NIF in a Nutshell

Do you want to know what is happening here? You’ll have to wait until the next issue of Nanonews to hear about this exciting new project.

National Imaging Facility Fellow
Dr Tim Stait-Gardner
The BMRF in Brief

AUTOMATED NMR SESSIONS – GREAT FOR MULTIPLE SAMPLES:

The Bruker Avance 400 MHz NMR spectrometer in the BMRF is fitted with an automatic sample changer. The sample changer is ideal for running routine experiments on multiple samples (e.g., different synthesis results or HPLC fractions). There are several experiments already available in the automation program (ICON) but more advanced experiments can be imported into ICON as well.

Users who are already trained with basic ICON NMR will know that some new perpetually booked sessions have been introduced. The quick sessions “QUICK ICON SESSION” are in the online booking calendar and occur 9 am – 10 am every Tuesday, Wednesday and Thursday mornings. The quick ICON sessions can be used without booking and allow multiple users to perform quick check experiments using ICON NMR. Single users should not hog these sessions and users can queue to use it – just be sure you are logged in correctly so that your data can be saved without error (if you need to clarify this just ask me). Users can select a limited set of experiments to perform in these sessions - QuickICON_Proton, QuickICON_COSY, or QuickICON_PtHMQC. Note that these are only quick initial experiments and the COSY and Pt-HMQC are at a low resolution but are good enough for an initial check of the sample prior to booking a normal session and running longer experiments. Users can also select these QuickICON experiments in their normal booking sessions – useful for confirming if your sample is good or if you are in the correct range for Pt-HMQC experiments.

Remember too, that to get the best results (so time is not wasted) for the quick sessions or a normal booking, make sure your samples are prepared carefully and in good, straight, clean NMR tubes. To help with shimming, the samples should be free from bubbles and particulates and have 500 µL sample volume in good quality, 5 mm NMR tubes (the preferred NMR tubes are Wilmad 5 mm precision NMR tubes - https://www.wilmad-labglass.com/ProductList.aspx?t=2331 and we use 528-PP-7 and 535-PP-7 tubes in the BMR facility). Tubes should always be 7 inches long so that they are suitable for the sample changer – do not use broken shorter NMR tubes as the claw gripper could drop the sample resulting in spilled sample or broken glass, some of which could be dropped into the NMR. Remember NMR tubes should only be dried in ovens at less than 50 °C and should pass the “roll test” (do they roll nicely on a flat bench?). Using a poor quality NMR tube or one that is warped may result in costly damage (in terms of both time and money) to the NMR. Using poorly prepared samples can increase the time required for shimming or auto-shimming (necessary for a multi sample run) may fail.

SAFETY, INDUCTIONS and TRAINING:

If you are a new or existing researcher who wants to use the BMR Facility at Campbelltown send me an email (Scott.Willis@westernsydney.edu.au) or alternatively come and see me to start the training. Note, if you are an existing user who thinks they can also use the quick ICON sessions but haven’t had training to do so, send me an email and we can organise a time for some training.

Dr Scott A. Willis
Biomedical Magnetic Resonance Facility Manager
Scott.Willis@westernsydney.edu.au
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Johnny Chen (PhD student)

Johnny Chen (PhD student) returned at the end of last year from his three-month traineeship in Professor Peter van Zijl’s lab at Johns Hopkins University (JHU) in Baltimore, USA. During his visit, he worked closely with Drs Nirbhay Yadav and Yang Zhou, learning many new skills and knowledge related to his field of research, including magnetic resonance imaging (MRI) of mice, image processing techniques, and phantom sample preparations. He also conducted his own research in studying competitive molecular binding using MRI, which will be further investigated at WSU.

Aside from his academic duties, he has also enjoyed the famous Maryland crab cakes as well as taking a quick trip to the bustling New York city and the nation’s capital.

This year Johnny was accepted to present at the International Society for Magnetic Resonance in Medicine (ISMRM) 2019 Conference in Montreal, Canada. With over 6000 attendees expected, it is one of the biggest and most prestigious international MRI conferences.

Johnny will travel to Taiwan in August for a 4 month research internship with Dr Dennis Hwang, Academia Sinica in Nangang, Taipei.

ANZMAG 2019 - 25 to 28 November 2019

The 12th Australian and New Zealand Society for Magnetic Resonance (ANZMAG) conference will be held from Monday 25th to Thursday 28th of November 2019, in the southwest region of Western Australia. This is the first time Western Australia has hosted ANZMAG and the conference will be held at the beautiful Pullman Bunker Bay Resort, which is located near the top of Cape Naturaliste in Geographe Bay. Bunker Bay is a three hour drive away from Perth airport, and close to the renowned Margaret River wine region.

The program will cover a wide range of topics in magnetic resonance, including liquid and solid-state NMR spectroscopy, imaging, EPR, theory and method development.

Sessions will be held in parallel format (as in 2018) and include short student talks.

Bill Price President of ANZMAG
(Western Sydney Uni.)

Kirk Feindel, Convenor and Co-Chair (Uni. Western Australia)

Ann Kwan, Co-Chair (Uni. of Sydney)

http://www.anzmag2019.com/
Nanoscale Research Group Students

Kaitlin Jones

Kaitlin Jones completed her B.Sc in 2018 at Western Sydney University. She is currently in her first year of a Master of Research under the supervision of Prof. William Price and the co-supervision of Abhishek Gupta. Her research interests involves using NMR relaxation and diffusion to determine what occurs at a molecular level upon the formation of azeotropes of various alcohols and water.

Elise Randall

Elise Randall completed her B.Sc. (Chemistry) in 2018 at Western Sydney University, earning a place on the Dean's Merit list. She was awarded a Western Sydney University Summer Scholarship 2018/2019 for the development of an in vitro pharmacokinetics teaching model. She is currently in the first year of her MRes at Western Sydney University under the supervision of Dr. Gang Zheng. Her research interests include metabolomic analysis of food products through NMR and ICP-MS, as well as the elucidation of metabolite biomarkers via chemometric analysis. Elise hopes to publish her findings from the in vitro pharmacokinetics model and further develop her NMR skills and knowledge of metabolomics before commencing her MRes thesis.

Behrouz Razuli

Behrouz Razuli is an international student who completed a B.Sc (Physics) at Payame Noor University and a M.Sc.at Tehran University. He hopes to commence his PhD in August. His thesis topic is “MRI-based electron density mapping for radiotherapy treatment planning”.

Vardieh Timorshahi

Vardieh Timorshahi completed a Bachelor of Nuclear Physics in Iran and has just completed a Bachelor of Science (pathways to teaching) this Semester. Vardieh has applied to start a Masters of Research with the Nanoscale Research Group supervised by Prof. William Price.

Riyaz Ahmed

Riyaz Ahmed is an international student who completed his Masters degree at the renowned Indian research Institute, IISER Mohali, under the supervision of Prof. Kavita Dorai. He plans to commence his PhD in Semester 2. His PhD candidature is funded from an ARC grant in collaboration with Prof. Jason Harper (UNSW). His PhD will focus on understanding how ionic liquids can be used to control reaction outcomes.
What we think and what really happens.

REACHING GOALS

YOUR PLAN

REALITY

HOW TO CALCULATE THE VOLUME OF A CAT?

We can put it in a tank of water and measure the rise in water level

Said the engineer

We can calculate the volume integral over its full body

\[ V(\text{cat}) = \int dV \]

Said the mathematician

Let’s suppose the cat is spherical

Said the physicist

What do chemists call a benzene ring with iron atoms replacing the carbon atoms?

- A ferrous wheel.

I’m reading a book about anti-gravity. I can’t put it down.

The meaning of opaque is unclear.

Alternative facts are an aversion of the truth.

So what if I don’t know the meaning of the word ‘apocalypse’? It’s not the end of the world.

A relief map shows where the restrooms are.
### NANOSCALE ORGANISATION AND DYNAMICS

<table>
<thead>
<tr>
<th>Name</th>
<th>Title and Research Area</th>
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| **Professor William S. Price** | Group Leader  
- Medical Physics, MRI, NMR and diffusion                                               |
| **Professor Janice Aldrich-Wright** | Director Research School of Science and Health  
- Potent in-vivo cytotoxic agents                                                        |
| **Professor Annemarie Hennessy** | Dean of Medicine  
- Preeclampsia                                                                          |
| **Assoc. Prof. Gary Dennis** | Deputy Dean School of Science and Health  
- Polymer and surface chemistry                                                          |
| **Dr Tim Stait-Gardner**     | National Imaging Facility Fellow  
- MRI and quantum physics                                                                  |
| **Dr Allan Torres**          | Research Instrumentalist  
- NMR and MRI                                                                              |
| **Dr Gang Zheng**            | Lecturer  
- NMR pulse sequence development                                                          |
| **Dr Scott Willis**          | BMRF Manager & Researcher  
- NMR and MRI diffusion measurements                                                        |
| **Dr Abhishek Gupta**        | Post Doctoral Fellow  
- MRI contrast agent development and NMR relaxation                                        |

### Group Meetings

**PROFESSOR WILLIAM PRICE’S LAB GROUP**  
Meet every Friday at 09:30 am in CA 21.1.65

**PROFESSOR JANICE ALDRICH-WRIGHT’S LAB GROUP**