ISS2011 scholars, staff and escorts

ADOLF BASSER TRUST

Australian Government
Department of Innovation, Industry, Science and Research

Mulpha Australia Limited

THE UNIVERSITY OF SYDNEY
The 36th Professor Harry Messel International Science School, ISS2011: Light & Matter, ran from 3–16 July 2011. The broad theme incorporated science across a spectrum of disciplines, from solar energy technologies to green chemistry, from particle interactions in the Large Hadron Collider to dark matter and the structure of the cosmos.

Over 140 Year 11 and 12 secondary school science students representing every state and territory in Australia, and nine participating countries, attended ISS2011. They were treated to a unique lecture series by leading researchers, participated in hands-on activities provided by schools within the Faculty of Science, and attended formal University and Consular events and social outings. The students were accommodated on the University campus at The Women’s College for the duration of the two-week program, providing a nurturing environment for accelerating friendships and bridging many different cultures and backgrounds, between the ISS scholars.

The emails, letters and cards of thanks we have received to date from the ISS2011 scholars show that, for many scholars, their time at the ISS is remarkable; they attest to the truth in the traditional words of welcome to the International Science School:

The ISS will be the best two weeks of your lives ...
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SUPPORTERS

The Professor Harry Messel International Science School could not run without the generous financial backing of our many supporters, including all those who have given to the Messel Endowment — the Physics Foundation’s campaign to secure the long-term financial future of the International Science Schools. Each ISS costs approximately $450,000 to run and we greatly appreciate the support which ensures we can maintain the high quality of the experience provided to the students at each ISS.

Ongoing ISS funding is provided by the Messel Endowment, the New South Wales Government through the Department of Education and Training, and the Australian Government through the Department of Innovation, Industry, Science and Research (DIISR).

THE SCIENCE FOUNDATION FOR PHYSICS
WARMLY THANKS ALL SUPPORTERS OF ISS2011:
LIGHT AND MATTER

Department of Education and Training,
NSW Government (DET)

Department of Innovation, Industry, Science and Research,
Australian Government (DIISR)

Adolph Basser Trust

The James N Kirby Foundation

Faculty of Science, The University of Sydney

Mr Ron Enestrom

Associate Professor Robert Hewitt and
Mrs Helen Hewitt

Dr Peter Jones AM

All donors to the Foundation’s Sydney
Development Fund ISS2011 Appeal

Donors to The Messel Endowment

Australian students were selected in their states and territories with the support of the Science Teachers Associations in: Australian Capital Territory, Northern Territory, Queensland, South Australia, Tasmania, Victoria, Western Australia and in New South Wales through the NSW Department of Education and Training

The following institutions assisted in the selection
and travel of the overseas students:

The Affiliated High School of Peking University, China
Raman Research Institute, India

Ministry of Education, Culture, Sports, Science and Technology in Japan (MEXT)

Ministry of Education, Malaysia

The Royal Society of New Zealand

Ministry of Education, Singapore (MOE)

Ministry of Education, Thailand

The Association for Science Education, United Kingdom

The Royal Institution of Great Britain

The Ogden Trust, Great Britain

The Comino Foundation, United Kingdom

Department of Energy, United States of America

Thanks to the Consulates of India, Japan, the UK and the USA for their support in hosting Consular events for overseas students and their guests.
THE MESSEL ENDOWMENT

The University of Sydney Physics Foundation (formerly known as the Science Foundation for Physics) established the Messel Endowment in 1999 to honour Emeritus Professor Harry Messel AC CBE and to ensure that the Professor Harry Messel International Science School, established in 1962, continues in perpetuity. The Endowment is managed to preserve the real value of all donations received.

To date approximately $3.83 million has been raised. A list of donors who have donated $10,000 or more appears below. All donors to the Endowment are listed on the Messel Endowment Honour Banner in the Slade Lecture Theatre, School of Physics and can be viewed online at: www.physics.usyd.edu.au/foundation/donations/MHonour.shtml

The University of Sydney Physics Foundation appreciates and thanks all our Messel Endowment donors.

EXTRA GALACTIC DONORS - $1MILLION AND OVER

Australian Government through the Department of Innovation, Industry, Science and Research (DIISR)
Mr Lee Ming Tee, through Mulpha Australia

GALACTIC DONORS - $100,000 TO $999,999

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Hermon Slade Foundation
Nell & Hermon Slade Trust
Science Foundation for Physics
Mr Albert YL Wong & Mrs Sophie Wong

STELLAR DONORS - $10,000 TO $99,999

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ANZ Banking Group
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Dr Gregory Clark
Cochlear Limited
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Mr Trevor Danos
Cecil & Ida Green Foundation
James Hardie Industries Pty Ltd
Associate Professor Robert Hewitt & Mrs Helen Hewitt
Mr John Hooke CBE
IBM Australia Limited
James Hardie Industries Pty Ltd
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Mr Michael Messel
Mr Jim O’Connor
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Queensland Cyber Infrastructure Foundation Limited
Mr John Slade
Mr Paul Slade
The James N Kirby Foundation Pty Limited
USA Foundation Donors
Vonwiller Foundation
Westpac Banking Corporation
Mr Thomas Yim

Mulpha Australia Limited

Department of Innovation, Industry, Science and Research
At ISS2011, scholars represented every state and territory of Australia: Australian Capital Territory (3), New South Wales (59), Northern Territory (4), Queensland (5), South Australia (6), Tasmania (2), Victoria (10) and Western Australia (6). International scholars came from China (5), India (5), Japan (10), Malaysia (2), New Zealand (5), Singapore (5), Thailand (7), the United Kingdom (5) and from the United States of America (4). A full list of the scholars who attended the ISS2011 is provided in Appendix A.

The Australian scholars were selected competitively at the State level. The NSW Department of Education and Training along with the Science Teachers’ Associations of the other States and Territories formed selection committees to judge the students’ applications. The committees were instructed to aim for a mix of male and female, city and country, and public and private schools — their efforts resulted in the scholars forming a reasonable cross-section of the national population. For many of the country scholars it was their first time in a big city, in a tertiary environment and more importantly, the first time they had interacted with peers with a similar passion for science.

Many students commented, in their evaluations of the program, that the diverse mix of scholars from different backgrounds and cultures was one of the great strengths of the program. One concern for the ISS has always been the need to ensure the scholars have suitable proficiency in English; overall the international scholars participated enthusiastically and were well represented in the question time following each talk, and it was noted by some of the overseas accompanying adult escorts that their students confidence in English developed during the ISS. The book of lectures is sent out as PDF to all scholars providing an opportunity for international scholars to preview the lectures. Also, many of the ISS staff are bilingual, which is of great assistance.

The ISS has been an unforgettable experience ... and I know I will never have such an amazing opportunity like this again.

ISS2011 Scholar
Indigenous Australians are greatly under-represented in Australian scientific, technological and engineering-related fields. In an effort to encourage and enthuse talented indigenous students with an interest in science, the Science Foundation for Physics and the Federal Government’s Department of Innovation, Industry, Science & Research (DIISR) created the Indigenous Scholars Program.

For the ISS2011, the Foundation reserved up to five scholarships specifically for applications from indigenous students. The applications were judged by the state selection panels, and were also considered by a panel comprising a representative from the University of Sydney’s Koori Centre, the NSW Department of Education’s Aboriginal Programs Unit and Engineering Aid, which runs the Indigenous Australia Engineering Summer School.

The scholarships were advertised through the Engineering Summer School and the Koori Centre, and directly to Science Teacher Associations and schools with Aboriginal Education assistants. The scholarships were also advertised on Koori radio in Sydney, and in indigenous education newsletters and email lists run by state Departments of Education and Science Teacher Associations.

Ten applications were received from students identifying themselves for the Indigenous Scholars Program, up from five in 2009. Eight of the applicants (five male and three female) were determined to be of very high quality — subsequently, the School of Physics and the Physics Foundation agreed to make scholarships available to all eight applicants. Three indigenous students attended ISS2011 from NSW, two from Northern Territory, and one each from the ACT, SA and WA.
PROGRAM

The two-week ISS is an intense mix of lectures, talks, tours of the School of Physics research groups and other parts of the University, hands on experiments and social events.

A typical ISS weekday is programmed as follows:

9.00am  Activities: tours, workshops, experiments, talks
10:30am Morning tea
11.00am Lecture #1
12:30pm Lunch at Women’s College
2.00pm Lecture #2
3:30pm Activities: tours, workshops, experiments, talks
5.00pm Finish: back to College for dinner and evening social activities

The lecture series was held in the Slade Lecture Theatre in the School of Physics. Topics focussed generally on applications of the interactions between light and matter, including:

- Photonics and the Future of Communications Technology (Prof. Ben Eggleton, USyd)
- Metamaterials and Invisibility (Prof. Sir John Pendry, Imperial College)
- The Large Hadron Collider (Prof. Allan Clark, University of Geneva and CERN)
- Dark Energy and Dark Matter (Prof. Fred Watson, AAO)

Twelve internationally renowned research scientists, selected for their subject area and known to be great communicators, were invited to give one or two lectures each.

Each sixty-minute lecture was followed by twenty minutes of question time. As in previous years, lecturers overwhelmingly reported being highly impressed by the perceptive and challenging questions posed by the scholars. A full list of the lectures from the program is provided in Appendix B.

Feedback from the scholars has indicated that the mix of lecture topics was well regarded and, although some speakers rated better than others in their presentation style, all were credited highly for the genuine passion and enthusiasm they displayed for their science.

Some of the additional lectures included:

- Capturing C02 (Dr Deanne D’Allesandro, USyd)
- Photovoltaics: Solar Electricity by Coupling Light and Matter (Prof. Martin Green, UNSW)
- Children of the Stars, Plasma is the 4th State of Matter (Dr Christine Charles, ANU)
- The Ocean Floor (Dr Jo Whittaker, USyd)
In addition to the official ISS lecture series there were several talks and special events:

- Public Talk by Prof. Allan Clark on the Large Hadron Collider, attended by over 200 members of the public.
- Meet-and-Greet-a-Physicist — an opportunity for the scholars to meet and chat with members of the School of Physics at a “trade-display”-styled environment set up in the Menzies Room of the Women's College. This event was run by the School of Physics Science Communication team.
- Dr Karl Kruszelnicki gave two of his ever-popular Great Moments in Science® talks, delighting fans and newcomers alike.

In parallel with the lecture series, a range of tours, hands-on activities and workshops were organised to give the scholars further exposure to science at the University of Sydney. Both a University and Physics Building tour were provided at the start of the ISS; other activities were staged by Sydney University Museums (Nicholson Museum); the Electron Microscopy Unit and the Schools of Biological Sciences, Chemistry, Geoscience, Microbial Biosciences and Physics.

An Ethics and Leadership in Science module was created for ISS2009 in partnership, and sponsored by, the Smithsonian Institution, and this ran again in 2011 through the assistance of the Department of Philosophy. Two 150 minute sessions held across two days involved plenary session talks and group discussions led by leaders from across the Faculty of Science. This continues to be enthusiastically received, and should continue as a feature of the ISS program.

As in the past, scholars participated in a special ISS Science & Engineering Challenge presented by the University of Newcastle, in which teams of eight competed against each other in a series of activities designed to encourage and reward problem-solving and teamwork.

The activities were very popular with the scholars; they enjoyed the opportunity to make decisions and control the direction of their efforts. Each activity allowed them to use their collaboration and communication abilities and exercise their creativity to solve problems and learn about new concepts. Several activities gave the students valuable communication experience by asking them to present their ideas to a wider group.
The organised social events, most run by the NSW chapter of the Young Scientists of Australia (YSAs), included a Trivia Relay Race, a bush dance, rock climbing, Sydney Observatory visit, city tours, Taronga Zoo tour, bushwalks, movie and theatre nights, and many in-college events. The YSA’s involvement in the Science Schools has been invaluable over the years — their infectious energy and rapport with the scholars and their enthusiasm to organise social events are an invaluable contribution to the environment of the ISS.

The scholars themselves organised a Talent Night on the last Thursday, with acts ranging from traditional dance and songs from the international students, to individuals showing off their musical, comedy and magic skills. The YSA also gave considerable thought on how they might assist those ISS scholars concerned about being distracted from HSC study by running dedicated study sessions in the evenings at the Women’s College.

An ISS tradition is the Harbour Cruise on the middle Saturday night, with lecturers, supporters, Foundation members and School of Physics staff invited to join the Scholars for dinner and dancing against a stunning backdrop of the city and bridge by night.
The Governor of NSW and Chancellor of the University of Sydney, Her Excellency Professor Marie Bashir AC CVO, Patron of the ISS, formally opened the 36th Professor Harry Messel International Science School during the ISS Opening Ceremony, held on Monday 4 July in the Eastern Avenue Auditorium.

Following the opening the first ISS2011 lecture was given by Prof. Allan Clark, Director of the Department of Nuclear and Particle Physics at the University of Geneva and member of the ATLAS detector team at the Large Hadron Collider at CERN.

The ISS Gala Reception was held on Wednesday 13 July, and was an opportunity for alumni, donors, friends and senior members of the University of Sydney to meet the ISS scholars first hand. This prestigious event was held in the Great Hall in the presence of Her Excellency Professor Marie Bashir and other distinguished guests. Dr Paul Willis, Director of the Royal Institution of Australia and ex-presenter of ABC TV’s Catalyst, was the MC to a gathering of over 400 guests.

Two important awards are made at this event: the Australian Government Len Basser Award for Leadership in Science and the Mulpha ISS Award for Leadership. Both awards were established in 2005 in recognition of million dollar donations to the Messel Endowment — the Len Basser Award was created by the Australian Federal Government and is managed through DIISR, while the Mulpha Award was created by Mulpha Australia, a multi-national corporation. The ISS staff select the winners of these special awards, based on close observation of the students over the two weeks.

The Australian Government Len Basser Award for Leadership in Science is presented to the scholar who, in the course of the ISS, demonstrates leadership in science through a combination of originality of thought and a willingness to assist other ISS scholars. Hadleigh Frost from New Zealand was this year’s recipient, with the award presented by Professor Ian Chubb, Australia’s Chief Scientist, representing The Hon Kim Carr MP, Minister for Innovation, Industry, Science & Research.

The Mulpha ISS Award for Leadership recognises the international kinship fostered through the ISS and is awarded to a student who displays diplomacy, friendship, encouragement and understanding of ISS students from all cultures. This year the recipient was Joelene Puntoniero from the Northern Territory, an ISS2011 Indigenous Scholar, with the award presented by Mulpha CFO Mr Greg Dyer.

Consulate-General events have become another highlight of the ISS program. Overseas scholars and escorts, each accompanied by an Australian guest, are invited by the Sydney Consulate-General to attend a function on one of the evenings of the ISS. The Indian, Japanese, UK and USA Consuls-General hosted events this year.
State selection committees provided the names and contact details of both successful and unsuccessful applicants. All applicants received notification letters and successful applicants were requested to complete and return an information form and other relevant material. Travel and accommodation was then organised for each scholar. Travel to and from Australia was organised by overseas committees.

All scholars, staff and overseas escorts were accommodated at The Women’s College, just five minutes’ walk from the School of Physics. While the accommodation comprises around one third of the cost of the International Science School, the benefits of housing the entire cohort of students in college — compared with accommodating only the visiting scholars — are enormous as the scholars are able to quickly form a cohesive whole. Also, this ensures staff can organise their group of scholars to leave on time for lectures after breakfast and can muster after dinner for evening functions and return to the college together.

The ISS staff are vital to the smooth running of the ISS. Back for their fourth ISS were our two House Parents, Karen and John, who — with the overseas escorts — were in loco parentis for the 143 scholars for the entire two weeks. We ensured all the overseas escorts felt very much part of the staff team, invited to participate in all activities as well as having a couple of evening and day-time functions organised just for them.

Each ISS invites previous ISS attendees to come back as volunteer ‘staffies’, and three staffies from previous years were also welcomed back as ‘senior staffies’. This year, a total of twelve ISS ‘staffies’ were engaged to assist in the welcoming of the scholars and assigned a group to escort from place to place throughout the ISS. Of special note is a UK scholar from 2009 who organised her own travel back to Australia to be a staffie this year — this is the third ISS in a row where an international alumnus has returned as a staff member. In addition, for the first time one of our indigenous alumni joined the ISS staffies, providing an excellent precedent for the eight attending indigenous Australian scholars at ISS2011.

A series of ‘Scholar Update’ newsletters was sent out at regular intervals in the lead up to the ISS. These emailed newsletters included useful information such as what to bring, what to expect at the ISS, as well as information about the program, health bulletins, college accommodation and so on. Scholar feedback was that this information was helpful in building their expectations. Staff feedback was that the scholars were a lot more prepared in areas such as shared accommodation, registration and participation in activities.
Since 1962 a book has been produced to accompany the International Science School, with chapters written by each of the ISS lecturers. The ISS book comprises a cross-section of the cutting-edge of science at that moment in time; it is both an introduction to a wide variety of scientific disciplines and a unique historical document.

All participants received a copy of the ISS2011 book on arrival in Sydney. Copies, signed by Professor Harry Messel were presented to each lecturer at the conclusion of their talk, and copies were given to friends and supporters of the program.

The book is also made available as a downloadable PDF from the ISS website.

Since 2005, we have recorded the ISS lectures and uploaded the series for listening or viewing on the web. In the past we have tested various methods for capturing the lectures, ranging from simple audio recordings, to full multi-camera videos. For the 2011 webcast series, we opted for an audio recording overlaying the speaker’s presentation slides, so that viewers can hear the explanations and read the details of the talk on the screen as it progresses. The entire ISS lecture series is available at: http://vimeo.com/iss2011

The electronic book and video lectures is promoted to schools across Australia, as well as through our international educational partner institutions, to share these resources with students, teachers and the general public across the globe.

Promotion of the ISS is part of the effort to raise the profile of the science school. Through media releases and contacts with the science reporters in all major media, many stories appear in local, national and international papers, featuring the students who have won a place. There are also media stories about some of the lecturers and the influence of their work.

It is very much part of the philosophy of the ISS that, wherever possible, science stories about the ISS scholars, the lectures or science at the University of Sydney are shared with the public through the media. The organisers work with the Faculty and University media office to prepare media releases, arrange interviews and provide background about the ISS. A sample of media stories is provided in Appendix D.
EDUCATIONAL OUTCOMES

If I was enthusiastic about science before attending the ISS, that was nothing compared to the motivation I feel now ... such an experience has helped me return to school with renewed enthusiasm and ambition — the impact of the ISS goes far beyond improved scientific understanding! ISS2011 Scholar

Students attending the International Science Schools have the opportunity to benefit from a wide range of experiences, both social and academic. Educational outcomes depend on each particular student; the effect of the ISS on a student from a small rural town might be very different from that on a student from a large inner-city school, and Australian students will take away a different set of experiences from the overseas scholars.

ISS scholars leave after the two weeks having made new friends, explored different cultures, discovered new fields of knowledge and encountered new intellectual and emotional challenges. The educational outcomes can be broadly grouped into scientific, cultural and generic attribute outcomes, as described below.

SCIENTIFIC UNDERSTANDING AND APPLICATION
The scholars learn about many important and relevant areas of science. The lectures series and many of the other experiences of the International Science School deal with modern science in significant breadth and depth. Many students comment on the range of the topics, noting that prior to the International Science School they had no idea that science was so diverse. The information gained through attending the ISS is truly beneficial for the scholars’ overall scientific development.

Scholars have contact with acknowledged experts in many different fields through the lectures, direct one-to-one conversations and other interactions with staff of the School of Physics and elsewhere within the University. Through these contacts the scholars observe scientists in their working environment. Scientists provide role models for scholars that aid them in making decisions about future career directions.

Through the tours of cutting-edge research laboratories and other activities during the International Science Schools, scholars see modern scientific equipment and instrumentation techniques and gain some familiarity with the way in which science is undertaken.

Scholars at the International Science School participate in formal and informal projects. Some of these projects teach them about experimental design and, importantly, about the trade-offs necessary between design and performance of equipment, and the costs of such equipment.

CULTURAL AWARENESS AND INTERPERSONAL RELATIONSHIPS
The International Science Schools provide a rich cultural environment. Contact with peers from other parts of the world and from different regions of Australia broadens the scholars’ perspective; they develop an
appreciation of learning environments elsewhere, and obtain insights about the nature and validity of approaches taken in their own educational system.

Activities such as the Ethics and Leadership workshop are an opportunity for scholars to learn about the impacts of scientific research in the context of their own culture and that of other cultures. They gain an understanding that, while scientific investigation may follow the same ‘rules’ wherever it is undertaken, the application of technologies (such as nuclear power) or certain lines of enquiry (such as stem cell research) are strongly influenced by cultural settings.

The scholars spend their two weeks living in college at the University, and this provides a unique opportunity for socialising, whether sitting down to meals (often with the ISS lecturers from that day), joining in planned social outings, or just meeting casually within the college. Scholars report that this environment accelerates friendships and bonding far beyond what most would expect from just two weeks. The scholars this year remain in active contact through email and social media — the ISS2011 Facebook page has over 120 members from all represented countries.

**GENERIC ATTRIBUTES**

Through many of the activities run during the ISS, the scholars gain experience and confidence in expressing their ideas, working in groups, critically analysing new ideas and using a range of techniques to solve problems. At various times over the two weeks, they are challenged to present and defend original ideas to the larger group, to build effective teams and negotiate group dynamics, to take a leadership role or encourage others to do the same. In short, the ISS gives opportunities for the scholars to practise many of the ‘generic attributes’ that have been identified as a crucial aspect of education by schools, universities and employers.

**OTHER EDUCATIONAL OUTCOMES**

The Physics Foundation continues to maintain the practice of producing a book of the lectures for each ISS. The ISS2011 book is available as a PDF on the web and formatted as an educational tool for science teachers — it is therefore accessible to many more educators and can enhance the diversity of topics that they cover. ISS webcasts have a similar impact as the books, making the lectures available to many who would not otherwise have been able to attend. They have the added advantage of being more generally available to both a national and international audience.

A/Prof. Robert Hewitt, with Ms Navarat Induwongs (the escort for the Thai scholars), and Ms Karen Palmer and Mr John Bright (the ISS2011 Houseparents)
FINANCIAL STATEMENT

The University of Sydney Physics Foundation could not run the International Science School without its generous supporters, some of whom helped fund the ISS for many years. We are very grateful to all whom contributed to make the 2011 International Science School possible, including the many donors to the Messel Endowment.

Appendix C gives a statement of ISS2011 finances as at December 2011.

IN CONCLUSION

The Professor Harry Messel International Science School is a wonderful and unique experience that honours scientific excellence. The ISS scholars are brought together from all over the globe to experience two weeks of lectures and activities run by leading researchers from varied scientific disciplines. The ISS2011 scholars were challenged to think about issues relating to the world they live in whilst also being given the opportunity to meet and interact with other promising young minds from diverse cultures and backgrounds. These scholars have been given an insight into the world of scientific research, and are now challenged to take this knowledge and experience further by aiming to reach their full potential and making an impact on the world around them.

With the goal of a fully-funded Messel Endowment in sight, guaranteeing the continuation in perpetuity of the ISS, the University of Sydney Physics Foundation and the School of Physics look forward to the next celebration of excellence at the ISS2013 — and a celebration of the 50th anniversary of the program in 2012.

Dr Chris Stewart
Manager, ISS2011
## THE AUSTRALIAN SCHOLARS

### AUSTRALIAN CAPITAL TERRITORY
- Alix de Caritat de Peruzzis  
  Narrabundah College
- Joss Kirk  
  Hawker College
- Jinneeka Klenka  
  Melba Copland Secondary School

### NEW SOUTH WALES
- Matthew Alger  
  Port Macquarie High School
- Stephen Au  
  St Johns Park High School
- Tom Bambrick  
  Mudgee High School
- Andrew Barber  
  Chevalier College
- Matthew Berrington  
  Toormina High School
- Jyotsana Bhasker  
  Baulkham Hills High School
- Jacob Buete  
  The Riverina Anglican College
- Ella Butcherine  
  Kinross Wolaroi School
- Paul Churton  
  Knox Grammar School
- Alex Davidson  
  Gosford High School
- Rosie Davidson  
  Roseville College
- Rebecca Dawkins  
  Fort Street High School
- Natalie Domingos  
  Danebrook Anglican School for Girls
- Hung Phat Duong  
  Cabramatta High
- Gloria Giang  
  Roseville College
- Summer Haidar  
  St George Girls’ High School
- Shuyang Han  
  Sceggs Redlands
- Winona Huang  
  Baulkham Hills High School
- Elyse Hudson  
  Merewether High School
- Tegan Hudson  
  William Carey Christian School
- Daniel Hwang  
  Baulkham Hills High School
- Marcus Ibaceta  
  Westfields Sports High School
- Thuvarahan Jegathees  
  Baulkham Hills High School
- Cameron Keightley  
  Inverell High School
- William Khun  
  The Scots College
- Matthew Kwan  
  Baulkham Hills High School
- Brendon Lai  
  Hurlstone Agricultural High School
- Rachel Lee  
  James Ruse Agricultural High School
- Kate Lloyd-Jones  
  Roseville College
- Brendan Loi  
  Baulkham Hills High School
- Aaron Lowth  
  Callaghan College Jesmond Senior Campus
- Jason Ma  
  Baulkham Hills High School
- Jessica McBroom  
  Caroline Chisholm College
Zoe McLaughlin  Roseville College
Ellen McRae  Wariailda High School
Kim Nguyen  Fort Street High School
Eshiyu Park  Baulkham Hills High School
Steven Phan  James Ruse Agricultural High School
Sue Qian  Sydney Girls High School
Nicholas Radoll  WSI TAFE, OTEN Campus
Jackson Read  Tomaree High School
Adelina Romano  St Scholastica’s College
Opinderjit S. Samra  Penrith High School
Armogh Sarda  North Sydney Boys High School
Nirukshan Shanmugam  Holroyd High School
John Shi  Fort Street High School
Danny Shuman  Kingsgrove High School
Nara So  Baulkham Hills High School
Christina Sun  Smith’s Hill High School
Talia Walker  Cerdon College
Charlotte Ward  Hornsby Girls High School
Paul Webster  Manly Selective Campus
Kylie Yang  Caringbah High School
Grace Yin  St George Girls High School
Alexander Yip  James Ruse Agricultural High School
Florence Yuan  Riverside Girls High School
Lucy Shang  Pymble Ladies College
Olym Dongyu Zhang  Bowral High School
Karen Zhong  Pymble Ladies’ College

NORTHERN TERRITORY
Nerida Liddle  Darwin High School
Leon Milne  Taminmin College
Joelene Puntoriero  Taminmin College
David Ung  Taminmin College

QUEENSLAND
Sarah Coughlan  Nanango State High School
Brenden Crago  Mareeba State High School
Talia Galbraith  Gladstone State High School
Katelyn Hall  St Monica’s College
Claire Pitts  Redbank Plains State High School

SOUTH AUSTRALIA
Matthew Dowling  Mount Gambier High School
Zac Kain  Grant High School
Lauren Murray  Reynella East College
Lisa Neldner  Faith Lutheran School
Courtney Theseira  Australian Science and Mathematics School
Bree Zaccardo  Tenison Woods College

TASMANIA
Clare Browne  Fahan School
James Newlands  Elizabeth College

VICTORIA
Benjamin Costa  St Leonards College
Benjamin Jones  Princes Hill Secondary College
Jack Ke  Balwyn High School
Levi Marotta  Trinity College
Jarrod Moonen  St Paul’s Anglican Grammar School
Braden Moore  Aitken College
Shweta Nair  St Monica’s College
Helena Niu  The Mac Robertson Girl’s High School
Cassandra Raselli  Presbyterian Ladies College
Joshua Torr  St Kevin’s College

WESTERN AUSTRALIA
Matthew Combs  Kelmscott Senior High School
Ella Giudice  Iona Presentation College
Mary Jack  Manea Senior College
Mitchell Peck  Leeming Senior High
Eli Sutton  Margaret River Senior High School
Nathan Ward-Tyrrell  Living Waters Lutheran College

THE INTERNATIONAL SCHOLARS

INDIA
Lalith Kishore AK  Maharishi Vidya Mandir Senior Secondary School
Jisha Kambo  St Xavier’s School
Nikhil Mahajan  Rose Mary Convent School
S Sathyawageeswar  Bhavan’s Vidya Mandir
Jyotesh Singh  St Columba’s School

JAPAN
Yui Go  Okayama Asahi High School
Kenta Kuniyoshi  The Junior and High School Affiliated to Showa Pharmaceutical University
Haruka Kuroda  Notre Dame Seishin Junior and Senior High School
Takumi Matsuzawa  Kanagawa Sohgo High School
Hiromasa Nakatsuka  Zeze High School
Denta Nojima  Otemae Senior High School
Mao Ono  Akashi Kita Senior High School
Ayu Oyama  Akita Prefectural Yukote Seiryo Gakuin High School
Ryoichi Sakata  Nara Senior High School
Dong Yu Shao  Tokyo Gakugei University Senior High School
MALAYSIA

Teh Jiasheng Chinese High School
Lam Yet Sin SMJK Sam Tet

NEW ZEALAND

Hadleigh Frost Lincoln High School
Lina Barthlen-Potter Kerikeri High School
Annie Welvaert Logan Park High School
Liam Buchanan St Paul’s collegiate School
Joshua Rippon Rongotai College

PEOPLE’S REPUBLIC OF CHINA

Danran Chen High School Affiliated to Peking University
Jingwei Deng High School Affiliated to Peking University
Andi Wang High School Affiliated to Peking University
Tianzhou Yang High School Affiliated to Peking University
Yifan Yang High School Affiliated to Peking University

SINGAPORE

Ananya Kumar NUS High School of Mathematics and Science
Nick Lee Pei Li Hwa Chong Institution
YiJun Lim River Valley High School
Azmi Sultan Sikander Rahman Victoria Junior College
Ting Ting NUS High School

THAILAND

Sirion Aksornthong Hatyaiwitthayalai School
Sirada Kamdee Sriboonyanon School
Kanjana Laosuntsuk Phraphathom Wittayalai School
Nipaporn Nakrong Samsenwittayalai
Kitinan Pongsangangan Kaennakhon Wittayalai School
Punika Ratchachittapong Bodindecha (Sing Singhaseni)
Chonnikan Thitiwatthanakan Yupparaj Wittayalai School

UNITED KINGDOM

Andrew Bunting Hinchingbrooke School
Cameron Ford Dr Challoner’s Grammar School
Nicholas Hulbert City of London School
Richard Lewis Watford Grammar School for Boys
Danya Zeng Kings High School

UNITED STATES

Andrew Chen Mira Loma High School
Russell Islam Mira Loma High School
Anish Khare Mira Loma High School
Sriram Pendyala Mira Loma High School
# Lecture Program: Week 1

All talks in the **Slade Lecture Theatre** unless otherwise noted.

## Monday 4 July

<table>
<thead>
<tr>
<th>Time</th>
<th>Location</th>
<th>Speaker</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>9am to 11am</td>
<td>Eastern Avenue Auditorium</td>
<td>Opening Ceremony</td>
<td></td>
</tr>
<tr>
<td>11am to 12:30pm</td>
<td>Lecture: Allan Clark (Geneva)</td>
<td><strong>Slade Lecture Theatre</strong></td>
<td><em>The LHC: A very large microscope to probe very small distances, Part 1</em></td>
</tr>
<tr>
<td>2pm to 3:30pm</td>
<td>Lecture: Deanna D’Alessandro (Sydney)</td>
<td></td>
<td><em>Capturing CO2</em></td>
</tr>
</tbody>
</table>

## Tuesday 5 July

<table>
<thead>
<tr>
<th>Time</th>
<th>Location</th>
<th>Speaker</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>11am to 12:30pm</td>
<td>Lecture: Allan Clark (Geneva)</td>
<td></td>
<td><em>The LHC: A very large microscope to probe very small distances, Part 2</em></td>
</tr>
<tr>
<td>2pm to 3:30pm</td>
<td>Lecture: John Pendry (Imperial)</td>
<td></td>
<td><em>Metamaterials and the Science of Invisibility</em></td>
</tr>
</tbody>
</table>

## Wednesday 6 July

<table>
<thead>
<tr>
<th>Time</th>
<th>Location</th>
<th>Speaker</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>11am to 12:30pm</td>
<td>Lecture: John Pendry (Imperial)</td>
<td></td>
<td><em>Negative Refraction and a Perfect Lens</em></td>
</tr>
<tr>
<td>2pm to 3:30pm</td>
<td>Lecture: Martin Green (UNSW)</td>
<td></td>
<td><em>Photovoltaics: Solar Electricity by Coupling Light and Matter</em></td>
</tr>
</tbody>
</table>

## Thursday 7 July

<table>
<thead>
<tr>
<th>Time</th>
<th>Location</th>
<th>Speaker</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>6pm to 7:30pm</td>
<td>Eastern Avenue Auditorium</td>
<td>Public Lecture: Allan Clark (Geneva)</td>
<td><em>Playing with Particles</em></td>
</tr>
</tbody>
</table>

## Friday 8 July

<table>
<thead>
<tr>
<th>Time</th>
<th>Location</th>
<th>Speaker</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>11am to 12:30pm</td>
<td>Lecture: Fred Watson (AAO)</td>
<td></td>
<td><em>Dark Secrets: Dark Energy, Dark Matter &amp; Dark Skies, Part 1</em></td>
</tr>
<tr>
<td>2pm to 3:30pm</td>
<td>Lecture: Dr Karl (Sleek Geek)</td>
<td></td>
<td><em>Great Moments in Science</em></td>
</tr>
</tbody>
</table>
Lecture Program: Week 2

All talks in the Slade Lecture Theatre unless otherwise noted.

Monday 11 July

9am to 10:30am  
Lecture: Steve Simpson (Sydney)  
*Paintbrushes, Cannibal Crickets, and Human Obesity*

2pm to 3:30pm  
Lecture: Jo Whittaker (Sydney)  
*Exploring the Earth’s Varied and Dynamic Seafloor*

Tuesday 12 July

9am to 10:30am  
Lecture: Steve Bartlett (Sydney)  
*Quantum Science: The Revolution is Coming*

2pm to 3:30pm  
Lecture: Christine Charles (ANU)  
*Children of the Stars, Plasma is the 4th State of Matter*

Wednesday 13 July

2pm to 3:30pm  
Lecture: Dr Karl (Sleek Geek)  
*Great Moments in Science*

6pm to 8pm  
ISS2011 Gala Reception in the Great Hall  
Guest MC Paul Willis, ABC’s Catalyst and Director, RiAus

Thursday 14 July

11am to 12:30pm  
Lecture: Robyn Williams (ABC)  
*Title: TBC*

2pm to 3:30pm  
Lecture: Ben Eggleton (Sydney)  
*Photonics circuits to Transform the New Information Age — Smaller, Faster and Energy Efficient*

Friday 15 July

11am to 12:30pm  
Lecture: Thomas Maschmeyer (Sydney)  
*Green Chemistry*

2pm to 3:30pm  
Lecture: Fred Watson (AAO)  
*Dark Secrets: Dark Energy, Dark Matter & Dark Skies, Part 2*
The Lecturers

Associate Professor Steve Bartlett
Quantum Science Group, School of Physics, The University of Sydney

Quantum Science: The Revolution Is Coming

The future of technology lies in controlling the quantum realm. Our understanding of the basic principles of quantum mechanics has produced the technology that shapes our daily lives; without quantum mechanics there would be no computers and no Internet. However, the materials and devices that are the building blocks of the modern information economy have quantum properties that are naturally occurring. Moreover, they do not yet make use of the most exotic quantum effects that have intrigued scientists since the field’s inception. Can we engineer the quantum world to our purposes? Can the strangeness of quantum mechanics be used as a new and untapped resource?

Professor Christine Charles
Head of the Space Plasma, Power and Propulsion Laboratory, The Australian National University

Children of the stars, plasma is the fourth state of matter

Everywhere we look, there is plasma. But we stand on solid earth and this solid state accounts for less than one percent of the total mass of the Universe. The rest is plasma, a hot ionised gas containing positive and negative charges (except, perhaps, for dark matter). Plasmas have existed since the very first moments of the Universe. It is the stuff of stars. It even fills the space between stars. It gives us the beautiful northern and southern aurorae. By properly harnessing the plasma state in the laboratory we can make plasma lights (fluorescent tubes), microchips for computers and mobile phones, plasma space engines and hydrogen fuel cells. Plasma applications also include arc welding, waste treatment and plasma coatings in the manufacture of bio-materials.

Professor Allan G. Clark
Director, Department of Nuclear and Particle Physics, University of Geneva

The LHC: A Very Large Microscope to Probe Very Small Distances

In my two lectures I hope to share the excitement of our current research in Particle Physics at the CERN Large Hadron Collider (LHC), and to explain why the experiments at the LHC are expected to result in new understandings of fundamental interactions at high energy (small distance) in the laboratory and as well the early Universe.

In the first lecture, we will first motivate the reason to explore very small distance scales and why this is important. We will then summarize our current understanding of the interactions between fundamental particles as well as what some of the open questions. We will see that this is also relevant to our understanding of the Early Universe. Finally, we will show that collisions at the LHC probe much shorter distance scales than previously possible. We will conclude by describing the LHC machine and what makes it so special. In the second lecture, we will discuss the particle physics experiments at the LHC, with particular emphasis on the ATLAS experiment where Australia is very actively involved. We will show how to obtain some important physics results from the LHC experiments, and we will make a menu for the future.
Metamaterials and the Science of Invisibility

Electromagnetism encompasses much of modern technology. Its influence rests on our ability to deploy materials that can control the component electric and magnetic fields. A new class of materials has created some extraordinary possibilities such as a negative refractive index, and lenses whose resolution is limited only by the precision with which we can manufacture them. Using the new materials cloaks have been designed and built that hide objects within them, but remain completely invisible to external observers. The new materials, named metamaterials, have properties determined as much by their internal physical structure as by their chemical composition and the radical new properties to which they give access promise to transform our ability to control much of the electromagnetic spectrum.

Exploring the Earth's Varied and Dynamic Seafloor

The floor of the ocean doesn’t get that much attention, but when it does the deep sea is often portrayed as an endless expanse of deep, smooth ocean floor inhabited by giant squids. Instead, ship and satellite geophysical data reveal steep cliffs and valleys over vast areas, sometimes over 3 kilometers in elevation. Other parts of the ocean floor are dead flat.

Ocean basins cover 70% of the Earth’s surface. What forces are at work and how the seafloor changes over time are secrets that have long haunted scientists. Today, more is known about the surface topography of the planet Venus than is understood about many areas of the seafloor. The study of the planet’s evolution since its accretion 4.5 billion years ago comprises arguably the largest scale research project you can possibly undertake ... but many of the secrets of continental drift and plate tectonics are to be found underwater.

Capturing CO2

Deanna’s research spans the areas of inorganic chemistry, physical chemistry and materials science and focuses on the development of functional inorganic materials that exhibit novel electronic, optical and magnetic phenomena. Potential applications range from the capture of greenhouse gases by using molecular sponges that can mop up carbon dioxide and release it on cue, to sensors, optoelectronics devices and photocatalysts.
Professor Steve Simpson
ARC Laureate Fellow, School of Biological Sciences, The University of Sydney

*Paintbrushes, Cannibal Crickets, and Human Obesity*

The Behaviour and Physiology Research Group (BPRG), led by Steve Simpson, studies the neural, physiological, ecological and evolutionary bases of animal behaviour. The group’s emphasis is “bottom-up”, in that we are especially concerned with the way in which lower-level processes lead to higher-level outcomes. Our approach focuses on the behaviour of individual organisms and involves an interplay between theory and experiment. Most of our experimental work is on insects, although recent work has examined fish, birds and mammals — including humans.

Professor Fred Watson
Astronomer in Charge, Australian Astronomical Observatory

*Dark Secrets: Dark Energy, Dark Matter and Dark Skies*

Professor Fred Watson says he has spent so many years working in large telescope domes that he has started to look like one. His main scientific interest at the AAO in Coonabarabran is gathering information on very large numbers of stars and galaxies. He is also an adjunct professor at the Queensland University of Technology and the University of Southern Queensland. Fred is the author of “Stargazer — the life and times of the telescope”, and is a regular broadcaster on ABC radio. In 2003, he received the David Allen Prize for communicating astronomy to the public, and in 2006 was the winner of the Australian Government Eureka Prize for Promoting Understanding of Science.

Fred has an asteroid named after him (5691 Fredwatson), but says that if it hits the Earth it won’t be his fault ....

Robyn Williams
Science Journalist and Broadcaster, ABC Science

Robyn Williams presents ABC Radio National’s *Science Show*, *Ockham’s Razor* and *In Conversation*.

Although he graduated with a Bachelor of Science (Honours) in England, Robyn admits to spending as much time acting as studying. Early in his career he made guest appearances in *The Goodies*, *Monty Python’s Flying Circus* and *Dr Who*, and stood in for Tom Jones for four months in his TV series.

He has conducted countless interviews with scientists on ABC TV on programs such as *Quantum* and *Catalyst*, narrated the *Nature of Australia* series and appeared in *World Safari* with David Attenborough. Outside the ABC, Robyn has served in various capacities, including President of the Australian Museum Trust, Chairman of the Commission for the Future, and President of the Australian Science Communicators. In 1987, he was proclaimed a National Living Treasure.

In 1993, Robyn was the first journalist elected as a Fellow Member of the Australian Academy of Science. He was appointed AM in the 1988 Australian Bicentenary honours list and in the same year received Honorary Doctorates in Science from the University of Sydney and Macquarie and Deakin Universities. The ANU awarded him a Doctorate of Law, and he is a Visiting Professor at the University of NSW and an Adjunct Professor at the University of Queensland. A Reuters Fellowship at Oxford University allowed him time to write his autobiography, *And Now for Something Completely Different*. He was a Visiting Fellow at Balliol College Oxford in 1995-96.

Robyn has written more than 10 books, the latest being a novel, 2007: a true story waiting to happen.
Professor Martin Green
Scientia Professor, Executive Research Director, ARC Photovoltaics Centre of Excellence, UNSW

*Photovoltaics: Solar Electricity by Coupling Light and Matter*

Martin Green is currently a Federation Fellow and Scientia Professor at the University of New South Wales and Executive Research Director of the ARC Photovoltaic Centre of Excellence. He is also a Director of CSG Solar, a company formed specifically to commercialise the University’s thin-film, polycrystalline-silicon-on-glass solar cell. His group’s contributions to photovoltaics are well known including the development of the world’s highest efficiency silicon solar cells and the successes of several spin-off companies. He is the author of six books on solar cells and numerous papers in the area of semiconductors, microelectronics, optoelectronics and, of course, solar cells. International awards include the 1999 Australia Prize, the 2002 Right Livelihood Award (also known as the Alternative Nobel Prize), the 2004 World Technology Award for Energy, and the 2007 SolarWorld Einstein Award.

Dr Karl Kruszelnicki
Science Media Guru, Sleek Geek and the Julius Sumner Miller Fellow, University of Sydney

*Great Moments in Science*

Dr Karl’s media career began in 1981, when he started presenting ‘Great Moments In Science’ on Double J radio to pay his way through medical school. Since then, his media career has exploded from radio to include TV, books, newspapers, magazines, scripting, professional speaking, and of course, the Net.

Karl made his TV debut in 1985 as the presenter of the first series of ABC’s science show, Quantum. In 2008 he completed a series for ABC TV with Adam Spencer called ‘Sleek Geeks’ and a second series went to air in the second half 2010. Karl also popularises science on ABC radio stations across Australia and on the BBC, for several hours each week. Karl has written (so far) 30 books, including such titles as ‘It Ain’t Necessarily So...’Bro’ (2006), which was launched, quite literally, via rocket at Sydney’s Bondi Beach.

In 2002, Dr Karl was honoured with the prestigious Ig Nobel prize awarded by Harvard University in the USA for his ground-breaking research into Belly Button Lint and why it is almost always blue. He received the Member of the Order of Australia Award in 2006, and in 2007 the Australia Skeptics Society awarded Dr Karl the Australia Skeptic Of The Year Prize.

Karl has degrees in Physics and Maths, Biomedical Engineering, Medicine and Surgery and has worked as a physicist, tutor, film-maker, car mechanic, labourer, and as a medical doctor at the Kids’ Hospital in Sydney. In 1995 he took up the position of the Julius Sumner Miller Fellow at Sydney University, spreading the good word about science and its benefits. His enthusiasm for science is totally infectious and no one is better able to convey the excitement and wonder of it all than Dr Karl Kruszelnicki.

Professor Thomas Maschmeyer
ARC Future Fellow, School of Chemistry, The University of Sydney

*Green Chemistry*

The world is standing at the technological threshold of a revolution that is driven by the need for truly sustainable (industrial) processes, both in the production of chemicals as well as in the generation of power.

At current rates of resource usage, a world population operating with Australian standards of living would require between 4 – 6 planets. Clearly, this is untenable and, from a chemical viewpoint, the inherent challenges can only be met by devising strategies for increased use of renewable resources, waste reduction, energy optimisation and process intensification as outlined in the 12 principles of “Green Chemistry”.

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**LECTURE PROGRAM**
The University of Sydney
The Science Foundation for Physics

36th Professor Harry Messel International Science School

Statement of Income and Expenditure
1st January 2010 to 31st December 2011

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INCOME</strong></td>
<td>$</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>Grants (NSW Department of Education)</td>
<td>0</td>
<td>94,000</td>
<td>94,000</td>
</tr>
<tr>
<td>Grants - DEST</td>
<td>0</td>
<td>90,000</td>
<td>90,000</td>
</tr>
<tr>
<td>Scholarships, Donations and Bequests</td>
<td>5,965</td>
<td>60,408</td>
<td>66,373</td>
</tr>
<tr>
<td>Business and Investment Income</td>
<td>10</td>
<td>4,468</td>
<td>4,478</td>
</tr>
<tr>
<td>Messel Endowment contribution (note 1)</td>
<td>97,000</td>
<td>0</td>
<td>97,000</td>
</tr>
<tr>
<td>Internal and Other Income</td>
<td>1,818</td>
<td>16,714</td>
<td>18,532</td>
</tr>
<tr>
<td><strong>Total Income</strong></td>
<td>104,793</td>
<td>285,590</td>
<td>370,383</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th><strong>EXPENDITURE</strong></th>
<th>$</th>
<th>$</th>
<th>$</th>
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</thead>
<tbody>
<tr>
<td>Salaries</td>
<td>37,938</td>
<td>97,736</td>
<td>135,674</td>
</tr>
<tr>
<td>Visitors Travel</td>
<td>0</td>
<td>21,484</td>
<td>21,484</td>
</tr>
<tr>
<td>Consumables</td>
<td>0</td>
<td>3,049</td>
<td>3,049</td>
</tr>
<tr>
<td>Equipment and Repairs/Maintenance</td>
<td>1,208</td>
<td>3,056</td>
<td>4,264</td>
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<tr>
<td>Services and Utilities</td>
<td>24</td>
<td>20,034</td>
<td>20,058</td>
</tr>
<tr>
<td>Contributions to External Organisations (note 2)</td>
<td>0</td>
<td>3,000</td>
<td>3,000</td>
</tr>
<tr>
<td>Internal service</td>
<td>0</td>
<td>4,375</td>
<td>4,375</td>
</tr>
<tr>
<td>Student costs: Printing /accommodation (note 3)</td>
<td>10,258</td>
<td>38,455</td>
<td>48,713</td>
</tr>
<tr>
<td></td>
<td>2,346</td>
<td>200,683</td>
<td>203,029</td>
</tr>
<tr>
<td><strong>Total Expenditure</strong></td>
<td>51,774</td>
<td>391,872</td>
<td>443,646</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th><strong>OPERATING MARGIN</strong></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>53,019</td>
<td>(126,282)</td>
<td>(73,263)</td>
</tr>
<tr>
<td>2010</td>
<td>10,898</td>
<td>63,917</td>
<td>10,898</td>
</tr>
<tr>
<td><strong>CLOSING BALANCE at 31 December 2011</strong></td>
<td>63,917</td>
<td>(62,365)</td>
<td>(62,365)</td>
</tr>
</tbody>
</table>

**Notes:**

1. Internal funds from Messel Endowment transferred to ISS accounts as follows:
   (i) 1st transfer in 2010 - $97,000
   (ii) 2011 Final transfer was made on 30th January, 2012 - $68,500. This amount if included in the 2011 accounts would have made a material change to Total Income, Operating Margin and Accumulated Funds Closing Balance. Therefore an Adjusted 2011 Statement of Income is presented below:
36th Professor Harry Messel International Science School

Adjusted Statement of Income and Expenditure

1st January 2010 to 31st December 2011

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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</tr>
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<tr>
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<td>1,818</td>
<td>16,714</td>
<td>18,532</td>
</tr>
<tr>
<td><strong>Total Income</strong></td>
<td>104,795</td>
<td>334,090</td>
<td>438,883</td>
</tr>
<tr>
<td><strong>Total Expenditure</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>51,774</td>
<td>391,872</td>
<td>443,646</td>
</tr>
<tr>
<td><strong>OPERATING MARGIN</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accumulated Funds as at 1st January 2010</td>
<td>53,019</td>
<td>(57,782)</td>
<td>(4,763)</td>
</tr>
<tr>
<td></td>
<td>10,898</td>
<td>63,917</td>
<td>10,898</td>
</tr>
<tr>
<td><strong>CLOSING BALANCE at 31 December 2011</strong> (note 4)</td>
<td>63,917</td>
<td>6,135</td>
<td>6,135</td>
</tr>
</tbody>
</table>

2. Contribution to The Young Scientists of Australia.
3. Student accommodation costs at the Women's College, Sydney University.
4. After adjusting for the 2011 Final transfer from Messel Endowment the Accumulated Funds Closing Balance as at 31 December 2011 is represented by:

<table>
<thead>
<tr>
<th></th>
<th>31 December CY2011 $</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reported Accumulated Funds Closing Balance as at 31 December 2011</strong></td>
<td>(62,365)</td>
</tr>
<tr>
<td>Add: 2011 Final transfer from Messel Endowment</td>
<td>68,500</td>
</tr>
<tr>
<td><strong>Adjusted Accumulated Funds Closing Balance as at 31 December 2011</strong></td>
<td>6,135</td>
</tr>
</tbody>
</table>

Professor Trevor Hambley
University Foundation Officer

17th May, 2012
Joelene’s one of world’s top science student

A STUDENT from Noonamah has beaten international competition to win a coveted science prize.

Joelene Puntoriero (pictured) was among 150 of the world’s top secondary school science students who attended this year’s Professor HarryMessel International Science School (ISS) at the University of Sydney. The Taminmin College student won the Mulpha Leadership Award, given by ISS scholar showing ‘diplomacy across all cultures and an ability to bring people together’.

She was ‘surprised and delighted’ to win the award.
Camp sets science buff on geology career path

SHE doesn’t need much motivation but Sarah Coughlin’s time at the International Science School earlier this month was “overwhelming”.

The 17-year-old Nanango State High School student, who has made waves in the science and mining sector for several years, was one of five Queensland high school students selected to attend the 14-day camp at the University of Sydney.

She said it has given her even more incentive to pursue a career as a geologist.

“We had the top scientists from their fields lecturing us – it was inspiring,” Ms Coughlin said.

“There were 143 people from around the world there and we all stayed at the Women’s College at the University.”

Each day Ms Coughlin and her peers would listen to lectures, tour the campus and soak up every bit of science they could.

“Most of what the experts would say was overwhelming but it was so good to know that there are opportunities to travel the world doing what they do,” she said.
Joelene is tops with coveted Mulpha Leadership Award

Joelene Puntoriero from Noonamah near Humpty Doo, Northern Territory, has been awarded the coveted Mulpha Leadership Award at the University of Sydney.

Joelene was selected from 150 of the world’s top secondary school science students who are currently attending the renowned Professor Harry Messel International Science School held in the School of Physics this week.

Mulpha’s Chief Financial Officer, Mr Greg Dyer, presented Joelene with the Award at a special University of Sydney ISS Gala Reception held last week.

Joelene’s citation read: “Joelene has been selected for her warmth, grace and poise, inclusive nature, working well with others, quietly confident style of leadership and for rising to the occasion and engaging with others.”

Mulpha Australia donated $1 million to the free science education program and inaugurated the Award in 2004, stating it should be presented to the ISS scholar who has shown not only a good understanding of science but who has also shown diplomacy across all cultures and an ability to bring people together i.e. a good global citizen.

A student at Taminmin College in Humpty Doo, Joelene said she was “surprised and delighted” to win the award.

Eight Indigenous science scholars attended the ISS2011. The Year 11 and 12 students earned their places at the science education program through academic performance, interviews and essays and have explored everything from photonics to particle physics to astronomy and beyond as part of the 36th Professor Harry Messel International Science School (ISS) – Light and Matter which is funded by the Science Foundation for Physics and run in the School of Physics, the University of Sydney.

The ISS honours excellence in outstanding science students and aims to encourage the talented scholars to pursue careers in all areas of science.

The ISS scholars attend from all over Australia, China, India, Japan, Malaysia, New Zealand, Thailand, the UK and the USA and have taken part in a variety of science activities and challenges.

Some of the ISS2011 speakers include Julius Sumner Miller Fellow, Dr Karl Kruszelnicki; the invisibility pioneer, Professor Sir John Pendry and Professor Allan Clark, Director of Dept. of Nuclear Science and Particle Physics at the University of Geneva; well-known astronomer, Professor Fred Watson, and ABC science journalist, Robyn Williams AM.
Winner of the coveted Mulpha Leadership Award, Joelene Punteriero (left) with Mulpha’s Chief Financial Officer, Greg Dyer. Photo supplied by Chris Bennett Photography, Sydney.
Indigenous students win record number of science school scholarships

Story and image provided by Kathryn Kenny

The eight Indigenous Science Scholars attending this year’s 36th Professor Harry Messel International Science School is the largest cohort of Indigenous students to attend the event in its 49-year history.

The school, held at the University of Sydney, is a biannual event that attracts elite science students in the final years of high school from around the world. Funded by the Science Foundation for Physics at the University’s School of Physics.

Since 2005 at least five places have been offered to Indigenous Science Scholars attending the ISS to encourage them to go on to tertiary study and work in science-related areas.

Professor Clive Baldock, Head of the School of Physics, was behind this year’s increase in Indigenous student places. He said it is important to ensure talented Indigenous students are acknowledged and encouraged.

“We are very enthusiastic in the School of Physics to increase the number of Indigenous students studying science," he said. “This will be a wonderful opportunity for the eight students who will be attending the International Science School.”

The eight Year 11 and 12 students from across Australia will explore everything from photonics to particle physics, astronomy and beyond as part of the ISS2011 school, which has the theme Light & Matter. The scholars will spend two weeks on the beautiful Sydney campus, learning about the diversity of science while making new friends from different cultures and countries.

Rebekah Raymond, an Indigenous graduate of the 2009 International Science School and current science undergraduate at the University of Sydney, will be an ISS2011 ‘staffie’ – an ISS alumni who volunteer to mentor current students and help them with the tertiary level science.

“The ISS changed my life,” she said. “After the ISS2009 I went back to Humpty Doo and focussed on doing the best I could to get into Sydney Uni. Now I’m here and it’s great. I tell my brothers and friends back home to work hard so their dreams will come true too.”

One hundred and fifty ISS scholars from Australia, China, India, Japan, Malaysia, New Zealand, Thailand, the UK and the USA will attend the ISS2011. They will take part in a variety of activities and challenges all planned to help these talented students realise their scientific potential.

Outstanding scientists donate their time to lecture to these top students. Some of the ISS2011 speakers include Julius Sumner Miller Fellow Dr Karl Kruzelinski AM, the invisibility pioneer Professor Sir John Pendry, and the Director of Department of Nuclear Science and Particle Physics at the University of Geneva, Professor Allan Clark.

Well-known astronomer Professor Fred Watson will be presenting a lecture to scholars, as will ABC science journalist Robyn Williams AM. ISS lectures will be podcast from August 2011.

The Professor Harry Messel International Science School, created in 1962 by Professor Harry Messel, is a free science education program.
Scholars Jackson Read, Joeline Puntoriero, Courtney Theseira, and Nick Radoli with Phil Dooley, centre, from the Physics Department University of Sydney. Image supplied.
Science excites top-flight talent

Shery Demian

AFTER attending space academy at the US Space and Rocket Centre in Alabama last year, Tegan Hudson can’t shake off her love for science.

The 16-year-old student from William Carey Christian School in Prestons is considering a career in the field.

She spent the school holidays at the University of Sydney after being accepted into the International Science School program.

The theme for this year’s participants is Light and Matter.

The program runs for two weeks until July 16 and Tegan has been living on campus during that time.

She said she was extremely excited when she received the acceptance letter from the University of Sydney.

“I can’t wait to hear from the many renowned lecturers on topics ranging from metamaterials and invisibility to quantum science,” she said.

“It will be a wonderful way to [build] my passion for science and bring this back to the school to share with my equally passionate physics teacher.”

The program, run by the Science Foundation for Physics within the University of Sydney, has a 45-year history. It is run once every two years.

Loves it: Tegan Hudson is getting her head into all matters science.

There are 140 students selected to participate from Australia, China, Japan, India, Malaysia, New Zealand, Singapore, Thailand, Britain and the US.

Students attend workshops and lectures by leading scientists on many topics including geology, psychology, astronomy, quantum computation, green chemistry and plasma physics.

Students in year 11 and 12 are selected on academic merit in science.
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Promising career: Tegan Hudson loves her science

Budding scientist

Shery Demian

AFTER attending the space academy in the US last year, Tegan Hudson can’t shake off her love for science.

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The theme for this year’s participants was “Light and Matter”.

Tegan said she was “extremely excited” when she received the acceptance letter from the University of Sydney. The program, run by the Science Foundation for Physics in the university, started 45 years ago and runs every two years.
Science school not just hot air

It is not every day high school students get to rub shoulders with the likes of media science guru Dr Karl Kruszelnicki.

About 150 of the world’s top high school students, including Port Macquarie’s Matthew Alger, did just that.

They attended the Professor Harry Miesel International Science School (ISS) during which the group had lectures on subjects as diverse as the “invisibility cloak” and the motion of tectonic plates.

The students won scholarships to the international science school held at the University of Sydney’s School of Physics.

The prestigious science school ended on Saturday.

“It is an interesting and awesome experience,” Matthew said.

“Everything is new and it’s always a challenge.”

The international science school honours excellence in outstanding science students and encourages students to pursue careers in all areas of science.

Students took part in scientific activities, guided tours and got hands on with science.

Dr Karl Kruszelnicki was among the guest lecturers.

International science school manager Dr Chris Stewart said it was really important to be a good global citizen and encourage such talented science students to pursue careers in science and related areas.

Matthew, 15, wants to pursue a science-related career.

The year 11 Port Macquarie High School student attended Melbourne’s Monash University in January this year for a biology summer school.

He is studying a pathways to university unit in psychology at The University of New England through distance education.

Matthew completed his Higher School Certificate in biology last year.
Science the drawcard for top scholars

A RECORD eight Indigenous Science Scholars are attending this year’s 36th Professor Harry Messel International Science School. The school, held at the University of Sydney, is a biannual event that attracts elite science students in the final years of high school from around the world. Funded by the Science Foundation for Physics, it runs until tomorrow at the university’s School of Physics.

Since 2005 at least five places have been offered to indigenous science scholars to encourage them to go on to tertiary study and work in science-related areas.

School of Physics Head Professor Clive Baldock was behind this year’s increase in indigenous student places. He said it was important to ensure talented Indigenous students were acknowledged and encouraged.

“We are very enthusiastic in the School of Physics to increase the number of Indigenous students studying science,” he said.

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SCIENCE ON HOLIDAY DIARY

SENIOR students from Iona Presentation College are getting involved in science during the July school holidays. Year 12 student Ella Guidice has been invited to attend the 2011 Professor Harry Messel International Science School (ISS) in NSW to take part in a two-week residential symposium at the University of Sydney, run by the Science Foundation for Physics. Fellow students Katrina Maller, Eleanor Maller and Kassia Ralston are attending the WA School of Mines’ Focusing on Mining Camp in Kalgoorlie.
Science really matters

CARRINGTON student Aaron Lowth has joined 145 other budding scientists from around the world for an international science school in Sydney.

The 18-year-old year 12 Callaghan College Jesmond student is living at the University of Sydney until the end of next week for the Light and Matter International Science School at the University of Sydney.

College principal June Hingston said Mr Lowth was a member of the student representative council and college council.

"He has demonstrated outstanding leadership skills and is an outstanding role model, inspiring other Aboriginal students," she said.

The science school is a free, biennial educational program which honours excellence in talented year 11 and 12 students and encourages them to pursue careers in science.

By day, the scholars attend lectures by leading scientists from Australia and overseas on topics ranging from meta-materials and invisibility cloaks to plasma thrusters for space travel, motion of tectonic plates to the collective behaviour of animals and from the discovery of the smallest subatomic particles to the origins of the universe itself.

They also take part in scientific activities such as a science and engineering challenge, take guided tours of scientific laboratories and the university's museums and get hands-on experience with some seriously amazing science.

"Aaron wants to pursue a career in science, so this international school is a wonderful opportunity for him to follow his dream and to meet with like-minded young scientists from different cultures and countries," Ms Hingston said.
Powering forward: Hung Phat Duong, of year 11, is one of 149 students from around the world to participate in the prestigious Professor Harry Messel International Science School at the University of Sydney these school holidays.

Picture: Wesley Loevogian

Love of science pays off

By Jenna Darocy

IN JUST two years since arriving in Australia, year 11 student Hung Phat Duong has powered forward in a range of activities.

From running publicity for his school's Rock Eisteddfod team, to coming second in his year group in English — a language he barely spoke when he arrived — the Cabramatta High School student has a proven flair for communication.

But it's in science where his real passion and talent shine, particularly in physics.

His talent has won him a scholarship at the prestigious Professor Harry Messel International Science School at the University of Sydney.

Only 149 students from around the world passed the tough selection criteria to take part in the two-week course.

"I was so excited at the idea of going and when I found out, I was just speechless," Hung said.

"I put a lot of effort into my application, but I never thought I would be selected. I love science because I'm interested in the universe and how the world around us was created. I like experiments too — I just like all of science."

Hung studies biology, chemistry, physics, maths extension 1, Vietnamese and English, but is keeping his post-school options "pretty open."

"I don't want to miss out on trying anything," he said.

He names geography, psychology or forensic science as possible future careers.

During the course, Hung will have lectures from professors in different fields from around the world and meet other young scientists in a range of activities, experiments and excursions.