University of Otago
Te Whare Wānanga o Otāgo
New Zealand

Department of Anatomy
School of Biomedical Sciences

ANATOMY OTAGO

THE INSIDE STORY

Issue 35, October 2018

Teaching Fellow receives national award

Anatomy Teaching Fellow Dr Rebecca Bird was a winner at the national Tertiary Teaching Excellence Awards held recently at Parliament, winning a Sustained Excellence Award in Tertiary Teaching. She is one of only ten teachers nationwide to receive an excellence award in 2018.

Rebecca says it was an incredible honour to be recognised with this award. *"It's wonderful to receive an award for something that I love doing so much. It wouldn't be possible without the amazing team I get to work with: enthusiastic teaching colleagues who inspire me, technical staff who create amazing teaching resources and make everything run smoothly, and administrative staff who are the glue that hold everything together. I'm also lucky to have the privilege of teaching so many curious students who surprise and challenge me. "*

In announcing Rebecca's success to the department, Head of the Department of Anatomy Professor Lisa Matisoo-Smith said of Rebecca *"This is much deserved acknowledgement of your dedication and hard work. We are so proud of you!"*

In the May 2018 edition of this newsletter we announced that Rebecca had received a University of Otago 2018 Teaching Excellence Award in recognition of her passion for teaching, and commitment to provide an inclusive learning environment for her students. At that time she mentioned that, for her, the joy of teaching was all about the interaction with students, helping them find what interested them, what they're passionate about and seeing those light-bulb moments when they suddenly get something they have been struggling to understand.

We are all very proud of Rebecca's achievement, and that her passion and enthusiasm to inspire students has been recognised at the national level.

And we have more winners ...

Young researchers receive prestigious awards

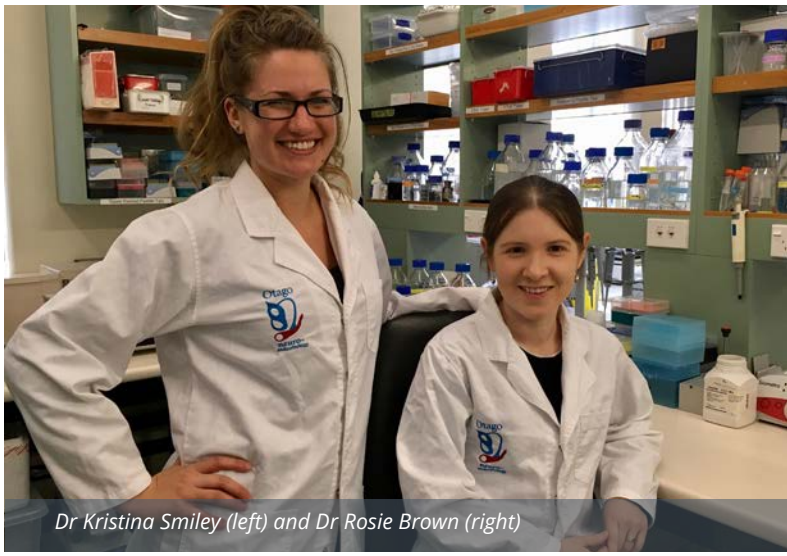
Two young researchers from the Grattan research lab have won prestigious awards at recent international meetings.

Research Fellow Dr Rosie Brown was awarded the Michael Harbour Prize for Young Investigators from the British Society for Neuroendocrinology. This prize is awarded each year to an outstanding member of the emerging generation of neuroendocrinologists. She was invited to give a lecture at the 9th International Congress of Neuroendocrinology (ICN) meeting held in Toronto. Her presentation showed how the hormone prolactin acts in the hypothalamus to induce a mother to show maternal nursing behaviour towards her offspring when they are born.

Postdoctoral Fellow Dr Kristina Smiley has received a Young Investigators Award at the Society of Behavioral Neuroendocrinology young investigator symposium held at the ICN meeting in Toronto. The award is presented to senior graduate students or postdocs who "have a substantial story to tell about their research".

Kristina's award was based on her recent PhD research which looked at the role of the hormone prolactin in avian parental care behaviours from a neural and hormonal perspective.

She has developed several new protocols for measuring hormone levels and hormone receptor distribution in avian brain tissues which has allowed her to measure prolactin in the blood and measure prolactin receptor density in the brain of zebra finches, methods which are novel to this species.



Dr Kristina Smiley (left) and Dr Rosie Brown (right)

Both awards were presented at the ICN meeting. This meeting is the largest gathering of neuroendocrinologists in the world, attended by over 1,000 scientists, held every four years.

School of Biomedical Sciences photo competition

Anatomy staff and postgraduate students scooped five of the ten prizes offered in the School of Biomedical Sciences photo competition held as part of the 2018 New Zealand International Science Festival. All staff and students of the School were invited to submit photos which illustrated the festival theme of "Go Beyond".

The Anatomy winners were:

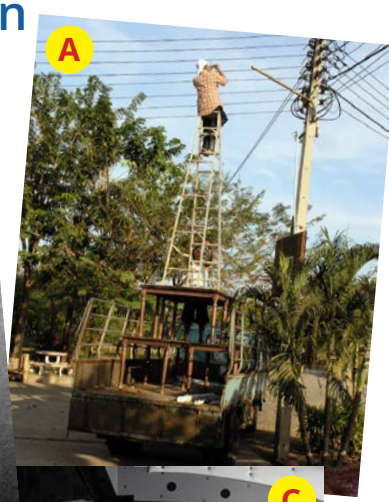
A: Chris Smith *"Go beyond. Enough said."* (Taken in the streets of Phimai, Nakhon Ratchisima provence in Thailand.)

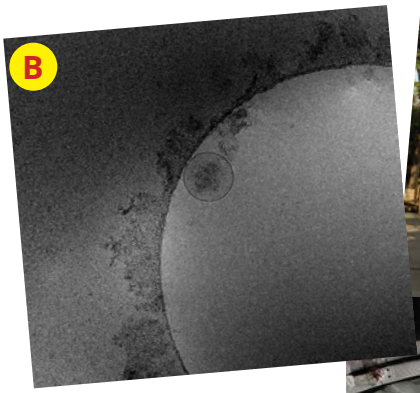
B: Aimee Chu *"Lost in inner space."* (An exosome - in the middle of image - secreted by a brain cell viewed on a JEM-2200FS Cryo-TEM)

C: Chris Smith "*Where dreams are made (and come true).*" (*Space Shuttle Explorer*, Kennedy Space Center, Florida, USA)

D: Neil Gemmell *"The last sampler?"* (On site at Loch Ness)

E: Kate McDonald *"An evening of stargazing and marshmallows."*





Academic profile: Dr Erik Wibowo

Erik Wibowo arrived in the Department in June to take up the position of Lecturer in Clinical Anatomy. We find out a little bit about him and his research, and how he is adapting to the New Zealand way of life.

Where were you born?
I was born in Pati, a small city in Central Java, Indonesia - population about 1.4 million. It's considered a "small" city compared to other cities in Indonesia. My home town is within 2 hours drive from two archaeological sites: one is where an extinct elephant species was found (*Stegodon trigonocephalus*); the other is where a giant skeletal fossil of the hominid *Meganthropus palaeojavanicus* was found. (I thought the biological anthropologists in the dept might appreciate this detail!)

I moved to Australia in 2003 to do a BMedSci (Honours) at the University of Sydney, and in 2008, I started my PhD in anatomy and neurobiology at Dalhousie University in Halifax, Canada.

What were you doing before you came to the Anatomy Dept?
In 2014 I moved to Vancouver, Canada, to do my post-doctoral training. I was involved in multiple research studies on prostate cancer patients. One was a national educational initiative designed to help prostate cancer patients and their partners manage the side effects of androgen deprivation therapy. In the second project I helped develop a questionnaire tool for assessing sexual function of gay and bisexual men with prostate cancer. The third project was a behavioural project to investigate how prostate cancer treatment affects visual attention.

Why did you apply for the Lectureship position at Otago?
Ever since I was an undergraduate, teaching anatomy and biomedical research have been my long-term career goals. That was the reason I pursued a PhD in anatomy and neurobiology. Towards the end of my post-doctoral training I was determined to find a career in academia.

When the Lectureship position at Otago was advertised, I saw a great fit in terms of my teaching and research background - I had previously taught anatomy and I see potential collaborations with faculty members here who are doing hormone-related work. I knew Otago has a great international reputation, so when I saw the ad, I did not hesitate to apply.

When I came here for the interview, I was really impressed by the teaching and research environment (also the warm welcome from the Department).

What does your research focus on?
My primary research focus now is on the behavioural impact of androgen deprivation (e.g. on sleep, sexual and memory functions). Since coming to Otago I have launched a study to investigate how androgen deprivation therapy affects the sleep quality of prostate cancer patients and, indirectly, their partners. I anticipate in the coming years I will start more projects on the quality of life of prostate cancer patients and their partners. In addition, I will use animal models to better understand the impact of androgen deprivation on the different behaviours mentioned above, and whether estrogen treatment can alleviate the negative impact of androgen deprivation.

Where do you hope to take your research?
My research falls into the category of behavioural endocrinology i.e. on how hormones affect behaviours. I see that my research has clinical relevance for populations that experience hormone deprivation such as prostate cancer patients who are on androgen-depriving treatment and post-menopausal women. The loss of gonadal sex hormones in these populations may impair their quality of life, so I'm hoping that data from my research may eventually help them have a better quality of life.

What papers are you involved in teaching?
I am currently teaching, as a demonstrator, the lab component of gross anatomy for the third year medical program. The topics I'm involved in are the thorax, abdomen and pelvic anatomy.

What stimulated your interest in pursuing an academic career?
I have been interested in an academic career since my undergraduate studies. Back in 2007 I did an Honours project in comparative anatomy. During that period, I taught a few undergraduate courses as a lab demonstrator. That early teaching experience made me realize how much I enjoy teaching and interacting with students. Plus, I see teaching as a learning experience for me. Every year, when students ask me challenging questions, it motivates me to find out the answers. There's always something new to learn by working with students.

Also, that Honours project was my first research experience, and really inspired me to pursue a research career. I am passionate about my research, so I find it rewarding to be able to do research in my area of interest. In research, when interesting data are found, it motivates me to explore more.

How have you found Dunedin? Had you been to New Zealand prior to applying for the position here?
I visited New Zealand in 2006 and I loved it! I spent most of my

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time in Christchurch and Queenstown, but I did have a one-hour stop at the Dunedin Railway Station.

My experience in Dunedin has been great! My partner and I found a quiet sunny home in North East Valley - so quiet that in the mornings we only hear birds and the occasional "baaa..." from the hills. I'm amazed at the vast number of stars I can see in the morning because there is very little light pollution here. I also appreciate that the city is so walkable. It's nice to walk to work through the Botanical Gardens. I walk everywhere most of the time, even a few times from NEV to St. Clair!

Things I like: It rarely rains (coming from Vancouver where it rains a LOT); Whittaker's Hokey Pokey chocolate bar (the bars are large and inexpensive!); being able to see sheep up close near the city, and the marshmallow slice Aven makes!

Have you had any culture shocks understanding Kiwi-slang or adapting to our way of life?
Sweet as; Good as gold; Wee bit.

Things I don't understand: WHY some people wear shorts or walk barefoot in the middle of winter? Also, I heard Christmas songs playing on a few occasions in May/June. One time I was in a barber shop, and Mariah Carey's "All I want for Christmas is you" was playing on the radio!

Is there anything you miss from home?
I like cool weather so I don't miss the extreme heat in Indonesia. I have been living overseas for so long that I can easily adapt to new environments. Perhaps I sometimes miss the food though.

What do you like to do in your free time? Any hobbies?
Since my PhD, I have enjoyed cooking. When I was in Halifax, there was no Indonesian food around, so I was forced to learn how to make my own dishes. I learnt a lot from my mom and grandma about Indonesian cooking at that time. I found cooking was a stress-relief when my experiments didn't work out. Also, it's the only hobby where my dissection skills can be useful at home (when cutting up a whole chicken)!

Other than that, I enjoy travelling, hiking, watching movies and going to music concerts. Since coming here, my partner and I have not done much sightseeing so we're really looking forward to seeing more of New Zealand. I went for a wildlife tour on the Peninsula after my job interview. It's amazing that we can see penguins and sea lions so close to the city. That's a Dunner Stunner!

Expo showcases Anatomy technology

When you think of the many different learning tools available to teach anatomy, you probably don't think of an avatar, or body slices so thin you can almost see right through them. And yet these are two of the innovative technologies being developed right here in the Department of Anatomy to help you learn, and remember, anatomy.

Dr Yusuf Cakmak's avatar app, and plastinates developed right here in the department were among technologies on display at TEXpo, a combined University and Polytechnic event held as part of a national Techweek festival back in June.

Yusuf demonstrated his interactive avatar app which uses 3D technology to mimic a user's hand and finger movements onto a laptop screen, translating the muscle activation to the image with labels indicating the muscles and tendons used to make the movement.

Ms Marlene Black presented a selection of E12 sheet plastinates, a cutting edge technique which can show the intricate connections and vessels normally hidden deep within the body, as well as prosections prepared in the Department.

Marlene said a broad cross-section of people visited the expo. *"Many people simply could not believe the specimens were real and had been produced right here in Dunedin."*

Caption this!

Isn't it interesting to see what some academics get up to in their spare time!

Put your thinking caps on and come up with a caption for this image of Professor John Reynolds at leisure. The person who submits the best caption (as judged by our Head of Department) will win themselves an Anatomy t-shirt. John will also be part of the judging panel (with your names anonymised) so be nice!

Send your entries to competition@anatomy.otago.ac.nz

Entries must be received by the end of Wednesday 31 October to be considered for the prize.

(Please note: permission to publish this photo was kindly (if somewhat foolishly) granted to us by Professor John Reynolds himself!

Under African Skies

Sitting on a blanket under a tree on a farm in Kenya is not your usual place to test new equipment. But it was one of the locations Dr Jo-Ann Stanton and colleagues visited to test the PDQeX (Pretty Damn Quick eXtraction) device, a portable machine capable of preparing nucleic acid on-the-spot.

In fact, the team visited farms in three East African countries to test the device on cassava crops. They were hosted by scientists from the Mikocheni Agricultural Research Institute (MARI) in Dar Es Salaam, Tanzania; the National Crops Resources Research Institute (NaCRRI) in Kampala, Uganda; and the School of Horticulture at the Jomo Kenyatta University of Agriculture and Technology (JKUAT) in Nairobi, Kenya.

Jo says the idea to develop the PDQeX came from the team's drive to move complex molecular diagnostics away from the laboratory and into the field (literally!), so that test results can be delivered quickly where and when they are needed.

Coupled with the MinION sequencer (a USB driven device which can perform high throughput sequencing) and the MinIT (which converts data in real time), the PDQeX makes on-farm sequencing possible – a process which would normally require precious time and a computer with a lot of memory – something not available when working on a remote farm!

You may be wondering why they chose to travel to Africa to test the device, not somewhere closer to home, and why cassava plants?

Cassava is a root vegetable which provides a primary food source for over 800 million people worldwide. The health and wellbeing of many villagers and the economy of their communities is heavily dependent on a good harvest and yield.

Jo is very excited about the benefits the device will bring to these communities. *"Long term this work has shown we can invent, reinvent and develop robust diagnostic screening technology that is accessible to all people in almost any environment."*

"In an increasingly globalized culture we can no longer rely on distance to contain outbreaks but must enhance response times to effect any containment."

All of the farms visited were either owned or farmed by subsistence cassava growers, mainly women, working to feed their families and provide the income needed to run their households.

"When arriving on site our first task after meeting the farmers was to find a place to spread out our blankets to form a work area. Then we would walk the farm collecting leaf or insect samples to sequence."

Once collected, each sample was crushed into a homogenization buffer and transferred to a specially designed extraction tube with a lyophilized enzyme mix. The tube was placed into the PDQeX and incubated to activate the enzymes for tissue digestion and heated to shrink the tube, forcing the prepared DNA through a purification filter and into a collection vessel. The DNA was then used to make a MinION sequencing library and loaded onto a flowcell for sequencing.

"Within about 20 minutes of starting DNA sequencing we were able to diagnose Cassava Mosaic Virus (CMV) in infected plants and also in whitefly, the vector that spreads the virus between plants."

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Jo is happy to report that in-field sequencing was successful in all three countries. Cassava which was clearly not infected did not generate CMV sequences while those displaying all of the clinical signs of infection returned CMV diagnostic sequence data. Plants that looked healthy but were growing alongside infected plants were shown to have low levels of viral infection.

The detection of CMV sequences from two of the six whiteflies showed for the first time, and in real-time, a link between the virus, the whitefly species and the host plant. A world first!

With these successes under their belts, the team decided to push further, and sequenced cassava stems. Stem material used to propagate cassava is widely traded between farmers. The virus has never before been detected in the stems but the team was able to detect low levels of the virus. This leads them to believe there may be a method for screening and certifying propagation material in the future.

"Not only will this ensure a clean crop for the farmer but it will effectively fight the spread of cassava viruses" Jo says.

One of the biggest results, and another world first, was that they were able to show that whole genome sequencing can be used as an on-farm diagnostic tool in extremely low resource environments.

"It doesn't get more basic than sitting on a blanket under a tree with no access to internet, refrigeration, mains power or running water."

The team still has a lot of work to do to ruggedize in-field diagnostic technology, but Africa has given them robust proof of the power of on-site diagnostics.

The next step is to publish the work they have done. And Jo hopes to be able to return to East Africa in the not too distant future to test their next on-farm diagnostics and to continue working with the incredibly inspiring team of scientists.

"I will always remember trying to extract DNA on a blanket under a mango tree while the whole village played African drums and cooked us cassava. Magic!"

[The Cassava Virus Action Project is led by Dr Laura Boykin of the University of Western Australia. Jo worked closely with scientists based at MARI, NaCRRI, and JKUAT, and collaborators from ZyGEM NZ Ltd, specifically Dr David Saul who founded the company and invented the PDQeX concept. This project is supported by an MBIE Project grant.]

Christchurch Thanksgiving Service

Over two hundred people attended the Department's Thanksgiving Service held in Christchurch on Tuesday 11th September. Family and friends of bequest donors were joined by Christchurch based fourth, fifth and sixth year medical students, staff of the Department of Anatomy, and Dr David Kieser, Otago graduate and Specialist Orthopaedic Surgeon, who gave the key address.

The service was an opportunity for staff and students to meet with the families, to acknowledge and thank them for supporting their loved ones wish to donate their body to medical science.

A special booklet of remembrance containing tribute messages written by the families was prepared for the occasion. Some of these messages were read during the service, giving an insight into the lives of these special people, their achievements, and reasons for donating their body. The students also gave their own words of thanks and appreciation.

An especially moving part of the service was when candles were lit in memory and respect of the donors.

The next Thanksgiving Service will be held in Dunedin in 2019.

ALUMNI PROFILE...

Carthika Luxmanan, BSc(Hons) PhD

Helping researchers to make a difference

Carthika Luxmanan works as a Business Development Manager for the Research and Enterprise Office at the University of Otago. She provides support for researchers in the biotech and public health sectors helping them identify new industry ventures and opportunities. She also assists in all aspects of non-contestable funding and provides support for industry engagement for researchers under her portfolio. In a nutshell, Carthika's role helps to bring business into the University of Otago!

A typical work day could see her negotiating research contracts or intellectual property (IP) disclosure agreements, helping with writing business cases, liaising with companies to arrange visits to the Dunedin or Wellington campuses, attending strategy meetings with colleagues and researchers, chairing meetings, putting student IP agreements in place, and general problem-solving.

Carthika says *"Actually, a typical day involves lots of meetings. Might sound a bit boring but the work is actually really fun. I get to see where our researchers are making a difference."*

"I really enjoy meeting with researchers, making connections with companies, and working with my colleagues. I especially enjoy 'walking meetings' and showing off our beautiful campus to visitors."

After completing her PhD in Neuroscience, Carthika worked as a Research Scientist for Pacific Edge Limited, a cancer research company in Dunedin. She worked in the lab on assay improvement and development, and ran patient samples for the Cxbladder assay in the diagnostic lab. She went on to help organise and run clinical trials and feasibility assessments of the Cxbladder suite of products in the US, Australia and New Zealand.

"I got to travel a bit and learnt a few good skills at Pacific Edge, including what it takes to translate research into clinical outcomes. I made great connections and was part of some exciting changes for the company. But after 7.5 years it was time to make a change and I found this great opportunity with the Research and Enterprise team at Otago in mid-2017."

She still gets to travel, with regular trips to Wellington to look after business developments at the University of Otago Wellington campus, and has opportunities to attend overseas conferences.

There are many skills Carthika says she learnt through her Anatomy and Neuroscience studies which she still finds useful in her job today.

"Completing an Honours degree and a PhD required focus and discipline, attention to detail and perserverence, all of which I use daily."

"The main papers I took were related to neuroscience and neuroanatomy, and my PhD research investigated molecular aspects of age-related memory deficits. I can't help but link behaviours I might see in people back to the brain regions that might be involved, and what possible cellular mechanisms may be at play to elicit that behaviour, be it good or bad!"

Science festival fun for all ages

There were loads of fun activities on offer for kids of all ages at Anatomy's booth at the Uni Expo. The expo was held as an event of the New Zealand International Science Festival. Kids could try their skill at a giant "Operation" game, get up-close and personal with a deer heart or a lamb brain, and paint their "insides" onto a t-shirt which they could then take home.

The W.D. Trotter Anatomy Museum was open for tours, along with a display of current research activities, including virtual reality technology.

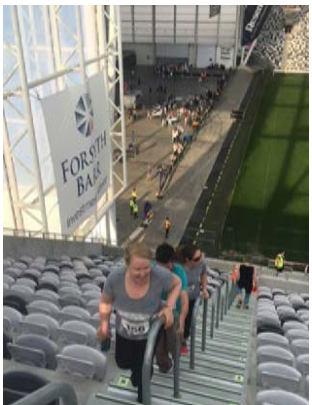
The Department also hosted an evening of short research talks. Some of our expert researchers spoke about the amazing research they are involved with. Topics ranged from bioarchaeology, building bone from sheep's wool, and native bird sperm, through to stimulating the brain, and the Loch Ness monster!

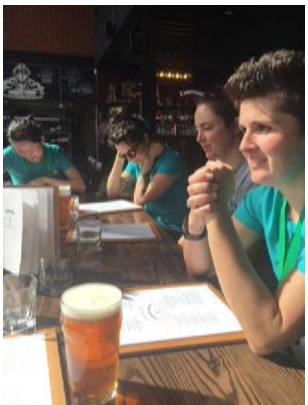



A small but gallant team from the Department of Anatomy took part in the Stadium Climb challenge in Dunedin, raising $1,500 for Leukaemia and Blood Cancer New Zealand. The team, aptly named "Anatomically Correct", navigated the more than 5,200 steps up and down and around the north, west and south stands of the Forsyth Barr Stadium - that's three laps of the stadium. Yes, that's right, they completed three full circuits inside the stadium … yikes!

We think they deserve a big round of applause, a massage and a long sit down! In total, Stadium Climb Dunedin raised over $60,000!

The Anatomically Correct team from left to right: Edwina Dowle, Alana Alexander, Andrew Clarkson, Lisa Matisoo-Smith, Lilly Yu, Aven Drayson, Lauren Meckel





Far Left: The view from the top

Middle: Celebrating at the finish line

Left: Liquid refreshments to replenish lost fluids!

NEWS FROM THE EMERGING RESEARCHERS GROUP

2018 Highlights

The Emerging Researchers Group (ERG) aims to connect early career researchers in the research groups across the Anatomy Department, forming a supportive community and providing opportunities for learning and growth. With the size of the Department and the diversity of the research groups, the ERG is an important way for early career researchers to feel connected.

This year we have had a full roster of journal club meetings that allowed members to gain presentation skills and practice and critically discuss research articles. There have also been a number of workshops, discussion sessions, and social events. Highlights so far have included a teaching workshop led by Drs Brad Hurren and Rebecca Bird, a discussion around the kindness in science movement, along with beginner guides to coding and conference attendance.

Our Mid-Winter Warmer potluck was another big hit! Hearty food and drink, and casual conversation brought everyone's spirits up after Matariki. We are currently anticipating a great workshop to celebrate Te Wiki o te Reo Māori.

New faces are always welcome, so bring your lab-mates (or even your supervisor) to the Anatomy tea-room on Friday afternoons. Come along and get connected!

Top image: Teaching workshop (photo Rebecca Bird)
Bottom Image: Mid-Winter potlock (photo Anna Gosling)

Bird of the Year 2018

PhD candidate Natalie Forsdick is on the campaign trail to see her study species, kakī/black stilts, voted New Zealand Bird of the Year this October.

Kakī were once widespread across New Zealand, but had declined to just 23 birds by the early 1980s. Intensive conservation management, including a programme of captive breeding for release has seen the population begin to recover. This culminated with the release of over 140 juvenile kakī into the wild in August, and the official population has now grown to 132 wild adults.

Despite this, kakī still have a long way to go, with one challenge being lack of public awareness. To combat this, Natalie is co-manager of the kakī Bird of the Year campaign alongside fellow PhD candidate Stephanie Galla of the University of Canterbury. Through an intense social media campaign illustrating how their favourite 'All Black' is staunch, fierce, rare, and beautiful, they intend to raise the profile of the critically endangered kakī, and their braided river habitat.

Natalie would love to see the Anatomy Department embrace their inner bird-nerd and support kakī this October! Voting runs from October 1 – 15 at www.birdoftheyear.org.nz.

For more on #TeamKakī, check out 'vote4kaki' on Facebook and Twitter.

Left: An adult kakī/black stilt
(PHOTO: Liz Brown)

NEWS FROM THE RESEARCH GROUPS

Biological Anthropology...

Researcher to receive Rowheath Trust Award and Carl Smith Medal

Associate Professor Siân Halcrow is the 2018 winner of the University's Rowheath Trust Award and Carl Smith Medal. The Award recognises her outstanding achievements in the bioarchaeology field of infant and child health and disease.

Siân leads, and is an Associate Investigator, on several multidisciplinary projects investigating the effects that the adoption and intensification of agriculture has on health in the past, with a regional focus on Southeast Asia.

The late Sir Carl Smith was a prominent Dunedin businessman and member of the University Council who set up the Rowheath Trust to support and recognise the outstanding scholarly achievements of Early Career Staff.

Siân will receive the Award and Medal on Thursday 18th October when she gives the Carl Smith Research Medal Lecture.

The Carl Smith Research Medal Lecture - Associate Professor Siân Halcrow
"Children as canaries in the coalmine: Modelling social and environmental change in prehistory."
Richardson Moot Court - Richardson Building 10th Floor,
Thrusday 18 October, 5:30pm

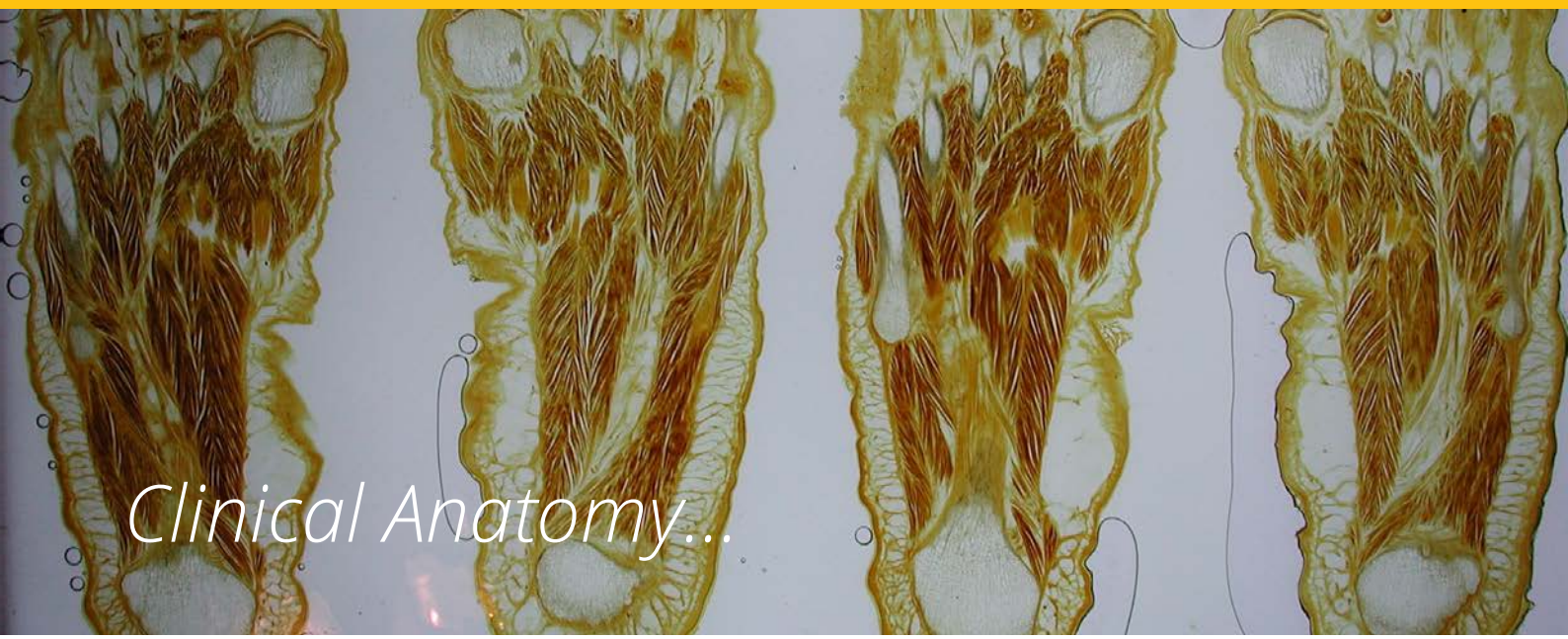
Can I offer you a slice of my thesis?

Clinical anatomy and bioanthropology PhD candidate Jade De La Paz loves a challenge. When the University's Graduate Research office ran a Bake Your Thesis competition as part of its Graduate Research celebrations, she didn't hesitate to enter.

Her only issue was ... how do you represent the biological profile of sex estimation (her research subject) as an edible treat? The answer - a sculpted chocolate skull cake with soft-tissue icing highlights.

Her creation was one of 14 entries from postgraduate research students around the University.

Sadly Jade's entry didn't win the competition (the winning entry was a poppable cyst cake representing polycystic kidney disease!), however the Department did get to sample her creation at a morning tea. You could say it was jaw-droppingly good!



Anatomy Museum models get a spruce-up

The Anatomy Museum Workshop has been a hive of activity over the past ten months as Dr Louisa Baillie works her way through a long list of jobs. Her two main areas of focus have been the repair and maintenance of Anatomy Museum models and the development of new prototype models for teaching.

Repairs to models have included bogging and touch-up painting, and magnet insertions for a variety of teaching models, including 11 clastic (separable) and non-clastic (non-separable) upper and lower limbs, 16 brain stems, a large eye, l5 larynxes and 12 hearts. There have also been one-off repairs for other models using a range of materials including silicone, glues, and hair elastics!

Dr Baillie says the development of new prototype models using contemporary processes and materials (including digital acquisition, 3D printing, silicones, and plastics) is coming along nicely, with two models now in the first prototype stage and other ideas in the queue.

Further action in the workshop includes an improved storage method for the E12 slices. Tags which hold the E12s to the storage racks often get ripped away when being handled. They will soon be removed and replaced with eyelets and hooks allowing for improved storage and stacking and easier handling in the classroom.

Eloise McGrath of McGraths Bench Tops holds two re-polished resin casts
PHOTO: Otago Daily Times

Louisa is also engaging with local businesses for specialty work, such as the restoration of the scratched and damaged surfaces of the resin casts in the Anatomy Museum. McGraths Bench Tops have sanded and polished the casts to a brilliant surface finish, presenting clearer views of the human tissue (or corrosion casts as illustrated here) for new generations of students to enjoy. To ensure these polished blocks are less damaged in the future, dots of clear plastic have been adhered to the large flat surfaces, so now the casts will sit a little higher above the table surface.

New technical staff in the clinical / gross anatomy area

Over the last six months we have seen the addition of three new staff to our Gross Anatomy Team (GAT).

From left to right: Sharon White, Djuna Elkan and Louisa Baillie

Sharon White has joined us as cover in the Dissecting Room Technician role as Ellie Stevens covers in the Gross Anatomy Manager role with Rachel Kinnard away on extended leave. Sharon may be familiar to many of us through her other University of Otago role as the Pathology Museum Technician, maintaining the 2600+ Pathology pots, a good number of which are well over 100 years old. Prior to all this Sharon was a courier driver for 25 years, and served in the New Zealand Territorial Forces for 25 years. During her time in the Territorials she had two active 6 month tours to East Timor as a peace-keeper for the United Nations, helping displaced people back to their homes and families and eventually gain independence in the now Timor Leste. To top all this off, Sharon has a Blue Belt in Goju Ryu Karate, with her next grading coming up for Brown Belt – disobedient students beware!

With the ever-increasing student numbers and research requests coming through to the team, the work pressure has been building on our prosectors and plastinators for the general management of our precious resource. An additional prosector role was added to the team, and in May Djuna Elkan joined us all the way from California, U.S.A.

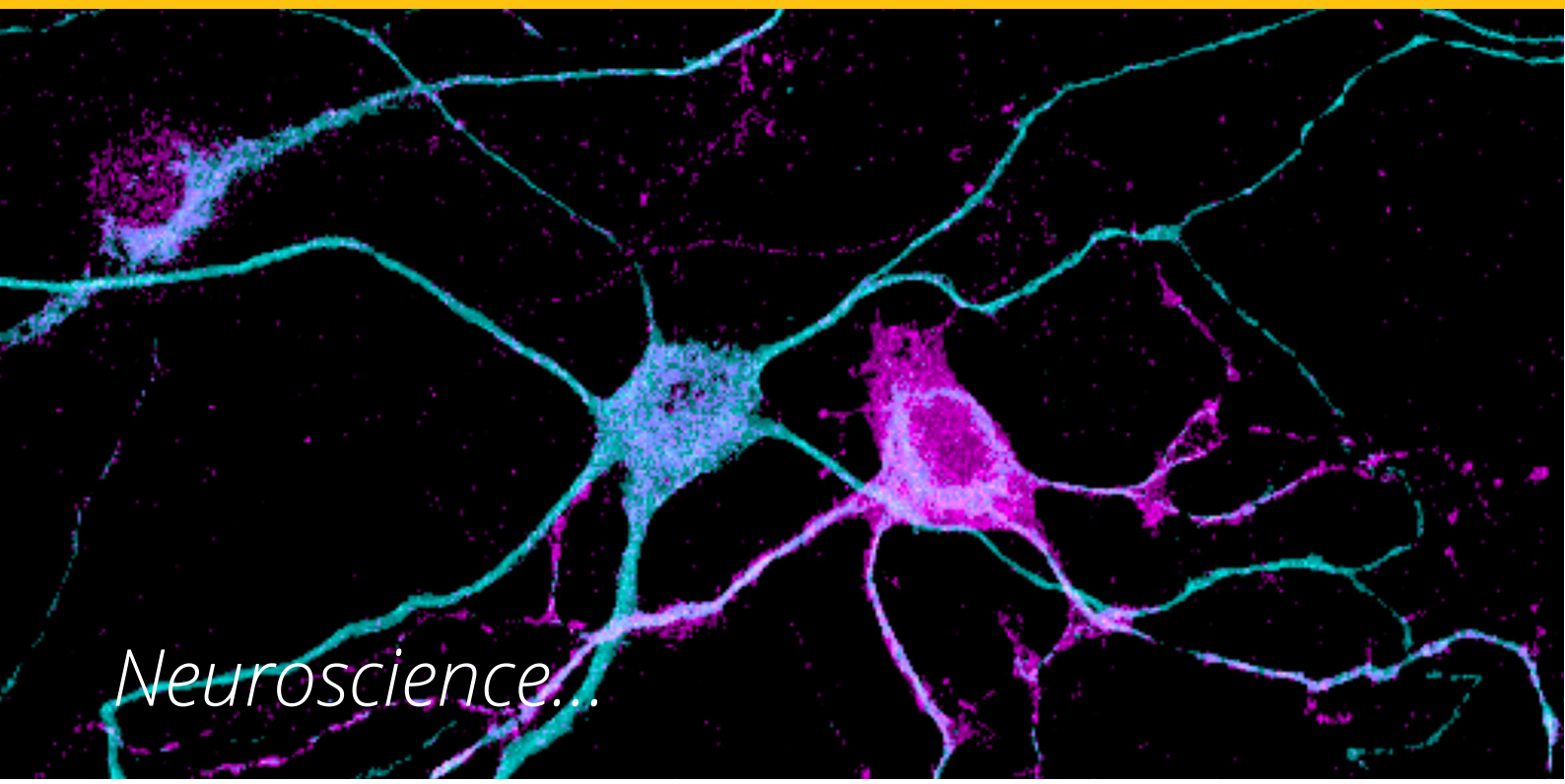
Djuna's interest in Anatomy began in High School where she took her first anatomy course. During her undergraduate training Djuna specialised in Forensic Anthropology and Criminal Justice, and in her spare time she volunteered at the Humboldt County Coroner's office where she assisted in autopsies. Djuna continued her education in anatomy and forensic anthropology at the University of Dundee in Scotland, where she completed her Master of Science. After graduate school she worked as a forensic autopsy technician in a private autopsy firm in California. She decided to move to New Zealand to get back to her anatomy roots, becoming a Prosector in the Department of Anatomy. As one of her many tasks in the Department, she is prosecting a lower limb to show the muscles of the leg and the gluteal muscles. Her next project will be a superficial facial dissection.

Another familiar face but in a new role is Louisa Baillie. Louisa had provided us with some temporary cover in the Anatomy Museum workshop for a few months, and it was great news to recently have her supported into a permanent role in this position. Louisa has a BCApS degree that was a double major in Nutrition and Food Science, followed by a Fine Arts degree that focused on figurative sculpture and drawing; and most recently a doctorate in Anatomy that investigated errors of prediction in forensic facial approximation. It is the Anatomy research that has given Louisa the opportunity to study the body from both scientific and artistic views, with a focus on practical outcomes.

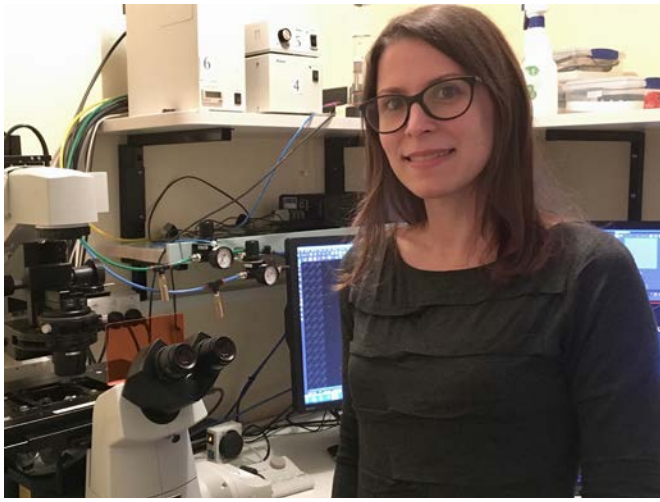
Louisa has begun work with the Department as an Anatomical Model Fabricator. Before Louisa began she had no idea how fascinating a job it could be. Louisa says *"Every day I am using my artistic and anatomical knowledge and problem-solving skills. I have the chance to be in the Anatomy Museum nearly every day, one of my favourite places, plus work with a great team of people equally animated about what they do. My work includes repairing and beautifying models that have become battered or worn, and collaborating with lecturers to create new models out of 21st Century materials and techniques that will deepen learning outcomes for 21st Century learners. To achieve these outcomes, I am developing collaborative and networking connections with key folk in other Departments, as well as outside industries and businesses".*

Outside of the Anatomy walls Louisa is doing some sculpture commissions. Her most recent work, a 2m tall relief sculpture of a festoon composed of a flower, ribbon, drapery and cacao pods, was a commission for the re-decoration of the original 19th Century facade of the Cadbury Fry Hudson's building that is on Castle Street opposite the Dunedin Railway Station. The restored facade was revealed to the public on the 30th September, just before Mondelez handed the complex over.

NEWS FROM THE RESEARCH GROUPS



Acquisition of the only Spinning Disk Confocal Microscope in New Zealand for live cell imaging



Research Fellow Dr Laura Gumy recently led an application to acquire a new Andor Dragonfly Spinning Disk Confocal Microscope that will be managed by Otago Micro and Nano-Scale Imaging (previously the Centre for Confocal Microscopy). The microscope will be equipped with 2 x 82% sCMOS cameras for simultaneous dual colour imaging and one EMCCD camera with SRRF for live superresolution. Andor's Micropoint has also been included for laser photoablation/photoactivation/photobleaching. The Department of Anatomy together with the Departments of Physiology, Pathology, School of Biomedical Sciences, Lottery Health, the Maurice and Phyllis Paykel Trust and a University of Otago Large Equipment grant-in-aid have contributed financially towards the purchase of the microscope. This microscope is an essential addition to core imaging facilities worldwide.

Spinning Disk microscopy has been hailed as the ideal solution for the live imaging of subcellular events over longer periods of time with greatly reduced phototoxicity or photobleaching to cells or tissue. Live-cell imaging using a spinning disk confocal allows high resolution fast 2D or 3D imaging, particularly of medium to thin living samples. The imaging technique is very flexible and not limited to one specific cell type or organism. In fact, any researcher at the University working with live cells/tissues ranging from microbes to plant and animal systems would benefit from using it.

This highlights the multipurpose character of the technique and microscope. The importance of live-cell imaging relies on its versatility and on the fact that the imaging facilitates the understanding of biological/pathological processes across diverse fields such as neurological, musculoskeletal, cancer, cardiovascular and microbiological systems. This information is crucial for understanding health and disease mechanisms and for the development of new drug leads and therapies.

Bringing a Spinning Disk microscope to Otago will create new opportunities for our researchers, increasing the possibilities of obtaining grants, forging new collaborations and publishing in prestigious journals. Most importantly, students will receive top tier training in cutting edge technologies expanding their training opportunities.

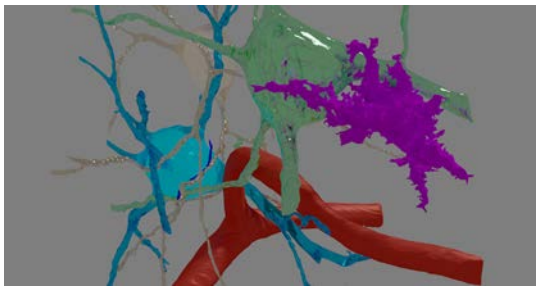
Funding for a SBF-FEG-SEM

We have exciting news for scientists and postgraduate students who are investigating biology and want to look at ultrastructural detail. The University of Otago Major Equipment has granted $990,000 as a grant-in-aid towards purchase of a Serial Block Face Field Emission Scanning Electron Microscope (SBF FEG-SEM) for the Otago Micro and Nano-Scale Imaging Centre. It is hoped to have a machine up and running by the end of 2019.

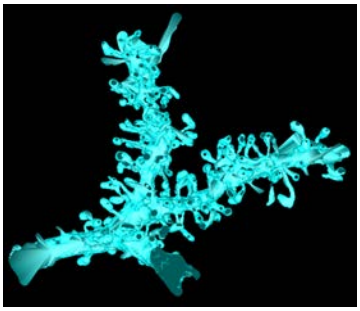
There are a number of projects already lined up to use the equipment but if you have never heard of SBF FEG-SEM contact Dr Ruth Napper, Mr Allan Mitchell or Dr Mihnea Bostina of the Otago Micro and Nano-Scale Imaging Centre. The essential advantage of looking at ultrastructure in the SBF-SEM compared to under a confocal microscope is that you simply see what is there, what is in the black space around the fluorescent antibodies that have labelled a specific structure and are imaged in the confocal.

The huge advantaged SBF-SEM has over conventional serial section analysis using transmission electron microscopy is that SBF-SEM can obtain a set of 800 reasonably well aligned serial images in a scanning run of approximately 24 hours. Something that previously required a high level of technical skill and at least two years. The resolution can also be very good but of course is tissue and operator dependent.

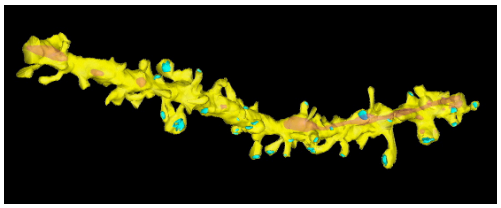
This year three Anatomy postgraduate students have been working on stacks of serial sections (ranging from 800 to 1200 serial images) obtained on a SBF FEG-SEM at Sydney University, to produce pilot data to assist with answering a number of questions concerning the long-term effects of exposure to alcohol during fetal brain growth.



The image on the grey background shows neurons, dendrites, a blood vessel and part of an astrocyte in the rat cingulate cortex (PHOTO: Callum Jones)



This image (left) shows a Purkinje cell spiny dendrite (teal blue) with postsynaptic specializations. (PHOTO: Sabian Wood)



This image (left) is a spiny dendrite from the CA1 region of hippocampus, with postsynaptic densities and mitochondria (orange) (PHOTO: Maddy Christy)

Distinguished researcher to visit lab

Dr Kelly Rogers, Lab Head of the Dynamic Imaging Centre at the Walter and Eliza Hall Institute of Medical Research in Melbourne will visit the University of Otago in early October. The visit has been arranged by Dr Laura Gumy in conjunction with Dr Adele Woolley from the Department of Pathology.

The Dynamic Imaging Centre is a core facility that supports biomedical research. Their facilities include confocal microscopy, live cell imaging (widefield and high-speed confocal), widefield deconvolution microscopy, small animal imaging using both bioluminescence and fluorescence techniques, high-content screening systems, and image processing and analysis.

During her visit, Dr Rogers has agreed to give two lectures, one on advanced imaging techniques, the other on managing a core facility (dates and venues to be arranged). She will also be involved in a Microscopy Workshop with a focus on Live Cell Imaging. Both the lectures and workshops will be available for researchers and postgraduate students from across the University.

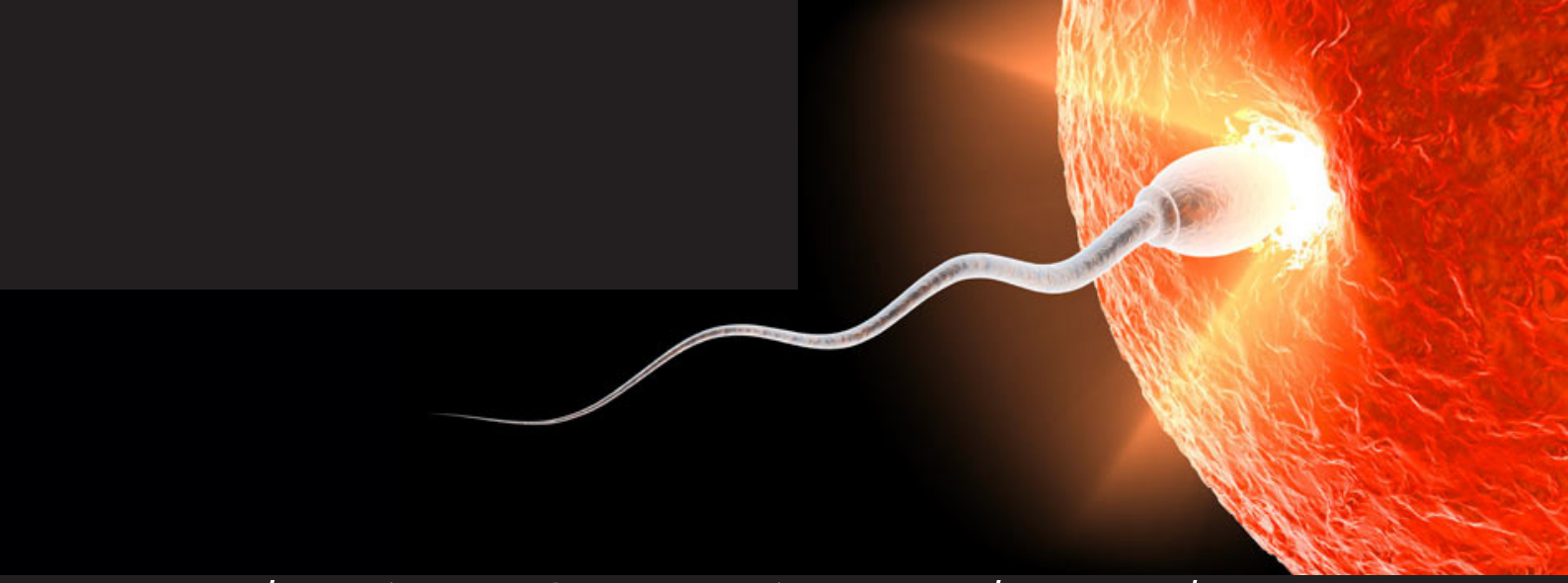
Queenstown Research Week

A large contingent of staff and postgraduate students from the department attended New Zealand's premier neuroscience gathering in Queenstown, the Australasian Winter Conference on Brain Research. The meeting encourages a multidisciplinary approach to neuroscience and is New Zealand's largest gathering of neuroscience researchers.

This year over 1700 registratnts from all around the world attended the week-long conference, including a Nobel Prize winner, and the Prime Minister's new chief adviser.

It was even rumoured that North Korean leader Kim Jong-un and "the Donald" himself attended! Or was it our very own Joon Kim and Greg Anderson in dress-up mode for the QRW fashionomics contest?

We'll let you decide!



Reproduction, Genomics and Development ...

Enabling 'attractive science' through an open-source Bio-On-Magnetic-Beads (BOMB) platform

Members of the Hore laboratory, along with collaborators in Europe, have recently released the "Bio-On-Magnetic-Beads" (BOMB), platform of protocols and methods they think will help change the way many biologists are doing their science.

A lot of research in modern biology requires the isolation of DNA, or other related nucleic acids, as these essentially contain the instruction manual for life. However, when most scientists purify nucleic acid, they do so using either toxic chemicals (such as phenol), or rely upon expensive 'spin-columns' that require bulky equipment like centrifuges. Usually this means that only a maximum of 24 samples can be processed at a time, so working with large numbers of samples is both slow and expensive. Dr Tim Hore and his team believe that tiny magnetic particles are the key to making this process much more efficient. Together with the laboratory of Tomek Jurkowski in Germany, they have perfected ways to make magnetic beads in an ordinary lab setting and use them to purify nucleic acids from a wide-range of sources – including animals, plants, yeast, bacteria and even environmental sources.

Co-first author of the study, and Hore laboratory member, Dr Donna Bond explains, *"The key to the process is the magnetic beads – under just the right buffer conditions, DNA and other nucleic acids will bind to the beads following cell lysis. Because the beads are attracted to a magnet, we can safely immobilise bound nucleic acid while all the protein and other components of the cell or tissue are washed away"*.

Although this technology has been around for some years now, it has not been possible for scientists to easily make their own magnetic beads, and much of the expertise surrounding their use has been locked away in large commercial companies. However, this Stuttgart and Otago based team have released all of their protocols online, and are now trying to grow an 'open-source' community where others can help refine magnetic bead protocols.

Dr Hore explains *"We want to get as many people involved as possible, so we created a website (https://bomb.bio) and a forum where researchers can easily access the protocols, but also leave comments about what works well and what could work better."*

BOMB.bio

The Bio-On-Magnetic-Beads (BOMB) platform uses magnetic nanoparticles to help purify nucleic acid from many samples for cheap. A single magnetic bead features in their logo (left) – essentially an iron ferrite core coated in glass to make it chemically stable. More details can be found at https://bomb.bio, or by following the "BOMB-squad" on twitter or facebook - @teamBOMBbio

Study co-author and teaching laboratory technician Tim Moser continues, *"...that said, we have actually been using the BOMB system in the 3rd year teaching labs for 3 years now. Getting things working in a class environment with large numbers of Anatomy students is a pretty good acid-test – we are confident that once almost anybody has the right beads and magnets, they will be able to purify beautiful DNA immediately."*

The beads in use in an ANAT 334 laboratory class

Team member Victoria Sugrue was first introduced to the BOMB protocols in the 3rd year Anatomy teaching labs, and then during a summer studentship in the Hore laboratory, played a key role in developing a protocol that extracts DNA from bulky mammalian tissues like muscle and skin. *"It took quite a lot of effort to get the beads working well for those tissues."*

While the team still has a long road ahead (their manuscript still needs to go through formal peer-review), Dr Hore said he was encouraged by the feedback and social media buzz they have had so far. *"We had over 70 tweets in the first 24 hours of posting the manuscript – more than I have had for any of my papers.....ever."*

A pre-print of the manuscript can be found at https://www.biorxiv.org/content/early/2018/09/12/414516