THE STUDENTS DON'T KNOW EACH OTHER WHEN THEY START THE WEEK-LONG PROGRAM, AND BY THE TIME THEY FINISH, THEY'VE MADE LIFELONG FRIENDSHIPS AMONG THEIR PEERS AND, EQUALLY IMPORTANT, STARTED NETWORKING WITH INDUSTRY SPONSORS, UNIVERSITIES, AND POTENTIAL FUTURE EMPLOYERS.

Alex Rodger, Norman Disney & Young

WE THANK OUR GENEROUS SPONSORS

Courtney Ryder was at the first IAES in 1998. As a fifteen-year-old Nunga child from South Australia, Courtney had never flown in a plane, visited Sydney or a university. Inspired by the week-long experience at Sydney IAES, Courtney went on to study biomedical engineering, graduating with honours from Flinders University and becoming the first Aboriginal biomedical engineer and the first Aboriginal female IAES alumni to graduate from engineering.

In 2021, she completed the highest possible academic degree, a PhD at the University of New South Wales, continuing her focus on research in Aboriginal medical education, injury epidemiology and big data. Over the years, Courtney has given back to EAA – from being a houseparent at IAES many times to peer mentoring Ben Lange. Ben became UNSW’s first Indigenous engineering graduate and is now a Director of Engineering Aid. Continuing this tradition, Courtney supervises recent IAES alumni Sidney Ruthven as she completes her Masters in Genetics Counselling research project.

In November 2020, Miranda Mahoney graduated from The University of Queensland with a Bachelor of Civil and Environmental Engineering. She attributes her interest in engineering to attending IAES as a Year-12 student, saying it opened her eyes to the possibilities of an engineering career. During her studies, Miranda did internships at AECOM. She is now a Graduate Civil Engineer in the company’s waste management team.

In November 2020, Miranda Mahoney graduated from The University of Queensland with a Bachelor of Civil and Environmental Engineering. She attributes her interest in engineering to attending IAES as a Year-12 student, saying it opened her eyes to the possibilities of an engineering career. During her studies, Miranda did internships at AECOM. She is now a Graduate Civil Engineer in the company’s waste management team.

Dr Courtney Ryder (IAES 1998) with PhD Supervisor Professor Rebecca Ivers

Miranda (IAES 2015) celebrates her graduation

Space Systems Engineer Jacob Smith enthrals students in the Cubesat session at IAES Perth 2021

FROM THE CLASSROOM ...
THREE

Our congratulations and thanks go to our IAES host universities for their initiative in confronting the COVID-19 virus in 2021. We appreciate their efforts to keep students engaged in their current or future studies.

IAES Perth
Curtin University hosted a very successful and safe program in Perth in July. Twenty high school students attended the IAES, and another 10 talented students who had attended a previous IAES were invited back to the extension program (IAEXP). Due to COVID-19 travel restrictions, only students residing in Western Australia attended, with strict safety protocols. See page 10 and onwards for the highlights of the IAES Perth.

FROM OUR CHAIRMAN
As I reflect on another challenging year full of COVID, I am pleased to say that EAA has moved forward strongly. After deep consultation with our stakeholders and partners, we can finalise our Future Directions Plan soon. Thank you to all those who so actively participated and thus ensured a plan full of rich content, passion, and ambition.

While we aim to release the plan in the new year, I can reveal our Purpose and Passion will be to:

- Ignite the big dreams of First Nations youth through increasing education and career opportunities and outcomes in engineering and technology
- Acknowledge and respect First Nations history, knowledge, and culture as Australia’s first people in the engineering and technology space

Given the challenges that COVID presented this year, I would like to thank all those who have enabled the continued success of EAA, in particular the students who continue to study and those who attended the Perth school.

Finally, a big thank you for the continued support from our existing partners and our three new partners Horizon Power, Sage Environmental Services and Worley.

Greg Steele, EAA Chairman

IAES 2021

Our congratulations and thanks go to our IAES host universities for their initiative in confronting the COVID-19 virus in 2021. We appreciate their efforts to keep students engaged in their current or future studies.

IAES Sydney
The COVID-19 restrictions in NSW forced the postponement of the Sydney IAES. Yet, our IAES host, Sydney University, conducted virtual sessions, ‘Lunch with a Sydney Engineer’, for students in Years 9 to 12. Students had the opportunity to hear from academics and current university students across all streams of engineering, including Aeronautical/Aerospace, Mechanical, Electrical, Chemical and Biomolecular Engineering, Project Management, Computer Science and Biomedical.

Looking forward to 2022
The next Sydney IAES is planned for 3-9 July 2022 at Sydney University and IAES Perth for 10-16 July 2022 at Curtin University.
This year EAA awarded eighteen Jeff Dobell Memorial (JDM) undergraduate scholarships to first and second-year students. Congratulations to all the students.

- **Tahlia Prior**, Curtin University, Bachelor Engineering Honours
- **Ellie Cooper**, Royal Melbourne Institute of Technology, Bachelor of Science | Environmental Science, Deans Scholar (Honours)
- **Matead Barber**, Newcastle University, Bachelor of Surveying
- **Jess Purvis**, University of Melbourne, Bachelor of Biomedicine
- **Hayden Wiggins**, University of Queensland, Bachelor of Engineering | Honours)/Bachelor of Arts
- **Nikaya Page**, James Cook University, Diploma of Higher Education leading to Bachelor of Engineering
- **Raphael Thomas**, Flinders University, Bachelor of Civil Engineering
- **Harley Luxford**, Queensland University of Technology, Bachelor of Engineering (Honours)/Bachelor of Arts
- **Brody Mitchell**, University of Wollongong, Bachelor Engineering (Honours)
- **Jarod Grining**, University of Sydney, Bachelor of Engineering (Honours) Software Design
- **Jai Spencer**, Curtin University, Bachelor of Science
- **William Peucker**, Curtin University, Bachelor of Science
- **Connor Hughes-Tincknell**, Newcastle University, Bachelor of Engineering
- **Mervyn Williams**, University of Western Australia, Bridging Course to Bachelor of Engineering
- **Eliza Lyall**, Queensland University of Technology, Bachelor of Engineering/Bachelor or Urban Development and Regional Planning
- **Beau Saunders**, Sydney University, Bachelor of Engineering (Honours)/Bachelor of Science
- **Joshua Pye**, UTS Sydney, Bachelor of Engineering (Honours)/Diploma of Engineering Practice
- **Jordan Salmon**, UTS Sydney, Bachelor of Engineering (Honours)/Diploma of Engineering Practice

Your support helps EAA ignite big dreams

EAA Director Kevin Hopkins accepts a donation from Railway Technical Society of Australasia, which was presented at the Conference on Railway Excellence (CORE) by Graham Holden, CORE Conference Chair
JAROD GRINING (2020)

Coming from an isolated Tasmanian town, I had never experienced anything quite like IAES. It gave me the opportunity to meet and learn from skilled professionals, visit sites and headquarters where innovations are made daily, and see first-hand the technologies and processes that shape the engineering industry.

My perspective on engineering broadened considerably as I saw the inner workings of an enormous variety of jobs in the field. Every activity in the event was fun and useful. It was eye-opening to see how far a career in engineering can take you. Thanks to the IAES, I had the confidence to study Software Engineering at the University of Sydney and the knowledge and resources to get involved with the industry.

CONNOR HUGHES (2019)

This was an unbelievable experience that truly cemented my passion for becoming an engineer and, for this, I am incredibly appreciative. At first, I was hesitant about which engineering field I wanted to study. But I left the camp with something most valuable to me, inspiration. Being submerged in an environment of success and, in particular, just a taste of Engineering at the networking session inspired me. Come HSC year, I used this passion to strive towards my goal of becoming an engineer. I am now in my first year of university, studying a Bachelor of Civil Engineering at the University of Newcastle. I recommend anyone with the opportunity to take full advantage of this experience.

CATE HOLLINGSWORTH (2016)

My desire to attend the Perth camp was probably like most year 9 students, not excited or overly happy to give up a week’s worth of my time but forced by a teacher who actually knows weirdly what’s best for you. Before the camp, I wanted to work in the medical field as a paediatrician. Once I participated in the activities at the camp, I followed the path to studying chemical engineering and extractive metallurgy at Curtin University.

The site visits and interactions with other engineers and engineering students allowed me to make connections that would make me a successful engineer. I chose my course because I enjoy chemistry and the physical components of my course. I was also persuaded by the opportunity to travel with my career and work in some of the most unique places in the world. Without the IAES camp, I really do not believe I would be studying engineering.
Each IAES has several university students who act as houseparents during the IAES week. Their participation and leadership in the IAES is invaluable. They are important role models as they help the IAES high school students navigate the program, providing support and encouragement every day. Houseparents also aim to engender feelings of self-worth and confidence in the students and, above all, ensure students return home with fond memories of a life-changing experience and with an understanding of the importance of finishing high school and going on to gain a tertiary qualification.

We extend our thanks and appreciation to the many university students, who over the past 25 years have acted as houseparents and contributed to the success of the IAES program.

The 2021 Perth IAES had five houseparents, four of whom were past IAES houseparents and former IAES students themselves. They all identify as Aboriginal or Torres Strait Islanders. This year in Perth, three volunteer Curtin University undergraduate science students assisted the houseparents.

Thank you to these houseparents for joining Perth IAES 2021:

- Cate Hollingsworth (ChemEng/Metallurgy)
- Sandro Pitt (Mechanical Engineering)
- Tahlia Prior (Civil Engineering)
- Sterling Winmar (Electrician)
- Rikki Jayne-Edwards (Geology)

Curtin University students and IAES alumni William Puecker and Jai Spencer and Curtin University science student Alana Dooley volunteered during the week.

(Left to right) IAES Houseparents and volunteers Sterling, William, Cate, Rikki, Sandro, Tahlia, and Jai

“ Without the IAES Camp, I really do not believe I would be studying engineering”

Cate Hollingsworth (IAES 2016)
IT WAS JUST A GREAT EXPERIENCE ALL TOGETHER AND HAS HELPED ME FIGURE OUT MORE OF WHAT I WANT TO DO.

*IAES Perth 2021 Student*

IAES AT CURTIN UNIVERSITY JULY 11 – 17, 2021

CLASS OF 2021 STUDENTS AND HOUSEPARENTS AT GOVERNMENT HOUSE

IAES participants (not in order)


Houseparents

Cate Hollingsworth, Sandro Pitt, Tahlia Prior, Sterling Winmar and Rikki Jayne-Edwards.
Twenty high school students who participated in the Indigenous Australian Engineering School (IAES) in Perth were selected based on academic merit, their passion for further education, interest in engineering and their extra-curricular activities and service to their community. Given COVID-19 travel restrictions, all students had to be WA residents. Please see page 10 for this year’s activities.

We thank the WA schools, teachers, Follow the Dream coordinators and all Aboriginal Education Officers who encouraged students to apply and supported their applications. We also give thanks to the STEM Outreach office at Curtin University’s Faculty of Science and Engineering, which manages the program on EAA’s behalf.

THE EXTENSION PROGRAM 2021

Ten talented students returned for the Indigenous Australian Engineering Extension Program (IAEXP). EAA selected participants based on their continued engagement in maths and science, met selection criteria and their desire to return. During the week, students experience an intensive, tailored, academic-focused program to improve their maths, physics, chemistry and communication skills. The program also helps develop their leadership skills and self-confidence as the new IAES students view them as role models.

The IAEXP is an important extension of IAES and enables ongoing engagement with students. The feedback we have received from the students, their parents, guardians and mentors about the program is outstanding.

This year, we paired each IAEXP participant with an IAEXP mentor. The mentors are volunteers from an engineering background (either a university student or from industry) who liaised with the IAEXP participant and their parent/guardian in the weeks leading to the IAEXP, mentored and assisted them during the IAEXP, and will follow up with them over the next year.

In 2021, the IAEXP students also visited a culturally significant place, Mandjoogoordap (Mandurah), led by George Walley. This was an invaluable experience for all participants.

We thank the WA schools, teachers, Follow the Dream coordinators and all Aboriginal Education Officers who encouraged students to apply and supported their applications. We also give thanks to the STEM Outreach office at Curtin University’s Faculty of Science and Engineering, which manages the program on EAA’s behalf.

EXTRA EFFORT WAS APPLIED TO MAKING THE IAEXP A RICHER EXPERIENCE FOR BOTH THE STUDENTS AND THE MENTORS, AND THE FEEDBACK WAS OVERWHELMING. MANY OF THOSE RELATIONSHIPS HAVE CONTINUED THROUGHOUT THE YEAR, INCREASING THE LIKELIHOOD OF THE STUDENTS GOING TO UNIVERSITY.

Curtin University STEM Outreach Coordinator Tim Keely
Twenty high school students joined the Indigenous Australian Engineering School (IAES), and ten alumni participated in the Extension Program, which welcomes back highly-engaged students for further academic mentoring and personal development. The students travelled from as far north as Kununurra and as far south as Albany for the IAES. Here are the highlights of their week.

### SUNDAY 11 JULY

Noongar Leader Shaun Nannup performed a beautiful Smoking Ceremony for the students who joined the program from many regions, including Bridgetown, Guildford, Newman, Thornlie, Esperance, Bunbury, Huntingdale, Cloverdale, Pinjarra, Maddington, Port Hedland, Broome, Kununurra, Geraldton, Karratha, Como, Cloverdale, Australind, Mt Barker, Orelia and Carnarvon. This ceremony connects the students with each other, the land and with Shaun, who features throughout the week as an elder.

![Welcome to country with Shaun Nannup](image1)

![Shaun in Room 21 Welcome](image2)

### MONDAY 12 JULY

#### THE OPENING CEREMONY

The opening ceremony was held in the Engineering Pavilion at Curtin University with a Welcome to Country from Karen Jacobs, a local Noongar woman and IAES alumnus Ezra Jacobs-Smith’s mother. The students heard short welcoming speeches by Engineering Aid Australia Director Kevin Hopkins, Curtin University Dean of Engineering Professor Vishnu Pareek and Curtin University STEM Outreach Coordinator Tim Keely.

*Karen Jacobs gave the Welcome to Country*
MONDAY 12 JULY

ENGINEERING BRAINSTORMING HEALTH ISSUES

Google representative Mark McDonald, Biomedical Engineering Entrepreneurship Researchers Matthew Oldakowski and Intan Oldakowska and Health Start-up Expert Arthur Ong led a biomedical design sprint with the students. The students first learnt about a range of health conditions that are more common for Indigenous Australians and the concepts of ideation and hackathons. Then they followed agile industry processes to design a solution for improving Indigenous Australian healthcare.

RENEWABLE WIND POWER

Anton Rieutskif, from the Curtin Chapter of Engineers Without Borders, demonstrated the principle of electricity generation with a wind turbine. He challenged the students to build and operate a scale model wind turbine, preparing them for the Worley visit.

WORLEY VISIT

During this visit, students met engineering role models and gained insights into the diverse engineering initiatives and projects that Worley are involved in locally and overseas. This included wastewater recovery, engineering applications of 3D printing, marine sciences, renewable wind farm construction and digital twins using IRIS and VR technology in conjunction with 3D models.
BOC CANNINGVALE SITE VISIT

Students donned PPE and completed inductions before this site visit, a meaningful reminder of the way of life of on-site engineers. They walked through the filling stations and later participated in a quiz about the information they received during the guided tour. Students also learnt about the production of critical medical oxygen and other essential gases used in the fight against Covid-19.

The International Centre for Radio Astronomy Research (ICRAR)

Dr Danny Price asked the students to ponder: Are we alone in the universe? He gave an overview of how many stars there are in the galaxy and what we know about the habitability of exoplanets in other star systems. The students tried a quick experiment with a jar of M&Ms to estimate how many intelligent societies are in the Milky Way.

Dr Kate Harborne and Dr David Gozzard gave the students a hands-on introduction to radio astronomy with the 'Tiny Radio Telescope'. The students helped to assemble the telescope, learnt how electromagnetic waves from space are converted into a signal on a cable that can be digitised and analysed on a computer to produce images and spectra.

The students, working in groups for the quiz, demonstrated how much they had learned during the tour.
TUESDAY 13 JULY

OBSERVATORY SKY VIEWING

The Observatory is on the land of the Whadjuk People, Noongar boodjar. During this visit, Elder Shaun Nannup spoke with the students about Dreaming stories of the sky. Indigenous Australians are amongst the world’s first astronomers and have used their observations about the night sky for navigation, calendars, ceremony, cultural lore, songlines and more for thousands of years.

(Below) Steve Ewing from Perth Observatory shows the students the Astrographic Telescope, Perth’s first research telescope.

(Above) Elder Shaun Nannup tells the students the Dreaming stories of the sky.

WEDNESDAY 14 JULY

WSP

WSP hosted the students for a session that explored Aboriginal design principles and consultation in engineering projects. The session involved a virtual presentation from WSP’s Indigenous Specialist Services team and several hands-on activities to apply design principles.

ENGINEERING IN COMMUNITIES SESSION

In this session the students learnt how engineering can and does benefit communities. In a speed-networking format, presenters and students interacted on a more personal level, and presenters could tailor their information to the students’ interests.

BOC Chemical Engineer and Sales Engineer (Onsite and Bulk) Jane Waugh spoke to students about where a career in STEM can take you.

Marnee West (Intern at Horizon Power) talked about her summer placement where she was able to visit Ngaanyatjarra Country and participate in a feasibility study. This study is to provide information for Horizon Power to upgrade the electricity services for 13 remote Aboriginal communities in the Kimberley.

CCE John Grapiglia spoke to the students about the shipwrecks of WWII in Micronesia and the Chuuk Lagoon and how important it is to slow the corrosion until the thousands of litres of trapped oil can be treated biologically to prevent an environmental disaster.

Curtin Chemical Engineering Researcher Mitch Craig spoke to the students about the role Chemical Engineers play in PPE protection and interventions that are saving lives during the Covid-19 pandemic.
WEDNESDAY 14 JULY

NETWORKING FUNCTION

The Networking Function was in Curtin University's Engineering Pavilion. In careers fair style, EAA partner companies each had a space where students could network with industry representatives, learn about future employment opportunities, and get valuable advice and contact details.

Arcadis: Ashwin Nayak and Denise Tyler-Hare

Arup: Jillian Bardos and Nathan MacDonald

Aurecon: Jaden Dzubiel

BOC: Stuart Mayne, Angelina Chan and Jane Waugh

CCE: Clinton Lobo, Marc Irvine and John Grapiglia

EY: Thea Kurniawan and Charlene Ellison

Honeywell: Nalin Senevi, Hong Ng, Russell Preece and Dean McAlpine
THANKS FOR THE OPPORTUNITY TO MEET THESE STUDENTS & THE AMAZING PASSIONATE ALUMNI. SUCH A REWARDING OPPORTUNITY. THE FUTURE FOR AN INDIGENOUS VOICE IN STEM LOOKS PROMISING

Professor Stephen van Leeuwen, BDP Curtin Indigenous Chair of Biodiversity and Environmental Science
THURSDAY 15 JULY

ARCADIS YANCHEP RAIL EXTENSION SITE TOUR

After a site induction and in full PPE, students visited several sites at the Yanchep rail extension. Engineering professionals explained the design, earthworks and construction.

Project Engineer Maria Vermeulen explained the foundation construction process of the Alkimos Station.

Students walked where the rail line will be constructed and saw the various stages of wall construction.

Superintendent Kym Lawler answered the students’ questions about the Alkimos Station construction.
WOODSIDE ROBOTICS LAB

In the advanced robotics laboratory, the students met Bingo – a robot used on Woodside facilities to perform surveillance and inspection tasks of plant equipment, particularly in dull, dangerous and dirty places. An onboard camera transmits the vision to a remote operator’s computer screen.

SMEC OFFICE VISIT

At SMEC, the IAES students met engineers and experienced VR in action, walking through a model of the Armadale line rail bridge. SMEC developed this simulation to liaise with various stakeholders and discuss how the new bridge and roads will intersect with the existing environment.

Robotics Engineer Anthony Biviano shows student Dennisher Green how to control Bingo.

Engineers explain how SMEC creates digital models for infrastructure projects.

After hearing short talks from engineers Olivia Bardzovski, Martha Cornwell and Thomas O’Connor the students met with Anthony Biviano for a tour of the Robotics Lab.
Governor Kim Beazley gave a warm welcome to the students as they arrived at Government House.

Kevin Hopkins thanked Governor Beazley on behalf of the EAA Directors, our Partner representatives and the students.

Dr Graham Strong (CCE) speaks with the students at the reception at Government House.

Governor Beazley took the students on a tour of Government House. In this photo, we see the painting ‘Spinifex Men’s Collaborative’ made by ten artists and commissioned for the exhibition ‘Spinifex: People of the Sun and Shadow’ held at John Curtin Gallery, Curtin University in 2012.
FRIDAY 16 JULY

GRADUATION DINNER

The Graduation dinner was a formal recognition and celebration of all that the students had achieved during the week. The students had connected with a new peer group and learned to network with adults in the engineering and science Industry.

Joanne Abraham, a Curtin metallurgy graduate and a Ngaluma woman with a Stolen Generation background, gave the keynote address.

Curtin University Dean of Engineering Professor Vishnu Pareek, EAA Director Kevin Hopkins and IAES Alumnus and Houseparent Cate Hollingsworth presented the RJL (Bob) Hawke leadership award to Sean Tucker.

Shaun Nannup gave a Welcome to Country at the Graduation Dinner.

Students danced in celebration with new friends from all over Western Australia.