

Sustainable Earth Institute

# STUDENT RESEARCH PRIZE 2016



**RESEARCH  
WITH  
PLYMOUTH  
UNIVERSITY  
SUSTAINABLE  
EARTH INSTITUTE**



# INSPIRING FUTURES, RECOGNISING TALENT

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Plymouth University's reputation for sustainability continues to grow and we are recognised as international leaders in the sector, taking an award winning approach to working collaboratively across campus operations, research and teaching and learning.

The Sustainable Earth Institute (SEI), was formally launched in June 2016 and leads the action areas on sustainability research in collaboration with other research institutes, centres and groups across the University. This institute incorporates and follows on from the work of the Institute for Sustainability Solutions Research (ISSR) which was established in 2012. Based in the Faculty of Science and Engineering, the SEI continues to promote interdisciplinary partnerships, investigating and tackling the diverse environmental, economic and social challenges that threaten a sustainable future.

The student research prize celebrates the inspirational sustainability projects being conducted by students, and recognises the talent they have for creating a better future.

Congratulations to all the winners from this year, and thank you to everyone who has helped coordinate this year's prizes.

To find out more about the Sustainable Earth Institute, visit our website at [www.plymouth.ac.uk/sustainable-earth](http://www.plymouth.ac.uk/sustainable-earth) or follow us on Twitter, @PlymEarth

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# ARTS AND HUMANITIES

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'The Sea & Me' exhibition is a collaboration between undergraduates on Marine Science and Photography degrees and features a collection of artwork that reflects a broad range of influences, such as architecture, pollution and the natural world.

## HEATHER NUNN

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### BA (Hons) Fine Art

Faculty of Arts and Humanities

Sustainable Earth Institute team leads: Deborah Robinson and Phil Power

Fine Art Undergraduate Programme Leader: Mike Lawson Smith

### Re(f)use and (Ex)change.

My belief is that human beings need to take a closer look at the dynamic interactions of nature, culture, and a progressive social transformation. I work to create an awareness of the imbalance between nature and modern society. Understanding the complexities of interdependence is one of the first steps toward ecological sustainability.

A collagraph series that captures the natural beauty that we as consumers take for granted and to challenge the perception of the viewer by providing scientific knowledge translated into imagery. We complete our daily activities blinded by routine, forgetting to actually look and see around us.

By collecting litter from aesthetic rural sites and using it to form an image each site, the work compares the beauty against the ugly.

The work exposes the overlooked corner of reality where waste is disposed of in an improper manner and the disastrous impact it has on the survival of not only marine wildlife but land too.



Freathy, Bigbury and  
Cassiobury (collagraph, 2016)

## MARK HICKS

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### BA (Hons) English

Faculty of Arts and Humanities

Sustainable Earth Institute team lead: Dr David Sergeant

Supervisor: Dr Mandy Bloomfield

### The Nature and Logic of Capitalism in Margaret Atwood's *MaddAddam* Trilogy.

This dissertation offers a series of focused analyses of Margaret Atwood's recent *MaddAddam* trilogy (2003-2013).

It examines Atwood's critique of the ways in which capitalism detrimentally shapes human relations to the material world through the appropriation of science, commodification and the manipulation of 'the human'. The arguments draw on extensive reading in philosophy and cultural theory – from Descartes, Rousseau and Burke to Derrida, Baudrillard and Debord, to the New Materialisms of Karen Barad, Jane Bennett and Timothy Morton. The dissertation moves away from romantically-inflected models of green criticism to a rigorous approach informed by a long philosophical tradition as well as the newest, most cutting-edge theoretical discussions.

## ANDREI DAN CARAUSU

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**BA (Hons) 3D Design (Spatial and Interior Designer)**

*Faculty of Arts and Humanities*

Sustainable Earth Institute team lead: Dr Pete Davis

### **Access.**

For over 100 years the automobile industry has been running on non-renewable energy. When looking at the recent developments of the Electric Vehicle (EV), we see that it is creating momentum and both supply and demand of such vehicles is rising rapidly. Like a new board game, this new industry will have new players, a new set of rules and a new playing field.

What if instead of running out of oil we would just stop buying it? Car-makers and tech companies are already investing billions of pounds into new technologies that are due to hit markets in the next few years. By 2020 the

innovation within the automotive industry could bring to us faster, cheaper, and safer alternatives to gasoline automobiles such as long-range fully electric cars. At the current sales growth and interest rates for electric cars, the oil industry could be displaced as early as 2023. But is our transportation infrastructure ready for a new behaviour?

By looking at the retail, public, and private spaces Access explores the possible attitudes of consumers and different business opportunities that could emerge in a future dominated by electric cars. Access also focuses on identifying the needs of electric vehicle users and ways to enhance their user experience. Building a conceptual proposal of a future service station inspired by airport terminals and placed on a motorway seemed a perfect scenario in which to visualize some of the new opportunities that could emerge in the years to come.



## KATELIN THOMAS

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**BA (Hons) Architecture**

*Faculty of Arts and Humanities*

Lead academic: Dr Karan August

Sustainable Earth Institute team lead: Simon Bradbury

### **Uneven development – analysing hierarchies within shanty towns.**

This study explores issues found within shanty towns and how hierarchies affect these matters observed.

The slums La Limonada in Guatemala and in Algiers will be focused on. Using a theoretical analysis methodology, applying key concepts from theorists to analyse the inhabitants of these spaces, the structures they live in and the wider context of these areas. Coming to the realisation that with a middle-out approach and liberating education change is possible.

## CHARLES MURPHY

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**BSc (Hons) Building Surveying and the Environment**

*Faculty of Arts and Humanities*

Sustainable Earth Institute team lead: Professor Steve Goodhew

### **Critical Evaluation of the Understanding of Responsible Sourcing by Procurement Teams.**

The procurement of construction products and materials has a significant impact upon sustainable development. This study aims to critically evaluate the understanding and utilisation of responsible sourcing by main contractors in the UK.

To achieve this the triangulated research method was employed to enhance the completeness of the research using questionnaires sent to a sample of the top 100 UK construction contractors. The research assesses the responsibility related to sourcing practices followed by a series of semi-structured interviews with appropriate members of the contracting industry. The analysis showed the awareness of responsible sourcing practices and the associated product standards was good. However, it was found that deeper understanding of the key concepts involved was poor with confusion persisting on its exact definition. Significant barriers to the utilisation of responsible sourcing were identified. The influence of prescriptive contractual arrangements along with poor client engagement being amongst them. Voluntary action in this area of sustainable construction is not deemed to be sufficient to drive more widescale adoption of responsible sourcing practices. Additionally the process for compiling the evidence to procure responsibility put a burden on purchases. Study therefore resulted in the design of a prototype mapping tool for further development to aid in alleviating the more geographically related sourcing issues.

## AMIE TOWNSHEND

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**BA (Hons) Photography**

*Faculty of Arts and Humanities*

Sustainable Earth Institute team lead: Heidi Morstang

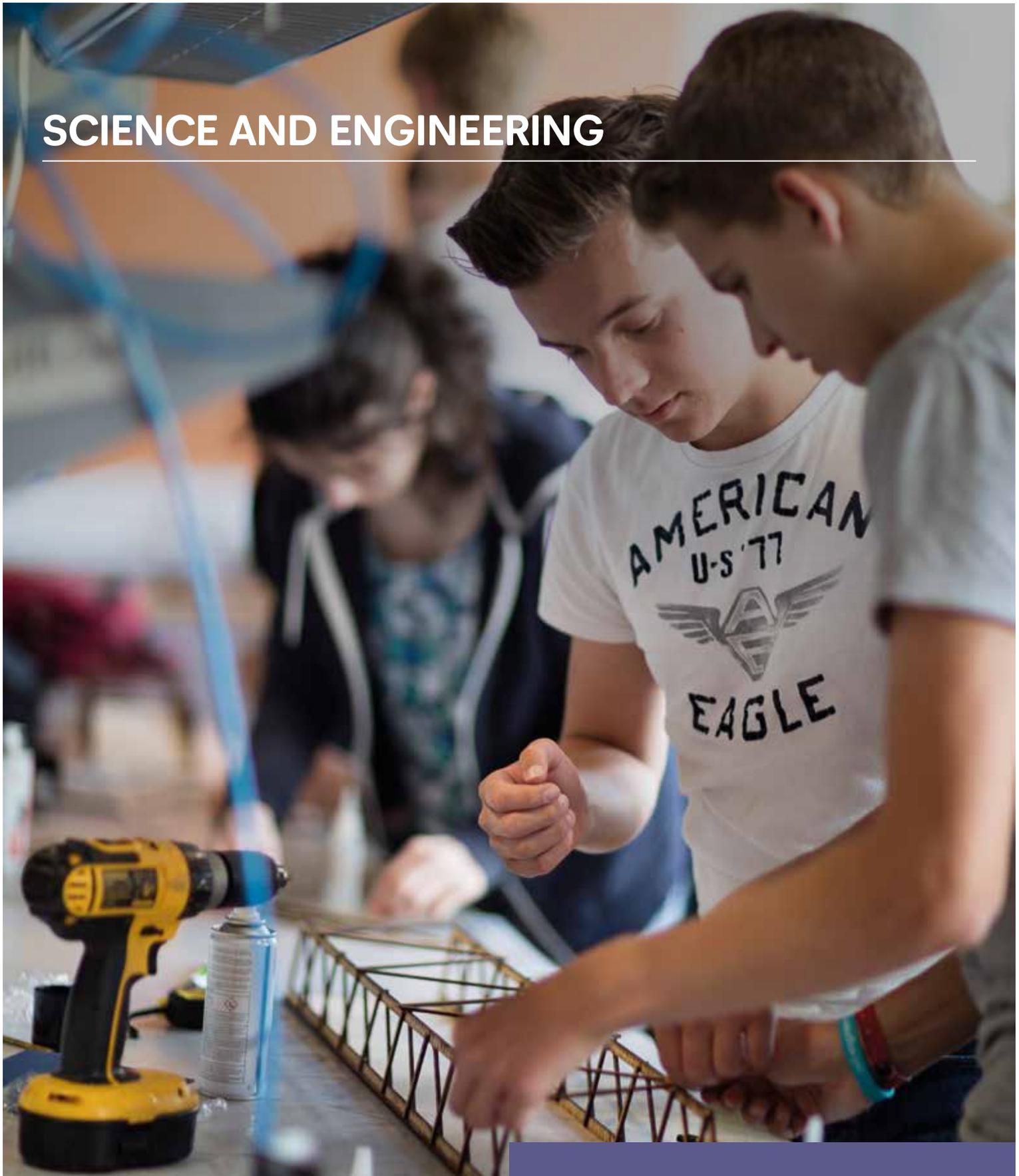
This body of work was created out of my desire to explore, and the aim of inspiring myself and others to explore local landscapes before heading further afield.

From this initial step I found myself fascinated with Wistman's Wood on Dartmoor, immersing myself in the many facets of the woodland both photographically and theoretically. These facets included the history, heritage, mythology, non-human agency, psycho geography, vulnerability, residence, geography, geology, science and conservation. The one area which I found myself captivated by was the science, geography and conservation of the site, and how my work could be used alongside the scientific work surrounding Wistman's wood. I hope to carry on evolving this project by bringing together science and art to other sites across Devon and Cornwall.



# SCIENCE AND ENGINEERING

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Student's on a residential course had the chance to design, make and test a bridge in the Smeaton and Brunel Labs at the University.

## JEMMA LOUISE HEARN

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**BSc (Hons) Biological Sciences**

*Faculty of Science and Engineering*

Sustainable Earth Institute team lead: Dr Mick Hanley

### **The relationship between life-history and risk of extinction for Canadian mammals.**

Certain biological traits such as small population density, slow life history and large body size have been previously associated with increased risk of extinction in mammals.

In this paper I have investigated four life-history traits of mammals which may underline a positive relationship between body size and extinction risk: reproductive output and extinction risk. The study investigated how life histories (adult size, gestation, size at birth, weaning and litter size) influence the risk of extinction for 22 Canadian mammals. The dataset varied of both small and large body sized mammals from different regions of Canada. The abundance time-series chosen for each species was subject to a count-based Population Viability Analysis. The average population size over the whole time series provided an expected initial populations size ( $N_0$ ). The intrinsic rate of population increase ( $r$ ) for each annual interval ( $t$  to  $t+1$ ) was calculated as:  $r = \ln N_{t+1} - \ln N_t$ . The standard deviation of this  $r$ -series ( $SD(r)$ ) was also calculated. These random draws were used in the iteration of the model  $N_{t+1} = N_t e^{r - SD(r)}$ . The model was iterated over 100 years and the proportion of species that went extinct provided an estimate of the probability ( $p$ ) of extinction. Population size, size at birth and degree of stochasticity had a significant influence on the species  $p$  of extinction. The average adult size had no significant influence on the  $p$  of extinction. Size at birth influenced the amount of parental investment received and litter size. Different life histories have evolved as adaptive strategies to ensure offspring survival. It is important for offspring to survive to reach sexual maturity so they can contribute to the next generation to increase the population's fitness and persistence. My findings reveal the role life-histories have on risk of extinctions in mammal populations and the importance of considering stable environments could be an important tool for conservation management.

## CHRISTOPHER ACKLAND

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**MEng (Hons) Civil and Coastal Engineering**

*Faculty of Science and Engineering*

Sustainable Earth Institute team lead: Dr Andrew Fox

### **An investigation into the effects of rising sea levels on bridge pier scour at the inter-tidal River Clyst and Exe Estuary coastal interface.**

Recent research has greatly improved understanding of scour in the off-shore marine environment, but scour at coastal locations remains less well understood. Computer models are often wrongly applied in coastal environments, failing to consider cyclic action caused by the gravitational pull of the sun and moon.

As a consequence, predictions about the effects of scouring and other geomorphological changes are incorrectly made. In light of global climate change, it is imperative that an improved understanding of scour at coastal locations is developed and predictions about the impact of rising sea levels on coastal structures are improved. This research addressed both issues by investigating the effects of sea level rise on two adjacent inter-tidal bridges over the River Clyst and at the Exe Estuary coastal interface. A physical model was created to simulate the effects of sea level rise using a range of different carbon emission scenarios. The results predicted that excessive scour, by as much as 2.3m in the worst case, is to be expected at the central pier of the cycle bridge and at piers 2 and 3 of the adjacent rail bridge. Overall, an intensification of change within the coastal environment was identified, including areas of erosion, accretion and sediment transport. The study concluded that similar bridge sites will be at increased risk of collapse and/or become scour critical in the future, revealing an urgent need for further research in this subject area.

## OLIVER SLAUGHTER

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**BSc (Hons) Environmental Science**

*Faculty of Science and Engineering*

Sustainable Earth Institute team lead: Dr Paul Lunt

### **Designing and implementing public participation workshops to influence behaviour towards climate change within an action research framework.**

Efforts to influence public behaviour towards tackling Climate Change are currently slow and ineffective. Urgent solutions are required to meet the increasing threat of Climate Change by fostering public participation and support towards the large scale decarbonisation of many anthropogenic activities.

Public attitudes and perceptions of Climate Change have been demonstrated as complex, possessing a wide variety of barriers and beliefs. This study presents public participation workshops as a timely solution to understanding and influencing public behaviours towards Climate Change. Utilising an action research framework the study implements the four stages of diagnosing, planning, taking action and evaluating action to achieve the study aim and support future research through continued cycles of progression.

A comprehensive literature review and a small scale public survey informed the design and implementation of a public participation workshop within Plymouth, UK. Workshop outcomes were analysed via participant observation methods then compared against existing literature and generated survey data. Results demonstrated distrust and resistance from several participants towards the acceptance of information presented within the workshop. The importance of timing of workshop activities, trust between facilitator and participants, provision of space for discussion and the ability to manage disruptive participants are highlighted as critical components of workshop design.

This study illustrates the obstacles and complexity towards implementing a successful public participation workshop, whilst building a foundation for future study. Action research methods provide a useful framework for the generation of new knowledge within this limited area of research. Further study and the implementation of widespread public engagement towards influencing Climate Change behaviour are critical to meeting increasing challenges in the face of an uncertain future.

# LUKE TAYLOR

BSc(Hons) Computing & Games Development

Faculty of Science and Engineering

Sustainable Earth Institute Team Lead: Dr Dan Livingstone

## Medication Assistant Application.

This project prototyped a mobile application for research associate Dr Shenton, from the School of Medicine and Dentistry, as part of an ongoing pre-feasibility study. Dr Shenton identified that the elderly are both intentionally and unintentionally, failing to take medication as prescribed. Noncompliance of given instructions is identified as an issue and concerns were raised with the user group having reservations about discussing potential issues with their doctor.

**Medication Assistant Application**  
*Prototype Of A Doctor Led Prescription Management Tool*

**Description**

Prescription medication wastage accounts for almost 300 million pounds of NHS funding each year.

The Medication Assistant provides patients with a platform to better communicate their prescription medication requirements. Reinforcing routine medication consumption and facilitating discussions between a Doctor and their patient.

Designed specifically for the elderly, attempting to reduce un-intentional non-compliance, whilst providing a platform to further combat intentional non-compliance.

Facilitating research through anonymous data gathering and visualisation, using both Android and Web based solutions, to move closer to finding the answer to the question:  
"Why is medication wasted?"

Prototyped for Dr Shenton from the School of Medicine and Dentistry, to support an upcoming feasibility study.

**BROADCAST**

**REMIND** **INFORM** **CUSTOMISE**

**Features**

- Providing a Doctor with information on why a patient has not taken their medication.
- Reinforcing patients' medication routines.
- Utilising audio, visual and kinetic feedback.
- Patient customisable options for alarm type, sound, vibration and broadcasting of data.
- Drug validation for the safety of the patient.
- Secure online storage of anonymous data broadcast.

Luke Taylor  
luke@codepointsolutions.co.uk  
BSc(hons) Computing & Games Development 2016

Wastage of prescription medication amounts to three hundred million pounds, per year, lost from the National Health Service [1]. A mobile application was to be used to determine if a digital application would further support current practices to reduce this wastage. This included having the ability to view the user's medication history to determine if noncompliance is happening to better assess users needs and to create points of discussion.

The developer solicited the functional requirements through meetings with Dr Shenton, using discussions to determine the business objectives that needed to be targeted as part of the project's objectives. Research carried out highlighted key elements elderly users would require for accessibility with a mobile application. Competition analysis highlighted positive aspects of similar applications and demonstrated a lack of doctor led applications. Competitors morale decisions were put into question through pharmaceutical affiliation, and sales tactics, being included within these applications. Designs were created for the application and an iterative development cycle was used to produce the application.

Further scope objectives were met through the creation of a website that stores all of the anonymised data it received as a hub to view data from many users. All deliverables were produced successfully. Core functionality was created and tested, with only minor filter options being pushed back into the next stage of development. Testing performed through development demonstrated that the application achieved the required functional tasks. Client limitations on project functionalities were imposed for research purposes which reduced usability at the prototypical stage. User testing was planned and ethical approval was given to test with elderly users, however this did not take place due to timing and location issues outside of the projects control. The project was successfully handed over to the client, with approval being gained and future progress planned to continue development.

## HELEN GOWANS

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**MSc Sustainable Environmental Management**

*Faculty of Science and Engineering*

Sustainable Earth Institute team lead: Dr Peter Downs

### **A critical evaluation of communication strategies used by aquariums to increase public awareness of marine conservation efforts.**

The ocean is highly vulnerable to human impacts. Across the world, marine conservation efforts are attempting to address this. Society needs to recognise the damage it does to the marine environment but a lack of connection presents a significant challenge to marine conservation. Aquariums are well placed to bridge the gap between society and the ocean and encourage environmental knowledge, concern and pre-environmental behaviour.

This study assesses different communication techniques used by two case study aquariums and explores how public audiences relate to marine issues. Interviews with public engagement officers and public questionnaires revealed that, although aquariums have a positive influence on public understanding and perception of marine conservation, they also showed that there are many barriers to creating appropriate cognitive, affective and conative responses.

Visitors to these marine attractions have little knowledge of marine issues which is a barrier to increasing knowledge during their visit. Along with making conservation messages simple and easy to understand, aquariums should also enable visitors to make connections between their previous experiences and the issues being interpreted. Interactive displays and presentations allow visitors to become physically involved in learning and can enhance understanding and desire to learn. Along with this, marine issues that are framed as local or familiar are more effective at creating concern among visitors which reduces disconnectedness and unfamiliarity with the marine environment and marine species.

Although aquariums create a desire to act pro-environmentally by increasing knowledge and concern among visitors, the effect is weak and the links are complex. An alternative method of promoting pre-environmental behaviour is suggested which involves the principle of cognitive behavioural therapy. By allowing visitors to see and experience the impact of different behaviours, alongside efforts to increase knowledge and concern, aquariums could become more successful catalysts for support and action to conserve the marine environment.



# BUSINESS

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Students from the Faculty of Business taking part in FLUX, one of the UK's largest inter-university business challenge competitions.

## MICHAEL LOVELL

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**BA (Hons) Marketing**

*Faculty of Business*

Sustainable Earth Institute team lead: Dr Victoria Hurth

### **A value-action gap: The study of male university students, materialism and sustainably sourced jeans.**

Consumption with regards to the utilisation of the worlds resources is a key issue at present. Business production and the purchasing habits of the world's population are exacerbating social, economic and environmental impacts, of which the fashion market appears to be at the forefront.

With men's jeans owning the highest sales market share in comparison to other items of clothing across both female and male genders, it is likely that jeans are the biggest contributor to the fashion-sustainability issue. However, despite there being sustainable options for jeans, and consumers admitting a responsibility and desire to care for the environment a value-action gap still exists in the purchase of such sustainably sourced products.

A review of the previous literature identified gaps in consumer behaviour between their intended action as a result of their values, and their actual action. Although the prominence of this gap is evident, less is known about what effects it, particularly when concerned with students. Using a qualitative approach, this study looked to provide an understanding on whether materialism affects the value-action gap of male UK university students and sustainably sourced jeans in a positive or a negative way.

As a result, materialism was mostly seen as positively affecting the value action gap with apparel involvement for non-sustainable options being a key issue. All respondents in the demographic were seen as being affected in varying degrees by aspects of materialism such as newness, apparel involvement and self-monitoring, however it was their knowledge for whether products were sustainably sourced or not that surfaced as potentially a larger issue. As a result, for sustainably sourced jeans companies, communication of their product benefits was seen as a key factor for success moving forwards, in order to appeal to the utilitarian desires of the UK male university student sustainably sourced jeans market.

## DANIEL BEATTIE

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**BA (Hons) Business Studies**

*Faculty of Business*

Sustainable Earth Institute team lead: Dr Alison Ashby

### **Millenials Perceptions of Sustainability in UK Retail.**

The purpose of this research was to find out millennials perceptions of sustainability in UK retail. This was achieved by asking research questions based around what level of understanding millennials currently have, what they care most about when shopping, what makes a 'sustainable' brand in their eyes and what could be done to further engage them. To find this out the methodology used was a mix of qualitative and quantitative, using semi-structured interviews with a survey to back up and triangulate findings from the interviews.

The key finding is that there is a clear link and correlation between perceived expense and perceived sustainability of a brand or product. Literature suggests consumers are more drawn to more sustainable products, however this research contradicts this in some areas and supports the current literature that suggests there is a lack of consumer understanding in the subject area. This research goes a step further and explores what basis a consumer (with focus on millennials) makes sustainable shopping decisions on if their understanding is limited. It clearly indicated that as price increases so does perceived sustainability. A theory is produced in the form of a graph to show explicitly how this works as well as plotting the place of current UK supermarkets. It is found that value retailers have more of an uphill battle to attract the conscious shopper, whereas more expensive brands are automatically and unintentionally greenwashing.

# HEALTH AND HUMAN SCIENCES



The sustainability in nursing skills session is a way of embedding sustainability into the nursing curriculum in a way that makes the topic of sustainability relevant to nursing practice. In 2014 this work won a national Green Gown Award which recognises the exceptional sustainability initiatives being undertaken by tertiary education.

# LOUISE WATTS

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## **BSc (Hons) Nursing**

*Faculty of Health and Human Sciences*

Sustainable Earth Institute team lead: Professor Janet Richardson

Module Leader: Graham Williamson

Module Tutor: Sarah Fitzpatrick

## **An exploration into nurses' knowledge and views on environmental issues in healthcare.**

Climate change has been described as the most important global health threat of this century. There are concerns, worldwide, regarding global warming and the over-use of resources.

The healthcare sector has a significant impact on water and electricity use, product consumption and waste management. As a result, it is important for the healthcare sector to address the issues of environmental sustainability. In 2010 the carbon footprint of the NHS, in the UK, was approximately 20 million tonnes of CO<sub>2</sub>. The NHS produces 5.5kg of waste per patient per day.

Addressing climate change is important, as it will directly affect public health. Climate change threatens health in a vast number of ways, including increased air pollution, more vector-borne diseases, ecosystem damage, reduced biodiversity, and changes in food, water and sanitation. These factors can lead to increased rates of malnutrition, which is a serious threat to vulnerable populations.

Findings from the literature review clearly indicate gaps in research and there is limited research on this topic. There are no studies testing this theory in relation to practice, and there are concerns over nurses' knowledge of environmental issues.

Based on the literature review a study is proposed to test the hypothesis that educating nurses in environmental issues will improve environmental sustainability in practice in relation to resource use.

### **Study Aim:**

- To identify whether education in environmental issues can assist improving environmental sustainability in practice.

### **Objectives:**

- To measure whether a teaching session in environmental issues will reduce the quantity of disposable gloves used.
- To measure whether a teaching session in environmental issues will reduce the quantity of disposable syringes used.

The proposed study will take place within a hospital setting. For this study, the participants will be pre-grouped by hospital ward/department. On the participating ward, the consumption of disposable gloves and syringes will be measured over a 28 days. The nursing staff who work on the ward, will be invited to attend a teaching session about environmental sustainability and the use of gloves and syringes. After the teaching session the consumption and disposal of gloves and syringes will be measured for another 28 days. Statistical analysis will be carried out in order to establish whether the teaching session made any impact on resource use.

### CLAUDIA TROTTER

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#### **BSc (Hons) Psychology**

*Faculty of Health and Human Sciences*

Sustainable Earth Institute team lead: Dr Sabine Pahl

Supervisor: Professor Jon May

#### **'It's in the bag!': Testing the effect of Functional Imagery Training on reducing plastic use.**

This study examined the effect of Functional Imagery Training (FIT) on the reduction of plastic bag and bottle use.

FIT is a new theory-based, manualized intervention that trains positive goal imagery. Motivation is evoked and maintained using multi-sensory imagery about personal goals, to make them seem less distant and more concrete. Previous research has shown that FIT was able to change behavior within the areas of snacking (Andrade, Khalil, Dickson, May & Kavanagh, 2016) and exercise (Lennox, Andrade, Kavanagh & May, in submission). In a stepped wedge design, 25 participants who wanted to cut down on their plastic use were randomly assigned to either receive FIT immediately or after a delay of two weeks. They were asked to complete an online survey measuring plastic use and motivational thoughts at baseline, after two weeks, and after four weeks. We found that motivational thought intensity, availability and imagery increased following FIT, and this change was correlated with plastic use following FIT. However there was no significant interaction between plastic use and condition (Immediate or delayed). This shows the potential for FIT to be used as a motivational tool in the area of proenvironmental behaviors.

### MEGAN MCGREGOR-SHENTON

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#### **BSc (Hons) Dietetics**

*Faculty of Health and Human Sciences*

Sustainable Earth Institute team lead: Dr Clare Pettinger

#### **The Role of a 'Less but Better' approach to Meat Consumption for Public Health Nutrition and the Environment.**

The Food and Agricultural Organization (FAO, 2012) defines sustainable diets as those with 'low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations.' However, it is becoming apparent that our current food systems are unsustainable, contributing to the large burden of chronic non-communicable disease and negatively impacting the environment.

There is a large body of evidence supporting the need for a 'less but better' approach to meat consumption to benefit human health and the environment, with the Dietetic profession being uniquely placed to influence this change in consumption habits. However, additional research is needed to examine the implications of such a diet on the whole of society.

It is clear that stronger government leadership is required to prioritise the adoption of healthy, sustainable diets in the UK, and the way in which this is tackled should encompass the wider societal issues associated with food, such as consumption practices, food poverty and the impacts on various stakeholders.

# ANETA NASTAJ

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**BSc (Hons) Psychology**

*Faculty of Health and Human Sciences*

Sustainable Earth Institute team lead and supervisor: Dr Sabine Pahl

## **The Effects of Environment on Motivation to Exercise and Commitment to Environmental Sustainability.**

Mental and physical health problems are increasing; depression and obesity rates are rising. Studies suggest that there are mental and physical benefits that result from spending time in nature and exercising.

Motivation plays a key role in the uptake of exercise. The main objective of this study was to measure motivation to exercise in 3 environments; a beach (Blue), forest (Green) and the Control condition. The hypothesis stated that motivation to exercise will be higher in the Blue and the Green conditions than in the Control condition. Additionally, commitment to environmental sustainability was measured. A video of a beach or woods was displayed using a projector in a laboratory. This allowed for an easy manipulation of environments and collection of data. Sixty six students from the Plymouth University participation pool cycled on a stationary exercise bike for 7 minutes in front of the display and completed questionnaires. The questionnaires measured physical activity and self-esteem before the cycle and perceived exertion, self-esteem, time perception, enjoyment and future intention, and attitudes towards sustainability after the cycle. Heart rate was measured every minute during the cycle. The results found were mixed; with enjoyment higher in the Control and time perception lower in natural environment. Self-esteem, perceived exertion, and commitment to environmental sustainability was the same in all conditions. Heart rate was higher after participants cycled for 7 minutes in the Control condition than in natural environments. The results mostly do not support the hypotheses. Possible explanations and suggests for further research are provided.



# **SUSTAINABILITY WITH PLYMOUTH UNIVERSITY**

The University is committed to providing information in accessible formats.

If you require information from this guide in an alternative format, please contact:

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