

ECU: EXPANDING RESEARCH FOCUS

Health research at ECU will take a major step forward in January 2012 when Professor Wei Wang rejoins the faculty, 10 years after completing his post-doctoral research, to initiate a program of research in glycomics. This is one of the highly specialised fields in molecular biology that has only appeared in the past 20 years since genomics – the study of genes – became established as one of the most exciting and rewarding endeavours in biological science.

“ECU has already achieved a widely-recognised reputation in genomics, and in proteomics, which investigates proteins,” Professor Wang says. “Glycomics, which studies sugars in an organism, has so far not been prominent at the University. “As an ECU Research Fellow, my initial objective will be to build up a team to work on glycomics.”

The sugars found in organisms, known collectively as glycomes, play a significant number of critical roles in the human body. Glycoproteins on the surfaces of cells are

important for bacterial and viral recognition; they determine some of the pathways in cancer development; and they are implicated in a number of diseases, such as metabolic syndrome.

“My most recent paper was with a research team investigating N-glycans as a biomarker of metabolic syndrome,” Professor Wang says. “This was a big team drawn from institutions in China, Croatia, the United Kingdom and Australia, in which I represented both Capital Medical University in Beijing and ECU’s School of Medical Sciences. We studied populations of 212 Han Chinese compared with 520 Croatians from the island of Korčula.

“Glycan study is a frontier area in epigenetics, and this research showed that variations in the composition of the N-glycome in human plasma could reliably reflect alternations of human metabolism in two very dissimilar populations, and could represent potential biomarkers of metabolic syndrome. Excellent replication of results between the Han Chinese and Croatian populations was observed.”

Professor Wang’s worldwide academic relationships, particularly strong in China, are a foretaste of the collaborations and joint

projects he expects to develop at ECU. He was previously the Dean of the School of Public Health and Family Medicine at Capital Medical University (CMU) in Beijing and holds an adjunct professorial position at the College of Life Sciences within the Chinese Academy of Science’s Graduate University.

“CMU is one of the largest medical institutions of its kind in China,” he says. “It has 10 schools, 14 affiliated hospitals and a teaching institution that, between them, have a staff of about 20,000 and more than 9,000 enrolled students. I believe there will be very good opportunities for partnerships between ECU and CMU.

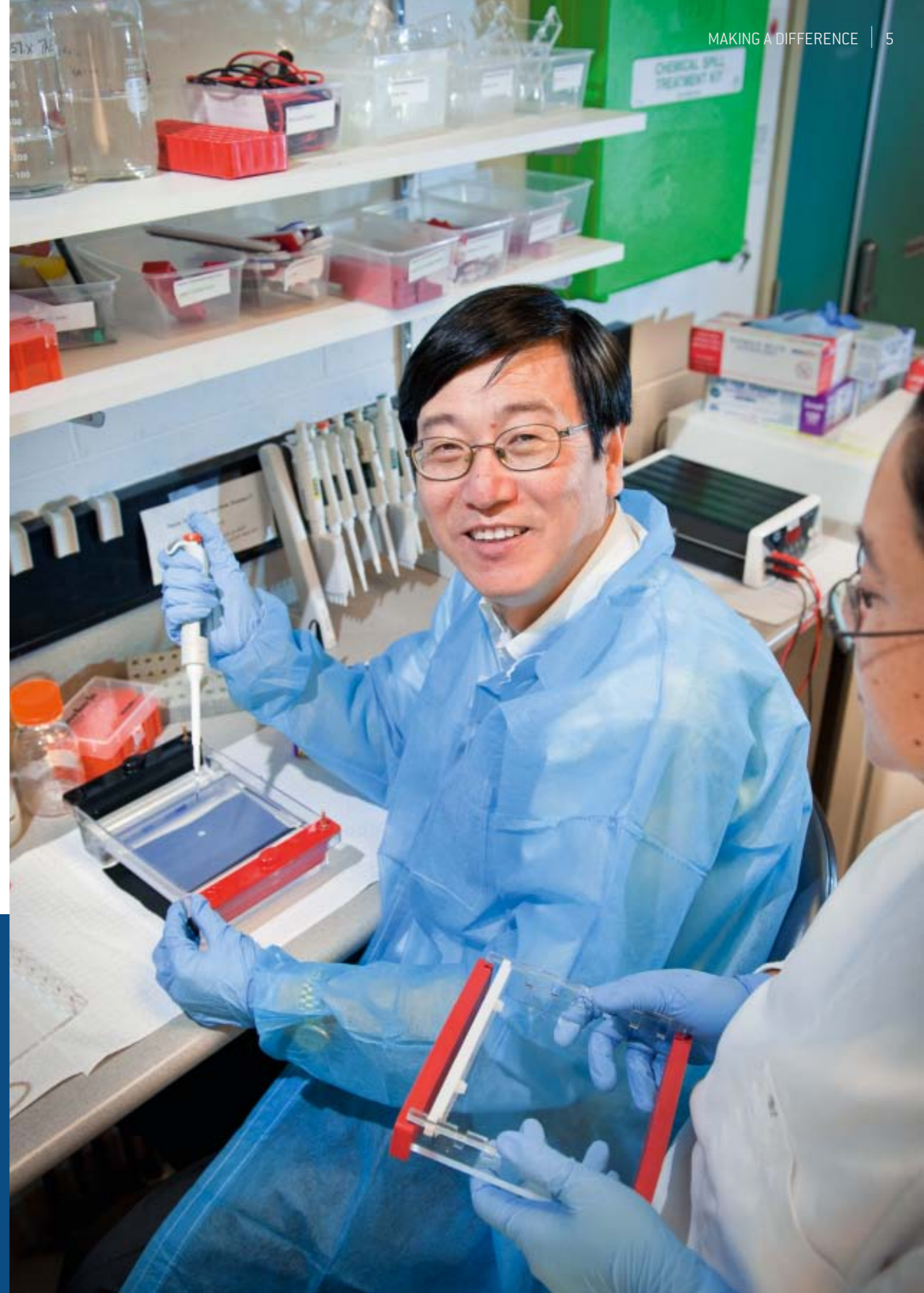
“Glycomics is a significant area of medical science with high research potential and a likelihood of attracting substantial grants and a contingent of PhD students. With the background of established work in genomics and glycomics ECU will certainly maintain existing collaborations with Chinese colleagues, of which the paper on screening for novel biomarkers for metabolic syndrome, published by the highly regarded Journal of Proteome Research, was just the most recent example.

Highly consanguineous relationships are often a feature of remote or isolated populations, and are particularly interesting in genomics because of the variations that can become established, compared with mainstream populations that historically have seen a regular influx of new genes. Professor Wang has based much of his research in this area over the years.

“A decade ago when I was undertaking post-doctoral research at ECU with Professor Alan Bittles, the focus was on genomic profiling of an Indian consanguineous population. More recently we have worked together on genomics in isolated populations, such as Chinese Muslim minority groups and some Indian casts, particularly in biomarker screening.

“My principal interests lie in human genetics and public health where I specialise in medical genetics, genetic epidemiology, population health, inbreeding studies and paternity testing.”

His interests and achievements have opened the door to a multitude of international bodies. He sits on the editorial boards of many of the world’s leading genomic publications, such as the Journal of Medical Genetics and Genomics, the International Journal of Nutrition and Metabolism, the Australasian Medical Journal, the Human Genome Organisation Journal (of which Professor Bittles is also a board member), the American Journal of Molecular Biology, the Journal of Global Health and the Journal of Infectious Diseases and Immunity.





Professor Wei Wang

"ECU and CMU have worked together a number of times in the past. We co-organised the Asian Workshop on Genomics in Shenzhen in 2004, and the Asian Workshop on Community Genetics in Beijing in 2008, both of which were supported by the Wellcome Trust, the Pasteur Institute, the Chinese Academy of Sciences and the Chinese Natural Sciences Foundation.

"This initiative came from the Pasteur Institute in Paris, which in 2003 ran a world-wide competition to select health-based initiatives appropriate to developing countries. The winning proposal came from our collaboration and we were able to train 23 university staff, postgraduate students, clinicians and medical researchers from eight countries in the latest techniques in molecular genetics."

Professor Wang sees increasing opportunities for collaboration between Australia and China, with strong support from both governments. "The Australia-China Science and Research Fund (ACSRF) has recently been formalised under a memorandum of understanding (MOU) between the Australian and Chinese Governments," he says. "This MOU was signed in Shanghai at the 8th meeting of the Joint Science and Technology Commission, which is the forum for bilateral science policy discussions.

"The ACSRF is now becoming operational in Australia and the grants management system is being established. Given ECU's strong relationships with China, I expect that we will see these ties strengthen even further."

Figures from the Department of Innovation, Industry, Science and Research show that China is currently Australia's third highest partner, in terms of joint scientific publications, while Australia is China's sixth highest partner.

"In the short term, I would like to see ECU step up its international profile as much as possible through working collaboratively to apply for research funding, and to steadily build our academic profile by recruiting post-doctoral fellows from the top institutions worldwide," Professor Wang says. "Longer term, we should set up a bio-bank with a broad collection of genomic materials and their corresponding databases as a basis for systematised research.

"The University would benefit from equipping itself to undertake studies of large cohorts on those diseases selected for targeting, aiming for results that will warrant publication in the top academic journals. It's no secret that this sort of self-reinforcing process attracts better faculty members which, in turn, maintains reputational growth and increases the success rate for research funding proposals.

"This can be assisted by organising and participating in significant international meetings and conferences, providing papers, posters, keynote speakers and contributing to workshops.

"As a Chinese-Australian I see a personal role in continuing to build a bridge between our two medical science communities and forging stronger links with those Chinese academics who are doing world-class research work. I will continue my current field of study, which mostly focuses on glycans and screening novel biomarkers for complex diseases.

"ECU already has outstanding work under way on Alzheimer's disease and a number of cancers, such as melanoma, and I would be most gratified to be able to contribute my expertise from the genomics and glycomics perspective.

"I am already tasked with a specific project to screen novel biomarkers for chronic disease by profiling human plasma N-glycans, which requires state-of-the-art techniques in glycan analysis. In collaboration with a leading group in Edinburgh, this research will further the study which has already identified 13 novel genes influencing renal function and chronic kidney disease."

Professor Wei Wang has had an interest in forensic medicine for almost 30 years. He graduated as a Doctor of Medicine from the China Medical University in 1983, and three years later was awarded a Master's degree in Forensic Medicine from the same institution. He continued as a medical resident at one of the university's associated hospitals and then became an assistant lecturer at his alma mater.

From 1990 to 1997 he was a lecturer at the University's Department of Forensic Medicine and at the same time completed his PhD in medical sciences through Oita Medical University in Japan. He then came to ECU as an adjunct professor and post-doctoral Research Fellow at the formally operational Centre for Human Genetics, and enjoyed Australia so much that he decided to become an Australian citizen.

Returning to China in 2003 he took up a post as Director of Research and Development in the Medical Centre set up by Peking University and the Hong Kong University of Science and Technology, and a year later became Dean of the School of Public Health and Family Medicine at Capital Medical University in Beijing.

His contributions to medical science include service as an executive member of the International Society of Translational Medicine, membership of the Standing Committee of the International Association of Physiological Anthropology, membership of the expert panel advising the World Health Organisation on its 'Grand Challenges in Genomics for Public Health in Developing Countries', and he is a Fellow of the Faculty of Public Health established by Britain's Royal Colleges of Physicians.

IMPROVING HEALTH SERVICES IN REMOTE INDIGENOUS COMMUNITIES

When it comes to remoteness, few communities can compare with those on Western Australia's beautiful Dampier Peninsula. It is 214 kilometres from Broome to Ardyaloon, on the tip of the Peninsula, along the unsealed Cape Leveque Road—a journey that can take more than 8 hours in some seasons.

"Isolation means these communities have significantly less access to necessary community services than most Australians," says Dr Andrew Guilfoyle, Senior Lecturer in ECU's School of Psychology and Social Science. "Nevertheless, they face some complex problems and have the same needs and rights for assured access to all the modern services of medical and mental health, education and child support that we take for granted in a metropolitan area."



Dr Guilfoyle is engaged in a research project in this remote region that aims to improve the provision of services to parents in Aboriginal communities. "My framework is 'PAR', or Participatory Action Research," he says. "It's a very powerful methodology, though perhaps not well utilised in social research in Australia."

As an educator, author and researcher he is a persuasive advocate of PAR, and has the runs on the board in demonstrating its effectiveness.

"I applied PAR in remote areas in 1998 to help establish the Derby Aboriginal Health Service for the West Kimberley region," he says. "Between 2006 and 2009 I designed a PAR model to help the Injury Control Council of WA build more resilient communities in the State's south-west region. After intensive planning and consultation in six country towns, community groups became empowered to implement actions that would

improve mental health, particularly among Aboriginal and other minority and marginalised people."

His latest project returns to the West Kimberley, with funding from FaHCSIA (Department of Families, Housing, Community Services and Indigenous Affairs) through which he will support Save the Children Australia to evaluate and improve Indigenous parenting support services at four Bardi Jawi communities on the Dampier Peninsula, at Beagle Bay, Ardyaloon (known also as One Arm Point) and the twin communities of Lombadina and Djarindjin. Along with outstations, the Bardi Jawi People number some 1,200 men, women and children. Their long traditions, ancient culture and strong connection to country were evident in a 15-year struggle for native title not only to the land, but to the sea-lands, islands and reefs as well, which was recognised by the Federal Court in March, 2010.

Dr Andrew Guilfoyle and Australian National University's Professor Mick Dodson sing from the same song sheet when it comes to understanding why there has been a consistent failure by official policy to achieve lasting and sustainable results for Indigenous communities.

"We know what the problems are, [and] we ought to be able to be in charge of the answers. That has never really happened in this country," Professor Dodson said in an ABC program in August.

"We hear a lot in the media about supposed divisions and infighting in Aboriginal communities, but what most people don't see is the underlying strength of Aboriginal families," Dr Guilfoyle says.

"In my experience, Aboriginal communities embrace every opportunity to address the needs of their children. The family is everything, and children are central to the family. As Pat Dodson points out, much of the 'problem' arises when communities suffer from imposed agendas and 'solutions' that rarely work.

"We plan to help by developing researchers from within the communities, who in turn will drive the process of developing ways to support parents to find answers to concerns that they themselves have identified."