8 Epic planet-saving solutions

Engineering is the ultimate problem-solving toolkit

#1 GOAL SUSTAINABILITY

TECH: PET recycling plant

By 2050, there could be more plastic in the oceans than fish. Darren Lomman is a mechanical engineer working to turn this problem around. He's setting up a reprocessing facility that recycles PET bottles into 3D printer filament for schools. That's a win for the ocean and the classroom!

More info: facebook.com/greenbatch

#2 GOAL EDUCATION FOR ALL

TECH: Aeromedical simulator

Stephen Bornstein, aerospace engineer and founder of Cyborg Dynamics Engineering, suggested adding a cockpit to the Royal Flying Doctor Service's aeromedical simulator. His engineering skills helped with every aspect of the project, "from the systems we put in, to making it more affordable," Stephen says.

More info: RFDS Look! Up in the Sky schools program • bit.ly/RFDS_schools

#3 GOAL FOOD SECURITY

TECH: Remote sensing imagery

Anastasia Volkova founded Sydney-based tech startup FluroSat to help farmers grow more with less. "FluroSat merges my aeronautical passions with a desire to make an impact in the world," she says. Her company uses hyperspectral cameras mounted on drones or satellites to detect crop stress and optimise fertiliser use. **More info:** flurosat.com

#4 GOAL BETTER HEALTH

TECH: Colour-changing biosensors

Dr Rona Chandrawati is a biomolecular engineer from UNSW researching disease-detecting nanoparticles 100,000 times smaller than the width of human hair. In a decade, nanoparticle kits could be used to test a drop of blood for cancer or flu. "When the strip or solution changes colour, that means there is an indicator of the disease we are looking for," Rona says. **More info:** UNSW newsroom • bit.ly/nanostrips

#5 GOAL ACCESS TO ELECTRICITY

TECH: Solar panels

ANU graduate Rebecca Watts joined Engineers Without Borders to provide clean, affordable power for 20 households and a school in Ta Ping, a village in Cambodia. She hopes to broaden the idea of how people think about engineers (a man in a hard hat), to include a woman installing biodigesters in the developing world. **More info:** EWB blog • bit.ly/EWBblog

#6 GOAL REHABILITATION

TECH: Robotic hand

Many amputees won't use prosthetics if they're tough to operate. Denny Oetomo, from the Melbourne Robotics Laboratory, is working on an easy-to-use robotic hand, collaborating with surgical researchers to restore amputees' sense of touch through artificial limbs.

More info: bit.ly/robohands

#7 GOAL FIRE SAFETY

TECH: Fire safe timber structures

University of Queensland's Dr Cristian Maluk is developing design tools to understand how timber structures behave during and after fire. "We are trying to highlight the key benefits of timber and how it can be used in an appropriate manner to build taller, build safer, and fulfil fire-safety considerations in the modern built environment," Cristian says.

More info: bit.ly/UQtimberstructures

#8 GOAL CLEAN AIR AND WATER

TECH: Water treatment system and improved cookstove

Millions of people die from water contamination or deadly gases from cookstoves with inefficient combustion. Dr Cris Birzer from the University of Adelaide aims to create a cookstove that mixes combustible gases with air to burn cleanly, as well as a portable water treatment plant that uses sunlight to produce oxygen radicals that sterilise water.

More info: bit.ly/CleanAirWater

WANT MORE?

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5 (non) engineering jobs to go for!

Discover a whole new world of careers using engineering skills

#1 LEAD BY EXAMPLE

Who: Trish White, former government minister and executive director

The Hon Trish White spent three years as a South Australian cabinet minister, after a career spanning broadcast engineering, infrastructure and defence research. "My engineering training really assisted in leading large government departments," Trish says. In her current role as an executive director at consultancy and advisory firm Slingsby Taylor, it's her analytical thinking skills that add value.

@TrishWhiteENG

#2 REACH FOR THE SKY

Who: Josh Richards, astronaut candidate

Engineer-turned-astronaut-candidate Josh Richards studied applied physics and psychology at Curtin University and worked as an Army engineer, mining explosives engineer, and British Commando before putting his problem-solving skills to good use by reaching the final 100 candidates in line for a 2031 Mars launch. "Engineering is about breaking a problem down into its components to find a solution," he says.

joshrichards.space

SKILLS SNAPSHOT

Shape up in these areas for fab future careers...

- Computer science
- Quality control
- Communications
- Problem-solving
- Leadership
- Creativity

#4 DRIVING DIVERSITY

Who: Dr Jillian Kenny, business founder

Jillian wanted to study law but then did a Bachelor of Civil Engineering at QUT. Realising how rare it is to be a woman in engineering, she founded Power of Engineering, workshops consisting of inspirational speakers, hands-on activities and a site tour or industry visit, with co-founder Felicity Furey. She also started Machinam, which connect maths to real-world contexts to further engage high school students in STEM. The most rewarding part? Jillian is now seeing the students who first started with Power of Engineering, graduate from uni and become professional engineers.

powerofengineering.org
Machinum.com

#3 ROBOT LATTE!

Who: Liam Wilkie, head of operations

Liam Wilkie went from third-year mechanical engineering studies at RMIT University to acting head of operations at Once Alike. He has recently finished public testing of their fully automated prototype robot barista in Melbourne. Liam's role combines experience in the coffee industry with his engineering knowledge of process optimisation and quality control. "If you want a great customer experience, you need to hit tight benchmarks for consistency and quality," he explains.

instagram.com/cafeenergy

#5 (VIRTUAL) REALITY RULES

Who: Hardik Trivedi, founder of VR start-up AuXR, which helps to develop autistic kids' social skills

Homeschooled from year five to 10, Hardik focused on developing his own skills rather than just passing subjects. He completed a Diploma in Engineering at UTS:INSEARCH and a Bachelor of Mechanical Engineering. While at uni, he entered UTS' Hatchery Entrepreneurship Program, taught himself to code and is now developing educational tools for autistic kids.

"Most of the learning we do is on our own. Find what you're passionate about and what problem you want to solve. You have so many resources to use."

@AutismXR

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WOMEN WORKING IN ENGINEERING

FROM ENABLING TECH TO EXPLORING SPACE, MEET FOUR ENGINEERS MAKING CHANGE

HEAD FOR BUSINESS

SIOBHAN TAGELL HELPS PEOPLE BUILD THEIR DREAM HOME

Siobhan Tagell worked in office-product management and as the director of a charitable fund before finding her engineering career as the founder of Perfect Plan Project Management. Her startup is dedicated to making home construction projects run smoothly.

The idea came about from her own experiences in renovating, and she saw an opportunity for a business that would manage the process for others, making construction projects simpler, cheaper and much less stressful for the client.

Her favourite parts of her role include problem solving unexpected issues for her clients. "I like to see an idea come to fruition, from the first plan to finalisation," she says.

INTERNATIONAL BUSINESS RELATIONS, GRIFFTH UNIVERSITY >> GENERAL MANAGER, ASA AUSTRALIA >> BUSINESS OWNER, PERFECT PLAN PROJECT MANAGEMENT

TAKE CHARGE

MEET HELENA KERTESZ LEADER AND AN EXPERT 'BOT BUILDER

Helena Kertesz was creating insects partially built from actual exoskeletons for art when her teacher asked her to try and make them move. "I just fell in love with electronics and programming and all the mechanics," Helena says.

Helena is now pursuing a Mechatronic Engineering and Computer Science degree at the UNSW and has also been president of BLUEsat, a UNSW student space society where a group of undergrads share a mission to build space hardware together. Helena has competed in the European Rover Challenge in Poland, not once but twice, as part of the group. "I don't know where the future will take me, but I want to put my knowledge to use in ways that will help others." – *Blaine Jarvis*

BACHELOR OF MECHATRONIC ENGINEERING / COMPUTER SCIENCE, UNSW SYDNEY >> PRESIDENT, BLUESAT, UNSW SYDNEY

OUT OF THIS WORLD

NASA ENGINEER DR BETH JENS IS MAKING INTERPLANETARY TRAVEL A REAL THING

Growing up in Torquay, country Victoria, Dr Beth Jens was always fascinated by space. Her end goal? To make it to NASA. Beth's perseverance paid off, and after her degree in Melbourne she began her Masters in Aeronautics & Astronautics at Stanford University in California. "It was highly challenging as a foreigner, particularly in a field like rockets, with potential military applications," she says.

Beth now works full-time at NASA's Jet Propulsion Lab across two projects: improving performance of a mini rocket (about the size of a shoebox!) for interplanetary missions, and working on a subsystem of the NASA Mars Rover, due to launch in 2020. – *Larissa Fedunik-Hofman*

BACHELOR OF ENG (MECHANICAL)/ BACHELOR OF SCIENCE (PHYSICS), UNIVERSITY OF MELBOURNE >> SUMMER SPACE STUDIES PROGRAM, INTERNATIONAL SPACE UNIVERSITY, NASA

PHD AERONAUTICS + ASTRONAUTICS, STANFORD UNIVERSITY, CALIFORNIA >> PROPULSION ENGINEER, NASA

A HELPING HAND

GABI NEWMAN CREATES EXCITING TECH TO HELP OTHERS

Gabi Newman is in her final year of study, and also helps to build robotic hands by volunteering for Enabling the Future, an international charity that produces affordable, 3D-printed, prosthetic hands.

"We're producing these hands for $30, in comparison to up to $20,000 for hospital-grade prosthetics," says Gabi, who adds that because 3D-printed prosthetics are so much cheaper to produce, they're great for growing kids who regularly need to be fitted with new ones.

And that's not the only benefit when it comes to building for kids. "We can modify the files to the child and take their input on what design they would like," says Gabi. It's all about confidence building. They can go into school and say 'I've got a cool Frozen hand or Iron Man hand!'"

BACHELOR OF MATERIALS ENGINEERING/BIOMEDICAL SCIENCE, MONASH UNI >> VOLUNTEER, ENABLING THE FUTURE

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