Senator Kim Carr, Minister for Innovation, Industry, Science and Research

Hon Maxine McKew, Member for Bennelong

Professor Margaret Sheil, ARC CEO

Vice-Chancellors & DVCRs

Professor Richard Coleman & the Super Science Fellowships team

I am thrilled to be here at the announcement of the results of the first ever Super Science Fellowship scheme. This is an exciting new approach to nurturing the development of our next generation of scientists.

For me, the chance to apply for Super Science Fellowships came as the perfect opportunity to build capacity in the area of transdisciplinary sensing research and to nurture emerging collaborations that I think have the potential to create high value, industries for Australia. Let me start by giving you a little background.

Over the last few years, The University of Adelaide has established 5 new research institutes as a way of focussing resources within areas of demonstrated research excellence with the capacity of making an impact and for growing our research. One of these institutes is IPAS, The Institute for Photonics & Advanced Sensing. IPAS was officially launched in November 2009, and I am its inaugural Director.

In late 2008, in the first round of the Federal Government HEEF (now EIF) scheme, IPAS was awarded $29M for the construction of a new research facility at The University of Adelaide. A further $5M has been invested in this facility by the SA State Government, an additional $1.5M by Defence SA, and DSTO are also partners in this venture.

The Institute for Photonics & Advanced Sensing has been founded on the success of the Centre of Excellence Photonics and the optical fibre research capabilities within this centre. This centre was established as part of a strategic alliance between the University of Adelaide and DSTO in 2005.

IPAS brings together physicists, chemists and biologists to pursue a new transdisciplinary approach to science. IPAS is developing novel photonic, sensing and measurement technologies that will change the way science is done within some scientific disciplines, stimulate the creation of new, high-value future industries, and inspire a new generation of scientists to be engaged in solving real-world problems. The award of 6 SuperScience Fellowships to IPAS is a perfect vehicle for driving this vision forward.

IPAS aim's to create disruptive new technologies for 4 areas: defence & national security, environmental monitoring, health and medical diagnostics and food and wine.

Imagine if in the future we could drive forward our fundamental understanding of biological systems by having physicists, chemists and biologists working side by side to create new approaches to measurement rather than having to rely on being the first people to get their hands on a new commercial measurement solution. Or having access to devices at the point of care with the power to provide real-time diagnostics without the costs and delay associated with sending samples off to centralised diagnostics labs.

IPAS research is already showing that this is possible.

Another example is work we have done that has recently led to the first sensor capable of detecting Aluminium ions in samples volumes of less than 10nL. This required a unique blend of new research in chemical synthesis, surface science and optical fibre sensing. This work paves the way towards smart structures, and in particular the remote detection of corrosion.

Just last month we patented a powerful new sensing approach capable of detecting swine flu in near-real time. This brought together concepts from optical physics, surface chemistry and microbiology together.

This is just a glimpse of the research going on within IPAS today, and I would like to take this opportunity to pay tribute to the wonderful staff & students of IPAS and our collaborators.

Today marks an exciting step forward for IPAS, because the award of these SuperScience Fellowships enables us to build and strengthen partnerships, both across discipline areas, and to end-users, thus driving forward both innovative science and enabling the development of Future Industries.

I would like to give you a flavour of the SuperScience Fellowships that have been awarded to IPAS today:

In Round 1, 3 fellowships have been awarded for the development of "Disruptive approaches to biological sensing"

The fellowships in this round focus on developing new fibre-based sensing architectures for sensing biomolecules with the potential to be sensitive, selective, fast and compact.

The 1st SuperScience Fellowship aim to develop a new class of sensor based on introducing resonance techniques to established capillary electrophoresis methods. If successful, this has the potential to create tools that are practical enough to work in real biological fluids, and sensitive enough that will provide insight into conditions such as cancer, Alzheimer's and Parkinson's disease.

The 2nd SuperScience Fellowship is focused on developing a new architecture for enhancing the interactions between light and matter by creating devices for optical-fibre-based cavity ringdown spectroscopy. If successful, this will underpin the development of tools for rapid biological fingerprinting.

The 3rd SuperScience Fellowship will develop light-driven nanomachines that can be located on the glass surface within micro and nano-structured optical fibres. The central idea to is create a new type of nanomachine-based sensor that can be remotely controlled via light. For example, these sensors will allow reversible analyte binding and light-assisted expulsion of the analyte after sensing.

In Round 2, 3 fellowships have been awarded to focus on the development of "Transformational Diagnostics"

This is a novel and ambitious suite of collaborative projects that focus on solving pressing problems in reproductive health, forensics and explosives

The 1st SuperScience Fellowship will work, in partnership with Reproductive Health Researchers, on probing "The Seed & the Soil". The Seed being the embryo: creating new ways of monitoring the viability of embryos prior to implantation. The Soil being tests for endometrial receptivity, which cannot currently be done without disturbing it.

Working with genomics researchers, the 2nd SuperScience Fellow will focus on developing field tools for rapid blood typing at crime scenes.

The 3rd SuperScience fellow will collaborate with Defence Scientists from DSTO to develop new tools for the rapid detection of trace quantities of explosives.

BioInnovation SA has generously provided support to these Round 2 fellowships to accelerate our understanding of the commercial potential of these new diagnostic technologies, and to facilitate the translation of this emerging science to practical outcomes.

Each of the fellows will receive a generous $50k pa support package to enable them to drive forward their research. These Fellowships provide a wonderful combination of a critical mass of excellence in sensing research, the rich transdisciplinary environment within IPAS, access to NCRIS-supported infrastructure for Speciality Fibre Fabrication and Surface Functionalisation, and access to collaborations nationally and internationally. In addition, the University of Adelaide is providing 6 new dedicated research scholarship as a way of further enhancing this area of research, providing the Fellows with extra capacity for delivering outcomes of potential benefit to industry as well as providing the students with an enriched learning experience.

Thank you to all my colleagues who worked with me to put together this exciting suite of project.

Thank you to you Minister Carr, and the ARC for this support.