

National Centre for Asbestos Related Diseases



Newsletter Vol 7 | Dec 2017

Editor | Tracy Hayward

NCARD in 2017: month by month

Here is a list of highlights from 2017. Without doubt there will be important things left out, but it gives a taste of the year at NCARD.

January

Craig Rive submits his PhD, receives his visa, moves to Vancouver in deepest winter to work in Rob Holt's laboratory.

Leesa Goodsell starts in Biomarkers group.

NCARD receives more than \$135,000 from UWA's Medical & Health Research Infrastructure Fund (MHRIF).

February

Anna Nowak and Joost Lesterhuis attend the Asbestos Diseases Society AGM, where the ADS PhD Scholarship is announced.

Joost Lesterhuis receives the inaugural Bernie Banton Fellowship.

March

Bruce Robinson is invited speaker at the British Columbia Cancer Agency in Vancouver and Vanderbilt University in Nashville, Tennessee, and at the International Symposium on Malignant Mesothelioma in Bethesda, Maryland.

Anna Nowak receives the Mesothelioma Applied Research Foundation (MARF) Pioneer Award.

Joost Lesterhuis presents at the Advances in Drug Discovery conference at the Wellcome Genome Campus in Cambridge UK.

Sophie Sneddon submits PhD, gets married, and moves to (you guessed it) Vancouver, Canada all within a few weeks.

April

Jonathan Chee is invited to the FIMSA Advanced Immunology Training Course and International Symposium in Beijing, China.

NCARD celebrates the International Day of Immunology (29 April) with superb handcrafted, immunology themed cupcakes.

May

Panel interview for the Cancer Research Trust application, a collaborative research project for which the NCARD submission was one of five shortlisted.

Cancer Council of WA films in NCARD laboratory to highlight mesothelioma research.

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Bruce is guest speaker at Immunotherapy@Brisbane 2017 Conference.

June

Joost Lesterhuis is one of two UWA researchers selected to present at the US-Australian Emerging Cancer Biomedical Technologies Workshop in Washington DC.

Professor Gary Lee, on sabbatical in Hong Kong, experiences a Level 8 hurricane warning, sends scary footage filmed at his window.

Tania Hudson from the Minderoo Foundation comes to NCARD to talk about research directions.

Dr Linda Ye commences work as a Respiratory Fellow, partly funded by Reflections Through Reality. Her research includes evaluating the safety of a clinical trial for a novel lung cancer treatment, and tissue collection in mesothelioma patients.

July

Joost Lesterhuis receives the RD Wright Biomedical Fellowship at the NHMRC Excellence Awards dinner in Canberra.



JOOST LESTERHUIS FLANKED BY KAREN BANTON AND ROD SMITH FROM THE BERNIE BANTON FOUNDATION

Filmmaker Rolf de Heer visits NCARD.

Longtime Laboratory Manager Emma Barber moves to Vancouver.

August

John Akehurst, Chair of the NCARD Board, shares his insights from an impressive management career, working with the NCARD Directorate on the exploration of team building, motivation and leadership styles: reluctance turns to praise.

Today Tonight features a balanced and hopeful story about the immunotherapy work of Joost Lesterhuis and Anna Nowak.

September

Bruce is an invited speaker at the 20th annual meeting of the Chinese Society for Clinical Oncology in Xiamen, China.



DR JOOST LESTERHUIS (CENTRE) ON PANEL FOR UWA RESEARCH WEEK

Joost is a panel member on a UWA Research Week panel, A Healthcare Revolution.

Bruce is a panel member on Advances in Cancer Research at the Fox Lecture Theatre, also for UWA Research Week.

PhD student Wes Wilson is runner up on the 3 Minute Thesis competition.

A contingent from NCARD join the Asbestos Diseases Society walkers for the Perth train station to Parliament House leg of their fundraising, awareness raising annual walk, this year from Merredin.



PROF KEN TAKAHASHI AND PROF JENETTE CREANEY AT ASEA CONFERENCE, CANBERRA



(L-R) DR JOOST LESTERHUIS, PROF RICHARD LAKE, MS LISA CHESTERS MP, THE HON BRENDAN O'CONNOR MP, PROF BRUCE ROBINSON

October

Anna Nowak is invited speaker at the 18th World Conference on Lung Cancer, Yokohama Japan.

The science group with the best acronym, Perth Immunology Group (think about it) has their annual meeting.

Bruce visits Hong Kong, Singapore and China, including the Cold Spring Harbor Conference as an invited speaker.

November

NCARD holds its Annual Scientific Meeting, with interstate guests Professor Andrew Lew from WEHI in Melbourne, and Professor Ken Takahashi from ADRI in Sydney.

Joost is a speaker at the Bernie Banton 10th Anniversary breakfast held at NSW Parliament House.

NCARD receives a visit from Federal Shadow Minister for Workplace Relations, the Hon Brendan O'Connor MP, and the Assistant Minister for

Workplace Relations, Ms Lisa Chesters MP.

Anna gives a particularly touching eulogy at the Asbestos Diseases Society Annual Ecumenical Service about the lessons in love and hope, and the ripple effect of both, that she has learned from her oncology patients and their families.

Jenette Creaney is a guest speaker at the Asbestos Safety and Eradication Agency Conference, Old Parliament House, Canberra.

Members of the Slater & Gordon Perth team, together with ECU's Dr Carolyn McIntyre and Melita Markey from the Asbestos Diseases Society, visit NCARD to acknowledge the Mouse Exercise Project led by Prof Anna Nowak, with Dr Scott Fisher and team, funded by a Slater & Gordon Health Projects and Research Fund grant.

December

NCARD newsletter sent to designers.



SLATER & GORDON VISIT. BACK ROW, L-R: SCOTT FISHER, JO SALMONS, KIM BURTON, RICHARD LAKE (NCARD); PETER HOLLINGWORTH AND LAINE MCDONALD (SLATER & GORDON). FRONT ROW, L-R: MELITA MARKEY (ASBESTOS DISEASES SOCIETY); ANNA NOWAK (NCARD); TRICIA WONG AND MARISA URBANO (SLATER & GORDON); CAROLYN MCINTYRE (EDITH COWAN UNIVERSITY)

NCARD Annual Scientific Meeting

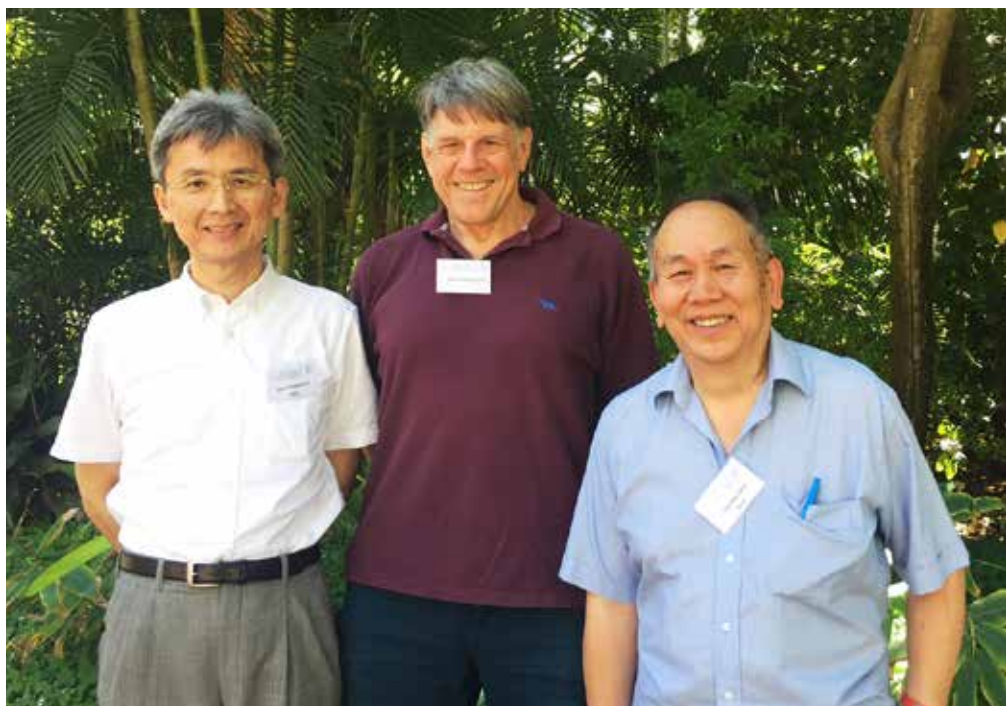
The NCARD Annual Scientific Meeting (ASM) was held over two days, 9 & 10 November 2017 at UWA's St Catherine's College. We were delighted to welcome two interstate guests: Professor Andrew Lew from the Walter & Eliza Hall Institute (WEHI) in Melbourne; and Professor Ken Takahashi, who earlier this year became the new director of the Asbestos Disease Research Institute (ADRI) in Sydney.

Prof Andrew Lew opened with a lively presentation titled "Dendritic and other antigen presenting cells: duties, disease and death". When he challenged his audience, he affectionately said he was "Doing a Bruce"

Prof Ken Takahashi spoke of a change of focus at ADRI, from molecular biology to the occupational disease, public health and prevention aspects of asbestos research; a number of crossover interests – including a Fibre Bank – have been identified for collaborative exploration between ADRI and NCARD.

On Friday Prof Fraser Brims took us from the infamous blue tailings of Wittenoom to the incomparable follow up study at Sir Charles Gairdner Hospital of its highly exposed workforce and residents for the Vitamin A programme set up by Bill Musk in 1990. Although Vitamin A was ultimately found to be toxic rather than protective against cancer, and the Vitamin A programme was ended after 17 years, the strong ties with that population has provided, amongst other benefits, the introduction in 2012 of the successful low dose CT scan programme for lung cancer. A history of working at Wittenoom, combined with a history of smoking, has been found to provide a staggering 18 fold increase to the risk of lung cancer.

The ASM is an opportunity for those working on different projects and aspects of mesothelioma research to showcase and share their work. As well as NCARD PhD students,



PROF KEN TAKAHASHI (ADRI), PROF BRUCE ROBINSON (NCARD) AND PROF ANDREW LEW (WEHI)



THE ANNUAL ASM GROUP PHOTO

post-docs and senior researchers, close collaborators from outside the group, including Steve Mutsaers and Sally Lansley from the Institute of Respiratory Health, gave their perspectives, while NCARD research assistant Sarah Henn contributed to a presentation on an Anti-PD-1 trial by Sam Bowyer. Research areas included molecular imaging,

radiotherapy, PET, biomarkers, cancer surgery, chemotherapy and immunology. Anna Nowak presented an update on the DREAM Trial, and Ian Dick updated the group on biomarker research. Kudos to Dr Alison McDonnell for the unenviable task of putting together such a comprehensive and informative programme.

3MT

It may have been a taste for theatrics back home in Toronto that gave him the edge, but Wes Wilson distinguished himself as this year's UWA Three Minute Thesis Runner Up.

The competition, known as 3MT, challenges students to explain their complex fields of study, and the significance of their PhD projects, in less time than it takes to make a cup of coffee, and in a way that almost anyone can understand.

Wes, who is studying a combination of radiotherapy and immunotherapy to treat mesothelioma, took the audience

from a brief history of Western Australia's blue asbestos mining town of Wittenoom, which has accounted for 2000 deaths from asbestos-related cancer among its one time population of 20,000 and workforce of 6000; through a frank account of the drawbacks of each current treatment for this still incurable disease; and on to a pantomime about T cells, checkpoint blockade and immunotherapy. Wes

likened the process he is investigating to 'getting the T cells drunk on immunotherapy' then pointing them in the direction of the tumour cells using radiotherapy ("Hey T cell – see that guy? He insulted your Mum – called her a macrophage").

As one audience member said "He was brilliant. I wanted him to win. His was by far the most creative."

Wes's success follows another NCARD PhD student, Rachael Zemek, who was the 3MT Runner Up in 2015, and won the People's Choice Award.

This year's winner is Gavrielle Untracht who is studying optimal and biomedical engineering, and researching tissue stiffness as a non-invasive means of detecting cancer. As Gavrielle put it "I think there's an idea that science isn't always accessible to the general public, but the ultimate goal of science is to make a difference in the world and make life better for people, so it's very important for researchers to be able to communicate their work in ways that people can understand."

There were 26 students competing, and Gavrielle will now travel to Brisbane for the national finals of 3MT in October.

Wes won a handy \$1000 prize, a book award, and kudos. He may or may not post the giant cheque to his Mum in Canada, depending on the cost of postage.



WES WILSON AND HIS GIANT CHEQUE

Singapore, Hong Kong and China

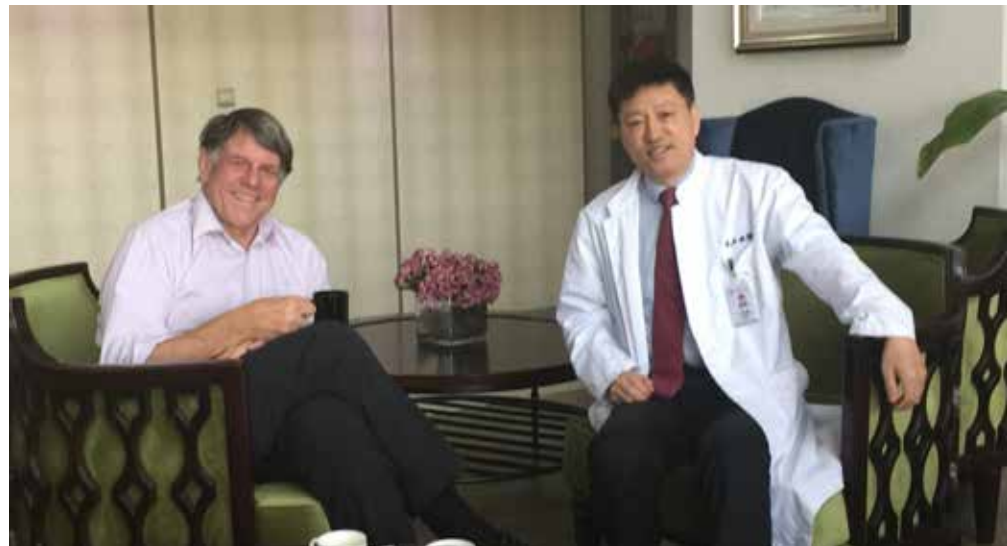
NCARD Director Professor Bruce Robinson undertook a recent trip to visit Singapore, Hong Kong and China. The goal of the trip was to foster collaborations with colleagues from Singapore, Hong Kong and Chongqing, China as well as to speak at a Cold Spring Harbor conference in Suzhou – alongside immunology “luminaries” such as Tom Schreiber, Laurence Zitvogel, Guido Kroemer and Olivera Finn – and at a symposium in Shanghai. The visits were successful and new collaborations and potential clinical trials are likely to be established.



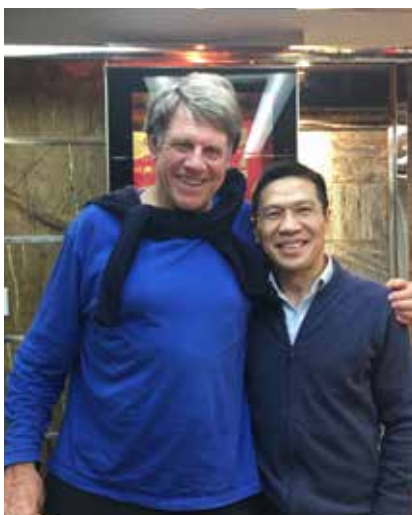
COLD SPRING HARBOR MEETING, SUZHOU CHINA



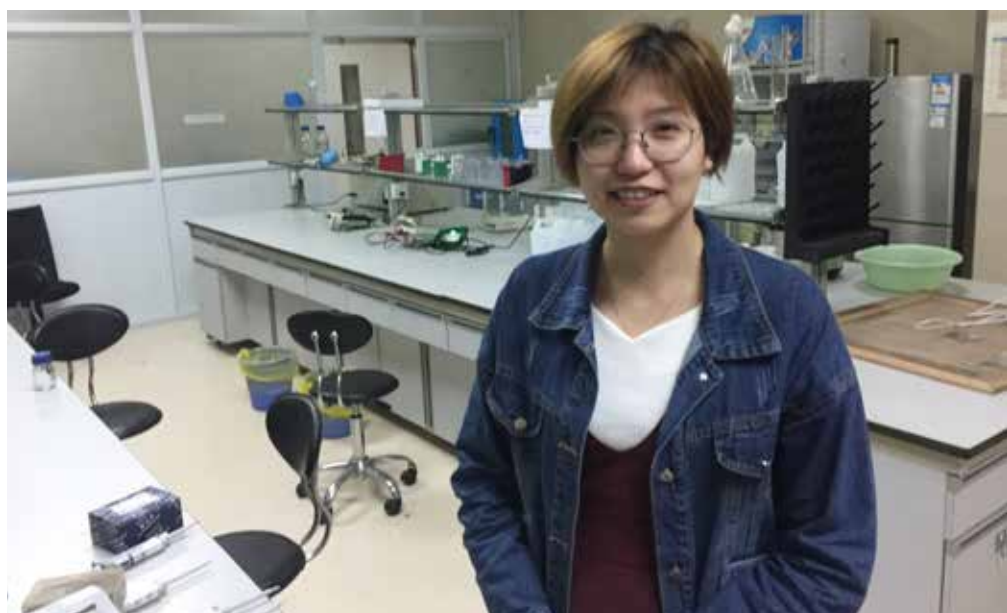
BRUCE WITH PROF TONY MOK, HONG KONG



BRUCE WITH PROF JI LIN, SHANGHAI



BRUCE WITH PROF BO ZHO, CHONGQING



CLINICAL FELLOW DR DAI YING, CHONGQING

CRISP-R

For Dummies



A google search for “CRISPR in laymen terms” describes the CRISPR system aptly as “DNA scissors”, which is very simple but correct. The CRISPR or CRISPR-Cas9 system is a two part DNA cutting mechanism that can be used to identify and target specific regions of DNA and cut (hence the DNA scissors) the double stranded DNA, allowing scientists to perform a multitude of experiments and research.

What does it stand for?

CRISPR stands for **C**lustered **R**egularly **I**nterspaced **S**hort **P**alindromic **R**epeats (which refers to the specific regions of DNA that can be used to target areas of interest) and Cas9 stands for **C**RISPR-**a**ssociated endonuclease **9** (the actual scissors of the system).

How long has it been around?

The system was first discovered in 1987 in bacterial cells as a defence system against invading viruses, but its true function wasn't understood until the late 2000s. Once the system could be replicated and used in laboratory cells, journal articles describing the use of CRISPR/Cas9 in research have been

increasing, with some labs now trying to determine how to use the CRISPR/Cas9 system safely in humans.

What can it be used for?

Due to the high degree of flexibility offered by CRISPR, the possible applications for the system are seemingly endless. CRISPR can be used for research purpose to 'turn off' or 'turn on' genes to help better understand their roles in biological systems (such as the infinite puzzle that is the human body) or to even try to correct genetic disease (work in progress). Although this does sound amazing, like many things, CRISPR sounds straight forward on paper but is paved with road blocks in real life. Although the so called “DNA Scissors” can be directed to cut at a specific site, sometimes they can wander off and cut at other similar sites (called off-target effects), and this is just one of the many teething problems.

What is it used for HERE?

In our laboratory we have only just started using CRISPR (lots of teething problems) to generate what we call 'knock out' cell lines, or cell lines where we have 'turned off' a specific gene of interest so we can see what happened to the rest of the system and to try to get a better idea of how that gene interacts with others.

Is it likely that it will be superseded soon?

That is hard to say. With the emergence of CRISPR, some of the older somewhat bulky methods of DNA cutting have re-emerged and combined with aspects of the CRISPR system to make them more refined. CRISPR is not a one-size fits all system, but it has opened up more avenues so researchers can alter the available tools to whichever suits them the best.

In a nutshell.

After all this the actual way we preform our CRISPR is very unexciting. We chemically 'open' the cells, allowing the pre designed CRISPR system to enter the cells and then let the cells sit in the incubator for 24 to 48 hrs. Afterwards the cells are screened to identify the ones where the CRISPR has done its job (will not have worked in every cell) and are put through quality control measures to ensure those pesky scissors haven't gone on a cutting spree before being put to use in the lab.

by Danika Hope

“Oh sorry”: A letter from Vancouver

by **Craig Rive**

After one year working in Vancouver for the BC Cancer Agency in the Genomic Sciences Centre under Rob Holt's supervision, I have learnt that the “nice Canadian” stereotype is 100% true and the nationally recognised greeting here is “Oh sorry”.

Under Rob's supervision, I am currently working on the research arm of BioCanRx CAR-T immunotherapy project. My research is a small part of a larger project aimed at building the capacity for Canada to provide CAR-T therapy to patients, by beginning with a proven CAR-T intervention targeting B cell malignancies. From here this project will create a CAR-T cell platform that will serve to further improve the effectiveness of this therapy through combination with other treatment strategies.

Briefly, CAR-T stands for Chimeric Antigen Receptor. Chimeric because it contains sub-components fused together, Antigen Receptor because it is designed to recognise specific features, or antigens, on the surface of tumour cells. The basic premise includes using the natural ability for T cells to recognise and induce an immune response in altered cancer cells. These are modified by the introduction of an extra gene carrying instructions for the new CAR component that, when expressed, contains an antigen specific receptor. The antigen-specific receptor recognises antigens expressed by the target cells, which are then killed (apoptosis) through the natural ability of T cells to induce immune responses.

Specifically, one of my many roles involves working towards the exploration of new CAR-T designs to improve on the existing CAR-T designs, providing a potentially more effective and safer therapy and to research the possibility of using CAR-T therapy to target and treat additional cancer types. I have a number of projects in the works, and have enjoyed quite



UPPER LEFT: “PRINCESS SOPHIE” GANIC (FORMERLY FROM NCARD); CHRIS MAY AND LISA DREOLINI. BELOW (L-R) SCOTT BROWN, KYLA COCHRANE (WHO SADLY HAS LEFT THE GROUP SINCE), ANNE-METTE, A PHD STUDENT WHO VISITED US FROM COPENHAGEN FROM APRIL-JUNE, ROB HOLT, CRAIG RIVE. GOVINDA GETS HIS OWN PHOTO (RIGHT), MAINLY BECAUSE HE WASN'T THERE AT SPANISH BANKS.

a bit of success so far. This is a new experience for me as I spent a large proportion of my PhD gathering negative results.

Like all Canadians, the group I am working with is extremely nice and have made my move from Australia to Canada an easy experience. You might recognise a few familiar faces in the photo taken at Spanish Banks beach. Govinda gets his own photo, mainly because he wasn't there at Spanish Banks. I am working hard to convince Govinda to do a Post Doc in Australia; he has almost finished his PhD and is a very intelligent student who gives us new Post Docs that imposter syndrome feeling.

Vancouver itself is located in the Pacific North West of America in the lower mainland region of British Columbia. Being in the Pacific North West region, Vancouver experiences a strange phenomenon where water falls from the sky. They call it “rain” and it happens a lot here, and I mean A LOT.

The beaches are not what I am used to in Perth, but I now realise it is unfair to compare most beaches to those in Western Australia. The mountain views



from the Vancouver beaches have their own charm.

I'm also lucky enough to have made a number of friends through my younger brother, who became good friends with a number of Canadians when he was backpacking through the east coast of Australia. All of them live here in Vancouver or over on Vancouver Island, and in true Canadian spirit were eager to help me out when I first



THIS PICTURE IS US AT OUR FRIEND SARB'S (FAR LEFT IN THE RED SHIRT) AT HIS 5TH BUCK'S PARTY BEFORE THINGS GOT MESSY. YES THAT IS CORRECT: HIS 5TH BUCK'S PARTY.



THE PICTURE TO THE LEFT WAS TAKEN FROM KITSILANO BEACH AND THE ONE TO THE RIGHT TAKEN AT JERICO BEACH ON A VERY RARE SUNNY DAY. AS I AM NOT VERY PHOTOGENIC, MY FRIEND AMANDA HAD BEEN TRYING TO SNEAK A PHOTO OF ME ALL DAY – THIS WAS THE BEST SHE GOT.

arrived, and eager to help me get into trouble (easy to do: beer is so much cheaper here!).

Finally I'd be remiss if I did not include some pictures of my first Ice Hockey game. From what I can gather, it is not "Ice Hockey" but something like "Sorry 'eh, Craig it is just Hockey you idiot." I do get why these Crazy Canadians love the sport, it is exciting. I am following the Vancouver Canucks who did badly last year but are doing

a lot better this year. Here the Canucks (in blue and green) are playing the Edmonton Oilers (white, blue and orange).

I don't have any pictures of me eating the national dish, Poutine, but I have experienced proper Quebec Poutine when I attended a conference in Gatineau, Quebec. It is a must.

I am planning on visiting Perth for a brief holiday sometime between

February and April 2018, mainly to see my nieces and nephew who I do miss very much. I would also love to visit the NCARD group and just catch up on all the amazing work being done. Perth may be the most isolated capital city in the world, but one thing I have learnt is that it is becoming very well known for the great science being done there and I am proud to be representing that community here in Canada.



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