year's program will be provided in *create* magazine, on the Engineers Australia website and through social media later this year.

### BRONWYN EVANS

Dr Bronwyn Evans has over 30 years' experience as an engineering executive in the areas of power generation, engineering education, standards creation and medical devices. She is CEO of Standards Australia and Vice President (Finance) of the International Standards Organisation. She is Chair of MTPConnect, the Industry Growth Centre for Medical Technologies and Pharmaceuticals and a member of the Australia-Japan Foundation. Past Board positions included John Holland Limited, Medical Technology Association of Australia Board and Robogals Advisory Board. In 2016 she was recognised as one of Australia's 100 Women of Influence.

### JAMES TREVELYAN

Professor James Trevelyan is an engineer, educator and researcher with 45 years of experience and has recently become a start-up entrepreneur. He is CEO of Close Comfort, a tech start-up introducing new energy saving air conditioning technology to Pakistan. For 41 years he taught design, computer methods, project management and sustainability at The University of Western Australia. He is best known internationally for pioneering research that resulted in sheep shearing robots from 1975 till 1993. He and his students produced the first industrial robot that could be remotely operated via the internet in 1994.

### JOHN IMMELMAN

John Immelman is the former Managing Director of Endress+Hauser Australia and was responsible for establishing the Australian operation in 2001. He qualified as an Electrical Engineer at the University of Witwatersrand in Johannesburg in 1971. Immelman is the current Chairman of the Institute of Instrumentation, Control and Automation NSW and the founder and ex-President of the Profibus Association Australia. He has extensive experience in the area of sensors for manufacturing and automation as well as the use of instrumentation in process industries. He has held senior positions in Lotus, Tetra and SPL.

AUSTRALIA'S MOST

# INNOVATIVE ENGINEERS 2017

## ALPHABETICAL LISTING



## Thank you to our sponsors

PLATINUM

LAING O'ROURKE

GOLD

THE UNIVERSITY OF SYDNEY

SILVER

McCONNELL DOWELL
CREATIVE CONSTRUCTION™

NOBLEOAK

BRONZE

CSS
the name behind the names.

FIDIC

engineers without borders australia

UNSW

## SHOULD YOU BE IN NEXT YEAR'S LIST?

If you're an engineer working on something really innovative at the moment, you should think about applying for the 2018 listing of Australia's Most Innovative Engineers. We will start calling for nominations later this year.

Keep an eye on *create* magazine and the *www.engineersaustralia.org.au* website for more details.