WIDEVISION

DESIGN FOR HEALTH & WELLBEING

SCHOOL OF COMPUTING ENGINEERING & MATHEMATICS
CREATIVETECH WEEK EXHIBITION **2019**

WELCOME

Transformation mind sets hold the key to successful leadership in creating sustainable world and global prosperity. The rapidly evolving knowledge economies and societies, as a result of the advances in socio-technical systems design, require such mind sets, offering new challenges and opportunities for contemporary university graduates. In-line with these challenges, through the years, the School of Computing, Engineering and Mathematics (SCEM) has been offering its students a learning experience that connects elements of computer and data science, design, engineering and science. This broad learning philosophy recognises the melting pot of the "discipline siloes of thought" into what MIT professor Neri Oxman has labelled as the 'Age of Entanglement.'

Every year, the Widevision exhibition demonstrates the capacity of SCEM students for creation and innovation, as well as their broad thinking. Centred around the outcomes of industrial design student projects, through the years the exhibition has grown into a show case that allows visitors to sample the achievements of students across architecture, computing, engineering, manufacturing, sustainable urban design and construction. What brings these works together under the Widevision umbrella is the transformative thinking of their creators, and the ability to translate it into solutions, which connect functionality, sustainability and liveability.

Western Sydney University Solar Car project is one of the exemplars initiated by industrial design and mechanical engineering students in 2012. It now includes also students in electrical and electronics engineering, information and communications technology, and visual arts and communication. These teams manage every aspect of the design, engineering and production of the vehicles as well as sponsorships, marketing and the administrative elements of their involvement in the competitions. They have designed and produced four vehicles. The latest one, UNLIMITED 3.0, designed and developed in 2019, is displayed at this Widevision. Next year, the team with this vehicle will try to defend the American Solar Challenge in the Challenger class, which the UNLIMITED 2.0 won in 2018.

The development of transformation mind sets requires substantial commitment from the University. The University has developed the Arts and Engineering Precinct on the Parramatta South Campus which included new design studios and networked maker spaces. It has significantly upgraded the Kingswood Advanced Manufacturing Precinct in support of contemporary 'ideation-design-manufacturing' processes. In 2021 the University will open a world-class Engineering Innovation Hu – a high tech environmentally sustainable vertical campus in the heart of Parramatta City, which will offer architecture, engineering and industrial design students opportunities for education in close relations with industry. Student professional expertise and capabilities, backed by these outstanding facilities are key factors of putting transformational ideas into practice. The Widevision exhibition will continue to be a vehicle that facilitates the translation of student solutions into industry. Do not miss the opportunities this year.

Professor Simeon Simoff
Dean, School of Computing, Engineering and Mathematics

QUALITY

Sustainable urban development is critical as we cope with intense urbanisation across our cities. By 2050 around 70% of the world's population will be living in cities. Many of the most significant growth centres are in our own region of the Asia Pacific and this is where the social, physical and economic infrastructure needs are greatest. More than half of the world's investment in buildings, transport, products, energy and other infrastructure is expected to occur in this region in the coming decades. The volume and focus of investment in cities will define the next two decades. US$20 trillion will be invested in urban infrastructure by 2050 - around half of that will be in our own backyard.

Urbanisation touches all our graduates in numerous and diverse ways. How our graduates respond to such big challenges they will face in their future professional lives is of concern to us. Our graduates in the Built environment programs; project managers, product designers, quantity surveyors, building surveyors, design managers, architects, construction managers and engineers will be part of global design-production supply chains. Learning to design, to conceive to imagine to create is an integral part of our students' learning experience.

Design is the domain of all the students in our Built environment programs – design as a way of thinking is necessary to problem solving; it is often a multidisciplinary pursuit and is an international pursuit.

We foster open, inter–disciplinary collaboration combining team leadership with a democratic generation of testing of ideas against a problem or challenge. We are exploring new ways of giving students more flexibility and more choice in their studies as we create intellectual, physical and virtual environments where they will be able work on industry problems amongst disciplines.

Creating the future thought leaders is an intensely human process which is culturally dependent. We need to promote learning and teaching environments that showcase multi, inter and transdisciplinary collaboration within and across the various programs and disciplines that encourage diffuse boundaries. At the heart of the new capabilities are future leaders that are boundary spanners, integrators and design thinkers and we are developing people oriented collaborative practice models within our new curricula that creates these opportunities.

WSU has a strong commitment to the UN Sustainable Development Goals and we shall be exploring this more deeply in the future in our new School of Built Environment. Our students and staff seek to be influential in addressing the challenges of the Built environment.

Professor Kerry London
Professor Built Environment and Urban Transformation, Interim Dean School of Built Environment

WIDEVISION 2019

In this 50th year of the moon landing 2019 reminds us of the spirit of collaboration and how people came together in a combined team of over 400,000 to realise the impossible and successfully coordinate the lunar landing and by delivering it captured the imagination of a generation, no generations.

The global competition of that time aligned superpowers in a race to out-do each other and in the process advanced the development of thousands of spin-off innovations we have today including non-scratch contact lenses, prosthetic devices supporting inclusiveness, mobile phone cameras, cordless tools, ear thermometers, fire-fighting equipment, long distance communication, MRI and CAT scans, memory foam, solar panels, ski boots, water filters, UV blocking sunglasses, Velcro, and non-stick tech for frying pans.

Widevision 2019 champions the professions in the contributions of each exhibiting student project as the result of many collaborations, evolving work-ready skills, evidence-based applied research methods, trials through testing, and ultimately a self-belief in one's own attributes and strengths toward entering the workforce.

This workforce is changing and predictions for the Future of Work will challenge the foundations of employment and interactions between fields. Our students are well-placed to respond to future challenges through their self-reliance built upon sound core subject knowledge and self-selected elective specialisations and the ability to lead and work in teams due to their refined understanding of projects, people, and the dynamics of interdisciplinary thinking and actions. The forging of robust collaborations and capitalised synergies will provide the basis for continued market opportunities for Western graduates.

When provided the chance, WSU students gravitate to projects "for the common good" to improve the human condition and make the world a better place. The growth in project titles that reflect health and wellbeing is on the rise as WSU's students' search for success through their advanced technological solutions supporting future contributions to growth in high value added domains which are defined but not limited to wearable technology and space industries that contribute worldwide a combined A$700 Billion annually.

We believe that good citizenship provides the basis for enduring relationships and that these relationships must combine high quality social, economic and environmental outcomes to create and maintain good living and working standards. We are also so proud that we choose to showcase an array of exemplary student projects across the years that define the spirit of this generation in the preparation of the leaders of the near future.

Dr. Sasha Alexander
Director of Academic Program
Industrial Design

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HONOURS PROJECTS

INDUSTRIAL DESIGN
HONOURS

SUPERVISOR: DR SASHA ALEXANDER

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EPM: (ELECTRONIC PATIENT MONITOR)

ANTON COX

There is a lack of user-centredness and lag in innovation in current models of patient vital monitors as used at hospitals in Australia. Patient monitor design clearly need revision and have an improved focus on the patients that they monitor, rather than merely on the technical package and price. This proposed design will incorporate different features including improved ergonomics, portability, better user interface and user experience for various stakeholders such as doctors, nurses, and especially patients.

The EPM (Electronic Patient Monitor) is a device that uses both old and new ways of reading and interpreting vital information and incorporates functions into a small package that can help with patients that have prolonged hospital admissions. The device caters for patients with non-life-threatening conditions that require 24-hour observation and assessment rather than interim observation of five times a day. Designing the product for the patient will build trust in the hospital, health management, and is intended to increase patient happiness and comfort.

EPM is designed for usability for nurses and doctors requiring little training to operate as the device automates vital readings and calculations. The feedback is then accessed by the doctors and nurses remotely. This is done to reduce downtime for the nurses during their rounds requiring less disturbance and reducing human error. Improved UI elements creates a seamless connection between the monitor, the patient and health provider, thus ensuring that each device is connected to the correct patient.

Innovation

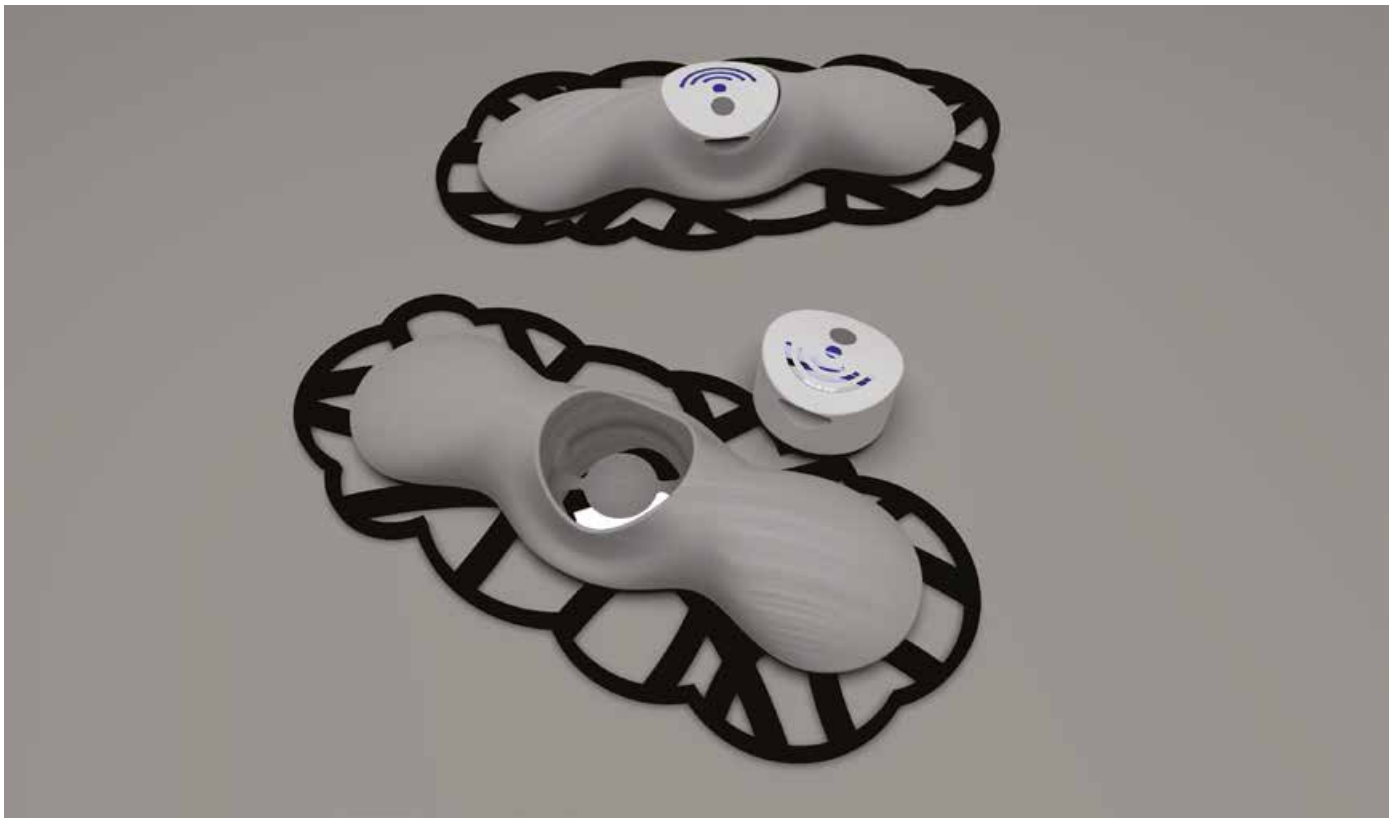
The device uses a new method for ECG calculations to find both the PTT (pulse travel time) and PEP (pre-ejection period) to then find the PPG (photoplethysmogram) which is used to give data on the patient's oxygen saturation levels and lung movement. This new way of monitoring requires less measurement tools and can lower cost and size of monitoring devices. Removing the bulky package needed for continuous monitoring gives a more portable device for better patient movement. Having the patient move around is better for the psychological well-being, reducing stress and creating a more comfortable time during the length of stay.

Taking more advantage of the hospital's cloud-systems can help give doctors and nurses better access to information and allows for remote access. With this reduction of downtime more focus can be put on the patient's psychological well-being to speed up the recovery time.

With focus on manufacturing and assembly creating a product that is quick and easy to deliver reduces product costs and supply times. Manufacturing time is also reduced by utilising products that other companies already make like ECG tape from 3M™. Materials that are antibacterial and resistant corrosion are suited to this design.

Outcome

Many hospitals generally cater to older age groups rather than younger patients in their early to mid 20s. Whilst it is difficult to cater for all age groups in the one facility, this design is flexible in helping medical professionals target critical care older patients, whilst allowing younger patients to self-monitor where possible. With the EPM offering not only function but also comfort it is designed to help the patients situate themselves in the hospital better. The features in the monitor could be used among other devices to create a network data to help create a better medical system for patient monitoring. Creating a product that helps both the medical provider or carer and patients is possible and there is much capacity for further investigation.



EPM Device

EPM Hospital Use

INDUSTRIAL DESIGN
HONOURS

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HALORA

CHELSEA GASSON

As homes become smaller and cities denser in population, the need for products that enhance, and advance open living style homes increases. Outdoor gardening opportunities in high rise apartments and inner-city townhouses are limited, creating the opportunity for a multifunctional, health and wellbeing focused indoor garden. Halora is an indoor smart garden focused on bringing the outdoor experience inside, in a new and innovative way. The name Halora is derived from a combination of flora and halo; referring to both the Latin term for plants and the way the product hangs above your head; just like a halo.

Halora targets the relationship between young children and their parents or guardians and how this relationship directly influences healthy eating habits carried throughout a child's lifetime. By getting both users involved in the gardening experience it is not only influencing the development of good relationships with food but boosting all users' immune systems. Immune systems are boosted via diverse microbiota that can be transferred to you via your mother during pregnancy, infections you catch throughout your lifetime and your interaction with the natural world. As previously mentioned, the density of living and population amongst the world's capitals is limiting the amount that people interact with nature due to smaller homes. By bringing the natural world indoors and encouraging the targeted users to interact with the plants that they grow, Halora increases the diversity the microbiota within the home and therefore boosts the immune systems of the occupants.

Innovation

Utilising a new form of gardening termed 'inverted gardening' to grow plants above the kitchen bench allows the user to cultivate a wide range of smaller plants indoors. The inclusion of smart LED lighting; that drops down from the central base, can be controlled via the app or voice activation, ensuring that plants receive enough required light. This shows innovation through multifunctionality by ensuring the successful cultivation of plants and the illumination of the room. Inverted gardening is proven through studies carried out by Plant Behaviour and Cognition Scientific Researcher Monica Gagliano, who discovered that with the correct stimuli a plant will learn to grow their leaves towards their main light source and their roots towards their main water source; scientifically termed phototropism.

The unique interior pot design features smart sensors that give real time feedback to the users via smartphone applications and AI-powered products such as Google, Alexa and Siri. Smart sensors track and record the ambient light and temperature, water level within the ceramic reservoir and soil moisture within the pot; these sensors are integrated seamlessly to help users watch over and cultivate their plants.

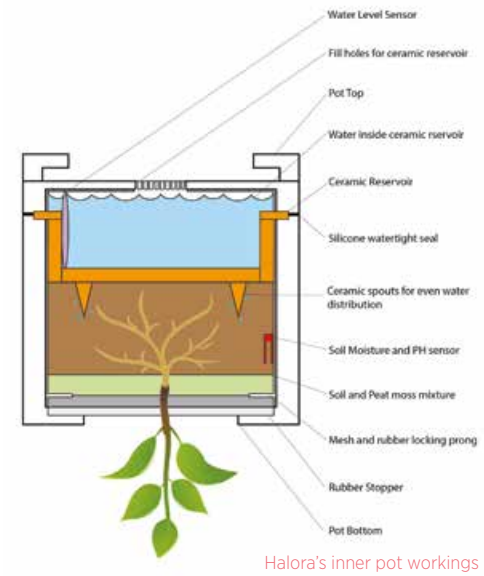
The semi-glazed ceramic water reservoir has a capacity of 750mL which allows water to slowly pass through the porous unglazed ceramic. The soil is kept moist for up to two weeks before needing to be refilled, it is easily refilled via the semantic water droplet design on the top of the pot. The innovative features of the design provide a semi-automated yet traditional gardening experience to the users who can personalise the care of their plants; utilising smart data to ensure that each plant receives the correct amount of water and light required for sustained growth.

Innovating the indoor garden using inverted gardening and smart sensors in this way means that no bench space is needed to grow your own herbs, fruits and flowers. This allows more room for meal preparation, appliances, and other kitchen tasks. Bringing the outdoors in using these innovative techniques also purifies indoor air by introducing plants into the space. NASA completed a study on the inclusion of indoor plants and found that in a space on average of four meters by five meters, the inclusion of six or more plants purified the air by up to 75%. Therefore, the nine-plant capacity of Halora can increase the air quality in the surrounding environment, leading to overall health and wellbeing benefits to the users.

Outcome

The outcome of this research and development is a smart indoor pot and sculptural lighting feature. A lush living halo of plants that targets overall wellbeing and health of the users that encounter it. It adds value by helping to teach young children valuable life lessons about good eating habits and caring for living things. Provides users with fresh produce and purified indoor air environments, whilst seamlessly delivering a smart system that enhances indoor inverted gardening. With an accompanying smartphone application that provides users with 24/7 access to data about how their system is running and what adjustments need to be made for the best plant outcomes, anyone can easily grow their own indoor garden with Halora.

Halora Close Up



Halora's inner pot workings

Halora in use

INDUSTRIAL DESIGN
HONOURS

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ECO SWIFT

TRISTAN HOOD

Data from the Australian Bureau of Statistics show the average distance people walk between public transport in Sydney is 0.65km, 48% of whom commute by train transfer at least once per day. Transit and fluid transportation for consumers are crucial elements for healthy economies and improved quality of life (Ditmar and Ohland, 2004). Scholarly articles show current forms of last-mile transportation need development. These trends unveil a substantial market for last-mile transportation. The design process involved investigation of the user needs, generating and testing concepts, considerations of product architecture, manufacturing and product specification. The process also ensured that the design was economically feasible, sustainable and commercially successful.

Some of the project parameters include a design that is compact in size, facilitates intuitive leaning, effortless ride-ability and a narrow turning circle (for crowded areas). This criterion resulted in a two-wheel front platform and a three-wheel rear platform. The front platform utilises a caster truck on a thirty-degree pivot angle (single wheel) and a rigid, rounded rear wheel. The rear platform utilises the same caster truck, which gives the skates harmony when separated, and a dual cone wheel with a simple truck system on a thirty-degree pivot angle on the back.

Innovation

Ecoswift is a last mile transportation device that fits within the average backpack. The multi pivotal wheel system is the first of its kind on a product of this size. A modular 'clip and slide' stabilising feature was created to connect the two skates for long journeys or beginner riders, it provides the user with stability but widens the minimum turning circle.

Ecoswift skates are designed with sustainability in mind. The product utilises easy disassembly methods with included tools to change worn parts (wheels, bearings). The decks on each platform are laser cut from recycled plywood. The product is easily disassembled to single material parts using household tools to be recycled at its end of life. Exercising theoretical and empirical research methodologies, user centred design and sustainable design methods, Ecoswift provides consumers with an affordable, high quality, easy to use option for the last mile of travel.

Outcome

My project identified that there is a gap within the market for a last-mile transportation product. This product will improve overall quality of life and improve flow of consumers/last mile users to and from their workplace/destination in an economical and timely fashion with little impact on the environment.

Ecoswift has the potential to solve the problem of sustainable, portable last mile transportation and also provides scope for a national initiative for adolescents to utilise sustainable forms of transportation.

Ecoswift complex/rear view.

Ecoswift exploded view.

Ecoswift side view - detailed render of product in use.

INDUSTRIAL DESIGN
HONOURS

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WithinREACH

JARRAD MANN

WithinReach is a fully automatic external defibrillator (AED) specifically designed for residential homes, wet environments and water-side emergencies.

Sudden Cardiac Arrest (SCA) is the abrupt loss of heart function and can happen to anyone of any age, at any time, even if they have not been diagnosed with a prior heart condition. SCA is more often than not fatal and with an increasing number of events and deaths recorded every year, out of hospital cardiac arrests (OHCA) are becoming a global public health problem. The number of OHCAs being treated by emergency medical services each year in Australia is climbing, similarly over the past decade the number of deaths from cardiac arrests in Australia has risen from 1550 in 2008 to over 2300 in 2017 ("3303.0 - Causes of Death, Australia, 2017" 2019).

Treatment of sudden cardiac arrest is time critical as the condition starves the brain and other vital organs of oxygen resulting in irreversible damage. Every year 30 000 Australians suffer from cardiac arrest and of those only between 9 to 15% will survive, however, survival rates can increase up to 74% if CPR and defibrillation from an AED are provided within three minutes of a collapse (Defibrillators Australia, 2019). An automated external defibrillator or AED delivers an electric current to the heart in order to restore proper rhythm and function. Statistical analysis and data from the NSW Ambulance Dispatch Database provides clear evidence showing that the majority of OHCA occur most often in a home or residence (68.5%), followed then by public settings (21%) and nursing homes (10.5%) (Sca-aware.org, 2019).

Australia is a coastal-driven society and thus, the need to create safe environments around water is paramount. Due to the predominance of OHCA in homes, the ever-increasing number of people moving to the coast and the rising amount of Australian homes with a swimming pool, there is a clear need for residential medical devices that operate in wet conditions (Australian Institute of Health and Welfare, 2019). The purpose of this project was to develop an AED that not only improved the time taken to defibrillation and the rate of survival of OHCA that occur in residential homes but aimed to advance the awareness of SCA and educate families in the operation of AEDs.

Innovation

Since the majority of OHCA present themselves in a residential home, it was this environment in which research into an innovation was focused. Using lightweight, sustainable materials *WithinReach* has been designed to eliminate barriers that delay time to defibrillation in out-of-hospital cardiac arrests by addressing environmental and functional obstacles. The compact yet ergonomic design of *WithinReach* allows for easy storage, swift access and transportation, and allows the device to be used in any residential or public environment.

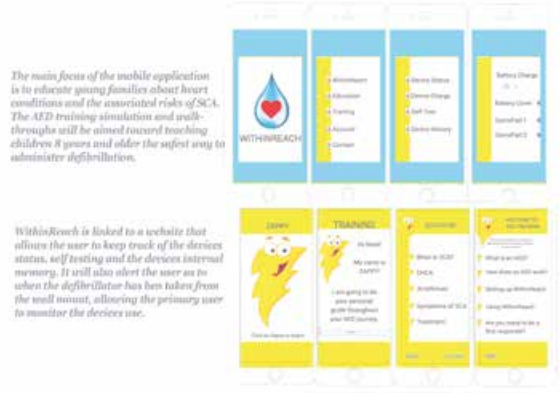
Standard AED operation and procedures in wet emergency environments instruct the user to dry the patient's skin before the electrode plates are attached. This is in an attempt to improve the conductivity of the electrodes and consequently enable the current to flow correctly through the heart but ultimately can unnecessarily delay defibrillation. When the victim's chest between the two electrode plates is wet, the electricity is dispersed across the skin reducing the effectiveness. The *WithinReach* dome pads contain an absorbent, moisture wicking mechanism, which effectively removes water from the patient's body thereby ensuring safe and effective electrode pad placement as well as rapid drying and preparation for defibrillation.

Further innovation lies within the specifically designed user interface of *WithinReach* and the intuitive operation of the device through the use of both visual and audible instructions. These features are enhanced through the accompanying mobile application that enables Australian's to educate themselves, their families and their friends on common heart conditions, symptoms and causes of SCA and prepare the best procedures to follow in the event of an arrest.

Outcome

The ultimate goal of *WithinReach* is to put a defibrillator in every home and one in every hand. Currently less than half of all people who suffer cardiac arrest in the community have someone commence CPR or use an AED before an ambulance arrives. The focus behind *WithinReach* was to not only offer families a life-saving medical device that can be used in a number of situations, but to educate children and adults in how to correctly treat SCA. *WithinReach* also has the potential to increase public awareness eventually resulting in increased bystander AED use.

In-Use graphic



Possible graphics for WithinReach Training Application

Exploded View of WithinReach

INDUSTRIAL DESIGN
HONOURS

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ELECTRONIC MONITORING: SENTIAN

RICHARD QUAH

There are many types of criminal offender profiles, from those that threaten acts of terrorism to those who have attempted to cheat Centrelink. Most people when hearing the words Electronic Monitoring think of ankle bracelets worn by paedophiles, and this is true for many offenders out in our communities in NSW. However, there are over 2000 offenders released on parole in NSW every year; and only a handful adequately meet electronic monitoring criteria. There is a huge strain on resources to try and control such individuals 24 hours a day. My research investigates alternative approaches to criminal monitoring by proposing a device that passively monitors low-risk offenders to encourage reintegration into our community.

The proposed design is a more humane system of rehabilitation. Research shows that offenders have a lower risk of recidivism (that is, the tendency to reoffend) when offenders are active in social programs and having regular contact with support officers. As such, I have chosen to focus on low risk offenders such as those on home detention and weekend work release orders, as a large proportion of these offenders are not subject to current electronic monitoring conditions and are assigned to meet with parole offices periodically.

Innovation
Most electronic monitoring devices track offenders as data points on a map, and alert when they are travelling in certain pre-determined zones. Offenders are restricted from crossing an invisible barrier and are not given any information regarding the completion of their order.

My research explores how devices can be used to rehabilitate and encourage positive behaviours in people, rather than focusing on what they are not permitted, the design solution highlight what they can do and thus encourages change behaviour. Less intrusive and more inclusive.

Outcome
Sentian is designed to go unnoticed. It integrates a phone app with a key dongle to become

part of a user's everyday pocket-items to passively track their movements and behaviours. As offenders go about their daily activities, they are required to biometrically scan their finger with the key dongle to correlate their location with a predetermined schedule, this is to ensure compliance. If the user chooses to deviate from their activities, tracking data can be collected from a mobile phone app. In addition, the app allows for continuous support and interaction from social workers and can act to provide progress information to the offender on the status of their order.

The key dongle device works with a charging dock which also allows for the offender to update and plan out their scheduling, giving them responsibility for their daily actions; the charging dock acts as a beacon indicating the end of the day's activities.

INDUSTRIAL DESIGN

SUPERVISOR: MS KAREN YEVENES

https://www.dropbox.com/s/5hwbentjm5haban/Portfolio.pdf?dl=0

BYRON BOILER

CHRISTOPHER RYDER

Arthritis is a major medical condition in Australia, with at least one in seven people suffering from at least one form of arthritis. This is a major problem for the suffers of this condition, considering that there are very few manufacturers that specialise in arthritic equipment for the household. The main theme of the project was to take an existing household kitchen appliance and redesign it in a way that provides users with dignity, independence and a sense of well-being in their own homes.

The proposed solution is the Byron Boiler, a kettle designed for people with arthritis. The Byron Boiler is a functional, yet beautiful kettle that incorporates design principles and considerations to create an accessible kettle that can be used by anyone.

Innovation

The Byron Boiler is completely different to any other kettle available. The Byron Boiler is designed to be as easy to use as possible and to look like an art-piece when not in use. The unique design allows for people suffering from degenerative hand and wrist conditions to be able to live in a manner that grants them independence whereby users are not always relying on carers.

The design is suited to arthritis suffers that live alone or with one other person in the household. This justifies the small size of the Byron Boiler, which allows the kettle to be lighter, easier to pick up and grants the ability to naturally use two hands, if required. The centre of balance has also been redesigned to make it much more centralised and lower for the user in order to minimise unnecessary strain placed on the hand, wrist and shoulder joints during the task. This further increases the ease of use. Another benefit of the reduction in size. The Byron Boiler now makes it easier than ever to enjoy warm beverages in your very own home and looks appealing on the kitchen counter-top and works well in kitchens with limited space.

Outcome

The Byron Boiler project has resulted in an innovative new kettle that is both highly functional and beautifully designed. The Byron Boiler kettle provides a truly unique user experience to both arthritic and non-arthritic people alike, and it is henceforth universal in its design. The uniquely designed shape is reminiscent of a water drop and helps to provide an easy to pour slope for the kettle that gives greater levels of control that ever before, resulting in the perfect blend of functionality and design combined together. The Byron Boiler Kettle affords users with an effortless way to pour their water through the utilisation of natural hand and wrist movements, in addition to a more centralised centre of balance.

This project gives the opportunity for arthritic people to live fulfilling lives in their own homes without being reliant on others for their wellbeing. Overall, the Byron Boiler is a distinctly designed kettle which is unique to the market.

Arthritic Kettle

Arthritic Kettle in Use

Arthritic Kettle in Kitchen Setting

INDUSTRIAL DESIGN

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EZMIX: FOOD PROCESSOR

TOM STAFFORD

With growing interest in healthy home-cooking, the demands for owning personal food mixers and processors is becoming increasingly popular. Kitchen appliances serve to aid preparation of food items in the home as an economical alternative to dining out. In addition, home cooking encourages well-being as the user is aware of their own dietary needs. The current product market features large, heavy appliances that require premium bench space, whilst low-end models have limited functions and capabilities. An extensive review of existing products has identified that there is a clear gap within the market for a midrange product for occasional use which suits small kitchen spaces. The criteria associated with this type of product acknowledges the need for ease in terms of manual handling, ease of use, assembly and disassembly.

The goal of my project was to heighten the product quality and to incorporate softer, natural forms in terms of product semantics, to appeal to a specific target market whilst also catering for individuals that experience variations of arthritis. A domestic product that can assist those grappling with arthritic conditions involves an understanding of bones, muscles and joints. Arthritis can affect an individual's regular activities, and when it impacts the hands objects become increasingly difficult to grip, hold, turn or even press button controls in the desired ways.

The design of EZMIX in relation to its target market considers parameters such as; the angle at which the wrist starts to ache, hand placement, weight ratio, motions that involve minimal strain, variation of use, lifting, storage and bench space, cleaning and modern integrity.

Innovation

The EZMIX food processor captures the needs of people that acquire independence in the kitchen or do not want to spend thousands of dollars on multi-use mixer with unnecessary features. My design exceeds the design criteria by providing a solution that meets the needs of the user through various features including size, smaller dimensions, and easy of storage within small kitchen cabinets and benchtops. The product has minimal weight making it easy to lift and relocate. The layered curvature edge features enable perfectly fitted palm and finger alignment for controlled handling, with additional underlaying textured grips.

The EZMIX bowl conveys a symmetric style with rubberised grips that are shaped to fit the distance between the thumb and index finger. This continues into a thick tubular rim that invites variations of hand placement and grip depending on user comfort. The handle grip design involves decreased joint strain and muscle pressure in the wrist, hand and fingers. Being a smaller design, my solution allows for all but the base component to be easily washed via dishwasher. EZMIX has minimal components and are all very easy to pull apart and put together with simple motions.

Outcome

The EZMIX project process has highlighted ways in which design can create a better experience for people (arthritis users) and to promote independence within the home. It has uncovered how even small details of a design can have a major impact on a person that suffers from arthritis. My design is ideal for both arthritic and no-arthritic users. It was the intention of this project to achieve an easier way of doing tasks associated with mixing food, while improving the aesthetic appeal through applied semantic traits. Due to a variety of resources including research, experimentation, empathy testing and interviews, the final design meets the aim that I set out to achieve.

Tapping the display opens the Touch screen. This removes irritating hand motions and pressurized buttons that can impact an arthritic user.

Rubber grips help to twist lock the bowl to the base in a clockwise direction. The lid can be attached the same way.

The product-environment relationship fits a modern style that supports ease of use, assembly and cleaning.

INDUSTRIAL DESIGN
HONOURS

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STRECH

MARC TAN

This project focuses on importance of health and wellbeing through the exercise of stretching. The outcome of the design research is a device called “Strech”. The removal of the “T” is deliberate as it is the first letter of “Traditional”, and my design “Strech” aims to defy traditional ways of stretching with its smart capabilities which overall benefits the user through safer and smarter stretching habits.

The project stemmed from the traditional “Flexibility test box” used by physiotherapists to track flexibility in muscle movement and joints. My research identified certain gaps that were presented in regard to the existing product and provides an alternative device with improved functions.

The motivation for this project was inspired by athletes and performers that require improved flexibility when undertaking exercise, this was also my personal experience in undertaking sports. Further to this, the product aim was to improve range of motion so that athletes could improve performance.

With many people experiencing lower back pain, this product offers scope for personalised exercise regimes in consultation with medical professionals that may improve the condition. The overall goal of this product is to help uncover and solve issues related to flexibility in motion and to identify gaps in the market to help cultivate and sculpt a feasible product that is currently not available on the market.

Innovation

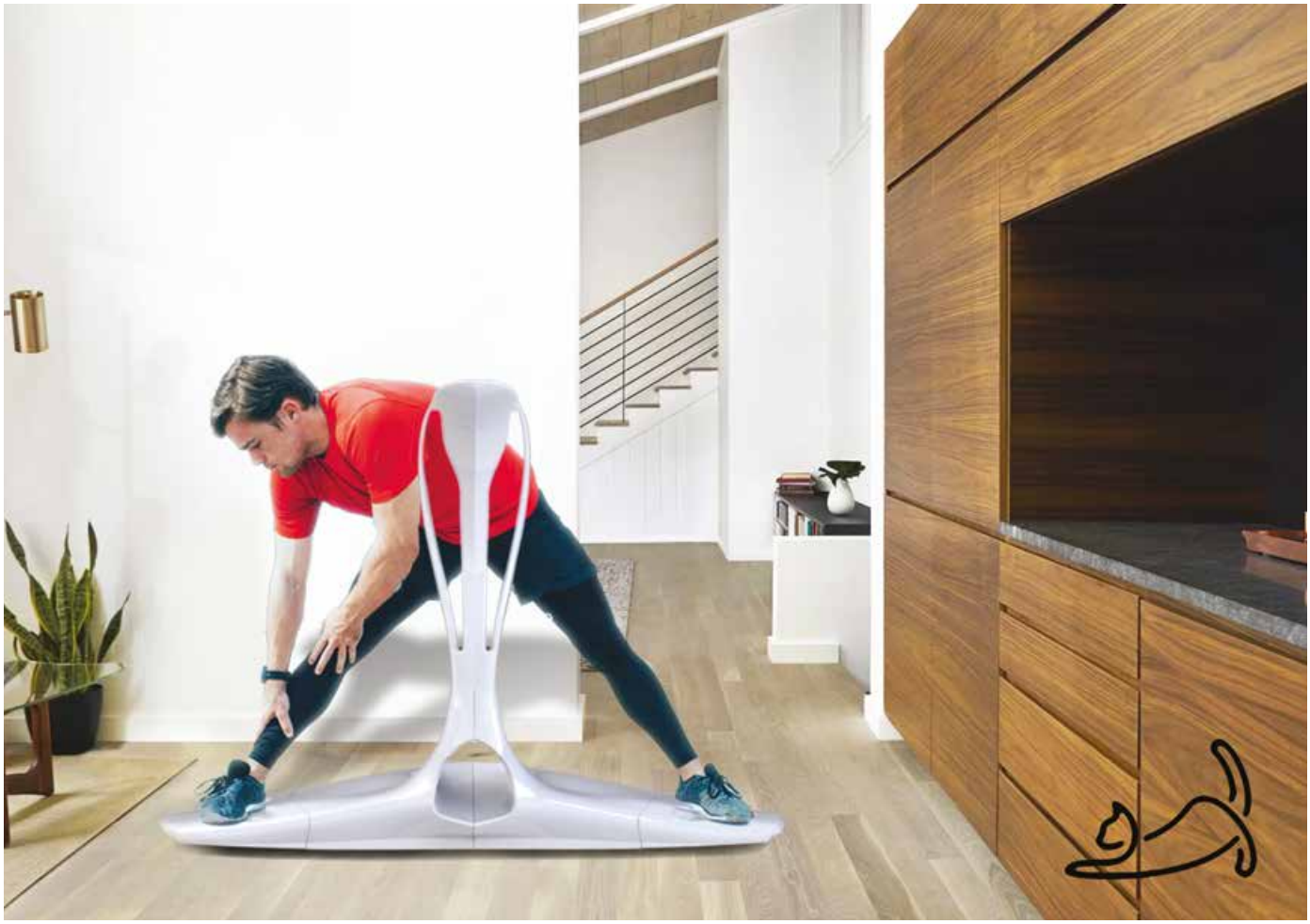
“Strech” is a device that promotes safe stretching exercise by controlling the muscle stretch range to improve flexibility, range of motion, muscle strength and also cardiovascular circulation. Stretching on a daily basis not only improves physical capabilities, but also calms the mind and reduces stress levels (Nora Tobin 2012). My design “Strech” innovates the traditional methods of stretching by providing the user safeguards to help prevent hyper-extension of muscles in the lower back and legs. These safeguards also enable the user to push their limits at a controlled manner, through the use of smart sensors, diagnostics and personal records. The user will be able to share their progress with medical professionals, team members, coaching staff through a specific “Strech” application. As such, this device can be seen as the future of stretching, due to its smart capabilities and also user-friendly design.

Outcome

“Strech” will feature a sleek Neo Futuristic styling, which is an unorthodox aesthetic towards athletic and clinical equipment, its form replicates the manner in which a cat stretches its nimble body, and is also accentuated through the product logo. “Strech” also features a smart interface design to provide the user with the capability to set personal goals such as: flexibility testing, safe stretching, data logs, stretching records and also progress tracking. “Strech” will be manufactured with recyclable materials, such as 3003 aluminium and also recyclable ABS plastic. Design-for-disassembly to quickly break down the product and its components after use, stems from the need for sustainable manufacturing practice. This product is also easily serviceable, with parts being interchangeable and available for replacement. In conclusion, “Strech” is the future of stretching, with futuristic features and implementation of smart tracking systems in the sphere of products for health and wellbeing.

Interface interaction

Features of the product such as the Interface and egonomics



INDUSTRIAL DESIGN
HONOURS

SUPERVISOR: MR JEAN PAYETTE

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OVU – SMART & SAFE BASSINET

LACHLAN TWEEDIE

The health and safety of a baby is always the top priority of all parents and primary carers and thus over the decades baby products especially carriers, car seats, and cribs have been continuously revised and innovated to provide the highest safety possible. Although many cribs have a large focus on safety there are still cribs that are proven to be unsafe and increase the risk of sudden infant death syndrome (SIDS). Cases of SIDS can be the result of a range of causes, some directly related to the crib and surrounding environment and others not. Throughout this project, I have researched the importance and scale of SIDS, discovered speculated reasons for its occurrence and precautions taken to minimize it. This research has been used to discover safety-focused technologies, materials and has enabled me to set design guidelines which has led to the development of OVU.

OVU – Open top configuration

Innovation

OVU is an innovative smart bassinet which aims to reduce the risk of SIDS in its most common ages, from 0 to 6 months. OVU gives parents peace of mind with innovative breathing monitoring technology. This records the babies breathing patterns with under-mattress pads. These pads monitor movement looking for inconsistencies and will set off an alarm if no breathing is sensed for longer than 15 seconds. OVUs rotating cover and floating mattress allow for the bassinet to be set up beside a parent's bed. This makes it easy for parents to tend to the baby during the night and gives an easier, safer and stronger connection between baby and parent.

The design solution allows the baby to sleep beside the parent without being in the parent's bed because as research shows, many infant deaths have occurred as a result of parents crushing/suffocating their babies while asleep after rolling onto them. The rotating cover stops in 3 different positions and as a result creates a completely open side form, an open top-only form and a completely closed (mosquito net) form. The bassinet stand is electronically height-adjustable and rests on lockable caster wheels which makes it movable while the parent is still in bed. The height adjustability has a range of 500mm; this allows the bassinet mattress height to adjust from bed height to an adult male's elbow height for easy lifting of the baby by all users.

The mattress makes use of an organic memory foam made from Talalay natural latex. This is the most breathable, mouldable natural memory foam which is important in reducing the risk of asphyxiation if the baby were to roll onto its face. The mattress top has an across-shoulder curve and reduces the chance of baby roll-overs and keeps them in the supine position (facing upwards). The cover is wrapped in a silver composite fabric mesh which protects against electromagnetic field radiation and has antibacterial properties.

The many innovative features have resulted in an elegant, organic design featuring; a bassinet inspired by a seed and the symbolism of new life supported by branch-like legs which hold the seed in two halves like two cupped hands.

Outcome

OVU becomes a product which looks after the parents' health as well as the baby's health and focuses on building a nurturing environment whilst maintaining convenience of use. The overall outcome is a visually appealing and functional bassinet which works to increase parent to baby bonding without compromising the baby's safety and is designed to curtail the risk of SIDS.

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OVU in use

OVU – Open side configuration

INDUSTRIAL DESIGN
HONOURS

SUPERVISOR: MR JAMES BERRY

https://www.linkedin.com/in/james-wesley-9a5922105

HERMES: ADAPTIVE ANKLE SUPPORT

JAMES WESLEY

Ankle sprains are the most common form of accidental injury in any single sport, accounting for around 14% of all sports related injuries. Acute ankle injuries have been linked to lifelong problems in over 40% of cases, leading to conditions such as chronic pain and instability. Ankle braces and supports are used in the prevention and rehabilitation of ankle injuries and work through a combination of mechanical forces and their ability to position the foot correctly a jump or stride.

It is widely accepted that ankle supports, especially ankle braces, are effective in preventing injuries. However, the efficacy of these devices is reduced if used incorrectly or at the wrong times. Many believe that ankle braces can also cause further issues if used for prolonged periods.

The aim of this project is to address the required level of support changes over the course of rehabilitation or as the users' needs change, which can become expensive for people who need to update their ankle support often during the course of their condition.

Innovation

The discovery of these challenges through a state-of-the-art review and product analysis led to the design of an adaptive ankle support for trail runners. This sport takes place in an unpredictable and changing environment where different levels of support and comfort may be required for people at risk of ankle injury.

This project goes beyond simple monitoring and analysis of exercise by using the data to make real-time changes to the ankle support. The advancement of miniaturised motors and gearboxes allows me to design a mechanism for automatically tightening the ankle brace supports through a cable and spool mechanism.

The concept was validated through two different wearable gait analysis prototypes to show that only simple, commercially available sensors are required to detect and process changes in the surface quality of a running path.

Outcome

Hermes is a smart adaptive ankle support system for trail running shoes. Sensors embedded in the insole monitor changes in environment and exercise intensity and provide feedback to the user. Through a motorized cable and spool mechanism, the level of support can be adjusted either with a mobile application or automatically in response to the feedback. *Hermes* can be supplied as a custom design trail running shoe or a retrofitted system to convert your favourite running shoes and provide more support as needed. Integrating the ankle support into the shoe removes much of the bulkiness that comes with using traditional ankle braces with shoes.

INHABITED BRIDGES

For this year's Second Year Architecture Design Studio: Rethinking Urbanism: Inhabited Bridges, students collectively developed proposals for 5 new river crossings in Parramatta Park.

Each of the proposals aimed to be more than a bridge, enabling other programs, activities and uses to occur, making each bridge a place to dwell and a destination in itself. Each of the projects was based on consultation with stakeholders, deep site analysis and interactions with members of the public

The project was a part of our involvement with the Coalition of the Willing (COW) which is a strategic group organised to support the idea of improving connectivity through Parramatta Park by adding bridge links across the river. This group is led by Suellen Fitzgerald from the Western Sydney Parklands Trust as managers of the Parramatta Park. WSU, Parramatta Council, Chamber of Commerce are all members. Professor London and Professor Poulet are members of the COW representing WSU.

The proposals were diverse and tailored to the individual location of each bridge; Lachlan Collins, Brock Baldwin and Matthew Wilde proposed a bridge which reinvigorated the traditions of the Wisteria gardens Darleen Sibug, Salma Eddie, Teodora Kekeric and Cassie Coates proposed a bridge to watch bats and gaze at the stars, Manuel Hankoo, Maria Hajj, Maryann Aziz and Nassim Zolfaghari proposed a bridge to cool you down and host small concerts, Ana Hernandez Chavez, Bronte Balenzuela, Oscar Crabbe and Jackson Lewis proposed a bridge that travelled along and into the river, Julian Biden, Aaishvika Jayswal, Aditi Patel and Mohammed Abdelkader proposed a bridge for play and coffee.

The Design Jury Panel who assessed the student submissions were enthusiastic about our students' work. The Jury Panel was composed by impressive professionals from across the Sydney region

including Stephanie Licciardo, Heritage Manager Parramatta Park and Western Sydney Parklands Trust and also Joshua French, Director, Parklands Development and Strategy and Laura Harding, Architect from Hill Thallis Architecture + Urban Projects.

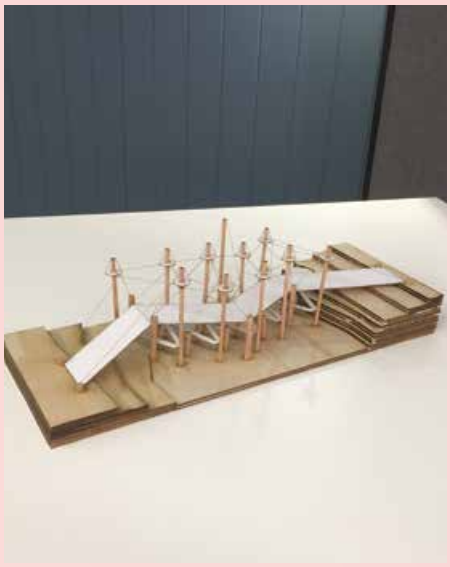
The project was led by Architect Hugo Moline with Professor Peter Poulet.

Models of bridges by all groups

FOR PARRAMATTA PARK

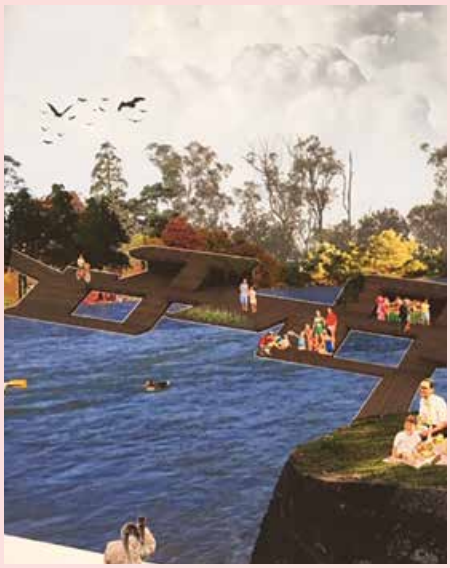
Darleen Sibug, Salma Eddie, Teodora Kekeric and Cassie Coates proposed a bridge to watch bats and gaze at the stars

Ana Hernandez Chavez, Bronte Balenzuela, Oscar Crabbe and Jackson Lewis proposed a bridge that travelled along and into the river



Julian Biden, Aaishvika Jayswal, Aditi Patel and Mohammed Abdelkader proposed a bridge for play and coffee

Lachlan Collins, Brock Baldwin and Matthew Wilde proposed a bridge which reinvigorated the traditions of the Wisteria gardens



Manuel Hankoo, Maria Hajj, Maryann Aziz and Nassim Zolfaghari proposed a bridge to cool you down and host small concerts

LUCIDÍTE

The project undertaken in Design Studio 6 “Lucidité”, enables students to gain confidence in applying their design knowledge in context of a lighting design solution.

Students were tasked to hone the studio skills that they have learnt throughout their studies and to focus on the project theme of Lighting Design. In this capstone unit, students were challenged to work with a client’s unique vision, to produce works of a high standard and to maintain a professional work ethic throughout the design process in order to deliver a successful outcome.

The project scope included a client briefing where parameters for design were tabled, that is, a product that utilised modular components with an emphasis on repeat-pattern, the use of a suitable technical package, and an exhibition-ready model.

Design Studio 6: Ambience, Place and Behaviour, follows industry practice in the sense that the process of design and project management is not dissimilar to what is expected from design students when they enter the industry. Students must be responsive to the client’s requirements, their solutions must address the user’s needs and they must deliver a manufactured product that has integrity of form, is beautiful and engaging, and serves the intended function.

Minnow Table Light

Nimnaka Athauda
Jose Fagel

IlluminATTE

Talha Ahmad
Ahmad Ali
Trent James McLean

Capstone Unit: Design Studio 6

Academic Team
Ms Karen Yevenes, Mr Jean Payette,
Mr James Berry, Dr Sasha Alexander

Lilypad Plume Pendant

Thomas McLaurin-Smith, Christopher Ryder, Billy Xu

Vula Pendant

David Bocanegra
James McLeay
Whisley Reyes

WESTERN SYDNEY SOLAR TEAM

A team of 22 volunteer students from Western Sydney University who design, build and race their own solar car through some of the harshest environments on Earth.

In 2018 the team became the first to represent Australia in the American Solar Challenge. Western Sydney Solar Team came 1st, beating Michigan who had not lost since 2001.

FOLLOW WESTERNSYDNEY.EDU.AU/SOLARCAR

PLACED 1ST IN THE AMERICAN SOLAR CHALLENGE
PLACED 6TH IN THE WORLD SOLAR CHALLENGE

A MULTI-DISCIPLINARY PROJECT

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VISION


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2019
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