There is no ignoring the huge role that women play on the St Vincent’s campus – from Sr Maureen Walters RSC, who worked tirelessly as the Sister Administrator of St Vincent’s Hospital prior to recently heading to Sydney to continue her work with the Sisters of Charity Congregational Office, to Professor Patricia O’Rourke, who is CEO of St Vincent’s Public Hospitals.

Closer to home, we have the Chairs of our Board and Foundation Board, ably led by Brenda Shanahan and Susan Alberti, respectively. We are also justly proud of our senior staff, 50% of whom are women.

Any researcher worth their salt would argue that our sample size is not large enough for statistical significance and, in fact, there is no ignoring the under representation of women in senior research positions across Australia.

Women account for more than 60% of all applications in the NHMRC’s early career fellowship scheme, but this drops dramatically when it comes to senior fellowships – women made up just 11% of applicants for the most senior fellowships in the NHMRC’s most recent funding round. This loss of talent is a huge concern, which is now being actively addressed by the NHMRC and by many Institutes, including SVI.

One of the ways we are approaching this is by providing support to our young female researchers as they face the challenge of rearing young children while keeping their research on track. In May, Dr Lorien Parker was awarded SVI’s Women in Research Award at the annual Susan Alberti Medical Research Foundation Mother’s Day Luncheon. The Award supports the work of an outstanding female scientist by providing her with technical support in the lab while she is on maternity leave. Dr Parker, a postdoctoral fellow in the Structural Biology Unit, will take leave in October for the birth of her second child.

At SVI we are lucky to have senior female researchers who all run successful research programs alongside their family responsibilities. These women are a key part of our team and are excellent role models for the next generation of researchers.

Recently joining the ranks of our senior staff is Associate Professor Geraldine Mitchell. Geraldine is one of 17 research staff who, along with 11 students, joined SVI thanks to a merger with the O’Brien Institute. The merger, which occurred on the 30th of April, represents a consolidation and strengthening of two research organisations that already have much in common.

I look forward to keeping you abreast of our new research developments in the year to come. I would like to take this opportunity to thank everyone who has supported the Institute over the last year, many of whom are listed on the back page of this newsletter.

IN THIS ISSUE

Tom says
Research: Brainy bones
Talent: Dr Jibran Wali
Hope: Edie’s story
Research: X-ray vision – exploring Alzheimer’s drugs

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The SVI Forum: Beyond Pills
SAMRF Signature Ball 2015
2015 events diary
Support: Thank you
Bones are savvy. They are light, strong, and they can repair themselves when damaged. What’s more, they are continually renewing themselves, replacing old bone for new. This is not unique - other tissues (most noticeably skin) are continually replaced. However, bones adjust to the body’s mechanical and physiological needs as they go. How do bones manage such a remarkable feat? Recent advances in imaging technology are starting to reveal the brains buried deep within bone: a living cellular network composed of bone’s most abundant cell, the osteocyte.

Like the neurons in the brain, osteocytes have long finger-like projections burrowing through the bone to interconnect with each other. Inspired by the complexity of this cellular network, SVI’s Associate Professor Natalie Sims and her colleague, Monash mathematician Dr Pascal Buenzli, set out to quantify the osteocyte network in the human skeleton. What they found exceeded all expectations, paralleling even the neural network of the brain.

The team estimated that the human skeleton contains 42 billion osteocytes. In comparison, the human brain contains 86 billion neurons, packed in a volume (1.2 L) comparable with the volume of bone in the skeleton (1.75 L), although of course the skeleton is more spread out.

Adding together the length of the osteocytes’ projections, the team estimated that the entire network is about 175,000km long: more than four times the earth’s circumference. This is very similar to the total length of the pathways between brain cells.

They then used a mathematical model to calculate the total number of connections between the cells. How many? Twenty-three trillion connections exist in the human osteocyte network. So, in a way, our skeletons have a similar number of cells as the brain, interconnected in a similar sized space. Why do our skeletons need such a complex network? The experts don’t know exactly, but they do know that the cells exchange information, just like neurons do.

We know that osteocytes communicate with each other about where the skeleton is weak and needs to be strengthened, or where there is damage that needs to be fixed. These messages are transmitted to cells on the bone surface that are able to remove damaged bone (osteoclasts) and form new bone (osteoblasts).

The team at SVI will continue their research into these brainy cells, in order to find better treatments for skeletal disorders like osteoporosis or osteogenesis imperfecta, and explore ways to get people back in action more quickly after a fracture. In the meantime, the osteocytes will continue to keep our skeletons strong (and smart) enough to support us.
Anne’s partner Edie was diagnosed with early onset Alzheimer’s disease when she was 59.

“Edie had been working as a driving instructor. She was the type of person who would remember things after she’d been told once, but then we started noticing that if she hadn’t written the details down...

After many consultations, a PET scan and re-examination of an earlier MRI formalised the diagnosis.

When it comes to coping with the disease, Edie just gets on with doing what she can. We don’t deny it, but we don’t need to be thinking about it every day. We know it’s going to progress, but it is moving slowly, which is good. We just don’t dwell on it.

The first few years were spent finding the right medication, becoming part of the Alzheimer’s Australia ‘world’ and getting good medical and emotional support. At first it was very hard for Edie, as she had to quit her job as soon as she was diagnosed. Now she just goes along with it and mood-wise is more consistent.

We were lucky. Even though it took 5 years from initial symptoms for Edie to be diagnosed, it was probably still at an earlier stage than many people experience. Being diagnosed early gives you time to get more information; to adjust, to plan how to manage as things progress, to explore whether or not medication has any side effects, and to live your life as fully as possible. We have travelled to Botswana, China and Vietnam since Edie’s diagnosis.

When it comes to medical research, we would both like to see first and foremost a cure. But in the shorter term, we would like to see the development of diagnostics such as a blood test, to help identify when someone is at risk of Alzheimer’s before the symptoms start to show.”
At the end of last year, PhD student Jibran Wali was awarded the SVI Director’s Award for the student with the most outstanding publication record in 2014. This was the fitting end to a successful candidature: Jibran submitted his PhD in September 2014, with an impressive nine publications to his name.

Jibran arrived at SVI in 2010 to work in Associate Professor Helen Thomas’ Islet Biology Laboratory. He came via Islamabad in Pakistan where he was raised and medically trained and then New Zealand, where he did a Masters of Health Sciences by research at the University of Auckland.

It was while working as a medical intern in the eastern city of Lahore in Pakistan that Jibran first appreciated the serious effects of diabetes on his patients. ‘At the same time, my father, who had always been very supportive of my career aspirations, was diagnosed with type 2 diabetes and this made me observe the effect of the disease even more closely.”

Jibran’s interest in diabetes eventually led him to SVI, where his PhD project focused on the life (and death) of the beta cells in the pancreas. “Beta cells are found in clumps of cells called islets, where they produce the hormone insulin. The main role of insulin is to promote uptake of sugar in tissues such as the muscle and liver. My research showed that high sugar levels seen in diabetes puts the beta cells under stress, which eventually leads to their death.”

His studies also identified molecular targets that might be used for drug development to treat metabolic disorders such as type 2 diabetes.

**Professor Michael Parker and his colleagues have used the Australian Synchrotron to reveal important new detail of the structure of a drug currently in advanced clinical trials to combat Alzheimer’s disease.**

Michael Parker and his team revealed how the drug, Solanezumab, interacts with brain proteins associated with the development of Alzheimer’s; the findings highlight what makes current therapies for the disease effective, and show how these therapies can be improved.

The team used the high-intensity x-ray beams from the Macromolecular Crystallography (MX) beamlines at the Synchrotron to visualise the structure at a resolution powerful enough to see how Solanezumab, an antibody, interacts with a toxic peptide thought by many to cause the disease.

“This research shows us how the drug interacts with a peptide that forms plaques in the brain, symptomatic of Alzheimer’s; these peptides are otherwise difficult for the body’s immune system to clear,” Michael says. Solanezumab works by identifying foreign molecules and ‘escorting’ them to other parts of the immune system that destroy them.

Prof Parker says the research shows the drug seems to behave in a fashion similar to a second Alzheimer’s drug, Crenezumab, also in clinical trials.

“Our current study explains how both drugs recognise the toxic peptide and, in doing so, lays the foundation for how we can improve these therapies.”

Michael says this level of understanding is essential and is informing the development of a second generation of drugs.

“Based on this new information, and with the success of current clinical trials, we are already developing a second generation antibody.”

Dr Tom Caradoc-Davies from the Australian Synchrotron says the two MX beamlines are essential tools for drug development and are used by hundreds of researchers every year.

Alzheimer’s disease is the most common form of dementia, affecting 34 million sufferers worldwide. It is expected to become three times as common in the next 40 years as life expectancy increases. There is no cure for the disease, which damages the brain and affects memory, thinking and behaviour. Out of every ten people with dementia, as many as seven have Alzheimer’s.

Sadly, Jibran’s father passed away from complications of diabetes just a few months before he completed his PhD. “My father took a lot of interest in the progress of my research and he always got excited when I told him about my new publications or a conference presentation going well. Although I was able to visit him twice during his serious illness, it saddens me that he wasn’t around to witness the completion of my PhD.”

Now employed as a postdoctoral researcher in the lab, Jibran has the opportunity to pass on some of his knowledge and experience to the next wave of PhD students. He intends to continue his research career the same way he has started it: full of passion and productivity. Jibran’s father would surely be proud of his son’s achievements.
Is it possible to be fit and fat? Well, yes it is, according to Professor Jo Salmon, Deputy Director of the Centre for Physical Activity and Nutrition at Deakin University. Joined by Jane Martin, Executive Manager of the Obesity Policy Coalition, the two headlined the fourth annual Friends of SVI Food Matters Event held on Tuesday March 31.

Almost 50 people attended the event, which started with a tour of SVI labs by A/Prof Jock Campbell, Head, SVI’s Molecular Cardiology Unit and Dr Sandra Galic, Postdoctoral Fellow in SVI’s Protein Chemistry and Metabolism Unit. Following the tours, SVI Foundation Board member and Chair of the Friends of SVI support group Bernadette Dennis, welcomed guests to the event and introduced the MC, SVI Board Member Karen Inge. An accredited practising dietitian who provides specialist nutrition comments to media, Ms Inge was well-placed to direct the lively discussion that followed the formal presentations.

In her presentation, Professor Salmon said that inactivity and low fitness were major determinants of illness and premature death, and that no matter your weight status or health, everyone should move more and sit less.

While Ms Martin agreed that you can be fit and fat, she advised the guests that unless rates of obesity/overweight are reduced, common cancers such as bowel cancer (9% attributed to obesity/overweight) and breast cancer (17%) will increase, while rarer forms such as endometrial cancer (49%), oesophageal cancer (35%) and kidney cancer (24%) may also become more common.

Thanks to everyone who participated in and attended the event.

If you are interested in learning more about the Friends of SVI, contact the SVI Foundation on (03) 9231 2480.

Dr Lorien Parker from SVI’s Structural Biology Unit has been awarded the ‘Susan Alberti Women in Research Award’ at the third annual Susan Alberti Medical Research Foundation Mother’s Day Luncheon, held on Thursday May 7 at Leonda by the Yarra.

Funds raised through the Luncheon go towards the Award, which supports the work of an outstanding female scientist by helping to ensure her research can continue while she is on maternity leave.

“Female researchers have worked hard to get to where they are in their career,” says Susan Alberti. “I think it’s important to support outstanding women who have much to offer the community through their potential for medical research discoveries, and who have also made the choice to raise a family.”

Lorien’s research focuses on improving the properties of cancer chemotherapy drugs. Current treatment frequently requires large and long doses of toxic chemicals that produce severe side effects. These treatment regimes also often result in drug resistance, resulting in cancer relapse.

“I’m very grateful to be the recipient of this year’s Women in Research Award,” said Lorien. “It means that I don’t have to worry about my research stopping while I’m away, and is going to allow me to stay home with my second child for the first year of their life.”

The Aussie Boys entertained the guests on the day with some classic Aussie music and Dr Judith Slocombe, CEO of the Alannah and Madeleine Foundation and mother of nine, spoke about her experience of successfully combining a career in business with motherhood. She said that women need to work actively on both their careers and their family and need to learn to prioritise to allow both to flourish.

“Housework has never made it onto my list,” she said, “no one ever suffered from having unpaired socks.” Enthusiastic applause indicated that the audience whole-heartedly agreed!
On Monday May 25, more than 200 guests at SVI’s Annual Forum learnt about the Therapeutic Revolution underway in medicine.

After a welcome from Tom Kay, SVI’s Patron, Sir Gustav Nossal, introduced the Forum’s keynote speaker, Professor Sir Marc Feldmann. Professor Feldmann, one of Australia’s pre-eminent immunologists, spoke of the challenges he faced in his development of new therapies for rheumatoid arthritis. The drugs have now been used by millions of people worldwide.

The next speaker, orthopaedic surgeon Professor Peter Choong, provided insight into recent advances in orthopaedics. According to Professor Choong, these are dependent upon a collaborative approach with researchers from areas including materials science and mechanical engineering.

During his presentation, Professor Michael Parker, Head of SVI’s Structural Biology Unit, spoke about his group’s Alzheimer’s disease research. Professor Parker compared neurons dying in the brain in Alzheimer’s disease to lights blowing out in a city; a single light going out may not be noticed, but the loss of large numbers of lights causes problems. He said that current approaches to Alzheimer’s therapy rely on the development of antibodies to stop neuronal death, but these need refinement through understanding of the three dimensional structure of the proteins involved – the speciality of Professor Parker’s lab.

The speakers then joined a panel with Professor Geoff McColl, Head of the Melbourne Medical School and Professor Mark Cook, Chair of Medicine at St Vincent’s Hospital, and fielded numerous insightful questions from the audience.

The Forum highlighted the fact that the Therapeutic Revolution is well underway, and patients will continue to reap its benefits, thanks, in great part, to home-grown talent.

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**THE SVI FORUM: BEYOND PILLS**

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**SAMRF SIGNATURE BALL 2015**

Susan Alberti AO is one of Australia’s pre-eminent philanthropists, having donated millions of dollars to medical research and many other charitable causes over many years.

In 2015 an historic milestone will be reached with the 30th Susan Alberti Medical Research Foundation (SAMRF) Signature Ball to be held on Saturday August 22 at Crown’s Palladium Room in Melbourne.

All attendees can not only look forward to a money-can’t-buy opportunity to mingle against the backdrop of a great night’s entertainment provided by Tina Arena, but they can also play their part in supporting Sue’s passion for better resourcing medical research.

St Vincent’s Institute is one of three institutes to benefit from the proceeds of this important SAMRF fundraiser and we encourage you to attend. The SAMRF Signature Ball is always a great affair and this 30-year celebration should be on your ‘must attend’ list of events!

For more information or to register, please call SAMRF on (03) 9560 1595 or visit susanalbertifoundation.org.au

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**2015 EVENTS DIARY**

**August 22**
SAMRF Signature Black Tie Ball at Palladium Crown

**October 15**
SVI Support Group Black Tie Dinner

**October 23**
Jack Holt Racing Lunch

**October 26**
SVI/Macquarie Leasing Charity Golf Day

**November**
Jack Holt Society Bequest Morning Tea
Thanks to all those who donated in 2014. Thanks also to those donors not listed here and to those who wish to remain anonymous. Every donation has the potential to change lives.

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