



Annual Report 2018

INSTITUTE FOR PHOTONICS AND ANYANCED SENSING

adelaide.edu.au/ipas

WELGOME.



WE HOPE THAT, THROUGH THE POWER OF LIGHT, WE CAN ENHANCE OUR COMMUNITY'S HEALTH, PROSPERITY AND SAFETY.



The University of Adelaide's institutes are globally recognised for their research quality and extensive connections with industry, government and the wider community. This was reflected in the federal government's 2016 National Survey of Research Commercialisation, which showed we are ranked No. 5 Australian university in total value of contracts, consultancies and collaborations in Australia.

The Institute for Photonics and Advanced Sensing (IPAS) houses over 260 researchers, with backgrounds in physics, chemistry and biology. Together, they are expanding knowledge and creating innovative new technologies to solve problems in areas such as health, the environment, mining and defence.

Combining scientific and technical excellence with a strong external-engagement focus, IPAS facilitates and accelerates industry development. Some of its key existing partnerships include: the Defence Science and Technology Group; the South Australian Government; Silanna and global analysis-technology company Trajan Scientific and Medical.

If you share the institute's vision to make the world a safer, healthier and wealthier place using the power of light, you'll find no better partner.

Professor Peter Rathjen

Vice-Chancellor and President The University of Adelaide

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INTRODUCTION FROM THE PROVOST AND DEPUTY VICE-CHANCELLOR (RESEARCH)



A strong commitment to research excellence has defined the University's history, and our research mission will be increasingly important in a world defined by accelerated knowledge creation and transition to an information-based economy.

The University's research institutes showcase and strategically support some of our finest talent in pursuit of multidisciplinary, large-scale research and innovation outcomes, with the capacity to pursue higher-risk, cutting-edge projects.

The Institute for Photonics and Advanced Sensing (IPAS) brings together a significant number of researchers, working towards creating knowledge and disruptive new technologies to solve problems in areas including health, the environment, mining and defence. One of its major strengths is combining scientific and technical excellence with a track record of strong external engagement to facilitate industry development.

2018 has been another remarkable year of research activity and successful outcomes at IPAS, whose talented researchers have continued to win prominent grants and prizes acknowledging the excellence of their research and its global impact. The prestigious awards include the Defence Science and Technology Eureka Prize for Outstanding Science in Safeguarding Australia, the Australian Institute of Physics Alan Walsh medal, the South Australian Tall Poppy of the year award and a place in the Top 10 innovators Under 35 competition in the Asia Pacific region.

IPAS has an inspirational culture, deeply rooted in engagement, whether with university stakeholders, industry partners, students of all ages or the broader community. IPAS members strive to inspire communities and future generations of scientists through exciting outreach activities and showcasing the incredible research taking place in their labs. The first IPAS Research Open Day was a great success in 2018, welcoming more than 200 excited external visitors to the North Terrace campus.

This report provides an overview of the substantial range of high-quality activities undertaken throughout 2018. It provides excellent examples of how world-class fundamental research can be undertaken in partnership with industry for the greater benefit of society.

32 Ras

Professor Mike Brooks Provost and Deputy Vice-Chancellor (Research)



260+ MEMBERS



4 HONOURS STUDENTS 16 MASTER-DEGREE STUDENTS 71 PHD STUDENTS

REPORT FROM THE BOARD CHAIR



2018 was the ninth year of operation for IPAS. It was a highly productive year for IPAS and again demonstrated the Institute's trend of increasing outputs from its researchers, as outlined in this report. Specific highlights include:

- A record \$15M annualised research funding, 40% coming from industry-linked work
- 20% increase in research and industry collaboration, including the formation of new domestic and international relationships
- Growth in IPAS membership to over 260 members

The substantial growth and capabilities of the Institute demonstrate that IPAS is tracking well in the key research strategies of IPAS excellence, innovation, global and enabled.

The University's new strategic plan, Future Making, highlights its commitment to supporting Institutes' growth, by increasing investment to build the scale needed to compete globally. A key role for the IPAS Board during 2019 will be to ensure close alignment between IPAS future directions and the new strategic goals of the University.

I would like to acknowledge and thank my fellow members of the IPAS Board, IPAS Director Prof Andre Luiten, the IPAS Executive Team, and the researchers, staff and students for their tireless and instrumental contributions.

Dr Warren Harch *IPAS Board Chair*



RESEARCH WITH MADACT

At IPAS we give businesses and organisations a competitive advantage through next-generation technologies offering greater sensing reach and more precise measurement.

Our engagement with industry ranges from solving specific end-user problems to providing access to cutting-edge manufacturing infrastructure for proof-of-concept materials and prototype devices.

This work's outcomes and impacts, some of which you'll learn about in the following pages, range from scientific discoveries and innovations, to spin-out companies and job creation. Over 40 per cent of our income is connected to industry. The Institute for Photonics and Advanced Sensing drives a transdisciplinary approach to science and excellence in research through the development of disruptive new sensing and measurement technologies.

Our areas of strength

IPAS's industry-leading research is focused on six key areas:

- Defence and Security
- Space Science & Astrophysics
- Health and Biotech
- Energy, Mining and Resources
- Advanced Manufacturing
- Agri-food and Wine



Outstanding transdisciplinary headquarters

Our \$96M headquarters, The Braggs, is a unique transdisciplinary University of Adelaide building that enables IPAS researchers to be co-located with students from a broad range of scientific fields.

The building also houses a similarly wide range of state-of-the-art facilities. These support research in:

- precision measurement—time, temperature and frequency
- photonic sensor development
- advanced manufacturing, including 3D ceramic and metal printing
- glass and optical-fibre development and processing
- laser development
- luminescence dating and radiation measurement
- synthetic and surface chemistry.

IPAS TRANSDISCIPLINARY RESEARCH ECOSYSTEM

		Scientific Discoveries
Defence & Security	Photonics	New Jobs
Space Science & Astrophysics	Biophotonics	Training
Health & Biotech	Nanotechnology Quantum —	Productivity Enhancement
Sustainable Energy, Mining & Resources	Entrepreneurship	Innovations
Advanced Manufacturing	Glass and Optical Fibres 3D Metal Printing	Advanced Products
Agri-food & Wine	Surface and Material Sciences	Spin-Outs

Themes

Capabilities

Impact

The University of Adelaide 7

IPAS's vision is to develop innovative sensors to make the world healthier, wealthier and safer. I think you can see from the stories contained in this document that we are accomplishing across the spectrum of our vision.

Professor Andre Luiten, FAIP GAICD, Chair of Experimental Physics

MEET OUR Director

Professor Andre Luiten, FAIP GAICD *Chair of Experimental Physics*

Andre has been a high-achiever from the outset. In obtaining his PhD in Physics from the University of Western Australia, he was awarded the Australian Institute of Physics' 1997 Bragg Gold Medal, recognising his thesis as the year's best by a physics student at any Australian university.

Between 1997 and 2013 he held three ARC fellowships, collecting the inaugural Western Australian Premier's Science Award for early-career achievement in science along the way (2002 joint winner). He joined the University of Adelaide as Chair of Experimental Physics in 2013, and just 12 months later was appointed to lead IPAS.

In 2017 Andre received the Barry Inglis Medal from Australia's National Measurement Institute for developing the remarkable 'Sapphire Clock', the world's most precise timekeeping device; and in 2018 he and his IPAS team won the Australian Museum's Defence Science and Technology Eureka Prize for Outstanding Science in Safeguarding Australia. This recognised their important work integrating the Sapphire Clock into the Australian Defence Force's over-the-horizon radar network (see overleaf).

In 2018 Andre was awarded the Australian Institute of Physics Alan Walsh Medal for Service to Industry and in 2019, Cryoclock, Andre's spin-out company won the Defence SME Innovation Grant at Avalon 2019.

Andre has published six book chapters, authored over 100 journal papers and been cited more than 4100 times.

IPAS EXECUTIVE COMMITTEE



Prof Andre Luiten IPAS Director



Prof Heike Ebendorff-Heidepriem IPAS Deputy Director



Piers Lincoln IPAS Institute Manager



Elodie Janvier IPAS Strategic Research Development Manager



Sara Leggatt IPAS Senior Office Administrator & Executive Assistant Manager



Thanh Nguyen e Research Support & Marketing nt Officer



Luis Lima-Marques IPAS Laboratory Manager



Prof Robert McLaughlin



Prof David Ottaway



Dr Erik Schartner IPAS Science Network Committee Co-Chair



Dr Ruth Shaw IPAS Science Network Committee Co-Chair



Melissa Coleman Administrative Assistant

IPAS BOARD



Dr Warren Harch Chair



Mr Neil Bryans



Dr Andrew Dunbar



ınbar Dr Peter Fisk



Dr Cathy Foley



Dr Amanda Heyworth



Prof Michael Liebelt



Prof Julie Owens



Mr Piers Lincoln Secretary

IPAS SCIENTIFIC LEADERSHIP COMMITTEE



Prof Andre Luiten



Prof Heike Ebendorff-Heidepriem



Prof Andrew Abell



Prof Mark Hutchinson



Prof Dusan Losic



Prof Robert

McLaughlin



Prof David Ottaway



Prof Nigel Spooner



Prof Yvonne Stokes



Prof Martin Lambert



Prof Christian Doonan



Prof Carolin Plewa





A/Prof Tara Pukala



A/Prof Reza Ghomashchi



A/Prof Gavin Rowell



A/Prof Tak Kee



Dr Jiawen Li



Dr John Bruning





Dr Ori **Henderson-Sapir**



Dr Abel Santos



Dr Tom Avery











Dr Ruth Shaw



Dr Georgina Sylvia

Dr Philip Light



Dr Sanam Mustafa



Dr Stephen Warren-Smith



Mr Luis Lima-Marques



Dr Steven Wiederman



Dr Giuseppe Carlo Tettamanzi





THE IPAS STUDENT EXPERIENCE

Study at IPAS

IPAS Honours, Masters and PhD opportunities are world-class and guided by research scientists who are global leaders in their field. As well as working on blue sky research, we also work in partnership with government and industry on projects aimed at delivering real-world outcomes e.g. new products and starting new technology companies. Our graduates have gone on to postdoctoral roles at leading research organisations worldwide, while others have started up companies based on their research or have secured employment with industry partners or defence organisations (including Trajan Scientific and Medical, Ellex, Schlumberger, BAE Systems, Australian Bureau of Statistics, Maptek, Coherent, Lastek, the Defence Science and Technology Group and the Australian Antarctic Division).

OUR GRADUATES HAVE GONE ON TO POSTDOCTORAL ROLES AT LEADING RESEARCH ORGANISATIONS WORLDWIDE

IPAS Science Network

The Science Network has been created to strengthen the bond between science disciplines of the University and bring together members and non-members of IPAS for networking events and professional development activities. The IPAS Science Network represents the needs of the students and ECRs within IPAS, with the added focus of supporting students in all aspects of their postgraduate experience. The co-Chairs of the Science Network sit on the IPAS Scientific Leadership and Executive Committees.

IPAS SCIENCE NETWORK COMMITTEE



Dr Ruth Shaw Co-chair



Dr Erik Schartner Co-chair



Dr Akash Bachuka



Dr Ben Sparkes



Dr Georgina Sylvia



Dr Jiawen Li



Dr Stephen Warren-Smith



Dr Tom Avery



Milad Abou Dakka



Mohammad Shafiq Rahman



Rebecca Frkic



Sarah Scholten



Craig Ingram



Elodie Janvier



Thanh Nguyen

STUDENT PRIZES

Students were invited to present their 2018 research in a three-minute talk. The Tanya Monro best presentation prize and the Merry Wickes- sponsored transdisciplinary prize, both worth \$500, were on offer.

The winners were announced at the IPAS annual New Year event. We would like to thank Merry Wickes for her ongoing support of the transdisciplinary prize.

- Ms Aimee Horsfall, PhD student Tanya Monro Best Student Oral Presentation Prize
- Mr Tom de Prinse, PhD student Merry Wickes Transdisciplinary Oral Presentation Prize

Ms Aimee Horsfall, PhD student

I work under Prof. Andrew Abell and Dr. John Bruning, with a view to develop a lead compound for a new class of cancer therapeutic. I am interested in a protein called PCNA, which plays a central role in DNA-replication, and is consequently implicated in many cancers. We are investigating how PCNA interacts with other proteins required for DNA replication. I synthesise peptides (short pieces of protein) which mimic these protein-protein interactions, and then change individual peptide components to observe how the interaction with PCNA is affected. This information helps us to design new therapeutics which inhibit PCNA interactions and thereby stop DNAreplication in over proliferative cells, such as in cancer. Our approach has selectivity for cancer cells over healthy cells, which will help minimise the side-effects often observed in traditional chemotherapy treatment.

IPAS provides a great cross-disciplinary environment that we are immersed in on a daily basis. This provides many opportunities to practice communicating your research to people outside of your own discipline, and results in exposure to many different views and techniques, which might not have been encountered otherwise. I believe it is these opportunities which help give rise to, and nurture much of the excellent research conducted at the Institute.





Ms Aimee Horsfall, recipient of the Tanya Monro Best Student Oral Presentation Prize





Mr Thomas de Prinse, recipient of the Merry Wickes Transdisciplinary Oral Presentation Prize

Mr Thomas de Prinse, PhD student

My project, under Prof. Nigel Spooner and Assoc. Prof. Tak Kee looks at using novel fluorescence to detect signatures from molecules of interest. The detection technique relies on anti-Stokes emission, in which the excitation light is of lower energy than what is detected. Using this technique, I am working towards detecting and analysing a vast range of molecules including explosives, environmental contaminates and complicated organic mixtures.

The value of spectroscopic analysis of materials is that it is rapid, has minimal interference with a process and can be done without physically approaching a sample. Having a technology that can readily distinguish particular chemicals, while remaining a distance of several meters away, is the end goal for explosives detection.

IPAS has allowed me to work on an exciting project very much on the edge between physics and chemistry. Having great colleagues with specialities in various areas across optics, applied spectroscopy, sensing and laser science allows for efficient problem solving and development of new ideas that would not have been considered inside of a single discipline.

CONGRATULATIONS

HE SAPPHIRE CLOCK



Defence Science and Technology Eureka Prize

Congratulations to Sapphire Clock team for being awarded the 2018 Defence Science and Technology Eureka Prize for Outstanding Science in Safeguarding Australia, one of 16 prizes awarded in Sydney Townhall on Wednesday 29 August 2018.



Prestigious Alan Walsh Medal awarded to Prof Andre Luiten

Prof Andre Luiten was awarded the prestigious 2018 Australian Institute of Physics Alan Walsh Medal for Service to Industry. This medal not only recognised Prof Luiten for his outstanding research in photonics and optics but also for his exceptional leadership in commercialising breakthrough research to support industry needs.



One of Top 10 Innovators under 35 in the Asia Pacific region

Dr Jonathan Hall was named as one of the Top 10 innovators in the MIT Technology Review Innovators under 35 competition for the Australia, Hong Kong, New Zealand, Southeast Asia and Taiwain region. Dr Hall, the director of and co-founder of Life Whisperer, has developed an AI-driven, cloud-based image analysis system to improve the selection of viable embryos for IVF implantation.



EO Tuck Medal Award for Prof Yvonne Stokes

Congratulations to Professor Yvonne Stokes, who was awarded the EO Tuck medal for outstanding research and distinguished service to the field of Applied Mathematics. The medal is awarded by ANZIAM (Australia and New Zealand Industrial and Applied Mathematics).



Best Biosensor Oral Presentation

Congratulations to Dr Stephen Warren-Smith for being awarded "Best Biosensor Oral Presentation" at the Emerging Sensing Technologies Summit in Melbourne, 24-26 September 2018.



IPAS DECRA named SA Tall Poppy of the Year

Congratulations to Dr Ben Sparkes for being named South Australian Tall Poppy of the Year at the 2018 SA Government Science Excellence Awards. Dr Sparkes was also awarded the prestigious Fulbright Future Scholarship which allows him to work with Prof Alex Gaeta at Columbia University in New York City on a project titled "Changing Colours in Optical Fibres: The Key to Long-Distance Quantum-Secured Communications".



2018 Warsash Science Communication Prize

Congratulations to Ms Sarah Scholten who won the 2018 Warsash Science Communication Prize in Optics for communicating the significance of her paper to a casual reader outside the field. "Number-Density Measurements of CO2 in Real Time with an Optical Frequency Comb for High Accuracy and Precision".



IPAS ECR wins the Heart Foundation Postdoctoral Fellowship

Congratulations to Dr Jiawen Li who successfully won the Heart Foundation Postdoctoral Fellowship. Dr Li was also awarded the 2018 FHMS Executive Dean Award for Research Excellence and a successful recipient for the 2018 FHMS Emerging Leadership Mentored Development Program. Dr Li's research has focused on developing a novel high resolution imaging tool to detect high risk plaques, one of the most common cause of heart attack.



People Choice Award at CRC ORE Annual Assembly

Congratulations to Ms Jillian Moffatt who won the "People's Choice Award" at the CRC ORE Annual Assembly 2018 for her poster "Novel Fluorescence Signatures from Minerals".



IPAS Researcher awarded ARC Future Fellowship

Congratulations to Prof Mark Hutchinson and Dr Steven Wiederman who have been successfully awarded ARC Future Fellowship. Prof Hutchinson is awarded \$998,125 for the project "Measuring pain in livestock: mechanisms, objective bio markers & treatment" while Dr Wiederman is awarded \$857,189 for "From insects to robots: how brains make predictions and ignore distractions"



IPAS welcomes Ramsay Fellow

Congratulations to Dr James Quach for being awarded the 2018 University of Adelaide Ramsay Fellowship. James joins the IPAS Precision Measurement Group, leading the project with the aim to harness the unique properties of quantum mechanics to build the world's first quantum battery, a new super battery with the potential for instantaneous charging.

INNOVATIONS IN PLAY

Developing new sensing technologies that push the boundaries of accuracy, sensitivity and sample volumes.

World's most precise clock boosting Australia's defence

Originally conceived by IPAS Director Andre Luiten and refined with institute colleagues, the 'Sapphire Clock' is 1000 times more accurate than any competing timekeeping technology.

Properly described as a cryogenic sapphire oscillator, it will lose or gain just one second every 40 million years; and it's giving the Australian Defence Force (ADF) a step-change performance improvement in one of our most vital national-security assets. The remarkable device, which uses a synthetic sapphire crystal's natural resonance frequency to maintain a steady oscillating signal, is being integrated into the ADF's Jindalee Over-The-Horizon Radar Network (JORN). Its inclusion will enable the already world-leading network to identify targets that are smaller, further away and moving more slowly.

Testing will continue in 2019, as will the IPAS team's work on two other JORNsupporting technologies: ultra-low-noise synthesis technology, which converts the Sapphire Clock's signals into radar-suitable frequencies; and signal dissemination technology, which lets JORN deliver pure signals through optical fibre from all network locations.







Groundbreaking 'Smart Needle' making brain surgery safer

IPAS member and University of Adelaide Chair of Biophotonics Professor Robert McLaughlin and colleagues have developed a novel imaging probe so small that it can be encased within a hypodermic needle.

Developed in collaboration with the Australian Research Council Centre of Excellence for Nanoscale BioPhotonics, the technology enables neurosurgeons to see blood vessels in a patient's brain as the needle is inserted, and avoid causing potentially fatal bleeds.

The probe contains a hair-sized fibre-optic camera that shines infra-red light. It sends live images to a computer, where custom-designed software—also developed at the University—immediately recognises vulnerable blood vessels and alerts the surgeon.

The probe was recently trialled with 11 patients undergoing brain surgery and the results published in the prestigious scientific journal Science Advances (Ramakonar et al., "Intraoperative detection of blood vessels with an imaging needle during neurosurgery in humans," Science Advances, 4(eaav4992), 2018).

Patented in the USA and under examination in Europe, the transformational technology will be manufactured in South Australia by spin-out company Miniprobes Pty Ltd (see page 11).

Ultra-high-temperature photonic sensor enhancing industrial efficiency

IPAS has co-created a revolutionary silica 'microstructured' optic-fibre sensor that enables significantly higher temperature measurement within industrial furnaces, facilitating greater efficiency, reduced emissions and longer component lifespans.

Developed in partnership with South Australian engineering company SJ Cheesman, the new sensor operates effectively in conditions up to 1300°C, up from just 250°C for traditional fibre-based temperature sensors (known as 'fibre Bragg gratings'). The technology also offers other important improvements supporting multipoint sensing in challenging locations: greater corrosion resistance; smaller size; and zero electromagnetic interference.

IPAS partnered with Mitsubishi Heavy Industries (MHI) in 2017 to commercialise the technology and it's currently being integrated into MHI's world-leading power systems.

RESEARCH SPIN-DU

MIRAGE Photonics

Mirage Photonics Pty Ltd commercialises IPAS-developed cutting-edge mid-infrared (mid-IR) fibre lasers for advanced research-and-development and atmospheric and environmental sensing applications.

The company's first product is the Mid-IR MFL-3500, a continuously tuneable $3.5 \,\mu\text{m}$ mid-IR fibre laser. Operating at room temperature and featuring broadband tuning, the MFL-3500 provides a new benchmark in efficiency and portability for $3.5 \,\mu\text{m}$ laser sources, with excellent beam quality.







CRYOCLOCK

Cryoclock Pty Ltd commercialises the institute's exceptional Sapphire Clock technology. Cryoclock will supply the ADF with multiple units for use in the nation's Jindalee Over-the-Horizon Radar Network, pending successful field tests.

The company is also fielding significant interest from quantumcomputer manufacturers seeking to boost their machines' performance. In 2019 Cryoclock began commericalisation of its technology.



MINIPROBES

Miniprobes Pty Ltd commercialises high-precision, low-cost optical scanning technology developed at IPAS. The company's initial focuses will be producing and distributing the Smart Needle (see page 9) and the 'Miniprobe' —a handheld device ideally suited for the livestock industry.

The Miniprobe provides high-resolution imaging under the skin. With seed funding from the South Australian Government, the company is pursuing applications in the sheep and cattle industries where their probes are able to provide farmers with new insights into animal selection, identifying livestock with improved production capacity or greater heat resilience in the hot Australian climate. They are working with investors to release an initial commercial product for the sheep industry by 2021. OPTOFAB FACILITES FACILITES AT IPAS

Optofab – Facilities in Adelaide

Optofab – Facilities in Adelaide specialises in optical fibre, glass and functional optical materials production. The range of key services offered include:

- Soft glass fabrication
- Soft and hard glass and polymer preform extrusion
- Doped silica preform fabrication
- Soft glass fibre drawing, including microstructured fibres
- Silica fibre drawing, including microstructured fibres
- Surface functionalisation of glasses and fibres
- Scanning Near Field and Atomic Force Microscopy (SNOM/AFM)
- DMG DMU-20 Linear Ultrasonic, 5-axis milling machine with ultrasonic milling capability for machining of glass, ceramics and metals
- 3D printing metals and ceramics

5-Axis Ultrasonic Mill

New high-tech materials and the higher demands being placed on surface quality and precision have made the utilisation of new manufacturing technologies and machining methods indispensable.

DMU-20 Linear Ultrasonic Mill offers the perfect solution by combining precision and versatility at a level of efficiency that was inconceivable only a few years ago. Specialised machining requirements are now available for soft, hard and advanced high-performance materials, which have been traditionally difficult to machine.

3D Metal and Ceramic Printer

3D printing facilitates rapid prototyping and manufacturing, allowing for the fast availability of functional prototypes for product development, as well as on demand manufacturing for research projects and industry requirements. 3D printing complements traditional development and manufacturing methods, reducing the time and cost of designing metal or ceramic parts by printing them directly from digital input. In September 2014, IPAS commissioned a Phenix PXM (3D Systems ProX 200) selective laser melting printer, which is now available to both Researchers and Industry for their 3D printing requirements.

Accessing the Facilities

The ANFF seeks to enhance national and international collaborations and enable world-class research by providing access to specialised facilities. Direct access to instrumentation is provided at an hourly rate or via a Fee-for-Service basis. Research Collaborations, Contract R&D and Consulting are also welcomed. Dedicated staff are on hand to discuss your requirements and assist accessing these leading-edge research capabilities.

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IPAS RESEARCH FACILITIES





The Braggs is a unique transdisciplinary building that enables the co-location of IPAS researchers and students from a broad range of scientific disciplines and facilities including:

- Precision measurement of time, temperature and frequency
- Photonic sensor development
- Advanced manufacturing including 3D ceramic and metal printing (ANFF Optofab)
- · Glass and optical fibre development and processing
- Laser development
- Luminescence dating and radiation measurement
- Synthetic and surface chemistry.

The Braggs is an accelerator facility, designed to speed up the pace of research by bringing together all the people working in these disparate disciplines and providing them with facilities required to progress further than would be possible in a traditional physics or chemistry lab. For example, we now have the ability to bring clinical samples into the laboratories to test them using new measurement tools developed within our labs, a critical enabler for our new ARC Centre of Excellence for Nanoscale BioPhotonics.

Other world-class research facilities underpinning the vital research conducted by IPAS members include:

- The Adelaide Proteomics Centre
- The STARR Lab (Reproductive BioPhotonics)
- Atmospheric Physics Buckland Park
- Advanced LIGO and the Gingin Facility
- Bragg X-ray Crystallography Facility

These facilities service the needs of IPAS researchers and offer contract services to researchers and companies across the world.

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PROF HEIKE EBENDORFF-HEIDEPRIEM

IPAS Deputy Director and Deputy Director of the Optofab node of the Australian National Fabrication Facility (ANFF)

Prof Heike Ebendorff-Heidepriem is Deputy Director of the Institute for Photonics and Advanced Sensing (IPAS) and Deputy Director of the Optofab node of the Australian National Fabrication Facility (ANFF). She is a Senior Investigator of the ARC Centre of Excellence for Nanoscale BioPhotonics (CNBP). In 2017 she became a Fellow of the Optical Society of America, an honour awarded by peers for having "made significant contributions to the advancement of Optics".

Heike obtained her PhD in chemistry from the University of Jena, Germany in 1994 and subsequently held two prestigious fellowships. From 2001-2004 she was with the Optoelectronics Research Centre at the University of Southampton, UK. Heike came to the University of Adelaide in 2005. She was awarded the Woldemar A. Weyl International Glass Science Award in 2001, the International Zwick Science Award in 2009, the University of Adelaide Women's Research Excellence Mid-Career Award in 2015, and the Winnovation SA Technology Award from the SA Women in Innovation and Technology in 2017. Heike has published over 290 refereed journal papers and conference proceedings, including 5 review papers and 9 postdeadline papers, and raised over \$24M in research funding. Heike's research focuses on the development of novel optical glasses, fibres, surface functionalization and sensing approaches.





OUR PARTNERS





HOW WE Can Help

At IPAS we're striving to establish our institute as a thriving research-anddevelopment hub for the local and broader photonics industry, and all who benefit from it. In doing so we seek to enhance our state's —and nation's—advanced manufacturing capabilities and global competitiveness, and create significant employment opportunities.

As part of this mission, we would be delighted to apply our capabilities in support of your own business's or organisation's goals. Partnering with IPAS will give you access to the world-class expertise and stateof-the-art facilities required to elevate your research and development to the next level.

So if you're ready to take that step, don't hesitate.

CONTACT US

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