

Tracking STEM success

Student stories from Big Picture Learning schools



At Big Picture Learning academies across Australian high schools, many students are showing a strong interest in diverse STEM topics which they pursue both inside school and outside school. Many more are graduating from school and transitioning into STEM-related further study and careers.

In the Big Picture Learning Design, students who are curious about STEM topics are enabled to zero in on their interests early, rather than wait until the appropriate stage of a syllabus has been reached.

They are encouraged to connect with expert mentors in universities, industry, business and the wider community. There, they are able to access the latest in technology and thinking. They have exciting opportunities to do real research and work alongside experts, to learn through doing, and to apply theory to practice.

Learning on internships and courses outside school stimulates ideas for future careers, builds students' networks, and equips them with skills and qualifications while still at school.

Students who otherwise might not have chosen to stay at school and pursue STEM subjects through traditional academic pathways and the ATAR, become passionate about working on society's great challenges and achievements, and find themselves a step ahead upon graduation, and confident in their choice of the next steps in life.

The International Big Picture Learning Credential (IBPLC), allows Big Picture graduates with STEM interests to more fully demonstrate their capacities and experiences to prospective employers, training colleges and tertiary institutions, and enables non-ATAR entry to one or more of the 17 universities around Australia that accept the IBPLC.

David Parsons

David Parsons is a Worimi and Biripai man who grew up in Newcastle. As a Big Picture student at Hunter Sports High School, he was able to structure his learning around his personal interests. At first, David thought he wanted to be a butcher, but after an accident in the surf, he injured his back and had to undergo surgery. There, he found his passion for neuroscience and surgery.

From then on, all his learning both inside and outside school was about medical procedures. He was mentored by a Surgical Assistant throughout Yr 11 and was able to observe open heart surgeries and talk with surgeons.

After gaining entry to university without an ATAR, on the strength of his Big Picture Graduation Portfolio, David studied Biomedicine at the University of Newcastle for two years. With help from the Wollotuka Institute at the University of Newcastle, which supports Indigenous students, David completed a year-long Open Foundations Course to increase his marks and was successfully able to transfer to Medicine.

His passion for surgery remains strong and he is currently enjoying the hands-on nature of obstetrics, neurosurgery and anaesthetics and doing work placements in a local hospital.



4th year of Medicine at the University of Newcastle

Interests: neuroscience and surgery

2017 Graduate from Hunter Sports High School

Savannah White

Savannah explored a broad range of interests while at school. As a keen sportswoman, she thought that physiotherapy might be useful to explore, but after interning at a physiotherapy clinic, she realised that the massage component of treatment was not for her. This was valuable information to have at a young age.

She then turned her attention to environmental issues, including conservation, carbon sinks, the Murray Darling Basin, the Snowy Hydro Scheme and sustainable agriculture.

While at a workshop with NSW Parks and Wildlife in Year 11, she discovered the field of Bio-Acoustics. For her Senior Project, working with a scientific mentor, Savannah recorded the sounds of birds in three locations over time to measure and analyse seasonal fluctuations in biodiversity. She also trained a local Land Care group to use an app to record and upload results to the NSW BioNet. As part of her senior studies, she completed the Investigating Science HSC elective while in Year 11 and achieved a Band 6.

She used her International Big Picture Learning Credential to gain entry to Environmental Science at the University of New England. She is the recipient of a futsal scholarship from her university and has represented Australia in Spain.



2nd year of Environmental Science at the University of New England

Interests: scientific investigations, biodiversity, futsal

2022 Graduate of Hunter Sports/Morisset High School

Lochie Westfall

As a Year 8 student in a mainstream high school, Lochie was bored by the slow pace of the mathematics course and wondered how he was going to remain engaged in schooling for four more years.

After joining Morisset High School's Big Picture Academy in Year 9, he was able to source and teach himself the maths that he required online. (Later, in Year 11, he attended maths classes at university.) He also started to pursue projects around Artificial Intelligence (AI) and one of his first exhibits was about decision trees.

During an internship at the University of Newcastle with the NUBots team who were teaching robots to play soccer and to compete in the Robot World Cup, Lochie focussed on algorithms associated with the decision-making and machine learning of the robots while the other members of the team were programming their movements.

At the end of Year 11, Lochie gained non-ATAR entry to the University of Newcastle to study computer science and was awarded a scholarship on the basis of his academic performance. In his second year, Lochie transferred to the University of Sydney. His ideal career would involve applying mathematical language and theory to domains including education.



5th year of Computer Science & Mathematics at the University of Sydney

Undertaking Honours in Computer Science

Interests: theoretical computer science and mathematics,

2020 Graduate from Morisset High School

Anais Murphy

Anais has had a lifelong passion for sea creatures and marine conservation. In her senior years, Anais became concerned about the degradation of the world's kelp forests, and undertook a Senior Project around: **How will climate change affect the Great Southern Reef's seaweed forest ecosystem?** This included a detailed study of the physiology of seaweed and the effects of climate change on oceans, the impact on the food chain of urchin barrens colonising reefs, and the displacement of kelp forests.

She enriched her research with extra-curricular learning opportunities, including sailing with the Young Endeavour Scheme and gaining her Advanced Open Water Scuba Diving Certificate.

Anais is now in her second year of her dream degree: Bachelor of Marine and Antarctic Science at the University of Tasmania, which is one of BPLA's partner universities.

She has been shortlisted for the New Colombo Plan scholarship which, if successful, will give her the opportunity to continue her research in the Solomon Islands.



3rd year Bachelor of Marine and Antarctic Science at the University of Tasmania

Interests: environmental activism, marine conservation and research

2021 Graduate of Five Islands Secondary College

Aiden Brown

Aiden refers to himself as a 'first generation' Morisset High School Big Picture Student because he joined the Big Picture Academy in its first year of operation in 2017 when he was in Year 9, and was among the first group of graduates in 2020 to use the International Big Picture Learning Credential (IBPLC) to gain entry to university.

He has had an interest in video games since he was young and spent much of his time in Big Picture learning about and creating video games.

To support this interest, in his senior years, Aiden was assisted to learn on several internships and courses at the University of Newcastle (UON). There he found mentors in games development and software engineering including university course coordinators, PhD supervisors and researchers, and a Westpac Bank Software Engineer.

Upon graduating from Morisset High School, Aiden used the IBPLC to gain entry to **UON to study Software Engineering**. Now in his fourth year of university, Aiden's interest has shifted from video game development to software engineering in general.

He is currently working part time in a cyber security role for the Australian Public Service (APS).



4th year of Software Engineering at the University of Newcastle, NSW

Part time software engineering role with the Australian Public Service

Interests: video games, software engineering,

2020 School Captain of Morisset High School

Amelia

After the Black Summer bushfires of January 2020, Amelia was concerned about the long term effects on the environment, in particular on the South Coast of New South Wales.

Having read an article on the ABC News website about how Australia's native bees were among the hidden casualties of the fires, Amelia set about tracking the existence and health of native bee colonies on the South Coast as part of a Citizen Science Project.

Knowing that honey bees are already under threat from the Varroa virus, she realised that native bees could become an important alternative to honey bees for pollination and food production.

For her Senior Project, Amelia is writing a thesis about how human activity impacts native bee habitats, and she is contributing to interactive maps that show where colonies can be found.

She has been in the Big Picture Academy for four years and enjoys learning in a small school such as FISC.

"Here I can structure my own day with routines suited to the way my brain works."

After she graduates from FISC, Amelia plans to study Wildlife and Conservation Biology at La Trobe University.



**Year 12 Student
Five Islands Secondary College**

Interests: Native bee habitats, environmental conservation

**Senior Project:
The Anthropogenic Effects of
on Native Bees**

**Future Pathway:
Bachelor of Wildlife and
Conservation Biology at
La Trobe University**

David Phan

At school, David's interests were around virtual reality and mathematics. He became interested in software engineering during a four-year internship at an engineering firm where he was involved in a project to develop augmented reality platforms to digitally monitor and maintain industrial machinery.

For his Senior Project, he created a machine learning algorithm to recognise whether a student could be suited either to Big Picture or to a mainstream style of learning. He drew upon information about students' personalities, learning behaviours and cognitive capabilities. He was mentored by both an engineer and a data scientist from UTS that David met through his internship.

David pioneered the pathway for the International Big Picture Credential to be accepted by the University of Technology, Sydney, where he is completing his third year. He is currently studying the ethics of artificial intelligence while tutoring maths to students at his old high school.



3rd year of Software Engineering at the University of Technology, Sydney

Interests: mathematics, computer science

2020 Graduate of Liverpool Boys High School

Milan Hammond

Milan is a talented football player who has been playing since she was seven, and has played for the Young Matildas and for national Indigenous rounds since high school.

Her Senior Project for the International Big Picture Learning Credential was to design and develop several High Intensity Interval Training (HIIT) Programs that would improve the body's response to physical challenges. She tested the programs on herself and recorded baseline and final data using empirical methodology.

In her final year at school, Milan learnt that she had a syndrome where her abnormally enlarged calf muscles were exerting pressure on the arteries behind her knees and causing severe pain. After undergoing vascular surgery, she became fascinated with the medical field and decided to combine her football career with medical studies. She gained entry to a Biomedicine degree at the University of Newcastle.

She is currently contracted to the Newcastle Jets and attending Young Matildas training camps. She has deferred her degree for the time being to pursue her football career and is employed part-time at an eye surgery company.



Professional football player in the Women's League & deferred entry to Biomedicine at the University of Newcastle

Interests: football, exercise science, medicine

2021 Graduate of Hunter Sports High School

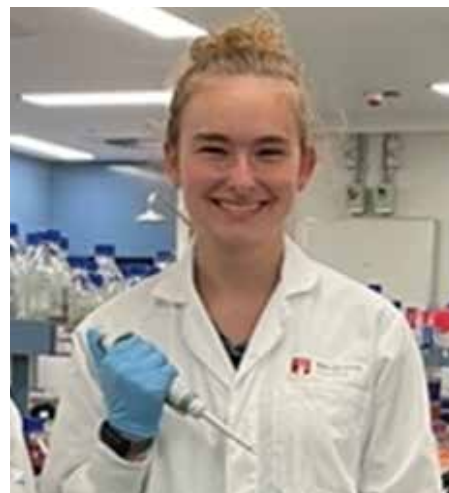
Tynielle Gomez

As a Year 8 student in a Big Picture Academy, Tynielle was interested in learning more about the science of medicine and pharmaceuticals after a family member had experienced cancer.

Over the years, the passion for understanding how medical science can help people has remained strong. As a Year 10 student, she completed the HSC elective Investigating Science and achieved a Band 5.

Tynielle has had an ongoing internship at a compounding chemist during her younger years, and in Year 12, she enjoyed a life-changing internship at a Synthetic Biology Laboratory at Macquarie University. There, she worked alongside university students to PhD and post-doctoral fellows to run and analyse experiments associated with bioproducts, polymers, gels and yeasts. The exposure to a medical research environment has reaffirmed her commitment to pursuing a career in medical science.

Tynielle now studying for a degree in Medical and Health Research at the University of Technology, Sydney.



1st year of a degree in Medical and Health Related Sciences at the University of Technology, Sydney

Interests: chemistry, pharmacology, medical research

2023 Graduate of Morisset High School

Dante Lloyd

During his three years at Guyra Central School's Big Picture Academy, Dante has had the opportunity to focus on his passions for graphic design, computer science and coding. He has spent a lot of time learning outside of school, including attending a first-year Computer Science class at the University of New England and studying for a Certificate III in Information and Digital Technologies with the Dubbo School of Distance Education. He also completed a Software Design and Development elective in Year 11 with Aurora College which is an online selective school for rural students.

His Senior Project involved building an online basketball simulation game from scratch called 'Basketball Manager', which uses strategic gameplay and statistical analysis to pit two team managers against each other. This has involved significant planning of the stages of development from conception to flow charts to prototypes. Dante accessed online resources to teach himself trigonometry, probability and statistics as and when he needed it.

Dante is studying Computer Science and Software Engineering at the University of New England and is already well-known by the Computer Science Faculty.



1st year of Computer Science at the University of New England

Interests: computer science, software development, graphic design, basketball

2023 Graduate of Guyra Central School

Ashlyn Sharp

Throughout her life, Ashlyn has always had pets and enjoys the many aspects of caring for animals. Being in a Big Picture school allowed her to explore different aspects of the animal care industry through doing regular internships.

She worked with Greyhounds as Pets, PETStock Vet (where she was later employed), Billy's Day Care for Dogs, and Kanyana Wildlife Rehabilitation Centre. She learnt many skills including: blood work, bandaging, surgery and basic care needs, and cleaning enclosures as well as understanding the demeanours and characteristics of breeds.

For her Senior Project she researched and produced an educational campaign about dental hygiene for pets, that her employer uses to raise awareness about the prevention and treatment of gingivitis and periodontitis.

She obtained her Certificate II in Animal Studies and is now completing her Certificate III in Animal Care Services, where she has learnt about zoonotic diseases along with some medical theory.

In 2024 Ashlyn plans to study for her Certificate IV in Veterinary Nursing at TAFE, and to then work in either a zoo or an animal rehabilitation centre.



Year 12 Student at Yule Brook College

Interests: animal care, cooking, creative writing, childcare

Goals: to attain Cert IV Veterinary Nursing

Jandre Viviers

When the opportunity arose to join the Big Picture Academy at Esperance Anglican Community School for his senior years, Jandr  jumped at the chance. He loved the idea of exploring his interests deeply inside and outside of school.

Jandr  completed several projects shaped around his passions for the outdoors, including learning about the field of apiary and establishing his own business producing, marketing, and selling honey.

He also spent time refurbishing small boat engines, explored his interests in 'shoe culture', basketball, and created a podcast channel called "Dre's Dribble" to share people's stories.

Throughout 2022/23 Jandr  engaged in an Internship with Esperance Southern Ports where he learned the ins and outs of vessel maintenance as he worked alongside the marine operations team.

As a result of his dedication to honing his overall watercraft, Jandr  was offered a traineeship in conjunction with a Certificate II in Maritime Operations which he has gladly accepted.



First Year Full Time Trainee Coxswain with Esperance Southern Ports & Cert II Maritime Operations

Interests: Apiary, Shoe Culture, Basketball, Fishing and Boats

2023 School Leaver Esperance Anglican Community School

Ty Roberts

Ty is studying for an Engineering degree with a major in Civil Engineering. He is finding university informative and engaging, and has had **practical placements at two civil and structural engineering organisations**, including at a Surf Lakes complex that uses technology to generate ocean-like waves in a lake.

At Silkwood School, Ty was given the skills to learn independently, plan his days, keep to deadlines and build his skills in scheduling. He was also given many opportunities to pursue his learning outside the classroom.

He completed a **Certificate III in Information and Digital Media** and was able to undertake an internship in the IT department at his school.

Silkwood School assisted him to do a **UniLearn mathematics course** that would be a pre-requisite for Engineering, as well as a **Head Start course in Engineering at the University of Southern Queensland** which allowed him to do a CAD software course during high school hours.

Ty is currently seeking to secure an undergraduate position to assist with full-time employment when he completes his degree.



*Bachelor of Engineering
Griffith University, QLD*

*Certificate III in Information
& Digital Media*

Interests: civil engineering, IT

*2019 Graduate of Silkwood
School*

Toby

Toby's lifelong passion is fishing. He is talented at working with his hands and runs a small business handcrafting and selling fishing lures which he makes out of cedar and pine and shapes with a bandsaw and a disc sander.

He uses his practical experience and maths skills to ensure that each lure is of the right weight and depth for the angler bibs. Toby's lures have all been quality tested and are designed to target a variety of fish.

Toby is dyslexic and found the mainstream style of learning difficult to engage with. Since joining the Big Picture Academy at Guyra Central School, Toby has been able to learn through 'doing' and to pursue his passions. He has become more confident since being enabled to determine the nature and pace of what he learns.

On an internship at Deano's Springwater Trout Farm, which produces smoked fish products, he learnt all about food handling, water quality and how to harvest and smoke trout from his mentor. This led to a school-based apprenticeship in Aquaculture.

Toby is now pursuing his interest in carpentry in his senior years of schooling and is enjoying being able to take pride in the work that he has undertaken as part of his schooling.



Year 10, Guyra Central School

Interests: fishing, woodwork

Apprenticeship in Aquaculture

Emma Wormell

Emma started out at the Silkwood School exploring her creative side in makeup artistry and clothing design before finding her love for psychology and criminology.

She did an **internship at Headspace** and she undertook a **Head Start course in Psychology at the University of Southern Queensland**. These are university courses that are accessible to high-achieving school students.

To pursue her interest in criminology, she wrote a Senior Thesis titled **'Is Criminality Influenced by Nature Versus Nurture?'**. By the time she graduated from high school, Emma had a very firm idea about what her next steps would be. She applied to Griffith University and completed a test to obtain an ATAR.

Now in her fourth year of tertiary study, she will be undertaking a placement in the prison system, while planning for a masters program of study. She is on track to graduate with honours and is acknowledged as consistently achieving in the top ten percent in her current degree.

Emma's goal is to be a profiler with the Australian Federal Police, with a back-up plan to be a consultant for the courts managing rehabilitation plans for cases.



In her 4th year of a double Bachelor of Psychological Science & Criminology and Criminal Justice at Griffith University, QLD

Interests: criminology, psychology, fashion design

2019 Graduate of Silkwood School

Matilda Miller

Matilda is fascinated by the human brain and loves learning about the way the mind functions. She also enjoys helping people and listening to their stories.

When she joined the Big Picture Academy at Silkwood school, she found herself very motivated by the opportunity to personalise her learning and organise her learning around her passions.

She set about exploring the field of psychology through a range of experiences including an **internship at a psychology clinic** where she worked in the business administration side, a **Head Start course in Psychology at the University of the Sunshine Coast**, and participation in a **Psychology subject at the University of Queensland**.

For her **Senior Thesis** in Year 12, she is combining her twin loves of psychology and music in a study into **the impact of music on psychological process and mental wellbeing**. She is researching whether the mental health effects of music in clinical settings can be applied to the everyday life of students.

All of these experiences have confirmed Matilda's desire to pursue a career in psychology and have shown her that she is academically capable of doing so.



Year 12 student

Yr 12 student at Silkwood School, QLD

Interests: psychology, music

A Head Start course in Psychology at the University of the Sunshine Coast,, an internship with a local Psychology clinic

Goal: to become a clinical psychologist

Michael Dearing

Michael is a Year 11 student with a passion for Cybersecurity and Computer Science. He joined the Big Picture Academy at Morisset High School in Year 7 to challenge himself and further explore these interests.

Since then, he has completed many projects, mostly focusing on Cybersecurity, Ethical Hacking, and AI. He has also participated in two electives. Michael came first in his course for Timber in Years 9/10 and is currently enrolled in HSC Physics. He has also assisted Big Picture students with technical support for years and has run the **e-waste program** at the school.

He has undertaken several Learning Through Internships (LTIs), including with the school Technical Support Officer, at a computer store in his community, and a one-day cybersecurity event in Lake Macquarie.

Recently, he completed an **Information Technology course** at the University of Sydney as part of the High School Fellowship Program and has begun a **mentorship with a lecturer at the University of Newcastle**.

Michael hopes to attend university for Computer Science when he graduates and ultimately aims to earn a PhD in the field.



Year 11 student at Morisset High School

Interests: computer science

Outlearning: School technical support, computer retail

Projects: cybersecurity, ethical hacking, artificial intelligence

Mainstream subjects: Timber, HSC Physics

Goal: to gain a PhD in Computer Science.

Mikaela Markovski

Mikaela is a talented and athletic student whose two main passions are for sport and the ocean. She competes in many sports and regularly represents her school at Zone and Regional levels for athletics, at the State Cup for soccer and the South Coast Regional Surfing titles (where she and a peer placed first in 2024).

Having grown up living and surfing at the beach, and travelling to different marine environments with her family, Mikaela has a keen interest in all things to do with the sea. Mikaela volunteers for **Clean Up Australia** and **Dune Care** to help preserve the coastal environments where she lives, and is also studying the **HSC elective Marine Studies** after attending a TAFE taster course in the subject.

Mikaela enjoys hands-on, practical learning and is currently doing a **Certificate II in Construction at ITeC Illawarra**. Here, she can learn the mathematical skills and reasoning that she requires for her course work and apply this to the practical products that she constructs and exhibits back at school.

Mikaela plans to complete a qualification in Construction when she finishes Year 12 and her ultimate dream is to live on a farm in the country in a house that she has built for her family.



Year 11 Student Five Islands Secondary College

Interests: Surfing, marine environments, athletics, travel, carpentry

Out-Learning: Certificate II in Construction, Maritime course with TAFE YES+, Yr 12 Marine Studies, Duke of Edinburgh Awards,

Future Pathway: Construction apprenticeship

STUDENT SNAPSHOT FROM NEW SOUTH WALES



SAMUEL TEDD – KURRI KURRI HIGH SCHOOL

Interests:

Science, technology in health

Senior Project:

The effects that bushfire smoke exposure has on the lungs and airways.

Out-Learning & Internships:

Hunter Medical Research Institute

Destination:

Bachelor of Medical Engineering (Honours) at the University of Newcastle (early entry - Samuel was a Year 11 student)

STUDENT SNAPSHOT FROM VICTORIA



ANDREW O'KEEFFE – CROYDON COMMUNITY SCHOOL

Interests:

Physics, maths, nuclear energy

Senior Project:

Researching the physics of nuclear fusion

Out-Learning & Internships:

Certificate II in Conservation and Land Management, shadow day with an electrician, mentored other students in VCE mathematics

Destination:

Pre-apprenticeship course in Electrotechnology at TAFE

STUDENT SNAPSHOT FROM QUEENSLAND



ZAC GOODALL – SILKWOOD SCHOOL

Interests:

Soccer, business, coding, app design, cars

Senior Project:

Web development including an inventory and order management system as well as coding his Online Portfolio from scratch

Out-Learning & Internships:

Internship at Compass IT, a Certificate II in Outdoor Recreation, and a Diploma of Business

Destination:

Bachelor of IT at Griffith University

STUDENT SNAPSHOTS FROM WESTERN AUSTRALIA

STIRLING HANNAY – ROCKINGHAM MONTESSORI SCHOOL

Interests:

Robotics, construction, electrical work, basketball

Senior Project:

Vintage train restoration project

Out-Learning & Internships:

Certificate III in Technical Engineering, iScience program, internships with Ineeda Sparky and Baseload Electrical, Duke of Edinburgh

Destination:

Apprenticeship with Baseload Electrical



CLARA CLARKE – HALLS HEAD COLLEGE

Interests:

Mixed martial arts, boxing, physiotherapy

Senior Project:

Expanding the NDIS eligibility criteria to provide equal support and opportunities for all disabilities

Out-Learning & Internships:

Certificate III in Fitness, internship at Mandurah Combat Sports Academy - coaching young people in the MMA field

Destination:

Bachelor of Physiotherapy at the University of Western Australia



FLETCHER PODMORE – ESPERANCE ANGLICAN COMMUNITY SCHOOL

Interests:

Photography, videography, diesel mechanics

Senior Project:

Starting a photography and videography business. Fletcher was hired as a photographer by his school and football club and as a videographer for a wedding.

Out-Learning & Internships:

130+ hours at Tyrewright Esperance and 50+ hours at Plus Fitness

Destination:

Heavy diesel mechanic apprenticeship with Agwest Machinery

