

# Weekly Newsletter

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## Physics & Astronomy

### From the HOD – Professor Roger Reeves

Welcome to the newsletter for the penultimate week of the academic year. Next week I'll write a bit of a review column to showcase our accomplishments of the year.

This week was of course graduation and following tradition we held an afternoon tea celebration for the graduates and their friends and family. A very good turnout occurred and there are more pictures later in the newsletter.



PhD's conferred: Mita Brierley, Clare Worley, Richard Graham, David MacKenzie and Giles Reid

This week the Vice Chancellor announced that the UC campus would become entirely

smoke-free including all open spaces and field

stations. As a lifetime non-smoker it has no impact on me but I'm sure that some staff and students will endure a little more stress in their lives as a result. The University is sponsoring quit programmes to help.

Yesterday the College Executive met with the VC to discuss some matters of concern around the contribution margin and the over-enrolment of students past the TEC quota. This Dept has ended up with 104% of the budgeted EFTS - just over the allowance of 103% considered to be in the noise. We have had our contribution margin increased as a result. At the moment we are between a rock and a hard place - at 100-level we have very little control over entry to our programmes, but then get into difficulty with TEC if more choose to come to UC than in the quota. This year we have an enrolment deadline - now passed - that may help the situation.

**Today's Seminar – Friday, 17th December, 11:00am Room 701, Rutherford Building**

**Dr Krzysztof Bolejko** (Australian National University)

***Homogenization of the early Universe***

The present-day Universe appears to be homogeneous on very large scales. Yet when the casual structure of the early Universe is considered, it becomes apparent that the early Universe must have been highly inhomogeneous. The current paradigm attempts to answer this problem by postulating the inflation mechanism. However, inflation in order to start requires a homogeneous patch of at least the horizon size.

During my talk I will discuss how dynamical processes of the early Universe may lead to the pre-inflationary homogenization, making it possible for inflation to occur.

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**Next week's additional Seminar – Monday, 20th December, 11:00am Room 701, Rutherford Building**

**[Dr. Robert Jedicke](#)**

**[University of Hawaii's Institute for Astronomy](#)**

***Killer Asteroids: Characterizing the Population with Spacewatch, Pan-STARRS and ATLAS***

Not too long ago the idea that life on Earth has been profoundly affected by asteroid and comet impacts was viewed with disbelief bordering on disdain. But in the past few decades this attitude has been replaced by an international awareness of the danger posed to human life by these objects. The impact hazard is determined by the asteroids' and comets' orbit and size distribution and the best measurement of these properties for asteroids larger than about a half kilometer in diameter was performed almost a decade ago using observations of about 100 objects obtained with the 0.9-m Spacewatch telescope at Kitt Peak, Arizona. The Pan-STARRS project in Hawaii expects to observe and discover thousands of these Near Earth Objects over the next few years which will allow a dramatic improvement in our understanding of the impact threat from large asteroids and comets.

The ATLAS project in Hawaii is a proposal to build the world's first early warning system to provide days to weeks notice of an impending impact of smaller objects that are not detected efficiently by deeper, large telescope asteroid surveys.

**Reminder: Video recordings of the department's recent seminars are now available on high definition video for viewing within the department on [\\Phys-nas1\Department Seminars](#)**

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**PhD Oral Congratulations [Simon Brown]**

Last Friday, Richard Graham successfully defended his PhD thesis entitled: *Design and Optimisation of Ring Laser Gyroscopes*". He has been researching under the supervision of Jon-Paul Wells and Roger Reeves. After making some minor corrections over the weekend Richard managed to make the cut off in order to attend this week's graduation ceremony. Well done on two fronts!



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**Several Awards & Prizes for Medical Physics students [Juergen Meyer]**

Recently I attended the 41st Annual Meeting of the German Medical Physics Society, Freiburg, Germany, 29<sup>th</sup> September - 2<sup>nd</sup> October 2010 and the Engineering and Physical Sciences in Medicine conference at the Melbourne Cricket Ground (MCG), 5<sup>th</sup> – 9<sup>th</sup> December 2010.

In Freiburg I presented research papers from Jidi Sun's MSc research and Greg Betzel's PhD research. The meeting was rather large for an annual national meeting with several hundred attendees, four parallel streams and excellent national and international keynote speakers. Before the conference

started I had a chance to visit PTW, a world leader in radiation dosimetry equipment with a presence in most countries ([http://www.ptw.de/ptw\\_worldwide.html](http://www.ptw.de/ptw_worldwide.html)). PTW also sponsored the PTW Dosimetry Award at the conference, which includes a prize of EUR 1500. It is given annually by the German Society of Medical Physics (DGMP) and was established to recognize a young scientist up to 35 years of age for an outstanding scientific research paper on dosimetry of ionizing radiation in medicine. Greg deservedly won this award for the paper entitled: "Clinical investigations of a CVD diamond detector for radiotherapy dosimetry" and features now on the homepage of PTW (<http://www.ptw.de/>). A summary of his work and the award can be found at [http://www.ptw.de/dosimetry\\_award\\_2010.html](http://www.ptw.de/dosimetry_award_2010.html) and an interview in which he talks about his PhD and his time at the University of Canterbury can be found at [http://www.ptw.de/fileadmin/data/download/news/Freigegeben\\_Interview%20GBetzel\\_1110\\_eng.pdf](http://www.ptw.de/fileadmin/data/download/news/Freigegeben_Interview%20GBetzel_1110_eng.pdf) Greg is now at the University Of Maryland School Of Medicine where he is performing research on four dimensional treatment planning and delivery of rotational radiation therapy.

The conference at MCG was something else. Although I am not into cricket it was great venue for any sports fanatic or even for those who don't like sport. One side of the conference room was a window front and gave us fantastic views on the arena. It was amazing to see how many people religiously groom the grass all day long and to see some teams practice. The conference reception was held in the National Sports Museum, which was impressive, and it was amusing to see people try interactive sports games after a few glasses of wine. There were approximately 400 attendees and a large number of NZers at the conference with several current MSc and PhD students and many registrars who have gone through the MSc programme at Canterbury and are now working in hospitals. In total we presented 6 papers. Syen Nik presented on his PhD research and a paper he co-authored with Rune Thing (BSc(Hons) student). David Jolly presented two papers about his current MSc research at the Wellington Blood and Cancer Centre, which he is due to finish next year. Alicia Cavan talked first about her BSc(Hons) project and was also invited to present her current PhD research in the plenary session on Microbeam Radiotherapy. Despite not being too keen initially to present stuff she did over a year ago for her honours project, Alicia's presentation entitled "A viscoelastic model of the correlation between respiratory lung tumour motion and an external abdominal signal" was named the 2<sup>nd</sup> best oral presentation of the conference.

Although not a presenting author, James Talbot, who completed his MSc in Medical Physics in 2008 and is now a registrar in Auckland, won two more awards for his work carried out during his MSc thesis. Firstly he received the Kenneth Clarke Journal prize for the best paper in the Australasian Physical Sciences in Medicine in 2009 for his work on "A method for patient set-up guidance in radiotherapy using augmented reality" and also independently won the industry sponsored CMS Alphatech Innovation Award for Medical Physics ([http://www.cmsalphatech.com/Innovation\\_T&C.pdf](http://www.cmsalphatech.com/Innovation_T&C.pdf)). James will receive a commemorative plaque and a total cash prize of \$1,000.

I would like to thank all the students and collaborators who presented or co-authored papers at the conference and congratulate those of you who won prizes or awards. It is great to see the hard work bear fruit!

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### **Realise the Dream [Graeme Plank]**

Last Friday evening I attended the awards ceremony for the "Realise the Dream" (<http://www.realisethedream.org.nz/>) event. Realise the Dream is organised by the Royal Society of New Zealand and celebrates top school students who have carried out an excellent piece of research or technological development. The prize giving event concluded a week-long trip for 23 students travelling from Auckland to Wellington visiting science and technology organisations along the way.

In Auckland they were hosted by the Liggins Institute where they learnt about extraction and analysis of their own DNA, gene cloning and explored genetically modified organisms. In Hamilton where they were hosted by DairyNZ and learnt about plant physiology, cow types and their feed and visited the mastitis lab. They were given a special insight into the animals at Hamilton Zoo and had the opportunity to feed many of them.

In Tokaanu they were hosted by Genesis Energy where they were presented with the scenario of a massive volcanic eruption. The teams had to look at biological considerations; how they would rebuild the Trout Centre Hatchery; engineering and re-design of structures, and also the recreational impacts. At Massey University in Palmerston North they participated in a day of hands-on activities ranging from atomic force microscopy, to robotics and mechatronics. In Wellington they visited Zealandia- Karori Sanctuary and the Carter Observatory.

Immersion in a variety of science disciplines was balanced with evening social events and group challenges, so by the time of the awards ceremony the group had bonded very well. In speaking with many of the students after the awards it was obvious that they all thoroughly enjoyed and valued the experience of the entire week.

Two students from this years' Canterbury science fair were successfully nominated for RTD and both won prizes. Hadleigh Frost, nominated by myself, won a Royal Society travel award to attend Professor Harry Messels' International Science School in Sydney for two weeks next July and Reuben Posthuma, nominated by Ross Petersen of "Bright Sparks", won the outstanding leadership award. The success of our students and comments from the organisers and many guests indicate the quality of science in the Canterbury region is well recognised.

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### **Mount Pickering and Mount Tinsley Place Name [William Tobin]**

William Tobin reminds us of the proposal to assign new names to unnamed geographical features situated between Lake Te Anau and Lake Manapouri in Fiordland National Park. To read more see following link: <http://www.linz.govt.nz/placenames/consultation-decisions/a-to-z/mounts-pickering-tinsley/report/index.aspx>

It is hoped that a confirmation will appear in this week's NZ Gazette (16<sup>th</sup> Dec - yet to appear on line) [http://www.gazette.govt.nz/diawebiste.nsf/wpg\\_URL/Services-New-Zealand-Gazette-2010-Gazettes?OpenDocument](http://www.gazette.govt.nz/diawebiste.nsf/wpg_URL/Services-New-Zealand-Gazette-2010-Gazettes?OpenDocument)

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### **Nanotechnology Festival [Simon Brown]**

The events originally scheduled for early September that were postponed after the Christchurch earthquake have now been re-scheduled for February. The events are

- Kim Hill hosts "A big discussion about small things"
  - Views on nanotechnology from across the spectrum of scientists, Maori, government regulators, business, NGOs, toxicity researchers, and more.
  - Note: tickets are free but must be booked online.
- "Nanotechnology" at Science Alive (exhibition open now)
  - The science behind nanotechnology, with a Christchurch flavor
- Public Talk: Georgia Miller, Friends of the Earth, Australia
  - "Nanotechnology in sunscreens and cosmetics: big name brands taking risks"
- Public Talk: Diana Bowman, Colin Gavaghan, and Jennifer Moore,
  - "Regulating Nanotechnology in New Zealand"
- For more details of these events please go to:

<http://www.canterbury.ac.nz/nanoevents/>

Please note that bookings are ESSENTIAL for the Kim Hill event.

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## Graduation December 2010 – Photo Gallery



Father and Son in matching garb - Giles and Mike Reid



Nurul Afiqah and Jeevan Kasinathan BSc graduates and their Physics Lecturers, Jenni Adams, Roger Reeves and Mike Reid



Lindsay Johnstone BSc and family. Lindsay will take up a role in the NZ Air Force next year – we've lined him up to be our BSc poster grad next year



Will Frost BSc(Hons) and family and to the right :with his project supervisor David Wiltshire



Left: Peter Cottrell with Mita Brierley and Clare Worley





Clare Worley and her proud Mum



Mita & Stuart Brierley



Giles Reid, Joseph McCartin & Will Frost (back row); Clare Worley, David Mackenzie, Mita Brierley and Richard Graham (front)



Joseph McCartin (MSc) and proud folks



Giles Reid with proud mum Jacquie



Giles with supervisor Jenni Adams



David MacKenzie crosses the stage, former Beer Society President and anonymous contributor to Canta – will UC ever be the same?



### **Physsoc (Beer Society) weekly Friday lunch**

Tandoori Palace, \$10 for any curry, rice and naan.

Meet in room 605 at 12:15pm for 12:20pm departure.

All welcome



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If you have anything you would like to contribute to the Newsletter, please email Ro on [rosalie.reilly@canterbury.ac.nz](mailto:rosalie.reilly@canterbury.ac.nz): Newsletter, Department of Physics and Astronomy, University of Canterbury, Private Bag 4800, Christchurch, Phone: +64 3 364 2404, Fax: +63 364 2469.