

WITTENOOM AND THE ASBESTOS REVIEW PROGRAM

PROF FRASER BRIMS AND
MRS NOLA OLSEN

The Wittenoom crocidolite (blue asbestos) mine and mill began formal operations in 1943 and closed in 1966. The impact of this industry on asbestos-related disease in Western Australia has been enormous.

Through the use of the employment and official records from Wittenoom, two large groups of people, Wittenoom workers (nearly 7,000) and ex-residents (more than 5,000) were identified and have been followed up since the 1970s. Using linked data through state hospital and cancer records, the effect of asbestos has been recorded and studied in these 12,000 people. Research from this study has improved and changed the understanding of asbestos-related diseases for people all over the world.

The Wittenoom studies show that there has been an ongoing epidemic of lung

cancer, malignant mesothelioma and asbestosis in Western Australia as a result of the mining of blue asbestos in the State. Because Wittenoom crocidolite was used extensively in hundreds of different asbestos-containing products in Western Australia, the legacy of Wittenoom has extended beyond the mine and the town and is still evident in the state more than 50 years after the mine's closure.

The Asbestos Review Program (ARP) is a health surveillance program that has been in operation since 1990 (when it was called the 'Vitamin A Program'). The program initially began by including the Wittenoom mine and mill workers, then rapidly grew to involve the ex-residents, and soon after to include any others with asbestos exposure; mostly, but not necessarily, from work (mixed-occupation group).

Since it started, the ARP has screened more than 4,850 people. Currently, about 1,500 people attend each year. The program has looked after 1,321 Wittenoom workers, 1,129 former residents of Wittenoom town, and nearly 2,300 of the mixed occupation

In this issue

- About our PhD students, and some others!
- Highlights of the year so far
- Science for Dummies: Checkpoint Blockade Immunotherapy

group. The success of the program, now entering its 30th year, is testament to the dedication of the participants. The average number of visits to the program is 13 for men and 17 for women, and we are very proud to report that there are at least 100 people who have attended every year since the start of the program. During the course of the Asbestos Review Program we have diagnosed 238 cases of lung cancer and 225 cases of mesothelioma; there have been 1,824 death from all causes.

The research and data collected from the ARP is impressive. Since 1990, there have been 46,400 visits to the clinic with lung function performed on everyone, more than 40,000 blood samples and nearly 30,000 chest x-rays taken. In 2012, the ARP became the first clinic of its type in the world to change to low dose CT scans of the chest (LDCT). This type of scan is capable of detecting early lung cancers at the same radiation dose as a chest x-ray. Since the ARP changed to LDCT we have found that about 1 in 100 participants have an early, treatable lung cancer. This has attracted interest from around the world and is changing the lives of those exposed to asbestos in Western Australia.

The ARP is likely to be the most comprehensive and impressive collection of data for people who have been exposed to asbestos in the world. Research from the ARP has contributed to knowledge around the world about asbestos-related diseases and it was the ARP blood samples that helped develop a special blood test for mesothelioma, developed in Western Australia. Blood samples continue to be used by researchers from NCARD to identify early markers of asbestos-related diseases and to help understand the genetics of these diseases. In the last six years alone, 20 scientific research reports have been published from the ARP and Profs Musk, de Klerk and Brims have been invited to speak at numerous international conferences, so other countries can learn from this unique experience in Western Australia.

The ARP is still recruiting new people. Anyone with more than three months of work exposure to asbestos, or those with any asbestos-related changes on x-rays or CT may be eligible. For information about the Asbestos Review Program, please contact fraser.brimms@health.wa.edu.au or the ARP clinic on 08 6457 2922.

Common terms of asbestos-related changes on x-rays and CT scans:

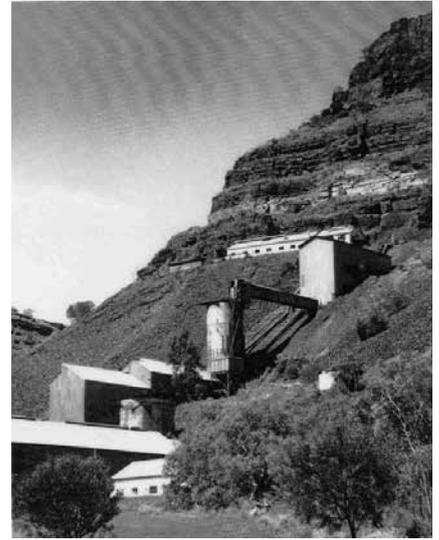
Asbestosis – this refers to scarring of the lung tissue that has a number of different causes including asbestos exposure. If this is very widespread it can cause breathlessness but usually does not need any treatment. The term ‘asbestosis’ is commonly misused to refer to any disease in the lung from asbestos exposure.

Pleural plaques – these are areas of scarring around the edge of the chest wall caused by asbestos exposure. Plaques do not cause any disease and do not need any treatment.

Diffuse pleural thickening – this is thickening of the lining of the chest wall and covering of the lung, caused by asbestos. Sometimes this can cause some breathlessness but usually only when it is very widespread. No treatment is available at this time.

Rounded atelectasis – this is a local patch of scarring within the lung that has a certain shape to it. It usually does not cause any symptoms and does not need any treatment.

Pulmonary nodule – a nodule is a lump, usually smaller than 10mm. Because these lumps are so small, it is usually not obvious what is causing them and so quite often repeat scans, or even a biopsy, can be needed.



BLUE ASBESTOS MINE SITE C.1960 IN COLONIAL GORGE, THE SECOND OF THE TWO WITTENOOM MINE SITES.

We need your email address!

Welcome to participants in the Asbestos Review Program. The NCARD newsletter is usually sent out by email. If you would like to keep getting the newsletter, please contact the editor, NCARD Admin Officer Tracy Hayward email: tracy.hayward@uwa.edu.au. [If you aren't interested in the NCARD newsletter, but are happy for the AFP to have your email details on file, please email lucy.conte@health.wa.gov.au or nola.olsen@uwa.edu.au].

NCARD PHD STUDENTS

Producing the next generation of mesothelioma research scientists is a key aspect of the work of NCARD. Currently we have several Masters students, an international work placement visitor and a record 10 PhD students. These graduates come from Mexico, Syria, the UK, Singapore, Malaysia, Cambodia, Canada, Iran, and Western Australia.

I put these questions to each student, and as you'll see, got quite a variety of responses. PS For longtime readers, you'll see that cake still features significantly.

1. *Why have you chosen NCARD for your PhD?*
2. *What were you doing before this?*
3. *What (if anything!) do you enjoy about being here?*
4. *What makes you passionate about science?*
5. *Do your friends and family understand your work?*
6. *How will your research impact on mesothelioma patients?*
7. *Has attending a mesothelioma clinic changed your outlook to your research?*
8. *Tell us a bit about yourself: where you're from, other interests, family... paint us a picture!*



CAITLIN TILSED PhD student

I decided to do my PhD at NCARD because I had a really great experience working with the group during my Honours year. I felt welcomed from my first day of Honours when I walked into the office. Everyone is always friendly and open to you asking questions, or for help. I would like to pursue a career in cancer research, so NCARD is a good fit as we work on mesothelioma. We also have a mix of people working on pre-clinical work (laboratory) and clinical work (with patients) so we get exposure to both aspects of research.

I went straight from high school to my undergraduate degree, which was a Bachelor of Science at UWA, majoring in Pathology. I did do a year of engineering but decided that it was definitely not for me. I then completed my Honours at NCARD in 2016 with Scott Fisher, looking at using immune checkpoint blockade as a treatment for mesothelioma. I decided to continue and do my PhD – which looks at how chemotherapy works, and how to improve the effectiveness of chemotherapy – with Joost Lesterhuis, Scott Fisher, Richard Lake and Anna Nowak.

The regular cake is a great incentive. The people within NCARD also make long days in the lab or at my desk writing enjoyable. We often have interesting conversations in the PhD office area or at lunch around the lunch table. I also love science and research, so being able to do it every day is great!

There are two main things that make me passionate about science. I enjoy problem solving, and research involves thinking of questions that no one else has answered yet and then working out how to answer them. Designing

experiments and thinking up ways to do this is one of my favourite parts of science and it is really exciting to see the results, even if they are not what you thought they would be.

The other is knowing that I am making a contribution to what we know about science and the world around us; in my case, increasing what we know about cancer/mesothelioma and how we can better treat this disease to improve the quality of life for patients.

I hope every time I talk about my work to (my friends and family) that they learn something they didn't know before. Cancer is a really complicated disease and treating it is even more complicated. I find that in the media, chemotherapy is thought of as one treatment when in fact there are many different types that work in different ways. Hopefully by the end of my PhD my friends and family will know all sorts of facts about mesothelioma, chemotherapy and some of the different types of immune cells.

My research helps us to understand how chemotherapy works; to identify which patients will benefit the most from treatment; and whether there are ways we can improve the effectiveness of chemotherapy by combining it with other drugs. At the moment, chemotherapy is not effective in all patients, so understanding how to make it effective in a greater number of patients would make a huge difference.

The patients at Anna's clinic that I attended were from different walks of life, backgrounds and professions, but all were affected by mesothelioma. Sometimes when working in the lab or reading papers you become distanced from the patient-based aspect of research, so it is really rewarding to be able to meet people that your research is working to help.

I was born in Perth and have lived here my whole life, but one side of my family is from England. I have only done a small bit of travelling, to the US twice, which is where I would like to move so I can escape the Australian summer.

I am a cat enthusiast, as evident by the many different types of cat apparel I wear around the lab. I have two cats, Bucky and Schrodinger, who enjoy waking me up at the early hours of the morning for breakfast.

I used to play AFL for Perth but have taken a year or two off to focus on my research. Instead I've taken up tap dancing, primarily inspired by my love of musicals and Broadway.



**JOEL KIDMAN
PhD Student**

I chose NCARD for my PhD as it combines the fields of immunology and cancer research. My background in diagnostic immunology gives me a strong sense of the power of the immune system to govern health and disease. I enjoy the shared enthusiasm for science, and the driven attitude for achieving the optimistic goals we have set to help the community.

Before my PhD I worked as a Research Data Manager at the Clinical Cancer Centre within The Queen Elizabeth II Medical Centre. My daily tasks involved collecting, organising and reporting clinical cancer trial data, as well as managing follow up appointments and tests for cancer trial participants. My undergraduate degree and previous job at Pathwest were aimed at using clinical laboratory science to help diagnose autoimmune and immunodeficiency diseases.

My undergraduate lecturer in immunology was good at teaching us the curriculum right up to the edge of knowledge that we have on the immune system. Lectures were akin to reading a book with the last few pages blank. There is a large body of previous immunology research but crucial open questions ahead. My interest is derived from the unfolding story. My passion is derived from the profound annoyance at not being able read the ending of the immunology story.

My family and friends understand my work to the extent that we have time to discuss it. They all have inquisitive natures, so any conversation we have will occasionally move towards our respective field of interest.

My research aims to build on the fundamental understanding of modern cancer immunotherapy treatments. Malignant mesothelioma is resistant to modern cancer chemotherapies, so novel research is needed to explore the potential of immunotherapy on mesothelioma. With a better understanding of what clinical factors influence cancer outcomes we can begin to tailor cancer therapies that give the best outcome for each patient.

Putting a face to the beneficiary of my work by attending a clinic humanises what is usually a very analytical and solitary pursuit.

I was born in the Collie hospital and lived in a small community nearby called Allanson, in South West Western Australia. Growing up in the country involved camping, climbing trees, swimming in the river and riding push bikes through the bush. I moved to Perth to start my undergraduate studies, and without much camping to do in the city, became more involved with swimming and riding. I finished the 2019 Rottneest channel swim in a team of four, and compete against other Perth cyclists on the time trial fitness app, Strava. In between these pursuits I have been travelling in Europe, South East Asia, New Zealand and within Australia.



**KIARASH BEHROUZFAR
PhD student**

I found and chose NCARD due to the presence of high-tech devices, facilities and interesting articles about mesothelioma.

Before coming here I was working in a medical laboratory as a lab specialist.

I enjoy the spirit of teamwork, friendship and hard work that exists amongst students and supervisors. I also enjoy the natural beauty in this city and the welcoming citizens.

The sense of curiosity and fervour in learning and exploring new worlds makes me passionate about science.

Do my friends and family understand my work? I think that they figure it out a little.

I hope that my research will introduce new therapeutic targets to scientists who are seeking to invent new treatments for these patients.

I'm from Isfahan, a city in Iran with a really hot and dry summer (40 degrees) and cold winter. It's a historical city including many old palaces and bridges and mosques with beautiful architectural designs, some of them constructed and designed 2500 years ago. I grew up in a four-member family with one brother and all of us love listening and performing Iranian traditional and pop music. I also know how to play Tombak (a Persian percussion instrument). Moreover, I am interested in many kinds of sport and exercise such as running, bodybuilding and football. My love of science sometimes keeps me engrossed in science movies and documentary series.



**KIESHA RICE
International Work
Placement**

I almost didn't do my placement here because I was so scared that I knew nothing about immunology or cancer but I was fast running out of time and thought to myself "if you never take chances you'll never get anywhere". I hopped on a plane and was wholeheartedly welcomed here. The people at NCARD have made it easy for me to settle in quickly and to make the most of this learning opportunity. I also really enjoy how frequently we have cake!

I'm currently working my way through my Biochemistry degree at the University of East Anglia and I was working a few part-time jobs as a tutor, a musician and a sales assistant at House.

There's a whole world to learn and understand through science. I think that finding elegant mechanisms or the amazing ways cells interact is beautiful and magical. The ability to help people and change the way we live our lives is also a big factor in why I love science so much.

I'm sure some of my friends who are studying similar subjects in the Biosciences could understand my work, but my family have less of an idea. My family are mostly in the housing and architecture industry but this means that most of them are aware of the effects of asbestos and know people affected by mesothelioma.

Hopefully, my work will make up part of a larger study that can help improve the use of checkpoint blockade so patients will know before treatment if it is likely to work or not for them. This would save time and money and even allow doctors to focus more on patients' quality of life.

I only recently visited the mesothelioma clinic and had the chance to meet some wonderful people. It has definitely lit a fire in me. I have known people who have been taken by mesothelioma, and so this fight against it has become personal. Working here has helped me make the decision that I want to work in cancer research.

I'm from cold, cloudy England... Norwich to be specific. It's a city of arts and is steeped in history. We're famous for having a lot of churches and even more pubs! I grew up in a smallish town called Aylsham and visited my mother's side of the family in Ipoh, Malaysia often. Ipoh is my second home and I love the amazing food that it's famous for.

I am a very keen rock climber and I like to go on about it! I've been climbing for almost 2 years and have led a few scary expeditions up some beautiful granite faces in Norway. I have been clambering all over the rocks (and rock climbing gyms) that WA has to offer. I'm also a musician and spend most of

my time playing jazz. I play a lot of instruments including sax, clarinet and flute, but also some odd ones like lute, dizi, viol and rauschpfeife.



LINDA YE
PhD Student
(and medical oncologist)

I started working with the lovely team at NCARD as a research fellow on the ATTAC clinical trial in 2017, evaluating cancer neoantigens as a potential new therapeutic target. This project incorporates a range of important areas at the forefront of cancer immunology research, such as genomics, proteomics and bioinformatics so I thought it would make a great PhD project! Currently I am enjoying learning how to do experiments.

I have just completed training as a medical oncologist. Most recently I completed a fellowship in phase I clinical trials and a fellowship in lung cancer.

I am excited when I see scientific discoveries translated into clinical practice leading to improved patient outcomes. After seeing the difference immunotherapy has made to oncology I am looking forward to what the next decade will bring.

My friends understand my work because most of my friends are medical and we like to talk about work (as sad as it sounds). Family, not so much.

The ultimate aim is to provide an additional effective treatment option for patients living with cancer, including those with mesothelioma, translating into more cures and people living longer and better. Having a neoantigen vaccine clinical trial program in Western Australia would make this novel treatment available to WA patients and hopefully help them achieve more positive outcomes.

Clinical contact makes me more aware of the impact cancer has on the lives of patients and their families, and what it would mean for patients to have access to more effective treatments.

When I am not working I am running around after my one year old little boy. My other interests include travelling, brunching and sleeping.



MARIANA LISETH
OROZCO MORALES
PhD Student

I wanted to focus my research in cancer and started to look for different universities in Australia. I submitted my documents to UWA and got contacted by my current supervisors as they were interested in having me as a student.

I graduated with a Bachelor of Science in Biotechnology Engineering in 2013 in Mexico and completed my Masters in Stem Cell Technology in 2016 in the UK. In between I've squeezed in around eight years of work experience in the biotechnology industry, research in government funded laboratories, private enterprises working with stem cells, and even worked as a quality engineer with Continental Automotive. I'm happy to say that I've been able to learn a lot from all of those experiences.

I'm enjoying my research, particularly all the challenges that I'm facing. I know that science is not linear, and even though I'd love that all my experiments work the first time, the learning process has been amazing. I also enjoy my desk: having a big window next to me that points out to Australia (I'm living in Oceania!) still blows my mind away.

Not that long ago, someone asked me "Isn't it sad to devote your life to finding the cure to some disease, but not finding it?" I had to think for a moment before replying "It is, but what we enjoy is the process of knowing that whatever we are doing now will help more scientists to actually generate a change,

and maybe find that cure". That's what makes me passionate about science: to know that in some way I'm contributing to something way bigger than myself.

Of my family and friends, only my husband understands my research work. He asks a lot of questions, pays attention to what I say, and remembers what I've already told him about my experiments and my project. The rest of my family and friends do not really understand my work, or even what it means to be a PhD student, but I guess they understand me.

My research focuses on understanding what drives mesothelioma invasion so we can open more doors to future therapies or combinations of therapies to stop rapid invasion, instead of using conventional therapies that have not previously worked.

Cancer has been personally significant to me. A year and a half ago my dad passed away from oesophageal cancer that metastasised to the liver. A couple of months ago an aunt also passed away, only a month after the doctors discovered that she had cancer. To have decided to come here and work and think about cancer every day is definitely not the easiest thing that I've done in my life. But my hope is to be able to do "a little something" for other families that are going through this horrible process.

I was born in Guadalajara, Mexico and basically lived there my whole life. When I was growing up I loved to draw and wanted to be an industrial designer like my parents. Years later, I changed my mind and decided that engineering would suit me better as I prefer a bigger challenge. I ended up studying biotechnology engineering. During my last year at college I went to Canada for three months for an internship; that experience decided me that I needed to pursue my future outside Mexico. Luckily, I met my future husband, who had the same mindset. We moved to the UK to do our Masters, and eventually went back to Mexico where we organised our wedding in one week (best decision ever!). Now we've moved to Perth for me to start my PhD and for him to get a job as a mechanical designer.

My favourite thing is to travel with my partner; I'd love to travel the whole world! I like to spend my time in the gym lifting weights. I also love coffee, playing challenging board games, watching series and salsa dancing.



**MELVIN CHIN
PhD Student
(and medical oncologist)**

NCARD brings together senior investigators with diverse skill sets and research interests, making it a very useful place to learn how to do good scientific research. I enjoy having a nice working environment with approachable, supportive people: critical for doing good science.

Before coming to NCARD I was doing clinical work in oncology. I am still doing this.

Science has great potential to improve patient care, and I hope that my research will increase the effectiveness of our current treatments for mesothelioma.

Do my friends and family understand my work? They accommodate it!

Mesothelioma clinics highlight the importance of research in this area, and infuses it with a sense of urgency.

I am the father of two beautiful children, a clinical oncologist and an avid fan of high performance computing in clinical research.



**NICOLA PRINCIPE
PhD Student**

I was fortunate enough to be chosen to do my Honours at NCARD in 2018 and decided to stay for my PhD, because the research that NCARD is undertaking is really cutting edge and making a real impact on the lives of cancer patients. Also, the team is not only friendly but really supportive. I am always encouraged to ask heaps of questions and take part in what can sometimes be "heated" scientific conversations. I am so grateful to be working with hard-working, enthusiastic cancer researchers that I hope to be one myself one day.

I grew up in Perth, completed my Bachelor of Science at UWA and last year completed my Bachelor of Biomedical Science (Honours) at NCARD supervised by Jon Chee. Before starting my PhD in March this year, I embarked on a 10 week holiday travelling through Europe. I'm so happy I did this before starting a hectic PhD.

My experience at NCARD has been really great so far. I love the facilities and the friendly environment to work in. The abundance of cake is a total yes!

I was a total nerd in high school! Science, especially Human Biology and Chemistry, were always my favourite and top subjects. I have always enjoyed learning how our body works to combat pathological disease, and having a number of family and friends diagnosed with cancer has made me really passionate about the new developments in the cancer research field.

Maybe the best way to explain my family and friends' view of my work is when I come home after a long day and they ask: "Have you cured cancer yet?" It's not that easy! I think before I started in the field of cancer research, cancer was a kind of black box to them. They knew it was bad and it is

incurable, but didn't know much else. They are definitely going through the learning curve with me when it comes to learning how our immune system tackles cancer.

My project is looking into the underlying mechanisms of how our immune cells, in particular T cells, function to tackle cancer cells. Each T cell has a specific receptor, called a T cell receptor, which binds to a particular antigen of interest (in this case a cancer cell) in order for the T cell to be activated and cause an immune response.

First line treatment for mesothelioma patients is chemotherapy, but there are also trials that Anna Nowak is doing looking at immunotherapy and also using the two in combination. Unfortunately, not all patients have complete tumour regression with these therapies. We want to figure out why some patients respond and others do not in terms of the activation of their T cells by their T cell receptor. Hopefully we can apply this knowledge to make more patients respond to these therapies.

Attending a mesothelioma clinic has put into perspective why all of us cancer researchers are really here. I enjoyed attending Anna Nowak's clinic: it motivates me to strive really hard in my work to improve outcomes for mesothelioma patients.

I was born in Australia but have been brought up in a big Italian family. I am very fortunate to have a loving family supporting me in everything I do. I am so grateful to come home to amazing home cooked food made with so much love from my parents and especially my grandma (Nonna). I also love travelling and in particular experiencing new and different cultures.



**SHAHAMA TAIFOUR
Masters student**

I have always been inspired by science, since I was a little child. I pursued a bachelor in pharmacy and pharmaceutical chemistry and I worked as a community pharmacist for a few years. When we relocated to Perth I was enthusiastic about undertaking a Masters course in Biomedical Science at UWA's School of Molecular Sciences. Joining NCARD has been an exciting step for me. Professor Jenette Creaney is supervising my research project. We are using a 2D and 3D cell culture approach to test the efficacy of drug targets in mesothelioma cell lines and pleural effusions suggested by single-cell RNA-sequencing. We hope that our innovative approach will help improve patient's survival by using personalised medicine. Working at NCARD is a good life experience and I am enjoying my daily work, engaging with world class researchers.



**SHAOKANG MA
PhD Student**

NCARD has a very diverse group of researchers with different expertise; it is a great place to learn and to do science. Being at NCARD, and being in Perth, is great. I enjoy the weather (not the wet winter days though) and the beach.

I was doing my honours with NCARD before my PhD. Before that, I was back in Singapore, serving in the military.

I've loved science since I was a kid. It has always fascinated me. The inner me is going: "This is so amazing! Wow,

this is how it works!" Understanding how the world works and how we can make things better through science has always driven my curiosity.

What I am doing and what my friends think I am doing is probably miles apart. Having to explain my work to them helps with my communication skills.

My work looks at immunotherapy with vaccines that target mutated proteins in cancer. It has the potential to provide personalised treatment options for mesothelioma patients. Meeting mesothelioma patients really drives home the message of why we are doing this, and reinforces the very purpose of doing this research.

I am from Singapore, a city-state not too far from Perth. My family are all back in Singapore: my parents, my wife, my sister and three amazing nephews. They have been very supportive of me pursuing research in Perth. I love and miss the food back home! Is looking for delicious Asian cuisines considered an interest? I am also a big Star Wars and Marvel fan.



**SYNAT KEAM
PhD Student**

I spent the final year of my UWA master's degree in Infectious Diseases doing a research project at Royal Perth Hospital with Dr Dino Tan, investigating whether blocking inhibitory receptors (PD-1 and CTLA-4) could improve anti-bacterial monocyte responses in patients with Chronic Obstructive Pulmonary Diseases (COPD). I was impressed to learn that our immune system can be harnessed to treat different diseases, especially cancer. As the project progressed I developed a strong interest in tumour immunology, and learned that NCARD was doing research in various aspects of tumour immunology. I contacted Professor Anna Nowak and was eventually offered a place as a PhD student at NCARD to do my research on radiotherapy and immunotherapy in mesothelioma.

My passion for science, especially medical sciences, was fuelled by the fact that many people are living with and suffering from incurable or chronic diseases such as cancer. Some cancer patients have not lived any longer after a course of chemotherapy, after spending so much money on the treatment. I have a wish that new effective treatment approaches could come out of my research so that cancer patients can live longer and healthier lives.

Most of my friends and family back home know I am working on cancer, but they do not understand what exactly I am doing because tumour immunology, and immunology itself, is a complex area of study, requiring previous background knowledge to understand how immune cells work to eliminate the foreign pathogen and cancer cells.

There is no effective treatment for patients with mesothelioma and the hunt for a cure is still ongoing. My group at NCARD is taking a new approach by trying to harness the synergy between radiotherapy and immune checkpoint blockade using a small animal model. We know that radiotherapy could “wake up” anti-tumour immune responses; however, we still do not know the optimal doses and schedules of radiotherapy which will produce the most effective responses in mesothelioma, or in combination

with other treatments. If our research is successful, the results can be rapidly translated into a phase I clinical trial.

I was allowed to attend Professor Anna’s mesothelioma clinic and got consent from patients to observe the consultation. I was saddened to see the distress from family members when their father or husband was diagnosed with mesothelioma. This has inspired me to work harder in order to search for effective treatment for patients with mesothelioma.

I’m from Cambodia and was born in the countryside. I did my undergrad degree in laboratory medicine there. My parents were farmers, but are now retired.



WES WILSON PhD Student

I have been a cancer researcher since 2010. I’m originally from Canada, where I was working on new approaches to cancer therapy at Toronto’s Sunnybrook Hospital; and on understanding childhood

brain tumours at The Hospital for Sick Children. I joined the National Centre for Asbestos Related Diseases in 2017 to work under Professor Anna Nowak’s supervision, and with the team’s approach to benchtop to bedside medicine.

I work on a tangential treatment regime for mesothelioma based on the DREAM trial in Australia. Instead of combining modern immunotherapy with chemotherapy, as in the DREAM trial, I combine it with targeted radiotherapy. This current work is supervised by NCARD’s Dr Alistair Cook.

My passion for science stems from the desire to positively impact the lives of others. Through medical research this reach means decreasing the suffering of those affected by cancer, and the families of those affected, around the globe. I am a firm believer in the principle that science isn’t finished until it is communicated. I work in my spare time to help communicate the discoveries and work of other researchers in STEM.

Outside of research, I also sit on the Faculty of Health and Medical Sciences Research Committee at the University of Western Australia, teach Machine Learning through the Faculty of Science, am the current president of the Science Communication Society at UWA, and am a member of the Royal Society of Western Australia.

NCARD DONATION ENVELOPES

After a number of requests from families and funeral directors, we have printed donation envelopes specifically for donating to NCARD. Some of these are now with the larger funeral homes in Western Australia, or we can supply as needed, anywhere in Australia (or overseas, if donations are made by credit card).

Please contact Tracy Hayward
Ph: 08 6151 1078 tracy.hayward@uwa.edu.au for donation envelopes, or with any questions about donating. We are so very grateful for donations towards our research.



NCARD HIGHLIGHTS

March

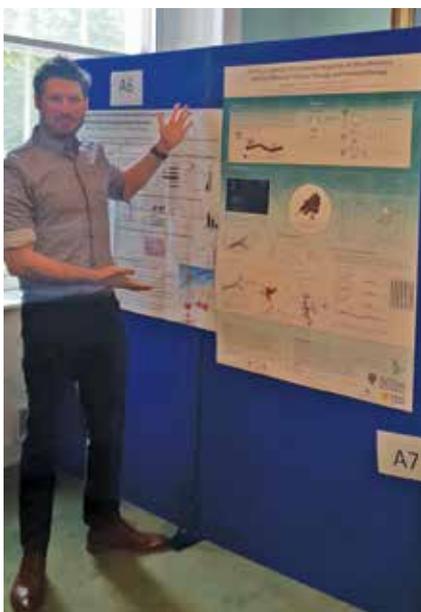
There's not many of us who would contemplate riding a bike from Fremantle to Sydney, let alone via the Australian Alps, but that's what Justin Barrasch did, to raise funds for NCARD. Justin was one of hundreds of Canberra residents horrified to learn that his home was a "Mr Fluffy" house, with loose-fill asbestos used for insulation. Motivated to contribute to asbestos disease research by the thought that one day his young family could be affected, Justin participated in the Indian Pacific Wheel Race, leaving Fremantle on 16 March 2019. An unsupported race, the cyclists have to provide for themselves along the 5500 km journey: they can stay in hotels and buy food, but don't have support crews to meet them, although they are allowed to accept provisions from "Road Angels" – people they meet along the way. It took just 23 days for Justin to make it to the steps of the Sydney Opera House, and he raised \$1715 for an impressed and grateful NCARD.



KEEN CYCLISTS AND NCARD RESEARCH SCIENTISTS DR SCOTT FISHER (LEFT) AND DR ALISTAIR COOK (RIGHT) MEET WITH JUSTIN BARRASCH. (THE FRESH FRUIT AND VEGETABLES IN THE KITCHEN WERE A CRUEL IRONY, CONSIDERING THAT JUSTIN WOULD PROBABLY BE GOING WITHOUT BOTH ON HIS RIDE ACROSS THE NULLARBOR!).

May

Well done to PhD student Wes Wilson, who had a poster accepted by the International Symposium on Immunotherapy, held at the prestigious Royal Society in London on 24-25 May. Wes combined travel awards to get to the symposium.



WES WILSON AT THE ROYAL SOCIETY, LONDON.



THE LUCKY LEMONS! FROM LEFT: ADRIAN GIL (LISETH'S HUSBAND); SYNAT KEAM; WILLIAM DUNSTER; DANIKA HOPE; DR JON CHEE; SARAH DART (WITH FRIEND); TRACY HAYWARD; LISETH OROZCO MORALES; ALEX BOULTER; GRAEME WAN.

The Centre that quizzes together... NCARD fielded a team of staff, recent staff and graduate students at the Australian Society for Medical Research fundraising quiz night held at the Irish

Club on Friday 31 May. In a room filled with some very enthusiastic researchers, The Lucky Lemons came second by just two points!



50 SHADES OF BLUE: THE PREQUEL. FROM LEFT: PROFESSOR BILL MUSK, MRS NOLA OLSEN, PROFESSOR ANNA NOWAK, DR LAURIE GLOSSOP, DR SCOTT FISHER.

A contingent from NCARD attended the Sundowner of the Australian Institute of Occupational Hygienists on 27 May at Curtin University's ChemCentre to see Dr Laurie Glossop's presentation on Wittenoom, 50 Shades of Blue – The Prelude. As well as the geological and human history of this blighted town,

Laurie had gathered some outstanding photos from the Battye Library, WA Newspapers and elsewhere, and some extraordinary geological samples, safely encased in resin. There is always more to learn about Wittenoom, and we benefitted from Laurie's enthusiasm.



CROCIDOLITE (BLUE ASBESTOS) SAMPLES.



June

While others were enjoying the WA Day Public Holiday on 3 June, the NCARD Honours students were participating in the Murdoch University Annual Research Symposium 2019, an interdisciplinary opportunity for graduate students to communicate their research, some for the first time. The symposium is open to Honours, Masters, PhD and post-doctoral researchers, and includes poster presentations, 10 minute oral presentations, and 3 minute 'fast-forward' presentations. There were 38 posters: congratulations to NCARD Honours student Jess Boulter, who came second in the poster presentations. Well done Jess!



HONOURS STUDENT JESS BOULTER.

We are thrilled that, for the second year in a row, the WA Cancer Council has named a mesothelioma researcher as WA Cancer Researcher of the Year. Our colleague at the Institute for Respiratory Health, Professor Gary Lee was recognised for his research into pleural effusion. A build-up of fluid in the chest, pleural effusion affects more than 8000 cancer patients a year in Australia, especially lung and breast cancer patients, but most especially those with mesothelioma. Gary's leading work introducing the indwelling pleural catheter, which allows patients to drain their fluid at home, has significantly reduced time in hospital, by an estimated 14,000 bed days across Australia each year. Gary is regarded as the world leader in pleural medicine and has delivered

more than 300 invited lectures in 30 countries. His work has attracted more than 20 overseas specialists to undertake pleural training at Sir Charles Gairdner Hospital, most of whom were sponsored by their home government and returned to their country to start their own pleural services.



WA CANCER RESEARCHER OF THE YEAR, PROFESSOR GARY LEE.

Gary's award, and other Cancer Council award recipients, were announced at the Cancer Council lunch on Friday 14 June 2019, at which NCARD was well-represented, having received funding for fellowships, projects and vacation scholarships. NCARD Director Professor Anna Nowak, who was the 2018 WA Cancer Researcher of the Year, is pictured here with Richard Nell. Richard lost his young son to leukaemia around two years ago. Last year he and his wife and their supporters ran a charity ball and raised money for Cancer Council medical research. They were able to direct a proportion of this specifically to paediatric research, but with some additional funds remaining chose to support immunotherapy research, which happened to be the DREAM biomarkers study.

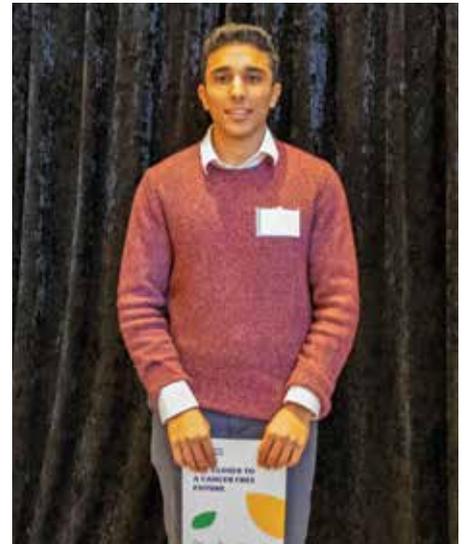
Our "London correspondent", Laurie Kazan-Allen, shared this photo (right) of the Asbestos Diseases Society of Australia's Dr Greg Deleuil receiving a lifetime achievement award in London on 18 June from the June Hancock Mesothelioma Research Fund. Hearty congratulations, Greg!



PROFESSOR ANNA NOWAK WITH DONOR RICHARD NELL.



PROJECT GRANT AND FELLOWSHIP RECIPIENT DR JON CHEE.



VACATION SCHOLARSHIP RECIPIENT ALI ISMAIL.



PRESENTATION AT THE LAW SOCIETY OF LONDON TO DR GREG DELEUIL (CENTRE) BY SOLICITORS FROM IRWIN MITCHELL; LAURIE-KAZAN ALLEN ON RIGHT.

SCIENCE FOR DUMMIES

While we don't believe in calling anyone a dummy, this is a continuing series designed to demystify an aspect of the everyday science concepts, or laboratory techniques, used here at NCARD, explained by postdoctoral scientists, or research assistants – like Tom.

Checkpoint Blockade Immunotherapy

TOM CASEY



The concept of tumour immunotherapy was a hotly debated topic in the 20th century. The idea that the immune system was capable of killing cancerous cells in much the same way that it would a virus or bacterial infection was for many years poorly understood and greatly overlooked. Come the 21st century, however, tumour immunotherapy has become an important concept for advancing our capabilities of treating even the most

difficult cancers. Checkpoint blockade (CPB) therapy is a form of tumour immunotherapy that is central to much of the research at NCARD. Relatively new in its existence, CPB therapy has become one of the most exciting areas for a potential break through treatment.

In essence, CPB involves speeding up or slowing down components of the immune system by targeting signalling pathways that immune cells use to communicate with each other. Using special antibodies to turn these pathways on and off, CPB therapy can be used to direct our immune response to better target and kill cancer.

While research into CPB therapy in the last 30 years has been exciting and promising, in mesothelioma it has yet to overtake more traditional therapies, such as chemotherapy. Why? While CPB therapy has demonstrated amazing potential, it only appears to be effective in a minority of patients, and it is unclear why this is the case.

What are we doing at NCARD?

Researchers at NCARD are currently trying to understand why CPB therapy works so well in some patients, but not so well in others. By understanding this difference, we hope to improve treatments and achieve greater treatment success in more patients.

One of the ways researchers at NCARD aim to do this is by changing the conditions in which immune cells fight cancer. Our research has shown that the immune response (the same response that causes a fever during a viral infection) differs inside tumours that respond to CPB compared to tumours that don't. In our preclinical studies we have demonstrated that giving particular 'pre-treatment' regimens

before CPB can alter the immune response, promoting tumour regression and ultimately enhancing the efficacy of CPB therapy. We are now investigating how and why this occurs.

In addition to our work aiming to improve CPB, we are also investing in ways to combine CPB with current chemotherapies. Preliminary data from the DREAM clinical trial, which studied the outcome of combining chemotherapy with CPB in mesothelioma patients (coordinated by NCARD Professor Anna Nowak and Dr Joost Lesterhuis) has shown encouraging results. A Phase III clinical trial – which is where the effectiveness of a treatment that has been trialled on a smaller group of patients is tested on a larger group, from several hundred to several thousand, and checked for any adverse effects – is moving forward in the planning stage.

Although this work is still early in its development, it is showing great potential to significantly advance the effectiveness of cancer therapeutics for the treatment of mesothelioma and other solid cancers.

This newsletter is compiled by Tracy Hayward, Admin Officer, NCARD. Design by UniPrint, The University of Western Australia. Comments or enquiries: Ph. 08 6151 1078 Email: tracy.hayward@uwa.edu.au



Find us on Facebook