THE UNIVERSITY OF QUEENSLAND MEDICINE MAGAZINE

UQmedicine

Winter Edition 2021

VISIONARY SURGEON *targets further world firsts*

From Afghanistan to South Sudan

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Cheery cookbook unites community

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COVER IMAGE
Dr Michael Wagels presents at the opening of the Herston Biofabrication Institute – article on page 6.

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MESSAGE
from the Executive Dean

It is reasonable to say 2020 was an unprecedented year for the Faculty of Medicine at UQ, with pandemic-induced border closures, lockdowns, shifts to online education, work-from-home arrangements and additional stress. As mentioned in my last editorial for 2020, the Faculty was tested, but demonstrated resilience and effectiveness in managing what we were dealt. This, however, came at a price, with everyone working extremely hard to maintain our tripartite mission of education, research and service to the community. I thank you all for that contribution.

So, what of 2021 and beyond? Globally, the public health response to SARS-CoV-2 has been variable, with an unfortunate politicisation of simple measures such as mask wearing and social distancing. Australia has performed well in this regard and achieved very low levels of community transmission. This was achieved, to a greater extent, by the closure of our international (and sometimes state) borders. What will be the steps to controlling the pandemic in 2021 and beyond? I suspect public health measures will remain important, but clearly mass immunisation to generate herd immunity is critical. Hopefully, the UQ vaccine will join the pantheon of current effective and safe vaccines in Australia, and this will render the clinical manifestations of the virus far less deadly. Community transmission may, however, increase, particularly when we open the international borders. It would seem likely that limited opening of the international borders will occur towards the end of the year, with the assistance of testing, vaccination and perhaps shorter quarantine.

In this context, what is the strategic intent of the Faculty of Medicine? First, we need to examine our actions and adaptations from last year, and retain what was good, while discarding what was not. We should not return entirely to the pre-pandemic world. In teaching and learning, we have accelerated our delivery of online education, but we need to balance this approach with the social construct of activated learning. In research, we have maintained extraordinary momentum in our areas of strength, but also have moved to examine new areas relevant to our current health dilemmas. In our service to the community, we have been a trusted voice in the pandemic discourse and we should broaden this to include all areas of our expertise. We also need to examine the best ways of working. What can be done at home? What needs to be done at work? How do we maintain the wellbeing of our staff and students?

The year 2021 also brings opportunity. As a result of the generous uplift of the Research Support Program (RSP) by the Commonwealth Government late last year, we have been able to create eight new research fellowships and will participate in UQ's central research support programs. Many of our teaching programs have grown as a result of the focus on health, and we are investing in new teaching support to further transform our educational offerings. We will also support our precious staff by offering new opportunities for professional development.

Even though the world is far from back-to-normal, the Faculty of Medicine is in a great position to harness the pandemic-induced disruption to transform our approach to our mission and purpose. With such a talented team of staff and students I know that we will be able to achieve a lot in 2021.

This brings me to this edition of *UQmedicine*. Again we bring you a snapshot of the talented people and innovative programs embedded within the Faculty of Medicine and implemented in partnership with our collaborators. I commend their work and look forward to reporting on the progress of the Faculty of Medicine later this year.

Professor Geoff McColl
Executive Dean, Faculty of Medicine

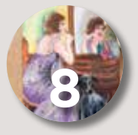
Our purpose

Through the education we provide and the research we conduct, the Faculty's medical, biomedical and public health endeavours aim to save lives and improve human health in material and lasting ways.

Our values

Pursuit of excellence
Creativity and independent thinking
Mutual respect and diversity
Honesty and accountability
Inclusiveness and wellbeing

Features



Fated for friendship:

how a shared history led to a cross-generational connection

A letter to the editor, from UQ Master of Business graduate Martha Gettvert.

I was on my way to the Hobart Airport when a notification from my mum popped up on my phone; it was a link to UQmedicine's article 'A random life', written about the life of Dr Bert Klug. I started reading it and could not believe my eyes when I read 'Born in the small town of Sered in Slovakia' – my mother's family is from Sered and my grandmother still lives there today. Dr Klug and I also both graduated from The University of Queensland. Struck by the similarities, I contacted the magazine, who connected me to Dr Klug who kindly agreed to meet with me. It was an honour to share stories with someone who had been through such devastating events as the Holocaust and then went on to live such an incredible and successful life with his wife, Eva, in Australia.

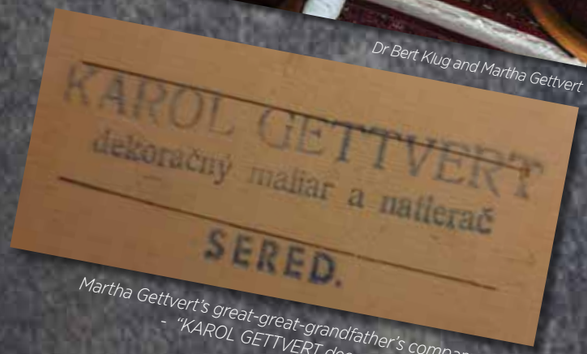
During our meeting we spoke mainly about Sered, the small town where Dr Klug was born and where I spent a big part of my childhood. We found that he went to the same Jewish Primary School as my great-grandmother, Irena Gettvertova. Her father, Karol Gettvert, had a painting company with over 50 employees – which during the 1920s was considered a big company, especially in such a small town. Dr Klug said that he still has a vivid image of Karol's company advertisement which stated his logo.

When I was in my early teens my grandmother showed me a class photograph from the Jewish school and told me, "Look at this, here's your great-grandmother Irena standing in between the teachers. Six years later, Czechoslovakia was invaded by Nazi Germany and likely most of the other children and teachers were deported to concentration camps." I remember looking at the faces of the other children, and the teachers, thinking of all the generations that could've been. When I met with Dr Klug, he confirmed that he went to that very same Jewish school, but being a few years younger than my great-grandmother, he was not in that photograph. He did, however, remember the names of the teachers in the photograph. Meeting Dr Klug was truly a historic moment for me – knowing that we both have roots in Sered, that he likely crossed paths with my ancestors, and that we both graduated from The University of Queensland is simply incredible.

Martha Gettvert

Jewish Primary School, Czechoslovakia, Sered. Year 1933-1934 (Grade 4 and 5).

Dr Bert Klug and Martha Gettvert



Martha Gettvert's great-great-grandfather's company stamp - "KAROL GETTVERT decorative painter SERED."

VISIONARY SURGEON *targets further world firsts*

"The most insane thing I have ever done" is how Dr Michael Wagels described the world-first reconstruction of 36 centimetres of a patient's tibia.

A PhD graduate and senior lecturer at The University of Queensland, Dr Wagels is continually expanding his horizons, with living joint replacements and regenerated organs firmly in his sights.

"We are looking at what is coming in five, 10, 20 and 50 years so we can be leaders," Dr Wagels says.

"Personalised medicine and surgery is happening now, but you can see it becoming much more common.

"We want to be ahead of that wave – to the point where we are manufacturing bits and pieces of people and implanting them, instead of a substitute.

"It will be cheaper and allow us to continue to provide high-quality health care to our community into the future."

Clinical Director of the recently opened Herston Biofabrication Institute, Dr Wagels is a visionary.

Talk to him for half-an-hour and you realise he is the kind of person who turns science fiction into reality.

In 2017, Dr Wagels successfully transplanted a 3D-printed shinbone into the leg of 27-year-old Reuben Lichter, who faced amputation after sustaining a serious bone infection.

Dr Wagels inserted a scaffold into Mr Lichter's leg, around which the bone successfully regenerated and grew to the point where the patient could walk again.

3D printed shinbone prototype.

"The closest anyone had come to reconstructing a bone defect was 15 centimetres, but you can't get 36 centimetres of bone from anywhere in the body," Dr Wagels said.

"I had the idea from a sheep study that we could use the lining of the bone, rather than the bone itself, to wrap around the inside aspect of the scaffold, so the bone grows into the 3D printed scaffold, which supports and directs the growth of new bone.

"Over the course of 18-24 months the patient grew sufficient bone to have an entirely new shinbone. That was pretty spectacular."

Dr Wagels, a plastic and reconstructive surgeon, has applied the same technique successfully in other patients, including a man who lost one-third of his skull in a motorbike accident.

"The beauty of the scaffold I use is that it is bioresorbable so it gets very quickly integrated with the body's own tissues and then dissolves," Dr Wagels says.

"Within eight weeks, this gentleman had evidence of bone regrowth on the inner and outer aspect of the scaffold, which is quite remarkable.

"Subsequent CAT scans eight months later showed continued bone regrowth.

"A lot of tissue engineering falls down, when you scale up, from a lack of blood supply."

Regenerating bone is one thing. To replicate the art with something more complex, like a joint, is another thing entirely.

"A living joint replacement has never been done before. You need to be able to manufacture not just bone but also cartilage," Dr Wagels says.

"There are people looking at engineering cartilage and bonding it to bone, but that has never been done successfully.

"You also need to stabilise the joint with ligamentous structures and lining tissue, which produces the fluid that keeps the joint well lubricated.

"When you get an infection in a joint replacement, the whole thing has to come out. Even if the joint replacement doesn't get infected, it will wear out. The current life of a joint replacement is about 10 years.

"A living joint replacement would be more resistant to complications: it would be the patient's own tissue, so would not be rejected and, conceivably, should last longer."

Dr Wagels said there was "just as compelling an argument" for similar organ procedures.

"At the moment if you need a kidney transplant you need to be on immuno-suppressant drugs so you don't reject the organ," he says.

"The thing transplant patients are most likely to die of in Queensland is skin cancer because immuno-suppressant drugs amplify the damage done due to sun exposure.

"What if you could take a circulating stem cell from someone's blood, process it in a way that you can send those stem cells down a particular path to become kidney cells, and keep them alive while they grow until it becomes a transplantable organ?

"This is why partnering with our core academic partner, UQ, is so important because they possess a wealth of expertise regarding organoid research."

One hundred cheers for one hundred years

A group of centenarians who generously donated their time to the Australian Longitudinal Study on Women's Health (ALSWH) will receive special 100th birthday cards to mark their contribution.

The women, born in 1921, were among the first to participate in what is the largest, longest-running research project of its kind in Australia. They were aged 75 when the project began in 1996.

To signify the milestone, each centenarian will receive a birthday card from the ALSWH directors at The University of Queensland and the University of Newcastle. The featured artwork, 'Reflections on Life' is from a drawing by Professor Julie Byles, ALSWH Director at the University of Newcastle.

"The card and the artwork are a heartfelt tribute to a group of very loyal women who have been part of the Study for a quarter of their very long lives," UQ ALSWH Director Professor Gita Mishra explains.

A participant from the original cohort left this comment on a survey from 2020:

I feel I have 'mellowed', become more pleasant and grateful to my many friends and neighbours who show me genuine love and care... and you folk who ask us to fill in this survey each time. It makes us think how lucky we all are!

An incredible 153 women born 1921-26 are still taking part in six-monthly surveys. The original cohort of 12,432 women aged 70-75 was one of three recruited in 1996. Together, their data provides a treasure trove of information on the complex psycho-social factors impacting women's health and wellbeing across the life course, and across generations.

The Australian Government funds the Study as an evidence base for women's health research and policy development. The University of Queensland and the University of Newcastle jointly manage the Study.

web *For more information* ***www.alswh.org.au***

A devotion to cancer *'rule breakers'*

The 'lightbulb moment' that awoke Dr Mathew Jones to the wonders of biology still elicits a grin from The University of Queensland researcher.

His work investigating cancer at UQ's Diamantina Institute (UQDI) was not on the radar when he attended Bribie Island State High School.

The Bougainville-born teenager's interests were less academic and focused more on recreational activities.

"I was much more interested in bodyboarding, fishing and surfing than learning," Dr Jones explains.

"But that changed in biology class when we were introduced to cell biology and the basic processes human cells use to grow and divide.

"Learning that cells are the smallest living component of our body, and that we all start as a single cell, really sparked my interest.

"That was the first time I remember being excited about science and paying attention in class."

Fast forward two decades and the UQDI Research Fellow is still interested in cell growth and division.

His Molecular Genetics group is focused on studying the uncontrolled growth and division of cancer cells and decoding what he calls their "rule-breaking" behaviours.

"Cancer cells are rule breakers in that they continue to grow and divide, when healthy cells would normally stop dividing or die," Dr Jones explains.

My research is trying to discover new knowledge about how cancer cells continue to divide uncontrollably.

"By understanding those processes, we can design treatments that specifically target cancer cells.

"Unfortunately, research into fundamental biology that expands our understanding and builds knowledge is currently underfunded and at risk as funding shifts towards late-stage translational research.

"It is important to acknowledge that the life-extending treatments and vaccines we have today are built on decades of fundamental discovery research.

"Investing in the pursuit of new knowledge is critical to ensure that we are able to continue to innovate and improve cancer treatments and patient outcomes."

One thing that Dr Jones says helped with funding applications here in Australia is his time building connections in New York City.

After earning a bachelor's degree at QUT and a PhD at UQ, Dr Jones packed his bags in 2009 with his partner, Dr Julia Pagan, who is also now a research fellow at UQ's School of Biomedical Sciences.

Dr Jones continued his training at New York University and Memorial Sloan Kettering Cancer Centre for the next 10 years, living and working in Manhattan with Dr Pagan.

Career-wise, the US was a rewarding move, with Dr Jones even presenting his research to the New York Academy of Sciences, founded in 1817.

The Academy has had members including Thomas Edison, Charles Darwin, and Margaret Mead.

"Presenting at the New York Academy of Sciences was a great honour and certainly a career highlight," Dr Jones recalls.

"The training I had at these institutes gave me a lot of exposure to world-leading scientists and that experience shifts your perspective. It changed the way I evaluate my own science and it showed me what was possible with a good idea.

"The postdoctoral community in New York is very international and we built friendships with colleagues from across the US, Europe and Asia.

"It has been exciting to watch this network spread as our peers go on to establish their own research groups in their home countries or in other parts of the US."

Cookbook leaves you wonton more

Do you know your sarma from your parma? What about your dolma and your korma?

A cheery cookbook, created by students, is not only helping solve these riddles, it has helped keep the academic community together amid challenging times.

In the face of the COVID-19 pandemic, the cookbook has become a forum where people can contribute ideas, interact and share positive vibes – and most importantly – help each other fill their tummies with some scrumptious and nutritious food.

"The aim and purpose of the cookbook is to create and hold a space that allows for genuine community connection," Doctor of Medicine Phase 1 (Year 2) Student Coordinator Yiota Lallas explains.

"It is a virtual space that facilitates engagement, where we support one another through sharing.

"We found a platform from which to connect that is universal...food. Food comes hand in hand with our social interactions with friends and family.

"We are creating conversations about the diverse ways in which we sustain ourselves and our bodies.

"We want to explore the many ways in which we prepare food, providing a plethora of cooking styles that has helped provide ourselves nourishment, while building social connection, personal strength and resilience."

Aside from sarma and dolma, the first edition of the cookbook, developed by the School of Clinical Medicine, features delicious iso-smoothies, baklava, crepes and the confidently titled 'Best Ever Beef Chilli'.

The book sidles Swedish gubbröra alongside German currywurst, French quiche Lorraine and Filipino roti and chickpea curry, while Aussie-inspired bacon jam is juxtaposed with strawberry jam made from a Greek family recipe.

For those with a sweet tooth, there is also room to be a little naughty with a choice of baked ricotta cheesecake or chocolate fudge slice.

On top of developing solidarity during a pandemic, the cookbook serves as a nice time capsule to provide future generations with insight as to how people reacted and kept in touch during a challenging time.

*View the cookbook at **bit.ly/isocookbook**. Submissions for future editions can be made at **bit.ly/mdcookbook**.*

Eakin honoured by appointment at critical time

There was no time for tentatively feeling out her role when Professor Elizabeth Eakin was appointed as the new Head of UQ's School of Public Health in October 2020.

At a time when COVID-19 was still a rapidly evolving phenomenon, and modes of education and workplace parameters were being challenged, Professor Eakin hit the ground running.

"Luckily, having been at UQ since 2005 – when I first joined as a Principal Research Fellow – I knew the lie of the land reasonably well," Professor Eakin says.

"Most recently I was Associate Dean (Research) for the Faculty of Medicine and was honoured to take this role at a point in time when public health was at the very forefront of community priorities.

"We've reviewed our school strengths and have developed a research strategy that's all about capitalising on those strengths and further building capacity for research.

"There is a particular emphasis on early career academics and higher degree research students."

A key focus for the School of Public Health is to continue the development of an Aboriginal and Torres Strait Islander Impact Strategy.

This endeavour corresponds to the School's strength in Indigenous Health Research and UQ's commitment to the Reconciliation Action Plan.

Professor Eakin's vision is to grow the next generation of leaders within the School of Public Health, so that excellence in teaching and research is maintained, while the School creates meaningful impact in unison with students, collaborators and community partners.

"We are seeing increasing enrolments across both undergraduate and postgraduate courses," Professor Eakin says.

"At a time of COVID, that's a huge endorsement of our academics, who responded incredibly by moving almost everything online, yet still provided a top-quality experience for students.

"The hard work and success of our staff is being reflected in continued positive student feedback."

A Thompson-Reuters Highly Cited Scholar in the years 2016-18, Professor Eakin's academic achievements include 15 continuous years as a NHMRC Research Fellowship funding recipient.

A clinical psychologist, the new Head of School was previously Director of the Cancer Prevention Research Centre and possesses extensive contacts across the cancer control community from her years of dedication and impact.

In photos

Graduations

Congratulations to all recent graduates, including the School of Biomedical Sciences graduates and academics pictured above.

Annual tribute

UQ staff, the community and members of the Australian Defence Force attended a ceremony to commemorate ANZAC Day.

International Women's Day

Faculty staff celebrated women's achievements with this year's theme #ChooseToChallenge.

A week of beef

RDAQ Foundation Chair Dr Dan Halliday, UQ RTHCQ Director Sneha Kirubakaran and UQ Pro-Vice-Chancellor (Indigenous Engagement) Professor Bronwyn Fredericks join UQRCS medical students and supervising clinicians who performed free health checks at Beef 2021. Photo supplied by RDAQ Foundation.

Prizes & Scholarships Awards

Professor David A F Morgan OAM Prize for Academic Improvement recipient Dana Tabbara (centre), and Professor David and Mrs Noeleen Morgan, philanthropic donors.

Reconciliation takes action

Ms Kara Ngampromwongse, Professor Elizabeth Eakin, Ms Tori Darnell and Associate Professor Maree Toombs pictured at the UQRAP Network launch. The event also signified the launch of the School of Public Health's Aboriginal and Torres Strait Islander Impact and Excellence Strategy (2021-2025).

Rite of passage

Third-year UQ-Ochsner medical student Autumn Stevenson receives a white coat – symbolising the commencement of the clinical phase of her medical training in the United States.

Brothers combine to improve INDIGENOUS HEALTH outcomes

Two Indigenous brothers set to study medicine at UQ will draw on their cultural knowledge and life experiences with one shared goal – improving health outcomes in their communities.

Unngoorra Harbour, 22, completed a Bachelor of Biomedical Science at QUT before starting his post-graduate Doctor of Medicine degree at UQ this year.

His 17-year-old brother, Injarra Harbour, who received his QTAC provisional entry offer to study medicine in January, began his Bachelor of Biomedical Science at UQ in February. He will transfer into the Doctor of Medicine program in 2023 or 2024.

Both brothers are motivated by their own life journeys to make a difference in their community.

"Our family doesn't have a medical background but our culture is very important to us, and we are aware of the issues our people face," Unngoorra says.

"We've experienced those issues. We've attended way too many funerals at a young age and have lost close family members way too early from chronic conditions.

"We've grown up learning from the experiences of our elders and, after speaking with them, we've realised that improving Indigenous health is a good starting point."

The brothers are proud Warluwarra, Yirendali, Eastern Arrernte and Alyawarre descendants, and grew up in North West Queensland where there are few Indigenous doctors.

"After listening to the community elders, it seemed some health professionals lacked understanding, which resulted in discomfort and insecurity among our people when navigating the health system," Unngoorra says.

Injarra, who was school captain at St Joseph's Nudgee College in 2020, said growing up in rural Queensland helped him understand how the health system works in regional areas. He hopes this knowledge will help him to advise on future health policy and to interact with patients.

"From a young age, I always knew that I wanted to help people. Once my older brother began his journey to becoming a medical doctor, it refined my views and what I wanted to achieve.

"I'm grateful for his support, and his leadership has influenced me greatly."

Like his older brother, Injarra says improving Indigenous health and life expectancy is important to him.

"I have been fortunate enough to experience first-hand how culture holds communities together," he says.

"Unfortunately, illness and disease are ravaging Indigenous communities and we are dying at alarming rates – not only at high frequencies but often at a very young age."

"Our elders harbour so much culture, knowledge and wisdom, but because they are dying at such a young age, the structure and leadership within our communities is diluting.

"I think that many of the social and political issues that Indigenous people face could be a result of the shorter life expectancy of our elders."

The brothers are currently living together in Brisbane's north, but plan to return to their community after graduation.

"The plan is to play a role in making our community a place for Indigenous people to access health care and achieve healthy outcomes," Unngoorra says.

"My brother has always looked up to me and it's great to go down the same pathway together. I will be a few years ahead of him, so I will hopefully be able to give him tips for when he begins his medical degree."

This article first appeared in Contact *magazine.*

The featured artwork is the Herston panel of A Guidance Through Time by Quandamooka artists, Casey Coolwell and Kyra Mancktelow.

JUDITH'S JOURNEY:
from Afghanistan to South Sudan

Senior Research Fellow and registered nurse/midwife Dr Judith Dean tells students to be unafraid of new experiences. She has lived that mantra, journeying to UQ's School of Public Health via South Sudan and Afghanistan.

You have quite the story to tell – how did your journey begin?

I trained as a registered nurse in the 1980s and quickly moved into midwifery. I was hospital-trained, so after working for nearly 10 years as a midwife, I went back to study and did my Bachelor of Nursing and then Master of Public Health. I also moved out of midwifery into broader sexual and reproductive health and HIV. I had always had a keen interest in travel and worked all over Australia and the world, often in low-income areas. That developed my interest in the inequities of health and improving health outcomes for people who had less access to services, and this really led to my work with the International Committee of the Red Cross (ICRC). I also developed an interest in health education and research, so in 2001 I took up a university position coordinating a postgrad sexual health program back here in Queensland. Then, before I knew it, I ended up with a PhD!

What made you decide to go to South Sudan and Afghanistan?

My work in both locations was with the ICRC, where my role was to develop maternal and child health programs, and midwifery and traditional birth attendant training programs. Both were in conflict zones. I learned about the real vulnerability of community and the inequities of health, particularly around women and young children being vulnerable to conflict and war. Out of that, I realised the privilege I had and how my knowledge could be contributed back to understanding that experience and developing systems to reduce that inequity. I experienced the amazing resilience of those communities and the power of those communities in that context. Our work was around assisting processes to be sustainable within the uncertainty of conflict. You can do development work, but when you add conflict, natural disaster, or pandemic as we have experienced recently, then it impacts sustainability. It can be frustrating, challenging and rewarding – all at once.

Were the conditions in South Sudan and Afghanistan challenging?

I was in Afghanistan at the height of the Taliban-controlled era in 1998. I had worked in remote settings before so I was used to not having a tertiary centre and not always having great resources. I was prepared for the unexpected, but in hindsight I am not sure I fully understood the challenges I would face. I was privileged to work with some wonderful women in a way that most people couldn't, because back then it was a closed society.

I was in South Sudan in 2000 – Sudan had been experiencing an ongoing internal war between the north and south for many years. I was in a very small village establishing a primary health care unit and expanding the maternal and child health care component of it. This was a different experience to Afghanistan, as I was working usually with only one other ICRC colleague and nearly a day's flight away from the ICRC head facility in Lokichogio, Kenya. It was challenging, especially when the conflict escalated, but the local community and healthcare workers provided me with a network of support and to some extent a sense of safety. I think my ICRC experience cemented my understanding of the need and importance of working in partnership with community, a practice I have carried into my research.

You also worked in the Northern Territory?

I went to the Northern Territory when I was practising as a midwife and worked mainly in birthing suites and anti-natal scenarios in Alice Springs and Arnhem Land. It was a privilege to be welcomed into the community. My philosophy has always been that I don't go in to help. I go in to learn, to share and listen to the community. It is always a two-way street.

Now that you are settled in Brisbane, what research are you doing?

I am in a research group doing work in sexual health and HIV. We work with communities to develop an understanding of issues they see as a priority. Working in partnership with the community also helps develop research skills, with the knowledge that, if you get good data, it helps build capacity within the service to gather evidence to lobby for policy change and advocacy.

We've noticed some real success stories in the innovative models of HIV testing. I've been active in working with Rapid Testing, a Queensland Positive People program, looking at how to increase access to testing for HIV and other sexually transmissible infections. We've been doing molecular point-of-care testing for chlamydia and gonorrhoea, and HIV self-testing projects, some of which are now embedded in standard operations and offered as a service.

Do you have a message for students about to embark on their careers?

Don't be afraid to ask questions and try new things. Where you think you may be heading – you may not end up. I am a case in point. I was a ward nurse at Nambour General and never thought that a number of years later I would be sitting where I am today.

web *To read the full interview, view the article online at* ***medicine.uq.edu.au/magazine****.*

Senior Research Fellow and registered nurse/midwife Dr Judith Dean.

Chelkou, South Sudan.

The challenges of reaching community clinics by road (Chelkou, South Sudan).

In Kandahar, Afghanistan, 1998, on a road trip outside the city limits.

A question of IDENTITY *excites Thor*

When Professor Stefan Thor talks about genetically engineering 'spare parts' for humans, he is constantly referring to microscopic components, the cells.

Since high school, Professor Thor, a developmental biologist at UQ's School of Biomedical Sciences, has been fascinated by how cells in the body know their precise function.

"Our bodies are full of trillions of cells with thousands of different identities, all engaged in different roles," Professor Thor explains.

"The question is: How do these cells know what identity they're supposed to have?

"When I started my research in the late 1980s, we knew almost nothing about these processes, but the field has moved forward at tremendous speed.

"We now understand more and more about the elaborate regulatory pathways playing out during embryogenesis.

"Cells are first told what particular team to belong to – whether they should be part of the muscle system or nervous system for example – and are sub-allocated different tasks as development proceeds.

"It is a sequential process with finer and finer instructions and finally cells acquire their terminal identity.

"Our studies in fruit flies have demonstrated that combinations of genes, rather than one single gene at a time, operate together to tell cells what they should be. This 'combinatorialism' explains how hundreds of regulatory genes can generate thousands of different cell identities."

Now researchers can grow human stem cells in a dish, and drive them into different terminal cell identities, like muscle or nerve cells. The long-term goal is to even create complete human organs from a patient's own cells.

"As a car gets older you are able to replace different parts," Professor Thor says.

"The goal of many laboratories is now to make human 'spare parts', to replace the ones that fail as your body is getting older, or to add parts that were never generated in the first place in younger individuals.

Professor Thor began studying cells in fruit flies, but is now focused on the hypothalamus, a small structure in the centre of the human brain that contains hundreds of different cell types controlling many aspects of human physiology, including energy and fluid balance, thermoregulation, sleep-wake states, stress responses, growth and reproduction, as well as emotional and social behaviours.

"This is one of the parts of the brain where we have the least understanding about how different cell types are made, so it is an interesting frontier," Professor Thor says.

"The goal is to learn how different cell types are normally specified in the hypothalamus, and then apply that knowledge to human stem cells, and try and make particular spare parts."

Professor Thor is keen to secure external funding to start his own research lab to study the hypothalamus, while continuing teaching students at UQ.

"Teaching at the university level is fascinating, because you are trying to convey some really complicated things to students ... and when you can tell from the exams later that they understood these very complicated things, it is incredibly fulfilling," he says.

Professor Thor undertook his PhD at Umea University in the north of Sweden before moving to San Diego, USA with his wife Osa to complete his post-doctoral training at the Salk Institute for Biological Studies.

From there, he set up his own lab at Harvard Medical School in Boston and spent five years building his own research team, before returning to Sweden after children Lucas and Frida were born.

In Sweden, he set up a new research team at Linkoping University, south of Stockholm, before moving to Australia and taking up a position at UQ.

"I'd been here a couple of times and loved it. It was always in the back of my mind we should live here and I managed to land a position at UQ," Professor Thor says.

"Australia is welcoming to people from overseas and the system is very organised, so for us it has been an easy place to settle in.

"UQ is a large and dynamic university and it's exciting being here with the strong research going on in the biomedical field."

Putting ***meat on the bones*** of rural medicine

Even on her day off, Dr Elizabeth Clarkson has been known to sit at the lunchroom table at Theodore Medical Centre giving direction to medical students about how to best suture raw meat, fresh from the local butcher. It's part and parcel of being a doctor in a regional town.

"I grasped the importance skilled medical professionals had to rural communities from a young age," Dr Clarkson says.

"Growing up in Moura before moving to a small township near the Sunshine Coast, I was a firsthand witness to the dedication my mother, a veterinarian, and father, a dentist, put into serving the community.

"Some of my family members lived in rural towns without doctors, nurses or medical centres. I saw them either suffer from complications from diabetes or die prematurely from diseases.

Dr Elizabeth Clarkson sits down with medical students in Theodore.

"I think if they'd lived in a town where they had access to health care, it wouldn't have happened."

After graduating with a Bachelor of Medicine/Bachelor of Surgery (MBBS) from The University of Queensland in 2015, Dr Clarkson decided to pursue a career as a rural generalist.

Following graduation, she gained knowledge and experience from a suite of hospitals and general practices around the state before settling in Theodore to complete her final two years as a registrar.

Now a GP and a fellow of the Australian College of Rural and Remote Medicine (ACRRM) and the Royal Australian College of General Practitioners (RACGP), Dr Clarkson says she's always had the desire to go back, raise a family in a rural town and work locally.

"Rural towns need a good, stable medical workforce; without a medical workforce and a regular doctor, towns do struggle," Dr Clarkson says.

"If we want to keep rural towns alive, the rural medical workforce needs some support.

"I think being a rural doctor keeps you honest in the clinical sense.

"Your patients are also your neighbours and people that you see every day, so in some ways this adds an extra layer of obligation and duty of care."

Dr Clarkson is proud to have gone through rural pathway training and hopes to quash stereotypes that general practice, and particularly rural general practice, is an easy path.

"Rural clinical practice can be quite challenging; the training program has quite high expectations, and general practice comes with added complexity such as running a small business," she said.

"I had difficulties deciding with specialty rotations as I enjoyed paediatrics, anaesthetics, obstetrics, emergency medicine, surgery, dermatology and infectious diseases, but I soon realised I got to practise a combination of all of the above and more."

While Dr Clarkson claims she's not a natural teacher, her peers and colleagues are thankful that she is working with UQ's Mayne Academy of Rural and Remote Medicine team, educating upcoming UQ medical graduates.

When she's not in lunchrooms suturing on her days off, Dr Clarkson enjoys hiking and camping with husband Ben around Banana Shire and is hard at work trying to train their young beagle pup.

Testing times call for at-home testing measures

Meet the UQ graduate behind the first COVID-19 home diagnostic tool.

Dr Sean Parsons saw firsthand the huge impact of a pandemic when he was only a few years out of UQ and working as a young doctor in the emergency department of Caboolture Hospital.

What he saw on the frontline in 2010 was a system in crisis, barely coping with the large number of people presenting with suspected swine flu, whose symptoms could only be accurately diagnosed through sending samples to a laboratory from which they would return several days later.

In just over a decade since then, Dr Parsons has turned into an international medical entrepreneur – largely through the development of a rapid and accurate flu test.

So, when the world was hit by COVID-19 early last year, the now head of medical research company Ellume knew exactly what he had to do.

"During that first swine flu pandemic I found that the most effective tool to combat the virus was being able to accurately and quickly diagnose it," he says.

"We had been researching a flu diagnostic for many years. So, when COVID-19 hit the world, we were easily able to switch our model to work on a quick and accurate diagnosis for that."

The switch has paid off big-time for Ellume. The company was last year given emergency use authorisation by the US Food and Drug Administration for its COVID-19 home test, the first diagnostic tool that can be used completely at home by an individual without a prescription.

In February this year, the US Department of Defense awarded a contract worth US$230 million (A$302 million) to Ellume to ramp up production of the home test kits.

The contract will help boost the number of tests in the US by 640,000 per day by the end of this year, with 8.5 million kits to be distributed directly by the US Government.

The kits will only be available in the US, with Australian authorities yet to approve at-home testing.

When announcing the authorisation, the FDA said the Ellume COVID-19 home test results are delivered in as little as 20 minutes to individuals via their smartphone.

The test uses an analyser that connects with a software application on a smartphone to help users perform the test and interpret results.

Individuals are required to input their postcode and date of birth, with optional fields including name and email address. The results are reported where appropriate to public health authorities to monitor disease prevalence.

There is huge potential for this product. Currently, people need to travel to a test site where they then undergo nasal and throat swabs, which are then sent off to a laboratory for analysis – a process that generally takes more than 24 hours.

But the Ellume COVID-19 home test means that people can do it by themselves in their own home. They still need to take a nasal swab – but not as deep as traditional tests – and they can be portably analysed. Effectively, people can self-diagnose through their smartphones.

For Parsons, it has been a seamless if spectacular rise over 20 years from university student to doctor to international entrepreneur.

He attended UQ between 1998 and 2005, departing from the St Lucia campus with a Bachelor of Science (First Class Honours) with a dual major in Physiology and Biomedical Science, as well as a Bachelor of Medicine and Bachelor of Surgery.

He also has a strong family connection to UQ – his grandfather, Ralph Parsons, was a physics professor in the 1970s and later became Chairman of the Academic Board and then Deputy Vice-Chancellor (Academic) at UQ.

There is very little silver lining on the dark cloud of COVID-19, but for Ellume, the company was in the right place at the right time.

The past year has been extremely busy for the company, as the world has been looking for a rapid and accurate test for COVID-19, and Ellume seemed to be in the best position to provide one.

Governments suddenly saw the potential in the Brisbane company which recently built a large manufacturing facility at Richlands in Brisbane's outer west.

In October, the US Government awarded the company US$30 million – about A$40 million – through its National Institute of Health Rapid Diagnostics initiative; while in December, the Queensland Government gave the company a grant to help expand its Richlands operation, which is already the largest of its kind in the southern hemisphere.

The company plans to manufacture and deliver more than 20 million COVID-19 diagnostic tests by the end of this year.

Ellume shows that Queensland can produce internationally competitive products for which there is a high demand – from Richlands. And saving a lot of lives as well.

This is an edited version of an article that appeared in Contact *magazine.*

BURSARY BOOST
for Indigenous doctors

Proud Aboriginal and Italian woman Ella Ceolin is one of dozens of students at The University of Queensland to have received a life-changing scholarship from the Dr Alan van Tran and Minh Ha Tran Indigenous Health Education Bursary.

The generous scholarship was established to address the health inequalities faced by Aboriginal and Torres Strait Islander communities.

After he and his wife, Minh Ha, arrived in Australia as refugees, Dr Tran obtained his Doctor of Medicine at UQ in 1983, and then opened his own clinic at Inala in Brisbane's south west.

Through his work, Dr Tran noticed the gap in health outcomes experienced by local Indigenous communities.

As a result, he and his wife created the Bursary 10 years ago to support the next generation of Indigenous medical practitioners, with 34 scholarships awarded since its establishment.

"My family has faced our own struggles in the past, but we have always managed a way through. We are humbled to now be in a place where we can support those who need assistance," Dr Tran says.

"I believe it is all of our responsibilities to 'Close the Gap' and actively seek to redress inequalities and disadvantage.

"I see this bursary as our way to ensure Indigenous students have the opportunities they deserve, but which society may not have always afforded them."

In 2020, one of those students was Ella Ceolin, who did not come from a family with a background in medicine.

"As I'm sure Dr Tran would know, pursuing medicine is not an easy task; however, my pathway has been made easier because of their generosity and support," Ella says.

For Ella, now a Doctor of Medicine student at UQ, her scholarship meant she could move closer to campus for her postgraduate studies and avoid the three-hour commute she endured from her family home during her undergraduate degree.

She now has more time to devote towards her dream of becoming an Indigenous doctor.

"I want to become an Indigenous doctor to make a personal contribution to closing the health gap," Ella says.

"I believe that building a strong Indigenous health workforce is key to providing more culturally appropriate and sensitive health care."

Minh Ha Tran and Dr Alan van Tran

Growing opportunities and improving health through generosity

Education changes lives, but many students struggle with financial hardship. Together we can improve the health of entire populations of women and men, children and seniors, families and communities. Help a student on their road to building a healthier world.

Give to ***medicine.uq.edu.au/philanthropy****, or create your legacy through a bursary by emailing* ***med.advancement@uq.edu.au***

Pictured left: MD student Ella Ceolin

medicine.uq.edu.au

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