



WONDER OF SCIENCE™

2019 ANNUAL REPORT

PROMOTING A STEM CULTURE





WELCOME

Wonder of Science State Conference 2019



2019 – MORE SCHOOLS, MORE STUDENTS, WIDER INTEREST IN STEM STUDIES AND CAREERS!

This year, as well as growing our reach by 43% to directly impact almost 6000 students in 63 schools, Wonder of Science also broadened the student capture. This included program implementation in a remote Aboriginal community school, extending the targeted year levels to include ~200 year four students, and we welcomed back schools in the far-north Queensland region.

Interestingly two student teams from that far-north Queensland implementation went on to become the Year 8 and 9 Champions at this year's State Conference! A total of 143 students representing Catholic, Independent and State schools showcased their projects at State Conference this year – you can check out the 2019 State Champions on page 8 and see all the highlights of the day on the website: www.wonderofscience.com.au

The positive trend in female participation in Wonder of Science also continued to increase in 2019 - 76% of the 107 Young Science Ambassadors were female, 78% of students at State Conference were female and 82% of students in the Champion teams were female.

Wonder of Science is increasing the participation of Queensland students in STEM, as well as supporting the visibility of Women in STEM! Keep reading to find out more...

ROBYN BULL
DIRECTOR
WONDER OF SCIENCE



4	PROMOTING A STEM CULTURE IN QUEENSLAND SCHOOLS	10	YOUNG SCIENCE AMBASSADORS	20	TEACHER PROFESSIONAL DEVELOPMENT	24	SUMMARY
6	THE WONDER OF SCIENCE ADVANTAGE	14	TESTIMONIALS	22	FLYING SCIENTISTS	26	PARTNERS
8	2019 IMPACT	16	STUDENT CONFERENCES	18	REACH		

PROMOTING A STEM CULTURE

WHERE STUDENTS UNDERSTAND THE IMPORTANCE OF STEM AND BELIEVE THAT STEM EDUCATION AND CAREERS ARE ACCESSIBLE TO THEM

WONDER OF SCIENCE

“A renewed national focus on STEM in school education is critical to ensuring that all young Australians are equipped with the necessary STEM skills and knowledge that they will need to succeed”

National STEM School Education Strategy report, 2015

THE WONDER OF SCIENCE APPROACH

- Promotes problem-solving skills, including critical, creative, collaborative and ethical thinking
- Develops the student capabilities required to achieve and succeed in a rapidly advancing and changing world
- Develops deep understanding of STEM concepts in students
- Supports teacher capability for quality STEM teaching and learning

STEM INQUIRY TASKS



STEM INQUIRY - CHALLENGING, REAL-WORLD TASKS ALIGNED TO THE AUSTRALIAN CURRICULUM

- The Wonder of Science challenge tasks immerse students in authentic and collaborative inquiry
- Students develop critical and creative thinking skills as they are challenged to develop a group response to a real-world problem or scenario



YOUNG SCIENCE AMBASSADORS - INSPIRATIONAL PhD RESEARCH STUDENTS ARE PASSIONATE AND KNOWLEDGEABLE STEM ROLE MODELS

- The Young Science Ambassadors support implementation of Wonder of Science, and judge presentations at the student conferences
- Teachers describe them as “bringing STEM to life” in their schools

STUDENT CONFERENCES



STUDENT CONFERENCES - ASPIRATIONAL REGIONAL AND STATE LEVEL STUDENT SHOWCASE EVENTS

- Representative teams from participating schools are invited to present their challenge task response at a one-day regional student conference
- Winning teams receive medals and a trophy for their school and are then invited to State Conference held at a university campus

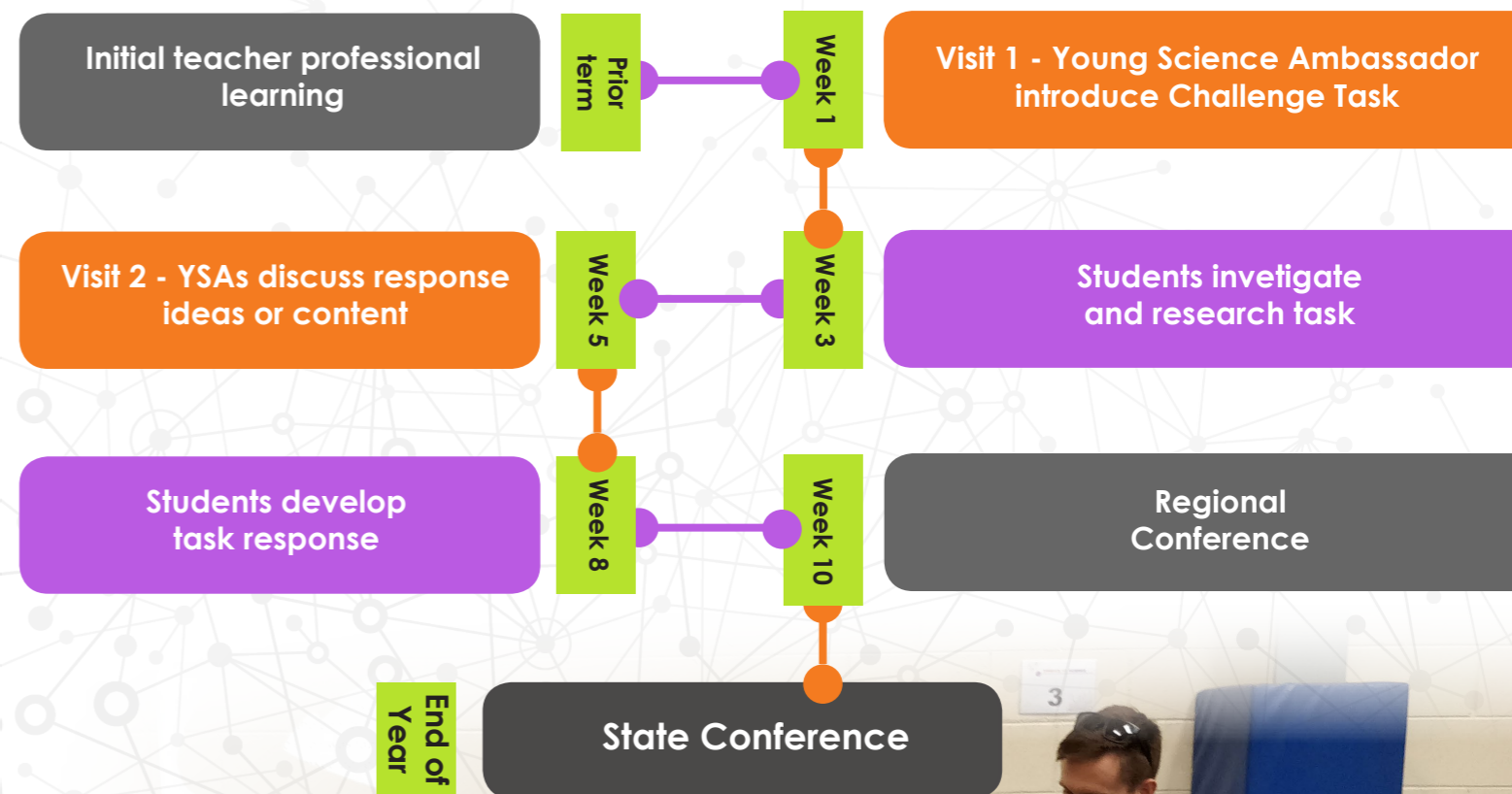
PARTNERSHIPS



STRATEGIC PARTNERSHIPS - BETWEEN SCHOOLS, UNIVERSITIES, INDUSTRY GROUPS, NON-PROFIT ORGANISATIONS & GOVERNMENT AGENCIES

- Wonder of Science fosters partnerships between schools and the wider community through our partner organisations
- Our partners support the student conferences and extension experiences for participating schools

TYPICAL TIMELINE FOR SCHOOL ENGAGEMENT WITH WONDER OF SCIENCE



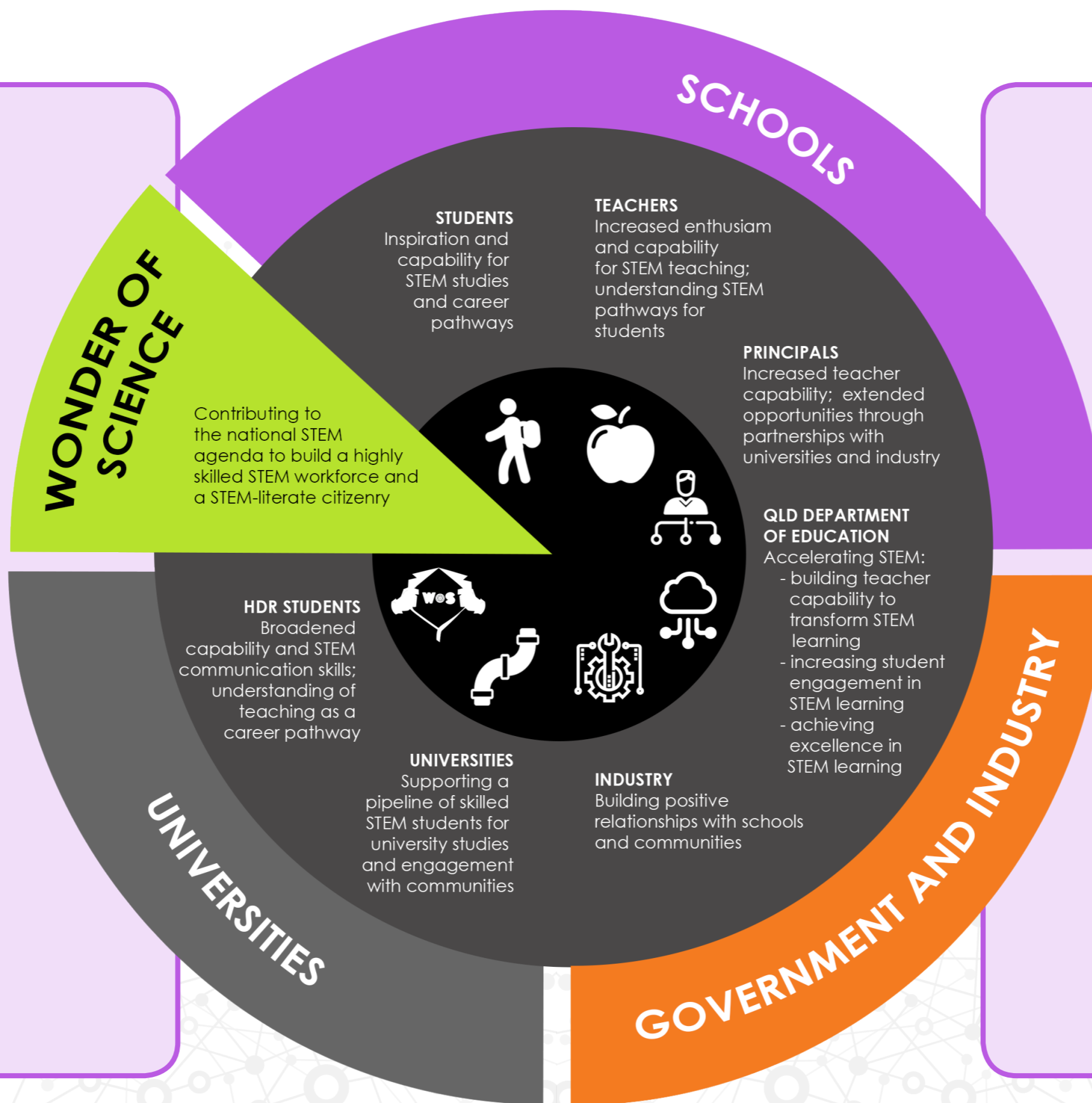
THE WONDER OF SCIENCE™ ADVANTAGE

ANDREEA RYALLS

HEAD OF DEPARTMENT - SCIENCE
Stretton State College

"I was asked to take on the role of Wonder of Science Coordinator at Mount Gravatt State High School in 2017. The initial trepidation of implementing such an open-ended task was palpable but was quickly dispelled as soon as the students had their first Ambassador visit. The link between real-world research and the classroom was quickly established and students became more and more involved with their chosen challenge.

The teams performed incredibly well, built upon their resilience and were incredibly excited to come out with a top spot at the prestigious State Conference. When I was appointed as HOD of Science at Stretton State College I could not wait to implement the program again. The opportunity was magnified as we are a P-12 college. Our Year 4, 5, 6, 8 and 9 teams could not wait to get involved and the teachers were on board immediately."



KAYE NORTH

QUEENSLAND DEPARTMENT OF EDUCATION
STEM CHAMPION
North Coast Region 2017 - 2019

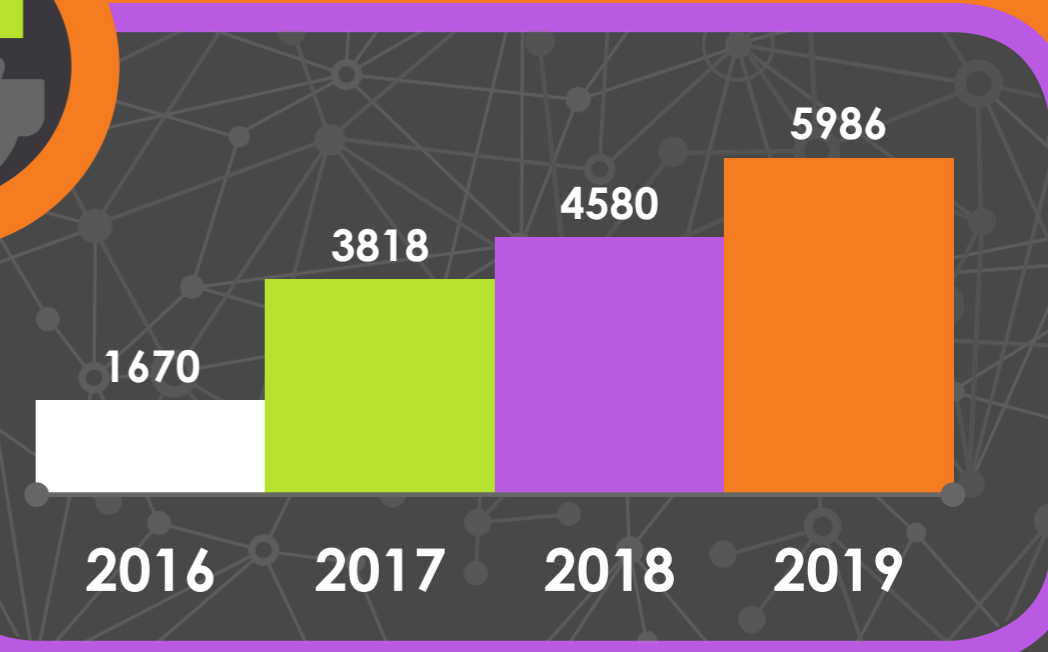
"I wanted to say thank you so much for all you have done for schools, teachers and students in the North Coast Region over the last three years. I have really enjoyed being a part of the Wonder of Science program and promoting it to schools. The conferences are always such a highlight of my year and they are a showcase of the work that has gone into the program.

I know across the region there are a large number of teachers who are better equipped and have a much better knowledge of how to approach science through inquiry and how to deliver science through this model.

I know that the students absolutely love engaging with this program. This can be seen when the YSAs visit in schools, when students are engaging in activities and lessons created by teachers, when students are developing their response to the inquiry question, when they are presenting their investigations to others and when they have the opportunity to present at conference. I have seen this as both an educator and a mother."

2019 IMPACT

STUDENTS IMPACTED THROUGH SCHOOL VISITS



4332
additional people
(including 3621 students)
reached via other STEM
activities

1004
students attended a
regional conference

24
students attended
a two-day Camp
Koala research
experience (QTFN)



76%
are state
schools

55%
of schools are
rated below
the average
socio-education
advantage
(ICSEA)¹

76%
of Young Science
Ambassadors are
female

43%
increase in
the number of
schools from 2018
to 2019

63
schools from
regional, remote
and metropolitan
Queensland

143
students attended
2019 State
Conference

107
Young Science
Ambassadors

85076
Twitter impressions on
the Wonder of Science
Twitter account

State Conference 2019



Year 5

Year 6



Year 7



Year 8



Year 9



Year 4



This year Wonder of Science reached

21356 people

including students, teachers, parents and community members

¹ www.myschool.edu.au (2018)

HIGHLY EFFECTIVE STEM COMMUNICATORS AND ROLE MODELS

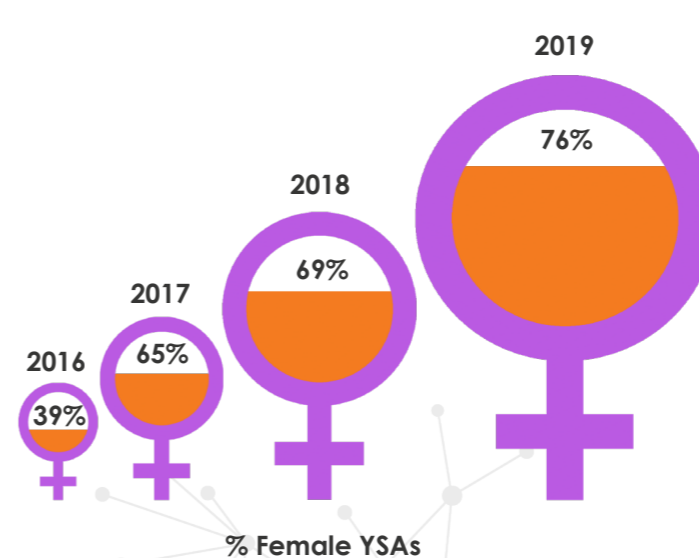
2019 was the first year that existing Young Science Ambassadors (those who had participated previously) outnumbered new recruits. The high retention rate of Higher Degree Research (HDR) students (which has increased each year since 2016) from leading Queensland universities highlights the significant benefit the ambassador program offers... fifteen YSAs have even continue with Wonder of Science following completion of their doctoral studies!

As Sadegh Imani and Amy Chan point out on the following page, being a Young Science Ambassador has significant personal and professional benefits. In addition, the ambassadors report great satisfaction through

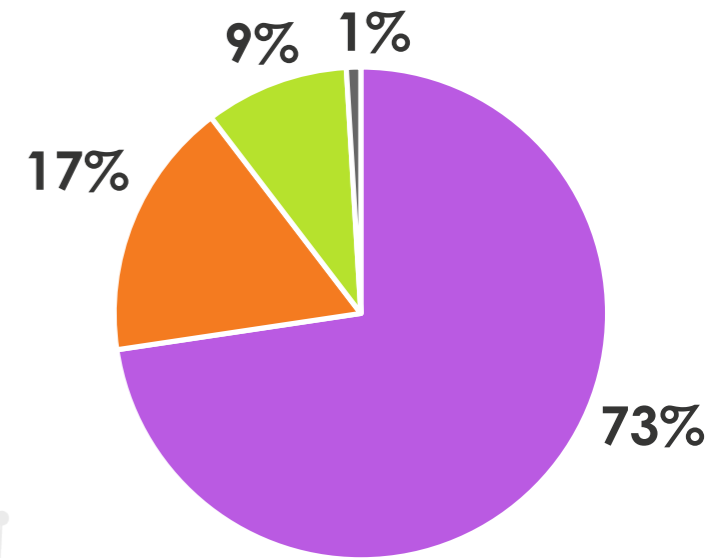
their interaction with students and teachers in schools providing them the opportunity for to 'give-back' to communities.

The significant impact of the ambassadors in schools is key to the Wonder of Science approach to building a STEM culture. Andreea Ryalls from Stretton State College captures this well on page 6 as she discusses how "the initial trepidation of implementing such an open-ended task was palpable but was quickly dispelled as soon as the students had their first Ambassador visit". In addition, "the link between real-world research and the classroom was quickly established and students became more and more involved with their chosen challenge".

GENDER BREAKDOWN



INSTITUTION BREAKDOWN

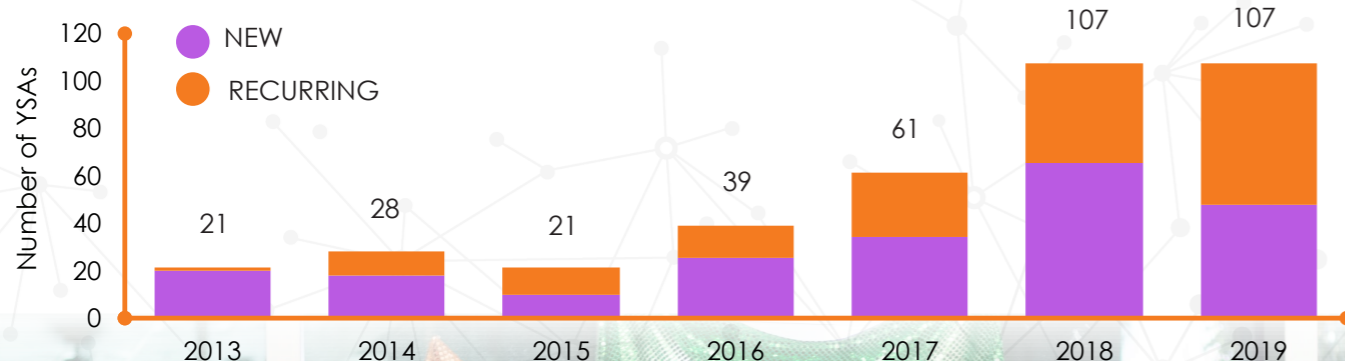


- The University of Queensland
- Griffith University
- Queensland University of Technology
- James Cook University

24% of YSAs have participated for 2 years or more

56% of YSAs returned from 2018

YSA RETENTION



AMBASSADOR TESTIMONIALS



SADEGH IMANI
MECHANICAL ENGINEER
Griffith University

"I just wanted to thank you for having me as an ambassador for the WoS program which is one of the most amazing experiences. I am so happy to know [Wonder of Science], which promotes the STEM culture and allows young students to communicate with PhD researchers. The visits that I have gone to were so fantastic - I saw many students who were told to think, brainstorm, and conduct scientific research and finally try to present their investigation results professionally.

What amazed me the most was that this program made the students not afraid of failure and always trying to learn new things. It was also a great opportunity for me to view my own research from a different aspect and to see if I could explain my complicated and challenging PhD topic into very simple words, so that the students could find it interesting."



AMY CHAN
IMMUNOLOGIST
The University of Queensland

2018 QLD Women in STEM
People's Choice Award
2019 Women in Technology
Life Sciences Young
Achiever

"Science is communication. As Sir. Mark Walport said, science is not finished until it is communicated. In today's political climate, I believe good science communication is more important than ever before. Though PhD students frequently give talks and write scientific papers, Wonder of Science taught me the skills to communicate to a general audience in an approachable and engaging manner."



Young Science Ambassadors - State Conference 2019

Q and A Session:
Regional Conference



Young Science Ambassadors:
Mount Isa Visit



Cornflour Slime:
Dalby Regional Conference



Hon. Leeanne Enoch MP
Queensland Minister for Environment
and the Great Barrier Reef,
Science, and the Arts at the
Wonder of Science State Conference



Young Science
Ambassador Visit:
Sustainable Living task



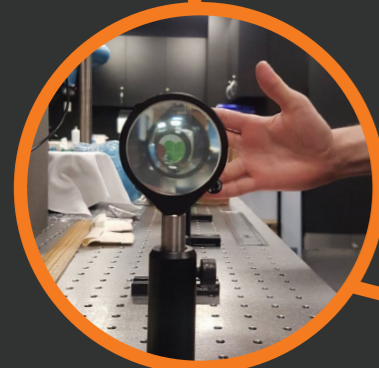
Science field trip -
Moreton Bay Environmental
Education Centre



Flying Scientist
Induction Day



Year 9 Invisibility Investigation
(Rochester Cloak)



Director Robyn Bull with Young
Science Ambassadors -
2019 Women In Technology
Award Finalists



Lena Batoon -
Winner 2019
Wonder of SciComm
Award



Winning Regional Team:
Miles Regional Conference

Science Communication
Workshop: Mount Isa
Regional Conference



**PROMOTING
A STEM CULTURE
IN QUEENSLAND
SCHOOLS**

Fizzy Chemistry Workshop:
Cairns Regional Conference



Brisbane UBTECH "It Takes a
Spark" Conference



Young Science Ambassador
Induction Workshop:
The University of Queensland

**ERIN VAN DER WYK**

TEACHER

Moreton Bay Environmental
Education Centre

"Thank you inviting us to this incredible day [State Conference 2019]. You put on an experience many of those students will never forget and may propel them into STEM as a career."

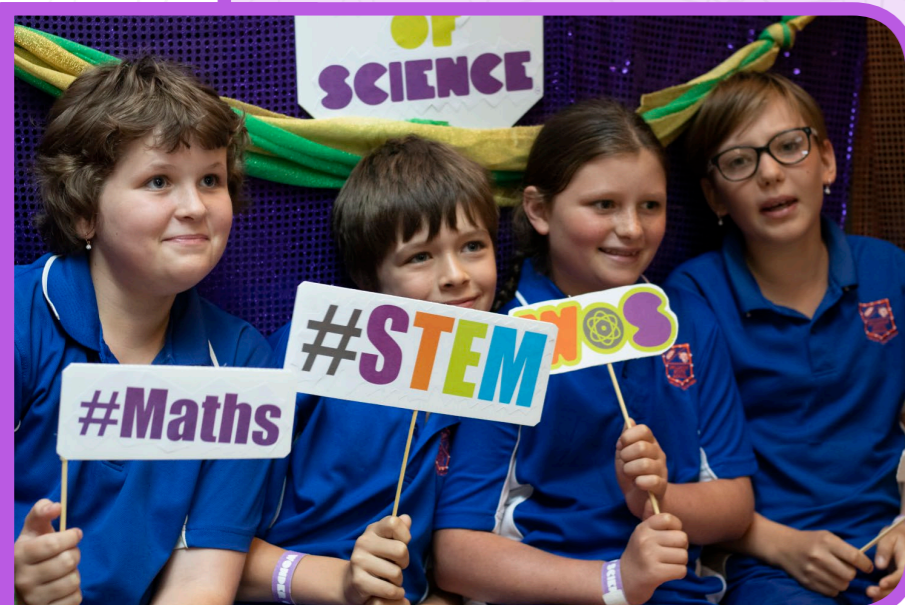
**ANDREEA RYALLS**HEAD OF DEPARTMENT - SCIENCE
Stretton State College

"The opportunity was magnified as we are a P-12 College. Our Year 4, 5, 6, 8 and 9 teams could not wait to get involved and the teachers were on board immediately."

KATRINA GAZE
TEACHER AND PARENT
Drillham State School

"I just wanted to let you know a little story that came about from last years conference. I am lucky enough to not only be a teacher at the conference but also a mum. [My daughter] went last year [to State Conference] and before going she didn't really know what she wanted to be when she was older or even if she wanted to go to uni. After attending the women in engineering workshop she walked out and decided that she was going to be an engineer. Being only in year 6 I didn't think she would keep the momentum but now at the end of year 7 she is still very strong in her ideas to be an engineer."

She has worked hard all year to achieve top marks (something I never thought I would see from her) and is participating in STEM club, future makers and anything like that she can. I think the WoS program is an amazing opportunity and it is great to see so many small schools at the State Conference....It is such a great way for our kids to see what is out there. Well done for making it what it is today!"



State Conference 2018

LEISA ELDER
VICE PRESIDENT EXTERNAL RELATIONS AND TENURE MANAGEMENT
Arrow Energy

"Arrow is committed to using its presence to build communities in its operational footprint, with a special focus on education. We've been supporting WoS since 2014 and, each year, we enable WoS to deliver two regional conferences for Western Downs schools... Each year the program reaches more schools, bringing WoS's enthusiasm and inspiration to more students - which is a great outcome for education in the Western Downs region."



Miles Regional Conference 2019

STUDENT CONFERENCES

BUILDING STUDENT CONFIDENCE AND CAPACITY FOR STEM STUDIES

Almost 20% of students participating in Wonder of Science attend a regional conference to showcase their team project to students from surrounding schools. The Young Science Ambassadors judge the student presentations against set criteria and award points to determine a winning team for each year level. The winning teams receive a trophy and individual medals, and are invited to attend State Conference in Brisbane in term 4, where they once again showcase their project, vying to be named the State Champions in their year level.

The conferences are proving to be an excellent learning opportunity for both students and teachers, who emphasise the benefit of observing other teams and the different approaches applied to the same challenge task. Almost 70% of students that attend a conference indicate, "greater interest in studying STEM-related subjects in years 11 & 12", and of particular interest is the increasing participation and achievement rate of female students at the conference level, with over 80% of the state champions being female this year!

78%

of students that attended State Conference were female

82%

of State Conference Champions were female

THE 2019 STATE CHAMPION TEAMS

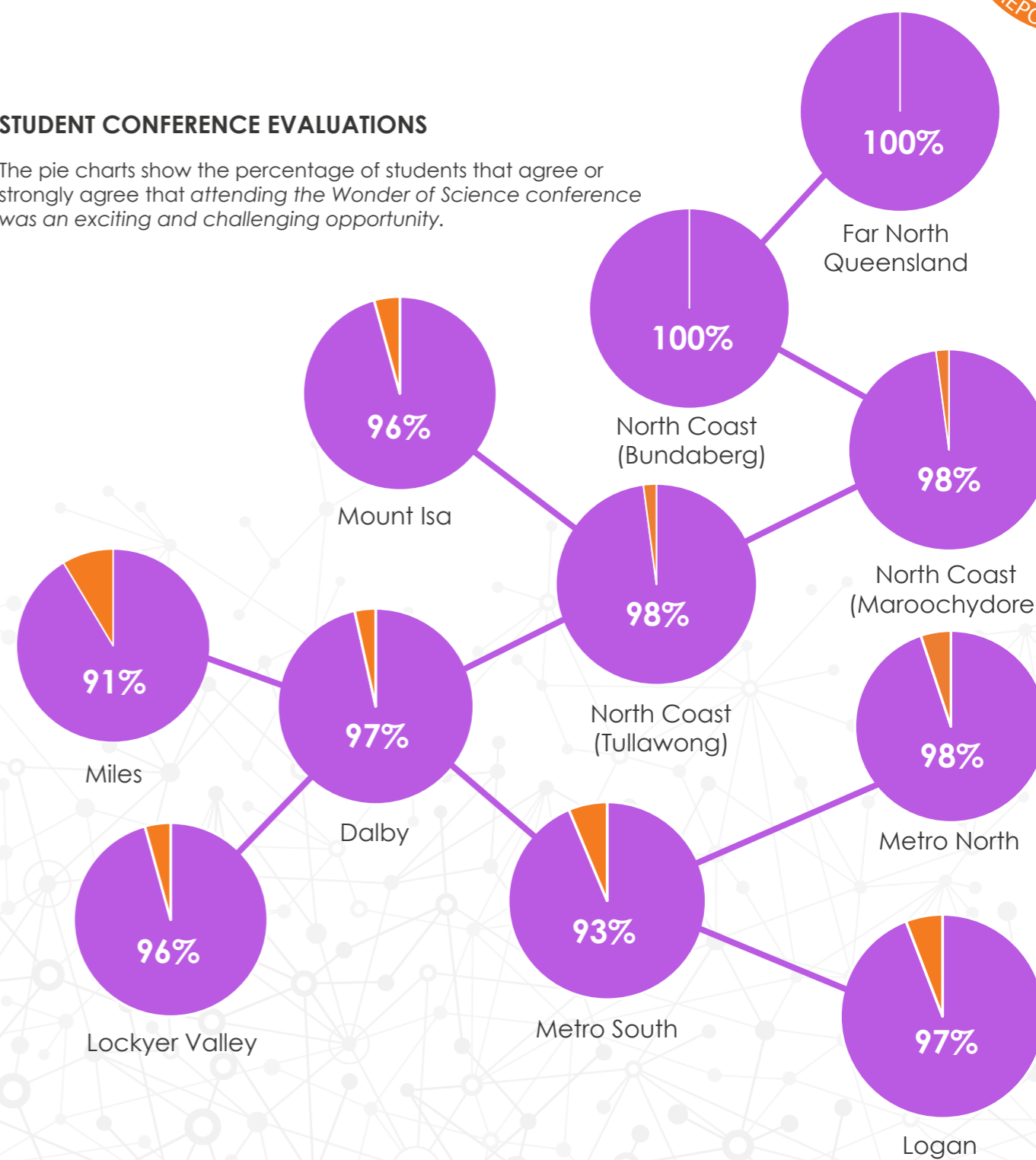
- Year 5 - Kimberley Park State School
- Year 6 - Mansfield State School
- Year 7 - Bundaberg State High School
- Year 8 - Innisfail State College
- Year 9 - Smithfield State High School



2019 State Conference Year 9 Champions

STUDENT CONFERENCE EVALUATIONS

The pie charts show the percentage of students that agree or strongly agree that attending the Wonder of Science conference was an exciting and challenging opportunity.



93% agree or strongly agree that presenting their team project at the conference was a valuable learning experience.

91% agree or strongly agree that observing other team presentations was interesting and valuable.

68% agree or strongly agree that they have a **GREATER** interest in studying STEM-related subjects in Years 11 & 12.

REACH

2019 WONDER OF SCIENCE STUDENT REACH

Cluster/Region	Funding model ¹		Number of schools	Number of classes		Total students	Conference attendees		
	Funded	Fee		Location	Teachers		Students		
Darling Downs South West	○		17	Year 5	17	296	Dalby	11	121
				Year 6	18	263			
				Year 7	13	247			
				Year 8	7	133			
				Year 9	8	144			
Total	63	1083	Total	27	252				
Brisbane Metro Primary (North)	○		2	Year 5	2	65	Brisbane	4	51
				Year 5/6	5	125			
				Year 6	1	40			
Total	8	230							
Lockyer	○		3	Year 7	8	200	Gatton	3	80
				Year 8	7	167			
				Year 9	6	150			
				Total	21	517			
Logan Primary	○		4	Year 4	1	29	Logan	6	130
				Year 5	4	104			
				Year 6	7.5	188			
Total	12.5	321							
Brisbane Metro Secondary	○		2	Year 6 (BSHS) ²	4	100	(Not applicable OR competed in Term 3 conferences below) ²		
				Year 8	1	29			
				Year 9	1	28			
Total	6	157							
Far North Queensland	○		2	Year 7	4	100	Cairns	3	38
				Year 8	3	75			
				Year 9	4	100			
Total	11	275							

¹Funding partners continue to support the program for some Queensland communities. The fee for service program is available for schools not in those catchments.

²Brisbane State High School Program does not include a regional conference

Young Science Ambassador - Mount Isa



This year
Wonder of
Science reached
over ~21000
people across
Queensland!

Cluster/Region	Funding model ¹		Number of schools	Number of classes		Total students	Conference attendees		
	Funded	Fee		Location	Teachers		Students		
Brisbane Metro Primary (South)	○		8	Year 4	7	175	Brisbane	8	29
				Year 5	17	425			
				Year 5/6	2	37			
				Year 6	18	460			
				Total	44	1097			
Moreton Bay Secondary	○		2	Year 7	8	200	Griffith University	22	100
				Total	8	200			
North Coast	○	○	16	Year 4/5	1	24	Bundaberg	5	60
				Year 5	22.5	540			
				Year 5/6	3	66			
				Year 6	15	361			
				Year 7	7	172			
				Year 8	7	178			
Year 9	7	175							
Total	62.5	1516	Total	33	240				
Mount Isa and Doomadgee	○	○	7	Year 5	8	190	Mount Isa	9	59
				Year 6	9	180			
				Year 7/8	2	20			
				Year 8	7	175			
				Year 9	3	25			
Total	29	590							
Total students in WoS STEM inquiry program			63	265	5986	Conference	122	1004	
Additional school visits (Flying Scientist)	○		10	Years Prep - 12	41	1082	N/A		
Additional reach through other STEM activities (Years Prep - 12)						3621	N/A		
Total			73	306	10689	Conference	122	1004	

PROFESSIONAL DEVELOPMENT

TEACHERS PROFESSIONAL DEVELOPMENT OPPORTUNITIES

Wonder of Science supports teacher professional development in effective inquiry-based STEM teaching and learning through provision of:

- Face-to-face workshops for teachers including one day and after school options
- Curriculum planning materials that support implementation of the Wonder of Science challenge tasks
- Observation of the Young Science Ambassadors who model scientific inquiry and design thinking with effective questioning during classroom visits

Teachers report that engagement in the face to face workshops prior to implementation of Wonder of Science is very advantageous in building understanding of effective STEM inquiry and clarifying expectations for the term-long implementation of the program.

Evaluation data of the workshops and teacher feedback (opposite page) is very strong and in 2020, a virtual professional development program will be offered to ensure equitable access to this valuable resource for teachers.

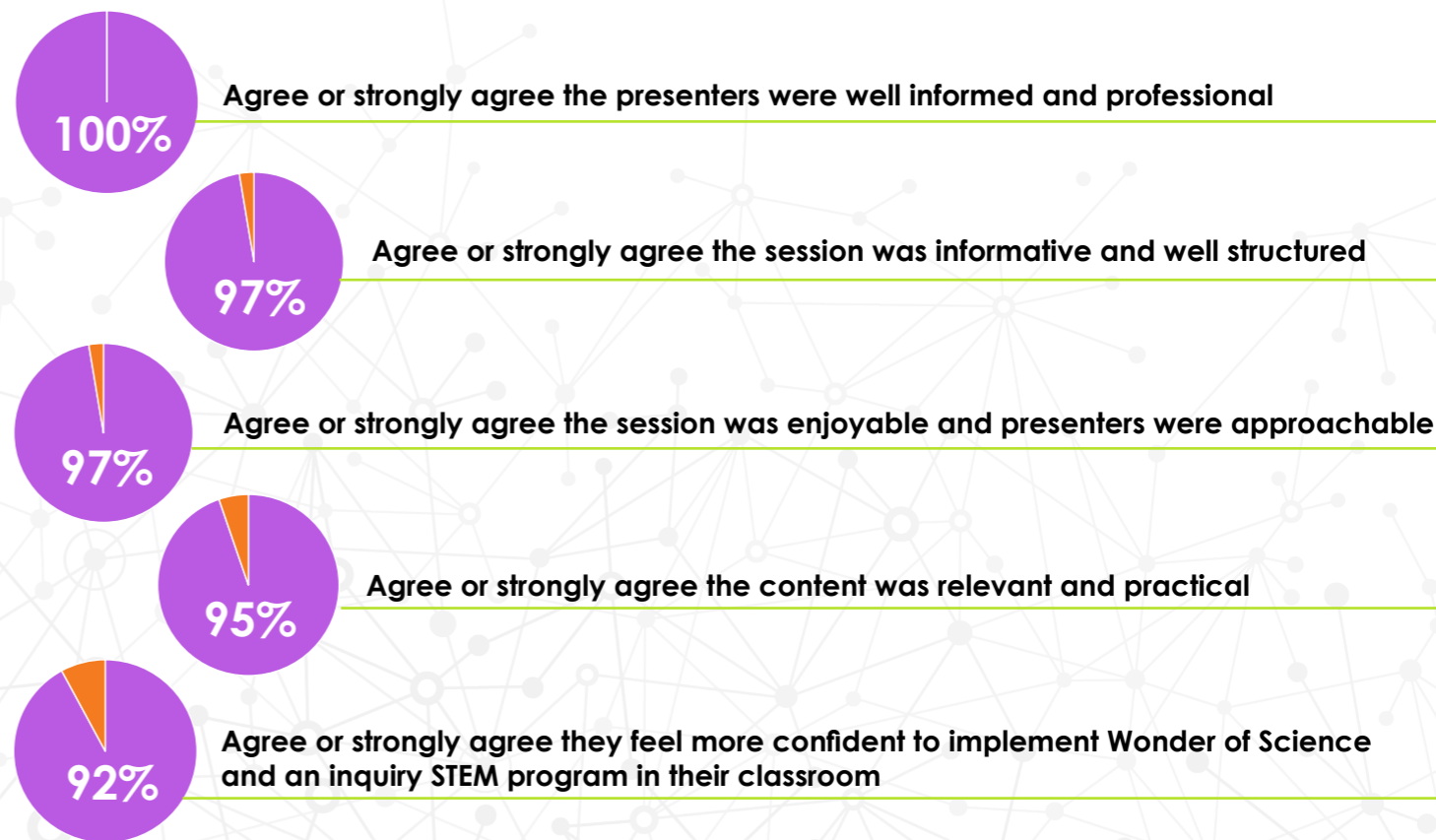


Wonder of Science and Natura Education Professional Development Day - Griffith University

TEACHER EVALUATIONS OF FULL-DAY PROFESSIONAL DEVELOPMENT WORKSHOPS

JULIA SCHLEEHAUF
 HEAD OF DEPARTMENT - SCIENCE
 Bribie Island State High School

"Thanks - it was one of the best PDs I've been to in ages. It will change the way we teach science at BISHS and then also change how we teach other subjects as well."



TEACHER FEEDBACK ON PROFESSIONAL DEVELOPMENT WORKSHOPS

"Thank you for an insightful and inspiring day! Love the inquiry process you highlighted as this is our pedagogy. I have many take-aways to share with staff."

"Very informative and passionate presenters who really know STEM and Science. Thank you for sharing."

"Wonderful presentation. Engaging. Practical applications. Useful pedagogy."

"[I have] More confidence in educating staff on running inquiry projects."

FLYING SCIENTISTS

ENGAGING RURAL QUEENSLANDERS IN SCIENCE

The flying scientists program is providing regional communities with access to engaging scientists and building their understanding of the impressive scientific research happening right here in Queensland. In 2019, 16 Flying Scientists (typically early career researchers) and 10 Young Science Ambassadors visited 11 regional Queensland centres to showcase the valuable contribution that science and our scientific community are making to our state and indeed, Australia.

The program is offered free of charge through our partnership with the Office of the Queensland Chief Scientist and funded by the Queensland Government Advance Queensland Initiative. Once again, evaluation data from the Flying Scientists program was very strong and is indicative of the benefit of strategic partnerships in providing equitable experiences for schools and communities regardless of their location.

In addition, the program is proving to be a valuable opportunity for Queensland's emerging scientists to hone their science communication skills and experience the satisfaction of sharing their research with everyday citizens and students.

97% of attendees agree or strongly agree that "more events like this would be useful and welcome in [their] community".

2019 FLYING SCIENTIST EVENTS

Date	Location	Flying Scientist	Activities	Attendee numbers	Total numbers
1 - 2 March	Gladstone	Dr Michelle Langley	World Science Festival Community Events	6500	
29 - 30 March	Chinchilla	Dr James Kesby	World Science Festival Community Events	2500	
2 May	Cairns	Dr Teresa Ubide	Community Event School Visits	64 107	171
20 May	Hervey Bay	Dr Audra Shadforth Dr Honor Hugh	Hervey Bay Special School Big Bang STEM Day	300	
18 - 21 July	Charleville Cosmos Centre	Dr Jyotsna Batra Dr Jake Clark Dr Erik Streed	50th Anniversary Moon Landing Events School Visits	170 160	330
13 August	Maryborough	Dr Francesca Frentiu	Community Event School Sessions for National Science Week	200 65	265

Gladstone



Mackay



Chinchilla



Charleville



Cooktown

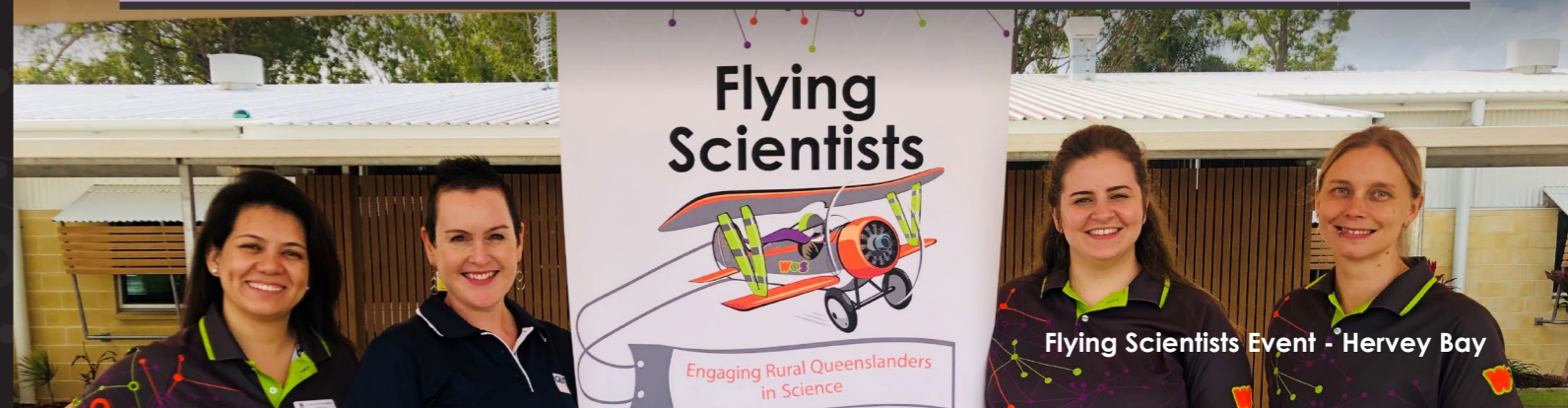


DR TERESA UBIDE
FLYING SCIENTIST - CAIRNS
The University of Queensland

"It was a great honour to engage with the Cairns community through the Flying Scientist program! [We] interacted with 6 classes of super engaged students. The evening community event was very successful and attendees were extremely participative and inquisitive ... It was an unforgettable experience and I hope I can be a Flying Scientist again in the future!"

2019 FLYING SCIENTIST EVENTS (CONTINUED)

Date	Location	Flying Scientist	Activities	Attendee numbers	Total numbers
14 August	Longreach	Dr Tom Cole-Hunter	Community Event School Visits	10 60	70
21 August	Cooktown	Dr Michael Simmonds	Community Event School Visits	12 365	377
11 September	Mackay	Dr Emma Gagen	Community Event School Visits	20 190	210
14 November	Airlie Beach	Dr Jenny Allen Catherine Kim	Community Event School Visits	28 135	163
15 November	Tullawong	Dr Michela Mitchell Dr James Kesby Dr Shaneel Chandra	Community Event	30	30
Total	11 Locations	16 Flying Scientists	10 School visits 11 Community events	1082 9834	10916



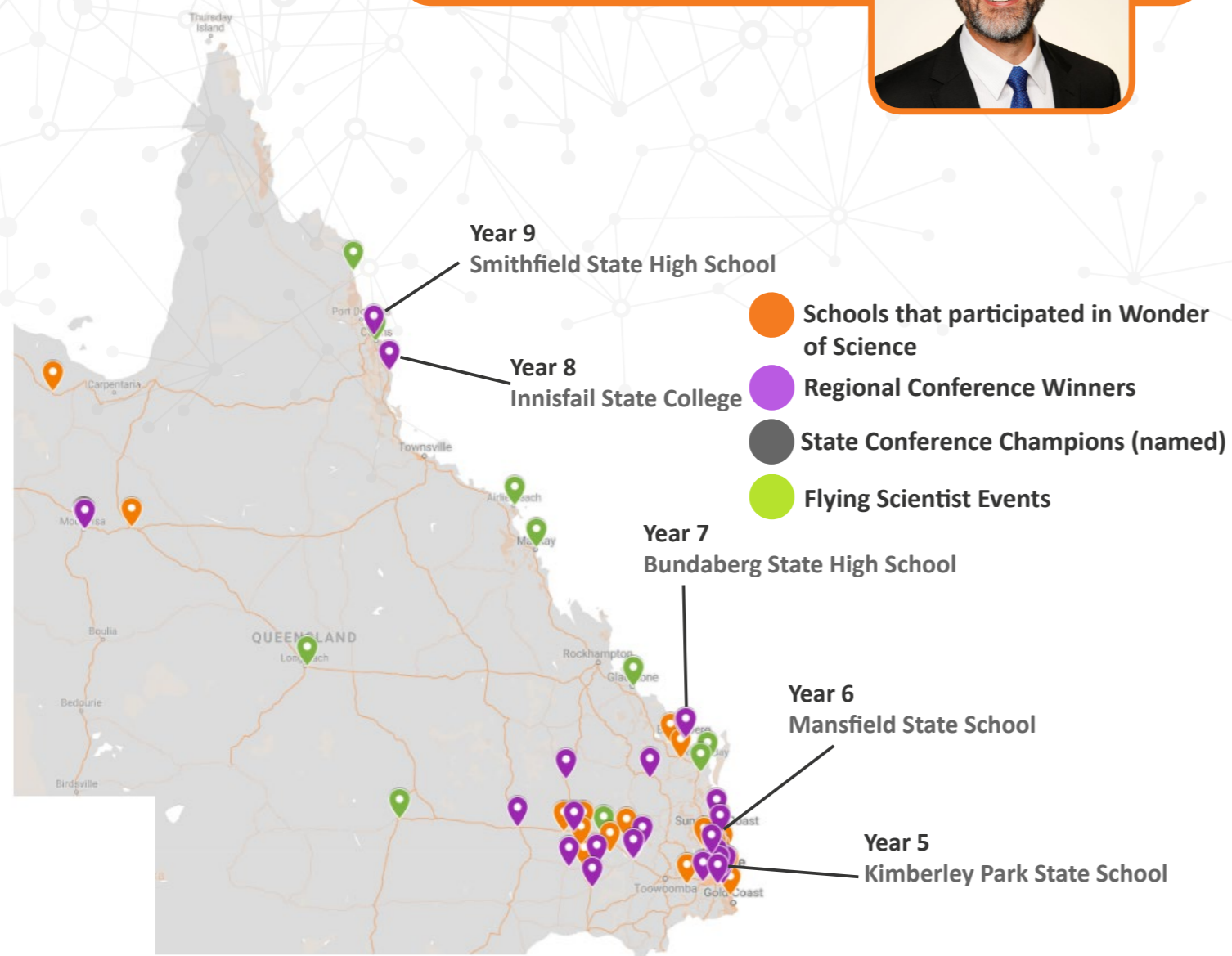
Flying Scientists Event - Hervey Bay

SUMMARY

The Wonder of Science program, under Robyn Bull's leadership has grown from strength-to-strength. We are particularly proud of our over 100 passionate and highly effective Young Science Ambassadors, who as PhD students in STEM fields, are positive role models and exceptional communicators to both school students and teachers. These Young Science Ambassadors bring "science to life" and put so

much into the program through their face-to-face interactions at schools across Queensland. The financial support from our valued partners enables the program to promote a STEM culture across public and independent schools, with a focus on regional/rural communities and the diversity of school students, who are Australia's future in the all-important STEM fields.

Dr David Noon FTSE
ATSE Queensland Division Chair
WoS Advisory Board Member



FINANCIAL OVERVIEW 2019

Income (\$'000)	
Partner Contributions	491
Ambassador funding (all universities)	110
The University of Queensland additional contribution*	134
Queensland Department of Education	150
Advance Queensland (Flying Scientists program)	25
School participation fees	105
Total	1015
*support for salaries and program delivery	
Expenditure (\$'000)	
Staff salaries	423
School program delivery cost	117
Young Science Ambassador award payments	199
State conference cost	10
Total	749
BALANCE (committed f'wd 2020)	266



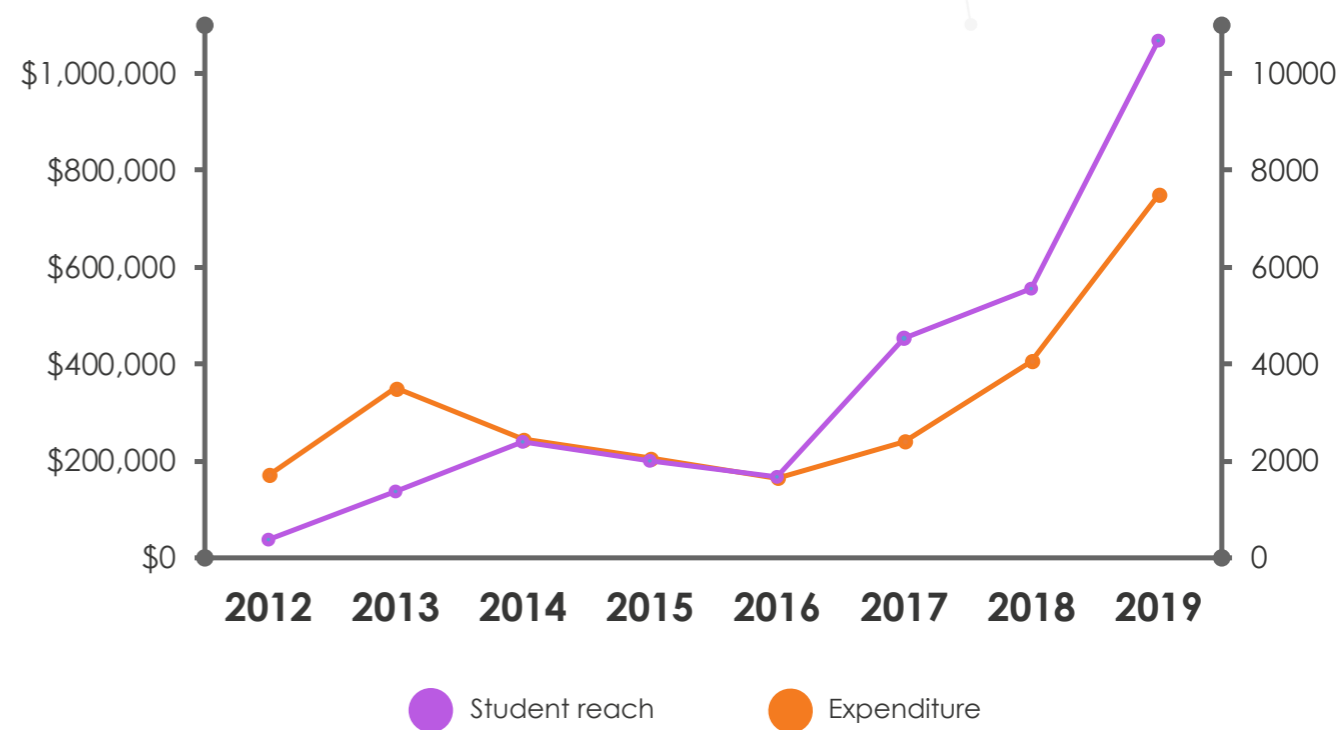
ROSIE CRANSTOUN
TEACHER
Taroom State School

"The girls really enjoyed the Wonder of Science program. Thank you also for the support that you gave through the whole process from beginning to end. I'm hopeful that next year we may be entering students from other year levels too."



The University of Queensland provides additional in-kind support to host Wonder of Science and support the team.

WONDER OF SCIENCE ANNUAL STUDENT REACH AND EXPENDITURE



PARTNERS

Wonder of Science would not be possible without our valued partners - thank you to all!



PARTNER WITH US

We welcome organisations, philanthropic foundations, universities, and other STEM agencies as partners.

For further information, please contact:
Robyn Bull, Wonder of Science Director



CONTACT

ROBYN BULL
DIRECTOR

www.wonderofscience.com.au
0410 265 404
robyn.bull@uq.edu.au

FOLLOW US ON SOCIAL MEDIA

@WoSQld

@WonderOfScienceQld

wonderofscienceprogram

company/wonder-of-science

Scan to visit the website



www.wonderofscience.com.au

