



The University of Sydney
School of Physics & International Science School

Alumni News

SUMMER 2007

There's a Moon in the Sky

John O'Byrne

In This Edition:

ISS2007 Review	p4
Research News	p7
Profile: Sam Butler	p8

City lights have dulled the public perception of the night sky; they make it hard to see celestial events and sometimes the weather is uncooperative. Perhaps some of us are spoiled by large screen TVs, action replays and special effects. As an astronomer I get used to public disappointment with exciting events in the sky. Do you remember Halley's Comet in 1986? A bit of a fizzer for the public, although pretty much exactly as predicted by the astronomers. (However, if you saw Comet McNaught in January—Wow!)

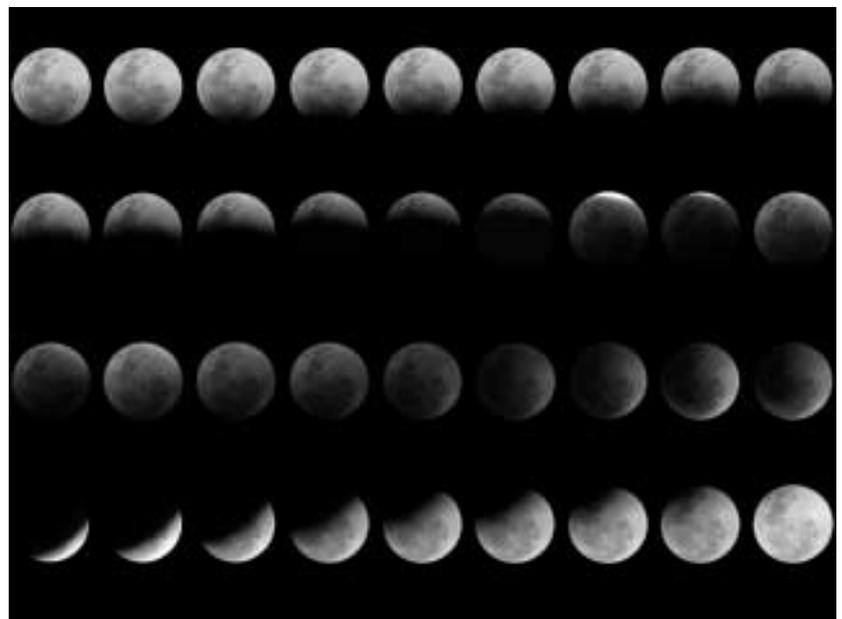
But on Tuesday 28 August the Earth and Moon put on a display that did impress the public as the eclipse of the Moon that night was perfectly timed for evening viewing in Australia – proving to be a great sight for all. Even the weather was good for many of us. Simple geometry suggests that the eclipsed Moon should be completely dark. However, some red sunlight is scattered onto the Moon by the Earth's atmosphere. As a result, it presented a colourful, easily viewed spectacle for the public.

From Sydney, the Full Moon started sliding into the Earth's shadow just before 7:00pm on a mild, clear evening. Then, just over an hour later at 7:52 pm, the last sliver of the Moon's disk dimmed and the Moon was totally eclipsed for the next 91 minutes. By 10:24 pm the spectacle was over and the Moon resumed its normal role illuminating the night.

The evolution of the event is shown in a montage of pictures taken by David Tobin from his Sydney backyard, using his digital camera zoomed at 24x, available in colour on our Alumni web pages at <http://www.physics.usyd.edu.au/alumni/events.shtml>. The varying shades of red of the fully eclipsed moon captured most people's attention. This arises because of dust in the Earth's atmosphere scattering away the blue light.

This montage of images was one of several sets of images that came to me via students in my classes (although David isn't himself a student). I

Continued page 7



The lunar eclipse Tuesday 28 August 2007 (David Tobin)

MyScience

A Primary Science Initiative to Watch

Alex Viglienzone

First piloted in 2006, MyScience is a new initiative aimed at developing skills in authentic scientific investigation within the primary school environment. This environment is often constrained by competing curricular interests, often resulting in the teaching and learning of science being marginalised.

MyScience is a collaborative program between the Science Foundation for Physics, IBM, Australian Catholic University (ACU), and the Western Sydney Region of the NSW Department of Education and Training (DET). MyScience aims

Continued page 6



MyScience is aimed at developing skills in authentic scientific investigation within the primary school environment



Headline

Assoc Prof Anne Green
Director & Head of School

By almost every measure, the School of Physics is outstandingly successful. As we move into 2008, we have welcomed a new Australian Research Council Federation Fellow, Professor Joss Bland-Hawthorn, to join the five who are currently undertaking research with us. Each of these excellent scientists is a world leader in their field and they are providing an exciting focus and inspiration to the young postdoctoral fellows and postgraduate students working with them. The School calendar for 2008 showcases some of their research, as well as giving a snapshot of other activities of Physics at Sydney.

Although we are all justifiably proud of the research in the School, this is no time to be complacent. Providing our students with an inspirational learning environment so they are well prepared for their future careers is a primary goal. Through our Talented Students Program we are encouraging the best new students to explore research with top physicists. At a time when the number of students studying science is dropping nationally, we are creating initiatives to promote physics and science to the community. Together, the School and the Science Foundation for Physics (SFP) have a diverse program of outreach and we are increasing our efforts through the Professor Harry Messel International Science Schools (ISS), Kickstart for high schools, Primary Science programs, the Science Teachers' Workshops and supporting the work of the inimitable Dr Karl. We are expanding our staff commitment in outreach and we also welcome Adam Selinger as the new Executive Officer of the SFP. Adam takes over from Chris Stewart who did a wonderful job in the role, particularly with the recent ISS2007 on ecoscience, and who has now moved to Canberra to lead Australian Science Innovations. Many many thanks to Chris and best wishes for the future.

One recent development for the School is a new postgraduate coursework Masters program in Applied Nuclear Science, which begins in 2008. This program is one of the activities under the framework of the Institute of Nuclear Science, which has been recently established, and the Memorandum of Understanding that has now been signed between the University of Sydney and ANSTO.

As we plan the future priorities for the School, we must integrate the efforts to promote and encourage science in school and the community, teach our students well and support the cutting-edge research that gives the School its premier status.

Farewell & Welcome



The Science Foundation's new Executive Officer, Adam Selinger

In August 2007 the Science Foundation for Physics bid farewell to its Executive officer, Dr Chris Stewart. Chris brought a great freshness and vision to the Foundation and we wish him the greatest success in his new role as Executive Officer, Australian Science Innovations.

The Foundation's new Executive Officer is Adam Selinger (BSc., Grad.Dip. Science Communication). Adam is a graduate of science (ecology and evolutionary psychology) and science communication from the Australian National University.

Adam has worked at Questacon where he acquired his enthusiasm for talking science with public audiences. He then travelled widely, working in science centres in Canada, Norway and the UK. Working as the science communicator and production manager for the Edinburgh International Science Festival provided the opportunity to incorporate outreach programs and media activities.

Since returning to Australia, Adam has worked for the Sydney Organising Committee for the Olympic Games and as Science Manager at British Council Australia. Working as a consultant, Adam's clients included UNSW, Sydney Marathon Festival, Australia Day Fun Run, Premier's Gala Concerts and Cosmos magazine. Adam created 'Café Scientific' and 'Science on Tap', variations of the well-known 'Science in the Pub' for public engagement with science issues.

Running a science communication business, Adam introduced and championed the electronics workshop, 'MadLab', which has featured at the Australian Science Festival in Canberra since 1996 and at events throughout Australia, New Zealand and South Africa. As the creative mind behind the not-for-profit company, Children's Discovery Museum Ltd, Adam developed and staged 'Kids Dig @ The Rocks', 'Build It', 'Tour of the Tummy' and other shows and hands-on workshops which regularly run during school holidays.

Previously based in the School of Biological Science Adam is very excited to have joined the Science Foundation for Physics as the new Executive Officer. Adam's skills and talents are sure to have a positive impact on all Foundation programs, events and activities.



Former SFP executive officer Dr Chris Stewart takes up the position of Executive Officer, Australian Science Innovations, Canberra

Physics Welcomes its 6th Fed Fellow!

In November 2007 **Professor Joss Bland-Hawthorn**, former Head of Instrument Science at the Anglo-Australian Observatory (AAO) will take up a Federation Fellowship at the School of Physics, within the Institute of Astronomy. The School heartily welcomes Joss whose astrophysics research interests include: Astrophotonics, Galactic Archaeology & Near-Field Cosmology, Feedback & Accretion through Cosmic Time, Dark Matter & Disks at Large Galactic Radius, Metagalactic Media & Radiation Fields, Starburst & Active Galaxies, Ionization of the Interstellar Medium and Star Formation at High Redshift.

For more information on his research visit www.physics.usyd.edu.au/ioa/

News in Brief:

Bright Spark



Professor Ben Eggleton

Professor Ben Eggleton (Physics) was named one of Cosmos Magazine's "Bright Sparks" for science 2007, awarded to Australia's top ten scientists under age 40. Congratulations to Ben who is a physics alumnus, an ARC Federation Fellow and the Research Director, CUDOS, an ARC Centre of Excellence based here in the School of Physics.

For more information on Ben's research visit: www.physics.usyd.edu.au/cudos/

Music & the Cosmos



(l-r) Cliff Kerr, Professor Tim Bedding, Associate Professor Geraint Lewis and Dr Peter Tuthill with special compere Robyn Williams at *Music and the Cosmos* 2007

On Wednesday 3 October 2007 the presenter of Radio National's Science Show, Robyn Williams, compered a unique event – Music & the Cosmos – at the Sydney Conservatorium of Music (the Con). Professor Tim Bedding, Associate Professor Geraint Lewis and Dr Peter Tuthill joined forces and gave a memorable astronomical presentation on the music of the universe. More earthly music was provided by the Sydney Conservatorium Symphony Orchestra, conducted by Maestro Imré Palló, which played the first movement of Mozart's Symphony No.41 K551 in C Major – *Jupiter* – to celebrate the special occasion of science meeting the arts. A stunning addition was a recital by Con and Physics student Cliff Kerr of his original work for piano *Quasars, Pulsars and Black Holes*. **Music & the Cosmos** has been invited back to the Con for a repeat performance in 2008 – this time with Holst's, *The Planets*. Stay tuned!

For more physics news visit: www.physics.usyd.edu.au

The Key Message



Derek Muller

"People love to jump on to technology bandwagons," says Derek Muller, PhD student in the Sydney University Physics Education Research group in the School of Physics "but I hate technology bandwagons!"

Unexpected words from someone whose PhD thesis is on using Multimedia for Physics education. Derek's findings, soon to be published in the journal *Science Education*, were summarised this week at the Uniserve science conference at The University of Sydney.

"Marshall McLuhan said that 'the medium is the message' but that's wrong-headed. The message is the message!"

Derek's research built on previous papers that showed that learning was not related to the type of multimedia - materials with animations and interactivity achieve the same level of learning as those without. However, other research shows learning situations which engage the student in debate, or predicting the outcomes of experiments, are more successful. Pulling these threads together Derek developed a "semi-Socratic" format, in which students watch videos of a dialogue between two students about a difficult concept. Compared with a video of an explanation of the topic, the dialogues did significantly better. "[Students] don't have to be out of their seats and pushing buttons. That's not the point. We just need to be a bit smarter about the way we teach. They don't have to be physically active to be cognitively active"

What is unexpected is that, although students who watched the dialogues learnt more, they actually felt more confused, and had less confidence in their answers. On the other hand, those who saw only the explanation, without any voicing of an alternative opinion, felt more confident about their answers, even though testing showed that they had barely improved their grasp of the concepts at all. "Having the alternative conception in the dialogue helps the students to unpack their own misconceptions, [but in the case of the explanation only] the students misremembered explanations to fit in with their existing misconceptions" marvels Derek.

Map for Success



Christine Lindström

As students from the School of Physics approach their end of year exams for 2007, they have an extra not-so-secret weapon up their sleeves, thanks to education research PhD student Christine Lindström. 'Link Maps', as Christine has christened them, are colourful visual learning tools designed to help students see the big picture by explicitly showing how fundamental physics concepts link together in different physics topics. In "Map Meeting" tutorials, students are given a copy of the map, hear a summary covering the information on the map and then solve problems using the map as a guide and reference.

"It arose from my own twenty years of schooling, trying to find the most efficient way to learn new stuff to leave me spare time to do the other things I love," laughs Christine. "I found I needed to know the basics, and be able to summarise what I'd learnt. The lecturers give you the detail, but getting the overview can be make or break for a student."

She crystallised her theory during her 2006 honours project with the Sydney University Physics Education Research (SUPER) group supervised by Dr Manju Sharma, by running the first pilot Map Meetings as optional extras for students from the first year Fundamentals stream. The results were startling, with her students averaging ten percent better – a full grade higher – than a comparable group (with similar backgrounds and school results). For her thesis she was awarded the Shiroki Prize for the best honours project in Physics (and was third amongst all honours projects in Science). She also earned the opportunity to have Map Meetings trialled as part of the regular first year teaching schedule. As part of her PhD project she is now doing a proper comparison of the Map Meetings with the traditional tutorials.

And even before the results are analysed Christine says she can see the students' enthusiasm, "You usually get people dropping off, but the attendance has barely declined at all. People are moving their other subjects, skipping lunch and so on, to make the Map Meetings."



ISS2007 ecoscience



The 34th Professor Harry Messel International Science School (ISS) was held in July 2007. EcoScience was the theme and the scholars from Australia, China, India, Japan, New Zealand, Singapore, Thailand, the UK and the USA proved to be keen and green. Planet Ark planted 140 extra trees on National Tree Day in honour of these outstanding Year 11 and 12 students. For two weeks the School of Physics was filled with youthful exuberance all in the name of learning and striving for excellence. These pictures give a brief overview of the EcoScience. And remember it all happens again in July 2009! For more information on the ISS 2007 EcoScience and to see the lectures that were given please visit www.scienceschool.usyd.edu.au/



ISS Alumni Japanese Reunion

Hong Nguyen

On 12 May 2007, twenty five Professor Harry Messel International Science School (ISS) alumni ranging in years from 1987 (!) to 2005 gathered in the Shibuya district of Tokyo, for a particularly special reunion that attracted ISS alumni not only from all over Japan but also from different ISS years. What's the big deal, you might ask?

Well, there's the fact that almost half of the regional ISS alumni in the last ten years turned up - yet it's more than that. There's the networking opportunity coupled with the stimulus and inspirations that each person brings and takes away. Reuniting with people from the same ISS is very stimulating but gathering alumni from different years adds diversity - diversity in terms of careers - ranging from science and technology to medicine, law and finance - as well as diversity in life experiences and philosophies.

Most agreed this diversity was most interesting, so much so that conversations went on until dawn of the following day, with topics ranging from the ISS memories to the design & manufacture of notebook computers (since we had an engineer from a well-known company amongst us), Darwinian evolution and societal issues.

Many of the younger ISS alumni found the reunion to be a great networking opportunity for advice on careers and university studies. Perhaps most importantly, being with other people who are driven, passionate and enjoying their lives, is very motivating, even a re-energising source of inspiration.

I agree with Yusuke Takahashi's ('87) and Shingo Ichikawa's ('97) comments that the ISS contributed



Row 3: (l-r) ISS students ham it up; the Gala Dinner in full swing at the Great Hall; Nruthy Madappa from India wins the Len Bassler Prize for Scientific Leadership
Row 4: (l-r) Sean Barrett, CEO, Planet Ark, with ISS students; Professor Michael Oppenheimer with British Consul General Mr Tim Holmes; ISS staffers crack up

greatly to make us who we are today, and the network that resulted from the ISS continues to enhance our growth ten years on (or twenty for Yusuke!).

On behalf of everyone who came, I'd like to thank Ken Okada ('99) for organising all the logistics for this reunion, and also Professor Harry Messel and the Science Foundation for Physics staff for creating the grounds for this "connection". We all hope that these reunions continue to take place both in Japan and in other parts of the world, with the help of the Foundation and the local sponsoring agencies, because it really is a unique opportunity.

Below: (l-r) Japanese ISS students' reunion at the restaurant in Shibuya, Tokyo. From left: Ken Okada (99), Sayaka Kawabata (05), Yusuke Takahashi (87), Keiko Morimoto (01), Aiko Shiraiishi (99); At Shinjuku Station. From left: Aya Kikuchi (03), Yuki Hasenaka (05), Hong C. Nguyen (97), Aya Sugimura (05), Shu Chen (05)





Row 1: (l-r) Dustin O'Hara receives the Mulpha Leadership Award from Greg Dyer, COO, Mulpha Australia; Dr Karl signing autographs; who said technology wasn't social!; the famous ISS chocolate fountain
Row 2: (l-r) The ever suspenseful bridge test; Adam Spencer and fans; the official party (l-r) A/Prof. Anne Green, VC Prof. Gavin Brown, Em. Prof. Harry Messel CBE, Dr Karl Kruszelnicki; HE Prof. Marie Bashir and Mr. John Hooke ; ...a successful result...; ISS staffie Gemma Brett (left) with ISS scholars

India joined the ISS for the first time in 2007. Nruithya Madappa shares her experience...

A July That Defied Gravity

It was with a wildly vacillating heartbeat and much excitement that I entered the gates of the University of Sydney, to experience my first ever Professor Harry Messel International Science School (ISS). Over the next couple of weeks I undertook the most fascinating journey of self-realisation, while discovering pristine scientific arenas and making friends to last a lifetime. To sum it all up, I had just experienced the 'ISS experience'!

At the ISS I was bombarded with the light, sound, time, space and gravity of an international exposure that one has to be felt, touched, sensed and engulfed by. The exposure to the elite of the student communities across the globe was truly an envy of any budding scientist. The science school taught me the mantra of fun science – a stimulating environment, a bunch of brilliant youngsters, thrown together at an excellently organized fest of ideas, opinions, questions, posers, and eureka! Never had I encountered a more conducive environment for spontaneous eruption of creative scientific thought!

Each moment spent at the ISS invoked in me a fierce patriotism towards my country, besides instilling in me a profound respect for every other culture I had the good fortune to come in contact with. How science could catalyse the chemistry of human bonding!

Winning the Len Bassar Award for Scientific Leadership, at the ISS, was the whipped cream icing on the chocolate cake. First, the best and

truly the most exhilarating experience of my life! To have been thought worthy of an award of such immense prestige was, and still is, exceedingly humbling. This award has assumed a very special place in my heart. Especially so, as this was the very first time that India was represented at the ISS, and we – the Indian team – brought home 'the' award!

Back home, in India, I was welcomed warmly. The media took up the news with much gusto. To date, a total of 12 national, state level and local newspapers have carried the 'Saga of the ISS'!! The press release on the ISS, and its overwhelming impact on me, encouraged an overwhelming positive response from the public. At school, my juniors approach me with all the eagerness to know what it would take for them to savour the ISS chocolate fountain too, the next time around! Congratulatory notes flew in from unknown people from all over! The telephone was ringing off the hook, with calls from parents anxious to grab 'advice' on how to prepare their wards for Sydney in July 2009 – the next ISS!

The ISS experience has bestowed upon me much – that extra vein of extra confidence that drives me to excel and set goals that seem beyond my reach, beyond my capabilities, the ray of self belief that lights me up each time I have the semblance of tiring ... the knowledge that my opinion is valued.... most importantly, the awareness of the power that I, as an individual possess, to be able to change the world with my thoughts, actions and words.

The experience that I had while at Sydney has been beyond the conventional physics of literary explanation. I was transported to a new world of learning where I amply realised that the frontiers of knowledge were seamless but integrated.

From a land of the metaphysical to the bowl of science, my journey was a dream come true. The award has catapulted me into an orbit which I am sure will not just propel me into visualising greater scientific achievements, but will instill in me the needed critical mass to accelerate learning, pursue research and bring the best of me, scientifically, methodically and strategically.

What I learned, what I gained and how much the ISS changed me are all beyond ordinary proportions. Just like they taught us at the ISS I ask, "Now, what can I do?"

Face the world, and throw my innumerable questions at it! Tirelessly seek answers or create them when there aren't any to sate my curiosity! All I hope is that I imbibe the true spirit of scientific thought and turn thoughts into action. The 'ISS Experience' has given me the wings, the thrust, the scope, the space and the fuel. I will. I can. You have instilled it in me. I believe I will just have to go out 'there' and make 'that difference', wont I!!!



House Parents ISS 2007 John Bright & Karen Palmer



Two weeks of early mornings and late nights as we attempted to keep up with 140 creative and intelligent teenagers from nine different countries and many different cultures! Who would want to be a House-parent? We would! Sometimes being a substitute Mum and Dad, sometimes being a friend and sometimes getting fascinating insights into how others live – it was worth every minute of sleep deprivation for the opportunity to share the wonderful experience of ISS 2007 with these amazing young people! We know that many will have formed friendships and taken home memories that will last a lifetime and we wouldn't have missed it for the world.

Calling 1985 ISS Alumni

Dr Jacqueline Phillips who attended the 1985 ISS (theme – The Study of Populations) would like to hear from you. If you would like to catch up please contact her directly – her contact details are below.

Dr Jacqueline Phillips
Senior Lecturer in Physiology
School of Veterinary and Biomedical Science
Division of Health Sciences
Murdoch University, Perth WA 6150
Phone: 61 8 93602257
Fax: 61 8 9310 4144
Email: j.k.phillips@murdoch.edu.au
Web: <http://www.vetbiomed.murdoch.edu.au/research/neurobiol/index.html>

MyScience continued from page 1



Dr Phil Dooley, Science Communicator, working with primary students

to inspire an enthusiasm for science and improve outcomes in Science and Technology education within primary school communities.

The MyScience program begins with professional development for teachers in authentic scientific investigation, including aspects of experimental design, data collection and analysis, and scientific reporting. Teachers then introduce these skills to their students over a number of weeks using the TryScience website (www.tryscience.org) as a launching pad, with continued support from trained facilitators.

In the final phase of the program students apply their newly acquired skills to their own scientific investigations based around a class theme or topic (in 2007 these themes included Energy, Communication, Natural Disasters and Plants). This phase also involves at least two visits to the classroom by Scientist Mentors who are currently sourced from the school's local community—including teachers from local high schools—and from ACU, IBM and The University of Sydney. Face-to-face mentoring sessions are complemented by ongoing communication between students and mentors via a secure online environment (IBM's MentorPlace).

The Scientist Mentors receive a training session giving them a project overview and guidance on how to support primary students with scientific and technical advice during their projects.

Another aim of MyScience is to sustainably position schools for two years after they are initiated into the program, so they can establish their own network of Scientist Mentors from their local communities.

Following a school celebration, student projects are appraised and submitted to the Young Scientist awards conducted by the Science Teachers' Association of NSW.

During the 2006 pilot the MyScience program was run with 2 primary schools: Quakers Hill Public School and Beecroft Public School, with over 130 students (Years 3 to 6), and 15 scientist mentors from the University of Sydney. Three of ten Young Scientist award winners in 2006 were students who had gone through the MyScience program.

In 2007, MyScience expanded to four schools: Quakers Hill East Public School, Beresford Road Public School, Quakers Hill Public School and Beecroft Public School, with over 510 students from Years 1 to 6, 40 scientist mentors from the University of Sydney, the Australian Catholic University, IBM, parents and teachers from other local schools, and 12 apprentice scientist mentors (Year 10 students from Quakers Hill High School).

Survey data from teachers and students consistently praises Scientist Mentors for their generous gift of time and expertise. One teacher from this year's program said that having Scientist Mentors involved with the program was a great benefit to the students, who learned so much from the experience. She said: "The input from the mentors has been fantastic – the students have really enjoyed having a real scientist both in the classroom and online helping them".

The collaborators of MyScience are planning to expand into more schools in the Western Sydney Region of the NSW DET and interstate to Melbourne.

For more information on MyScience visit the website: <http://myscience.com.au/>

If you are interested in becoming a Scientist Mentor please contact Ms Alex Viglienzona, Education and Administration Officer, The Science Foundation for Physics
Tel: (02) 9036 6188
Email: alexv@physics.usyd.edu.au



Research News

For those of our alumni who are interested in the Research Grants coming into the School of Physics here's the official list for funding to commence in 2008!

ARC DISCOVERY PROJECTS

Dr SD Bartlett

Quantum enhanced reference systems
2008 : \$ 100,000
2009 : \$ 108,000
2010 : \$ 109,000

Prof IH Cairns;

Prof PA Robinson

Wave localization and burstiness in type III solar radio bursts

2008 : \$ 175,000
2009 : \$ 150,000
2010 : \$ 145,000

Prof RW Hunstead

Massive galaxies: tracers of extreme density peaks in the early universe?

2008 : \$ 120,000
2009 : \$ 110,000
2010 : \$ 100,000

Dr BT Kuhlmeiy; Prof BJ Eggleton; Prof JC Knight

Ultra sensitivity through resonances in photonic bandgap fibres

2008 : \$ 90,000
2009 : \$ 85,000
2010 : \$ 80,000

Dr S Kuyucak; Dr T Bastug

Quantum mechanical and dynamical investigation of ion channels

2008 : \$ 100,000
2009 : \$ 99,000
2010 : \$ 94,000

Prof DR McKenzie

(Australian Professorial Fellowship)

Control of protein attachment and its optical detection

2008 : \$ 170,000
2009 : \$ 170,000
2010 : \$ 170,000
2011 : \$ 160,000
2012 : \$ 120,000

Prof DB Melrose;

Dr MS Wheatland

Quantum plasmas

2008 : \$ 110,000
2009 : \$ 109,000
2010 : \$ 104,000

Dr AR Parker; Dr C Grillet

Optical biomimetics of diatoms

2008 : \$ 135,000
2009 : \$ 134,000
2010 : \$ 129,000

Prof PA Robinson

Quantitative dynamics of functional magnetic resonance imaging

2008 : \$ 90,000
2009 : \$ 100,000
2010 : \$ 100,000

Dr PG Tuthill; Dr MJ Ireland;

Dr TA ten Brummelaar (Australian Postdoctoral Fellow – for MJ)

Multiplicity in star and planet formation with the PAVO instrument

2008 : \$ 140,000
2009 : \$ 164,000
2010 : \$ 109,000
2011 : \$ 90,000

A programme to study quarkonium like states at ATLAS

2008 : \$ 125,000
2009 : \$ 124,000
2010 : \$ 119,000
2011 : \$ 110,000
2012 : \$ 110,000

ARC LINKAGE INFRASTRUCTURE, EQUIPMENT AND FACILITIES

Prof MM Bilek; Dr CD Ling;

Prof PR Munroe; A/Prof MA Steven Kalceff; Dr DP Riley; Dr AS Holland; Prof JF Williams; Prof DR McKenzie;

Dr BJ Kennedy; Prof MJ Hoffman; Dr N Valanoor; Prof DG McCulloch; Prof MA Green; Prof CJ Kepert; Dr K Kalantar Zadeh; Prof Dr T Maschmeyer; Dr GJ Conibeer; Dr KA Gross; Prof RP Burford; A/Prof A Mitchell;

Prof MW Austin; Dr S Samarin

Comprehensive analysis facility for thin films and surfaces

2008 : \$ 750,000

Dr JM Cairney; Prof SP Ringer; A/Prof FC Braet;

A/Prof M Ferry; Prof CC Sorrell; Prof L Ye; A/Prof AJ Ruys; A/Prof GW Barton; Dr AT Harris; Dr G Ranzi; Prof BJ Eggleton; Dr C Grillet;

Prof DR McKenzie; Prof PA Lay; A/Prof AF Masters; Dr AR Parker; Prof RL Overall;

Prof AS Weiss; Prof CR Murphy; Dr IM Ramzan; Prof LJ Copeland; Prof DT Potts

High resolution field emission scanning electron microscopy (FESEM) platform for characterisation at the nanometre level

2008 : \$ 450,000

A/Prof MG Burton; Dr MR Cunningham; Prof JW Storey; A/Prof AJ Green;

Dr A Walsh; Dr ST Maddison; Dr PG Edwards

Water vapour radiometers for millimetre wave phase correction for the Australia Telescope

2008 : \$ 201,224 (Administering Organisation: The University of New South Wales)

ARC LINKAGE

ARC LINKAGE

Prof MM Bilek; Prof AS Weiss; Prof DR McKenzie

Plasma processes for optimising the performance of surfaces for biomedical applications

2008 : \$ 250,000
2009 : \$ 275,000
2010 : \$ 270,000

ARC LINKAGE INTERNATIONAL

Prof RW Hunstead;

Prof EM Sadler;

Prof R Subrahmanyam;

Dr L Saripalli

Cosmic evolution of radio galaxies

2008 : \$ 6,900
2009 : \$ 6,000
2010 : \$ 15,200

Prof DR McKenzie;

Dr M Lattemann;

Prof U Helmersson

Physics of high power pulsed plasmas for materials synthesis

2008 : \$ 78,648

Dr PG Tuthill; Dr S Lacour

New technologies for the DRAGONFLY instrument

2008 : \$ 83,148

NHMRC RESEARCH GRANT

Adjunct A/Prof Nataalka

Suchowerska, Dr Michael Jackson, Prof David McKenzie

Rectal in vivo radiotherapy dosimetry using a fibre optic array

2008 : \$416,675

Where Are They Now?

Laurie Wilson:

ISS 1963, BSc 1968, PhD 1973, Senior Tutor 1975–1978 Research Team Leader, Human Factors Project Leader, ECHONET CSIRO ICT Centre



People often get a surprise when I tell them I did my PhD in cosmic ray physics (I now work in research in eHealth and Human Factors), and I wonder myself what that has to do with what I do now. When I graduated and even did my PhD there was no training for what I do now, or even what I have done over the last few decades. But Physics was probably the best training I could have got because it taught quantitative thinking about the real world. I think it is true to talk about the Physics Diaspora – people who have trained in Physics then spread their skills into a wide range of fields. I often note the number of Nobel Prizes (other than Physics) won by physicists – possibly every category.

So if you want to be working at the cutting edge in 20 years time, you can't study for it directly because the cutting edge will almost certainly be in a new field – Physics is one of the best ways to prepare for innovating in a changing world.

For more info on Laurie's work visit: www.ict.csiro.au/staff/Laurie.Wilson/

Moon in the Sky continued from page 1

was teaching both first and second year astronomy classes at the time, so the timing was ideal and I showed a selection of images to all my classes. There's nothing like something topical to spark up a lecture.

The next lunar eclipse (visible from Australia) will be only partial on the morning of 17 August 2008. 81 per cent of the Moon's diameter will be in the Earth's shadow. The next total eclipse of the Moon to be seen from beginning to end in Australia will be on the night of 10/11 December 2011. Put it in your diary and have your own digital camera ready!

The Astronomical Society of Australia occasionally issues Factsheets to help inform the public of upcoming events in the sky. To learn more, visit the Australian Astronomy web site at <http://www.astronomy.org.au/ngn/engine.php?SID=1000011> and of course visit www.physics.usyd.edu.au/research/#ioa to learn more about astronomy research in the School of Physics.

Profile: Sam Butler

Professor Stuart Butler (1926 – 1982) cut a dashing figure during his time here in the School of Physics. A theoretical physicist who had visiting professorships at Harvard and Cornell, he was awarded the Tom Bonner Prize for Nuclear Physics and the Thomas Rankin Lyle Medal during his prestigious career. Stuart's undergraduate record was so brilliant that he was awarded an Australian National University Scholarship to work in theoretical physics in the University of Birmingham. Alumni News caught up with Stuart's grandson, Sam Butler, to see how his second year here at the School of Physics is progressing.



Sam Butler at Milford Sound, New Zealand



Professor Stuart Butler

ALUMNI NEWS: While you never got to meet your grandfather, has his reputation as a great physicist had an influence on your choice of study?

SAM BUTLER: Yes but not entirely. I discovered my own passion for mathematics when I was in high school, well before I knew of all the great work Stuart had done. I never knew Stuart, but I had heard about how great a physicist he was

when I was young. It wasn't till I started studying at uni that I could appreciate the scope of his academic work and realise all the contributions he had made to the university and to the field of physics. His reputation sparked an interest in me about physics that has grown over recent years. It is this interest that has tilted my career path choice from mathematics to physics.

AN: What areas of Physics are you particularly interested in? Why?

SB: Mainly theoretical physics. I enjoy branches of physics that incorporate a lot of mathematics and abstract ideas, such as quantum physics. I am also drawn to areas that aim to solve really fundamental questions about the universe, such as cosmology. However, seeing as I have only completed two years of undergraduate physics, I don't think I have enough experience in any one area to call it a favourite.

AN: Where do you think this area of study will lead you – academia, industry?

SB: Hopefully somewhere in the realm of academia. I can't really see myself working in

industry. I much prefer the idea of doing research at the frontiers of science rather than working for a company.

AN: Your grandfather was also a pretty good pianist – do you have any musical aspirations?

SB: Actually I played the piano myself for a number of years, but gave it up for the drums. I have been playing for nearly 13 years and have toured overseas whilst in high school. These days music is more of a hobby for me, and as far as aspirations go, they all now lie with my studies.

AN: With such an illustrious family member do you ever feel that you have a reputation to live up to? If so, in what way?

SB: Stuart was a brilliant physicist who contributed greatly to the university and to physics in Australia. I don't feel I have to equal his reputation, but rather I see it as a window into what is possible through studying physics. I would love to be able to live up to half of what he did, but I see it as encouragement rather than a responsibility.

AN: Why do you think the study of physics is important?

SB: It's all about the search for knowledge and answers. Physics is ultimately a quest for knowledge, a quest to find out why things are the way they are. That is something everyone should be interested in. Physics inspires in you a thirst for knowledge that is important for individual growth and progression on a global scale.

AN: What do you hope to achieve in your career in science?

SB: I hope I will be able to continue what I love doing – sitting down and trying to predict and account for the events of the universe with a pen, some paper and a vast imagination. As far as achievements go, I do not have a list of prizes I want to win, or comets I want to name. Winning a medal would be great but I just want to be able to enjoy what physics offers. (Although if I solve one of the Millennium problems I won't say no to the prize money!)

Dr. Karl Julius Sumner Miller Fellow

Dr Karl's 26th book *Please Explain* looks at the quirkier side of science as only Karl can. Published by Harper Collins, *Please Explain* is in stores now. *Alumni News* has two autographed copies for the first two alumni to contact Alison Muir via email - a.muir@physics.usyd.edu.au. Happy Holidays!

