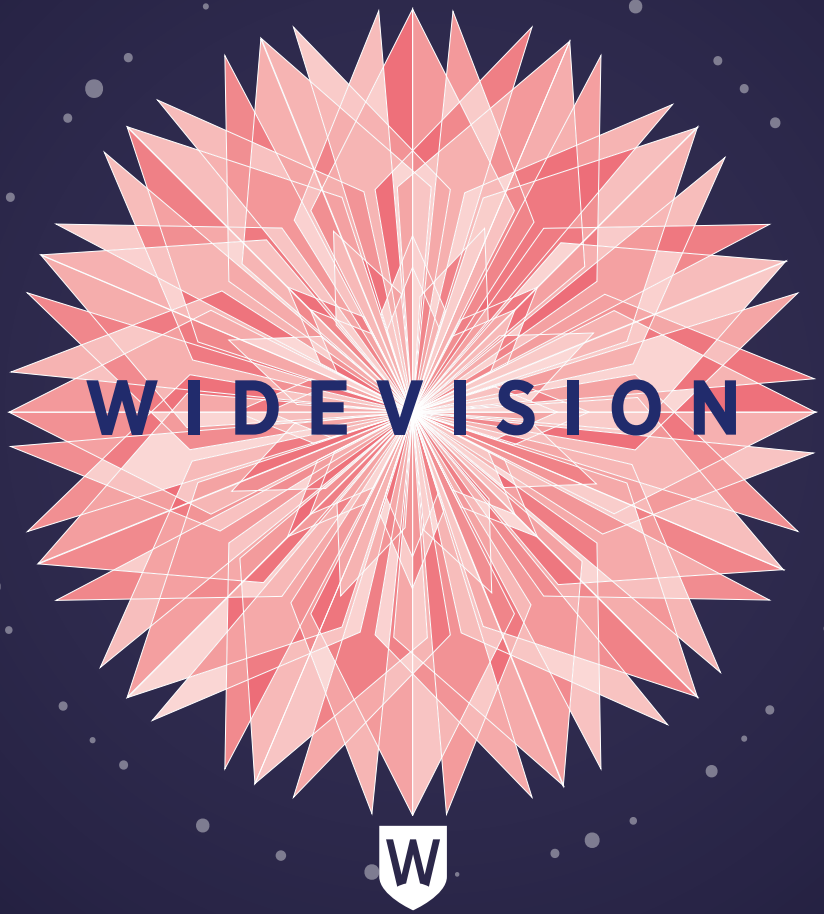
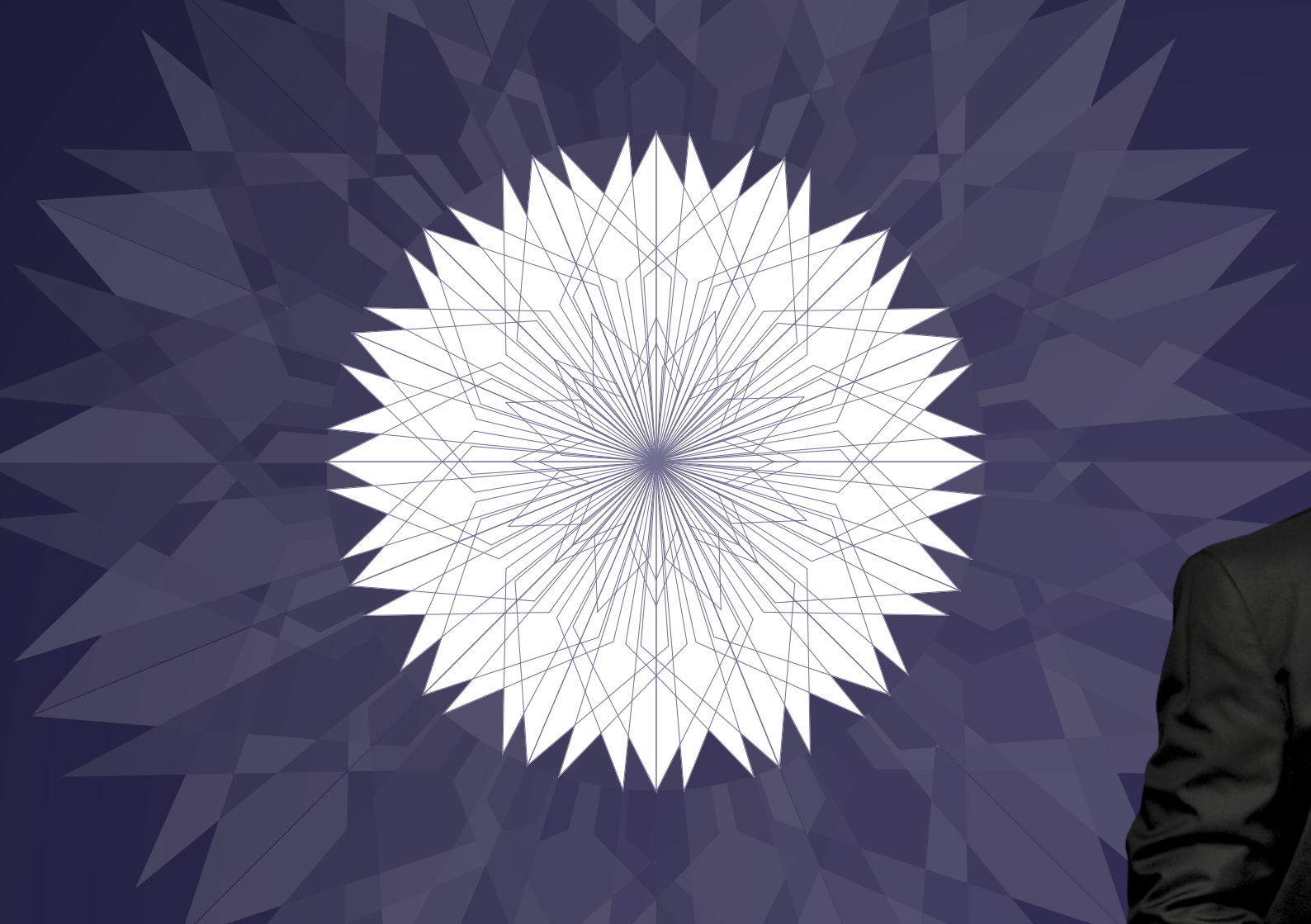
25TH ANNUAL

WIDEVISION



SCHOOL OF
COMPUTING
ENGINEERING &
MATHEMATICS
CREATIVETECH
WEEK EXHIBITION
2018



WELCOME

Mind sets, knowledge and skills development can hold the key to global prosperity and peace. Universities have a key responsibility in the strategic development of these interacting and complementing systems. The rapidly changing environment of knowledge economies and societies as a result of the advances in socio-technical systems design, sets new challenges and opportunities for contemporary graduates. Mark Nelson, Founder and Co-Director of Stanford Peace Innovation Lab has emphasised the importance of "designing technology that increases people's ability to be good to each other."

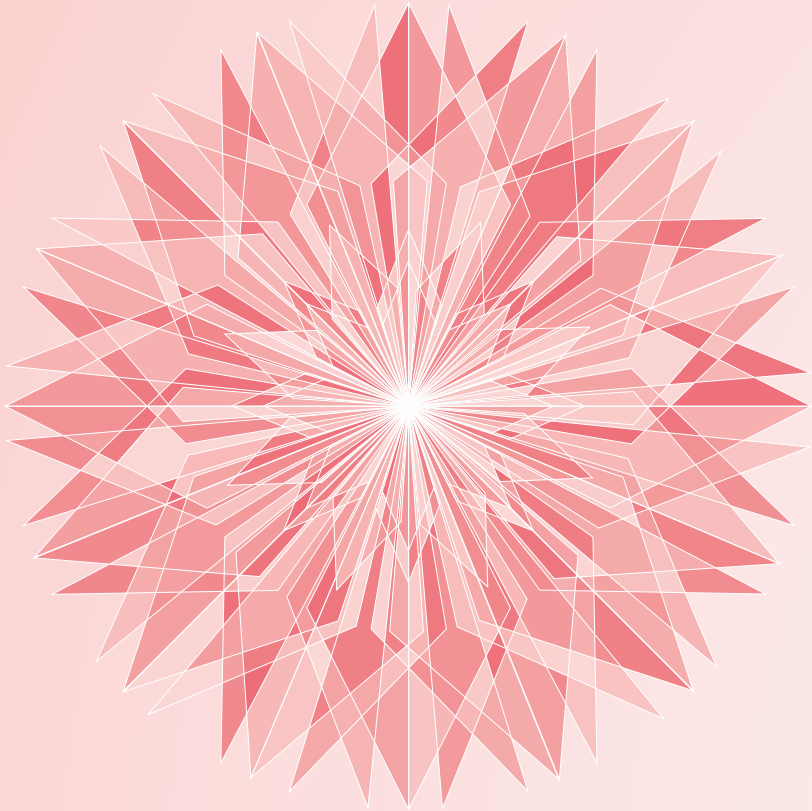
Through the years the School of Computing, Engineering and Mathematics (SCEM) has focused on projects in which the interaction of the discipline expertise enriches SCEM students with markedly distinct abilities, evidenced in their successful achievements.

Every year Widevision exhibition demonstrates student capacity for innovation. Centred around the outcomes of industrial design students, through the years the exhibition has grown into a show case that allows visitors to sample the achievements of students across SCEM, including also engineering, computing, architecture, manufacturing, and smart urban design and construction. What unites these works is the synergetic connection between the rationale and utility of proposed solutions, their approach to sustainability and liveability, and overall aesthetically and psychologically pleasant appearance. These outcomes are starting points for entrepreneurial success.

A fine example of such success is Western Sydney University Solar Car project, initiated by industrial design and mechanical engineering students, which now includes also students in electrical and electronics engineering, information and communications technology and visual communications. 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 challenges. In 2018 the latest team UNLIMITED 2.0 has won the American Solar Challenge in the Challenger class, becoming the first non-North American team to win the competition.

The integral development of the mind sets, knowledge and skills across the multidisciplinary team has contributed to the success. Committed to enable such integral student development, the University has developed the Arts and Engineering Precinct on the Parramatta South Campus, including the introduction of new design studios and networked maker spaces, and has significantly extended the industrial design and engineering facilities in the Kingswood Advanced Manufacturing Precinct. Student professional expertise and capabilities, backed by these outstanding facilities, allow seamless conversion of student creative ideas into cutting-edge solutions and prototypes. The Widevision exhibition is a vehicle that can facilitate taking those into the real world. Do not miss this opportunity.

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



QUALITY

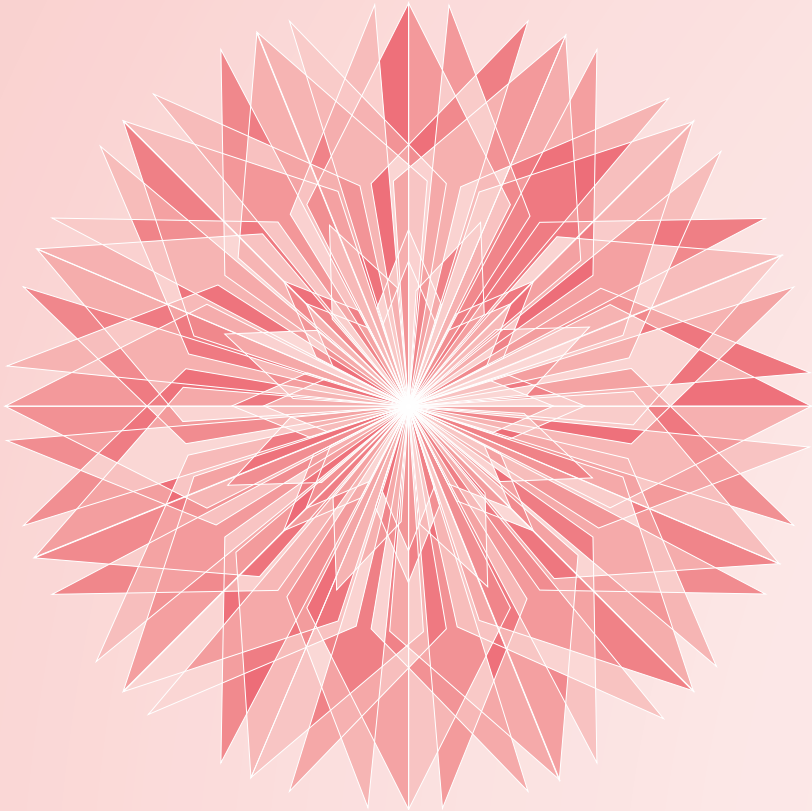
The speed at which we are urbanising is phenomenal. By 2050 around 70% of the world's population will be living in cities. Many of the most significant growth centres are in our own region of the Asia Pacific and this is where the social, physical and economic infrastructure needs are greatest. More 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; project managers, product designers, architects, construction managers, engineers, mathematicians and data scientists 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 School – 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 so we create intellectual, physical and virtual environments where they will be able work on industry problems amongst disciplines. We shall be trying to dispel deep seated perceptions and myths that professions have about each other. 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.

It has been an exciting year with a new Bachelor of Architectural Design and Master of Project Management launched. We also have seen a commitment to the UN Sustainable Development Goals in the Bachelor of Industrial Design program. The Master of Engineering has continued to grow with new specialisations in Biomedical engineering to begin in 2019. Students are also now studying Bachelor of Construction Management and Bachelor of Industrial Design at Parramatta South.

Professor Kerry London
Professor Built Environment and Urban Transformation, Deputy Dean Strategy Quality Performance



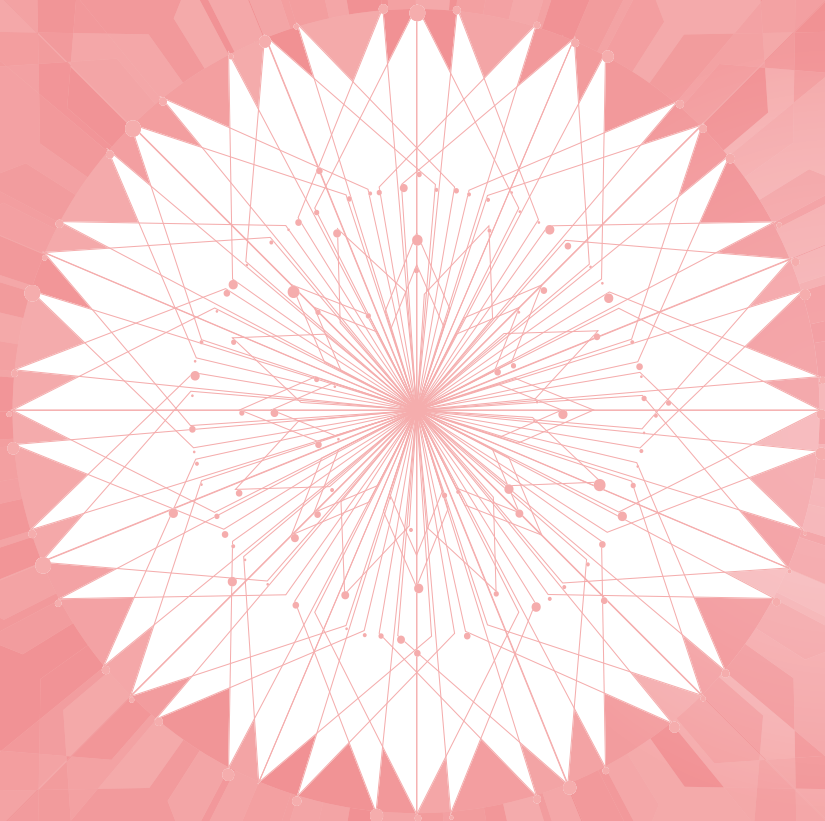
OUTREACH

As the Deputy Dean (International, WIL, Industry, Alumni, Process) of the School, I provide support to the Dean Professor Simeon Simoff, and lead and manage the day to day operations of the School across a wide range of spectrum (academic program offerings, cross school/unit liaison and collaborations, management of student matters and experiences, international promotion and collaborations, etc.). I am also a professor in Civil Engineering with research interests in structural engineering, computational mechanics, nano-mechanics and nano-composites.

I am very pleased to see the growth of Widevision from a single disciplinary (Industrial Design) event to a School-wide event for parents/friends, industry practitioners and academic/professional staff to witness and celebrate the great achievements of our students. observing from the exhibited work we can see that many of the projects have involved multi-disciplinary innovation, collaboration, and input.

I would like to warmly congratulate our students for their wonderful achievements and sincerely thank parents, industry partners and university staff for their continuous support to our students and our School which is essential for the success of Widevision!

Professor Yang Xiang
Deputy Dean International, WIL, Industry, Alumni, Process School of Computing, Engineering, and Mathematics



CONTENTS


RALIA
WESTERN SYDNEY
UNIVERSITY

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.

1ST PLACE IN THE AMERICAN SOLAR CHALLENGE

6TH PLACE IN THE WORLD SOLAR CHALLENGE

UNLIMITED 2.0 WEIGHS **160KG**

2x

THE WEIGHT OF THE DRIVER

DRIVER

THE PROJECT CLOCKED OVER

50,000

MAN-HOURS

30 SCHOOLS **3000** STUDENTS

UNLIMITED 2.0 CAN TRAVEL

67X

FURTHER ON THE **SAME AMOUNT** OF ENERGY AS A **STANDARD VEHICLE**

THE TEAM **ATE**

15X

THE **WEIGHT** OF THE CAR DURING OUR **LAST RACE**

56% FEMALE

MEDIA REACH: 2.79 MILLION

44% MALE

2017

70 EVENTS

40,000 PEOPLE

WE'VE RUN **WORKSHOPS** FOR ENOUGH **SCHOOL CHILDREN** TO FILL THE **SYDNEY CRICKET GROUND!**

FOLLOW US: | westernsydney.edu.au/solarcar | WestSydSolarTeam | Insta: @westsydsolarteam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NSW
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AUSTRALIA

Lab38

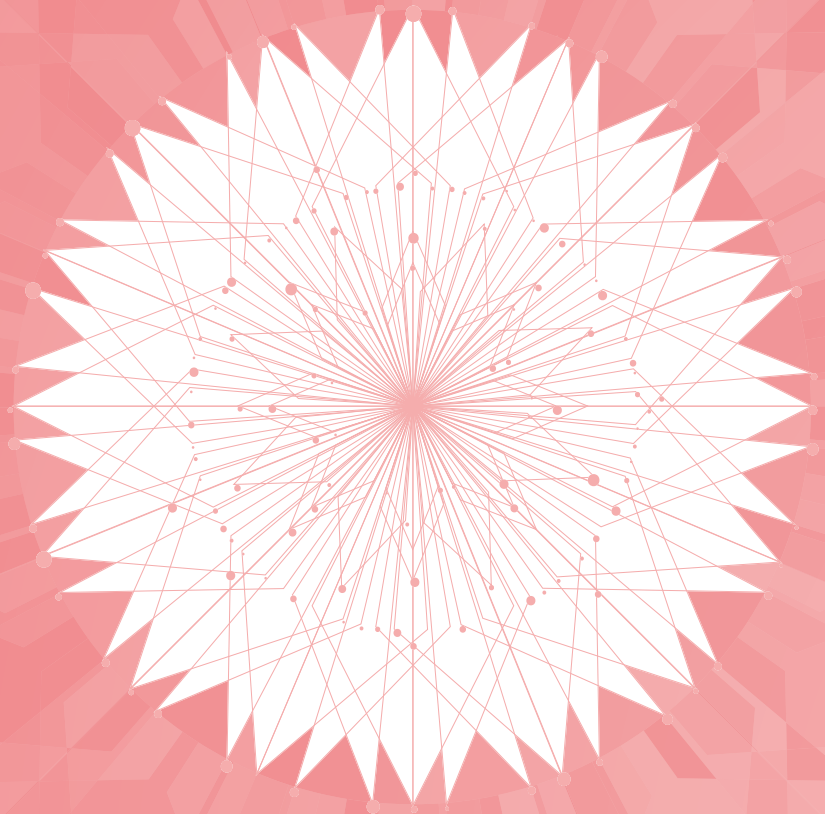
Innovate. Collaborate. Design

LAB38

Lab38 is a multidisciplinary SCEM research group of graduate and postgraduate designers and engineers in the School of Computing Engineering and Mathematics at Western Sydney University and supervised by Dr Sasha Alexander, Professor Miroslav Filipovic, Nicholas Ralph, John Ballantine, Rita Naidu and Wayne Pearce.

Our research focus is design and mechatronic engineering, with research and industrial projects spanning from architectural visualisation in virtual reality, desktop fabrication machines, rapid prototyping and machine learning in image processing. Through our growing portfolio, we aim to develop the university's innovation profile with our research output in addition to giving students and recent graduates a springboard into industry and research with real-world contracts and projects.

Lab38 works in close collaboration with the Western Sydney University Robotics Club, which has entered a NIARC team, supervised by Professor Gu Fang for the last 5 last years. The current team is managed by Patrick Hamilton, Sami El Arja and Joseph Lam. The team works on mechanical, electrical and firmware engineering to integrate systems to create an autonomous car to complete the competition. The robotics club has become a platform to access past students for their knowledge and expertise to boost the innovation output of Western Sydney University.



WIDEVISION+

The year 2018 marks the 25th Annual Widevision Exhibition with SCEM CreativeTech Week launching this time in the Western Sydney University flagship building 1PSQ denoting 1 Parramatta Square, a centerpiece of urban development that will see an $8B investment in the surrounding area, and confirming once again WSU as an early adopter and beacon for community, industry, and the graduates of Western always in the heartland of discourse, collaboration, co-creation and innovation.

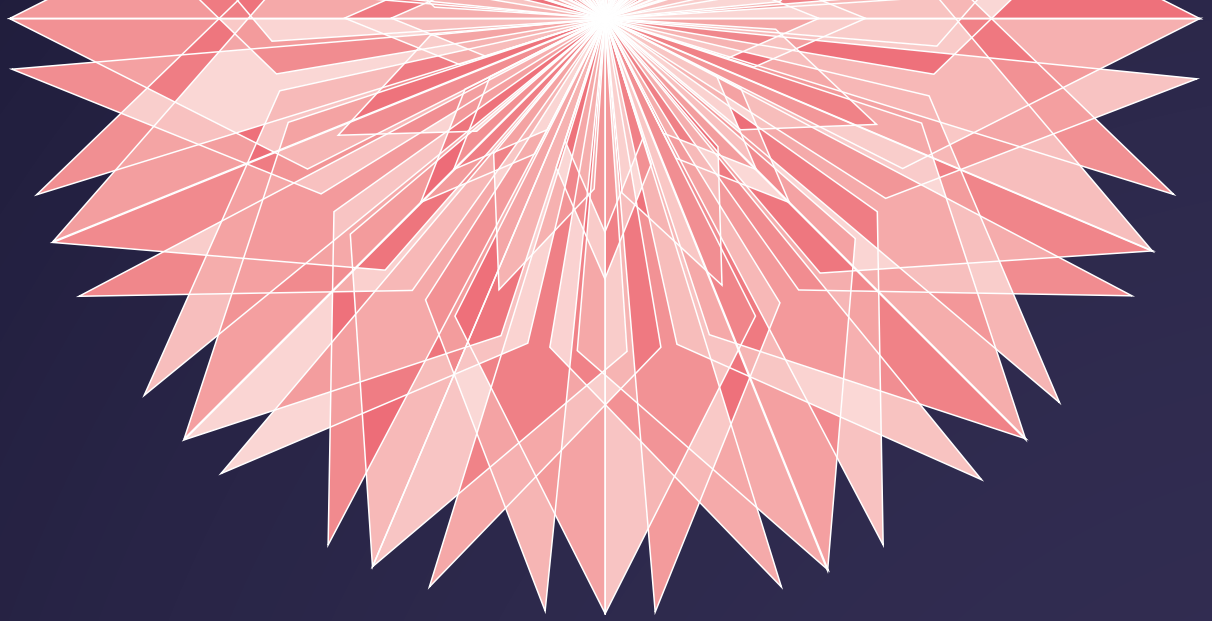
The WSU campaign of 'Unlimited' captures the imagination and seeks students to strive for their own independent yet interconnected view of the world. When the caption 'ambition Unlimited' flashes across the multimedia screens in the lobby of 1PSQ the message reaches out to current students but also to the commercial co-occupiers of the building on the higher floors and their guests, signaling a challenge for future interactions supporting new visions for society, cooperation, and meaningful intergenerational legacies including job creation and cultural and environmental stewardship.

Bravely, WSU announced in the first half of 2017 as becoming an institutional signatory to the United Nations Sustainable Development Goals (UNSDGs) 2030 and in doing so signaled a pledge and undertaking to consider wider societal goals that both contributes to local and regional collective community prosperity and global ambitions in caring for people, the environment and mindful economic renewal in UNSDG principled actions with an estimated $12T global opportunity towards 2030 whilst doing so.

WSU is also involved in a small number of universities appointed by the UN as Regional Centre of Expertise for Sustainable Development and SCEM factored well in the 2017 WSU Annual Sustainability Report in curriculum integration for sustainability in professional practice including designs to mitigate the impacts of the Heat Island Effect especially on citizens in the Greater Western Sydney region and in 2018 a joint venture project with a NASA affiliated university in Texas related to astronaut health and well being on long duration spaceflights.

We wish the class of 2018, their industry partners, and the Alumni whom have joined us for the anniversary celebrations, good career fortunes and that they endeavour to challenge the status quo in delivering new future human-centred solutions and new business models that generate optimism and professionalism in their cross disciplinary teams and the generations that follow them.

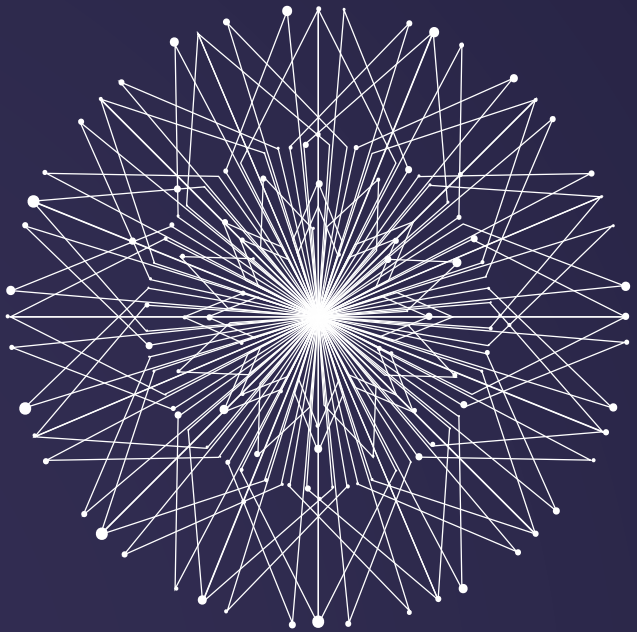
Dr. Sasha Alexander
Director of Academic Program Industrial Design and Widevision Custodian



BACHELOR OF INDUSTRIAL DESIGN

FINAL YEAR STUDENTS

HONOURS PROJECTS



INDUSTRIAL DESIGN
HONOURS

SUPERVISOR: Jean Payette

NEXT-PEN

JAMES BAILEY

There has been an increase in reports of EpiPen problems such as needles bending, secondary injuries, and device being misused, due to the user panicking or the needle cover design.

These growing reports suggest an opportunity to redesign the EpiPen device.

Design Innovation

The research conducted has uncovered some unexpected issues that identify the environment as a factor contributing to the EpiPen's effectiveness. This has helped to refocus the solution from not just focusing on the EpiPen itself but to also include the person using the device and the environment they are in.

Next-Pen prototype's design communicates how to use the device to the user and affords a more ergonomic design, preventing slipping in the user's hand regardless of the type of working environment they are in. These improvements have resulted in a safer and more reliable device.

Research Methods

Observational research evaluated how participants interact with both the current EpiPen and my proposed solution in a scenario that closely resembles a real life event.

Research Findings

The research conducted has uncovered some unexpected issues that identify the environment as a factor contributing to the EpiPen's effectiveness. This has helped to refocus the solution from not just focusing on the EpiPen itself but to also include the person using the device and the environment they are in.

EpiPen

- Temperatures out side of 20-25 can affect the adrenalin shoot
- A study found that 39% of participants used the EpiPen incorrectly.
- When a person is having an anaphylactic shock, they are in a state of panic, this can lead to them misusing the device (state of mind).
- The price of renewing a device make people hesitate to use it.
- Injury to self or other as a result of incorrectly using the device.
- Confusing the operation of the device with another device by a different company.
- As obesity increases the standard needle length of 15mm may no longer be adequate to reach the intramuscular layer.

Next-Pen prototype's design communicates how to use the device to the user and affords a more ergonomic design, preventing slipping in the user's hand regardless of the type of working environment they are in. These improvements have resulted in a safer and more reliable device.

EpiPen in use

EpiPen with medical kit & bag

INDUSTRIAL DESIGN
HONOURS

SUPERVISOR: Jean Payette

CRYOPOD

SHIN'ICHI JOHN BAKOURIS

The CRYOpod was created to increase the reliability of transportation for Cryoglobulin blood samples.

Currently in the field where Cryoglobulin testings are practiced, certain flaws can be seen where the blood samples are not being distributed to the labs at their required characteristics. In order to perform a successful analysis of the samples, laboratories are required to maintain the samples at a specific temperature between 36.5- 37.5°C (body temperature) once extracted from the patients. However to this day, the successful deliveries of Cryoglobulin samples are not consistent, which causes unnecessary delays for the patient's treatment outcome. The CRYOpod was created to eliminate the odds of unsuccessful deliveries, and allow the practitioners to perform this specific test without any difficulty and miscalculation.

Design Innovation

The CRYOpod is a portable device which carries a maximum of 9 blood sample tubes at a specific temperature between 36.5- 37.5°C.

The device is powered by a rechargeable lithium-ion battery that is able to hold the specific temperature for several hours.

Each individual compartments (flasks) are warmed by the technology of neutral heating pads embedded within the inner assembly, this allows the device to produce a consistent temperature throughout the duration of time.

CRYOpod side

CRYOpod front

In the current field, warmed water eskies and sand thermoses are the main source of devices that are utilised for the specific Cryoglobulin analysis testing. These devices often require standard preparation procedures:

- Adjusting the water/ sand to the required temperature.
- Pre-heating the empty test tubes to body temperature.
- Removing excess water/ sand off the tube before blood extraction.

CRYOpod will shorten lengthy preparation procedures, and increase the efficiency of the tests.

CRYOpod in use

INDUSTRIAL DESIGN
HONOURS

SUPERVISOR: Jean Payette

PORTFOLIO
gillroydesign.wixsite.com/portfolio

THKN (THICKEN)

JOSH GILLROY

Project Overview

Esophagus dysphagia is a swallowing problem in which the brain is unable to correctly trigger the 3-stage swallowing response. There is currently no cure, and it is a condition that is managed by modifying the thickness of both food and drinks to three standardised degrees of viscosity, that is nectar thickness, honey thickness and pudding thickness.

A gum based thickening agent is used to make the drinks and is currently made by manually pumping the thickener into the drink and stirring the compound in, this can take 2-3 minutes per drink to do correctly and accurately.

Design Innovation

THKN is aimed towards medical facilities such as nursing homes and hospitals in order to reduce the time it takes to make the drink, increase safety and accuracy, remove the need for training via automating the process and henceforth, to save money.

The research has revealed that there are definitive problems within the manual process, a variety of risks associated with making the drinks and a range of unnecessary actions and jobs. With the integration of THKN in a medical facility, it would alleviate many, if not all the existing issues with the current process. THKN will make for a much more productive, cost effective, safer and cleaner facility.

THKN works by first choosing the amount of liquid needed and the thickness required, it then dispenses out a fluid using high flow peristaltic pumps and combines a gum based thickener into a cup at the exact ratio of fluid to thickener, the amount of thickener dispensed is determined by the setting chosen and is accurately controlled by the electronics. Once the cup is full it can finally be mixed with the motorised spindle and then served.

Research methods

Research was used by devising a questionnaire to identify the current methods used and it was given to kitchen staff of a nursing home. The research identified the amount of drinks that

THKN fridge

are required, the amount of waste produced, tools used and a variety of other information that could not be sourced through secondary research.

Observing and being a part of the process was also useful as it defined a deeper understanding of the methods used and how the product's design, functionality and ergonomics could be implemented in the most appropriate manner.

Results/findings

The results from the questionnaire were taken from a nursing home with 80 residents where 40% suffer from dysphagia.

It takes an average of 23.75 minutes to make the thickened drinks for each meal of the day (1 of 5), an average of 65 drinks need to be made per day, most participants experience problems with the current products used to make the drinks (the thickening pump), there is between 1L-4L of wasted drinks per day and generally results in quite allot of cleaning due to the vast amount of equipment required.

The results purely from the questionnaire show a strong need for an alternate solution.

Future work

With the continuation of this project the aim is to complete product testing in order to see how workers interact and use THKN, this will be conducted in order to gather information on how to improve the functional aspects, technical components, aesthetics, and product features.

THKN mixer

THKN to scale

INDUSTRIAL DESIGN
HONOURS

SUPERVISOR: Jean Payette

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EDEN RAISED GARDEN SYSTEM

CAMERON LEE

Project Overview

As a variety of low height activities such as gardening would require the individual to kneel and bend over for periods of time, it was found that prolong exposure in these body positions can impact the long-term health of the individual and thus the experience of undergoing the activity. This is because poor body posture in conjunction with age can influence the effects of chronic diseases such as osteoarthritis, and so mitigating this occurrence should be a priority as it currently affects around 2.1 million Australians (AIHW, 2017).

The Occurrence of urban sprawl and consolidation within our major metropolitan areas has influenced how people live and the type of dwellings they currently reside in. Thus, this has resulted in the amount and quality of fertile land needed for gardening activities to be restricted, but also the steady decline in local food production and supply chains, as research shows that Sydney's local food production could drop from 20% to 6% by 2031 due to rapid urbanisation converting agricultural land into new developments to support the population growth (Cordell, Jacobs &Wynne, 2016). Therefore, to ease these circumstances the EDEN Raised Garden System was developed to help reduce the physical strains of gardening, while also having the ability to reconfigure itself in how vegetation can be grown and where it can exist within a variety of urban environments or scenarios.

Innovation

The EDEN Raised Garden System focuses around 3 main areas:

Group EDEN Garden

Modular Design

Ergonomics: All points of the garden can be easily accessed without the need to kneel or bend over as the system conforms to ergonomic principles of being elevated at a typical work-top height (900 mm), and that all vegetation is within a comfortable arm's reach relative to the smallest percentile of users (Female 5%).

Adaptability: Due to the systems modular interlocking design, this allows multiple formations to be achieved so that it can adapt to any urban space (e.g. backyard, balcony or public space) or gardening activity required (e.g. Community gardening), while also providing a fresh free-flowing aesthetic.

Functionality: Configurable functionality provides the user the freedom of how they want their vegetation to be grown, as the system can support either a traditional self-watering soil base garden, or one that utilizing hydroponics, where no soil is required and allows vegetation to be efficiently grown within limited spaces.

Future Work

For the EDEN Raised Garden System to further cater for the needs of users, additional modules in the form of different shapes and sizes, but also to act as storage for gardening tools or water supplies or composting for food waste would be developed.

EDEN Garden in use

Portable Net Pots

Removable Plant Dividers

INDUSTRIAL DESIGN
HONOURS

SUPERVISOR: Sasha Alexander

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SPACE DYNOM
LUKE MCGANN

The design inspiration

The design concept focuses on “measuring strength during long-duration spaceflight (180 days Mars Mission)”. The early research phase investigated health and wellbeing during spaceflight. Topics such as the Astronauts’ Experience, Habitational Architecture, Materials and Technology on spaceflight, Long-duration Spaceflight (Mars Mission), Timeline/Astronaut engagement/Activities and Experiences from past missions.

Many concept solutions were considered to address physiological, neurological, biomechanical, mechatronic, and spatial considerations in order to maximize cardiovascular health, maintaining muscle strength, and promoting good astronaut emotional health through integrated socialisation on long-duration Mars flights through fit-for-purpose exercise (pastime) equipment.

The International Space Station (ISS) is what astronauts call home for the period of time that they are in space. Space travel impacts muscle mass, bone density and other health problems if astronauts do not participate in sufficient exercise. Habitation architecture and spacecraft design must respect human needs and requirements and needs to be addressed at every stage of the design process: “considering people to be more than an ‘element’ of the system but its modifier and innovator”.

Design Solution

The Space Dynom is a product designed to measure the muscle mass of the, hand, arm, leg etc. It is very similar to that of a Hand Dynamometer, which measures grip strength, however the Space Dynom is designed to be used on Earth and in outer space.

This product would help astronauts in a number of different ways. Astronauts need to pass a very high fitness test before they will be allowed to go into outer space, but once they come back after their time in space problems such as muscle loss and bone structure decrease, have become evident. This product will allow astronauts to monitor their muscle mass whilst on the long duration spaceflight. It will also allow them to determine how much time they should spend on specific exercise machines in space. Allowing them to possibly put time they would not usually have into other areas of the spacecraft.

In association with the Space Dynom, astronauts will have access to an app that will allow them to keep a record of their muscle mass throughout the whole period they are in space. This app will encourage them to keep performing to the standard required for them to come back from space in a healthy condition. Also instructing

them on different exercises they can do to maintain a particular muscle area.

The user would grip the Space Dynom in one hand and they squeeze as hard as they can. They then can see a number (in g/kg) that tells them their muscle strength. In association with that, there will be a LED light that projects if an astronaut's muscles are lower than (red light), average (orange light) or above (green light) the required muscle mass. With a twist top head, the user is able to read the results for someone else or use it independently.

The Space Dynom is ergonomically designed to fit comfortably within one hand. Whilst also being used for hand grip strength, users will be able to push the Space Dynom (as instructed in the app) on other muscle areas to determine the muscle strength in different muscles (i.e. legs, quads, biceps etc.).

This product will evidently reduce a lot of the time that astronauts spend working on the wrong exercise. It will give them a continuous moderation of how they are traveling whilst on their long duration spaceflight.

Conclusion

In conclusion, from the research conducted, it is important to understand that we are designing for the users (i.e. astronauts). These users call the ISS home for a number of months but find that it is quite an uncomfortable environment to work in. From previous experiences in space we can consider the problems that have been presented from the past and look further into ways in which they can be resolved. Some of these problems include things like, effects on the body, such as microgravity, loss in muscle mass, decrease in bone structure.

Hand Dynamometer in use

Hand Dynamometer exploded

Hand Dynamometer environment

INDUSTRIAL DESIGN
HONOURS

SUPERVISOR: Mauricio Novoa

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STEPPING STONES

RITA NAIDU

Abstract

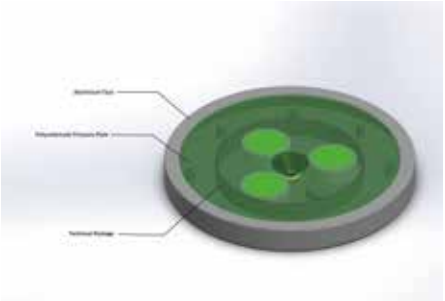
Education, Psychology and Anthropology research suggests that play is a powerful facilitator for learning throughout a person's life. The rapid advancement of technology within all areas of society has driven the notion of increasing processing capabilities of computers with the advantages of play. The project will be centred on music and it will be used as the means for learning through interaction design. There have been numerous studies conducted to show the benefits of learning and participating in music on health and wellbeing. Although, the effects of music on social development has received far less attention than the effects on intellectual attainment. The objective will be to develop a modular music device that interacts with university students and engages social interaction by persuading gestures and motions to create music.

Introduction

Project Description: The aim is to transform an outdoor space into an interactive, multimedia learning environment through the use of modular music devices in order to encourage community connectedness. The creativity and participation of citizens and their capacity to engage in analytics, systems and advanced technological innovation will determine economic and social growth, therefore, focusing on improving wellbeing and quality of life is essential for the development of the future.

Problem Statement

Social support and social interaction are one of the most important factors in predicting the physical health and well-being of everyone, ranging from childhood through older adults. Although social interaction is complex, it is vital to human health, both mentally and physically. Being valued by others is an important psychological factor in helping us to forget the negative aspects of our lives, and thinking more positively about our environment.



Stepping Stones detail

The Benefits of Community Music-Making

The evidence is growing on the concept that music-making with community involvement has positive psychological, cognitive, social, and health benefits for participants. Community musical activities, choral and instrumental, provide the opportunity for developing social networks well-being support and increased quality of life. Making community music can provide a sense of inner happiness, content and satisfaction. (Hays and Minichiello, 2005). It impacts positively on general and mental health (Clift, Skingley, Coulton and Rodriguez, 2012), in particular, anxiety and depression (Creech et al., 2014; Lally, 2009).

INDUSTRIAL DESIGN
HONOURS

SUPERVISOR: Sasha Alexander

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H.E.A.R. STEERING WHEEL

DAN NEMEC

Research Problem:

The importance of improving driver safety has long been a topic of debate, particularly where young drivers are concerned. Between the years 2015 and 2017, statistics shows that on average just under 100 drivers aged between 17 and 25 are involved in a fatal crash per-month, which is higher than any other age group. Current measures such as; laws banning the use of mobile phones whilst driving and strict restrictions on performance vehicles for young drivers have shown a consistent lack of ability to deter the rising levels of road trauma associated with young and inexperienced drivers. This is due to an inability to effectively target and enforce current laws and protocols and here is where I aim to take different course. By utilising focus group feedback and user interaction data, I intend to identify which factors limit the performance and interactive ability of the driver with the driving experience and devise an integrated, interactive assist system which enhances the engagement of the user with the driving experience.

Research Methods:

FOCUS GROUP TESTING - Using focus groups made up of members of the target market to effectively test evaluate design concepts and prototypes.

Using data generated from focus group sessions to objectively evaluate strengths and weaknesses of design ideas in order to improve future iterations.

Prototypes and design created as a result of focus group testing will better adhere to the

H.E.A.R. steering wheel

H.E.A.R. steering wheel section view

desires and expectations of the target market whilst allowing them to feel involved in the process and therefore creating a positive impact.

Research Findings:

My findings have shown that whilst advances in driver assistance technology have been on a steady rise, a new approach is required to create a more significant impacting reducing road trauma for young drivers. Current systems take control away from the driver in an attempt to keep the driver safe. My alternative proposes that we augment their driving experience with additional information with the aim of preventing the creation of a potentially dangerous situation, thereby being proactive, rather than reactive.

Design Innovation:

The steering wheel is called **H.E.A.R.**

Haptic.

Enhanced.

Augmented.

Reality.

The purpose of the product is to mitigate the potential of a crash and retain a sense of accountability for the driver whilst they are behind the wheel.

This goal is to be achieved via haptic feedback created by vibration motors inside the steering wheel rim as well as further visual aids fed to the user through a HUD (Head's Up Display).

Body panels of steering wheel provides the aesthetic and ergonomic features of the system.

Being that these panels are mounted to a standard 304 Stainless Steel chassis, there is potential for the implementation of modular body panels to allow the user to customise the system to their particular needs.

This system takes haptic feedback in vehicles to a whole new level moving beyond simple lane departure warnings utilised by current manufacturers and provides detailed information regarding possible hazards on the road ahead, allowing the driver to make better informed decisions with ample time, in order to keep our roads safer.

H.E.A.R. steering wheel vehicle interior

INDUSTRIAL DESIGN
HONOURS

SUPERVISOR: Mauricio Novoa

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BUILD. PLAY. LEARN.

KATIE MACGREGOR

This project explores the connectivity between virtual and physical play. The design aims to be a personalised, self-learning, home-based literacy program for three to six-year-olds. It immerses the child into learning through a playful, storytelling environment with the support of an enhanced interactive product.

The research undertaken during this project identified a gap in the current market which creates a design opportunity, in particular the bringing together of both the virtual and physical world. In addition, the manner in which this product is used allows a child to freely incorporate and use not only the physical toys that are provided, but also the freedom for the child to incorporate other favourite toys.

The Build. Play. Learn. concept is able to fill this gap using an interactive story via an innovative use of design and technology.

Design Innovation

The design consists of a hand-held product containing a small, battery operated infra-red light, which works together with a corresponding technical package in the main structure, or building blocks, and is programmed to control a projected, interactive game and story on the floor of the child's environment. The housing of the technical package allows for the optimal angle for use and is sturdy enough to withstand rough play. This product is easily compactable, aiding the storage and retail packaging of the product. This concept gives a strong focus on the interaction between the product and the user, so seamlessly that the user does not even come to the realisation that the activities they are doing are improving their literacy skills, by simply playing their favourite games.

Looking to the future, this product has great potential to influence how children interact through play and technology.

Full Tower

Collapsed

Scale

INDUSTRIAL DESIGN
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THE HUMMINGBIRD

JORDAN ROHR

Abstract

The prevalence of overweight and obesity among Australians is a major problem that's only getting worse, however studies point to short spurts of lifestyle exercise as an important part of the solution. Increasing physical activity, particularly through active travel and walking, has been identified as an area for large-scale improvement. In collaboration with decreasing sedentary behaviour, using health promoting incentives and reducing the number of short trips by car, this project focuses on developing a device for urban environments to engage, encourage and incentivise individuals to become more physically active, since traditional methods to solve the problem have proven ineffective.

Concept

The Hummingbird is a sleek, high-tech device for urban environments with an aim to increase physical activity. Each Hummingbird is equipped with Bluetooth Low Energy (BLE) technology, which interacts with a user's smart-device and connected app to provide rewards for physical activity.

When a user passes a Hummingbird beacon, the app detects that it's within range of the checkpoint and adds a 'point' to the user's account. Once a certain number of points are collected, the user can redeem them for discounted fruit and vegetables, discounted public transport fares or donate the amount to a chosen charity. The product-service system

Hummingbird in use

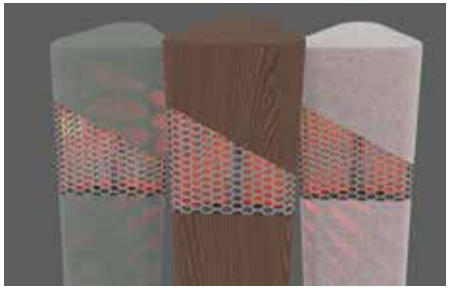
will impact on an individual's health through an increase in physical activity, while also reducing pollution and congestion associated with car travel.

Validity

The benefits of physical activity are widely known, however getting individuals to participate in activity is at times a challenge. Health promoting financial incentives (HPFI's) "involve an exchange between the recipient and the incentive provider" where the recipient benefits from the behaviour encouraged and the incentive offered, while the provider benefits from "the improvement in public health brought about by the change in behaviour"(Giles et al. 2015). Using this strategy, the Hummingbird system aims to encourage individuals to change their physical activity behaviours to become more active.

Future work

With plans to take the Hummingbird project further, the aim of improving Australian's health and wellbeing remains the core focus. Current possibilities include taking the proposal to local and state governments to be run as a government initiative to tackle obesity, while another opportunity may be in meeting with leading gyms to propose the Hummingbird system as a way of increasing their customer base and utilizing the built environment. Stay tuned.



Multiple Beacons lit up

Concept

INDUSTRIAL DESIGN
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ZERO GRAVITY RESISTANCE TRAINER

MARK TIMMERMANS

Background to the Project

The Zero Gravity Resistance Trainer acts as a device for exercising onboard spacecrafts, and provides astronauts with their exercise needs.

Zero gravity space environments and lack of exercise heighten the effect of bone mineral density (BMD) loss, leading to an early onset of arthritis. However BMD loss can be offset by exercising for up to two hours a day. Current testing on the International Space station uses machines that take up entire rooms, and they are extremely heavy, reducing the fuel efficiency of the space station. I was challenged in finding a solution that reduced the size and weight of the exercise device, and at the same time free up extra floor realestate for the astronauts, as well as increasing fuel efficiency for the spacecraft and therefore allowing the spacecraft to travel further at a faster rate.

Design Innovation

The Zero Gravity Resistance Trainer is comprised of a cylindrical pump that uses air pressure to provide the user with resistance training. Due to the zero-gravity environment, the device could not use traditional weights like those find in a typical gym. The central cylinder is used to transfer air from inside the cylinder to the outside through a series of 1mm holes to create resistance. Through testing, I found that with a cylinder diameter of 50mm is able to achieve a pressure reading of up to 235 kPa through normal exercise. This equated to a force of 460 Newtons, ideal for a variety of different exercise techniques.

The Zero Gravity Resistance Trainer is fully adjustable to allow for different resistance levels to suit different exercise techniques. The blue sections of the device are handles that can be rotated to open or close a variety of 1mm airflow holes. There are corresponding numbers that allow the user to know how the exercise device is set up. For instance if the indicated number is '2' then there are two holes opened on that end of the resistance trainer, this will provide the user with a high amount of resistance caused by all of the air escaping from just two openings. If

Zero Gravity Resistance trainer detail

the indicated number is '5' this is the maximum number of holes open, and will provide the user with less resistance. This resistance setting may be suited for less strenuous exercise.

Design Production in Space

Due to the inability to manufacture components using traditional manufacturing methods on board a spacecraft, I needed to look towards more modern manufacturing methods incase spare parts are required. Currently available on the International Space Station is a 3D printer that has been used to create tools and more recently a future NASA ORION Spacecraft is set to use more that 100 3D printed parts to make sections of the vehicle. NASA claims that "3D parts would offer a 50 per cent weight-saving over previously used material, such as coated metal, without losing any strength" (NASA, 2018).

For my final model I manufactured The Zero Gravity Resistance Trainer using a Stratasys J750 3D printer, the same brand used by NASA. This machine "produces ultra-smooth surfaces and fine details with layer thickness as fine as 0.014mm, about half the width of a human skin cell" (Stratasys, 2018). With this high level of tolerance I have been able to create a device with material that is accurate and rigid. Because of this high tolerance and the use of specialised piston seals, and an aluminium cylinder from SMC Pneumatics, the rotating components are air tight which increases the effectiveness of the resistance training. All of these factors contribute to a more effective workout for the user and reduces the onset of BMD loss.

As a result of my research, this concept ensure that astronauts would achieve all of their exercise requirements on a journey to Mars. My proposed device is light weight and portable while using a sustainable manufacturing method that has been proven by NASA to work in the space industry. Creating multiple prototypes along the way has enabled me to fine tune the Zero Gravity Resistance Trainer to provide effective exercise through a rigid and aesthetically pleasing design.

In use

INDUSTRIAL DESIGN
HONOURS

SUPERVISOR: Jean Payette

RECOVERY BRACE

JONATHAN WONG

Background

With the popularity of young adults and adults using wheeled sports gear (including Scooter, Skateboard and Inline Skates) as well as different type of sport (strenuous exercise/sports), the possibility of ACL injury has increase.

The purpose of this study is to investigate the better way to prevent ACL injury for patient, in the current market most of the products are for user in the stage of post-injury (recovery stage), but however, to a stage that user will stop using after they "recover", however, without using the ACL bracelet, the possibility of injury occurs again will be increase.

Moreover, this report will be developing the concept for patient that have experience ACL injury and recovered but want to involve in wheeled sports or strenuous sports etc. So that will reduce the possibility of patient to experience another ACL injury.

Methods

The study will be using different methods such as short interview, data collection & data comparison to find out the reason of ACL injury re-occurs to patient, hence to develop concept to prevent ACL re-occurs (including increasing flexibility, light, less bulky etc.)

Detail

Scale

By knowing the reasons behind, the research will be redesign and implement new technology to ACL bracelet and able to reduce the chance of ACL injury.

Results

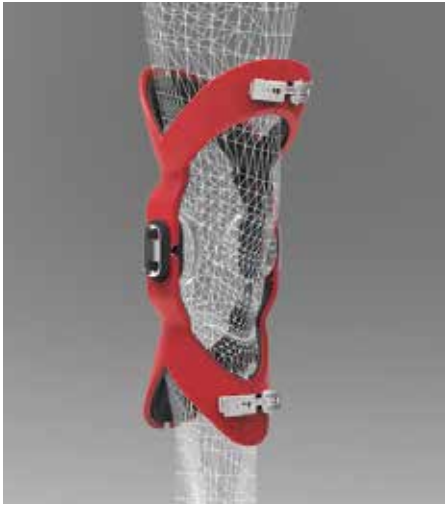
Without the protection of safety equipment for ACL injury patient, it will increase the chance of ACL re-occurs during sports or different exercise. Which is the stage of “after recovery of ACL”.

The result of the study also found out the same way of ACL recover bracelet can also apply to prevention, but moreover, the redesign concept will have to reduce the bulkiness, easy to quip, follow the shape of you leg etc

In the same time by comparing different time frame’s data, we will also find out that all the design of ACL recovery bracelet is almost the same, which in the research, we will be implementing different technology into it.

Conclusion

In conclusion, the chance of ACL injuries will be increase with the proportion of patient movement, the design of ACL prevention bracelet is to encourage patient to equip during their strenuous exercise/sports, hence to reduce the possibility o ACL injury re-occurs.



Fitting

Exploded view

INDUSTRIAL DESIGN
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HELIX PARTITION
NICHOLAS WRIGHT

Project overview

The modern workspace has been the subject of much transformation over the past few decades. These changes aim to make workers happier and more productive, but they fail to deliver fluid interiors. The Helix Partition aims to change how offices adapt to meet the needs of employees within an organisation. This project has explored the modern office space and the effect of such space on the employee and the tangible products that have influenced productivity. The aim of this project has been to find a new way of improving the workplace in fostering a positive culture for individuals and groups. The goal has been to create a product that provides a flexible working environment for the open plan office while offering privacy when needed but remaining lightweight and durable.

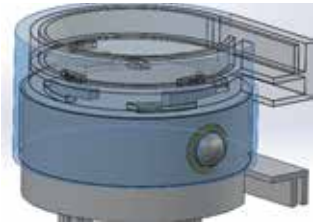
Innovation:

The Helix Partition is a retractable partition device that allows the user to create a flexible office environment. The partition provides sectioned-areas thus creating a sense of privacy in what otherwise would be an open office. In addition, the partitions are stackable and lock in place through the use of a base or raised access floor tile with a unique locking mechanism.

Features

- Provides privacy
- Creates a division within the space
- A Unique Timber Casing
- Customisable – Colour and Pattern
- Auto retract Easy to assemble and store – simple clip into each other
- Creates a sense of personal space and open space when required
- Allows for flexibility within the office
- Simply link together
- Twist Ball Locking Mechanism

Helix partition



Helix linking cap

Meeting Market Needs

The Helix Partition design meets a gap in the market. The Helix Partition also allows for customisation of the outer casing pattern and choice of colour of the partition itself. The modern office is a changing environment and this product allows for greater usability and adaptability within smaller offices that often have very rigid and inflexible spaces. This provides a positive response to the problems often encountered in open-plan offices.

Research

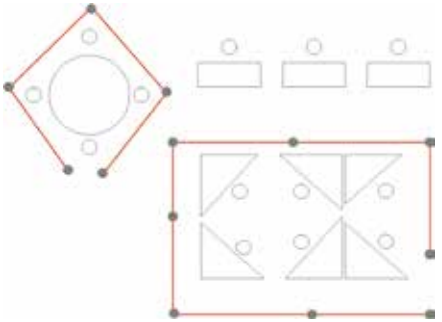
The results from interviews and questionnaires indicated that traditional open-plan offices and open office movement was not the answer to resolving the issues encountered with the single-cubicle concept of previous years. This has also been linked with changes in technology and the way in which we work. The development of the concept of activity-based working has sprouted out of these changes where workers need to be in the best environment for their current tasks. The research also displays that there is a need for the product in the case of a smaller business that cannot afford to modify furniture required for activity based working.

The research discovered that a clear aspect of furniture that is designed for activity-based working is the ability for the products to create a clear sense of purpose and separation of areas

depending of the task at hand. These areas can be set up for different lengths of time based on factors like comfort, noise distractions, meeting spaces and so on. Current design means that there is less sense of ownership when it comes to places or desks that employees are utilising, however the Helix Partition addresses such issues.

Future Direction

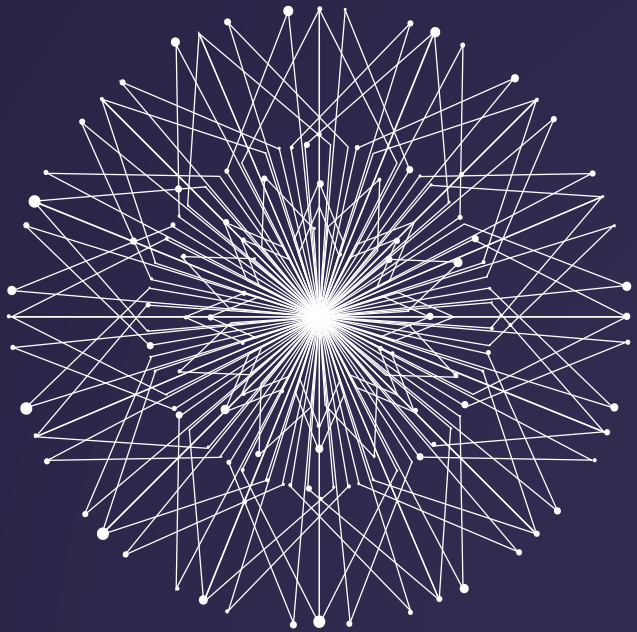
The Helix Partition can be applied to many different office environments. There are opportunities to investigate the product's commercially viability in retro-fitting scenarios as well as newly built offices.

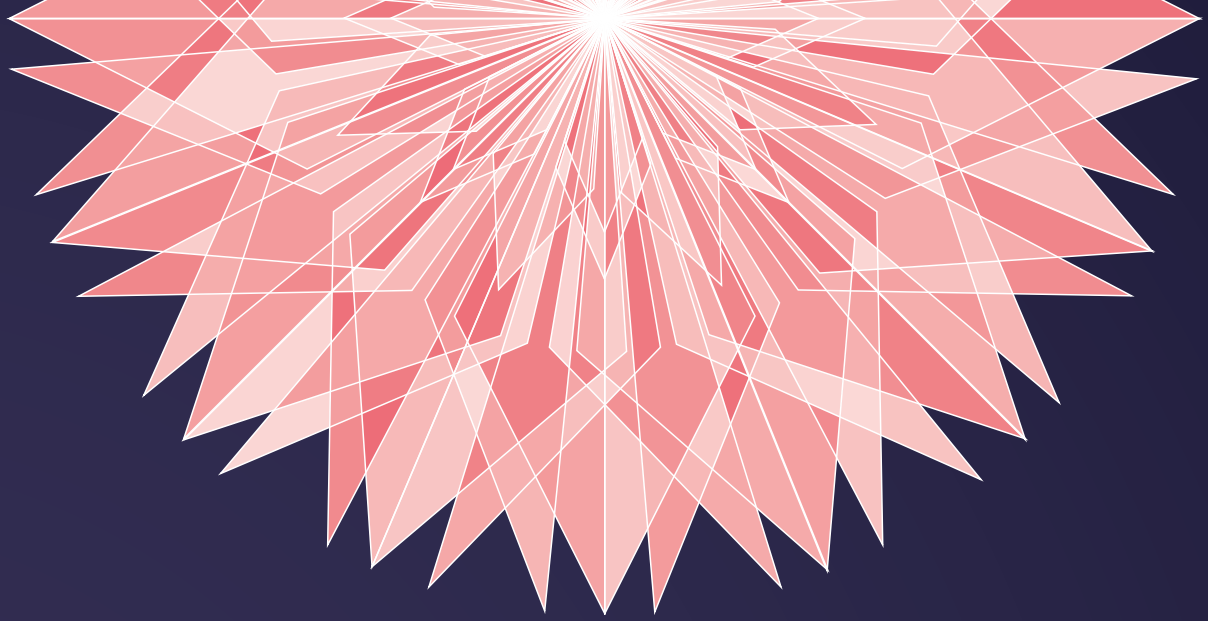


Office layout

BACHELOR OF INDUSTRIAL DESIGN

FINAL YEAR STUDENTS





PROJECT WORK

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HONOURS

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SYNOWEAR
ROODY PARIKH

This project aims to harness the effectiveness of heat therapy and embed it into a wearable design in order to combat joint stiffness for people affected by Arthritis.

Synowear will include electronic heat elements that can be wirelessly controlled through an interactive smart app; allowing users to adjust settings and set the wearable to activate at pre set times. These specific design features will allow users to benefit from heat therapy - alleviating the struggles of waking up with joint stiffness.

Findings

- Arthritis is an 'umbrella' term for over a 100 conditions - all of which affect the joints and cause joint stiffness and pain.
- Projections show direct correlations between ageing populations and an increase in Arthritis. [72 million by 2030.]
- Arthritis has no signs of slowing down its impact on Australia's population - with it being one of the top chronic diseases in Australia since 2015 [14.8% of the pop].
- Doctors can prescribe anti-inflammatory medications to help relieve pain but they will also recommend "including exercises and heat treatment" (Keene, N. Dr)

Synowear in use

Conclusion

Arthritis is a major issue that produces chronic pain and is steadily embedding itself into the population. Research shows that heat therapy is one of the primary methods that individuals can implement to relieve painful symptoms. The build up of synovial fluid in the joints occurs overnight, causing people to wake up earlier than usual simply to loosen the joints and get their mobility back. Synowear provides a method that allows the user to receive heat therapy prior to waking up through the pre set activation feature. This significantly decreases their pain and immobility in the mornings. Synowear provides a cost effective and healthy alternative to relieving pain and joint stiffness for people with arthritis.

A menu screen allows users to access all parts of the interactive app.

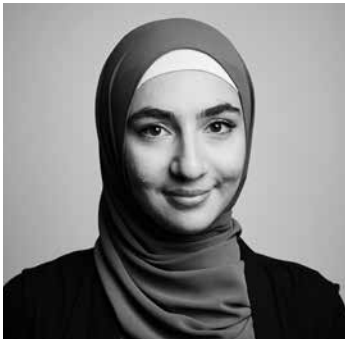
This shows how the user will be able to pair their wearable device to the interactive app.

All paired wearables will be automatically listed in the app. Users can adjust each wearable by tapping on each device.

Each wearable device can be adjusted via a designated screen for each paired wearable.

SYNOWEAR

Synowear app



INDUSTRIAL DESIGN
HONOURS

SUPERVISOR: Karen Yevenes

GLUCOSCAN

OXREM ZEYREC

Introduction

Throughout the years, health and wellbeing is becoming more of a priority for the aged rather than young adults. As the aging population is increasing in Australia due to women producing lesser children, it is relevant and crucial to make improvements on existing medical products in the market. The GlucoScan is used for people with the chronic disease diabetes type 2 and is particularly focused on the aged 65 years and older. Considering the current issues with existing glucose monitoring products such as hygiene, a long fixed

method and having multiple items, the GlucoScan is used with one placement held in the hand. The results from survey's have shown positive behavior between user and GlucoScan and mostly because of the simplicity. The GlucoScan caters for most needs of the elderly with the design and features implemented.

Design Problems

In the market, the regular monitoring devices does an average job at monitoring someone's blood sugar level and can improve a lot with the design.

The method of monitoring the users blood sugar level has some flaws, one of them is requiring space to place the monitor or strips.

Monitoring a user's blood sugar level should not need much space which may be a problem for users that are in an environment where there are no flat surfaces making it more difficult to complete the task. The user must also have clean hands before monitoring their sugar levels as it requires to pierce the skin, this may also cause an infection if not clean enough.

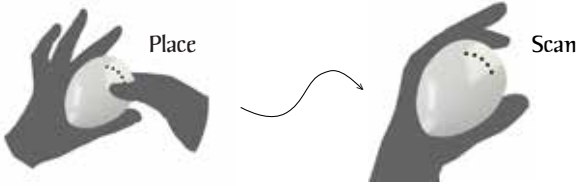
Most existing devices are not suitable for someone that lacks dexterity, this becomes a drawback for users as the method requires transferring the blood on the finger to a strip.

To address this, the GlucoScan not only is hygienic but also very easy for users to scan their glucose as it uses specific technology called infrared spectroscopy that scans glucose levels in a non-invasive way on the area between the thumb and forefinger using one hand.

For users that lack dexterity will find this method easy as it only requires the moving and pressure on the index finger and thumb, this can be used on either hands.

Conclusion

As the elderly population increases through out the years, medical products still call for new innovation. Older Australians don't like over complicated things as their lives are their main priority and have learnt to appreciate the things around them, this makes it easier for designers to understand their needs in a product. Nevertheless, presenting a medical product in the market with technology that makes the task easier will help break through boundaries for people that believe



LASER WIZARD INNOVATION AWARDS

2018 Theme: Smart Sustainable Health & Human Comfort in Western Sydney

The Laser Wizard Innovation Awards are an opportunity for students to address problems faced by their local communities and turn their visionary ideas into practical reality.

The 2018 theme was prompted by a report form Greening Australia, highlighting The Urban Island Heat Effect and how it is adversely affecting Western Sydney's public health, air quality and energy use.

This disturbing development has driven Western Sydney University to seek to improve the health and well-being of people residing in Western Sydney and align with The 17 Global Goals for Sustainable Development.

The goals have the power to end poverty, fight inequality and stop climate change. The Laser Wizard Innovation Awards are the platform to see these goals become tangible.

WINNER AND RUNNER UPS

LASER WIZARD
INNOVATION
AWARDS

MealLink

LACHLAN CHAPMAN

Almost one third of the food intended for human consumption is wasted annually. This leads to increased green-house gases and an imbalance in human rights with millions starving whilst food is being thrown out. The cost to Australia is estimated to be over $10 billion. Not only is this a huge impact on the current generation but it also poses a threat to future life on Earth. It is estimated that is the global population were to reach 10 billion by 2050, the equivalent of three planets resources would be required to sustain current lifestyles.

At the retailer level, high food standards lead to “sub-optimal food” being thrown out, whilst environmental, managerial and technical factors constrain producers. Yet the biggest contribution happens at the consumer level with 62% of Australians opting to eat out rather than using leftovers from the fridge.

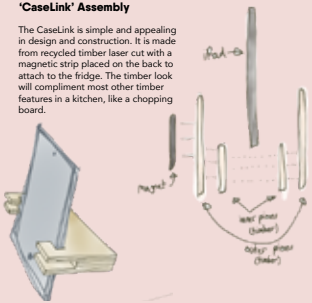
Meallink aims to change the behaviour of consumers by allowing them access to helpful information about the contents of their fridge, including expiration dates and potential recipes for contents, whilst eliminating the need to purchase a new Fridge for access to this technology.

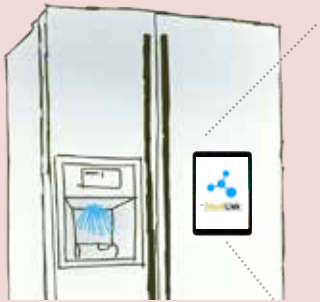
‘CaseLink’ Concept

The ‘CaseLink’ is a versatile stand/case for iPads that allow the user to either attach it to their fridge or place it on their countertop in a slanted position. This case will also be sold alongside the ‘MealLink’ software, as a bundle, so users can easily make use of the full system and in different environments.

‘CaseLink’ Assembly

The CaseLink is simple and appealing in design and construction. It is made from recycled timber laser cut with a magnetic strip placed on the back to attach to the fridge. The timber look will compliment most other timber features in a kitchen, like a chopping board.





LASER WIZARD
INNOVATION
AWARDS

1ST RUNNER UP

AQUA AVENUE
TRISTAN HOOD

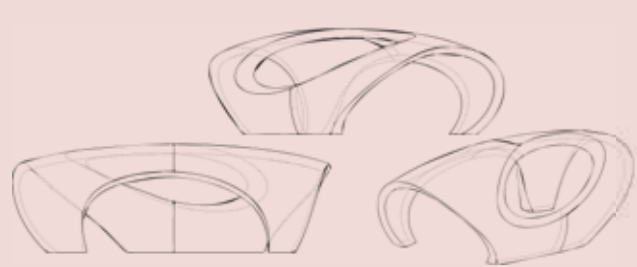
Aqua Avenue is a large open walkway which combats urban heat island effect within central Western Sydney City. It is an aesthetic fibreglass structure with integrated sensors on movement, temperature and time.

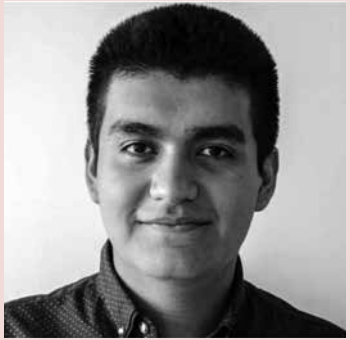
When it is the ideal heat and time of day the sensors activate which release a fine mist that covers anyone who walks beneath. The mist is low residue and does not wet the user. Instead it works similar to sweat on skin, lowering the user's body temperature, cooling them down.

The materials, manufacturing and distribution has all been carefully researched and evaluated to obtain the most sustainable option. Aqua Avenue has been designed to be mass produced with fiberglass moulds, water jet cut from recycled foam and measured to be within semi-trailer dimensions for distribution.

The structure complies with Australian Standards including securing the structure to the ground, braille on the sides and space for a wheel chair to complete a full rotation while inside.

Aqua Avenue also targets Global Goals for sustainable development





LASER WIZARD
INNOVATION
AWARDS

SNAP & PLAY

JAMES TORRES

This is a new laptop concept utilizing a modular design allowing for the laptop to split up into 6 separate pieces. This function gives users the ability to easily mix and match parts to fit their needs and budgets. Modularity also makes repairs and upgrades simple and easy to perform regardless of a user's technical knowhow.

The Snap & Play laptop has been designed as a direct response to the lack of upgradability found in common laptops. This issue has negatively contributed too many areas including but not limited to e-waste, lowering product lifespan, pollution, and resource depletion while also negatively affecting the experience of the user.

Using product service systems, modularity, recyclable materials, and designing for material efficiency and a compact size creating a sustainable closed loop system. A situation where more material is being disposed of properly with less materials being disposed of overall ensuring that as little material is lost as possible throughout the device lifecycle.

Your workshop to create and innovate.

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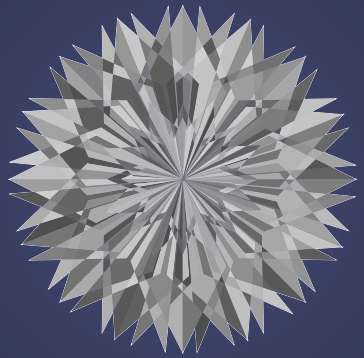
MAKERSPACE



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