Forest Stewardship Council (FSC®) is a globally recognised certification overseeing all fibre sourcing standards. This provides guarantees for the consumer that products are made of woodchips from well-managed forests, other controlled sources and reclaimed material with strict environmental, economical and social standards.
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What is Science Alliance?

Science Alliance is the outreach arm of the sciences at the University of Sydney.

For years we have been running public events, programs for high schools and primary schools and promoting science through our many ambassadors.

We hope you will join us for one or many of our exciting and educational events or programs in 2016!
What is Science Alliance?
High school programs

- sydney.edu.au/science/outreach/high-school

Sydney Science Experience
Have you ever found yourself questioning the science behind CSI and NCIS? Are you interested in the psychology involved in Criminal Minds? Are you fascinated by Sci Show, Veritasium and Vsauce on YouTube? If you’re a natural problem solver and enjoy exploring a case from every angle, the Sydney Science Experience is the only place you need to be in January.

Come and give us your best Sherlock impression as you help solve a murder mystery on campus. You will employ real science – through hands-on laboratory sessions and interactive lectures – to solve this crime. You will work with your fellow detectives to interview suspects and collect evidence against them.

Gifted and Talented Discovery Program
If you’re fascinated by science and want to go beyond what you cover at school, the Gifted and Talented Discovery Program is for you. As a talented high school science student in Year 9 or 10, you will enjoy additional challenges and stimulation in the areas of biology, chemistry and physics in this three-day workshop. You will have the opportunity to engage with University teaching staff and current researchers, access first-class facilities and make friends with people who have a mutual interest in science.

To be eligible for participation in the July workshop, you must first sit an entrance exam when you are in Year 8 or 9. The exam aims to test the your ability in the areas of biology, chemistry, physics and general processes. If your result is in the top 10-15% of the cohort you will be invited to participate in the program. The exam is to be organised by your classroom teacher and is sat in November each year.
Mega Maths Day
No matter what you choose to do in the future, maths will be a part of it: from maths models that help you predict which latest fashion items will sell out, to calculations that allow you to build bridges, to statistics that show you what people think of your business, to computations that help you understand diseases.

Discover how maths is involved in pretty much every area of life at Mega Maths Day. Year 10 is a key time when you are choosing your future direction, so this day is an opportunity to find out just how important a solid background in maths is for a huge array of disciplines and careers. Be inspired by how your maths studies will open doors for you in the future during this Mega Maths Day full of workshops showcasing the importance of maths in a variety of settings.

Mega Maths Day will show you how magnificent, marvellous and monumental maths is!

Camden Open Day
Explore the fascinating world of agriculture, environment, science and veterinary science at the University of Sydney’s Camden Open Day. Do hands-on workshops, hear captivating talks and meet scientists conducting cutting edge research, plus be entertained by amazing science with a talk by Dr Karl Kruszelnicki!
**Sleek Geeks video conference**

Join the Sleek Geeks, Adam Spencer and Dr Karl, and our 2016 Sleek Geeks Science Eureka Prize finalists to view the winning films and hear from the students themselves about how they developed and produced their films.

This event will showcase some fascinating science, provide an insight into science communication and offer insider tips that might just help you excel in next year’s competition.

For more information about the Sleek Geeks Science Eureka Prize see the competitions section of this brochure.

**Spectacular Science**

Take a journey into the fascinating world of science, with a day trip to Spectacular Science. Do hands-on science activities and meet real scientists who’ll share what they are discovering about the world around us.

Designed for high school students from Years 7 to 11, Spectacular Science will engage and spark your interest in the huge diversity of science. Experience firsthand some of the intriguing and important areas that scientists are working in and spend a spectacular day submerged in science.

**Dr Karl Kruszelnicki**

Dr Karl Kruszelnicki, author and Triple J science presenter, is also the Julius Sumner Miller Fellow in the School of Physics at the University of Sydney. Why not catch a free Dr Karl ‘Great Moments in Science™’ talk during your next University of Sydney visit? Excellent for motivating students about science. Or, if you can’t get to Sydney, Karl is also using Skype to beam into classrooms across the world!
CAASTRO in the classroom
Reach for the stars without even leaving the classroom.

Astrophysicists from the ARC Centre of Excellence for All-sky Astrophysics (CAASTRO) will be beamed into your classroom via videoconferencing to share with you the secrets of how the universe works.

The content is aligned with the Australian Curriculum Science; the Australian Curriculum Physics; and the New South Wales Physics Syllabus.

CUDOS – photonics
Photonics is the study of light, covering all technical applications of light over the whole spectrum from ultraviolet over the visible to the near-, mid- and far-infrared. It is becoming increasingly important as we reach the limits of electronics in this information age.

Our dedicated postgraduate students at CUDOS (the Centre for Ultrahigh bandwidth Devices for Optical Systems) are ready and willing to visit schools and present some basic science of light that ties in with the NSW science curriculum and the new National Curriculum. The presentations feature a range of interactive demonstrations and the students talk about what it’s like studying physics at University and what career options are available. Visit the CUDOS website for more information.
The National Mathematics Summer School
If you are a gifted or talented young mathematics student, you will enjoy the two-week National Mathematics Summer School, sponsored by the University of Sydney. Held in January each year in Canberra, you will study three topics in higher mathematics, attend guest lectures, plus attend a special lecture at the Australian Academy of Science. Students should be in Year 11 when they apply and are selected and ranked by the mathematics teachers.

Mathematical Enrichment & Mathematical Olympiad
The Australian Mathematical Olympiad Committee offers a variety of activities ranging from correspondence programs to residential schools, run with the assistance of academic mathematicians throughout Australia. These programs, which are presented in a carefully sequenced arrangement of enrichment activities, offer valuable tuition and resources to students. The most gifted students may be selected for more specialised training directed towards the Mathematical Olympiad.

Activities in engineering and information technology
Engineers, project managers and information technology professionals develop innovative, creative and sustainable solutions that promote positive change worldwide.

Throughout the year we invite high school students on campus to experience what it’s all about. You can participate in fun, interactive workshops, challenges and competitions, tour our facilities and talk to our academics and current students about study options, job opportunities and life at the University of Sydney. During the workshops you might get hands-on with the user-friendly microprocessor platform Arduino, create an avatar, build a railway or a prosthetic leg or race in a fuel cell car challenge.
Girls’ Programming Network
The Girls’ Programming Network (GPN) is a programming club developed and run by girls for high school girls interested in learning and/or improving their computing skills. GPN is a unique opportunity to meet other females with similar interests, find a mentor and learn about university life from female university students. The program has been developed and run by female IT students — under the guidance of academics at the University of Sydney. No programming experience is required.

National Computer Science School
The National Computer Science School brings together talented young people for an intensive week of computer programming, robotics, web design and related activities at the School of IT (Faculty of Engineering), University of Sydney. NCSS is a residential school and open to all students in Australia in their penultimate high school year. No programming experience is required.
NCSS Challenge
The NCSS Challenge is a five-week programming competition designed to educate participants about computer science. The Challenge involves participants solving interesting but simplified computational tasks. Unlike existing competitions, the Challenge is designed to cater for both beginners and advanced students. The Challenge will be particularly valuable for science students, mathematics students and computing studies students. No programming experience is required. We teach you how to program as you go along.

MadMaker embedded systems design challenge
MadMaker is a 6-week online course aimed at Year 9 students with a goal to educate them about embedded systems and their use in everyday life. It involves using Arduino Esplora boards to investigate fun and interactive ways to use science, technology, engineering and maths to solve real-world problems. No programming experience is required.
Project management winter camp
Designed for students in years 10, 11 and 12, our two day intensive workshop, held in July, will give you a head start in project management and show you where this dynamic field can take you.

The Paper Pilots
The Paper Pilots are the world’s first educational paper plane sports team! Not only are Dylan Parker and James Norton the inspiration behind the hit Aussie movie Paper Planes but they are touring the country teaching the science of flight through their awesome paper plane workshops. The Paper Pilots offer half or full-day packages to both primary and secondary schools which deliver multiple ‘Flight School’ workshops.

The full-day package can cover up to 240 students and has been developed in consultation with teachers and the new national science curriculum. A visit from The Paper Pilots will serve as an excellent tool to engage students around topics such as Forces, Transport and a variety of other curriculum focuses. The workshops culminate in a variety of hands-on paper plane activities where students demonstrate and refine their understanding of the topics covered while sparking a love for physical sciences.
“What an amazing time to be studying and learning science. In the classrooms and university laboratories of this country, we are building the future for Australia, Asia and the world.”

Adam Spencer, Mathematics and Science Ambassador, the University of Sydney
HSC revision programs

Kickstart Science HSC workshops
If you are an HSC student or teacher, you will benefit from the Kickstart Science Workshops. These workshops are designed to meet the demand expressed by science teachers, as parts of the science syllabus require equipment or expertise in areas that many schools may not be able to provide. These useful and flexible workshops are offered in Biology, Chemistry and Physics.

Biology
Blueprint of Life
Communication
Genetics — the code broken
Biotechnology
The Human Story
Search for Better Health

Chemistry
Production of Materials
Chemical Monitoring and Management
Industrial Chemistry
Shipwrecks, Corrosion and Salvation
Forensic Chemistry

Physics
From Ideas to Implementation
Motors and Generators
Space
Quanta to Quarks
Medical Physics
Preliminary Physics
Space Lecture

– sydney.edu.au/science/outreach/high-school
**Kickstart On The Road**
Kickstart on the Road takes Physics and Biology HSC workshops to regional areas throughout the year. In 2016 we will be visiting Armidale and Dubbo.

**Kickstart in the school holidays**
Kickstart workshops will run during the July school holidays. You can register as an individual student to attend these workshops.

**Agriculture HSC seminar**
Spend a day on valuable revision and case studies of current research for the HSC Agriculture course at the University of Sydney’s Agriculture HSC Seminar. The day revises key concepts in the HSC Agriculture course and provides current examples of research that you can use in the extended response answers. You have the choice of attending the seminar in person on the Camden campus or joining through DART connections.

**University of Sydney & STANSW HSC science revision days**
The Science Teachers’ Association of NSW would like to extend an invitation to all students (and their teachers) preparing for the 2016 HSC Science Exams.

The event brings you together with highly qualified science teachers to prepare you for the Higher School Certificate examinations. Experienced presenters, who have been involved in all stages of the HSC process, will deliver workshops providing you with hints and strategies to enable you to improve your HSC performance.

For bookings and more information on these programs, visit:

- sydney.edu.au/science/outreach/high-school
Jumpstart Your Science Career
Come along to one of our Jumpstart Your Science Career information evenings to hear advice from employers and industry experts from a variety of backgrounds and industries. Jumpstart covers a variety of career pathways and is a great opportunity to network with potential employers as well as get useful advice from our recent graduates.

Science careers website
Considering a career in science? What careers are available? Who employs scientists? How do you prepare for that first interview? How do you get a dream job in science? Visit the Careers in Science website to find answers to these and other questions.

The site contains:
- interviews with real science employers
- case studies of recent graduates
- information about how students can develop their skills while they study
- advice on how to start a CV and portfolio
- portfolio log template to download
- employment links

- sydney.edu.au/science/cstudent/ug/jump/
- sydney.edu.au/science/cstudent/ug/careers/info
Primary school programs

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Museums

Anatomy in the Shellshear Museum
The Shellshear Museum is the only museum dedicated to physical anthropology in Australia and holds collections of human skeletons, other primate skeletons, vertebrate skeletons and casts for the study of human evolution. The museum is open to school groups, in addition to functioning as a teaching collection for the Discipline of Anatomy and Histology and research collections for bona fide researchers. Workshops provide students with a unique opportunity to observe the structure of human skeletons, and compare them with those of primates and our human ancestors through handling bones and casts.

Macleay Museum
The Macleay Museum is a museum of natural history, ethnography and the history of science. Its significant collections, based on the original donation in the 1880s by William John Macleay and later additions, are important for the purposes of historic research and teaching. The Museum offers programs for school visits which focus on various syllabus topics, including science (especially biology and scientific history), history and Aboriginal studies.

Nicholson Museum
The Nicholson Museum is the largest public antiquities museum in Australia with a collection of archaeological artefacts from Egypt, the Middle East, Greece, Italy and Europe. Guided visits to the Nicholson Museum focus on the role of science in archaeology and examining the use of scientific dating methods, conservation practices and precise archaeological recording of ancient materials.

For bookings and more information on these programs, visit:
- sydney.edu.au/science/outreach/high-school
**Sleek Geeks Science Eureka Prize short film competition**
— Win a Share of $10,000!

The University of Sydney Sleek Geeks Science Eureka Prize will be offered in 2016 to primary and high school students nationally. If you have a passion for science and for communicating ideas, then enter this competition by telling a scientific story via a short video piece. We’re looking for the next generation of Dr Karls and Adam Spencers!

The idea is to communicate a scientific concept(s) in a way that is accessible and entertaining to the public while painlessly increasing their science knowledge or, as the Sleek Geeks like to say, “learn without noticing”.


**STANSW Young Scientist models and inventions exhibition**

Come along and be amazed at the ingenuity of NSW school students. The University of Sydney will proudly host the Models and Inventions Exhibition that will be displayed in conjunction with our 2016 Open Day.

Organised by the Science Teachers’ Association of New South Wales, the Young Scientist Awards receives hundreds of amazing scientific investigations and inventions each year from K-12 students. All Models and Inventions entries will be on display with their student inventors present, demonstrating how the working model of their invention works. The exhibition will conclude with the announcement of the winning projects.

If you know a budding young scientist who would like to submit an entry please visit the website.


**NSW School’s Paper Plane Challenge**

The NSW School’s Paper Plane Challenge is a new event on the NSW schools’ calendar. Tens of thousands of students took part in school events around the state in 2015 and over 800 K-12 students qualified for the State finals. The University of Sydney will once again host the 2016 State finals which will be held in conjunction with our Open Day.

Science Teachers’ Workshop

Join our Science Teacher’s Workshop – a professional development course for Year 11 and 12 science teachers. A selection of our sessions will cater for new teachers and those who want to focus on syllabus points, take-home practical activities, notes and lesson ideas; and other sessions will cater for the experienced teacher interested in getting a first-hand taste of the University of Sydney’s current scientific research and inspiring science stories from our academics.

The six disciplines on offer are:

- Agriculture
- Biology
- Chemistry
- Earth and Environmental Sciences
- Geography
- Physics
In addition to all our activities and workshops, we also run many free public events throughout the year, to which schools can make group bookings.

Our free one-hour Sydney Science Forum lectures, held at our Camperdown campus, are featured on the following pages. After some talks we will also feature hands-on activities and demonstrations. Check the website for details.

Follow us on social media to stay up to date on new public events, and visit our website to reserve your seat!

The quantum future: powering the next technological revolution
Presented by Associate Professor Michael J. Biercuk, School of Physics, Australian Institute for Nanoscale Science and Technology, University of Sydney

Whether you know it or not, quantum mechanics powers almost every piece of technology you encounter day-to-day: from LED lights in your home to the microprocessor in your mobile phone. Despite the ubiquity of these technologies, they represent only the first step of what is possible if we harness the full breadth of what quantum mechanics has to offer.

Discover how Associate Professor Biercuk’s work is seeking to control and exploit the strangest phenomena in quantum physics to power a new technological revolution.

Wednesday 2 March, 5:45pm–7pm, Messel Lecture Theatre, Sydney Nanoscience Hub
Short back & science
Presented by Dr Karl Kruszelnicki,
Julius Sumner Miller Fellow, University of Sydney

In Short Back & Science, Dr Karl probes the link between earwax and armpit sweat (and why polyester shirts stink), and why we draw stars as having points (even though stars are enormous spherical blobs without points). Also find out how radioactive you are, how much clouds weigh and whether cows can really make strawberry milk.

Short Back and Science – science has never looked better!

Wednesday 6 April, 5:45pm-7pm, York Theatre, Seymour Centre

2084: how future medicine will create a happier world
Presented by Professor David James,
Charles Perkins Centre and School of Molecular Bioscience, Faculty of Science, University of Sydney

Albert is born on 5 June 2084. At birth a prick of blood is drawn for DNA sequencing of his genome and epigenome. The Wellness App diagnoses Albert’s long term disease risks. Fecal matching is done and Albert is provided with optimal colonisation from a suitable donor.

For the first two years of Albert’s life he is provided with environmental cues matching his DNA profile, ensuring optimal neuronal synapses in the brain for a happy and healthy life. The MedChip is implanted to monitor sleep, food, activity and language. Data is uploaded to the Wellness App providing Albert with constant feedback about his optimal life options.

Unlike the Orwellian view of life, now we have learned how to help people live happier healthier lives. This requires individuals to take control of their own data and their own health for better outcomes. Discover how metabolic systems biology could revolutionise our health by offering precision medicine.

Wednesday 17 August, 5:45pm-7pm, Eastern Avenue Auditorium
Nature’s engineers: how ants, bees and slime moulds are helping us build better cities
Presented by Dr Tanya Latty,
Faculty of Agriculture and Environment, University of Sydney

Can ants build better infrastructure networks than us? Despite having tiny brains, ants build efficient transportation systems, manage complex supply chains, and have effective communication networks. Even brainless slime mould amoebas can design transportation networks that are as efficient as those built by human engineers. Like human designed infrastructure systems, natural systems must stand up to a slew of disruptions from targeted attacks, to traffic jams, to natural disasters. Unlike human designs, natural infrastructure systems have had millions of years to evolve solutions.

Find out about Dr Tanya Latty’s research on ant, bee and slime mould infrastructure systems and how she is working with mathematicians, computer scientists and civil engineers to translate animal and slime mould behaviour into solutions for building better, more resilient human infrastructure systems.

Wednesday 21 September, 5:45pm–7pm
Eastern Avenue Auditorium

Does stress cause cancer?
Presented by Professor Phyllis Butow,
School of Psychology, Faculty of Science, University of Sydney

You may wonder whether stress can increase your risk of cancer: can stressful life events, such as divorce or conflict at work, result in a serious illness like cancer?

A number of studies have investigated this question, with mixed results. Some very large studies, which have followed thousands of people over time, have found that stress does increase risk of cancer, while other similar studies have not. In reality, it is likely that a mix of factors influence risk. Professor Phyllis Butow will reveal the findings from a new Australian study, which involved more than 2000 women, and examined the link between stress and cancer.

Wednesday 19 October, 5:45pm–7pm
Eastern Avenue Auditorium
## Important dates 2016

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<td>Mathematics Summer School</td>
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<td>Sydney Science Experience</td>
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<td>5 February</td>
<td>Sleek Geeks Science Eureka Prize entries open</td>
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<td>19 February</td>
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We hope you will join us for one or many of our exciting and educational events or programs in 2016!

The University of Sydney Science Alliance
sydney.edu.au/science/outreach
E science.alliance@sydney.edu.au