



Australia's National
Science Agency

Generation STEM

2022 Annual Review



Acknowledgement of Country

CSIRO recognises that Aboriginal and Torres Strait Islander peoples have made and will continue to make extraordinary contributions to Australian culture, economy and science and we aim to promote and support the vision of 'A science landscape in respectful partnership with Indigenous Australia delivering innovative, sustainable, holistic solutions to meet our greatest national challenges'.

Generation STEM is managed by CSIRO and made possible by the NSW Government's \$25 million endowment to the Science and Industry Endowment Fund (SIEF).

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Executive summary

2022 was a successful year of growth for Generation STEM with expanded reach and diversified program offerings. Generation STEM continued to create strong relationships with its participants, partners and collaborators, building on a solid foundation to ensure its programs are impactful and meet local community needs.

Over the past 12 months, the now well-established STEM Community Partnerships Program (STEM CPP) (Focus Area 1) focused on increasing opportunities for students to engage with industry through new and remodelled offerings, and expanding its activities outside Western Sydney. The program reached over 2,300 high school students in 2022, providing opportunities for 2,208 industry-student interactions across 89 activities and events.

With the addition of Deadly in Generation STEM (DIGS) (Focus Area 1) and Generation STEM Links (Focus Area 2) to Generation STEM's offerings, the team has been actively working to increase the participation of people from diverse backgrounds within the STEM pipeline and supporting tertiary students in their transition to employment. Noting that the programs are still in establishment phase, significant work was undertaken to refine these programs and strengthen relationships with community, schools and industry to inform program improvements.

While participation numbers for these programs remain relatively small, initial participant feedback has been positive and in the case of DIGS, indicates the potential for deeper impact, and in the case of Generation STEM Links, is establishing a solid delivery model that can be scaled and replicated.

Industry and community are increasingly seeing the value of Generation STEM, with some businesses being involved in multiple programs or expanding their participation to more activities. The program's flexible nature and suite of offerings across the STEM pipeline makes it easy to participate in a way that suits their needs while providing the structure and support to make the experience engaging and rewarding.

Recognising that Generation STEM has completed its fourth year of delivery, an Evaluation Report has been developed for the first time, outlining progress to date and evaluation assessments associated with Generation STEM's initiatives. This report provides the team with key insights and recommendations to consider for implementation as the programs continue to grow and develop.

In summary, 2022 was a year of firming up our presence in NSW, refining the suite of program offerings and learning by doing.

Generation STEM 2022 year in review

3 programs delivered in 5 location priorities

104% growth in student numbers

96% growth in industry partners

1219 attendees across 10 STEM CPP showcases

Deadly in Generation STEM Immersion Days held in the Illawarra and Moree

29 internships completed or underway, with a further 31 in the pipeline

First STEM industry-education roundtable in Newcastle

First STEM specific careers event held with 450+ students attending

Our partners see the value of Generation STEM

“STEM CPP is both a strategic and tactical approach to developing and retaining STEM talent in our region that can support the development of local and regional industry and future-focused economy.”
– Queanbeyan-Palerang Regional Council

“We find STEM CPP dovetails perfectly with our requirements. We often have students start flight training after a STEM CPP site visit.”
– Central Coast Aero Club

“The [Generation STEM Links] candidates we were offered were all good but the candidate we have chosen is an exceptional fit for our business. I doubt we would have been able to achieve this without the aid of the CSIRO.”
– Generation STEM Links industry partner

Our impact

The monitoring and evaluation of Generation STEM to date has shown:

- 1 Increased levels of interest and intention to pursue STEM careers among students
- 2 Increased teacher capacity, including in inquiry-based learning
- 3 Increased awareness of Indigenous knowledges in STEM
- 4 Increased skills and confidence among students

Communicating to a wider audience

16,340 website visitors (249.67% increase from 2021)

4129 social media engagements (LinkedIn, Facebook, Twitter and Instagram)

Data insights

Continued progress including initial results from a predictive analytics project and approval of Evidence X, a project that aims to improve STEM education outcomes.

Continued growth and expansion

Gaining momentum with two new programs

2022 saw two new programs – Deadly in Generation STEM and Generation STEM Links – ramp up delivery.

Deadly in Generation STEM Immersion Days were delivered for the first time in the Illawarra and Moree. Students engaged in hands-on STEM activities on Country and explored the connections between Indigenous STEM knowledges and Western science.

Generation STEM Links also gained traction throughout the year, with 29 placements completed or underway and 31 in the pipeline. The team has now developed strong relationships with 12 tertiary educational institutions and received applications from 271 students¹.

All of NSW

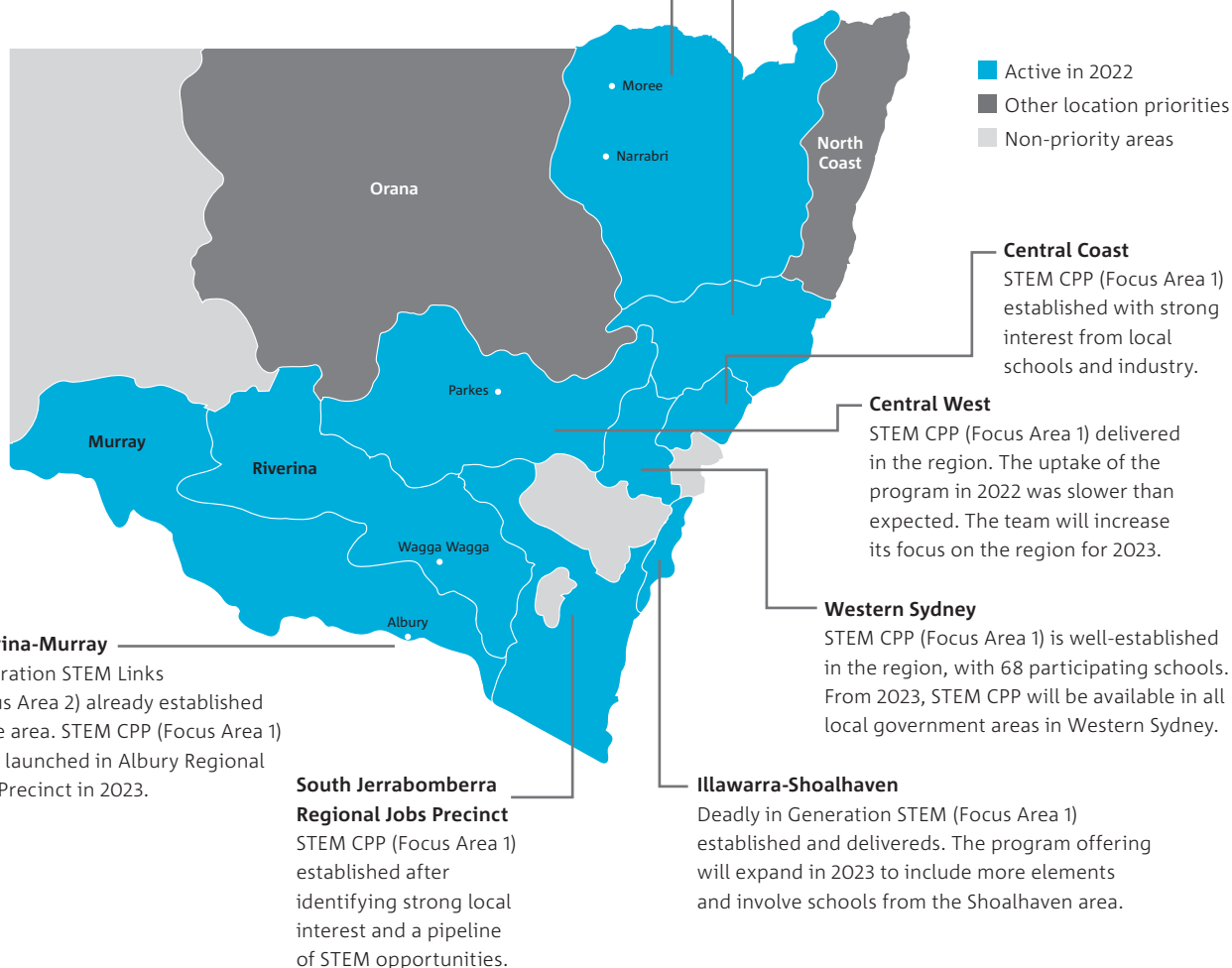
Generation STEM Links (Focus Area 2) open to businesses, organisations and tertiary students in Generation STEM location priorities and from September 2022, across all of NSW.

New England

Deadly in Generation STEM (Focus Area 1) delivered in Moree to leverage opportunities related to the Special Activation Precinct. Discussions commenced to establish STEM CPP (Focus Area 1) in the region in 2023.

Hunter region

Identified as the first location to test opportunities to build and strengthen connections between the tertiary education sector and industry as part of Generation STEM Links (Focus Area 2).



¹ This does not include an additional 75 applications that did not meet the eligibility criteria.

Expanding our geographical reach

Generation STEM continued its geographical expansion in 2022. It commenced programs in the Illawarra-Shoalhaven region, Central Coast, Moree and the South Jerrabomberra Regional Jobs Precinct and grew its presence in the Central West region. Within Western Sydney, the STEM CPP expanded from seven to 11 local government areas (LGAs).

Since September 2022, Generation STEM Links is now available to all NSW businesses/organisations. This has streamlined recruitment and marketing processes while still enabling the team to retain a focus on Generation STEM's location priorities.

Delivery models to meet community needs

The expansion of Generation STEM beyond Western Sydney opened opportunities to work with different organisations and individuals with local knowledge and expertise. For example, the Moree Deadly in Generation STEM program was delivered in collaboration with a Moree-based youth organisation, SHAE Academy.

The new partnerships and collaborations have enabled the team to gain deeper insights into local and regional needs, and better tailor our programs. With this in mind, the team will continue to explore and consider the most suitable collaborators when working in different regions.

Building on a solid foundation

STEM CPP continued to grow from strength to strength. Recovery from COVID-19 disruptions allowed the team to deliver elements of the program that had been in development for some time. These include partnering with TAFE NSW on two STEM Taster Programs and delivering Generation STEM's inaugural #WithSTEMYouCan Career Expo at Sydney Olympic Park. These activities provided students with more immersive STEM experiences and a broader range of connections to local STEM pathways and careers.

The relationships developed as part of STEM CPP have contributed to the growth of the other programs, with businesses appreciating the ability to engage with students at both the high school and tertiary level through Generation STEM's programs. To date, 8.5% of the Generation STEM Links industry project applications have come from existing STEM CPP relationships.

STEM CPP continues to strengthen capability in inquiry-based learning and linking to real-world STEM within schools. Both existing and new schools continue to send, on average, 1.9 new teachers to the Teacher Professional Learning Day (TPL) enabling the program to become more embedded in the schools. Across the life of the program, capability has been developed in approximately 275 NSW teachers and in some schools, entire faculties have completed the TPL.

The roadmap to sustainability

As Generation STEM approaches the halfway point of its 10-year timeframe, the team has started to consider and develop a plan for the sustainability of the program. This will involve working in collaboration with key partners and participants towards self-sustaining programs, a shift in culture and perspectives and having insights to inform future programs.

Initial discussions have commenced with longer-term collaborators to take on greater responsibilities. Additionally, through focused professional learning and intensive support at the beginning of a participant's involvement, sustainable relationships between teachers and industry are starting to emerge.

A Content Specialist has also commenced in the team, who will lead the development of participant resources to support their current involvement and ongoing post-Generation STEM activities.

The next one to two years will be crucial for ensuring that strong foundations for Generation STEM's legacy are laid. STEM CPP will be the ideal testing ground for sustainability as it is the most progressed program. Learnings from STEM CPP's legacy planning approach will inform the future of the other programs as they develop.

Broadening our reach through communications

What we did

Made it easier for participants and stakeholders to engage with Generation STEM

- Refreshed entire Generation STEM website.
- Developed new program flyers for Generation STEM and Generation STEM Links.

Celebrated successes and student achievements to attract more participants

- Developed 10 new program stories (blog posts).
- Launched Generation STEM newsletter with program news and stories to our supporters.

Promoted activities in new ways and across a range of platforms

- Paid LinkedIn campaign for Generation STEM Links.
- Promoted content (including live tweeting) on CSIRO social media channels and CSIRO Education Facebook page.

Partnered with NSW Small Business Month in November to promote Generation STEM Links

Proactively shared news stories and content with a range of channels

Such as Regional Development Australia, Education Today, *Coast Community News*, University of Newcastle and *Nepean News*.



Students learn the drill at Central Coast Aero Club.



Virtual work experience program offers students a behind-the-scenes look into STEM careers, Sam Miles is a PhD candidate in medicinal chemistry at The University of New South Wales.

What were the results

Increased website traffic

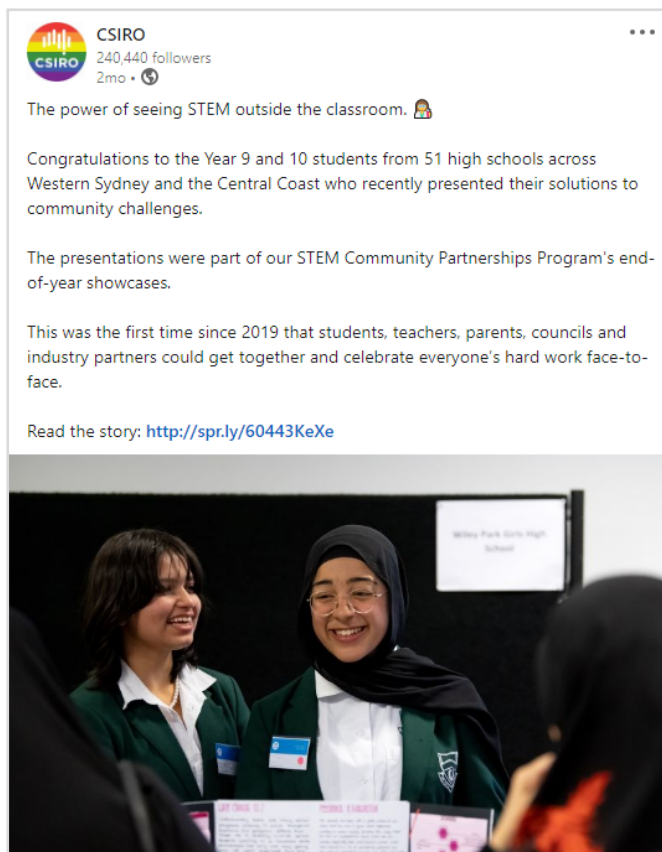
- 16,340 visitors to the Generation STEM website compared to 4673 in 2021.
- 112.18% increase in website pageviews from 36,662 in 2021 to 77,791 in 2022.

Increased engagement across social media channels

- 4129 engagements and 177,277 impressions across LinkedIn, Facebook, Twitter and Instagram.
- 224 web visits and 44,719 impressions from the Generation STEM Links LinkedIn campaign.
- #WithSTEMYouCan hashtag reaching 4710 people.

Increased coverage

- Coverage in the *Coast Community News*, a local Central Coast news source, about the STEM CPP operating in the region.
- A filming opportunity organised by the University of Newcastle to highlight Generation STEM Links for Career Connect, an extra-curricular university program designed to help students build the essential knowledge, skills and experience that employers demand.



CSIRO
240,440 followers
2mo • 🌐

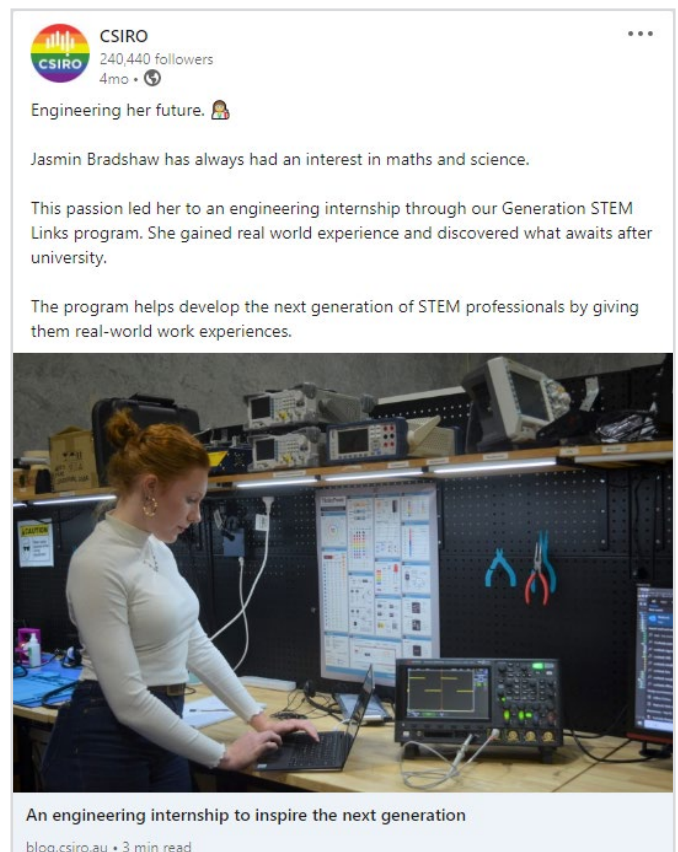

The power of seeing STEM outside the classroom. 🧑🎓

Congratulations to the Year 9 and 10 students from 51 high schools across Western Sydney and the Central Coast who recently presented their solutions to community challenges.

The presentations were part of our STEM Community Partnerships Program's end-of-year showcases.

This was the first time since 2019 that students, teachers, parents, councils and industry partners could get together and celebrate everyone's hard work face-to-face.

Read the story: <http://spr.ly/60443KeXe>



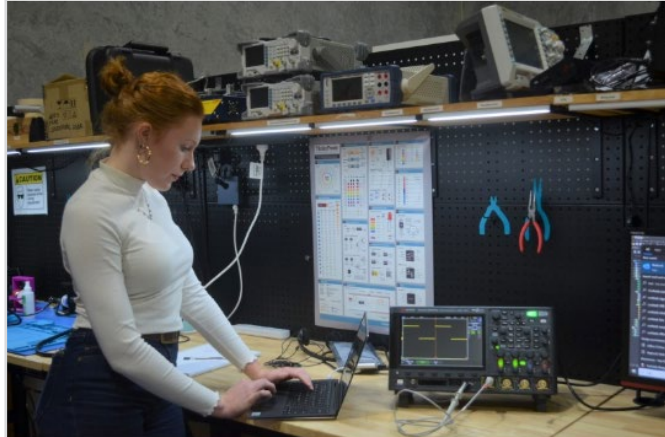
CSIRO
240,440 followers
4mo • 🌐

Engineering her future. 🧑🎓

Jasmin Bradshaw has always had an interest in maths and science.

This passion led her to an engineering internship through our Generation STEM Links program. She gained real world experience and discovered what awaits after university.

The program helps develop the next generation of STEM professionals by giving them real-world work experiences.



An engineering internship to inspire the next generation
blog.csiro.au • 3 min read



Program insights

Following the completion of four years of program delivery, a mid-term Evaluation Report 2019–22 has been developed to outline progress to date and provide evaluation assessments on STEM CPP (being the most mature program), as well as implementation and early outcomes evaluation on Generation STEM Links, and implementation evaluation on DIGS.

Overall, strong implementation outcomes were observed, including significant scaling up of STEM CPP and formation of industry partnerships, and successful first year implementation of Generation STEM Links and DIGS. The key outcomes are highlighted below.

STEM CPP



Increased teacher capacity, particularly in inquiry-based learning

Increased student interest and knowledge of STEM, particularly among those with lower initial interest levels and female students

Increased awareness of and intention to pursue STEM careers

Deadly in Generation STEM



Engagement of students in hands-on, real world STEM activities

Students valued hands-on activities and the involvement of Community Knowledge Holders

Strengthened knowledge and understanding of culture and Indigenous knowledges

Generation STEM Links



Successful targeting to students in lower socio-economic areas

Increased student confidence in core work-readiness skills

Industry partners valued access to potential high-quality recruitment pipeline

Some of the key areas of consideration included refinement of the program model and targeting (STEM CPP), greater focus on TAFE (Generation STEM Links), and discussion with young people on the design and delivery of camps/Immersion Days (DIGS).

For further information, refer to the Generation STEM Evaluation Report 2019–22.

Program delivery

Focus Area 1

STEM Community Partnerships Program

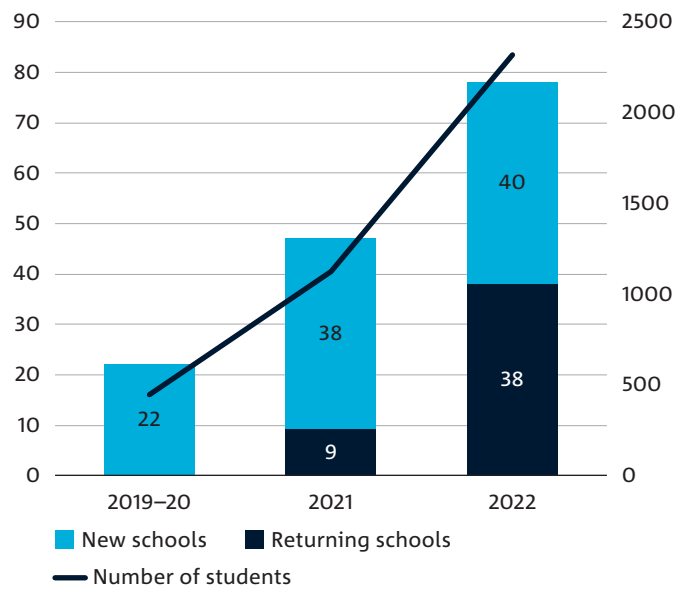
STEM CPP is now well-established in Western Sydney and is making headway outside of Sydney. Not only has the number of schools and students participating in the program increased by 66% and 107% respectively, but the average number of classes within each school and range of activities being offered has also grown.

Increased reach and reputation of STEM CPP have resulted in more STEM professionals and organisations interested in sharing their real-world knowledge with students through the program. 2208 industry-student interactions took place across 89 activities and events.

The relationships and processes established in previous years have paved the way for sustainable industry-education relationships, with more partnerships facilitated by the program flourishing and becoming independent of the program. Several strong partnerships have formed, including with Canva, Western Sydney Airport, Sydney Water and Lincoln Electric, who have engaged with a large number of schools on different activities, such as offering multiple site visits, participating in the Careers Expo and encouraging staff to become mentors.

2022 also allowed for the return of face-to-face showcase events, after two years of virtual events due to COVID-19. Over 100 industry professionals were able to celebrate students' achievements, view their projects and engage with them about the program.

Continued year-on-year growth since 2019



STEM CPP number of schools and students year-on-year

After four years of program delivery, almost 4000 students have participated in STEM CPP. Importantly, an accumulated 94 schools have participated over the life of the program, with a retention rate of 83% for schools that complete their first year and many continuing to send new teachers every year. This is evidence that the program is becoming more embedded within schools.

“STEM CPP has been crucial in showing schools and students the links between the different subject areas. So that science, technology, engineering and maths are brought together as one curriculum unit of work.”
– Teacher

“In presenting their projects to industry a number of the students greatly developed their interpersonal skills. I have not seen growth like this from any other form of learning.” – Teacher

Key activities and achievements

Community engagement	Empowering teachers	Attract, support and train students	Connect to industry
<p>12 industry/council engagement workshops</p> <p>124 school leaders engaged</p> <p>1219 showcase attendees</p>	<p>12 teacher professional learning (TPL) workshops</p> <p>60 STEM professionals partnered with teachers (increase of >100% from 2021 (29))</p> <p>Additional optional TPL on Gender Inclusive Classrooms offered</p> <p>10 teacher meet and drop-in sessions to provide additional support</p>	<p>2231 students (increase of 99% from 2021 (1122))</p> <p>78 participating schools (increase of 66% from 2021 (47))</p> <p>10 showcase events with 839 students presenting their projects</p> <p>91% school retention rate across the year (87% in 2021)</p>	<p>28 industry partners involved in activities and events</p> <p>44 virtual work experience opportunities (27 in 2021)</p> <p>Industry input into 50 new challenge scenarios</p> <p>2208 interactions with students</p>

Responding to participant feedback and expanding program offerings

Feedback from previous years' program insights allowed the team to focus on program activities that have the most impact and close out those that students and teachers saw as less beneficial, such as masterclasses. This was one of the recommendations from the 2021 M&E data insights report.

New and remodelled program activities included the STEM Taster Program, #WithSTEMYouCan Careers Expo, more virtual work experience opportunities and an optional Gender Inclusive Classrooms professional development session for teachers.

Following teacher requests and stakeholder consultation, STEM CPP will expand to Stage 4 students (Years 7 and 8) in 2023. This will enable students to see and interact with real-world STEM earlier, strengthen teacher capability in inquiry-based learning and increase the program's ability to influence the subject selection and career choices.

"The passion for STEM is built in the Stage 4 course and there are currently many students across this stage who would jump at a chance for something like [STEM CPP]. It is an opportunity for students to really see what STEM is about in a more authentic manner ... Stage 4 students are best engaged in a hands on manner, so being able to work in this manner would suit them." – Teacher

"I enjoyed being able to talk to professionals about nanotech and STEM in general. It gave me a lot of helpful knowledge that would definitely benefit my future." – Virtual work experience student

CASE STUDY

Partnering with TAFE NSW to provide a taste of STEM to Year 10 students



Generation STEM partnered with TAFE NSW to offer a STEM Taster Program to raise awareness of local vocational pathways in STEM. Twenty students attended each of Kingswood and Padstow campuses across 5–7 days.

The program provided opportunities for students to engage in hands-on practical activities and interact with industry professionals.

Students could “try” a range of local vocational career pathways in STEM, such as allied health, IT, advanced manufacturing and aviation.

Feedback about the program has been very positive, with students indicating it has made them more interested in learning about STEM and knowing about potential STEM jobs. Early discussions are underway to look for opportunities for a collaborative one-TAFE approach for delivery of the STEM Taster Program across NSW.

What partners said:

“Having the opportunity to experiment in these fields of study enables students to visualise what a job would look like and learn how TAFE NSW can help them forge a career they love.

“We want to inspire these young people through hands-on learning and ensure vocational education and training is front of mind when they are considering future training and career pathways.”
– TAFE Services Manager

CASE STUDY

Showcasing STEM at the #WithSTEMYouCan Careers Expo



What participants said:

“It was an absolute thrill to be a part of [the expo], and engage with so many keen and interested young people on the day. Congratulations to the CSIRO team who were involved in the planning and delivery of such a wonderful day.” – Sydney Water

“Students were able to converse with industry professionals and engage in some practical tasks or see the practical application of the different fields. They have a better understanding about career opportunities in STEM related jobs and understand that there are different pathways to reach their goals not just a straight line.” – Teacher

Generation STEM delivered its first Careers Expo, supported by Sydney Olympic Park Authority (SOPA), to showcase a range of STEM careers to students in June 2022. The event continued the theme of the 2021 Generation STEM #WithSTEMYouCan campaign.

The Careers Expo provided students access to businesses offering STEM careers in their local community. They were able to ask questions, discuss educational pathways and learn more about the varied career paths they could move into.

Students also participated in a range of hands-on workshops delivered by the industry as well as listened and asked questions as part of a panel discussion by STEM professionals.

A total of 450+ students from 16 schools attended the event, with overall positive feedback from attendees. Six new industry partners committed to further activities with Generation STEM as result of attending the event.

A strong relationship formed between SOPA and Generation STEM as a result – this combined with the positive results from this event, has increased SOPA's contribution in 2023, with a larger venue confirmed already enabling more attendees and hands-on activities.

Testing new models of collaboration

A committed local stakeholder is the key success factor of STEM CPP. Generally, this role has been fulfilled by local councils. However, in recognition that STEM CPP needs to accommodate the local community and the resourcing constraints of local councils, the program continued to be agile when working with local stakeholders in 2022. This resulted in different models of collaboration, reducing both the strain on local councils and the over-reliance on a single stakeholder in a particular region.



2022: How STEM CPP collaboration model adapted to address community needs and new model delivered

Alternative local stakeholder: Where a local council was unable to collaborate on the STEM CPP, an alternative was sought. This led to collaborations with Sydney Olympic Park Authority (SOPA) and RDA Central Coast, with a smooth roll out and high engagement in the Parramatta LGA and Central Coast area. SOPA has been key in delivering the #WithSTEMYouCan Career Expo and the Central Coast model has produced a strong collaboration between Generation STEM and other Department of Education programs (Regional Industry Education Partnerships Program and Educational Pathways Program).

Co-collaboration with multiple local Councils: STEM CPP has commenced a co-collaboration agreement with Yass Valley Regional Council and Queanbeyan-Palerang Regional Council to deliver STEM CPP in the South Jerrabomberra Regional Jobs Precinct. This allows reaching regional areas with more dispersed populations and the shared responsibility places less pressure on the one council.

Delivery partner model: Generation STEM partnered with RDA Central West to deliver the program in the Central West. The intention of this model was to ensure the program was delivered “on the ground” by a local organisation with the expertise and networks. This partnership ended in 2022 due to capacity issues of the delivery partner, which had impacted our ability to grow the STEM CPP and establish a strong presence in the Central West.

2023: Learning and further improvements to be incorporated into program for 2023

Generation STEM will continue to explore other local organisations like SOPA and RDA that have the capacity and capability to collaborate in different regions.

Discussions are ongoing with Department of Regional NSW and Regional Growth NSW Development Corporation (RGDC) to replicate this model in other regions in 2023, notably in Tamworth and the wider New England region. Generation STEM will continue to consider other local stakeholders, such as universities, in this model.

Ongoing consideration of the balance between building capacity in regional areas and ensuring what is delivered meets our program standards, including considering options for collaboration before moving into a delivery partner arrangement. Reengaging schools and industry in the Central West will be a priority for 2023, and discussions are already underway with existing networks, including RGDC, TAFE NSW and Mining NSW.

Reflecting on 2021 impact and evaluation recommendations

Recommendation: Further explore gendered differences in student outcomes

Actions taken:

Developed and delivered Gender Inclusive Classrooms professional learning session to teachers

Actively reached out to women in STEM networks to seek more female mentors (Superstars of STEM, Western Sydney Women, WSU networks)

Encouraged representation from women in the business at site visits

All discussion panels included at least 50% female representation

Result:
Increase from
29% female
mentors in 2021 to
50% female
in 2022

Recommendation: Focus on matching schools with industry mentors earlier in the school year and review matching process

Actions taken:

Focused on engaging more mentors prior to school engagement therefore enabling the team to match teachers as soon as they started the program

Highlighted to interested industry partners that the mentor option is the 'lightest touch' way of them engaging in the program

Continued to approach larger organisations that have the capacity to offer more mentors across a wide range of STEM disciplines

Had mentors provide testimonials at Council/Industry workshops to boost interest from industry

Result:
**Majority of
mentors matched**
in the first
half of 2022

Recommendation: Consider the purpose and effectiveness of the pre-recorded masterclass videos

Actions taken:

Conducted a cost-benefit analysis and noted the high effort and cost required for developed the masterclass videos

Decided in July 2022 to cease producing masterclasses and focus on face-to-face engagement activities, such as the Careers Expo, bespoke site visits and the STEM Taster Program, especially as feedback from teachers was that students were less keen on virtual activities

Result:
**More engaging
industry
experiences**
for students



Focus Area 1

Deadly in Generation STEM

Following extensive community consultation, Immersion Days were delivered for the first time as a pilot in 2022 in Dharawal Country (Illawarra) and Kamilaroi Country (Moree). These days were designed as interconnected experiences as an alternative to an immersive camp experience given the COVID-19 related challenges in early 2022.

Immersion Days were delivered with a select group of local Years 8–11 Aboriginal and/or Torres Strait Islander students. They provided opportunities for deep engagement in STEM activities delivered on Country by Cultural Knowledge Holders, local cultural mentors and STEM professionals, where they explored cultural knowledge connections and links to local STEM pathways.

2022 learnings

2022: What we heard from the pilot

The original idea of a four-day camp was changed to interconnected Immersion Days spread across the year to reduce the risk of COVID-19 disruptions. However, there were elements that weren't able to be replicated, and it proved challenging to maintain momentum and engagement with participants, teachers and families throughout the program.

Feedback from community stakeholders was that most Indigenous students are disengaged from STEM subjects by the time they get to high school. However, students valued hands-on activities delivered outside of the classroom by Cultural Knowledge Holders, and being able to see the links between cultural knowledges and Western applications of STEM.

Some students felt there is still inherent racism in the schools from teachers and peers, which presents as a main barrier to engagement for Indigenous students in the classroom.

Local Aboriginal Education Consultative Group (AECG) members and teachers want support to authentically embed Indigenous cultural knowledges into their STEM-based curriculums and strengthening local Aboriginal community partnerships with schools.

Building strong networks and relationships with local collaborators and community members takes time, but can lead to lasting benefits and deeper community impact. Having a local presence also enables the team to provide “on the ground” support to teachers and other participants.

2023: Learning and further improvements to be embedded into program for 2023

Delivery of the camp as planned to meet program outcomes. Ensure adequate communications and planning in place to mitigate the risk of disruption caused by external factors, such as COVID-19.

Continue to look for ways to incorporate more immersive, hands-on experiences into future programs and continue to engage Cultural Knowledge Holders. Expand the Illawarra program to primary schools to engage students in STEM earlier.

Utilise the CSIRO Inquiry for Indigenous Science Students (I²S²) Teacher Professional Learning program to address unconscious bias, promote an understanding of Aboriginal contributions to STEM and their relevance in today's industries, support culturally safe learning environments, and strengthen student engagement and achievement in science.

Expand the Illawarra program to support teachers in embedding Indigenous cultural knowledges through hands-on, inquiry-based projects within the STEM curriculum, through the I²S² program. Deliver the I²S² program to more schools in the Moree area.

Continue to have a local presence and broaden Aboriginal Community and industry networks and relationships with a focus on fostering sustainable relationships.

CASE STUDY

Combining STEM and culture in the Illawarra

The Illawarra program explored the themes of Identity, Connection, Pride and Empowerment while taking a community-driven approach to deliver and support activities.

Over the four days, 11 Year 9 and 10 students from 5 schools visited local sites, including Mount Keira and Sandon Point Aboriginal Place, two important cultural sites. They also learnt about the importance of Country and the relationship between Indigenous knowledges and Western science through hands-on activities involving astronomy, drone technology, environmental management, sustainable design, traditional medicines, weaving and storytelling.

The experience enabled the students to broaden their perspective of STEM and what their STEM journey could look like, as well as create strong friendships. After completing the program, students can continue their learning journey as ambassadors, pass on their learnings and support other Indigenous students.



What participants said:

“I’m walking away with so much knowledge about my culture that I’ll be able to pass on to my family, especially my younger brother. It’ll be nice to teach him how to connect to Country. I’d like to be a nurse and combine my cultural knowledge.” – Lucy, Student

“I thought it was going to be like science at school. But it was completely different.” – Shakira, Student

What community members said:

“I think this has opened up his mind and he’s moved to the top ten [of the class]... The whole school is talking about how – they just don’t know where [it] comes from. And I think this has opened up the importance [of cultural knowledges] and just made it more relatable.” – Parent

“I just want to say how proud I am of what this program is doing for our kids. If they taught more of this stuff when I was in school, I wouldn’t have dropped out.” – Aunty

Focus Area 2

Generation STEM Links

Generation STEM Links is gaining traction across NSW, with applications from students and businesses on the rise and word spreading about how the program has helped businesses to recruit the right intern. Many organisations participating in Generation STEM Links are taking on student interns for the first time.

2022 was a year of ‘learning by doing’, where the team trialled new strategies, streamlined processes and incorporated feedback and learnings to scale and improve the program.

Generation STEM Links held its first STEM industry-education roundtable in Newcastle in November 2022. This brought local industry and the tertiary education sector together to explore opportunities to strengthen connections and work together to build a strong, local STEM pipeline and workforce. Planning is underway for the next phase of this work, as well as early planning for similar activities in other areas in 2023.

Program highlights²

29 placements completed or underway, with a further **31** in the pipeline

Almost **80%** of student interns offered ongoing employment

31 industry partners applied

Average of **2 student interns per business**, with many interested in further interns

Most common industries: **manufacturing, IT, agribusiness and sustainability**

Continuous improvement throughout 2022

What we learnt and heard

There needs to be an easy-to-use, online application form and straightforward process for businesses and students to reduce application barriers.

Location priorities were a cause of confusion amongst stakeholders as to whether a business was eligible to participate in the program.

Due to a strong-matching process, Generation STEM Links interns have generally been ‘work-ready’ and able to bring skills and knowledge to support businesses with projects. However, there is a negative perception about the value students can bring to a business, which can take time to overcome and is often a barrier to participating.

What we did in response

Refreshed and enhanced the website, application form, and internal procedures and documentation, leading to a smoother process and experience for participants.

Updated the eligibility criteria to enable businesses across all of NSW to apply to participate, as well as clarifying other criteria elements regarding business size and number of STEM-skilled staff members.

Developed clearer communications and case studies showcasing success stories, benefits to businesses and how the program is different to other internship programs. A working group was formed to unpack challenges preventing businesses participating in the program, including the perception challenge. Further actions will be undertaken in 2023, including highlighting key messages and further simplifying the application process.

² The reported figures do not include four businesses who withdrew their applications due to internal changes.

CASE STUDY

Nautitech invests in students to build its workforce



Nautitech employs 34 staff at its Western Sydney headquarters, focusing on the design and manufacture of products that improve safety and productivity in hazardous areas underground.

“Recruiting takes a lot of time and during the past two years, it’s been difficult to hire engineers,” says Nautitech Engineering Manager Mojtaba Ghaderi.

Mojtaba mentored university students Callum and Jeffrey during their 12-week placement. This internship has led to both students being offered ongoing roles at Nautitech.

Mojtaba explains that the candidates received through Generation STEM Links were better suited in terms of values and skills than when they advertised on job sites.

“Generation STEM Links has been outstanding. Specifically in terms of the students’ level of expertise and the opportunities we’ve been able to give them,” he says.

As the first two interns were finishing their placement and transitioning to full-time work in late 2022, Nautitech took on two more students through Generation STEM Links, and already they’ve learnt new skills, received mentorship and gained insights into the workplace, their chosen fields, and potential career pathways.

Nautitech plans to continue participating in Generation STEM Links.

Data insight projects

Significant progress was made in 2022 to establish and implement two data insights projects – predictive analytics and Evidence X.

Project one

STEM education predictive analytics

STEM education-specific analytics project spanning STEM pipeline to identify and help address leaks before they happen.

Key activities

- Received ethics approval to proceed.
- Signed a collaboration agreement with the Catholic Education Diocese of Parramatta.
- Analysed a student-level dataset from around 70 schools.
- Will seek additional opportunities to partner with data holders.

Key results

Initial results build on what is understood about the factors that contribute to STEM education outcomes in high school, including parent's education levels and prior STEM achievement. Initial accuracy levels (of whether student completed HSC in STEM) are over 70 per cent, with further refinements underway.

Project two

Evidence X (previously STEM education outcomes framework)

Evidence X seeks to help build an evidence base for STEM education interventions; that is, to better understand what interventions work and why, and achieve an increased ability to assess an intervention's effectiveness.

Key activities

- Built a prototype of an online, interactive evidence tool that would allow users (program designers, program funders, and program evaluators) to understand the current state of evidence and inform their decision-making.
- Received approval to progress co-design phase of Evidence X.
- Commenced a procurement process for a co-design consultant for Evidence X, which will involve STEM education stakeholders being invited to help design a platform or set of tools that will improve the ability to assess and measure success.
- Next phase will involve seeking approval to progress to the build phase.

Key results

Phase two of project (Evidence X) approved and planning commenced.

These projects will play a key role in Generation STEM's legacy, through harnessing insights and an evidence base to shift the dial in STEM education outcomes on a larger scale.

Program management

Governance

The current membership is as of 31 December 2022:

Dr David Wright (Chair)

Managing Director at Aqua Ventures

Ms Elanor Huntington

Executive Director, CSIRO Digital
National Facilities and Collections

Ms Gail Fulton

Director, CSIRO Services

Ms Chloe Read

Deputy Secretary, Skills and Higher Education
NSW Department of Education

Dr Ian Oppermann

Chief Data Scientist and CEO
NSW Data Analytics Centre

Ms Gabrielle Trainor AO

Chair of the Construction Industry Culture Taskforce

Appendices

This section details the characteristics of the student/schools that participated in Generation STEM in 2022.

STEM Community Partnerships Program

Number of students participated by year

	Year 9	Year 10	Total
2019–20	358	91	449
2021	757	365	1122
2022	1171	1150	2321
Year on year change	+55%	+216%	+107%

Number of schools participated by sector and year

	Government	Catholic	Independent	Total
2019–20	15	1	6	22
2021	27	12	8	47
2022	43	19	16	78
Year on year change	+59%	+58%	+100%	+66%

Number of schools participated by LGA/region and sector

	Government	Catholic	Independent	Total
Blacktown	3	5	3	11
Blue Mountains	1	0	1	2
Camden	1	1	2	4
Campbelltown	4	0	1	5
Canterbury Bankstown	7	2	0	9
Central Coast	5	1	1	7
Central West	2	0	0	2
Fairfield	4	2	0	6
Hawkesbury	1	0	0	1
Liverpool	3	3	3	9
Parramatta	3	2	1	6
Penrith	7	2	3	12
The Hills Shire	2	1	1	4
Total	43 (55%)	19 (24%)	16 (21%)	78

Deadly in Generation STEM

Number of students participated by region

	Illawarra	Moree	Total
2022	11	16	27

Generation STEM Links

	Total
Number of placements confirmed or underway	29
Number of industry partners applied	31
Number of student applications ³	271
Percentage of student interns from underrepresented groups	89.6%

³ Excluding 75 applications that did not meet the eligibility criteria.



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For further information
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