

STANSW YOUNG SCIENTIST AWARDS

Virtual Presentation Ceremony Awards Booklet

Monday 16th - Thursday 19th November 2020



Connecting school and society through the active promotion of Science, Technology and Mathematics

STANSW Young Scientist Awards:

**A major project of the
Science Teachers Association of New
South Wales**



Program

Monday 16th November - 7pm

Welcome message

Anjali Rao, STANSW Young Scientist Awards Coordinator

Presentation of Awards

STANSW Scientific Investigations - Primary

STANSW Scientific Investigations - Secondary - Biology

Australian Society for Biochemistry and Molecular Biology (ASBMB)
Award

STANSW Scientific Investigations - Secondary - Chemistry

Royal Australian Chemical Institute (RACI) Chemistry

Encouragement Award

National Measurement Institute (NMI) Awards - Science

Tuesday 17th November - 7pm

Welcome message

Ann Hanna, STANSW Young Scientist Awards Committee

Presentation of Awards

STANSW Scientific Investigations - Secondary - Earth &
Environmental Science

Primary Environment Award

STEP Environment Award

STANSW Scientific Investigations - Secondary - Physics

AARNet (Australia's Academic and Research Network)

Communications Awards - Science

Australian Institute of Physics (AIP) Most Outstanding Physics
Award

Rowe Scientific Depth Study Awards

Wednesday 18th November - 7pm

Welcome message

Firth Garth, STANSW Young Scientist Awards Committee

Presentation of Awards

OSHClub (Primary) Inventions and Innovation Awards

Secondary Innovations and Engineering Design Awards

AARNet (Australia's Academic and Research Network)

Communications Awards - Technology

National Measurement Institute (NMI) Awards - Technology

Sebel Testing Awards

STANSW Most Promising Awards

Thursday 19th November - 6pm

Welcome message

Daisy Kong, STANSW Young Scientist Awards Committee

Presentation of Awards

MANSW Working Mathematically Awards
AARNet (Australia's Academic and Research Network)
Communications Awards - Mathematics
National Measurement Institute (NMI) Awards - Mathematics

Thursday 19th November - 7pm

Message from the President

Margaret Shepherd, Science Teachers Association of NSW

Presentation of Awards

Australian Water Award
NSW Student Nominees for the 2021 BHP Foundation Science and
Engineering Awards - Primary and Secondary
NSW Nominee for the 2021 BHP Foundation Science and
Engineering Teacher Award
Budding Young Scientist (K-2)
Primary Young Scientist (3-6)

Keynote Address

Dr. Cathy Foley, Chief Scientist, CSIRO and
Chief Scientist, Australia (January 2021)

Announcement of Grand Awards

Broadcom Honourable Mention
Broadcom Representative to 2021 (virtual) Broadcom Masters
Program
ISEF Finalists
Young Scientist of the Year

Acknowledgement of Country

We at the Young Scientist Awards would like to pay our respects to the Traditional Custodians of this land on which we work, learn and live. We recognise Country includes but transcends land and borders, being both belongingness and a way of being.

Recognising this, we pay our respects to Aboriginal peoples past, present and to those of the future who are our knowledge holders and teachers. As we share information, teaching, and learning, we remember to appreciate and value the knowledge embedded forever within the Aboriginal custodianship of Country.

Message from the President



This year COVID-19 cannot stop us. Whilst we will miss attending our amazing awards ceremony in person, we still continue to acknowledge and celebrate the very talented young scientists who are the best of 855 entries into the Science Teachers' Association Young Scientist Awards Program for 2020. All students in NSW have access to this competition and we

are very happy to see entries from all school sectors and both girls and boys. We commend all the teachers of these schools for their commitment to their students and passion for scientific research.

The Science Teachers' Association of New South Wales is very proud to have this amazing state program that truly incorporates all STEM subjects and brings together the professional teaching associations. As President of the Association, I would like to acknowledge and thank our Young Scientist committee and its hard working convenor, Anjali Rao. This is the third year Anjali has committed to being convenor of this project for the Association. There are also a large number of sponsors of our YS program that support this STEM initiative and I would like to thank them for their commitment to the future scientists of Australia. There are also hundreds of teacher and non-teacher volunteers that are required for this ongoing initiative to succeed so well and the program could not occur without their support.

Can I request all schools consider sending a teacher along to gain experience judging the student projects? It is a wonderful accredited professional learning opportunity, through which teachers can read for themselves some of the amazing research projects being developed by high calibre students across the state. So next year when the judging notice is sent out, think about coming along. You will be impressed.

So congratulations to all students who reached this level of the YS Awards. That is an achievement itself. Congratulations also to the winners. Well done.

Best wishes from STANSW
Margaret Shepherd President 2020

STANSW Young Scientist Committee

The STANSW Young Scientist Committee is a group of dedicated volunteers who work to develop innovative STEM strategies for supporting NSW teachers.

Anjali Chandrasekar-Rao (Coordinator)

Leonard Cheung

James Cleaver

Firth Garth

Stuart Garth

Ann Hanna

Edwina Hine

Daisy Kong

Matt McKenzie

Philippa Miller

Elizabeth O'Connor

Sian Ware

ISEF Judging Panel

The ISEF Panel is a highly experienced judging panel, who review the top 20+ projects and select the STANSW Young Scientist of the Year and the finalists for the International Science and Engineering Fair.

Dagmar Arthur McCloughan (Judging Chair)

Dr Melissa Thompson (Science Education Expert)

Associate Professor Kerry Hitos (Biomedical Scientist)

Sandra Woodward (Science Educator-Physics)

James Cleaver (IBM)

Stuart Garth (SRC Chair)

Message from the Coordinator

What an incredible year 2020 has been for our country and for the whole world. The challenges of the global pandemic to the way we live, work and learn meant we had to adapt at every stage to a new normal this year.

After months of supporting our ISEF 2020 finalists to refine and finalise their projects, we switched to helping them prepare for a virtual experience online. Our wonderfully talented students continued to make their mark in this format as well (See Stuart Garth's description below). ISEF 2021 has already been announced as a virtual (competitive) fair and we look forward to working with our team over the next six months.

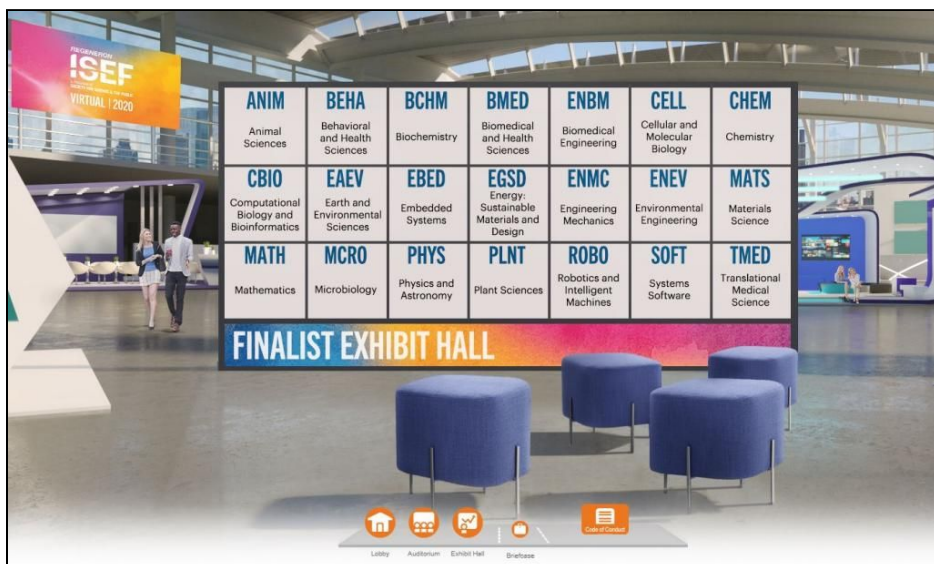


We were also overwhelmed by the number of entries we received this year despite the very real challenges all students would have faced because of the lockdown earlier in the year and COVID-19 restrictions. In a year when the role of science and the advice and counsel of well informed scientists has been so significant in our lives, the commitment that the students have shown in persevering with their investigations, design projects or inventions has been so heartwarming to see. The Young Scientist Committee would like to congratulate and commend each and every one of our participants. It is also a mark of the times that so many projects had an environmental concern at their core.

Our hard working committee has also demonstrated creativity and adaptability in meeting the challenges of an entirely online program. Along with the rest of the education system, we have moved relatively seamlessly to a virtual world which has brought some wonderful benefits with it. We have been so pleased to welcome many more of our rural and regional colleagues to the judging teams now that distance from Sydney is no longer a barrier. My thanks to all of the members of the committee as well as the executive committee of the STA NSW for their support and encouragement. Lastly, I would like to acknowledge the work of Lachlan Bolton - multiple YS award winner and ISEF Finalist 2018, in putting together our online awards presentation.

Anjali Rao
STANSW Young Scientist Awards Coordinator 2020

NSW Young Scientists make Virtual Impression! ISEF 2020



ISEF 2020 ended up being a virtual event. Our 9 Young Scientist ISEF finalists took part in a week-long virtual event which included an Opening Ceremony and a Finalist Exhibit Hall, where all of our projects were on display for a few weeks. All of their official abstracts can be found on the [ISEF Archives](#) webpage by clicking on Australia, "2020 Virtual ISEF" and "All Abstracts Matching Criteria" to see our 9 Young Scientist and 5 BHPFSEA ISEF finalists.

The highlight of the week was a number of panel discussions where panellists answered three to eight video-recorded questions that were chosen from the 1200 finalists. Our Young Scientist team was very well represented with Eleanor Clifton-Bligh, Emma Leggett-Budden having a question selected and Molly Dixon had two separate questions selected for different panels. Eleanor's question which related to the COVID-19 virus highlighting the challenges of globalisation was discussed for 13 minutes by Nobel Prize Laureates on the Excellence in Science & Technology Panel.

Presentation Night 1: Monday 16th November

Category Awards

STANSW Scientific Investigations K-2

Marlow Headley, St Joseph's Primary School East Maitland, *How Does Location Affect Rainfall?*

Marlow lives in a little village called Fishermans Bay but goes to school in East Maitland which is about an hour away. He noticed on some days it was windy and rainy at home but at school it was sunny and calm. Marlow measured rainfall from a number of locations and found that obstacles do affect how much rain falls on the ground and that trees are the best rain shadows.

Maddison Holden, St John Bosco Catholic Primary School, *How can I get Clean Water from Dirty Water?*

Maddison wanted to see if there was a way to clean dirty water using cheap or natural materials. She filtered water with rocks, sand and charcoal separately but when she layered them she got a better result however the water was still not clear. She found that adding a coffee filter ensured that the water came out clear however this system did not kill bacteria.

Romilly Merani, PLC Sydney, *My Marvellous Mucus Project*

Romilly investigated how water temperature and the concentration of salt affected how well nasal irrigation worked. She used slime and a metal grid to model mucus and the sinuses. She concluded that a temperature of 40°C with two packets of nasal irrigation would be best for a sinus rinse for nasal mucus however for safety reasons this was not appropriate.

Sebastian Sun and Antony Merritt, Highfields Preparatory and Kindergarten School, *Float vs. Sink*

Sebastian and Antony decided to investigate which items and materials sink in a range of different liquids to find out whether the liquid matters in terms of how well something floats. Among other things they concluded that bubbles in a liquid help to keep objects from sinking and salt makes things float better.

Allegra Tsoupis, PLC Sydney, *Curly, Whirly Soccer Ball*

Allegra investigated four different factors to see if they changed the way a soccer ball curled. She concluded that to get the best curl you should wear soccer boots, kick the ball in the middle on the laces part of the boot, kick at medium strength and with a ball that is pumped up hard.

Cate Yuen, PLC Sydney, *Growing Plants with Grey Water vs Tap Water*

Cate was curious to investigate whether there were any differences in growing plants from seeds, when watered with tap water compared to when watered with grey water from showers which contained soap and shampoo. She concluded that seeds will still germinate and plants will grow in both tap water and grey water, but plants watered with tap water will grow faster and taller.

STANSW Scientific Investigations 3-4

Zoe Alt, Castle Cove Public School, *Kids in Lockdown Survey*

Zoe designed a survey for kids to find out if they were happier or less happy in lockdown and if their activity levels changed. Her findings included that kids played a lot less sport but they did more walking and cycling, girls were more likely to miss being at school and girls were more likely to worry about themselves or their families getting sick.

Karmichael Candra, Redeemer Baptist School, *Ripeness After Harvest?*

Karmichael's investigation aimed to determine whether the sweetness, and skin colour, of red and green table grapes changed after they were removed from the vine. He found that the skin colour darkens and the darker the skin colour of the grapes, the sweeter they will be.

Hannah Chalmers, PLC Sydney, *Stormwater - It Bugs me!*

Hannah wanted to find out if water quality and water flow, and waterbug biodiversity was better in naturalised stormwater canals than non naturalised stormwater canals. She found that waterbug biodiversity is better in naturalised stormwater canals than non naturalised stormwater canals and that water flow was significantly slower in naturalised canals.

Lucius Figueira, Redeemer Baptist School, *On a mission to clean the kitchen ... Where do I start?*

Lucius wanted to find out where the cleanest and dirtiest places were in his kitchen. He found the dirtiest surface was the kitchen sink and the cleanest surface was the stove. The most bacteria was found in the sink and the most fungi was found on the bench and on the floor. The surface that contained the most different species of microorganisms was the kitchen floor.

Anabelle Green, Northern Beaches Christian School, *Culturing Clean Classrooms and Clearing the Colonies*

Anabelle was interested in exploring which parts of her school classroom had the most germs and whether antibacterial wipes helped to kill the germs. She found that school classrooms have a lot of bacteria especially at points where lots of different people touch often, or in hard to clean places. She also found antibacterial wipes don't kill all bacteria, but they do reduce their number.

Levi Randell, Glenhaven Public School, *Sleep is My Superpower*

Levi finds it hard to get to sleep and when he finally gets some sleep, he often wakes up and stays awake. After trialling melatonin, magnesium and an oil diffuser with sleep assist oil he found that magnesium helped him get more REM and deep sleep. He also found a regular bedtime was helpful for settled sleep.

STANSW Scientific Investigations 5-6

Amelie Barrington-Marsh, Maddison Breuer, and Elle Cavanagh, Currans Hill Public School, *Is it possible to detect goldfish DNA in small amounts of pond water?*

Amelie, Maddison and Elle aimed to develop a rapid eDNA based test to determine the presence of Goldfish in waterways where they may be harmful to native aquatic species. They found that a PCR machine was effective in finding DNA of species in large bodies of water.

Nicholas Farley, Castle Cove Public School, *The effect of different types of water on the growth of French Breakfast radishes*

Nicholas wanted to determine the effect of different types of water on the emergence of seedlings, growth, and weight of radishes. He investigated rainwater, tap water, demineralised water and microwaved tap water. Nicholas found that the rainwater produced on average taller and heavier plants.

Ruben Merani, Wyvern House Preparatory School Newington College, *Throw another snag on the barbie - but should it be fresh or frozen?*

Ruben's aim was to see if there was a difference between defrosted frozen and non-frozen sausages. He investigated the difference in taste in a blind test and compared histology slides. He found people preferred the taste of non-frozen sausages and there was no appreciable difference in the appearance between defrosted frozen and non-frozen sausages when compared on histology slides.

Ronin Naumovski, Wollongong Public School, *Sound of Silence*

Ronin investigated the effectiveness of different layers of wall soundproofing against low, high and stepped frequencies of sound. He found that the lower frequency sounds ranging from 20 to 120 Hz were able to penetrate the levels of soundproofing, whilst the higher frequencies were not able to penetrate.

Simon Smith, Arden Anglican School, *A Comparative investigation into the levels of carboxyhaemoglobin in tunnels and above-ground travel within the same proximity*

Simon conducted an investigation using pulse carboximetry to compare carboxyhaemoglobin (COHb) levels in human subjects travelling through the Lane Cove Tunnel, compared to human subjects travelling the same distance and at the same time of day, on Epping Rd above the tunnel. He found no difference in OCHb levels and was reassured that Lane Cove tunnel provided safe ventilation for travellers.

Neomi Verma, Abbotsleigh, *Saving strawberries from spoilage*

Neomi wanted to find an effective treatment method for delaying mould growth on strawberries. She found the most effective treatment method was treating strawberries with Aloe vera juice and keeping them refrigerated. The thermotherapy treatment (125 °F for 30s) proved to be the second best treatment method for increasing the shelf life of strawberries when stored in a refrigerator.

STANSW Investigations Biology 7-8

Sebastian Aspres, Cranbrook School, *Investigation into the impact of different bicarbonate soda concentrations on the growth of mustard cress plants.*

Sebastian conducted an investigation examining if there was a relationship between plant growth and the different concentrations of sodium bicarbonate soda solutions. He discovered that indeed that the growth of mustard cress plants was affected negatively when they were exposed to higher levels of bicarbonate soda in comparison to plants that were exposed to no or less bicarbonate soda.

Anastasia Prokhorov, PLC Sydney, *Bacterial Playgrounds On Your Kitchen Sponge - An Investigation into the Contamination and Decontamination Strategies of Kitchen Sponges*

Bacteria are absolutely everywhere so Anastasia designed two investigations to examine the growth of bacteria on kitchen sponges. In one experiment she exposed a number of sponges to different cleaning techniques and determined that bleach was the most effective method for killing bacteria. In the other experiment she discovered that sponges used to wipe up fruit and vegetable matter had the most contamination.

Lachlan Reynolds, Cranbrook School, *The Effect of Magnetic Fields on Plant Growth*

Does the magnetic field of the Earth affect plant growth? Lachlan did and subsequently designed an investigation to determine if there was a relationship between plant growth and the distance of a magnet planted in the soil. He did this by first germinating and then growing mustard plants and did discover that there appeared to be a correlation between these two variables.

STANSW Investigations Biology 9-10

Abigail Arrage, Hornsby Girls High School, *The Impact of Pharmaceutical Chemicals on the Growth of Mustard Seeds*

Ever wondered if pharmaceuticals affect the growth and health of plants? That's exactly what Abigail wondered when she designed an investigation into how plants react when exposed to six commonly used drugs such as Claratyne and Valium. Abigail conducted her experiment by first monitoring the germination of mustard seeds, and then the subsequent growth of the plants. She determined that indeed pharmaceuticals have a negative effect on the plants.

Michelle Ni, PLC Sydney, *The Pro Tip To Getting Your Protein In: Can probiotics increase protein absorption?*

Can probiotic use aid the absorption of proteins into the body? Michelle thought so and designed an investigation looking at different probiotic strains. She modelled conditions of the small intestine by using dialysis tubing in gas jars filled with water. Michelle found that all of the commercial probiotics she used had some effect on the breakdown of the protein and thus supports the idea that probiotics are indeed helpful with protein absorption.

Lilian Stock, PLC Sydney, *CSI: A Crime Green Investigation*

Lilian's project was inspired by the recent summer bushfires. She wondered if the constant exposure to the PHOS-CHeK fire retardant, as well as the production of ash, would have an impact on the fresh waterways, specifically on the growth of cyanobacteria. Lilian carried out two experiments and discovered that both substances had a positive effect on the growth of the cyanobacteria, which could trigger potential harmful algae blooms in fresh waterways after bushfire events.

Rowe Scientific Investigations Biology 11-12

Veronica Abal, MLC School, *Ratio Dependency of Ampicillin and Silver Nanoparticle Synergism against Escherichia coli*

In a year where disease has been at the fore-front of our minds and with antibiotic-resistant bacteria on the rise, it is becoming more important to find creative and effective ways of battling these tiny adversaries. Veronica investigated whether using an antibiotic in conjunction with silver nanoparticles would be an effective treatment against the bacterium *Escherichia coli* and at what ratio. Her investigation found that a 3.7:1 ratio of silver nanoparticles to Ampicillin was the most effective against *E. coli*.

Sarah Hens, Menai High School, *A randomised controlled trial evaluating the differential efficacy of *Ginkgo biloba*, *Ginseng*, *Curcuma longa linn* and *Vinpocetine* on spatial learning and memory in mice*

What if there was a medication you could take to improve your memory? You could then 'forget' about losing your car keys and about health problems like dementia. Sarah investigated whether some traditional herbal remedies had any efficacy. She tested their effects on the memories of mice by administering them in their food and water and then testing their ability to navigate a water maze by memory. Sarah found that these herbal remedies had no significant effect on the memory of mice.

Antonio Rajaratnam, Redeemer Baptist School, *The Survival of the Fairy: An in-depth survey into the behaviour and life cycle of the Sand Fairy cicada*

The Sand Fairy cicada (*Sylphoides arenaria*) is as rare as its name suggests. Inhabiting beach dunes, it is thought to be under threat from rising sea levels and storm waves. Despite this, its life cycle remains largely a mystery. After rediscovering it in Sydney last year for the first time in 100 years, Antonio sought to find out as much as he could about the species. His survey documented for the first time a number of behaviours, including emergence patterns, feeding, mating, and egg laying on its host plant Hairy spinifex.

Sponsored Award



ASBMB Award

Awarded for excellence in Biochemistry and Molecular Biology

Sarah Nolan, Brigidine College Randwick, *The effect of pH on RNA absorption and liberation on mineral surfaces*

Is there life on Mars? With her interest in astrobiology and her dream to work at NASA, Sarah may be the first person to find out. Her experiment measured how changing the pH of an RNA solution affects the amount of RNA liberated off a mineral surface. The impact changing pH has on the absorption rate of RNA has provided insight into the theory that life began in land-based hot springs. Sarah's results provided strong evidence for the 'complexity' of the hot spring environment as the results demonstrated minerals absorb RNA at varying rates.

Category Awards - Scientific Investigations

STANSW Investigations Chemistry 7-8

Alessandro Biles, Cranbrook School, *Investigating the Effect of Changing the Concentration of Sand in Soil*

How does changing the concentration of sand in soil affect plant growth over time? Alessandro's project indicated that whilst a small inclusion of sand in the soil will assist with plant growth as sand improves the soil drainage however as the concentration of sand increases in soil, the growth of plants slows. This is due to too much water drainage from the soil and a reduction of nutrients available for the plants.

Danielle Gibson, Redeemer Baptist School, *Advance Australian Fare*

For thousands of years Australia's aborigines thrived on the country's wide variety of flora and fauna. But are the native bush fruits as healthy as we are led to believe? Danielle investigated the sugar content of native bush fruits and their juice and compared their sugar content with non-indigenous fruit species. Danielle's results indicated that Australian Native fruits generally have lower sugar content than fresh and frozen pears and thus could be a healthier alternative in our diet.

Jacinda Tjiantoro, Meriden School, *The Impact of Different Hair Conditioner Brands on the Strength of Hair*

Jacinda's project tested which brand of hair conditioner would prevent human hair from breaking. She determined this by measuring the amount of weight human hair can hold and to identify the conditioner that allows the hair to hold the most weight. The experiments carried out indicated that conditioner brands such as Schwarzkopf, OGX and L'Oréal Paris Elvive will strengthen human hair.

STANSW Investigations Chemistry 9-10

Sarah Ge, PLC Sydney, *Moody mackerel or mackerel moody? Histamine in mackerel: The best way to store Spanish mackerel in order to reduce your chances of histamine poisoning and related anxiety disorders*

The aim of this investigation was to determine the best treatment of Spanish mackerel that would reduce the histamine concentration content in the sample. Sarah treated the mackerel with unsweetened almond milk, red wine, lemon juice, clear vodka and water and the extracts analysed using "RIDASCREEN Histamine (enzymatic)" kits. The results indicated that the treatments of unsweetened almond milk or clear vodka would reduce the histamine concentration in Spanish mackerel, and thus are potentially useful in reducing the incidence of histamine poisoning.

Emily Roberts, PLC Sydney, *Painting to Protect*

The toxic effects of common fire retardant products, such as paints, are widely acknowledged and prevalent. They contain a range of toxic chemicals. This investigation had the purpose of exploring potential less toxic paint retardant alternatives (sodium borate, potassium alum, sodium bicarbonate and vinegar). Emily's project indicates the addition of sodium borate, sodium bicarbonate and vinegar can improve the paint's fire retardant qualities.

Annabelle Strachan, Meriden School, *Bioflocculation*

This investigation explores whether lemons are a feasible bio-flocculant, being an accessible, safe, affordable and environmentally-friendly water treatment option. Using a flocculant composed of 2g chitosan and varying amounts of dried lemon peel, and determining the Turbidity Efficiency Removal on various samples, Annabelle determined that a flocculant containing approximately 33% lemon peel was most effective.

Rowe Scientific Investigations Chemistry 11-12

Katie Maddock, Wollondilly Anglican College, *False Positives in Blood Detection using the Hemastix Test*

Hemastix, used primarily in forensic applications, is a plastic strip with a special reagent material at the tip that detects the presence of blood. Despite this, the Hemastix Test has been known to produce false positive readings when testing substances other than blood, such as horseradish, tomato sauce and onions. While Katie found that onions do produce a weak false positive result, the potato family produced an unexpectedly high false positive result. So proceed with caution when using similar testing kits to detect the presence of blood.

Sarah Nolan, Brigidine College Randwick, *The effect of pH on RNA absorption and liberation on mineral surfaces*

Is there life on Mars? With an interest in astrobiology and her dream to work at NASA, Sarah may be the first person to find out! Her experiment measured how changing the pH of an RNA solution affects levels of RNA liberated off a mineral surface. The impact changing pH has on the absorption rate of RNA has provided insight into the theory that life began in land-based hot springs. Sarah's results provided strong evidence for the 'complexity' of the hot spring environment as the results demonstrated minerals absorb RNA at varying rates.

Emily Shen, Kambala School, *Determining the rate law of crystal violet and sodium hydroxide*

When studying Senior Chemistry you quickly learn that every reaction involves a complex mechanism where the rate of a reaction is dependent on both the concentrations of the reactants and the ratio of their proportions. Always willing to challenge herself, Emily used a spectrophotometer and two analytical methods to experimentally determine the reaction order of crystal violet and sodium hydroxide. For both methods she found that they combine in a 1:1 ratio, demonstrating the reaction is a classic first order reaction.

Sponsored Awards

RACI Chemistry Encouragement Award

For primary and secondary students demonstrating ability, skill and promise for Chemistry



Primary: Karmichael Candra, Redeemer Baptist School, *Ripeness after Harvest*

Karmichael's investigation aimed to determine whether the sweetness, and skin colour, of red and green table grapes changed after they were removed from the vine. He found that the skin colour darkens and the darker the skin colour of the grapes, the sweeter they will be.

Secondary: Sarah Ge, PLC Sydney, *Moody mackerel or mackerel moody? Histamine in mackerel: The best way to store Spanish mackerel in order to reduce your chances of histamine poisoning and related anxiety disorders*

To reduce histamine content, Sarah treated Spanish Mackerel with unsweetened almond milk, red wine, lemon juice, vodka and water and analysed the extracts using "RIDASCREEN Histamine (enzymatic)" kits. This showed that the treatments of unsweetened almond milk or clear vodka reduce the histamine concentration, and thus are potentially useful in reducing the incidence of histamine poisoning.

Secondary: Emily Shen, Kambala School, *Determining the rate law of crystal violet and sodium hydroxide*

When studying Senior Chemistry you quickly learn that every reaction involves a complex mechanism where the rate of a reaction is dependent on both the concentrations of the reactants and the ratio of their proportions. Always willing to challenge herself, Emily used a spectrophotometer and two analytical methods to experimentally determine the reaction order of crystal violet and sodium hydroxide. For both methods she found that they combine in a 1:1 ratio, demonstrating the reaction is a classic first order reaction.

NMI Measurement Award



Australian Government
Department of Industry, Science,
Energy and Resources

**National
Measurement
Institute**

Awarded to entries in the category of Working Scientifically that demonstrate an excellent understanding of measurement

Danielle Gibson, Redeemer Baptist School, Advance Australian Fare

Danielle utilised three methods to determine sugar content of six native bush fruits and compared their sugar content with non-indigenous fruit species. The first method involved a fermentation process and measured CO₂ levels against calibrated D-Glucose and D(-)-Fructose levels. The second and preferred method was comparing CO₂ levels against a known relative sugar standard of 9.75g/100g for raw pear. The third method used a refractometer to measure brix value. She found Quandong and Muntries had comparable sugar levels to non-indigenous fruits but the other native bush fruits had lower sugar levels.

Beatrix Farley, Loreto Kirribilli, Fungi in Harold Reid Reserve

Beatrix carried out an investigation into the effects of different vegetation communities in Harold Reid Reserve, Middle Cove on the abundance and diversity of fungi fruiting bodies. The investigation was conducted using 150m long transects in each of three different vegetation communities. Six replications covering the 3 transect areas were carried out from 2 April to 3 May 2020, and all fungi observed were photographed, morphology recorded and then identified. The three transects were compared for abundance and diversity (using Simpson's Index of Diversity) and it was discovered that the plateau section showed most abundance in observed species.