



THE UNIVERSITY OF
**WESTERN
AUSTRALIA**

Health and
Medical Sciences

Research Highlights 2018



UWA Faculty of Health and Medical Sciences

Advancing the health and wellbeing of communities through education and innovation

The Faculty of Health and Medical Sciences (HMS) offers courses, training and research opportunities in a range of scientific and clinical disciplines to benefit the health of Australian and international communities. Our Faculty has an important role in delivering knowledge and discoveries to guarantee we have healthy futures. We strive to deliver research-led teaching in high-quality facilities and are supported in this venture by leading academics, valued alumni and expert health professionals. We offer our students a world-class student experience and education.



Medical School

Research spans the breadth of medical issues and is carried out in laboratories, hospitals and communities in WA, Australia and internationally.



Dental School

Using state-of-the-art facilities, our research contributes to the understanding of oral diseases, their prevention and treatment.



School of Allied Health

Our research aims to improve the expertise of our future health professionals and patients.



School of Biomedical Science

Research in this area explores the intersection of human disease and health.



School of Population and Global Health

We take an evidence-based approach through research, advocacy and health promotion to protect and improve the health of communities.

HMS key research areas:

- Cancer
- Cardiometabolic medicine
- Infection and immunity
- Ageing and regenerative medicine
- Maternal and developmental health
- Adult and paediatric oral health
- Ophthalmology/visual science
- Population and public health
- Rural, remote and indigenous health

HMS 2018 global snapshot:

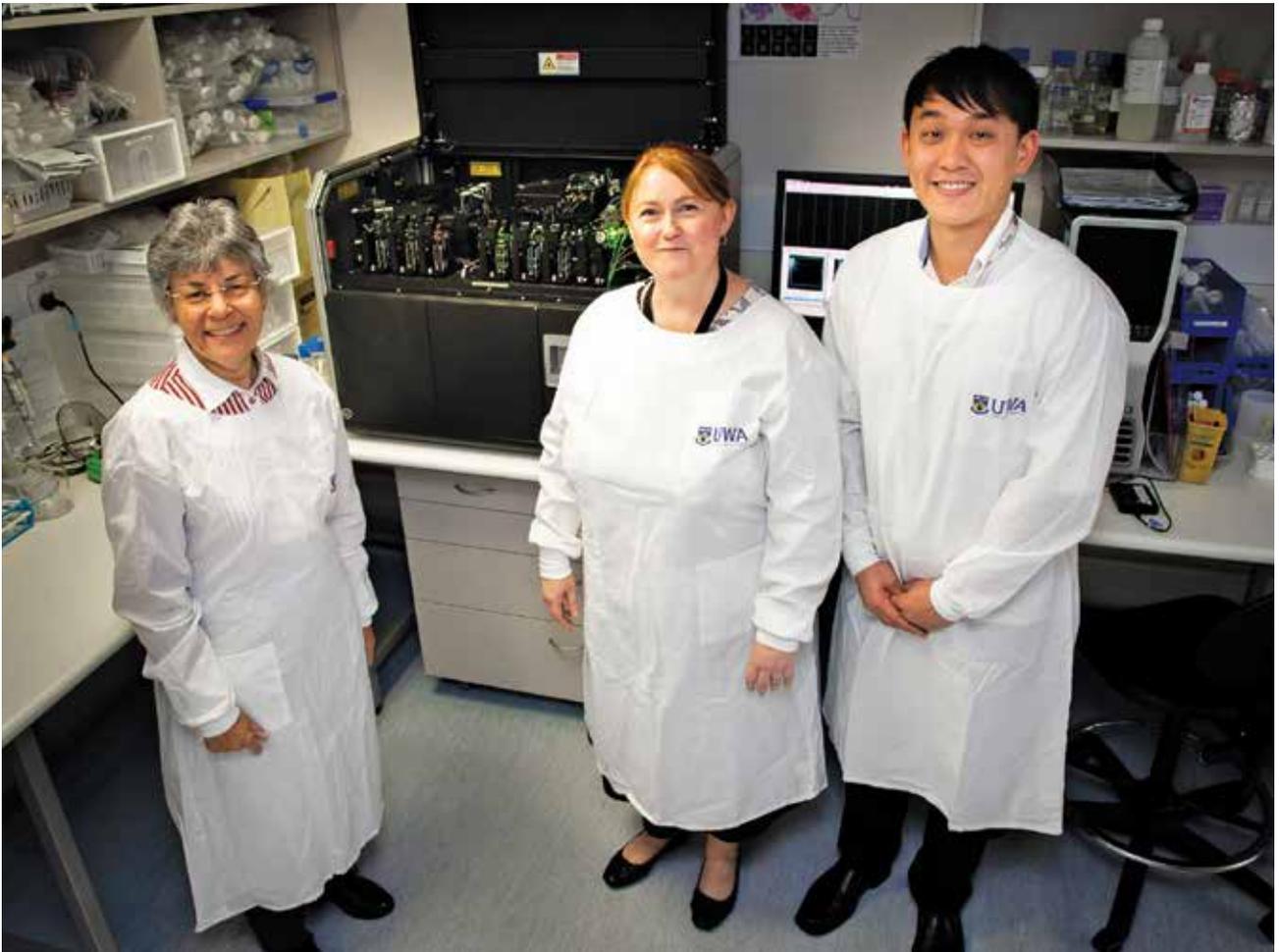
Clinical Medicine at UWA is ranked **39th** (ARWU)

Public Health at UWA is ranked **48th** (ARWU)

HMS awarded **\$21 million** in 2017 NHMRC Project Grant round

329 PhD students

UWA team wins Eureka prize



L-R: Executive Dean, Faculty of Health and Medical Sciences, Professor Wendy Erber, Dr Kathryn Fuller and student Mr Henry Hui

A medical research team from The University of Western Australia has won the Eureka Prize for Innovative Use of Technology. Professor Wendy Erber, Dr Kathryn Fuller and Mr Henry Hui were announced as Eureka Prize winners in August, for developing an automated method for rapid leukaemia detection.

The Australian Museum Eureka Prizes are Australia's leading science awards, rewarding excellence in the fields of research and innovation, leadership, science engagement and school science.

The method they have developed, named Immuno-flowFISH, enables

the chromosomes and the whole leukaemia cell to be seen using a microscope built into the instrument used for this test. More than 20,000 cells can be studied in one test, a vast improvement on current methods which only assess a few hundred cells and are much slower.

The name was derived to acknowledge that three tests have been incorporated into one: 'immuno' recognises that immunology testing is used to identify the leukaemia cells, 'flow' because the machine is an 'imaging flow cytometer', and 'FISH' is the name of the test that identified the chromosomes inside the cells.

The fast, accurate and sensitive automated method can detect just

one leukaemia cell in 10,000 normal cells, a major advance that will lead to personalised treatments and better patient care.

The team, from the UWA Medical School and School of Biomedical Sciences, has developed a method to study chronic lymphocytic leukaemia, the most common type of leukaemia in Australia and which affects three per cent of people over 60 years of age.

Professor Wendy Erber and her research team are now expanding the test so that it can be applied to other types of leukaemia and cancers.



L-R: Hon Ken Wyatt AM, MP; Dr Dawn Bessarab; Professor Dawn Freshwater, Vice-Chancellor, The University of Western Australia; and Dr Kate Smith

UWA researchers awarded \$2.5 million for dementia prevention

A research team led by Dr Kate Smith at UWA's Centre for Aboriginal Medical and Dental Health has been awarded \$2.5 million in federal funding to reduce the prevalence of dementia in Aboriginal Australians. The NHMRC funding forms part of a \$14 million commitment over five years for research into dementia in Aboriginal and Torres Strait Islander peoples.

Federal Minister for Indigenous Health, the Honourable Ken Wyatt, said studies by the UWA-led team in a seven-year longitudinal project in WA's Kimberley region suggested up to one in eight Aboriginal people aged 45 and over were affected by dementia. These findings have since been replicated in urban NSW.

Dr Smith, an occupational therapist who works as a Research Fellow with UWA's Centre for Aboriginal Medical and Dental Health, said the funding would enable her research team to develop and trial a health management program at Aboriginal Community Controlled Health Services, targeting

the key dementia risk factors for Aboriginal people previously identified by the research team.

"Sadly, older Aboriginal Australians have one of the highest rates of dementia and cognitive impairment in the world – three to five times that of non-Indigenous Australians," Dr Smith said.

"Given the rapidly ageing Aboriginal population, the significant impact that dementia has on Aboriginal communities and the financial cost to society, there is an urgent need to develop and roll out programs that are effective in reducing dementia in Aboriginal Australians."

The Dementia Prevention and Risk Management Program for Aboriginal Australians (DAMPAA) is a five-year research project that will include a randomised controlled trial of a physical activity and cardiovascular management program in Perth and Geraldton, to target key dementia risk factors for Aboriginal Australians.

Over \$9 million federal funding boost for health and medical research

Researchers at The University of Western Australia have received \$9.7 million in Federal Government funding to tackle issues ranging from diabetes to stillbirth, heart health, eye disease and the mental health of Aboriginal and Torres Strait Islander LGBTIQ young people.

Thirteen projects, all which are from the Faculty of Health and Medical Sciences, totalling \$9,746,185 have been awarded by the National Health and Medical Research Council (NHMRC) and Medical Research Future Fund (MRFF) so far in 2018.

Partnerships:

Dr Hayley Christian, UWA School of Population and Global Health, *Partnership Project for better health: evidence-informed physical activity policy for early childhood education and care*, (\$ 406, 759)

Professor John Newnham, UWA Medical School, *Partnership Project for Better Health: an Australian multi-state partnership to prevent preterm birth*, (\$1,096,408)

Practitioner Fellowships:

Professor David Mackey, UWA Centre for Ophthalmology and Visual Science, *Understanding Predicting, Preventing and Treating the highly heritable, common eye diseases Glaucoma and Myopia to reduce Blindness and Visual Impairment*, (\$585,270)

Professor Timothy Davis, UWA Medical School, *Community-based studies of diabetes and infectious diseases*, (\$585,270)

Professor Leon Flicker, UWA Medical School, *Maximising health for older Australians*, (\$585,270)

Research Fellowship:

Professor Alistair Forrest, UWA Centre for Medical Research, *Systems Biology of Human Disease*, (\$717, 275)

Associate Professor Aleksandra Filipovska, UWA Centre for Medical Research, *Targeting mitochondrial dysfunction in cardiovascular disease and cancer*, (\$792, 275)

Associate Professor Oliver Rackham, UWA Centre for Medical Research, *Designing new therapeutics using medical synthetic biology*, (\$649,175)

Early Career Fellowships:

Ms Tina Lavin, UWA School of Population and Global Health, *Reducing preventable stillbirths in high-risk populations: a mixed-methods, multicounty approach*, (\$327,192)

Ms Nicola Bondonno, UWA School of Biomedical Sciences, *Variations in flavonoid metabolism as an explanation for inter-individual differences in physiological responses to flavonoid-rich foods*, (\$417,192)

Dr Edward Litton, UWA Medical School, *Improving outcomes for critically ill patients receiving treatment in an intensive care unit*, (\$193,596)

Targeted Calls for Research:

Dr Ashleigh Lin, UWA Centre for Child Health Research, *Understanding and promoting the social and emotional wellbeing and mental health of Aboriginal and Torres Strait Islander LGBTIQ young people*, (\$716,301)

Practitioner Fellowships:
\$1,755,810

Research Fellowships: \$2,158,725

Targeted Calls for Research:
\$4,124,007

Early Career Fellowships:
\$937,980

Career Development Fellowships:
\$437,036

Partnerships: \$1,503,167



Dr Sam Salman

Child-friendly chocolate helps medicine go down

Researchers from the UWA Medical School and School of Allied Health have developed a winning medicine formula which improves the taste of medicine, making it easier to treat sick children.

The UWA study published by the journal *Anaesthesia* tested 150 children and found that the majority of children who were given the new chocolate-tasting medicine would take it again while still experiencing the same beneficial effects as the standard (less pleasant tasting) medicine.

UWA Clinical Senior Lecturer Dr Sam Salman said the poor taste of many medicines, such as Midazolam, a sedative used prior to surgery, presented a real difficulty in effectively treating children.

“Many children struggle with taking medicine, including medicine used at the time of surgery that has an extremely bitter taste that is often hard to mask. This can result in distress for the sick child, their parents and the healthcare team and ultimately risks reducing the effectiveness of medicines and ongoing poor health”. Dr Salman said.

continued overleaf

Child-friendly chocolate helps medicine go down *continued*

A medicine no matter how powerful will not be effective if a child refuses to take it, however, creating a nice tasting medicine is not as simple as melting a chocolate bar and putting it into medicine.

“It requires a skilfully crafted formula that can mask the taste, have a long shelf life and not reduce the effect of the medicine, amongst other things.” Dr Salman said.

The UWA team, including formulation specialist Professor Lee Yong Lim and paediatric anaesthetist Professor Britta Regli-von-Ungern-Sternberg, say the successful formula could be rolled out to patients.

After the success of the initial trial, a second medicine using the new formula is showing similar positive preliminary results with ongoing trial at Perth Children’s Hospital with a plan to develop other medications including antibiotics.

The team is now looking for industry partners to help take the new medicine formula to the world.

“Our hope is that this formula could result in child-friendly medicine becoming universally available and remove a common struggle when it comes to treating sick children,” Dr Salman said.



L-R: Professor Alistair Forrest and Professor Camile Farah, Head of School UWA Dental School/ Director OHCWA)



L-R: Dr Mehdi Habibi, Dr Amanda Phoon Nguyen, Dr Lalima Tiwari, Dr Alice Wong, Dr Vanessa Cho, Dr Lisa Bowden, Dr Matthew Lewis, Dr Jilen Patel, Dr Jason La

UWA Dental School Research Day 2018

The UWA Dental School Research Day was held in June at the Harry Perkins Institute of Medical Research. Over 150 staff, researchers and students attended the annual event designed to showcase the diverse research undertaken within the School.

Professor Alistair Forrest from UWA Centre for Medical Research opened the speaking program, with a presentation on his work as part of the FANTOM5 (Functional Annotation of the mammalian genome) consortium in generating maps of promoters and enhancers across a range of tissues and cell types.

Professor Linda Slack-Smith, Dr Amr Fawzy and Dr Simon Fox (on behalf of Professor Camile Farah), presented an overview of the research occurring in their respective research programs. This included cutting-edge clinical

trials guiding surgeons to more accurately excise oral cancers, innovative programs to address oral health issues faced by vulnerable populations and exciting nanoparticle approaches to drug delivery to the dental pulp.

The speaking program continued with presentations from the School’s Doctor of Dental Medicine (DMD) and Doctor of Clinical Dentistry (DCD) students. These sessions emphasised the breadth of research occurring in the School, with representatives from all seven research programs: Biomaterials and Nanodentistry (Dr Amr Fawzy), Craniofacial Biology (Dr Mithran Goonewardene), Endodontics (W Prof. Paul Abbott), Reducing Oral Health Inequities (Prof. Linda Slack-Smith), Oral Implantology and Periodontics (A/Prof. Alessandro Quaranta), Oral Oncology (Prof. Camile Farah) and Paediatric Oral Health (A/Prof. Robert Anthonappa).



UWA student Ms Megan Dodd assembling birthing kits to be sent to East Africa and South Asia regions for the Birthing Kit Foundation

Students assemble 2000 birthing kits to help women in developing countries

More than 400 students studying Human Reproductive Biology and Issues in Women's Health at UWA will assemble 2000 birthing kits for women who not have access to the facilities needed for a clean and safe child birth. The kits will be sent to women in East Africa and South Asia regions by the Birthing Kit Foundation Australia.

School of Biomedical Sciences lecturer Dr Demelza Ireland, Faculty of Sciences senior lecturer Dr Caitlin Wyrwoll and UWA Bachelor of Science student Megan Dodd are leading local efforts behind the national initiative.

It is estimated more than 300,000 women die every year in childbirth from infections that can be prevented. A birthing kit provides the essentials needed for a clean birth including a sheet of plastic, soap, gloves, cords, gauze and a sterile scalpel blade all in a small press seal plastic bag.

Ms Dodd, who is passionate about philanthropy and improving global health, drove a fundraising initiative that raised more than \$6000 to purchase the birthing kits, made possible by the generosity of the Perth community.

Fifty percent of cardiovascular patients suffer from multiple diseases

Research by the UWA School of Population and Global Health and the Western Australian Centre for Rural Health Researchers has revealed that **one in two patients admitted to hospital with a cardiovascular disease are suffering from multiple chronic medical conditions which require complex treatment. The rate was significantly higher among Aboriginal people, affecting three in four patients.**

Cardiovascular diseases, including heart attack and stroke, are responsible for the majority of deaths and disability among Australians, second only to cancer. The health care costs associated with managing these conditions is substantial.

The study, published in *PLOS ONE* examined WA health data in patients aged between 25 and 59 years. The data identified the presence of distinct



Dr Mohammad Akhtar Hussain

patterns or combinations of commonly occurring long-term medical diseases in cardiovascular disease patients. It revealed combinations of mental health issues including alcohol and drug abuse and respiratory conditions to be more prevalent in people under 40 years, while metabolic conditions like diabetes, hypertension and chronic kidney diseases were common in those over 40 years.

Lead researcher Dr Mohammad Akhtar Hussain said although his team identified the disease combinations in hospitalised cardiovascular disease patients, they expected these patterns to be reflective of what was present in the community.

“A shift in thinking in how to provide high-quality, patient-centred, holistic

care to patients with cardiovascular diseases and multiple health conditions is needed,” Dr Hussain said.

Co-author Professor Sandra Thompson from the Western Australian Centre for Rural Health said the research had implications for current treatment guidelines where treatments assessed in drug trials generally focused on one specific condition.

“The clinical care of patients with cardiovascular conditions has become more complex. Rather than providing care in a single disease paradigm, management of cardiovascular diseases needs to be delivered by multidisciplinary teams that focus on the whole patient and all of the relevant conditions they have.” Professor Thompson said.



Dr John van Bockxmeer

HMS alumnus recognised by Her Majesty Queen Elizabeth II

Faculty of Health and Medical Sciences alumnus, Dr John van Bockxmeer (MBBS, BA 2010) has been named the 45th Commonwealth Point of Light recipient for his tireless work in establishing Fair Game Australia, an organisation that delivers fitness activities and recycled sports equipment to benefit underprivileged communities in remote areas of Australia.

Points of Light is the world’s largest organisation dedicated to volunteer service and mobilizes millions of people to take action and change the world.

New test can predict diabetic kidney disease before it occurs

A new test developed by researchers from UWA's Medical School that can reliably predict the onset of diabetic kidney disease up to four years in advance, has been given the green light for use.

Medical technology company Proteomics International Laboratories Ltd (Proteomics International; ASX: PIQ), headquartered in Perth, has partnered with a US company to make the test, PromarkerD, available to more than 30 million Americans living with diabetes. The company is also in discussion with Mexico, Australia, China, Japan, and Europe with a view to making the test accessible in those locations.

UWA lead researcher Professor Tim Davis said PromarkerD involved a simple blood test that used a unique protein 'fingerprint' to detect future signs of kidney disease.

"For every million people living with diabetes, 10 per cent – or 100,000 people – are expected to suffer a rapid decline in kidney function within four years. This test has the potential to spare many people from future dialysis through the opportunity to intervene early with preventive measures and could save the healthcare system a substantial amount of money," Professor Davis said.

Therapeutic Goods Administration tender application success

In August this year the Therapeutic Goods Administration (TGA) announced UWA would become a prospective provider of Evaluation Reports in Medical and Scientific Evaluation Services.

As a member of the Panel, UWA will have the opportunity to tender for clinical evaluations of medicines under review by the TGA, as well as non-clinical and technical data evaluations.

The success of the tender is testament to the calibre and quality of the Faculty's members, as well as the efforts of the Innovation and Industry Engagement team. It provides an excellent opportunity for UWA to be more involved with the national agenda by reviewing and contributing to decisions regarding drugs and regulations.

For UWA researchers, this announcement presents an opportunity to generate funds for research and increase their profile as a contributor to therapeutic product decision making.



PhD student Jessica Kretzmann

Jessica Kretzmann chosen to present breast cancer research at 68th Lindau Nobel Laureate Meeting

In July, PhD student Jessica Kretzmann was selected by the Australian Academy of Science and the Council for the Lindau Nobel Laureate Meetings to present her gene therapies for breast cancer research at the highly prestigious annual gathering of Nobel Laureates in Lindau, Germany.

Kretzmann was chosen as one of eight rising stars of Australian science to be a member of the national delegation. She joined 592 scientists from around the world, all under the age of 35, who presented their medical research to Nobel Laureates and the next generation of leading scientists.

Jessica is currently completing her PhD in chemistry and nanotechnology at UWA and the Harry Perkins Institute of Medical Research.

Her work involves developing a safe and efficient method to deliver gene therapies, in particular, for the potential treatment of breast cancer.

Jessica has previously been awarded the Australia Nanotechnology Network Young Ambassador Award for 2015 and 2016, which allowed her to travel to rural schools and promote science and nanotechnology.

Faculty Award Winners

The Faculty congratulates all 2018 award winners. Below are some highlights of staff and alumni achievements this year:

HMS Australia Day Awards:

- Clinical Associate Professor Philip House (AM)
- Dr James Mohan (OAM)
- Dr Michael Stanford (AM) (Dean's Council)
- Ms Annette Stokes (AM)
- Professor Ian Hammond (AM)

Dr Mitali Sarkar-Tyson (Project Leader Award, Defence Materials Technology Centre)

Professor Helen Milroy (recognised with ISSTD Media Award (Written))

Dr Mary Webberley (CSIRO Breakout Female Scientist Award)

Assoc/Prof Angela Durey (International Association for Dental Research Giddon Award)

Dr Chan Cheah (2018 Cancer Council Western Australia Early Career Cancer Researcher of the Year)

Professor Peter Le Souef (Research Medal, Thoracic Society of Australia and New Zealand Scientific Meeting)

Professor David Forbes (2018 Howard Williams Medal)

Queen's Birthday honours list:

- AO – Professor Jim McCluskey (BMedSc 1974, MBBS 1977, MD 1991)
- AO – Professor Christobel Saunders
- AO – Clinical Professor Michael Quinlan (MBBS 1962, MD 1969)
- AM – Professor Jonathan Carapetis
- AM – Professor David Hillman
- AM – Clinical Professor Dominic Spagnolo (MBBS 1976)
- OAM – Adjunct Clinical Professor John Rosenthal (BSc 1967, MBBS 1971)

Dr Stephen MacDonald (Global Sepsis Award)

Associate Professor Rob Whitehead (Best teacher in clinical/practicum setting UWA Teaching Awards)

Professor Stephen Zubrick (Scientist of the Year finalist WA Premier's Science Awards)

Dr Haibo Jiang (nominated Woodside Early Career Scientist of the Year)

Dr Melissa O'Donnell (nominated Woodside Early Career Scientist of the Year)

Miss Lucy Furfaro (nominated ExxonMobil Student Scientist of the Year)

Professor Rhonda Clifford (Australian Journal of Pharmacy Top 12 Agenda Setters 2018)

Clinical Associate Professor Richard Riley (Society for Simulation in Healthcare (SSH) Academy Class of 2019 Fellow)

The Noisy Guts Project (2018 WA Innovator of the Year)

Dr Asha Bowen (L'Oreal Women in Science Fellowship)

Professor Sandra Thompson (Public Health Association of Australia Mentor of the Year)

Associate Professor Lisa Wood and **Dr Karen Martin** (Excellence and Innovation in Public Health Team Research, 2018 Council of Academic Public Health Institutions Australasia)

New hub to boost life sciences and innovation research



L-R: MTPConnect CEO Dr Dan Grant with Parliamentary Secretary Chris Tallentire MLA and The University of Western Australia VC Dawn Freshwater at the MTPConnect WA Hub launch at the Harry Perkins Institute of Medical Research in Perth

An initiative to grow Western Australia's life sciences and innovation sector, and boost local research capability was officially opened in September. The MTPConnect WA Hub, located at the Harry Perkins Institute of Medical Research was officially opened by UWA's Vice-Chancellor Professor Dawn Freshwater and WA Parliamentary Secretary for Innovation and Science, Chris Tallentire MLA.

The Western Australia life sciences precinct, a collaboration between the WA State Government, The University of Western Australia and MTPConnect, will bring together university researchers and industry partners to generate new business opportunities in medicine, health, agriculture and biodiversity.

A Western Australian Node of the Commonwealth Government's Industry Growth Centre's initiative, MedTech and Pharma Growth Centre (MTPConnect) will run educational programs to support life sciences start-ups and provide business development, innovation, health translation and investment attraction advice.

The WA Government will commit \$1.2 million over four years and work with MTPConnect and UWA towards the acceleration of medical and biotechnologies through the creation of this life science precinct; establishing WA as a world leader in this area.

UWA will be the lead university for the precinct providing \$300,000 per annum over four years in-kind support towards the provision of facilities and the appointment of a leader to connect institutes, research and industry across the sector.

Top mesothelioma investigator named Cancer Researcher of the Year

In April this year, an internationally recognised UWA researcher, specialising in asbestos-related diseases was named Cancer Council Western Australia's (CCWA) WA Cancer Researcher of the Year.

Professor Anna Nowak, who works as a medical oncologist and senior researcher at the National Centre for Asbestos Related Diseases, was presented with the award at the annual CCWA Research Lunch at the Parmelia Hilton.

Cancer Council WA CEO Ashley Reid said the award was in recognition of Professor Nowak's dedication to bettering the lives of WA mesothelioma patients and mentoring WA's next generation of cancer researchers.

"Professor Nowak has initiated and led multiple clinical trials that have allowed WA patients access to cutting-edge experimental treatments they wouldn't have otherwise had," Mr Reid said.

"Cancer Council WA is incredibly proud to have provided funding for a number

of Professor Nowak's research projects over the years, and it's exciting to see a number of the young researchers she's mentored now successfully applying for our grants to continue the search for the next cancer breakthrough."

Professor Nowak splits her time between clinical care of patients with cancer at Sir Charles Gairdner Hospital and research at the National Centre of Asbestos Related Diseases, based at UWA.

"WA has sadly one of the highest incidences in the world of mesothelioma and part of this is a legacy of Wittenoom – the former asbestos mining town in the Pilbara region of WA's north-west," she said.

Professor Nowak said for a long time researchers had believed chemotherapy and immunotherapy were opposing forces when it came to treatment.

"We were part of the first team to show chemotherapy and immunotherapy together could actually work better rather than as opposing forces. Using



Professor Anna Nowak

the body's own immune system to treat and hold in check the cancer is a fantastic strategy," she said.

The Cancer Council WA award is the latest in a string of accolades for Professor Nowak, who last year's received the Pioneer Award from the International Mesothelioma Applied Research Foundation for her exceptional achievements and dedication to mesothelioma research.

We welcome your support

The Faculty of Health and Medical Sciences welcomes philanthropic support to advance the health and wellbeing of communities through education and innovation. The generosity of our donors has enabled the Faculty to invest in academic posts and programmes, student activities, infrastructure and research.

The following are ways through which your support can help our Faculty to continue to produce cutting-edge health and medical research:

- Giving via your will/leaving a Bequest
- Making a gift
- Contributing to a PhD scholarship

The support of our alumni community members – including graduates, students, staff and friends – provides financial aid to the areas of greatest need across the Faculty.

Contact Asha Stabback, Faculty Development Officer – Health and Medical Sciences for a confidential discussion about giving options:
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