

THE INSIDE STORY *Issue 30, September 2016*



Lisa Matisoo-Smith receives University's top honour!

Biological Anthropology Professor, Lisa Matisoo-Smith, has been awarded the University of Otago's highest honour for outstanding scholarly achievement – **the 2016 Distinguished Research Medal**. The honour recognises Professor Matisoo-Smith's international standing as a leading biological anthropologist, her innovative use of technology, and her commitment to engage the public in her projects and results.

Head of the Department of Anatomy, Professor Neil Gemmell, said he was thrilled for Professor Matisoo-Smith. *"It is a huge mark of respect for the University to recognise Lisa in this way. Research undertaken in her lab not only contributes to the better understanding of the settlement of New Zealand, but also the migration patterns of people throughout the Pacific and the world."* he said.

Professor Matisoo-Smith's research centres on human genetic variation in ancient and modern populations. Her primary focus is to identify the origins of Pacific peoples and their commensal plants and animals in

order to get a better understanding of the settlement, history and prehistory of the Pacific and New Zealand.

Matisoo-Smith and her research team use modern molecular biology techniques and ancient DNA analyses to gather genetic evidence to track human migration and settlement of the Pacific, and the impact that settlement had on the environment.

Matisoo-Smith has published three books, 17 book chapters and 75 papers in leading international journals, including Nature, Science and the Proceedings of the National Academy of Sciences.

She is the Pacific region's principal investigator for the National Geographic's Genographic project, which used DNA sequencing and genetic markers from 98 global subpopulations, including New Zealand and several Pacific communities, to map the history of global human migration across the world.



"Lisa Matisoo-Smith is a greatly respected international scholar who has reshaped our understanding of the last great human migration into the Pacific. She is also a great communicator who has engaged and motivated the public about her science in a way few others working in New Zealand have achieved." Vice-Chancellor Professor Harlene Hayne

Photo by Sharron Bennett

As an extension of the Genographic Project, Matisoo-Smith more recently undertook a project called 'Africa to Aotearoa: The longest journey' to investigate the deep ancestry of all New Zealanders. Over 2,000 New Zealanders participated in the study. She and members of her team visited towns and cities across New Zealand during 2014 and 2015 to obtain the genetic ancestry results for each region. All participants received their personal results and lectures have been presented across the country and to various community groups.

Matisoo-Smith is the Director of the Allan Wilson at Otago Research Theme: Human Evolutionary Genomics. She was elected a Fellow of the Royal Society of New Zealand in 2013, and received a James Cook Research Fellowship from the Society for her project 'Africa to Aotearoa' in that same year. She was elected a Fellow of the Society of Antiquaries of London in 2009.

The Distinguished Research Medal will be presented to Professor Matisoo-Smith in October, when she gives a public lecture to mark the occasion.



Te Tari Kikokiko
Unearthing our journey

NEW WEBSITE!

The Department of Anatomy has a new website! Explore the different pages and let us know what you think.

It's as simple as clicking on the banner image below...

www.otago.ac.nz/anatomy





And the honours continue...

Ms Aven Drayson (Executive Assistant to the Head of Department) was recently awarded a **Rotary Pride of Workmanship Award**. Presented by the Rotary Club of Dunedin North in conjunction with the University of Otago, the award recognises University staff that show a distinct quality in their approach, attitude and dedication to their job.

Aven certainly embodies all these qualities, notably via her continuous positivity, dedication, consistency, honesty, integrity of work and her willingness to accept any challenge.

In her day to day role, Aven manages a complex HoD diary, ensures a multitude of documents are prepared, checked and double checked, organises meetings, and ensures all deadlines, policies and good practices are met. Aven does all this with skill, good humour and charm.

Professor Gemmell says *"Aven is one of the most pleasant and dedicated staff members I have ever worked with over a professional career now spanning thirty years. Aven's extraordinarily pleasant and professional attitude and demeanour is an inspiration to us all."*

Aven has an extraordinary work ethic, and exceptionally high standards. She is the consummate professional – efficient, effective, reliable and extremely thorough in all that she does.

She is also an extremely talented baker, and often shares her home baking with the Department at special morning teas and other events. Her cheese-puffs are world famous in the Department of Anatomy!

Congratulations Aven. Recognition that is well deserved!

While Anatomy technician **Fieke Neuman** is one of two University of Otago employees awarded this years top honour for general staff – the **General Staff Award**. She shares this honour with Department of Human Nutrition Laboratory Technician, Kieran Columb.

Fieke has worked various roles in this Department over the years, including research technician, anatomy Museum Curator and Technical Manager. But it is her present role as Teaching Laboratory Manager and her creative talents when it comes to developing and

producing teaching aids to demonstrate anatomical structures, for which she is being recognised.



Fieke with one of her 3D models

Her 3D anatomical models, such as the burlesque brain which sheds its outer protective layers to reveal what lies underneath, are often used by lecturers in practical classes to illustrate complex anatomy in a simplified and more visual way.



Assoc Prof Christine Jasoni using the burlesque brain in class.

The models are not only popular with the lecturer's, they are also popular with the students who say they are a highly effective learning tool.



But it's not just Fieke's creative talents which make her a valued employee. Her nominators commented that *"she is constantly looking for new and better ways of doing things, is always there when we need her, and interfaces seamlessly with academic and general staff across a broad range of disciplines within the Department."*

"Fieke's facility and deep involvement with research has also meant that she's brilliant at adapting even the most difficult research methods for use in undergraduate teaching laboratories."

"Moreover, Fieke appears to possess endless patience, retains a cheerful and pleasant demeanour in the face of adversity, and always works towards the common goal of excellence in research and teaching for everyone in the Department of Anatomy."

Fieke received the Rotary Pride of Workmanship Award in 2014. She has presented her creations at an international conference and some of her patterns are available on the website for others to construct and use.

UPCOMING EVENT...



AIAS 2016 conference to be hosted by the Department.

The end of November this year will see many of the teaching and research technical (professional) staff from Australia and New Zealand visiting the Department for the 2016 Australasian Institute of Anatomical Sciences (AIAS) Conference. The Department last hosted this group back in 2005, and after many years of visiting Australian Institutions, our Australian colleagues have been demanding a return to our shores to catch up on our facilities, processes and skills.

We are hoping to provide a varied and practical experience for our 60 conference delegates, with workshops in E12 sheet plastination, resin vascular corrosion casting, a seminar on Thiel embalming and discussion based around the many facets of our very varied and demanding roles.

Anyone with an interest in this can visit the conference website at www.otago.ac.nz/aias-2016.

ALUMNI PROFILE...

Charlotte Verstappen, BSc(Hons)



"I feel like I'm making an important contribution to future medical research"

An Honours degree in Anatomy gave Charlotte Verstappen the practical knowledge and confidence she needed to gain a job as a Tissue Bank Technician at the University of Auckland. Charlotte plays an important role in liaising with surgical patients who have consented for their tissues or biopsies to be donated to the Auckland Regional Tissue Bank for future use in research. Her role is varied and, as the job is a relatively new one, she has quite a lot of input into the procedures and establishment of the tissue donor database.

A typical day sees Charlotte visiting consenting patients in the morning, before coordinating with the surgical team and pathologists to facilitate the timely collection of blood and tissue samples. From there, she heads to the lab to process and freeze the samples, where they will be stored for future unspecified research.

Charlotte has always been interested in research and the idea of investigating something that has never been looked into before. Having completed an anatomy degree, she was keen to take her undergraduate studies further and saw the one year Honours course as a good stepping-stone into postgraduate research.

Her honours research was a joint clinical anatomy and biological anthropology project, under the guidance of Dr Stephanie Woodley and Associate Professor Hallie Buckley. Over the course of her honours year, Charlotte investigated the relationship between soft tissue (tendon and muscle) architecture and bone in the upper limb using cadaveric tissue, with a focus on the regions of bone into which tendon inserts (entheses). It is anticipated that her findings will aid in improving entheseal assessment in future bioarcheological investigations attempting to interpret patterns of activity in past populations.

The medical terminology and understanding of human anatomy she gained through her honours research is now helping Charlotte interact with clinicians. In addition, it also means she has a better understanding of patient diagnoses and can effectively contribute to discussions when attending multi-disciplinary meetings to identify potential cases for tissue banking. The practical lab experience she gained during her undergraduate study at Otago has also allowed her to pick up the practical side of her job very quickly.

As a postgraduate student, Charlotte would attend the fortnightly clinical anatomy research group meetings. *"It really hit home to me how important research is, particularly studies using human tissue"* she says. *"This job gives me the satisfaction of knowing that I'm helping to facilitate this research."*

She loved the independence and freedom postgraduate study gave her, and she would recommend it to anyone who has a passion for learning.

"I actually took a year off to travel between my undergraduate degree and my honours year, and this was the best decision I could have made" she says. *"When I came back to study, I worked harder than I ever had before, because I knew this was what I wanted to do and I was committed to getting the best results I could."*

"If you are passionate about science or academia, and you are willing to push yourself, then jump in. There are so many jobs out there for science graduates. It took me 8 months to find a job that I love, but it is definitely worth it when you find a job that challenges you and keeps you learning."



Anatomy Alumni - where in the world are you?

Are you pushing back the boundaries of science? Are you educating our future leaders? Maybe you are involved in policy making or grant funding? Or you are part of a team making a difference in peoples lives? Whatever you are doing we'd like to know where you are, what you do, and how you got there.

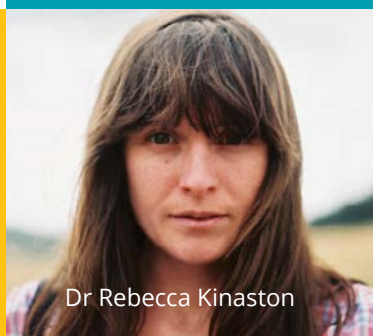
Get in touch with us anatomy@otago.ac.nz, and don't forget to update your details on the University's Alumni page ... <http://www.otago.ac.nz/alumni/index.html>

Anatomy PhD students gain prestigious Postdoctoral Fellow positions at the Max Planck Institute for the Science of Human History in Jena, Germany.

Dr Rebecca Kinaston and **Ms Monica Tromp**, who both recently undertook their PhD research projects in the Department, have gained prestigious positions at the Max Planck Institute for the Science of Human History.

They were among 250 people who applied for the five advertised positions within the Department of Archaeology. Only ten people were interviewed. Rebecca was offered an additional sixth position in the Department of Archaeogenetics.

While in the Department of Anatomy, Rebecca and Monica both contributed to research on Pacific diet, health and migration patterns. Rebecca analysed dental and skeletal remains from prehistoric Pacific communities to analyse diet, health, and mobility, while Monica's research used hardened dental plaque or dental calculus to study how early colonists interacted with plants in the southwest Pacific. Monica's thesis is currently under examination and she recently completed a successful oral defence of her thesis.



Dr Rebecca Kinaston



Ms Monica Tromp

Rebecca was offered a position in the Institute, within the Department of Archaeogenetics. Her research will now focus on sampling skeletal assemblages for ancient DNA and isotope analyses, while continuing her research focused on ancient diet and mobility patterns in the Pacific Islands and Island Southeast Asia.

Monica will continue to work on human dental calculus as a postdoctoral researcher in the Department of Archaeology, expanding both her geographic and temporal range into pre-Neolithic Southeast Asia. The new position allows her to continue her focus on the role plants have played in the human settlement of the Southeast Asia-Pacific region.

The Max Planck Institute for the Science of Human History was established in 2014, and is an inter-disciplinary research centre. Its overarching goal is to explore the history of humans, from Palaeolithic times through to today.

NEWS FROM THE RESEARCH GROUPS

This image is of anatomist and sculptor, Dr Louisa Baillee, sculpting muscles onto a skeleton during the recent International Science festival. The five hour long live demonstration, which was designed to show people how muscles work, was a huge hit with people of all ages.

Clinical Anatomy...

A busy few months for the Anatomy Museum.

Since the last newsletter, the W.D. Trotter Anatomy Museum and staff have been busy with a variety of programmes. The end of May saw the end to a very busy teaching semester and June the start of the exam cram for students and their examination period.

After exams, during the mid-semester break, we were once again providing support to the annual Brain Bee competition and hosted many of the visiting schools from all around the South Island through tours of the Museum. At the same time, the Department was running its week long component of the post-graduate Ophthalmology course, most of which is taught in the Museum and using Museum material.

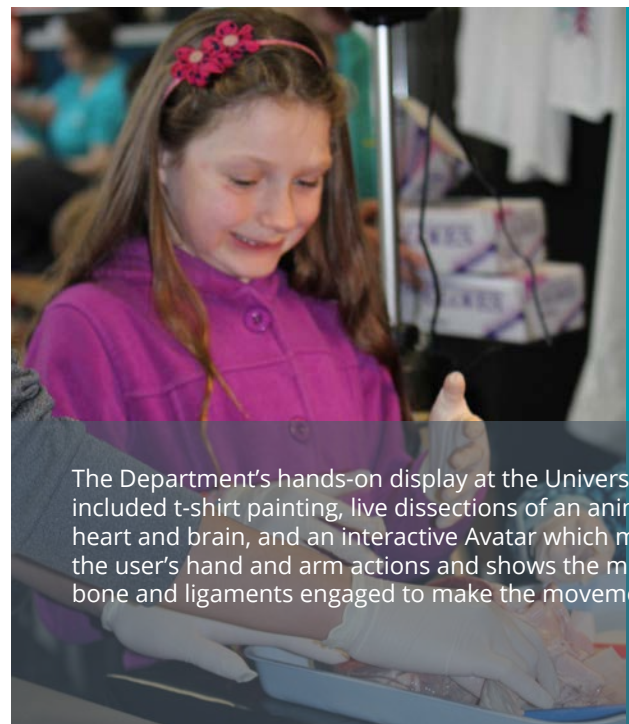


The following week saw the start of Semester Two, but for many families around the country, the start of the July school holidays, which this year meant International

Science Festival week. The Department was involved in the University Science Expo held in the St. David Street theatre complex, with the Anatomy Museum staff engaging with 250 people of all ages and from far and wide (even Australia!) through tours during the weekend.

Then it was back into the second two-week intensive installment of our PGDip. Surgical Anatomy programme where again the Museum space and its resources are heavily used, alongside our normal Semester teaching support duties.

Schools and other community education groups and institutions are regular visitors to the Anatomy Museum. However, during this period we hosted 9 classes of budding scientists from Balmacewan over a 3 day period, keeping us on our toes. At the other extreme, this last week saw the local members of the New Zealand Conservators of Cultural Materials (NZCCM) have a tour and 40 of the attendees at the annual University of Otago General Staff Conference make their regular visit.



The Department's hands-on display at the University Expo included t-shirt painting, live dissections of an animal heart and brain, and an interactive Avatar which mimics the user's hand and arm actions and shows the muscle, bone and ligaments engaged to make the movement.



Museum aids in potential back pain diagnosis

As many people are aware, the W.D. Trotter Anatomy Museum at the University of Otago houses a varied and substantial collection of teaching and research resources for this part of the world. Much of this is accessed by scholars from outside the Department of Anatomy, indeed, from outside the University of Otago and New Zealand. The collection has as much relevance in social and scientific history as it does in science and scientific endeavour. With the introduction of new technologies, many aspects of the collection and our scientific understanding are able to be revisited.

The osteology collection of the Museum is one particular area that can be revisited time and again as technologies evolve. A recent paper published in Data Science Journal (<http://datascience.codata.org/articles/10.5334/dsj-2016-009/>) is one such example.

In September 2012, Hamza Bennani, a Ph.D. student in the Department of Computer Science, University of Otago, contacted Chris Smith, Curator of the W.D. Trotter Anatomy Museum, requesting access to lumbar vertebrae for image processing and analysis. Lumbar or lower back pain and ailments, as many of us can attest, can be particularly debilitating and affect a large percentage of the population. Yet few validated 3D models of the lumbar spine exist to facilitate assessment.

Hamza's ambition was to create a 3D surface dataset for lumbar vertebrae from human vertebrae, but in particular, an inexpensive method involving image

capture by digital camera and reconstruction of 3D models via an image-based technique. This would then be validated against laser-based arm scanners and measurements derived from the real vertebrae using electronic calipers.

We were able to provide Hamza with an extensive number of lumbar spine units from which to choose his sample set, assist with his image collection and provide relevant anatomical advice when necessary.

The accuracy of the method indicated that the generated models could be used for biomechanical modeling or 3D visualisation of the spine.



Constructing 3D models via images requires four steps: generating digital images of the vertebra, pre-processing of the images, constructing the 3D models, and postprocessing of the 3D models.

Postgraduate students and staff from any department in the University may apply for research-based access through the Museum Curator or a senior member of the academic staff from the Department of Anatomy. Some of the models in the Museum are available for use by other University of Otago departments in their teaching.

Contact the curator: museum.curator@anatomy.otago.ac.nz

NEWS FROM THE RESEARCH GROUPS



'Biological Anthropology' and 'Reproduction, Genomics and Development'....

Fourteen researchers from the 'Biological Anthropology' and 'Reproduction, Genomics and Development (RGD)' research groups recently attended the Society for Molecular Biology and Evolution (SMBE) Conference on the Gold Coast. The PIs and their students gave presentations throughout the five day conference which was attended by over 800 delegates from around the world. The presentation topics highlight the incredible breadth of research being done in the Department:

- Prof Neil Gemmell: "Sexual selection for genetic compatibility: new insights into the genetic basis of cryptic female choice in Chinook salmon"
- Gert-Jan Jeunen: "Maximizing environmental DNA capture and extraction in the marine environment"
- Dr Michael Knapp: "Soaring on the wings of giants – rapid evolution of island gigantism in extinct New Zealand birds of prey"
- Professor Lisa Matisoo-Smith: Public lecture on "The longest journey – from Africa to Aotearoa".
- Dr Helen Taylor: "Seeds of destruction? The relationship between inbreeding and male fertility in two threatened bird species"
- Dr Erica Todd: "Whole-transcriptome profiling in a model sex-changing fish identifies genes that maintain flexible sexual phenotypes"
- Dr Nicholas Dussex: "Genomic basis of tool manufacture and use in New Caledonia crows"
- Dr Megan Wilson: "Establishing bipotentiality for gonadal differentiation" and "Evolutionally conserved mechanisms of regeneration in chordates: Uncovering signalling pathways required for WBR in *Botryllodes leachi*"

- Dr Bridget Martinez: "Deiodinase type 3 methylation increases in response to thyroid stimulating hormone in a fasting adapted mammal"
- Dr Tim Hore: "Epigenetic memory in vertebrates"
- Jessica Thomas: "An aukward story of evolution and extinction – the disappearance of the Great Auk."
- Andrew Wang: "Creating a new code: Constructing a synthetic epigenetic memory system in mammalian cells" [poster]

Photo (L to R): Dr Bridget Martinez (visitor with Gemmell lab), Gert-Jan Jeunen (postgrad student with Gemmell lab), Dr Helen Taylor (with Gemmell lab), Professor Lisa Matisoo-Smith, Dr Megan Wilson, Professor Neil Gemmell, Dr Michael Knapp, Andrew Wang (postgrad student with Hore lab), Katrina West (postgrad student with Matisoo-Smith lab), Jessica Thomas (visiting student with Knapp lab), Denise Martini (postgrad student with Knapp lab), Dr Tim Hore.

Allan Wilson @ Otago

The Allan Wilson @ Otago research theme also ran a symposium which was chaired by Professor Lisa Matisoo-Smith and Professor Neil Gemmell. The symposium was a memorial session for Allan Wilson.

The late Allan Wilson was one of the greatest evolutionary biologists of the 20th Century, and one of the principal founders of the sub-discipline of Molecular Evolution. Wilson unravelled the origins and evolutionary history and relationships of numerous species with an approach to research characterized by the development and application of new techniques to big evolutionary questions. Using protein and DNA sequences, Wilson revealed first that the human divergence from our common ancestor with chimpanzees was more recent than ever imagined and second that all modern humans

shared a common and recent African ancestry. These two major findings rightly gained widespread public attention. Wilson also pioneered the idea that variability could not be readily explained by variation in protein coding genes and that regulation of gene expression likely was at the heart of much of that variability, prescient thinking that is now central to work on disease susceptibility in humans and other species. His group were also pioneers in ancient DNA research. This year marks the 25th anniversary of Allan's untimely passing.

The Allan Wilson Memorial Symposium focused on research that has been inspired by Allan Wilson and the ideas and approaches he promoted. Speakers included some of Allan's former students and post-docs including Prof Becky Cann (known for the Mt Eve Hypothesis), from University of Hawaii who spoke on 'Avian Pox Virus in Hawaiian birds'; Prof Scott Edwards, Harvard University,

who spoke on 'Convergent regulatory evolution and the origin of flightlessness'; Prof Axel Meyer, Univ of Konstanz, who spoke on 'Genomics of parallel evolution and speciation in cichlid fish'.

Allan Wilson at Otago is a University of Otago Research Theme which uses evolutionary genomics to explore the health and histories of New Zealand populations.

Click on the logo below to visit their website.

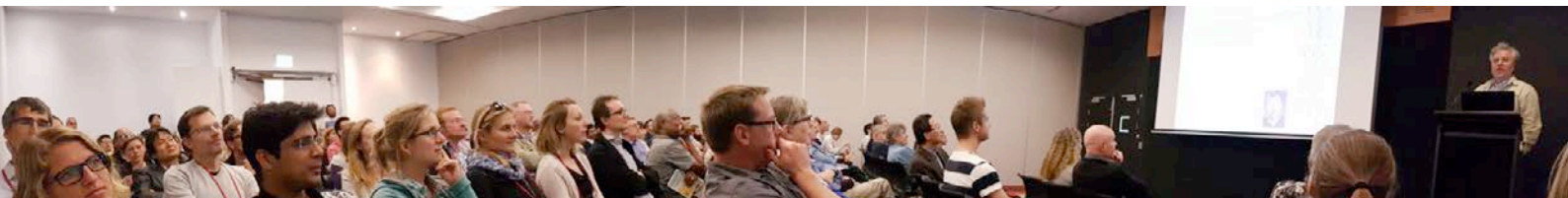


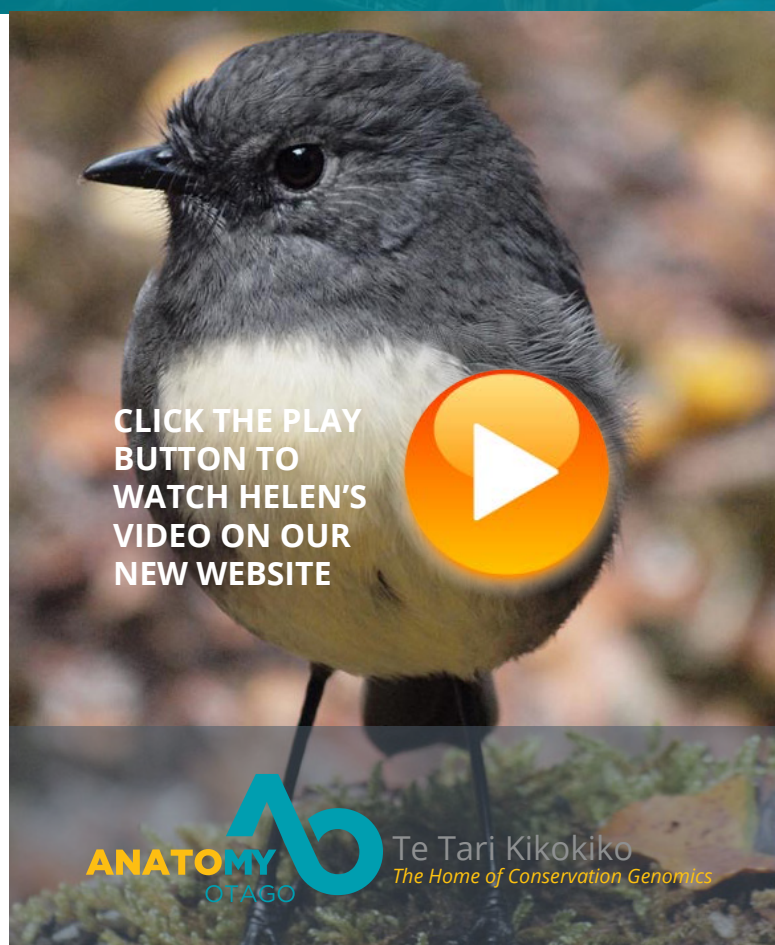
Photo from the 2016 SBE Allan Wilson Memorial Symposium: Prof Axel Meyer addressing the session. The next Genetics Australasia/Asia meeting will be held in Dunedin in July 2017.

RGD video wins big!

Conferences are a great place to share research with fellow colleagues, but Dr Helen Taylor of the Gemmell Lab knows it's also important to share your research with the public, *"If you can't make people care about and understand your work, why are you doing it?"* So last month Helen entered the '180 Seconds of Science' video competition for early career researchers, run by the Royal Society of New Zealand's Early Career Research Forum and its Australian counterpart.

Finding out about the competition at the last minute, and with only 14 days to create her video, Helen didn't have high hopes of winning. She just hoped she could reach a few people. But Helen didn't reach a few people: She reached over 5000! Helen's video, **'Studs or duds? Bird sperm and conservation,'** was viewed over 5000 times in just one week. It won the People's Choice Award *and* The Future Leader Award.

Helen won \$4,000 to put towards her research... Oh and a fully paid trip to another conference!



To find out more about how Helen made her video in just 14 days read the Genetics Otago article: 'The DNA of the Award Winning Film 'Studs or Duds?' The making of this video is a great example of the power of collaboration. (Click anywhere on this yellow banner to access the story)

NEWS FROM THE RESEARCH GROUPS



Neuroscience... Inspiring a room full of teenagers!

New Zealand's only neuroscience competition for high school students.



More than 80 Year 11 students from 16 South Island high schools met in Dunedin on July 5th for the second round of the Australia and New Zealand Brain Bee Challenge. The challenge introduces the students to neuroscience, a topic which is not part of the high school curricula.

Round one (held during Brain Awareness week) was an online quiz hosted by Education Perfect, and from this, students were selected to come to Dunedin to take part in round two.

Anatomy Senior Lecturer Dr Ruth Napper was the main organiser of this year's round two event and she and her team, which included lecturers and postgraduate students from various departments, created a truly inspiring experience. As well as competing in individual and team events the students got the opportunity to experience what being a student at Otago University may be like. They attended a lecture by Kristen Hillman from the Psychology Department and took part in an interactive "NEURO 101" laboratory session using one of



the teaching laboratories used for First Year Health Science classes.

During the laboratory session the students looked at human brain tissue and nerves under the microscope and ran an experiment using electrodes to stimulate the ulnar nerve and see the response as their fingers moved. They also explored the gross anatomy of the brain and spinal cord using models and plastinations.



The entire Brain Bee experience is really

exciting for the students as it allows them to gain insights into working in neuroscience and exploring potential career opportunities. *"We hope the hands on experience they received will not be forgotten when the students are thinking of possible study options after high school"*, says Ruth.

Daniel Wei from Riccarton High School was the 2016 individual winner while Villa Maria College was the winner of the team competition.

A man with short brown hair and a mustache, wearing a checkered shirt, is smiling and holding a realistic model of a human brain in his left hand. The background is a blurred indoor setting with bookshelves.

1.

\$14M funding success....

Four projects have received funding by the Ministry of Business Innovation and Enterprise (MBIE) totalling over NZ \$14M.

1. Dr Andrew Clarkson (Neuroscience)

enGAGing the brain to restore function

Smart Ideas Project - \$1 million over three years

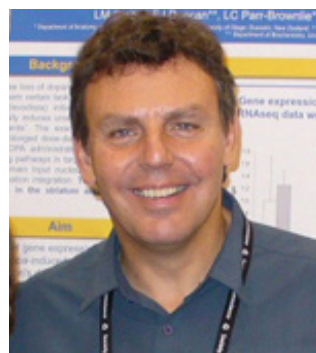
"Stroke is the leading cause of lasting impairment and can affect anyone at any time. Until recently the brain was thought not to recover following a stroke. However, we have previously shown that if the right treatment is given at the right time following a stroke, significant improvements in motor and cognitive function can be achieved,

This three year Smart Idea project, under the leadership of a stroke biologist at the University of Otago (Dunedin), brings together leading experts in chemistry from the Ferrier Research Institute (Victoria University of Wellington) and KODE Biotech (Auckland University of Technology), and biomaterials experts at the University of Otago (Christchurch). Our common goal is to develop novel treatments to improve function following brain injury. This research builds on our team's ability to greatly simplify the synthesis of novel compounds capable of targeting any part of the brain extracellular matrix; the glue that holds all brain cells in place, vital to brain health. The team will use an iterative, smart design approach to develop and test a range of potential drugs to help patients recover from stroke.

Such novel compounds have wide-ranging potential as they have the ability to modulate many biological and physiological processes in the brain. So beyond holding

great promise for treatment of stroke, in the future they may aid in improving outcomes for numerous other neurological conditions."

2. Associate Professor John Reynolds (Neuroscience)



Targeting Drug Delivery within the brain - Building a system for human application

Research Programme - \$4,859,256 over four years

"This programme will stimulate a high-profit, technology-based medical device and consumables

industry in New Zealand for the treatment of brain disorders. The technology will incorporate a delivery system for brain chemicals together with a controller that will manage timing and dose. Drug delivery will mimic natural release of neurochemicals in the brain, reducing side effects and improving treatment efficacy.

The new technology will enable smart, non-invasive drug delivery that will revolutionise the treatment of disorders with underlying neurochemical imbalances. The team wish to expand their device concept into a drug delivery platform that will first be applied to better treat Parkinson's disease, preventing, and in theory reversing, current treatment-induced side effects in humans. The technology could also target chemotherapy to brain cancers and arrest epileptic seizures at the site of origin."

3.

3. National Institute of Water and Atmospheric Research Ltd, including co-investigator Professor Neil Gemmell (Reproduction, Genomics and Development). *Overcoming dispersal and recruitment constraints on native freshwater biodiversity*. Research Programme - \$7,275,000 over five years

3... “Enabling ecologically sustainable water resource use is a key challenge for New Zealand. Land use change and human infrastructure in and around waterways can disrupt the movement of organisms between environments used by different life stages, and degrade critical habitats, preventing successful completion of life cycles. These disruptions to connectivity and habitat reduce the resilience of freshwater communities to other environmental disturbances, such as floods, pollution events or climate change. In combination, these pressures greatly contribute to declines in macroinvertebrate biodiversity and the abundance of iconic fish, such as whitebait species, which are regarded as taonga by Māori and indicators of healthy waterways.

Understanding how species respond to human impacts is fundamental to resolving the challenge of maintaining resilient aquatic ecosystems. This project will improve the biological integrity of threatened ecosystems and species in modified landscapes. This will be achieved by identifying habitat and connectivity bottlenecks that limit dispersal and recruitment in fish and macroinvertebrate populations, and by providing guidelines on practicable solutions to overcome these constraints. The guidelines will incorporate improved understanding of the abilities of exemplar species to move between critical habitats, and how to mitigate human alterations to river habitats that impact on reproduction and colonisation success. These tools will inform effective and efficient restoration, protection and maintenance of ecosystems in modified landscapes. This help will sustain our aquatic fauna and the ecosystem services they provide to people.”

4. AgResearch Ltd, including co-investigator Professor Neil Gemmell (Reproduction, Genomics and Development). *World first proof-of-application of Trojan female pest control*. Smart Ideas Project - \$869,562 over three years



“Agricultural pests cost New Zealand over \$2-4 billion p.a. and new tools for managing them are urgently needed to replace flawed pesticide-based approaches, and bolster plant resistance and classical biocontrol,

which have important limitations. Trojan female (TF) pest control is an ingenious approach for controlling or even eradicating pests, conceived in NZ, which we propose to implement as a world-first proof-of- application. Recent modelling and laboratory research support its exciting potential for use in the real world.

TF pest control involves breeding up females that carry natural mutations in their mitochondrial DNA which reduce male fertility, and releasing them back into wild populations 2. This simple intervention involves no genetic modification (GM). TFs survive and reproduce similarly to normal females, and persist across generations. However, their infertile sons mate with wild females, produce few offspring and reduce pest population fertility.

4.

Using TFs to control pests has unparalleled advantages including: controllability, species-specificity, persistence, zero-toxicity, non-GM, affordability, humaneness, social acceptability and efficacy. We propose to develop TF pest control to improve control of, and eventually eradicate, a pasture pest called clover root weevil (CRW), which causes \$0.45 billion of economic losses to New Zealand each year. By the end of this project, we aim to be ready to implement TF control for CRW in the field, then afterwards to implement it in partnership with industry. TF pest control is applicable to numerous vertebrate and invertebrate species, and our proposed research will serve as the basis for TF control of many other pests. "

Photo by Phil Bendle

"Pssst, want to help us make more babies?"

We are looking for an enthusiastic **PhD student** for a project in animal reproductive sciences. The project is a collaboration between the Department of Anatomy and Agresearch.

Click **HERE** to find out more
www.otago.ac.nz/anatomy/study/postgraduate/opportunities

RESEARCH DAY

FRIDAY DECEMBER 9TH



Investigating fundamental questions of the human past that have pressing implications for human health today in Aotearoa, the Pacific and Southeast Asia.

APPLY NOW

Otago Research theme, **Asia-Pacific Biocultural Health: Past and Present**, are holding a Student Development Research Day on the 9th of December 2016.

Potential candidates can apply for a travel and accommodation grant to attend the research day!

Postgraduate research topics will include: Archaeology, Biological Anthropology, Biomedical Genetics, Child and Public Health, Dental Epidemiology, Evolutionary Medicine, History, Medical (Social) Anthropology and Sociology. The winning applicants will receive a grant to attend the research day and develop their own research ideas.

We especially encourage Māori, Pacific Island, and Southeast Asian scholars to apply. We will consider all prospective applicants from New Zealand, Australia, the Pacific, and Southeast Asia.

Please contact: sian.halcrow@otago.ac.nz for more information on research topics and the application process. Candidates need to contact Siân **BEFORE** the **21st of October** with final applications due **31st of October**.

Local prospective students are also encouraged to attend the Research Day.

THANKSGIVING...

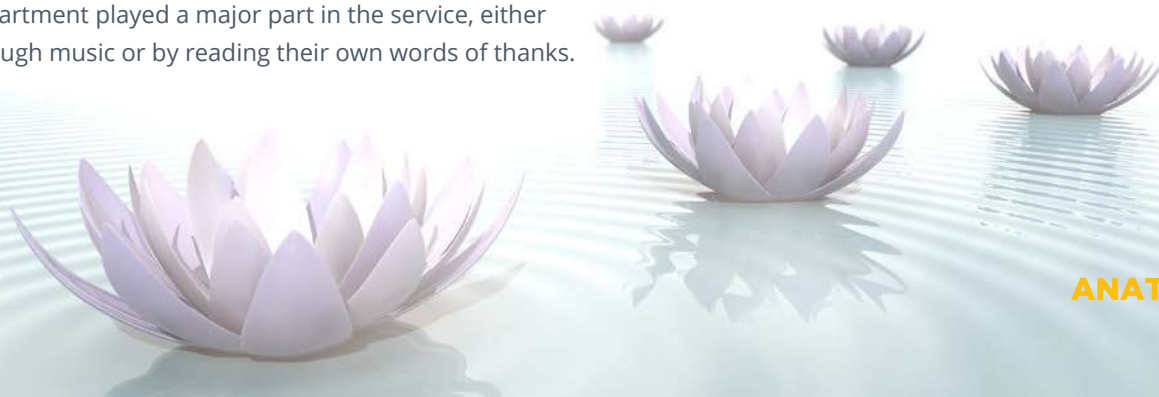
Over 260 people attended the Department's 12th Thanksgiving Service in Christchurch. The evening was a celebration of the lives of our donors, and the amazing gift given to health science education and clinical anatomy research. It was also an opportunity for the Department to personally thank the families for supporting their loved ones decision to donate their body.

The service was officiated by University of Otago Chaplain Rev Greg Hughson. Fourth, fifth and sixth year medical students and postgraduate students from the Department played a major part in the service, either through music or by reading their own words of thanks.

The Department's Body Bequest Programme is one of only a handful of bequest programmes still in existence anywhere in the world.

The principal use of bequests is for teaching anatomy to medical, dental, physiotherapy, physical education, and science students, but a number of academic staff and postgraduate students in the Department are also using human bodies for research purposes.

The 2017 service will be held in Dunedin. For more information please contact anatomy@otago.ac.nz.



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If you are interested in purchasing a t-shirt then please email t-shirts@anatomy.otago.ac.nz. Please note that for out-of-town purchasers there will be an additional charge on top of the \$15 to cover the cost of postage. Alternatively you can send a courier bag with your payment. Click on the t-shirt style you want to find sizes. Or go to <http://www.ascolour.co.nz/>