Science Alliance
Programs and Events
2017 edition
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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 2017!
High school programs

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!

International Science School

The International Science School (ISS) is an amazing, all expenses paid two weeks of science at the University of Sydney. Join 140 other top young scientists from Years 11 and 12, from around Australia and across the world, for inspiring talks by leading researchers, tours of scientific labs, hands-on experiments and activities, and a packed social program.

The ISS lectures are given by leading research scientists from Australia and overseas. In addition, the incomparable Dr Karl Kruszelnicki — Julius Sumner Miller Fellow and renowned TV and radio science guru — is a regular ISS guest, presenting some of his ‘Great Moments in Science’™.

Beyond the lecture theatres the ISS gives you a chance to explore real research labs, get your hands dirty on a wide range of experiments and activities, and meet a hoard of like-minded science-mad students from all over the world.

For more information visit:
− sydney.edu.au/science/iss
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!

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.

Sleek Geeks video conference
Join the Sleek Geeks, Adam Spencer and Dr Karl, and our 2017 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.
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!

You can also join Dr Karl and special guests for weird facts and amazing conversation in his latest podcast ‘Shirtloads of Science’:
- bit.ly/shirtloads-apple
- bit.ly/shirtloads-android

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 Ultra-high 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. For more information visit:

- cudos.org.au
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 association in each state.

Mathematical Enrichment and 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 or improving their computing skills. GPN is a unique opportunity to meet other girls 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 (NCSS) brings together talented young people for an intensive 10 days of computer programming, robotics, web design and related activities at the School of IT (Faculty of Engineering and Information Technologies), 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 five-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. This program includes teacher training workshops on demand. For more information visit:

madmaker.com.au
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.

For more information about The Paper Pilots visit:
− www.paperpilots.com.au

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.

To learn more about the winter camp, visit:
− sydney.edu.au/project-management/winter-camp

More information
Learn more about our high school programs and activities at:
− sydney.edu.au/science/outreach/high-school
“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
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
Kickstart on the Road
Kickstart on the Road takes Physics and Biology HSC workshops to regional areas throughout the year. In 2017 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 via videoconference.

University of Sydney and 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 2017 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

More information
Learn more about our HSC revision programs at:
- sydney.edu.au/science/outreach/high-school
Science career info

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 range of career pathways and is a great opportunity to network with potential employers as well as get useful advice from our recent graduates. Find out more at:

- sydney.edu.au/science/cstudent/ug/jump

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:

- sydney.edu.au/science/cstudent/ug/careers/info

The site contains:
- interviews with real science employers
- case studies of recent graduates
- information about how you can develop your skills while you study
- advice on how to start a CV and portfolio
- portfolio log template to download
- employment links
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For more information about the prize see page 18.
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Learn more about The Paper Pilots at:
- www.paperpilots.com.au
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.

More information

For bookings and more information about 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 2017 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”.

For more information and to enter visit:
- bit.ly/sleek-geeks-eureka-prize

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 2017 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:
- sydney.edu.au/science/outreach/competitions/stansw
STEM Teacher Enrichment Academy
The STEM Teacher Enrichment Academy at the University of Sydney offers knowledge, skills, resources and support to enable teachers to make a real change in their classroom teaching of science, technology, engineering and mathematics (STEM) subjects. The Academy is the first of its kind in Australia and is helping to build the nation’s STEM capability by inspiring teachers through enrichment-focused professional development.

The STEM Academy runs BOSTES-accredited residential and non-residential programs for teachers of STEM that focus on themes embedded in the Australian curriculum F-10. Facilitated by the University’s leading academic specialists from the faculties of Education and Social Work, Science and Engineering and Information Technologies, the program aims to provide schools with the opportunity to evaluate teaching and learning practice in secondary education.

Participation in the program is through partnerships with schools. Becoming a partner school brings benefits to teachers, students and your school as a whole. It creates the best opportunities for new classroom approaches to emerge by:

- enriching your teachers’ knowledge of content and pedagogy and inspiring them to develop STEM units of learning within and across disciplines
- introducing and supporting exciting and effective approaches to learning
- developing a community of practice for teachers, with ongoing support and engagement through mentoring, online forums, newsletters, seminars and events
- opening opportunities for your students to learn more about STEM-related research and programs at the University, and STEM career pathways.

For more information about the program visit:
- sydney.edu.au/stem/academy
Events

In addition to our activities and workshops, we also run many free public events throughout the year, to which schools can make group bookings.

**Sydney Science Forum**

Our free one-hour Sydney Science Forum lectures give you an opportunity to hear about the latest scientific research, ideas and innovations from our brightest scientific minds. In addition to our regular series of lectures at the Camperdown Campus, we’re excited to be bringing the Sydney Science Forum to Westmead for the first time in 2017.

After some talks we also feature hands-on activities and demonstrations where you can experience science in a way that’s informative and fun.

Full details of our 2017 program will be available in early 2017. Follow us on social media to stay up to date on new public events, and visit our website to reserve your seat!

- sydney.edu.au/science/outreach/whats-on
- facebook.com/SydneyScience
- twitter.com/Sydney_Science
- instagram.com/Sydney_Science
Meet our 2017 presenters

Dr Michael Bowen
School of Psychology
Wednesday 22 March
5.45 – 7pm
Eastern Avenue Auditorium
Camperdown Campus

Professor Ben Eggleton and
Dr Andrea Blanco Redondo
Centre for Ultrahigh bandwidth Devices for Optical Systems (CUDOS) and School of Physics
Wednesday 26 April
5.45 – 7pm
Westmead Campus

Dr Karl Kruszelnicki
Julius Sumner Miller Fellow, University of Sydney
Wednesday 7 June
5.45 – 7pm
York Theatre, Seymour Centre
Dr Camilla Whittington
School of Life and Environmental Sciences
Wednesday 16 August
5.45 – 7pm
Eastern Avenue Auditorium
Camperdown Campus

Professor Dietmar Müller
School of Geosciences
Wednesday 20 September
5.45 – 7pm
Eastern Avenue Auditorium
Camperdown Campus

Associate Professor Dieter Hochuli
School of Life and Environmental Sciences
Wednesday 18 October
5.45 – 7pm
Westmead Campus

Dr Alice Williamson
School of Chemistry
Wednesday 25 October
5.45 – 7pm
Eastern Avenue Auditorium
Camperdown Campus
Sydney Astrofest

After the hugely successful inaugural Sydney Astrofest in 2016, we are excited to announce that the University of Sydney and the ARC Centre of Excellence for All-sky Astrophysics (CAASTRO) will again be hosting Sydney Astrofest in 2017.

Together with other Australian research organisations, science outreach initiatives, astronomy societies and many others, we have designed an exciting program for an entire evening of free indoor and outdoor entertainment, suitable for all the family, including:

- night-sky telescope viewing
- awesome astronomy talks
- planetarium shows
- expert interactive activities and demonstrations
- prizes to win

More information about Sydney Astrofest 2017 will be available in early 2017.
Important dates 2017

5 January
University of Sydney Info Day 2017

8 to 21 January
National Mathematics Summer School

11 to 13 January
Sydney Science Experience

3 February
Sleek Geeks Science Eureka Prize entries open

24 February
Careers Advisers and Teachers Day

5 May
Sleek Geeks Science Eureka Prize entries deadline

9 to 10 May
Kickstart on the Road Armidale

30 to 31 May
Kickstart on the Road Dubbo

Early June
Year 10 information evenings

14 June
Mega Maths Day

15 June
Agriculture HSC Seminar

16 June
Camden Open Day

2 to 15 July
International Science School

3 July
Physics Kickstart School Holiday Program

4 July
Biology Kickstart School Holiday Program

5 July
Chemistry Kickstart School Holiday Program

3 to 5 July
University of Sydney and STANSW HSC Science Revision Days

11 to 13 July
Gifted and Talented Discovery Workshop

12 to 20 August
National Science Week

26 August
University of Sydney Open Day 2017

22 to 23 November
Spectacular Science
We hope you will join us for one or many of our exciting and educational events or programs in 2017!

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

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