



Microengineering Winter School



You're invited!

Tuesday 2nd to Friday 5th July, 2024

LOCATION:

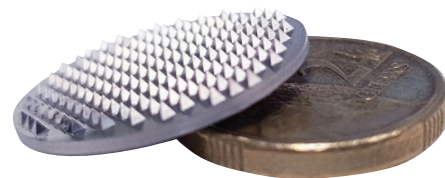
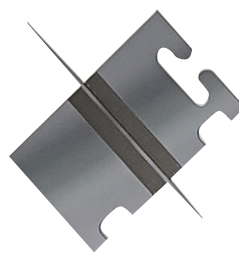
Building MM 1-05
UniSA Future Industries Institute
Mawson Lakes Campus

COST: FREE

REGISTRATION ESSENTIAL:

Attend [onsite](#) or join us [online](#)

More info: www.anff-sa.com



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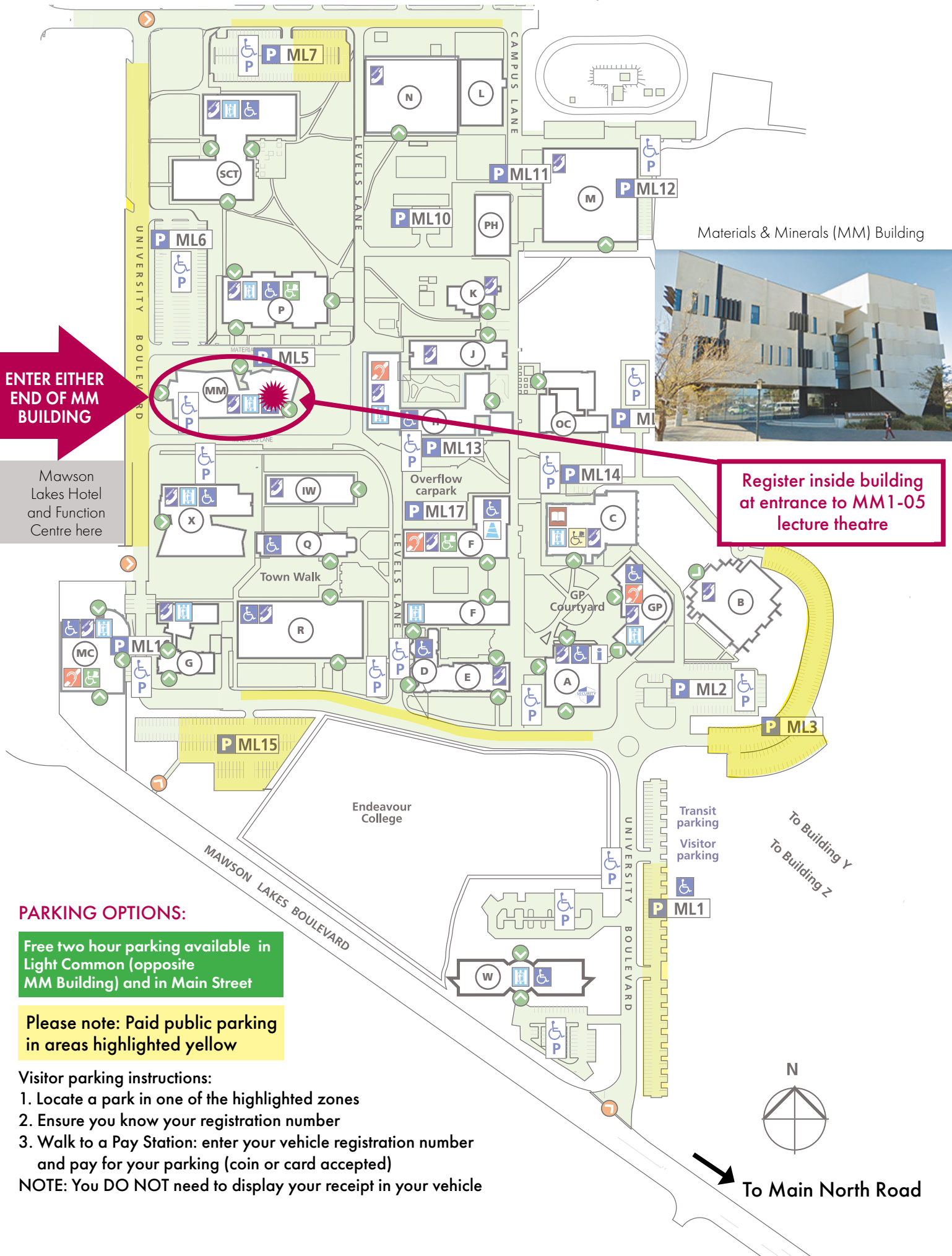


**The South Australian Node of the
Australian National Fabrication Facility**

Providing micro and nano fabrication facilities for Australia's researchers



ANFF-SA





Tuesday, July 2

TIME	SESSION
8.45am	Registration Foyer of Building MM
9am	Welcome Prof Craig Priest, Director, ANFF-SA
9.05am	Opening remarks Dr Jane Fitzpatrick, CEO, ANFF
9.15am	INSIGHT ONE: TBA Dr Judy Halliday, Director, Innovation and Entrepreneurship, Department for Industry, Innovation and Science
9.45am	INSIGHT TWO: Lab on a chip: miniaturising the chemistry laboratory Prof Michael Breadmore, ARC Future Fellow, University of Tasmania
10.15am	MORNING TEA
10.45am	Sponsor video - Nano Vacuum
10.50am	LECTURE ONE: Thin film coatings Dr Paul Weber, Utah Valley University
11.30am	LECTURE TWO: Photolithography Sophia Su, Microfabrication Technologist, ANFF-SA
12.10pm	GROUP PHOTO + LUNCH
12.40pm	Industry tour: Tindo Solar
2pm	PRACTICAL SESSION ONE
3.30pm	AFTERNOON TEA
3.45pm	PRACTICAL SESSION TWO
5.15pm	CLOSE OF DAY

Wednesday, July 3

TIME	SESSION
8.45am	Lecture theatre doors open
9am	Opening remarks Prof Craig Priest, Director, ANFF-SA
9.05am	Sponsor video - Evident/Olympus
9.10am	INSIGHT THREE: Speciality optical glasses and fibre: fabrication and applications (Online) Prof Heike Ebendorff-Heidepriem, Deputy Director of IPAS, University of Adelaide
9.40am	INSIGHT FOUR: Advanced undersea sensor technology Dr Scott Foster, STaR shot Lead, Quantum Assured, Positioning, Navigation and Timing, DSTG
10.10am	MORNING TEA
10.40am	LECTURE THREE - Etching Dr Jing-Hong Pai, Microfabrication Technologist, ANFF-SA
11.20am	LECTURE FOUR: Laser milling Dr Ben Johnston, ANFF Optofab Facility Manager and Alex Stokes, Laser Technician, Macquarie University
12.00pm	LUNCH
12.30pm	Industry tour: Rapier Electronics
1.45pm	PRACTICAL SESSION THREE
3.15pm	AFTERNOON TEA
3.45pm	PRACTICAL SESSION FOUR
5.15pm	CLOSE OF DAY

- FREE - ANFF OptoFab tour & dinner • Wednesday July 3 • 6-8pm

Join the visit to ANFF Optofab to learn about:

- Glass manufacturing
- Glass extrusion
- Fibre drawing
- 4 advanced manufacturing (metal 3D printing & ultrasonic CNC machining)

SCHEDULE:

5.30pm...Bus from UniSA to OptoFab
 6pm.....Register and tours
 7pm.....Networking (pizza & drinks)
 8pm.....Close of event

*Put your name on the list available at reception desk on Tuesday July 2.



ANFF - OPTOFAB NODE

Australian National Fabrication Facility
 Providing micro and nano fabrication facilities for Australia's researchers



Thursday, July 4

TIME	SESSION
8.45am	Lecture theatre doors open
9am	Opening remarks Prof Craig Priest, Director, ANFF-SA
9.05am	Sponsor video - Scitek
9.10am	INSIGHT FIVE: Medical Device Partnering Program - case study for success Stephen Blakeney, National Innovations Manager, Medical Device Partnering Program, Flinders University
9.40am	INSIGHT SIX: Microfluidics for biomedical research Dr Nicole Dmochowska, Research Fellow and Biomedical Research Scientist, UniSA
10.10am	MORNING TEA
10.40am	LECTURE FIVE - Micromachining Mark Cherrill, Microfabrication Technologist, ANFF-SA
11.20am	LECTURE SIX - 3D Printing Daniel Williams, Industry 4.0 Testlab Technician, ANFF-SA
12.00pm	LUNCH
12.40pm	UniSA Thin Films lab tour: Dr Marta Illusca
1.10pm	PRACTICAL SESSION FIVE
2.40pm	AFTERNOON TEA
3.10pm	PRACTICAL SESSION SIX
4.40pm	CLOSE OF DAY

Friday, July 5

TIME	SESSION
8.45am	Lecture theatre doors open
9am	Opening remarks Prof Craig Priest, Director, ANFF-SA
9.05am	Sponsor video - EV Group
9.10am	LECTURE SEVEN - Fundamentals of wafer bonding (Online delivery) Dr Thorsten Matthias, Regional Sales Director Asia-Pacific, EV Group
9.50am	INSIGHT SEVEN: Microengineering for Space Technology (Online delivery) Dr Srihari (Hari) Rajgopal, NASA Glenn SiC Technology
10.20am	MORNING TEA
10.50am	LECTURE EIGHT - Packaging Dr Sruthi Choppalli, Research Engineering, Research Technology and Operations Division, DSTG
11.20am	INSIGHT EIGHT: TBA Adjunct Prof Elaine Saunders, Managing Director, Bingarra Scale-Up Solutions
11.50am	Certificate presentation with Prof Craig Priest and Dr Elaine Saunders
12.30pm	PIZZA LUNCH
1.30pm	PRACTICAL SESSION SEVEN
3pm	AFTERNOON TEA
3.30pm	PRACTICAL SESSION EIGHT
5pm	CLOSE OF DAY

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Practical sessions

DETAILS & LOCATION

Practical 1 Photolithography

Presented by: Dr Jing-Hong (Mike) Pai, ANFF-SA and Asad Feroze, UniSA

Location: In this practical, you will follow the spin-coat, expose, and develop processes for microstructure fabrication.
Q Building Cleanroom

Practical 2 Etching

Presented by: Dr Mohamed Amen, ANFF-SA

Location: In this practical you will become familiar with laboratory processes for etching of thin metal layers.
Q Building Cleanroom

Practical 3 CAD modelling and FEA analysis

Presented by: Mark Cherrill and Sudhakar Sujja, ANFF-SA

Location: This practical will cover lithographic mask fundamentals. You will also design parts using 3D CAD software.
MM2-04

Practical 4 PDMS devices

Presented by: Dr Mona Tarek Elsemary, Tekcyte and Sophia Su, ANFF-SA

Location: Hands-on experience casting PDMS on microchannel master structures. Chips will be bonded using plasma and you will test them in our microfluidics laboratory.
MM2-11

DETAILS & LOCATION

Practical 5 Fibre optics

Presented by: Dr Stephen Warren-Smith and Dr Dale Otten, UniSA FII

Location: Dive into fiber optics! This workshop covers fiber optics types like single mode, multi-mode, and more, with hands-on activities including cladding removal, cleaving, and splicing. Participants will learn to measure splice losses and explore applications like Fibre Bragg Grating sensors for temperature and strain sensing.
Q1-16

Practical 6 3D Printing

Presented by: Daniel Williams and Billy Michalatos, UniSA

Location: Introduction to 3D printing from an engineering perspective. You will learn about development and production methods, the various techniques and engineering materials available to achieve the desired properties suited to your application.
MM Building Industry 4.0 Testlab

Practical 7 Characterisation techniques

Presented by: Dr Jason Gascooke, ANFF-SA; Craig Noble, Evident/Olympus; Son Nguyen, Leica Microsystems

Location: Learn how to use a scanning electronic microscope (SEM) to create virtual images for examining a multitude of materials and for quality control/failure analysis. Observe and identify defects in a real device using a range of optical inspection techniques for characterising fabricated devices.
MM1-04

Practical 8 Microelectrodes

Presented by: Igor Switala and Dr Maryam Khaksar, DSTG

Location: Introduction to wafer dicing and bonding. You will also electrically test some heaters made by thin film deposition and lithography.
Q2-12

Generous support for practicals provided by:

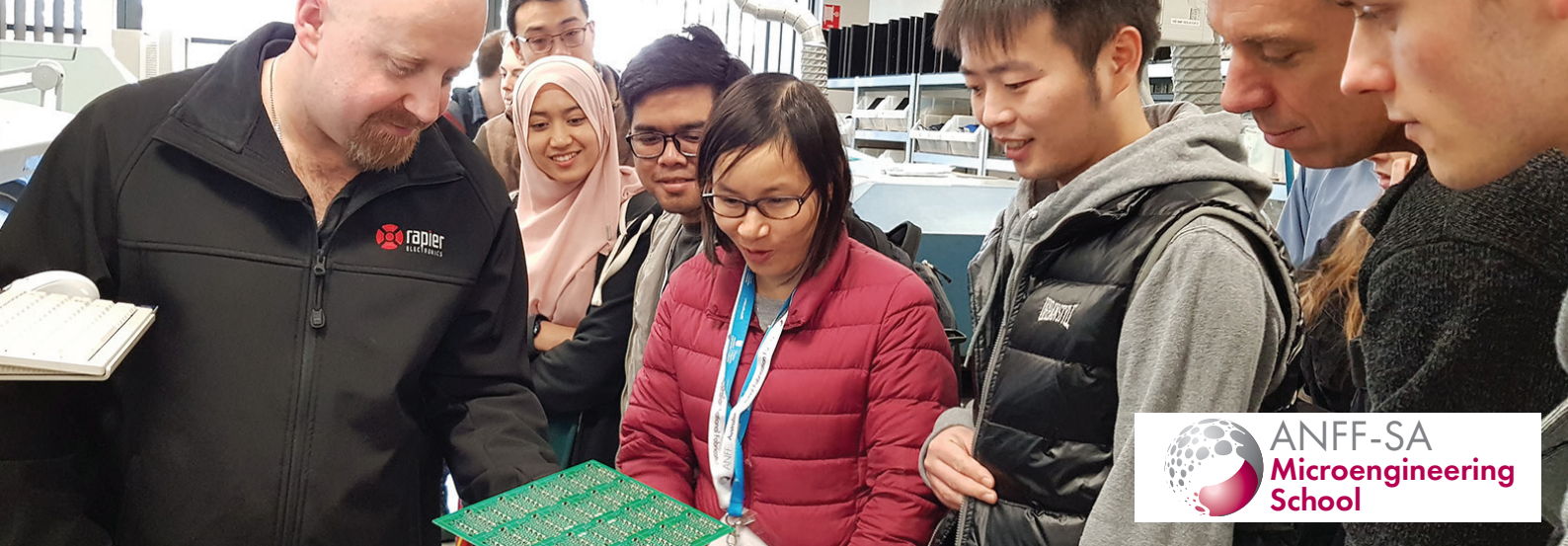


Participants will be allocated a practical session group at registration on Tuesday, July 2.
Practical session schedule

PRACTICAL & LOCATION	PRACTICAL SESSION GROUP NUMBER							
	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY				
	1	2	3	4	5	6	7	8
Photolithography Location: Q2-30	H	G	F	E	D	C	B	A
Etching Location: Q2-30	G	H	E	F	C	D	A	B
CAD modelling and FEA analysis Location: MM2-04	F	E	H	G	B	A	D	C
Fibre optics Location: Q1-16	E	F	G	H	A	B	C	D
PDMS devices Location: MM2-11	D	C	B	A	H	G	F	E
Microelectrodes Location: Q2-12	C	D	A	B	G	H	E	F
3D Printing Location: MM Industry 4.0 Testlab	B	A	D	C	F	E	H	G
Characterisation techniques Location: MM1-04	A	B	C	D	E	F	G	H

Generous support for practicals provided by:





ANFF-SA Microengineering Winter School industry tours

TOUR - TUESDAY JULY 2 FROM 12.40PM TO 1.40PM

Tour 1 Tindo Solar - 5/6-8 Second Avenue, Mawson Lakes



Tindo designs and manufactures technologically advanced solar panels in Australia, for Australia and the world. Tindo Solar is a wholly Australian owned and operated company, founded in 2011, focused on increasing manufacturing output and creating Australian jobs in the advanced manufacturing sector.

Presented by: Robert Sporne, General Manager

TOUR - WEDNESDAY JULY 3 FROM 12.30 TO 1.30PM

Tour 2 Rapier - 9A Park Way, Mawson Lakes



Rapier offer comprehensive Electronics Manufacturing Services (EMS) to cover all of your product needs. From Printed Circuit Board Assembly (PCBA) to Printed Circuit Board (PCB) supply and part procurement for prototyping and product development, volume production for consumer use items right through to critical use, space electronics, no job is too big or too small.

Presented by: Daniel Mason, Operations Manager and Business Development

TOUR - THURSDAY JULY 4 FROM 12.40PM TO 1.10PM

Tour UniSA Thin Films laboratory



The Thin Film Coatings facility in the Future Industries Institute (FII) can be utilised to apply thin films to the final product to improve abrasion resistance, water repellency, anti-reflection and corrosion resistance which important in many industries such as the mining, food and agriculture sectors.

Presented by: Dr Marta Llusca, UniSA Future Industries Institute

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Speaker list for ANFF-SA Microengineering School 2024



Prof Craig Priest - Director, ANFF-SA and Research Leader UniSA Future Industries Institute

Professorial Lead at Future Industries Institute (UniSA) and Director of ANFF-SA – a \$20M advanced manufacturing investment at UniSA and Flinders University, Craig oversees teams of research and technical personnel working on interfacial, physical, and analytical science in micro/nanofluidic devices for new sensing and manufacturing applications. He has been awarded > \$20M of research and infrastructure funding from ARC, NCRIS, AAS, SA Government in collaboration with > 20 industry collaborators in lab-on-a-chip technologies, new sensors, process intensification, and advanced manufacturing.



Dr Jane Fitzpatrick - Chief Executive Officer of the Australian National Fabrication Facility Ltd (ANFF)

Jane supports and fosters world-class research in Australia and the development of the industries, such as Defence, MedTech, Energy and Space.

Jane previously held positions within academia, the MedTech start-up space and industry focused research entities, as well as Board positions for Women in Technology. She holds a PhD in Applied Immunology and a degree in Biotechnology, and added technical expertise in many areas, including micro and nanofabrication.



Dr Judy Halliday - Director, Innovation and Entrepreneurship, Department for Industry, Innovation and Science

With a focus on sustainable economic growth in South Australia, Judy leads a small high-performing team that works closely with scientists, entrepreneurs, research institutions, businesses and startups to bring innovative South Australian research outcomes, products and technologies to global markets.

An inventor, founder, investor, academic and industry professional in the private and public sectors, Judy has more than 25 years of executive and management experience in entrepreneurship and innovation.



Prof Michael Breadmore, University of Tasmania

Director of the Australian Centre for Research on Separation Science, Michael was previously an ARC Future Fellow, QRC QEII Fellow and ARC APD.

He has a national and international reputation for the development of new and novel portable analytical systems with more than 200 peer-reviewed publications, and has supported the release of 5 products at-market – the most recent being Eco Detection's Ion-Q, released for global sales in 2022.



Prof Paul Weber, Department of Physics, Utah Valley University, USA

Faculty member and researcher in thin films physics and nanotechnology pedagogy at Utah Valley University. Paul spearheaded a \$704K National Science Foundation grant project to create virtual reality simulations used as pre-training for laboratory exercises.

As a visiting scholar to the Future Industries Institute, he will continue to develop interests in creating new teaching methods for nanotechnology processes and fostering effective industry/academia partnerships.



Sophia Su, ANFF-SA Microfabrication Technologist

Sophia has a research background in the field of microelectromechanical systems (MEMS) and previously worked at the Taiwan Semiconductor Research Institute (TSRI) for three years. During her time at TSRI, she was responsible for the development and fabrication of pressure sensors and gas sensors.

Sophia joined ANFF in 2021 as a Nanofabrication Technologist and focuses on micro/nanofabrication.



Prof Heike Ebendorff-Heidepriem, Deputy Director, Institute for Photonics & Advanced Sensing, University of Adelaide

Heike received her PhD in chemistry from the University of Jena, Germany and held two prestigious fellowships. In 2001 she received the Weyl International Glass Science Award and joined the Optoelectronics Research Centre at the University of Southampton, UK, before moving to Australia in 2005.

Heike leads the Fibres and Photonics Materials Research group at the University of Adelaide and is Deputy Director of the Institute for Photonics and Advanced Sensing. Her research focuses on the development of novel optical glasses, fibres, surface functionalisation and sensing approaches.

Speaker list for ANFF-SA Microengineering School 2024



Dr Scott Foster, STaR shot Lead, Quantum Assured, Positioning, Navigation and Timing, Defence Science and Technology Group

Obtaining his PhD in mathematical physics from the University of Adelaide in 1996, Scott worked in the opto-electronics industry for three years before joining DSTG as a Research Scientist in 1999. From 2003-2017 he led research into precision photonic sensor technologies for undersea surveillance and, in partnership with defence industry, has developed advanced fibre optic sonar systems. He currently leads national multi-institute initiatives on precision quantum sensing technologies and next generation piezo-electric materials.



Dr Jing-Hong (Mike) Pai, ANFF-SA Senior Process Engineer, UniSA

Mike has a research background in microfluidic design and micro / nano fabrication and extensive experience in manufacturing and product development. Focusing on the development of the multiplex biosensing method, Mike received his PhD in Engineering in 2014, from University of South Australia.

He joined ANFF-SA in 2015 as a Nanofabrication Technologist and is experienced in various micro/nano fabrication methods.



Dr Ben Johnston, ANFF OptoFAB Facility Manager, Macquarie University

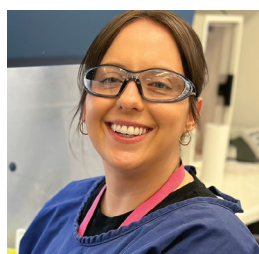
Ben gained a Bachelors of Technology in Optoelectronics in 2004 and a PhD in Physics from Macquarie University in 2008.

Since 2002, Ben has assisted with the running of semi-commercial laser micromachining services, offered by Macquarie University. These facilities and activities form part the Australian National Fabrication Facility, and Ben's role is to provide fabrication solutions for researchers and industry using applied laser technologies.



Stephen Blakeney, National Innovations Manager, Medical Device Research Institute and Medical Device Partnering Program, Flinders University

Stephen is the National Innovations Manager for the Medical Device Partnering Program, MedTech Venture Partner for the Target Translation Research Accelerator, co-lead for Research Translation at the Medical Device Research Institute and a guest lecturer and mentor for the Innovation in Medical Devices topic at Flinders University. Stephen has worked on a wide variety of devices and in his current role he supports medical device companies around Australia, speaking to at least 50-100 medtech start-ups per year and providing advice and guidance on how to commercialise their medical devices.



Dr Nicole Dmochowska, Research Fellow and Biomedical Research Scientist, UniSA

Nicole works closely with Adelaide-based Ferronova to develop cancer imaging technologies. She was awarded a PhD in Medicine at the University of Adelaide and then joined Prof Benjamin Thierry's Bioengineering group at UniSA's Future Industries Institute and her research has focused on developing small molecule tumour targeting imaging contrast agents/nanoparticles aimed at improving the imaging of primary tumour lesions. Nicole is a key member of Ferronova's research team that is building on first generation FerroTrace to develop FerroTrace-FAPi, designed to target the stroma of solid tumours, leading to improved delineation on MRI.



Mark Cherrill, ANFF-SA Microfabrication Technologist, UniSA

Mark joined ANFF-SA after working as a mechanical designer for engineering companies in Adelaide on projects including oil and gas, water purification, rail and naval structures.

Prior to immigrating to Australia, Mark worked as a CNC Machinist/Programmer for the Honda Racing Team and Brawn GP where he completed a BSc in Engineering Design. He also worked in the Mercedes AMG Petronas Team in research and development. Mark's main focus is on the design and manufacture of microfluidic devices and components using the Kira CNC micromilling machine.

Speaker list for ANFF-SA Microengineering School 2024



Daniel Williams, Technician, ANFF-SA 4.0 Industry Testlab

Daniel has worked in the Industry 4.0 Testlab for two years, utilising a suite of industrial 3D printers, including resin, filament, metal and fibre reinforced printers. In addition there are 3D scanners, desktop CNC and mechanical testing equipment. Outside of the testlab he recycles 3D printed plastics and creates his own filament.



Dr Thorsten Matthias, Regional Sales Director Asia-Pacific, EV Group

Prior to his role as Regional Sales Director Asia Pacific, Thorsten was director of business development, specifically focused on 3D integration, MEMS, LEDs and a number of emerging markets.

Thorsten joined EVG in 2002 as product manager for the SmartView wafer bonding alignment system and became director of technology of EV Group North America in Tempe, Arizona.

He received his doctorate degree at Vienna University of Technology with a thesis in solid-state physics in 2002.



Dr Srihari (Hari) Rajgopal, NASA Glenn SiC Technology

Hari joined NASA in 2019 after completing his PhD in Electrical Engineering from Case Western Reserve Univ (CWRU). His current work focuses on the development of an RF SiC power amplifier for the propagation and transmission of signals through the Venus atmosphere.

At CWRU, he worked on several funded projects including a piezoelectric valve and drag force flow sensor for fuel modulation in jet engines, NEMS mechanical switches to lower power consumption in integrated circuits, and Gait-corrected MEMS Inertial Measurement Units for personal navigation in GPS-denied environments.



Sruthi Choppalli, Microfabrication specialist, Research Engineering, Research Technology and Operations Division, DSTG

Sruthi completed her Master's in Biomedical Engineering and Bachelor's in Electronics and Communication Engineering at Andhra University, India. She recently completed her PhD in Biomaterials Engineering and Nanomedicine at University of South Australia and joined the Micro and Nano Engineering team at Defence Science and Technology Group in 2023. As microfabrication specialist, Sruthi's experience includes photolithography and micro packaging techniques including wire bonding, decapsulation and wafer dicing.



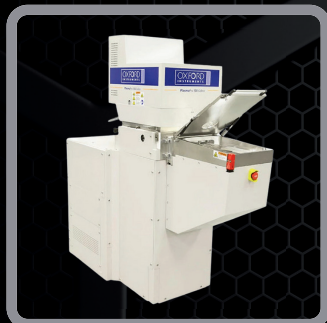
Adjunct Professor Elaine Saunders, FTSE, and Managing Director, Bingarra Scale-Up Solutions

Qualified in science, engineering, business and audiology, Elaine is a director, mentor, and successful entrepreneur. She has worked in the hearing industry, including building a hearing aid manufacturing, retail and telehealth company, for which she won her second Australian Good Design award.

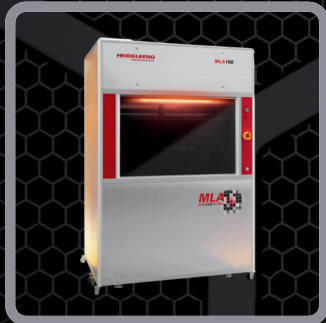
Elaine's personal awards include the AFR/Westpac's Women of Influence, the ATSE Clunies Ross Medal for Entrepreneur of the Year, and the National Telstra Businesswoman of the Year Award (Private & Corporate Sector). Elaine is a Churchill Fellow; an adjunct professor at Swinburne University, an ATSE Fellow; an Honorary Research Fellow at the Bionics Institute; Deputy Chair of the Victorian Pearcey Foundation; an active mentor in STEM and leads a consulting group that helps businesses scale.

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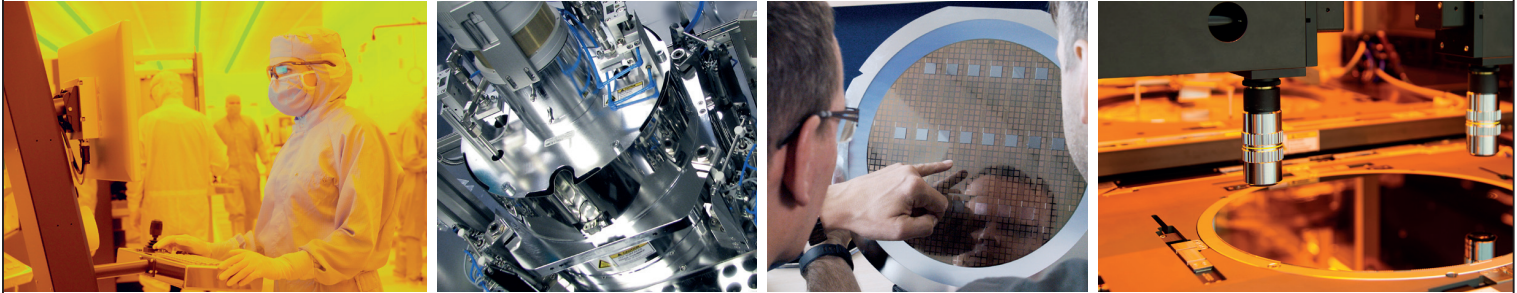
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- Equipment and process training,
- Open access to world-class fabrication capabilities.

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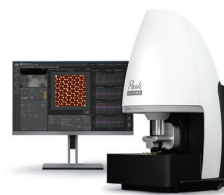
- Plasma Solutions**
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 - Atomic Layer Deposition
 - Vacuum Chambers
 - Evaporative Materials



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