Credit: NASA

Remember this? Perhaps not but it marked a spot in exploration which will always be significant. 50 years ago, the first manned moon landing was watched by an estimated 600 million people around the world. On July 20, 1969 - [4:17 pm US EDT] Apollo 11 landed on the moon. Neil Armstrong (commander), Buzz Aldrin (lunar module pilot) and Michael Collins (command module pilot) were the crew.

CONSTAT 2019

The Conference of the Science Teachers Association of Tasmania Inc. celebrates the anniversary of this amazing achievement of human collaboration, Science, Engineering, Mathematics and resilience.

"That's one small step for a man, one giant leap for mankind." July 20, 1969:

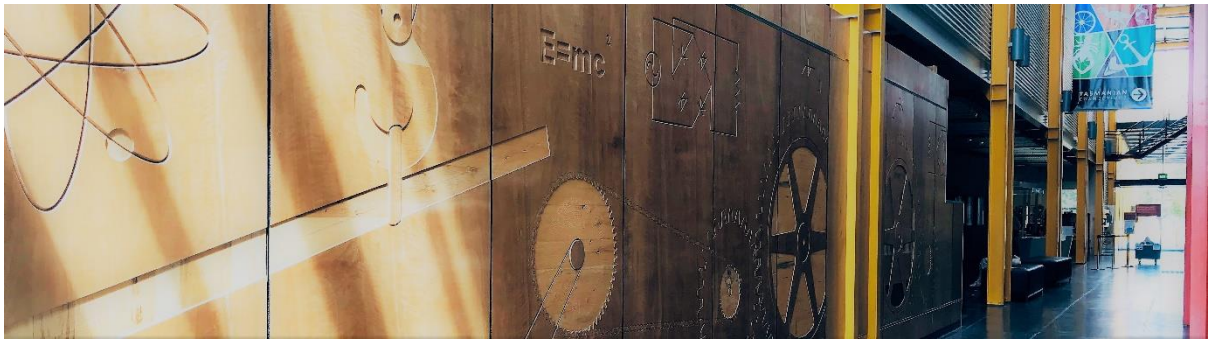
Launceston
March 29th & 30th, 2019

UNIVERSITY of TASMANIA

Queen Victoria Museum and Art Gallery

Launceston Church Grammar School – Senior Campus

TASMANIAN ALKALOIDS



Supporting STEM Education

The Queen Victoria Museum and Art Gallery provides learning programs and self-guided tours designed to challenge and inspire students.

Program content is drawn from museum collections and research which our professional educators bring to life with rich, engaging programs.

Students

- Discover life on earth, and the history and future of space science
- Explore dinosaurs and Tasmanian animals
- Get hands-on with over 20 Phenomena Factory interactive exhibits
- Watch a Planetarium show on the dome, discover what will be in Tasmania's sky tonight and speak to an astronomer.

Support for Educators

- QVMAG assistance with excursion planning
- Guided tours of exhibitions
- Hands-on workshops

All QVMAG workshops and guided tours are linked to the Australian Curriculum.

For more information visit www.qvmag.tas.gov.au/Learning

About Queen Victoria Museum and Art Gallery

The largest regional museum in Australia, QVMAG's collection has been in the making since 1842, and covers Natural Sciences, History and Visual Arts. The southern-most Planetarium in Australia is operated from the Museum at Inveresk.

QVMAG are the caretakers of a significant and wide-ranging collection, from dinosaur skeletons to a preserved two-headed snake; shipwrecks to a Skylark rocket.

Welcome – from the President
Rosemary Anderson

On behalf of the Science Teachers Association of Tasmania, I would like to warmly welcome you to CONSTAT 2019 in Launceston.

The conference theme: ***The Moon and Beyond – More Missions – More Science – More Opportunities*** *provides us with the opportunity to celebrate the 50th anniversary of the moon landing. It is therefore fitting that we are having our evening program at the Queen Victoria Museum, and Art Gallery which hosts one of Australia's oldest planetariums. With space experts Martin George, Brad Tucker and Matt Dodds – you are in for a treat!*

STAT recognises the importance of science learning in the early years and for the first time, in addition to the usual programme, we are offering a whole day dedicated to early years and lower primary educators. As such, we are privileged to have Dr Angela Fitzgerald as a keynote speaker for this day. Dr Fitzgerald is a specialist in early years STEM learning.

We have made the whole program an exciting one that will allow you to be inspired, get rejuvenated, learn new skills and strategies, renew friendships and extend networks. We hope that you will have a productive and fun-filled experience.

To put a conference of this magnitude together is not a small task. To that end, we want to thank our conference convener, Dr Marj Colvill and her committee for their tireless efforts.

We would like to thank all of the sponsors for providing their generous financial and in-kind support, and the educators who are providing conference workshops over the two days. Last, but not least, we would like to thank all of you for being part of CONSTAT 2019, for without your participation there would be no conference.

Enjoy the experience!

Table of Contents:

Our keynote speakers:

Associate Professor Angela Fitzgerald

Angela Fitzgerald is an Associate Professor in Science Curriculum and Pedagogy in the School of Teacher Education and Early Childhood at the University of Southern Queensland. She has expertise in special education, teaching and learning and is passionate about classroom-based research. This has taken her across Australia and to several international locations to collaborate with schools, teachers, academic colleagues and student teachers. She has been responsible for professional experience of pre-service teachers and recently coedited with Dr Deborah Corrigan "Science Education for Australian Students – teaching science From Foundation to Year 12. She brings a wealth of knowledge and experience to Science in the Early Years of Schooling.

Dr Brad Tucker

Brad Tucker is an Astrophysicist/Cosmologist at the Research School of Astronomy and Astrophysics, Mt. Stromlo Observatory and the National Centre for the Public Awareness of Science, at the Australian National University.

Brad received Bachelor's degrees in Physics, Philosophy, and Theology from the University of Notre Dame and a PhD from Mt. Stromlo Observatory at the ANU. He's leading programs using the NASA's Kepler Space Telescope and TESS to understand why and how stars blow up. He is also leading a project to build a network of ultraviolet telescopes in the upper atmosphere, as well as a search to find Planet 9 – a hypothetical new planet in our Solar System, as well as a new mission to capture and mine an asteroid. Brad frequently gives talks to school groups and the public about Astronomy and has regular segments on various radio and TV stations such as ABC 24 and 7:30 report, and Channel 7 Sunrise and the Morning Show. Among other things, Brad has also developed a series of Astronomy coins with the Royal Australian Mint, consulted on science fiction movies such as Alien: Covenant, and has been featured in TV specials. He is currently in the process of writing his first popular book and developing a series of Massive Open Online Courses (MOOCs).

Martin George

Martin George is Manager of the Launceston Planetarium at the Queen Victoria Museum and Art Gallery (QVMAG).

He was born in England and educated at the University of Tasmania. He is passionate about public communication of astronomy, being well known in the media and making frequent appearances on radio (mainly) and television since 1973 to discuss astronomy and space research. Amongst Martin's many other media activities are regular newspaper and magazine columns: notably, he has had a weekly article in Hobart's *Sunday Tasmanian*, followed by *Saturday Mercury* newspapers, since April 2001. Martin has also appeared in the media in several other countries.

Martin is a Fellow and former President (President, 2005-06) of the International Planetarium Society (IPS) — the world body of planetarium professionals — and currently he is IPS Chair of International Relations.

He has been awarded the David Allen Prize for astronomy communication by the Astronomical Society of Australia (Australia's body of professional astronomers), and the Winifred Curtis Medal for Science Communication by the Science Teachers' Association of Tasmania. In 2018 Martin was presented with the IPS Service Award — the highest award within the International Planetarium Society.

Martin has close links with the University of Tasmania, and has on many occasions presented undergraduate courses in astronomy at the University's Launceston Campus. He frequently speaks to community groups such as Rotary International, and the public, on astronomical topics. He is also a member of the International Astronomical Union (IAU), the world body of professional astronomers. His IAU involvements include Education, and the history of Radio Astronomy.

Matt Dodds

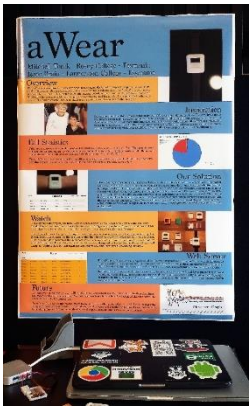
Matt Dodds is a high school Science Teacher with a passion for Physics, Astronomy and engaging students in Science. After studying a Bachelor of Science and Bachelor of Education at UNSW in Sydney he moved to Tamworth NSW for a relaxed lifestyle and the dark skies it offers. Matt can often be found travelling the country with his telescopes and sharing the night sky with school students and the general public alike. He enjoys keeping at the forefront of teaching methodologies and effective classroom teaching and sharing his knowledge with other educators both in person and online. He attended CONASTA 65 in Brisbane and presented at CONASTA 66 in Hobart and more recently the 2018 Science and Maths Conference. Matt is also the camp manager for YMCA Space Squad, a week-long camp held in Canberra every school holidays, designed to inspire and challenge students from across Australia. The program sees students build their own, telescope and spectroscope. They also build and code small rovers, engage in logic-based coding challenges, and most importantly have access to university and industry presenters to talk to the students about how they got to where they are and their current research. You may connect with Matt on both Twitter and Instagram @Sciencewithmat.

stat. Science Teachers Association of Tasmania Inc.

The Tasmanian Science Talent Search – offering fantastic opportunities to some of our successful students.

From TSTS to Arizona in 2019 for Mitch Torok & Isaac Brain who won the **National Engineering Award with "aWear"**

Young Tasmanian Engineers, Isaac Brain from Launceston College, and Mitch Torok from Rosny College, are off to the International Science and Engineering Fair (ISEF) in the Arizona, where they will showcase their winning entry in the Engineering section of the National Science and Engineering BHP Foundation, Student Awards. These talented cousins will each enjoy a fully funded trip to ISEF and will share the first prize of $4,000. They received their award at a gala dinner in Melbourne on Tuesday February 4th. Dr Larry Marshall, CSIRO Chief Executive, presented the prize and applauded their collaboration.



Prompted by a concern for their Great Grandmother and the need to care for her should she fall, together they developed a watch, *aWear*, which can also be warn as either a broach or a lanyard, alerts by SMS, nursing staff with both status and location of the wearer and is triggered through an accelerometer to analyse fall detection. Isaac developed the software and web development and Mitch built the hardware.

Isaac and Mitch were invited to enter the National Awards, after winning the Senior Engineering prize in the 2018 Tasmanian Science Talent Search. There were over 12,000 entries in Research and Engineering from across the country and Tasmania was represented by four students in the 26 finalists. Congratulations also go to Lucy Eade from St Mary's College, Hobart and Emma Spurr from Kingston High school. Entries in the National Awards are by invitation only, through the Tasmanian Science Talent Search.

For complete information about the 2019 BHP Billiton finalists and to look at their videos go to https://scienceawards.org.au/Student-Awards

For information regarding the 2019 Tasmanian Science Talent Search go to www.http://stat.org.au/tsts/

CONSTAT 2019 Program Overview

Friday March 29

Friday is a concurrent day for teachers from K-12

For teachers from K to 4:

- *teachers from years K-4 are invited to a dedicated STEM professional learning day at the Launceston Tram Sheds, Invermay.*
- *Day includes, keynote address, choice of workshops, morning tea, lunch and visiting trade displays.*

For Teachers from 5-12:

- *Teachers from years 5 – 12 are invited to take part in local field experiences – see descriptions for details*

For all teachers from K-12

- *Everyone is invited to join Dr Brad Tucker at the Queen Victoria Museum and Art Gallery, Invermay for a Master Class*
- *Everyone is invited to join Martin George for a Launceston Planetarium taster*
- *Everyone is invited to take part in the CONSTAT 2019 celebratory dinner at the Launceston Boat House*

Saturday March 30

Saturday is for teachers of students from 5-12

- *Teachers from years 5-12 are invited to a STEM dedicated professional learning day at Launceston Church Grammar School, Senior Campus, Mowbray*
- *Day includes, keynote address, choice of workshops, morning tea and lunch and visiting trade displayers.*
- *All teachers will receive a certificate of participation and acknowledgement of the contribution that this PL makes to the AITSL Teaching Standards.*

Friday March 29

Experiences in the Field for Teachers from Years 5-12.

Tamar Valley Truffles – start at 10.00am - Cost $12.00/delegate

Where: **349 Ecclestone Road, Riverside - 15 mins from the centre of Launceston**

Enjoy a tour around the truffle paddock and an explanation of how it works. You will see some new truffle growing ready for next season
Experience a tasting of some of Tamar Valley Truffle products (with the option to buy) – the Truffle Honey is to die for. 😊
See where the industry is growing with the building of a new shed for truffle grading.
Your shoes: Make sure you have appropriate sensible footwear (no thongs or open-toed shoes) as you will be walking through a grassy paddock.
Understand the future of the industry – the opportunities for employment in the future and where this market sits in the future of Tasmanian Agriculture.

James Boag Brewery – start 12.00 pm – Cost $34.00/delegate

Where: **39 William Street, Launceston (across the road from the brewery)**

Experience a one-hour fully guided tour of the brewery followed by a beer tasting.
Your shoes: Fully enclosed shoes must be worn. There will be stairs
Please do not consume any alcohol prior to the tour.
James Boag's Brewery is working site – they share all aspects of the brewery which are operational on the day.
Timing: Please arrive 15 minutes prior the tour departure time – i.e. 11.45pm

Queen Victoria Museum and Art Gallery – A behind the scenes visit to the Natural History Collection – Start 1.30pm – Cost $5.00

Where: **2 Wellington Street, Launceston (Meet David or Tammy in the foyer)**

Meet David Maynard &/or Tammy Gordon for a guided tour of the Queen Victoria Museum and Art Gallery's amazing Natural History collection.
Learn about the work building and preserving of this amazing collection and the contribution that it makes to Australia's natural history knowledge bank. Learn also about possible career options for your students and the pathway they might undertake in order to work in this capacity. This is a very rare opportunity to be enjoyed by CONSTAT 2019 delegates only.
Shoes: You will be walking in laboratory spaces so closed shoes are most appropriate.

CONSTAT 2019 @ Launceston Tram Sheds

Friday March 29

STEM Professional Learning Day for Teachers from K to 4 including pre-service teachers

8.30 – 9.00 *– Registration and morning coffee/tea*

9.00 – 9.15 *– Welcome and house keeping*

9.15 – 10.30 *– Keynote address – Associate Professor Angela Fitzgerald*

10.30 – 11.00 *–* ***Morning Tea and Trade Displays***

11.00 – 11.50 *– Workshop choices A1 and A2*

A1 – Sustainability in ECE with Jenny Dudgeon (ECE)

A2 – Looking after the planet with Maree Bakker, DPIWE (3/4)

11.50 – 12.40 *– Workshop choices B1 & B2*

B1 – Celebrating the moon landing with little people – Ian Pattie (K-4)

B2 – Makey Makey with Sam and Ali from Questacon (K-4)

12.40 – 1.20 *– Lunch and Trade Displays*

1.20 – 2.10 *– Workshop choices C1 & C2*

C1 – Celebrating inquiry in science for years K-4 with Doug and Shaun

C2 – Thinking about thinking with Sam and Ali from Questacon (K-4)

2.10 – 3.00 *– Science from Picture Books with Associate Professor Angela Fitzgerald. (K-4)*

3.00 – 3.15 *– Conclusions to the day.*

Invitation to everyone: An afternoon with the Stars

3.30 *– At the Queen Victoria Museum - Join Dr Brad Tucker and Martin George for an afternoon with the stars. Find out ways to celebrate National Science Week with your students and what is available when they visit Launceston's planetarium.*

6.30 *- Come to the CONSTAT Celebratory Dinner at the Launceston Boathouse, Inveresk.*

Workshop descriptions.

Friday March 29th for Kindergarten to Year 4 teachers.

Workshop Number &Time	***Presenter/s***	***Description***
A1 10.55 to 11.45	Jenny Dudgeon from the Sustainability centre Years Prep to 2	**Evidence based inquiry – All little kids are fascinated by poo. So, whose poo is that?** Science: **Foundation:** Participate in guided investigations and make observations using the senses (ACSIS011 - Scootle) using sight, hearing, touch, taste and smell so that students can gather information about the world around them **Year 1:**Use informal measurements to collect and record observations, using digital technologies as appropriate(ACSIS026 - Scootle) Use a range of methods to sort information, including drawings and provided tables and through discussion, compare observations with predictions (ACSIS027 - Scootle) Represent and communicate observations and ideas in a variety of ways (ACSIS029 - Scootle) Investigate using these tools 1. Exploratory, observational sensory walk 2. Introducing and using Tasmania's new Poo Flip resource Use these Apps: • Atlas of Living Australia App https://www.ala.org.au/tag/apps/ • Australian Museums: Frog ID App https://www.frogid.net.au/ • Nature Play WA's: https://www.natureplaywa.org.au/things-to-do/places-to-go **Participants are requested to:** • bring a digital device with the above Apps downloaded, • a charger • wear clothes to suit an investigation outdoors
A2 10.55 to 11.45	Maree Bakker – Education officer with DPIWE Target Audience – Years 3 and 4	**Looking after our planet:** It is wonderful to celebrate 50 years since humans first walked on the moon, and that we can explore space. However, we also need to look after this planet! In this workshop, we will celebrate another human achievement – the development and important role of plastic in our world, along with the unfortunate situation whereby plastic enters the ocean and has its devastating impact. Teachers will investigate the chemical and physical properties of different types of plastic, and the benefits of plastic, such as its light weight, insulating properties, flexibility and its uses, such as in packaging, construction and clothing. We will investigate the types of plastic that can be reduced/re-used/recycled, and discuss how to minimise single use plastic, in light of the devastating impact that escaped plastic has on the ocean and its animal life. Then we will play the 'how long does it take to break down in the ocean game' and do an experiment on marine animal entanglement with a fish tank and various plastics. Then each participant will make a beeswax wrap in a slow cooker (from beeswax, pine resin and jojoba oil), which can be used to minimise the use of cling wrap. All of these activities will be able to be replicated by the teachers in their respective classroom setting/s. During this session, I will promote the teaching resource on plastic waste that EPA Tasmania has developed, https://epa.tas.gov.au/sustainability/resources-for-schools/waste-education, which includes 14 lessons (and 6 Extensions), including the above teaching ideas and more.

B1 11.45 to 12.35	Ian Pattie – STAT life member Target Audience – Years K-4	**Space, Rockets, Technology and Engineering** 50 years on from the first walk on the moon, gravity appears to be no less and the amount of energy required to launch a rocket into space is still vast. The 2019 celebration of this event is a STEM godsend starting from simple energy explorations using the energy captured in an inflated balloon. This session will open with a rocket launch and provide opportunities for teaching about the amount of energy required to move objects. The energy stored in a balloon will enable a refinement of a basic technology. The technology of rockets and launching will also be explored through paper rockets and this will result in a challenge to use inflated balloon energy to launch a rocket vertically.
B2 11.45 to 12.35	Sam Hardwicke & Ali McGregor from Questacon Target Audience – Years 3 & 4	**Electrical Safety with a Makey Makey** Electrical safety is no laughing matter… Unless of course you're learning about electrical safety with a Makey Makey. In this engaging, fun, hands-on workshop, Sam Hardwicke and Ali McGregor, two of Questacon's Teacher Professional Learning team will explore circuitry using a Makey Makey. Participants will explore the functionality of the Makey Makey, and along the way learn about what an electrical circuit is, the conductivity of different materials, and how electricity travels. Through this inquiry we will discuss ways that teachers can utilise the Makey Makey to equip students with knowledge about electricity and how to interact with electrical appliances safely. We will discuss how inquiry exploration like this can be a rich source for content learning and can result in greater retention of content than revision alone. We will explore ways in which teachers could further develop a unit around inquiry, as well as how they might assess open exploration in a meaningful way. The workshop content is more suitable for primary and lower secondary teachers, but any teacher who wants to develop strategies for inquiry learning in their classroom is encouraged to come along and have a play!

C1 1.25 to 2.15	Doug Grubert – Director of TSTS & Shaun Sexton from Launceston Church Grammar Junior School Target Audience K to 4	**Whole Class Research Investigations – Making the best use of them** Conducting Research Investigations in the earlier years of education can be quite daunting – We will share with you a process of doing a whole class research investigation where students are able to be engage in the research, share ideas, record their findings, present material for individual assessment in Science, Literacy and Mathematics. This is both fun and manageable in the classroom and provides students with the necessary experience to move on to small group and individual experience as they progress through their schooling. We will share examples and provide opportunities for you to take some ideas with you for your own class. This work takes into consideration the demands of the Australian Curriculum: Science in a practical and meaningful way which is both engaging and manageable in the classroom.
C2 1.25 to 2.15	Sam Hardwicke & Ali McGregor from Questacon Target Audience – Years K to 4	**Thinking About Thinking . . . With a Pen!** The Australian Curriculum Technologies strand is underpinned by three types of thinking processes; Design Thinking, Systems Thinking, and Computational Thinking. How can we effectively teach these processes, especially when teachers face limitations around time and resources? During this engaging workshop Sam Hardwicke and Ali McGregor, two presenters from the Questacon Teacher Learning team, will support participants to uncover ways that Design Thinking, Systems Thinking and Computational Thinking can be explored using nothing more than a pen, your creativity, and a healthy dose of collaboration. Over a series of hands-on activities, we will explore different ways of approaching thinking, and discuss ways that STEM learning can be integrated into the classroom without costing too much time or money. We will discuss how different thinking styles can be utilised by classroom teachers to empower students, and how those same thinking styles can help you to more deeply understand your school's context, the needs of your school community, and the development of sustainable models for integrated STEM learning. *'The most important thing happening in a classroom at any given time is what a student is thinking' – Peter Ellerton, UQ*

D1 2.15 to 3.05	**Associate Professor Angela Fitzgerald from the University of Southern Queensland** **Target audience Years K to 4**	**Finding the science in a picture storybook …** using a range of age-appropriate Australian picture storybooks that on the surface seem unrelated to science and unpack them and map to AC to see links and possibilities. An opportunity to link literacy and science through children's literature and to give Science the context in the delivered curriculum that it really deserves.
3.05 – 3.20	**Everyone**	**Join us for the wind up of the day and an opportunity to win a lucky door prize.**

An Afternoon and evening with the Stars for everyone

3.30 – 4.45 – Dr Brad Tucker – QVMAG Theatre

High-Altitude Balloons are a popular means for launching space experiments. Reaching altitude of 30 - 45 km, they reach environments which are very similar to Mars. However, many people are unaware of their capabilities, ease of use, or even how cheap they are. I will outline the reasons why we use these space platforms, and how schools can incorporate it into interactivity learning. For as cheap as a few dollars, your class can create their own Mars-analogue experiment!

4.45 – 5.00

Join other CONSTAT Delegates for a very light refreshment in the Phenomena Factory

5.00 – 6.15 – *Visit Launceston's Planetarium with Martin George*

Hear about the exciting options for students of all grade levels (yes there are different programs depending on the year level of your students). Martin George will share with you what is on offer and how this experience can be tailor-made for your students. This opportunity is being offered free of charge to all CONSTAT delegates so make the most of the opportunity to check out the experience before you decide to bring your students along.

From 6.30 for 7.00 Launceston Boat House - CONSTAT 2019 celebratory dinner - $75.00 per person

Everyone is welcome – bring your friends and partners (Bookings essential – conference booking site for details – all dietary requirements can be catered for)

A welcome drink, followed by a two-course meal. The Dinner Speaker will be Dr Brad Tucker, (as frequently seen on ABC Television) who will share some of his expertise in all things astronomical.

CONSTAT 2019 @ Launceston Church Grammar, Senior School Campus, Button Street, Mowbray

Saturday March 30

STEM Professional Learning Day for Teachers from 5 to 12 including pre-service teachers

8.30 – 9.00 *Registration and morning coffee/tea*

9.00 – 9.15 *– Welcome and house keeping*

9.15-10.15 *–* ***Keynote address with Matt Dodds****, Science Educator in Space Education. "The wonders of the night sky – how to engage students in practical astronomy"*

10.15 – 10.30 *– STAT AGM – chaired by 2018 STAT President, Rose Anderson*

10.30 – 11.00 – Morning Tea and Trade Displays ***(Includes Launch of Energy Wise)***

11.00 – 11.50 *– Workshop choices A1, A2, A3, A4 and A5*

12.00 – 12.50 *– Workshop choices B1, B2, B3, B4 and B5*

12.50 – 1.40 – Lunch and Trade Displays

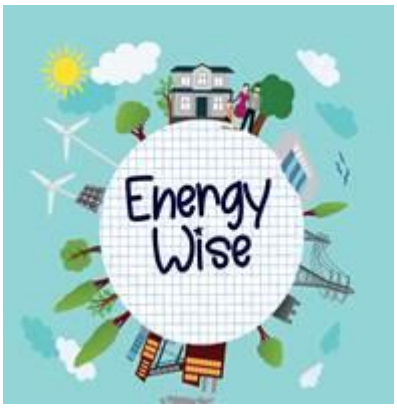
1.40 – 2.30 *– Workshop Choices C1, C2, C3 and C4*

2.30 – 3.20 *– Workshop Choices D1, D2 and D3*

3.20 – 3.30 – Join us in the theatre - You might win a prize – thankyous and goodbyes

(NB Content descriptions for these workshops are in the following pages.)

Morning tea will include the launch of:



Energy Wise

Showcasing a new Tasmanian curriculum resource
Investigating energy literacy and renewable energy
For years 7 and 8 STEM teachers

Get your copy
Produced by Greening Australia supported by TasNetworks and DoE.

CONSTAT Delegates thank Energy Wise for their contribution to our morning tea

Workshop descriptions.
Saturday March 30th for Teachers of Years 5 to 12.

Workshop** **Number, Room &Time	***Presenter/s***	***Description***
A1 11.00 to 11.50 Rm No H1	**Darrin Timms from East Launceston Primary School** **Target Audience – Years 5 & 6**	**Seeing the light.** Drawn from a variety of different resources and tested in the classroom this session will discuss light, visible light, sources of light and demonstrate some of the activities that you can use in the classroom. The supplied Unit Plan covers: ▪ How light is made up of both wavelengths and particles and the visible spectrum is simply another form of electromagnetic radiation. ▪ How to differentiate between different types of light (primary, secondary) ▪ The interactions of light and the difference between absorption, transmission, refraction, and reflection. ▪ How we 'see' objects through different interactions of light. ▪ The material properties of objects which are transparent, translucent, and opaque and how light behaves differently as it interacts with difference kinds of matter. ▪ Why physical interactions of light with matter can affect the colour perceptions of the object. ▪ How our eyes interpret light into vision including animal adaptions (nocturnal) Cross-curricular links will also be provided to the Maths, English, Arts and HASS curriculums."
A2 11.00 to 11.50 Rm No H2	**Jane Hall-Dadson – Science Teachers Association of Tasmania** **Target Audience Years 5 to 8**	**Protostorming –** uses artefacts (or common classroom building materials) to encourage students to use descriptive and imaginative skills. The second stage involves building prototypes of imagined devices. Use of the strategy in the classroom can engage students in STEM and lead to improved learning outcomes while engaging in both technology and engineering challenges. Participants will stretch their problem-solving skills to create models, prototypes and conceptual representation of ideas. Gain insight into how you can use simple materials in new & unusual ways and generate your own hands-on STEM activities using easily available materials
A3 11.00 to 11.50 Rm No H4	**Sue Murray from New Norfolk High School** **Target Audience Years 7 & 8**	**Modelling geology with food** Are your geology lessons missing that certain something? Let's face it, some students find geology a little boring. Add some food and turn a boring lesson into an exciting one with the promise of being fed at the end. In this workshop, I will share with you some recipes, models and teaching ideas that will stimulate both the tastebuds and minds. In the workshop, we will be participating in several activities that involve modelling aspects of geology with food. This links directly with the Year 8 Geology Australian Curriculum.
A4 11.00 to 11.50 Rm No S2	**Martin George from the Queen Victoria Museum and Art Gallery** **Target Audience Years 7 to 10**	**Apollo: 50 years on** 2019 marks 50 years since the first crewed landing on the Moon as part of the Apollo 11 mission. However, there was an eight-year leadup to this, and following Apollo 11 there were six more successful crewed landings, ending in 1972. Martin will share information about this mammoth effort, explaining some important concepts that will be useful when teachers investigate this topic with students. Martin will also address the well-known 'conspiracy theory' that people never landed on the Moon, and how teachers can help students to see that these theories are not only wrong but based on bad science.

A5 11.00 – 11.50 Rm No S1	**Philip Sansom - Teacher Earth Science Education Programme (TESEP), Tasmanian Coordinator** **Target Audience Years 7 to 12**	**The Virtual Library of Australia's Geology** delivers free, downloadable visualisations of outcrops, fossils, rocks and virtual tours of larger geological features. Participants will become confident in accessing and using the resources utilising this technology. Recent developments using 3D geological imagery will also be presented and participants will be able to investigate for themselves the potential of this technology for use in the classroom.

B1 12.00 – 12.50 Rm No H1	**Associate Professor Angela Fitzgerald from the University of Southern Queensland** **Target audience Years 5 and 8**	**The STEM Club** How to start your own STEM club and get students fired up about all things Science, Technology, Engineering and Maths. This session will give guidance as to where to start and the resources and commitment you need to begin engaging students in STEM activities
B2 12.00 – 12.50 Rm No H2	**Sam Hardwicke & Ali McGregor from Questacon** **Target Audience Years 5 to 8**	**Electrical Safety with a Makey Makey** Electrical safety is no laughing matter… Unless of course you're learning about electrical safety with a Makey Makey. In this engaging, fun, hands-on workshop, Sam Hardwicke and Ali McGregor, two of Questacon's Teacher Professional Learning team will explore circuitry using a Makey Makey. Participants will explore the functionality of the Makey Makey, and along the way learn about what an electrical circuit is, the conductivity of different materials, and how electricity travels. Through this inquiry we will discuss ways that teachers can utilise the Makey Makey to equip students with knowledge about electricity and how to interact with electrical appliances safely. We will discuss how inquiry exploration like this can be a rich source for content learning and can result in greater retention of content than revision alone. We will explore ways in which teachers could further develop a unit around inquiry, as well as how they might assess open exploration in a meaningful way.
B3 12.00 – 12.50 Rm No S2	**Martin George from the Queen Victoria Museum and Art Gallery, Launceston** **Target Audience Years 7 to 12**	**Modern Developments in Astronomy** This session will cover several topics currently of great interest to astronomers, students and the public in general. Included will be the *New Horizons* mission to Pluto and beyond, up-to-date studies of the far side of the Moon, and how we discover planets around other stars. Each contains some useful tips about basic science that is involved.
B4 12.00 – 12.50 Rm No S1	**Adrian Eberle and Tullia Chung-Tilley – Bayview Secondary College** **Target Audience 7-10** Adrian is a 9th year high school teacher with a background in marine and Antarctic sciences. Adrian has a passion for providing students with 21st century learning opportunities, and strategies for creative design thinking process linked to STEM education and industry practice. Tullia is a 9th year high school teacher with a background in Science and Dance. She has worked with over 12 schools across Australia addressing a multitude of themes including the United Nations	**Creative Community Engagement** In this workshop, participants will experience a brand-new teaching resource suitable for use across all curricula and in particular for Science Inquiry Skills with a fresh twist. The unit 'Creative Community Engagement' focusses on creative design thinking to solve real-world problems. STEAM pedagogy focusses strongly on designing solutions for real world problems and this unit provides STEAM teachers with additional activities to enhance their students' learning experiences. As a 21st century learning concept with an emphasis on the General Capabilities, creative design thinking is a necessary process for future generations to experience and comprehend. In the future, user-focussed outcomes are forming the forefront of scientific inventions, digital innovation and problem solving, and product development. This teaching resource is a unique teaching tool that guides students to work through the creative design process starting with building empathy for an end-user, rigorous ideation strategies, product research, and proto-typing which can be applied in any learning context. Participants will experience the learning activities firsthand

	Sustainable Development Goals, agricultural practices, science and mathematics inventions, and space science theory.	and have the opportunity to discuss potential applications related to their school contexts and learning programs.
B5 12.00 – 12.50 Rm No H4	**Matt Dodds from ScienceWithMat, NSW** **Target Audience Years 7 to 12 (Physics & Physical Science teachers)**	**Spectroscopy – build your own Spectroscope**. Spectroscopy is an Astronomers greatest tool, it allows us to analyse the light from distant stars, nebulae and exoplanets to determine their elemental and molecular composition. In this workshop you will build your own spectroscope using nothing but an A4 paper plan, scissors, sticky tape and a piece of diffraction grating. After you have you have built your spectroscope, we will then examine a Hydrogen emission spectrum and relate this to the energy levels in the Hydrogen Atom. Apart from looking at emission spectra tubes we will also analyse the light from light globes and party lights to look at how different colours are created. The goal of this workshop is to empower you to go back to your class and teach Spectra to your students in an engaging way getting your students to build their own spectroscope. The history of Spectroscopy and its role in Astronomy will also be covered.

C1 1.40 – 2.30 Rm No H1	**Paula Huett - Assistant Principal East Launceston Primary School,** (previously Principal Education Officer (K-8) and Senior Project Officer – Digital Technologies with the Department of Education Tasmania, Curriculum Services) **Target Audience – Years 5 to 8**	**Drones, Our Eyes in the Sky!** Remotely Piloted Aircraft (RPA), in particular 'Drones' are becoming more easily accessible and have great potential to be used in innovative ways to achieve educational outcomes in Science, Technology and numerous other curriculum areas. During this workshop participants will discover how 'Drones' are used by scientists to gather information and data. Participants will become familiar with how to operate a 'drone' responsibly and legally while investigating how learners can program robots and/or Micro RPA (under 100g) to conduct simulated scientific investigations and navigate set pathways. Throughout this workshop Paula will highlight Australian Curriculum links and assessment opportunities.
C2 1.40 – 2.30 Rm No H2	**Sam Hardwicke & Ali McGregor from Questacon** **Target Audience – Years 5 - 10**	**Thinking About Thinking . . . With a Pen!** The Australian Curriculum Technologies strand is underpinned by three types of thinking processes; Design Thinking, Systems Thinking, and Computational Thinking. How can we effectively teach these processes, especially when teachers face limitations around time and resources? During this engaging workshop Sam Hardwicke and Ali McGregor, two presenters from the Questacon Teacher Learning team, will support participants to uncover ways that Design Thinking, Systems Thinking and Computational Thinking can be explored using nothing more than a pen, your creativity, and a healthy dose of collaboration. We will explore different ways of approaching thinking, and look at STEM learning being integrated into the classroom. We will discuss how different thinking styles can be utilised by classroom teachers to empower students, and how those same thinking styles may help you to more deeply understand your school's context, the needs of your school community, and the development of sustainable models for integrated STEM learning. *'The most important thing happening in a classroom at any given time is what a student is thinking' – Peter Ellerton, UQ*

C3 1.40 - 2.30 Room Number S2	**Kent Poulton from Launceston College** **Target Audience Years 7 - 12**	**Edge of space balloon flight and experiment(s)** An opportunity to engage with planning and risk management being undertaken for 1 or more edge of space balloon flights. Engineering students will design, build and test a 'rig' capable of taking a number of GoPro cameras and science experiments to the edge of space using Helium weather balloons. Science students from Launceston College (may offer to local high schools depending on demand) will be invited to design experiments that can be undertaken on a balloon flight. Modelling and predictions of landing sites will be done and one or more flights will be undertaken. Using GPS payload will (hopefully) be recovered. Students are asked to analyse data collected from the flights and present their findings at Launceston Colleges STEAM day for Science week 2019.
C4 1.40 – 2.30 Rm No H4	**Matt Dodds from ScienceWithMat, NSW** **Target Audience Years 7 to 12**	**Rockets and Projectile Motion** From the V2 to the Saturn V and now the Falcon 9 from Space X, Rockets are a ubiquitous tool of our modern society, launching Australian made satellites to orbit above our heads. Rockets are a great way to engage students in projectile motion and the design process. In this workshop aimed at Science teachers from Primary School all the way through to Yr.12, we will launch rockets and analyse their flight path. We will manually pump up our pressure vessel with a bike pump and then launch ultralight rockets vertically and at various angles to examine various aspects of their flight path. From simple velocity equations, to more advanced equations involving trigonometry, learn to use rockets to engage your students!
C5 1.40 – 2.30 Rm No S1	**Philip Sansom - Teacher Earth Science Education Programme (TESEP), Tasmanian Coordinator** **Target Audience Years 7 to 12**	**Rocks – how important are they?** The Teacher Earth Science Education Programme (TESEP) Rock Kit for Australian Schools will be introduced to participants. The rock kit is complemented by a range of online resources such as 3D imagery, the stories behind the rocks in the kit, virtual thin sections, questions for students and model answers. The TESEP Plate Tectonics poster will also be introduced to enable participants to explore how this resource can be utilised in conjunction with understandings gained from the Rock Kit. Participants will be given the opportunity to investigate these resources and assess their suitability for use within the Earth Science units in the Australian Science Curriculum.

D1 2.30 – 3.20 Room No H1	**Ian Pattie -** STAT life member **Target Audience – Years 5 – 8**	**Space, Rockets, Technology and Engineering.** 50 years on from the first landing on the moon, gravity appears to be no less and the amount of energy required to launch a rocket into space is still vast. The 2019 celebration of this event is a STEM godsend. You will explore the concept for the energy required for a moving machine, through history starting with Hero of Alexandria and demonstrate the sort of activities that might be undertaken in an exploration of applying energy principles that have culminated in rocket science. This session will also provide a technology challenge for operating a "moon-buggy".

D2 2.30 – 3.20 Room No H2	**John Cadogan from Scientrific** **Target Audience Years 5 to 12**	**Investigative Science Experiments with mobile devices and sensors** Real time data analysis is possible using Bluetooth sensors connected directly to mobile devices. In this workshop you will have an opportunity to connect a sensor device directly to your: * iPad * Apple or Android mobile phone * Chromebook * Windows or Mac laptop (computer) You will explore the possibilities for performing experiments that were either previously not possible or were difficult to collect accurate data. You will have opportunities to explore hands-on experiments that may include: * measuring light and temperature in school yard studies * measuring forces of friction on different surfaces * investigating thermal insulators as well as • human responses to exercise • Greenhouse Effect • frictional and gravitational forces • performance of solar panels and generators • rates of chemical reactions. To get maximum practical time please pre-load Vernier Graphical Analysis 4 software for your preferred device from here: https://www.vernier.com/downloads/
D3 2.30 – 3.20 Room No H4	**Matt Dodds from ScienceWithMat, NSW** **Target Audience Years 7 to 12**	**Build your own Telescope** Galileo first turned his telescope to the heavens in 1609. He observed the moons of Jupiter, the phases of Venus, the craters on the Moon and the ear-like rings of Saturn. In this workshop you will learn how to make a simple refracting telescope using two lenses similar to the one that Galileo built. This simple and cost-effective activity allows you and your students to build their own telescopes using two lenses, Blu Tac, black poster board, sticky tape and then achieve focus. These telescopes can then be used to view objects in the distance and the Moon. This activity builds upon the topic of light, reflection and refraction.
Auditorium **3.20 – 3.40**	**Chair, Rose Anderson**	**Join us in the Auditorium for a wind up of the day and perhaps collect your lucky door prize**

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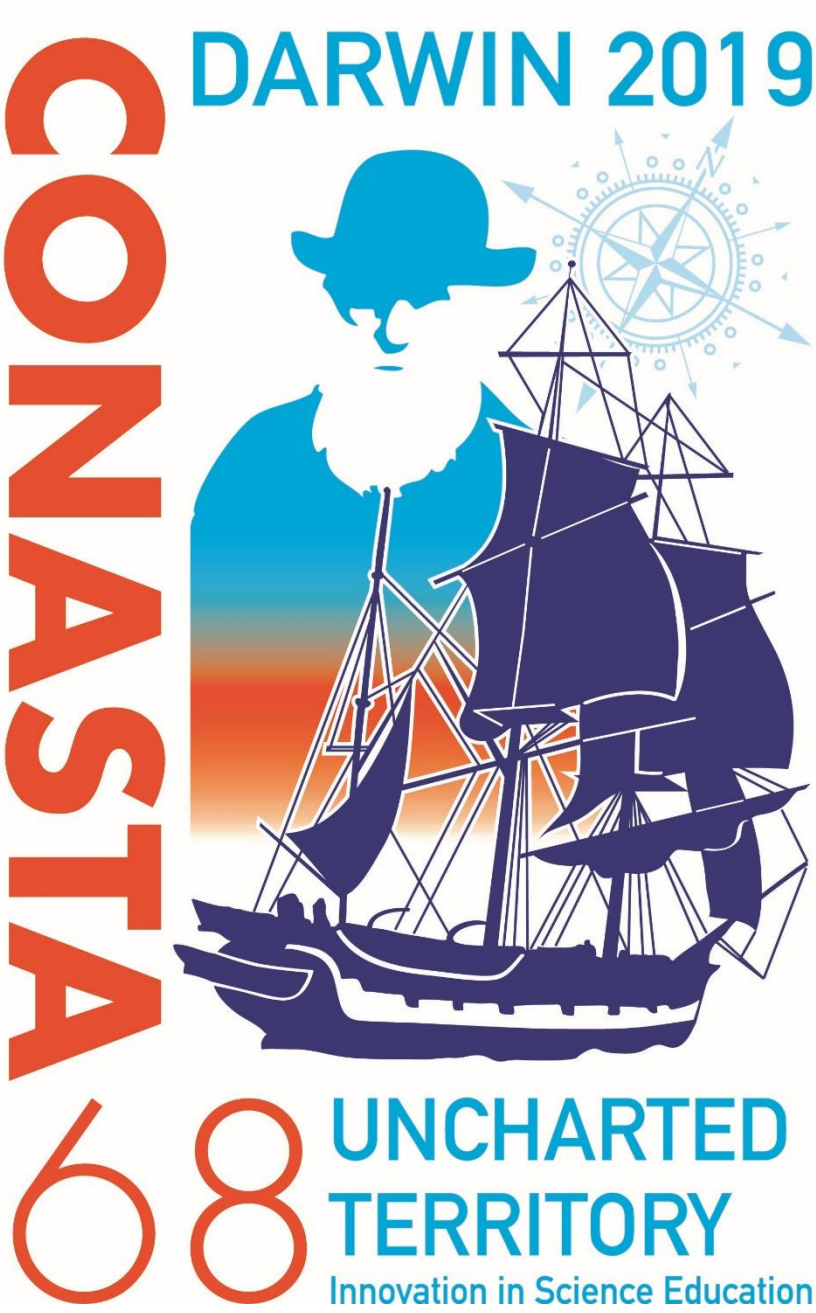

7 – 10 July 2019

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