

THE INSIDE STORY *Issue 33, October 2017*

Global market the target for diagnostic technology



Members of the research team include (from left) Christy Rhand, Dr Jo-Ann Stanton, Dr Chris Rawle, David Saul (ZyGEM NZ Ltd), Associate Professor Marilyn Hibma (Pathology) and Chris Mason. Team members not pictured are Assoc Prof Bev Lawton and Assoc Prof Peter Whigham (University of Otago), Orion Scott (ZyGEM NZ Ltd) and Michael MacKnight (AD Instruments)

Dr Jo-Ann Stanton and colleagues have been awarded nearly \$6M in funding from the Ministry of Business, Innovation and Employment (MBIE) Endeavour Fund to design a hand-held analytical tool for on-the-spot diagnostic screening.

Despite advances in diagnostic technologies, the ability to rapidly and accurately diagnose infectious disease lags behind what the world requires. Diagnostic tools able to deliver immediate actionable information would address world health and environmental challenges such as water contamination, and diseases like Ebola and SARS (Severe acute respiratory syndrome)

Funding of this four-year Research Programme will enable Dr Stanton and her team to develop a 'sample-to-result' molecular diagnostics platform that will allow non-experts to deliver results rapidly at the point-of-care, enabling front-line professionals to take immediate action. The device will purify samples, detect the diagnostic marker and report the result to the operator in under 15 minutes.

Dr Stanton says the technology will target the global point-of-care diagnostic market, potentially worth US\$19.3 billion per annum.

"Our research places New Zealand at the forefront of the molecular diagnostics world stage. Benefits to New Zealand include establishing a significant export industry in high-value productions, research and development stimulation in the biotechnology sector, quality job creation and new growth opportunities."

Research funding support ...

Developing technology to facilitate tissue repair

Dr Andrew Clarkson and colleagues at The Ferrier Research Institute, Victoria University of Wellington, have received \$6,203,540 in funding from the Ministry of Business, Innovation and Employment (MBIE) Endeavour Fund for their research project entitled "Tissue repair technologies based on novel sulfated sugars".

The project focuses on preparing novel products that facilitate tissue repair. The technology being developed will replace existing treatments that have undesirable side effects.

Andrew is working with Lead PI Dr Simon Hinkley, and Professor Richard Furneaux and Peter Tyler of The Ferrier Research Institute, and Dr Azam Ali, Centre for Materials Science and Technology at the University of Otago.



Deep brain stimulation to improve quality of life

Dr Louise Parr-Brownlie has received \$1.1M funding from the Health Research Council of New Zealand for a three year project grant which aims to improve the quality of life for people living with Parkinson's disease.

The pre-clinical study will create an implantable light stimulator capable of delivering optical stimulation patterns to support lifetime treatment options for patients living with the disease.

It is hoped the effect of chronic light stimulation will improve precise hand movements and general daily activities of those living with the disease.



National award recognises excellence



Dr Brad Hurren receives his award from the Hon Paul Goldsmith, Minister for Tertiary Education, Skills and Employment

Congratulations to Dr Brad Hurren whose enthusiasm, commitment and passion for teaching was recognised at the 2017 national Tertiary Teaching Excellence Awards held in Parliament. The event was hosted by the AKO Aotearoa National Centre for Tertiary Teaching Excellence.

Brad is a Teaching Fellow in the Department and was one of only three University of Otago teachers to receive a Sustained Excellence in Tertiary Teaching Award.

The award citation states *"He truly inspires students in the field of anatomy to be the best they can be and so much more."*

Brad brings a unique blend of enthusiasm, student-centred learning and passion for his subject to his teaching.

Earlier this year Brad received a University of Otago Teaching Excellence Award, which qualified him for consideration for the national awards in Wellington.

Understanding the critical role of prolactin in nurturing behaviour



Dr Rosie Brown (centre) and Professor Dave Grattan (right) in the lab with Research Fellow Dr Sharon Ladyman (left) and Assistant Research Fellow Zin Khant Aung

Research undertaken by Dr Rosie Brown and colleagues has for the first time established a critical role for the hormone prolactin in promoting nurturing behaviour by a mother towards her young.

The results were recently published in the international journal *PNAS*.

With mammals giving birth to dependent young it is vital for their survival that parents care for their offspring. In most species, maternal care is the predominant form of parental behaviour.

It is known that hormones play a modulatory role in the brain to induce the onset of maternal nurturing behaviour, however the specific role of the pituitary hormone prolactin has remained elusive. The research team generated adult female mice with a targeted deletion of the prolactin receptor gene in one specific region of the brain, the medial preoptic area. These mice were able to get pregnant and

give birth normally, but they abandoned their pups within 24 hours of giving birth.

Prolactin is best known for its role in milk production, and these data now indicate that it also plays a vital role in establishing maternal nurturing behaviour. Disruptions in the ability of prolactin to act on neural circuitry in a mother may lead to problems with a mother establishing a bond with her baby.

Although they have shown that the brain's medial preoptic area is key to prolactin's regulation of behaviour, Dr Brown says the nature of prolactin's actions on neurons in this brain region is still unknown. Their future work aims to investigate how prolactin action in this brain region leads to such a profound change in behaviour.

Visit the [PNAS website](#) to view the full publication.

Anatomy Thanksgiving Service: *"Their memory will live on"*



Anatomy staff and students gathered recently with the families and friends of its body bequest donors to honour and thank those who have so generously donated their body to the Department for health science teaching and research.

The service was held at the Glenroy Auditorium in Dunedin and was attended by about 200 people, including University dignitaries, and students who take Anatomy as part of their health professional or science courses.

The service provided an opportunity for the Department, and its students, to acknowledge its donors, and the great sacrifice families make when a loved one bequeaths their body.

Families were invited to bring along photographs of their loved ones which were placed at the front of the stage, providing a focus for these people who were much loved, and had lived full lives. A booklet of remembrance containing families' own tributes and memories of their loved ones reinforced the generous and giving nature of these altruistic people. An especially moving part of the service was the candle lighting where families, staff and students were invited to light a candle in memory of the donors.

Students provided music and song throughout the service, and gave their own personal words of thanks to the families for the gift which has enhanced their own learning:

"We may not have known your loved one personally, however we hold an immense gratitude and respect for them through the gift they have given us." (Lily Cane, Second Year Medicine)

"As friends and family of these precious people, you have ushered us into a very private part of your life. I hope you feel we have earned the trust to be present there." (Aliana Corlett, Second Year Medicine)

For the families, the service provided a sense of closure for their loss, and hopefully a new understanding of how much the Department and its students value and respect their loved ones bequest.

This is the fourteenth year the service has been held. The 2018 service will be held in Christchurch.



Developing new perspectives on the mother-infant nexus

An innovative workshop run by Dr Siân Halcrow and Dr Rebecca Gowland of the University of Durham, brought together world-leading international scholars of anthropology with the aim of developing new theoretical and methodological perspectives for the study of the mother-infant nexus (relationship) in anthropology.

The aim was to develop new theoretical directions within anthropology and set future research agendas regarding the unique mother-infant relationship.

The workshop covered themes which explored biocultural understandings and embodied practices relating to maternal, fetal and infant bodies and the significance for early life development and overall population well-being.

Dr Halcrow says these themes were particularly topical as there is a burgeoning awareness within anthropology regarding the centrality of mother-infant interactions for understanding the evolution of our species, infant and maternal health and care strategies, epigenetic change, and biological and social development.

"Over the past few decades the anthropology and archaeology of childhood has developed apace, however, infancy, the pregnant body and motherhood continue to be marginalised. This



Dr Siân Halcrow (far left) with some of the participants who attended the workshop

meeting was the first of its kind to investigate the anthropology of the infant-maternal interface from a cross-disciplinary perspective, from biological anthropology, archaeology, bioarchaeology, social anthropology, medical anthropology, and psychology."

Participants came from the US, Canada, England, Ireland and New Zealand.

The workshop was held at Durham University in the United Kingdom, a research intensive university that actively fosters and supports inter-disciplinary workshops of this nature.



Durham University, England

Siân says the beautiful historic university buildings (pictured at left), which form part of the UNESCO World Heritage site, combined with excellent facilities created an inspiring backdrop for hosting the workshop.

The workshop was funded by the Wenner-Gren Anthropological Association, and supported by a Durham University International Senior Scholar Fellowship awarded to Siân ("Health and Diet Near the Start of Life: Small beginnings, significant outcomes") and a Matariki International Research Grant from the University of Otago.

PhD students sweep awards

OMSRS PhD student awards

Congratulations to Stella Cameron and Matthew Sykes who were placed first and second respectively at the 2017 Otago Medical School Research Society (OMSRS) PhD student awards. The awards evening is an opportunity for PhD students to present their health-related research in front of a learned audience of academics and their peers.

Stella's talk was entitled *"Pathophysiological and anatomical changes of the deep cerebellar nuclei in a chronic rat model of Parkinson's disease"*. Her PhD project focuses on investigating the role of the cerebellum in Parkinson's disease and how this may be affecting downstream activity in the motor thalamus, using in vivo electrophysiology and optogenetics. Stella is supervised by Dr Louise Parr-Brownlie. She received \$1,000 prize money.

Matthew's talk was entitled *"Low-intensity magnetic stimulation and excitability in the rodent neocortex as measured by local field potentials"*. Matthew works on a form of neuromodulation known as repetitive transcranial magnetic stimulation (rTMS). His PhD is focused on whether a low-intensity form of rTMS is able to impact local excitability in the cortex using in vivo electrophysiology and in vitro imaging. He is supervised by Professor John Reynolds, and received \$750 prize money.

Congratulations to you both. It is great to see the Anatomy flag flying so high!



Stella Cameron and Matthew Sykes are pictured at the awards evening with OMSRS President Dr Lyn Wise.

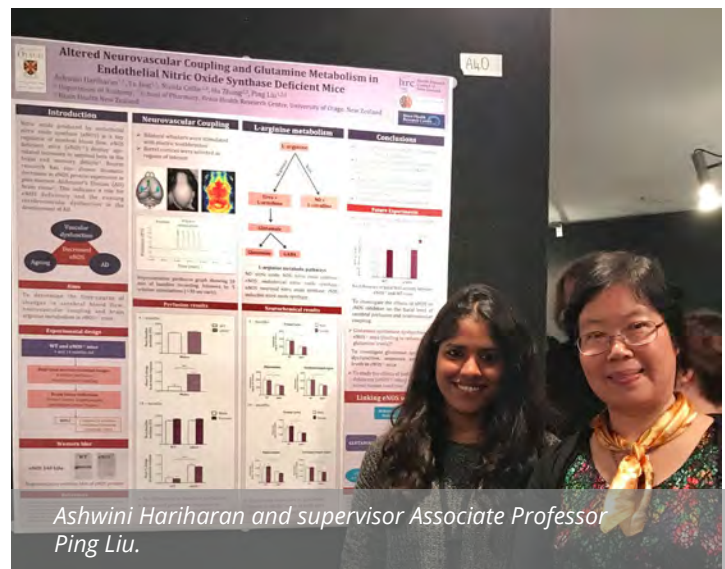
Goddard Prize

PhD student Ashwini Hariharan, under the supervision of Associate Professor Ping Liu (pictured far right), was awarded the Goddard Prize - the Best Student Poster Presentation - at the 35th Australasian Winter Conference on Brain Research (AWCBBR) held in Queenstown in September. Her poster was entitled *"Altered neurovascular coupling and glutamine metabolism in endothelial nitric oxide synthase deficient mice"*.

Alzheimer's disease (AD) is the most common cause of dementia. Since the amyloid cascade hypothesis has been increasingly challenged due to clinical trial failure of amyloid-centred therapy, a critical question has been raised: *Is amyloid- β the primary cause for the 95% of sporadic late-onset AD cases, or is it secondary to some other process?* There is therefore an urgent need to explore other mechanisms.

Neurons rely on brain's highly dynamic and complex vascular network to assure accurate and adequate distribution of oxygen and glucose. In the brain, neuronal activation triggers a local increase of cerebral blood flow, and optimal condition of such neurovascular coupling is critical for normal brain function. Recent research proposes that cerebrovascular endothelial dysfunction during advanced aging, together with other risk factors, may trigger the neurodegenerative processes. Mice with endothelial nitric oxide synthase (eNOS) deficiency display age-related increases in amyloid beta in the brain and memory deficits.

Ashwini's work, for the first time, demonstrates early and long-lasting alterations in cerebrovascular coupling and glutamine metabolism in eNOS deficient mice. She is currently investigating the underlying mechanisms and functional significance of these changes.



Ashwini Hariharan and supervisor Associate Professor Ping Liu.

The sprint for stroke



Celebrating after crossing the finish line are (from left) Josh Houlton, Ethan Fisher, Chris McIntee, Danny Churcher and Deanna Barwick



Josh and Deanna out fundraising on the streets of Dunedin

While most Dunedinites were tucked up in their beds on a recent wintery Sunday morning, PhD students Josh Houlton and Deanna Barwick were out running the Cadbury Dunedin half-marathon to raise funds and awareness for the New Zealand Stroke Foundation.

Josh and Deanna are both involved in research in Dr Andrew Clarkson's lab to find ways to improve post-stroke recovery. To support the amazing work of the Stroke Foundation, Josh and Deanna decided to commit to completing the half-marathon, and in June they joined a marathon training bootcamp to get them half-marathon ready in three months!

In Josh's words ... *"We thought we'd investigate first hand the positive effects of aerobic exercise on our circulatory health, and promote the importance of living a healthy, balanced lifestyle."*

They had a fundraising goal of \$1,500, but have managed to surpass that total by so far raising \$1,678 !

So, money raised, the only thing left to do was run the 21.1km half-marathon. With the awesome support of friends and colleagues, Josh and Deanna fought through some of the worst Mother Nature could throw at them, and both completed the run under their set time goals.

Josh aimed to run under 1:40:00, and with a last minute sprint for the line, he made it home in 01:39:33. Deanna aimed to complete under the two hour mark, and easily made it under with a time of 01:53:08.

Congratulations guys, what an awesome achievement!

Donations to the Stroke Foundation can still be made through their [charity webpage](#) .

They have now set their sights on the Queenstown marathon in November where Josh hopes to complete the full (42km!) marathon, and Deanna is hoping to better her time in the half-marathon.

Good luck guys!



Josh and Deanna at work (?) in the lab

ALUMNI PROFILE...

Papi Gustafson, BSc(Hons) PhD



Addressing maternal health issues

Papi's interest in neuroendocrinology was first sparked when she was introduced to the topic in the second and third years of her undergraduate Anatomy degree. Now, having completed two postgraduate degrees on the topic, including a PhD which is listed on the Division of Health Sciences exceptional theses list, Papi is working as a Postdoctoral Fellow in the research labs of Professor Dave Grattan and Dr Rosie Brown in the Centre for Neuroendocrinology (CNE) at the University of Otago.

She is contributing to two different research projects, which complement the research she did for her doctoral thesis.

The first project investigates the role of the pituitary hormone prolactin in the regulation of maternal behaviour. Specifically, Papi is working to identify the phenotype of a population of prolactin-responsive neurons in the brain which have been recently identified by the Grattan lab as critical for controlling the onset of maternal behaviour in the mouse.

The second project, in Dr Rosie Brown's lab, looks at the mechanisms by which hormones such as prolactin, leptin and insulin gain access to the brain and how the regulation of this access changes under different reproductive conditions. Papi has primarily been looking at whether there are changes to the structure of the blood brain barrier

across pregnancy and in lactation.

"My PhD project focused on understanding the role of prolactin in the suppression of the maternal stress axis. This complements my current research, particularly the maternal behaviour project, really well as these projects involve investigating actions of prolactin within the brain to mediate adaptive physiological and behavioural changes which then facilitate successful pregnancy and lactation."

At first Papi wasn't at all sure she wanted to do postgraduate study. But she approached Professor Grattan and Associate Professor Bunn during her undergraduate third year and was given the opportunity to complete a summer project.

"I thoroughly enjoyed my summer project which was ultimately the major factor in my decision to stay on for Honours" she says.

"I knew early on in my Honours project that I wanted to stay on and do a PhD. I enjoyed the lab environment and wanted the experience and challenge of working on a bigger project."

"I became interested in maternal stress when I was writing my Honours dissertation and so when it came time to decide with my supervisors, what I would work on for my thesis, I knew this was the area I really wanted to pursue."

(continued ...)

Papi says she feels fortunate to now be part of a lab and research centre in which there are so many talented scientists working on a wide variety of interesting projects.

"I enjoy the balance of working independently, along with the collaborative nature of experiments and projects."

Papi has recently returned from attending the MedSci conference as part of Queenstown Research Week, and is grateful for the opportunities she has to attend conferences, and present her research in front of national and international colleagues and scientists.

Her focus for the next twelve months is to publish more research papers - a necessity for her career development - and secure a Fellowship to fund another postdoctoral project.

In the meantime she is relishing the opportunity to gain as much experience as possible whilst working in the CNE, and use some of the latest tools and techniques in neuroscience research.

While she is still undecided on exactly what career path she wants to follow, what she does know for sure is that she loves the research she is doing, and she definitely wants to continue working on projects that address the important issues of maternal health.

Anatomy Alumni - where in the world are you?

Did you know the University of Otago has over 90,000 contactable alumni living in over 140 countries around the world?

The Alumni's online choropleth map shows there are currently 5,116 Otago Alumni registered as living in Australia, 5,697 living in the United States and 2,285 in the United Kingdom.

At the other end of the scale, five alumni are registered as living in Peru, two are living in Gabon, and one person is living in Kazakhstan!

Where in the world are you?

Whatever you are doing we'd like to know where you are, what you are doing, and how you got there.

Keep in touch with us through anatomy@otago.ac.nz, and don't forget to update your details on the University's Alumni page ...

<http://www.otago.ac.nz/alumni/index.html>

Outreach: back to school

In May the Department undertook its biggest ever school visit - three days based at Clearview Primary School in Rolleston. Staff showcased Anatomy to around 750 Year 1 to Year 8 students from local schools in the area, and their teachers.

Teaching Fellows Dr Rebecca Bird and Dr Brad Hurren were joined by PhD students Jaye Moors and Josh Houlton to run interactive sessions with the students. The children learnt how to grow and protect healthy bones, how to build a skeleton, and how to use stethoscopes to listen to noises that the heart and gastrointestinal systems make. They also had the opportunity to test reflexes on their teacher's using tendon hammers.

According to everyone involved it was full-on and incredibly good fun!



NEWS FROM THE RESEARCH GROUPS

Biological Anthropology...

Research highlights maternal-infant transference

PhD student Annie Snoddy recently published her second paper from her research at the University of Otago in the leading paleopathology journal *International Journal of Paleopathology*.

The publication aimed to assess if there was any impact on the reduction of dietary diversity in prehistoric Chile with the adoption of agricultural food practices, by investigating evidence for nutritional deficiencies from a transitional Early Formative Period site (3,600-3,200 years before present).

Annie's research found all the infants in the sample showed evidence for nutritional insufficiency in the form of scurvy including, interestingly, an adult female from a probable mother-foetal pair.



Annie Snoddy (right) with Chilean colleague Bernardo Arriaza at Playa Camerones in the coastal Atacama.

This paper is important for the wider interpretation of the environmental context of the Atacama Desert in which these populations lived.

It is thought that there were likely periodic food shortages due to the El-Niño events in the area. Importantly this paper also contributes to an understanding of the maternal-infant transference of vitamin C deficiency.

Annie is supervised by Dr Siân Halcrow and Professor Hallie Buckley. The research was supported by Dr Halcrow's Marsden Grant.

Visit the [Science Direct](#) website to learn more.



Gail Elliot and Annie Snoddy (right) in front of a statue of a Chichorro mummy at Playa Camerones in the coastal Atacama.

Unearthing our colonial past

A project initiated by residents of a small South Otago town has resulted in the first ever large-scale archaeological excavation of a colonial-period European cemetery in New Zealand.

The town of Milton has hosted a research team from the University of Otago as they searched for, and found, long forgotten early settlers' graves in the abandoned cemetery grounds and farm land around St John's Anglican Church.

The research team, led by Professors Hallie Buckley and Lisa Matisoo-Smith, and Dr Peter Petchey (Department of Archaeology and Anthropology), worked in partnership with local historical group Tokomariro Project 60 (TP60), the Anglican Church, and local iwi. The site was blessed and a whakawātea (clearing of the way) performed before geophysical surveying and excavation work began.

TP60 was able to provide valuable information about the first settlers of the area, and details of those thought to be buried in the cemetery. The first burials in the cemetery were interred in 1857, predating the consecration of the site by Bishop Harper in 1860. The last known burial was in 1926.

Members of TP60, including some descendants of early settlers, worked alongside the research team to uncover many of the burial sites.

Twenty-five graves were excavated, including 16 discovered outside the boundary fence of the cemetery. The remains of 27 individuals, including two double graves of infants and children, were found. Four of these have been identified either through painted name plates attached to their coffin, or a headstone buried on top of the coffin.

A local vicar performed a blessing as each burial was uncovered and the remains lifted.

The research team presented some initial findings at a public meeting in Milton in August as those involved with the project were keen to learn more about what life was like for the settlers.

It was found that early New Zealand settlers followed the same funerary practices as were common in the United Kingdom at that time. Coffins were often draped in a black woollen fabric, iron coffin plates attached to the lid of the coffin bore the name and age at death of the person. Knitted woollen blankets, some which had partially survived more than 100 years buried under ground, had been placed over the bodies of children laid to rest.

Infant mortality rates were high, with diseases such as tuberculosis and whooping cough claiming many lives.



In the foreground: Kate McDonald, Anna-Clare Barker, and Gail Elliot

An intensive osteological study is now underway by Professor Hallie Buckley, to characterise the quality of life of these people.

Further analyses of the remains will be carried out by Professor Lisa Matisoo-Smith and Dr Charlotte King. Bone, hair and tooth samples will be used for DNA and isotope studies which may help to pinpoint where in the UK the settlers came from and possibly identify individuals and link them with living descendants. Dr Petchey is using historical documents to try to determine where in Milton these people lived, and how they lived.

It is hoped the results, together with the historical information already gathered by TP60, will give researchers and the community a better

understanding of the life and hardships experienced by the early European settlers who arrived in the area to create a better future for themselves and their families.

The skeletal remains and coffin furniture found with them will be reburied in their original graves before the end of 2017.

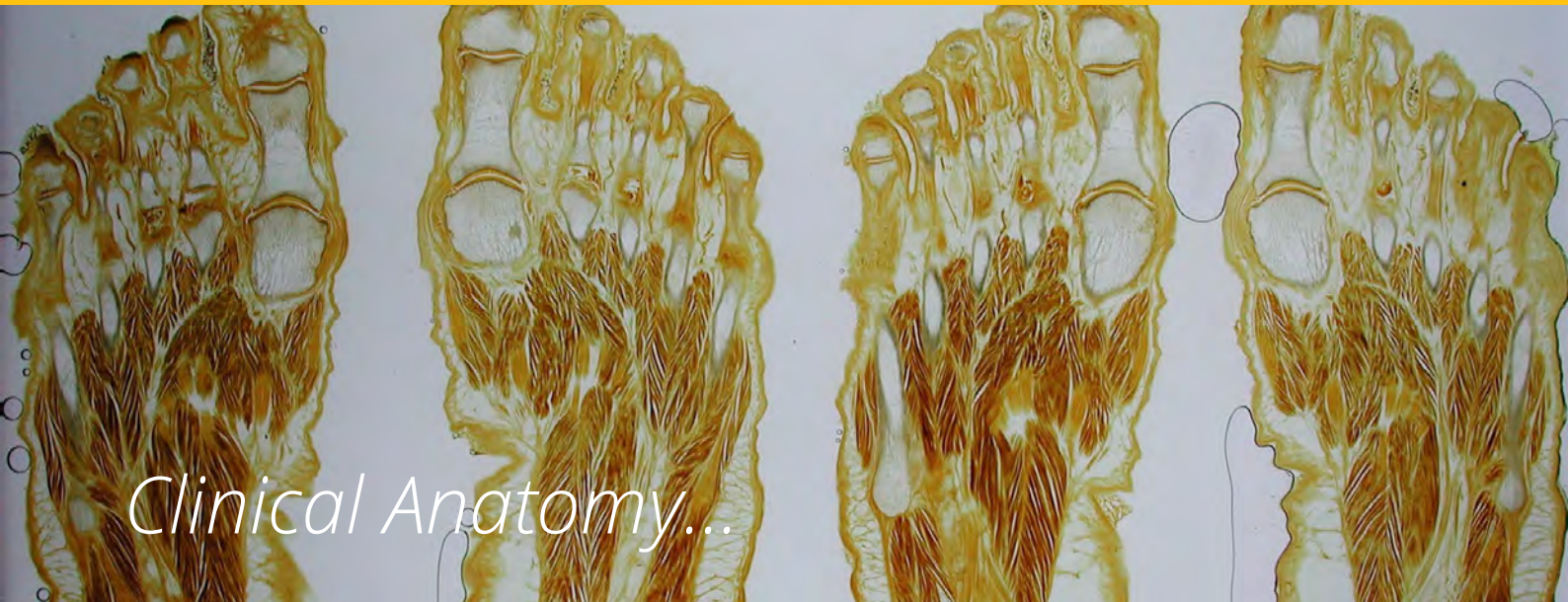


Gail Elliot (left) and Koreana Wesley



Teina Tutaki (left) and Alana Kelly

NEWS FROM THE RESEARCH GROUPS



Clinical Anatomy...

19th Century model given 21st Century face-lift

A much loved and well used model of a very large ear has been given a thoroughly modern 21st Century spruce-up. Originally created in the workshop of French anatomist and lecturer Dr Louis Auzoux in the late 1800s, the original papier-mâché model has been cloned!

The ear is one of several precious Auzoux *"anatomy clastique"* models in the W.D. Trotter Anatomy Museum. At a time when corpses for anatomical dissection were difficult to come by, Auzoux created large-scale papier-mâché models in very accurate detail, designed to be taken apart to reveal anatomical structures and detail.

The model is used extensively in the Department for postgraduate ophthalmology and surgical anatomy teaching as well as the medical and second year undergraduate dental classes.

You may wonder why such an old model is still being used in the Department to teach anatomy when we have access to cadavers and digital imaging.

Head and neck lecturer Associate Professor George Dias says he always felt guilty handling such a delicate museum piece, but he found images and diagrams in textbooks didn't show structures in as intricate detail as they appear on the model.

In fact, he says this particular model is the only one he has come across which so clearly demonstrates the branches and pathways of the facial nerves.

"As a student I struggled to follow and understand the pathways of the intracranial nerves. It wasn't until I arrived in the Department in 1995 and laid eyes on this model that I truly

W.D. Trotter Anatomy Museum Curator Chris Smith and Dr Louisa Baillie with the old Auzoux model (left) and the new plastic model (right)



(continued ...)

understood the pathway of the 7th nerve. It is so beautifully demonstrated here” he says, pointing to the original model.

Anatomy Museum Curator Mr Chris Smith initiated the project to replicate the model using 3D printing.

The model was CT scanned, and the data manipulated to produce digital 3D files with the much appreciated help of Andrew McNaughton and Ross Marshall-Seeley. Unfortunately due to a significant amount of hidden metal chassis which supports the papier-mâché, the files had a lot of digital artefact or ‘noise’ from the scan. As a result, Dr Louisa Baillie has devoted much time sculpting and painting the 3D printed plastic copy, to make it look like the original.

The sculpting included subtractive (carving back) modelling, using a Dremmel and bits kindly loaned from the Technical Services Laboratory at the Dental School (thank you Steve Swindells!). It also included additive modelling, using car bog and a product she hadn’t used before, modeller’s green clay, thanks to Brynley Crosado.

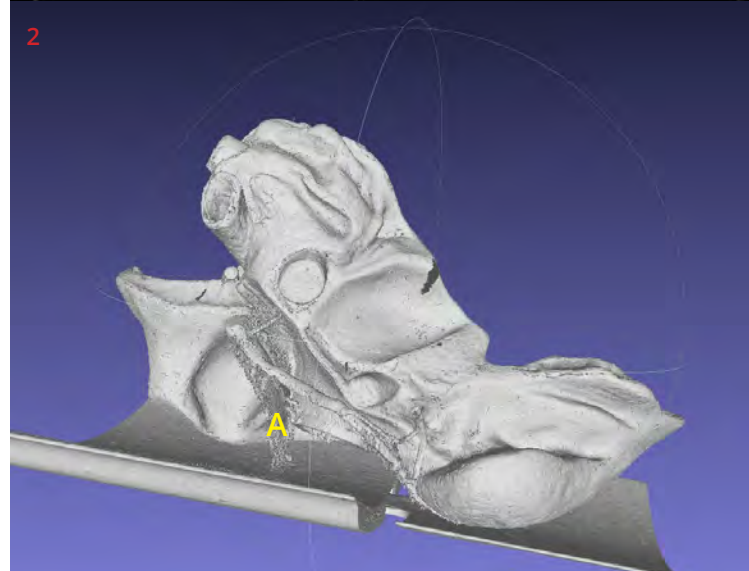
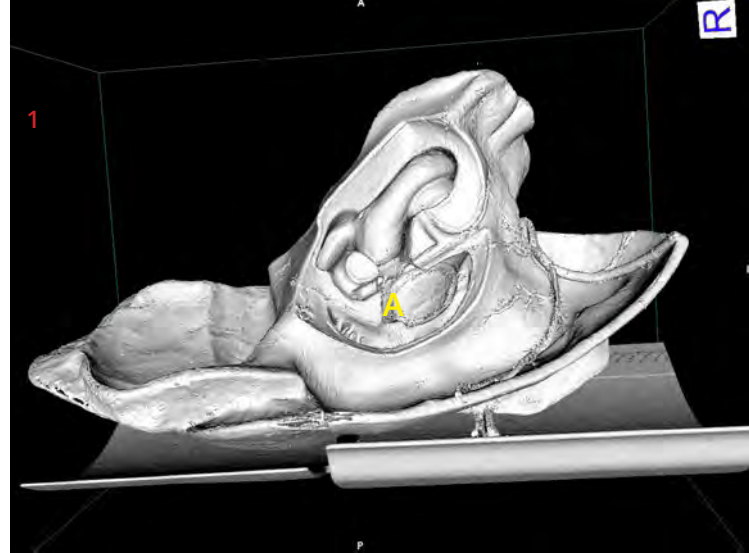
Finally, the ear was sanded to 400 grit smoothness and then intricately painted. The new ear shows the same details as the original, even including pipe cleaner to describe the cilia hairs in the semi-circular canals, and 0.22 rifle shells as shafts to receive the long pins.

One part, the cochlea, was too poor a reprint to be able to be salvaged. Instead Louisa is working separately on this, experimenting with other digital imaging methods to achieve a reprint of high quality, with no ‘noise’. Once a successful reprint is made, the method will be applied to other reprint projects. This means future reprints will be relatively quick to achieve.

Next on the restoration list is an eye model, currently being held together by blu-tac.

Louisa says it has been fascinating working on the ear. It has given insight to the way Auzoux must have taught. She is excited by the possibilities contemporary digital imaging methods give to obtaining other, previously unachievable, reproductions for anatomy teaching, from our richly resourced Anatomy Museum.

You could say it has been a project of *earpic* proportions!



Images 1 & 2 are CT scans showing the speckly ‘noise’ (A) produced by the hidden metal chassis

Image 3: Louisa Baillie carefully sands a part of the new plastic model

Image 4: The old Auzoux model (foreground) and the new plastic model

NEWS FROM THE RESEARCH GROUPS

Neuroscience...

Student selected for mentorship programme

The past few weeks have been full of exciting opportunities for PhD student Nadia Adotevi.

Not only did she attend the prestigious 32nd International Epilepsy Congress meeting in Barcelona, she was selected for a new mentorship programme run as part of the meeting, and her abstract, co-authored with Associate Professor Beulah Leitch, was selected by meeting organisers for a platform presentation.

Nadia was also one of the few emerging researchers to be awarded a travel bursary from the International League Against Epilepsy to attend the meeting.

She says the experience was very special, and through the mentorship programme she was able to meet clinical scientists and specialists who are established in their careers in different regions of the world.

"It was an amazing opportunity. To meet these amazing scientists, and to have my own mentor and be able to spend one-on-one time with them to discuss my own research and career goals was something I will never forget."

Nadia hopes to stay in touch with her mentor, and meet up with them again at future international conferences.

The biennial meeting was a joint collaboration of the International Bureau for Epilepsy and the International League Against Epilepsy. Nadia says it was an honour



Associate Professor Beulah Leitch and PhD candidate Nadia Adotevi

to be chosen to give a platform presentation at such a prestigious meeting.

Her abstract, co-authored with Assoc Prof Beulah Leitch, looked at changes in synaptic expression of glutamatergic AMPA receptors in cortical inhibitory interneurons in a mouse model of absence epilepsy.

Nadia has recently submitted her PhD thesis for examination, and is supervised by Associate Professor Beulah Leitch.

Research leads to exciting new discoveries

University of Otago researchers have made an important break through in the understanding of how nerve impulses form memories in the brain.

The findings, published in leading journal *Nature Communications*, will help researchers to better understand how learning processes are affected by brain disorders such as Parkinson's disease and Attention Deficit Hyperactivity Disorder (ADHD). The findings will also help develop new therapies for these types of conditions.

It has long been known the timing that nerve impulses arrive at cells – in the order of 1/100 of a second – is critical in the strengthening of brain cell connections during memory formation.

"Researchers were faced by a conundrum in that the part of the brain that processes the brain chemical dopamine during the learning of a new skill seemed to follow completely the opposite timing rules to all other brain areas" says lead researcher Professor John Reynolds.

"In this case, it appeared that the brain cell needed to fire a nerve impulse before the actual movement activity was registered by the cell, which seemed intuitively wrong" he says.

Professor Reynolds and Dr Simon Fisher (now at the University of New South Wales) have discovered that the pulse of dopamine into the brain that accompanies arrival of a reward had its own critical timing requirement – in seconds. When that requirement is met, the timing of nerve impulses in memory formation became exactly the same as all other areas of the brain.

"In other words, the naturally delayed arrival of these rewards shapes the ability for memories to be formed in a normal fashion" Professor Reynolds says.



Professor John Reynolds

Professor Reynolds believes this finding has important implications for the better understanding of, and development of, new treatments for brain disorders where the processing of brain reward is abnormal.

"The discovery is very exciting not only for researchers but also for those who live with the challenges and frustrations of these types of conditions every day" Professor Reynolds says.

Professor Reynolds believes their research findings can also be applied to better understand how ingesting pleasurable stimuli, such as chocolate, or addictive substances such as alcohol, drugs and nicotine which release pulses of dopamine when consumed, can become habitual.

Visit the [Nature Communications](#) website to view the full publication.



Rose Smither (right) at the conference with colleague Coosica Petrova (from the University of Auckland).

Love your Anatomy t-shirt Rose!

Edinburgh Summer School an enlightening experience

Rose Smither was one of thirty six international delegates who attended the 4th International Edinburgh Super Resolution Imaging Consortium (ESRIC) Summer School programme at Heriot-Watt University in Edinburgh. The course focused on super-resolution microscopy, a form of light-microscopy which allows images to be taken with a higher resolution than the diffraction limit of light.

Rose says she thoroughly enjoyed the opportunity to learn more about super-resolution microscopy from industry experts, meet other delegates from around the world, and forge new collaborative links.

She particularly enjoyed being hands-on with the state-of-the-art equipment especially set-up for delegates to process their own samples.

The summer school was co-organised by the Royal Microscopical Society, and equipment was provided by industry leaders such as Leica, Nikon, Zeiss and Olympus.

Rose plans to bring what she learnt back to the research lab where she works with Dr Louise Parr-Brownlie on optogenetic stimulation to treat Parkinson's disease. In addition she works for Marama – the viral vector optogenetics platform for Brain Research New Zealand, and these skills will enable her to help others throughout New Zealand in high resolution microscopy.

Rose received funding assistance from the Department of Anatomy, Brain Health Research Centre and Brain Research New Zealand to attend the course.



Reproduction, Genomics and Development ...

Booby prize turns out to be a winner!

A new member of the Michael Knapp research team is causing quite a stir, even ruffling a few feathers. Now, we're not saying she is a sticky beak, but she definitely has a passion for bird-watching and is certainly one of a kind!

She is called Orbell, a life-size model Takahē presented to PhD candidate Natalie Forsdick as the 'booby' prize at the conference dinner at the recent Birds New Zealand meeting run by the Ornithological Society of New Zealand. The conference provided opportunity for researchers and "birders" to present and discuss new research, network and attend workshops on banding and science communication.

Although she's not sure exactly what she did to win the booby prize, Natalie says she and Orbell are becoming close friends. (Strictly speaking, Orbell belongs to the Ornithological Society of New Zealand and is only in Natalie's care until the Society's next conference.)

Orbell has settled in well to her new digs and has been regularly seen out and about enjoying the sights. She now has her own Instagram account ([orbell_the_tak](#)), where Natalie posts pictures from around Otago to raise awareness

for the Society and threatened bird species in New Zealand.

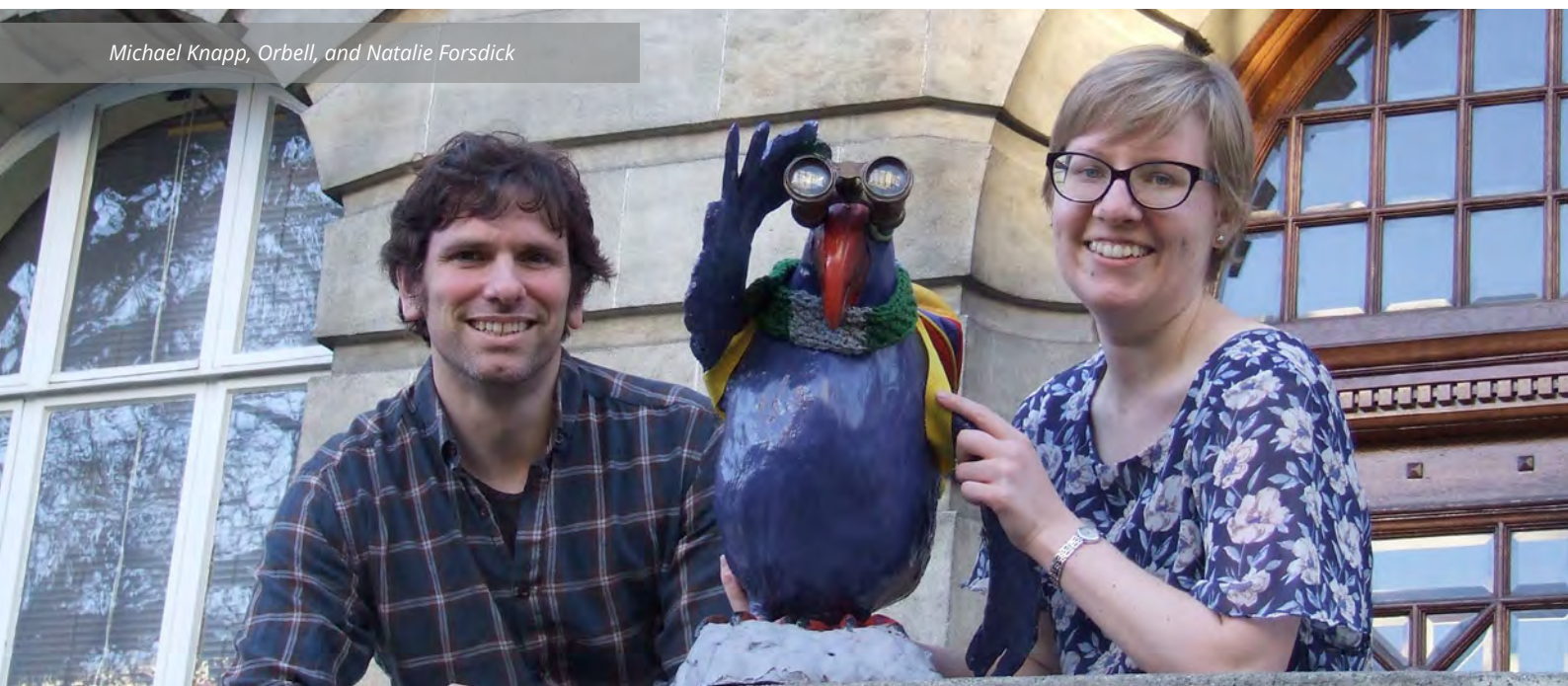
Dr Michael Knapp says Orbell has become a valued member of the team and has herself attended multiple events and meetings. In fact, he is not sure he will be able to convince Natalie to leave Orbell off the authors list for her PhD papers!

[Natalie was thrilled to receive the Student Presentation Award at the conference for her talk about her MSc project undertaken at the University of Canterbury, using genetic tools to assess the current state of the Chatham Island Black Robin, once known as the world's rarest bird.

She has also been successful in obtaining funding from Birds New Zealand to support her research project *Australasian stilts: Genetics and evolutionary history*. Congratulations Nat!

Fellow PhD candidate Denise Martini also attended the Birds New Zealand conference. She gave a presentation on a component of her PhD project, using whole genome sequencing to detect functional variation associated with functional variation in the Kea.]

Michael Knapp, Orbell, and Natalie Forsdick



Art & Science - this time it's all about genetics

The worlds of art and genetics combined recently for the 2017 *Art and Science* exhibition, a collaborative project between the Dunedin School of Art and the University of Otago. The exhibition paired twenty-four local artists with geneticists to create 21 pieces of art which went on display at the Otago Museum during the Genetics Society of Australasia conference in July.

Among the geneticists involved were PhD students Denise Martini and Natalie Forsdick. They got involved as a way to raise awareness of genetics, conservation, and their study species', the kākā and kakī.

Denise teamed up with Alexandra-based photographer Eric Schusser, while three artists were interested in working with Natalie - Michelle Wilkinson (jeweller), Brigitte Kammlein (printmaker) and Madison Kelly (painter).

Denise and Natalie each met with their artists over three months to discuss their projects. The end results were the artists' own interpretive and creative visions of the research.

Denise's project investigates the modern and historical genetic diversity of kākā across its geographical distribution in order to support its current and long-term future management. For her, the experience was more than she expected.

"I was very happy with the collaboration with Eric, and I learned a lot about myself and what strikes people as interesting when I am communicating my project" she said.

Eric spent time in the lab taking photos and talking to Denise about her own personal story as a researcher. He also visited kākā at the Orokonui Ecosanctuary. The finished exhibit (pictured below) was a mosaic of pictures and text that Denise was blown away by and says represents what she is working on and why.



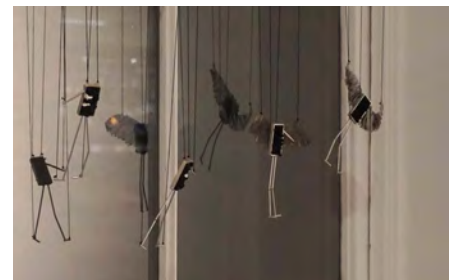
"I wasn't expecting to be so deeply and emotionally involved in the process and I was shocked by Eric's ability to read between the lines of what I was telling him. He came up with an interpretation that I could not have imagined on my own."

The experience was very similar for Natalie.

Her research focuses on hybridization and the role of genetics/genomics in conservation work. She says the artists really helped her experience her project in a different light. She hopes more information about the art pieces will be published in the journal *Junctures: The Journal for Thematic Dialogue*.

"They each produced some really awesome pieces for the exhibition" Natalie said.

Michelle used pure silver, copper and various alloys of the two to create a series of 9 brooches in her exhibit *A Conglomeration of Stilts* (pictured right), depicting the differences in plumage that occur in the Stilt due to hybridization.



Brigitte created a print, *Kakī, on the Cutting Edge* (right), integrating genomic sequence data with images of kakī and their habitat.



Madison created a set of four temporary charcoal drawings (pictured below), *Kakī, Reared and Sampled*, on the wall of the Skinner Annex, showing the interconnection between the birds in the landscape and the breeding facility in Twizel, DNA samples processed in the lab and the genomic data output.

Taking part in the *Art and Science* project was a growing experience for both Denise and Natalie, and they say they would definitely recommend a cross-disciplinary collaboration like this to anyone.

"We have learnt so much about ourselves through this process, and hopefully we have also stimulated some discussion among the wider community about the importance of genetic diversity and conservation."

Denise Martini with artist Eric Schusser



Natalie Forsdick (right) with Madison Kelly





Otago Summer School

Going to be in Dunedin for the summer?

Need another paper?

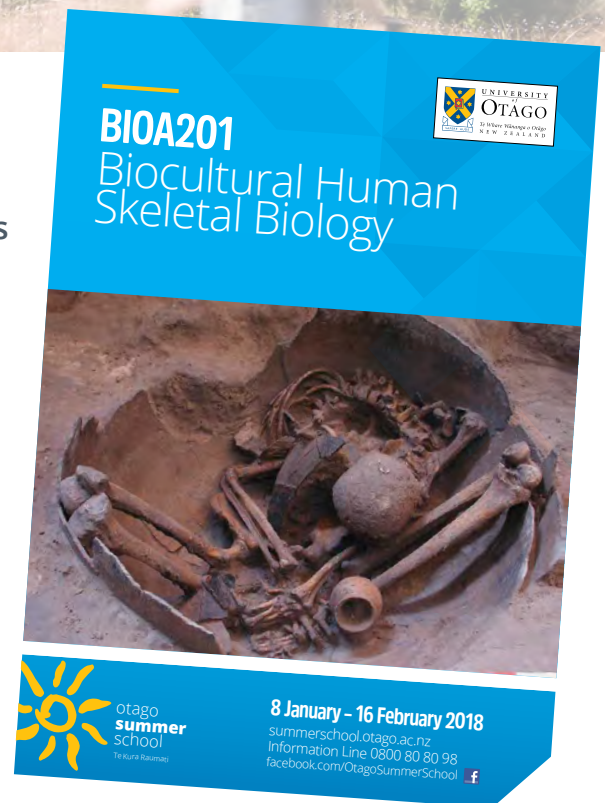
Want to complete a paper in just 6 weeks?

Sounds like Summer School is the thing for you!

The BIOA 201 paper is an introduction to human bioarchaeology, particularly the evolutionary and comparative anatomy of the human body, what makes it unique among other primates and why it varies among populations. The paper also includes aspects of forensic anthropology.

If you think this paper may be for you, check out the [Summer School](http://www.otago.ac.nz/summer-school) webpage for more info.

Enrolments for 2018 Summer School close on 10th December.



www.otago.ac.nz/anatomy