

**University of
Northampton**

Research Highlights 2016-17.

UoN



Welcome.

As postgraduate research students, we know that learning to become researchers is not all about simply learning how to 'do' our research. Many other skills are needed - developing a research network, presenting research to different audiences, negotiating with supervisors, project managing a large research project and much more. Importantly, we need to realise the impact of our research and the real-world application.

Being a good university for research is not simply about succeeding in the league tables but, more importantly, it's about finding a research environment that helps us to develop as researchers and as people. What makes us motivated to continue our research is a supportive environment, in a university that is willing to understand the complexity of our research and encourages us to be curious.

We have found this at the University of Northampton. We have people who believe in us, support us, and encourage us in our research to reach those heights that we don't think we can achieve. We both started our research feeling rather lost (sometimes literally) but every time Northampton's research environment - the supervisors, academics and support staff - has brought our research back into focus, whilst maintaining its identity. And in the current global climate, having a supportive network is more important than ever and, crucially, helps us to see the practical application of our research in a real world context.

Research Highlights does just that. From Education to Waste Management, the researchers are driven by the same burning question: how do we use research to impact the world in a positive way? Sadly, research can be seen as an object that collects dust on a shelf but, as Research Highlights shows, research can have real-life implications and offer solutions to complex issues, not just on a local scale but globally as well. Hailing from various countries, cultures and traditions, our researchers are as diverse as our research topics and further display our commitment as an institution to the principles of Changemaker and our desire to celebrate diversity in academia.

**Artemis Artemiou and Nour Zantah,
Postgraduate Research Students**

Biographies

Artemis Artemiou is a recent graduate from the University of Northampton (UoN) with a First in BA Drama (Hons). His passion for applied theatre and drama was sparked during his undergraduate degree and this led him to embark on his current postgraduate research degree at UoN, running Imagine A Day Project (IADP) workshops with a team of facilitators in secondary schools. IADP employs drama games, activities, improvisation and play to offer participants a space to envision a future they want to live in. Artemis is measuring the impact of these workshops and the development of his practice.

Nour Zantah is a Syrian professional artist. She is a BA Fine Art graduate of the University of Damascus, Syria, and an MA Contemporary Art alumna of Limkokwing University of Creative Technology, Malaysia. She is currently doing her PhD in Fine Arts at the University of Northampton. In 2007 Nour started exhibiting her artworks globally. Nour's artworks convey the subject of violence, focusing on the aesthetic and expressive values that can be achieved while depicting violence. They reflect the effectiveness of the new media and the painting of the viewer in expressing the concept of violence. She also explores different techniques to interrogate violence through painting.

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News in brief.

Researchers demonstrate impact of lucid dreaming.

New research from the University of Northampton, recently published in the journal *Dreaming*, suggests that training to induce lucid dreams can affect how aware you are whilst awake. After a twelve-week programme, volunteers who were able to induce lucid dreams – where the dreamer is aware that they are dreaming – became more adept at perceiving subtle changes or objects in their visual field.

According to lead researcher, Dr David Saunders, this observed change in perception suggests that lucid dream experiences may impact on the way we think, solve problems and relate to others in waking life.

Wearable tech claiming to encourage lucid dreaming is set to become the next big craze when it hits the shops. David commented that “these findings suggest people who are trained to lucid dream become more ‘field independent’ in their waking life”.

“People high in this characteristic tend to be more self-sufficient, less reliant on colleagues support when completing tasks, have a much stronger internal compass and tend to perform better in formal educational programmes than field dependent individuals.”



New research looks to improve our internet experience.

University of Northampton researcher, Dr Mu Mu, has been awarded £100,000 to research ways of making the internet work better for users.

The two-year project – funded by the EPSRC (Engineering and Physical Sciences Research Council) – aims to find solutions to common frustrations such as slow music downloads or buffering during video playback.

“At the moment user experience is not given precedence, with priority usually given to other features such as network coverage,” said Dr Mu, from the University’s Advanced Technologies Research Group.

“As such, different media streams compete for resources and user experience suffers.”

To improve the flow of internet traffic, the project aims to develop software that will improve network efficiency, fairness and, ultimately, user experience.

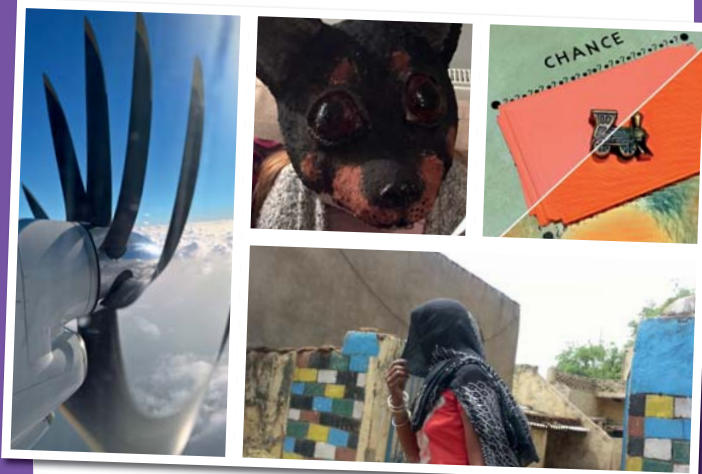
“High quality and reliable media streaming will also be beneficial to the digital economy and digital public services”, added Dr Mu. Also involved are Lancaster University and Aruba, a Hewlett Packard Enterprise company.

You will be able to follow the progress of the project on Dr Mu’s blog.

<https://drmu.net/>



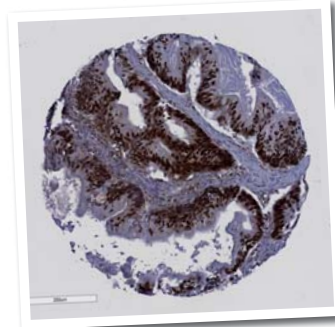
Images of Research competition showcases research at UoN.



The University of Northampton's fourth annual Images of Research competition, organised by The Graduate School, received a record number of entries this year.

The competition includes an exhibition of images which capture research projects in a visually attractive way, in a form understandable by a general audience. Each image is accompanied by a summary text which explains the research and links it with the visual medium. The work of 33 staff and postgraduate research students was showcased in a touring exhibition and the winners were announced in May 2017. All the images and winners can be seen here. <https://tinyurl.com/lor17winners>. The 2017-18 Images of Research exhibition will be launched on January 31st 2018.

Ovarian cancer survival linked to protein.



Eleven women die from ovarian cancer every day in the UK. But research by Dr Lee Machado, Associate Professor in Biochemistry at the University of Northampton, has shown the chances of surviving ovarian cancer may be drastically affected by the production of a specific protein.

In a study of more than 500 cases, patients with no, or very low, amounts of the DNA-binding protein survived twice as long as those whose tumours produced much greater levels. The results, published in the journal *Oncotarget*, have important implications for diagnosing and treating the disease.

Dr Machado said the high-mobility group protein B1 (HMGB1) should now be considered as a target for new treatments.

"High levels of HMGB1 are also known to confer tumours with resistance to therapy, and future studies should determine the exact mechanism of HMGB1 function in ovarian cancer. If this can be determined, then strategies designed to disrupt HMGB1 production may one day produce new therapies."

University of Northampton student scoops regional logo design prize.

A University of Northampton PhD student's creative flare has won him a cash prize in a logo design competition.

Julius Azasoo, from the Faculty of Arts, Science and Technology, won £450 for a design that was praised by judges for being "professional" and "innovative". Julius accepted the challenge to create a new logo for the East Midlands Doctoral Network (EMDoc), a group of universities across the region that share best practice, resources and insights into postgraduate research.



Continuous growth in research student recruitment.

Recruitment of postgraduate research degree students at the University of Northampton continues to grow steadily. Growth over the last year was around 11%, to more than 300 students. By far our largest group of students is those studying for a PhD for which they will submit a final thesis – the ‘traditional’ route – but we are diversifying the range of research degrees the University offers.

In the latest year for which we have data for all our research degree students (2015-16), part-time students just outnumbered the full-timers and female students outnumbered males. Just over half of our students were from the UK but an increasing trend over the past five years has been for the University to attract students from outside the UK. Those from outside the UK originated from 35 different countries with particularly strong representation from Nigeria, Algeria, Iraq and India. The increasing diversity of our student body is reflected in the impressive range of topics that they are studying, issues they are investigating, communities being researched and places they are collecting data in.

The biggest area of growth for us at the moment is in professional doctorates in health and business. Students on our professional doctorates are mid-career professionals who are keen to bring a research focus to their workplace. They look to develop the skills to



Photo: October 2017 PGR Induction

draw on research findings – either their own or results reported by others – to inform their practice at work. Professional doctorates involve some structured learning in a modular framework which accounts for about half their programme followed by a more traditional doctoral thesis.

Professional doctorates have been available at the University for over five years, but a recent initiative has been to deliver our DBA (Doctor of Business Administration) programme overseas working with partners in Myanmar, Abu Dhabi, Bahrain and Singapore, thereby extending the University's reach and impact internationally.

The Graduate School continues to provide high quality programmes to support the development of all our students and their supervisors. With small but increasing numbers of our students and supervisors based outside the UK it is important that we are aware of their development

needs. We are making materials available online including videos of many of our training workshops and events. In 2016, for the first time, we streamed our annual postgraduate conference live on the Internet and had viewers both in the UK and abroad.

The past five years has seen sustained growth of numbers of doctoral students at the University which underlines the importance of research to the University. But that growth has also created a far more diverse student community. And their range of research topics continues to provide fundamental support for the University's mission to transform lives and inspire change.

Focus on our research students.



Dominic Alexander Langdon

What is your research about?

My research is focussed on the potential benefits that blood flow restriction training may have on older adults. The main aim of my research is to see whether using blood flow restriction training (using specially made blood pressure cuffs applied to the thighs) combined with resistance training can improve balance and functional ability in older adults.

What does your research hope to achieve?

Due to a multitude of factors, falls are a common hazard in old age - with age-related loss of lower limb muscle mass and strength one of the main reasons. This area of research will hopefully identify a possible intervention that could be used on older adults to help improve their ability to balance and reduce the possibility of them falling.

What have been your achievements so far?

I have presented at the 3rd and 4th Moulton College Postgraduate Symposia. I have managed to pass the ethics and proposal stages of my PhD and I am currently collecting data for my first two pilot studies in order to apply for transfer.

What advice do you have for people who are considering undertaking a research degree?

Think long and hard about the commitment you are going to be making before putting yourself forward to complete a PhD. As a part time PhD student and lecturer, it has been difficult at times to balance research with marking or delivering lectures! On the flip side, embrace the opportunity that has been given to you. This is a unique experience that will mentally and physically challenge you along the way, and where the rewards will be fruitful at the end. Make sure you are prepared and well organised throughout and persevere during tough times.

Why did you decide to do a research degree at the University of Northampton?

Previous exposure to colleagues' research publications and being involved as a participant in research projects spurred my decision. I tailored my research idea around the expertise of the Sport and Exercise staff already at the University of Northampton.

What are your future plans?

Currently, I am working at Staffordshire University as a lecturer in sports therapy and rehabilitation. I deliver lectures and seminars to Sports Therapy and the Strength and Conditioning degree courses at Staffordshire University. I plan to use the knowledge and experience gained from my PhD within the modules I deliver. I also intend to apply blood flow restriction training within a clinical setting and embed this mode of training into older adults rehabilitation or strength programmes.





Alyaa Al-Barrak

What is your research about?

Wireless communication uses radio signals but due to their nature, errors can occur as the information travels, disrupted by factors such as noise, reflection, diffraction, shadowing and fading. My research focuses on the most widely used techniques to correct these errors. Also, this study looks at the existing phenomenon that affects wireless communication in a negative way and investigates whether it can instead be utilised in a positive manner.

What does your research hope to achieve?

With the 'Internet of Things', wireless communications are ubiquitous and play an essential role in our everyday lives. My research aims to increase the overall performance of wireless communication systems, whilst saving expensive channel resources from retransmission. I aim to achieve this by utilising a phenomenon known as multipath propagation. The outcomes of my research should have an impact on future technology and smart applications such as 5G technology.

What have been your achievements so far?

I presented my research paper "Utilisation of multipath phenomenon to improve the performance of BCH and RS codes" at the eighth Computer Science and Electronic Engineering Conference that was held at the University of Essex. Based on the originality and the high-quality of my research, this paper was awarded 1st place out of 93 other

international papers, which has led to inclusion in the Institute of Electrical and Electronics Engineers' Xplore Digital Library - and an offer to publish an extended paper in a journal. I consider this a great achievement which has encouraged me in my research. Also, I have been working as a part-time classroom assistant at the University of Northampton.

What advice do you have for people who are considering undertaking a research degree?

Sometimes the PhD journey can be exhausting and frustrating, but at the same time is a major accomplishment in life and very rewarding. Blocks and friction are a simple part of the research process. Take a break and bring vitality to yourself, get some fresh air. Put in extra effort to push things through when major deadlines conflict. Participate in conferences to learn from the rest of the world and make friends within the research community.

Why did you decide to do a research degree at the University of Northampton?

Since 2005 I have worked at the University of Baghdad as a lecturer. I managed to gain a scholarship from the Higher Committee for Education Development in Iraq (HCED) and explored various universities and their staff. I found Ali Al-Sherbaz's and Robin Crockett's (supervisor's) profiles interesting and found they connected to my study area. Eight months after starting the PhD, Triantafyllos Kanakis joined our team. He has excellent experience with wireless communication on both the practical and theoretical sides. Also, the partnerships between the University and other Iraqi universities gave me a good idea of the University's achievements and ambitions.

What are your future plans?

I have learned a lot from my supervisory team and the University. I would like to transfer the academic and administrative experiences that I've gained to my students in Iraq. It would be great if I can organise a workshop programme like our Graduate School's

to support the people undertaking research degrees in Iraqi universities. Beyond this, I would be interested in joining a research team to develop my skills and supervise research degree students. Then I will apply for a post-doc.





Claire Paterson-Young

What is your research about?

My research involves collaborating with a large national organisation in the youth justice sector to assess the impact of the organisation's youth offending interventions. It will explore the reoffending of children and young people and their transitions to adulthood.

What does your research hope to achieve?

My research project aims to develop a social impact measurement framework that can be used to evaluate (and refine) the delivery of youth interventions nationally. Overall, my research project seeks to explore children and young people's transitions in relation to positive behaviour, education, work, relationships and adulthood. By combining theory and practice, my research project aims to help improve the 'frontline' provision of youth offending interventions at the local, national and international level by promoting evidence-based interventions.

What have been your achievements so far?

I have written regular progress reports with recommendations for improving best practice and service delivery. These reports have influenced a change in the organisation's operations, with the most recent report instrumental in helping re-design the organisation's violence reduction strategies. By influencing how a global company operates, my research is starting to have an impact

on the effective delivery of services for children and young people which will lead to improved outcomes. I've also been awarded the Chancellor's Fund to promote the importance of effective support for children and young people involved in criminal activity at the European Conference on Educational Research in Copenhagen. This will allow me to highlight the vulnerabilities for children and young people in custody, with an emphasis on developing effective and sustainable support services to reduce recidivism and improve outcomes.

What advice do you have for people who are considering undertaking a research degree?

For me, leaving full-time employment and embarking on a research degree was a tough decision and balancing the pros and cons helped. Selecting a research topic that motivates and interests you is crucial: after all, you will be spending at least three years researching that area. Find the right balance between conducting your research and your personal life is crucial.

Why did you decide to do a research degree at the University of Northampton?

Before starting my research degree, I spent ten years working in the criminal

justice field working to support children and young people in the areas of restorative justice and child sexual exploitation. During this period, I had the opportunity to develop recording and measurement frameworks for local authorities and charities. This work sparked my interest in social impact measurement and the Institute for Social Innovation and Impact (ISII), with their expertise in this area, were the obvious choice to support me with my studies. On reading the profiles of the supervisory team, I knew that applying to the University of Northampton was the right decision.

What are your future plans?

Ideally, I would like to become an internationally leading academic in the youth justice and restorative justice fields, with an emphasis on increasing the use of evidence-based approaches. I think that the increased use of evidence-based approaches in this field could lead to significantly improved outcomes for children and young people, not just in the United Kingdom but globally. Working with learners in this field, conducting further research in this area and publishing academic articles are where I see myself making a contribution in the future.





Exploring the social impact of UK cadet forces.

Photo: Cadets in conversation

What are the benefits provided by cadet forces to young people and adult volunteers and to the UK? This is the focus of a project led by Dr Meanu Bajwa-Patel, Senior Researcher, in the University's Institute for Social Innovation and Impact (ISII) which was launched by the Defence Secretary in Greater Manchester.

A University of Northampton report demonstrating the significant social impact of the UK's cadet forces was launched in October 2017. The newly unveiled research looked at the entire cadet programme and found that joining the cadets offers a range of benefits to the individuals involved and the wider community. According to the report's lead author, these include increasing social mobility and helping kids from disadvantaged backgrounds. Meanu said: "The evidence so far has been overwhelmingly positive and demonstrates that the Cadet Forces can make a huge difference to social inclusion, social mobility and the mental wellbeing of young people."

The first interim report launched at the Albion Academy in Salford – itself a school which has a Combined Cadet Force – was based on a

range of primary and secondary data, collected across the UK in the previous 12 months, used to measure the economic and social benefits delivered by the Cadet Forces. Its key findings so far include:

- The social impact of Cadet Forces is vastly greater than the annual cost of the cadet programme to the defence budget.
- Cadet Forces help children receiving Free School Meals achieve their potential.
- Children excluded from school who join the Cadets are more likely to have improved attendance and behaviour on their return to school.
- Cadet Forces help make communities more inclusive by helping people to overcome disadvantages in the way school does not.
- Serving soldiers who used to be in the Cadets are four times more likely to be a senior non-commissioned officer or an officer.

The report also found that Cadet Forces help to develop an individual's communication, confidence and leadership skills, as well as increasing their awareness of the Armed Forces and improves respect for veterans.

Speaking during the launch, the Defence Secretary also announced the approval of 31 new cadet units in state schools across the country under the Cadet Expansion Programme, he said:

"Joining the cadets is a great way for young people from all backgrounds to develop leadership, confidence and communication skills".

"I'm delighted that this new report shows the social value the cadet programme brings to the country, in particular helping kids from disadvantaged backgrounds achieve their potential."

The new cadet units, established under the MOD and Department for Education's Cadet Expansion Programme is backed by £50 million funding from LIBOR fines, which pays for set up costs, the cadets' uniforms, equipment and training.

The new units also include the first school cadet unit to be approved under the programme in Wales.

More research on the Cadet Expansion Programme and Cadet Forces across the devolved nations is planned, allowing the research team to evaluate the social impact further. Meanu commented: "Participation in cadets is clearly life changing for many young people and adult volunteers. The Cadet Forces deliver impact that is directly relevant to the Prime Minister's vision of a 'shared society', and clearly contribute to increasing social mobility and decreasing social disadvantage."

Further details of the research are available at:

<https://tinyurl.com/UoNcadets>



Photo: Students on parade



Photo: Field craft – firearms



Biography: Dr Meanu Bajwa-Patel

Dr Meanu Bajwa-Patel is a Senior Researcher at the Institute for Social Innovation and Impact (ISII). As well as her research on social impact and educational disadvantage, Meanu has interests in special educational needs and educational interventions. She has considerable teaching experience and has presented at academic conferences across the world.



Photo: All at sea with the cadets



Photo: Wearable sensor

'Fitbit' for sheep: wearable tech monitors for lameness in the flock.

Shepherds may well have once watched their flocks by night, but thanks to new University-led research, wearable tech could soon be keeping a virtual eye out for problems 24/7.



Photo: Lameness in sheep



Photo: Dr Wanda McCormick with The One Show team

Lameness in livestock is both a welfare and commercial concern. The main cause of sheep lameness in the UK, the infectious disease foot-rot, costs the farming industry up to £80 million a year through the resulting deaths or infertility of ewes, or the poor growth and survival of lambs.

Sheep that have been infected are usually treated as soon as they are found - but with hundreds of sheep spread out across their fields, it can be difficult for farmers to catch it early. When the underlying cause of lameness is also contagious, the need to act quickly is vital.

Hoping to address this problem, University computing experts, Dr Ali Al-Sherbaz and Dr Scott Turner teamed up with animal welfare expert, Dr Wanda McCormick at nearby Moulton College to develop a lameness 'early warning system'.

Dr Al-Sherbaz said: "Infected sheep have a characteristic limp, and we decided that the best way to detect it remotely was to develop a wearable sensor."

And whilst the team's choice for a prototype- a mobile phone worn around the neck of the sheep - might surprise many, Dr Al-Sherbaz says it was an obvious choice.

"All smart phones contain gyroscopes, accelerometers and GPS sensors. So as well as being readily available and easy to collect data with, they provided us with everything we needed to measure sheep movements."

To be exact, the phones recorded movement along nine different axes at a rate of ten readings a second, and the PhD student attached to the project, Zainab Al-Rubaye, has spent much of the last two years monitoring sheep during hundreds of five-minute test periods.

Which is all well and good - but how does that translate into something that can alert farmers to a distressed animal?

"The first thing we needed was lots of baseline data, from sheep we knew to be healthy and sheep we knew to be infected," explained Dr Turner. "Then we carefully analysed these numbers to find where there was divergence between the two."

Using this approach (which involved data mining and machine learning) the team created an algorithm that could do just that - or to put it more simply: they taught a computer to distinguish between healthy and lame sheep using just their sensor data.

"Now we know we can tell the difference, the next step is to build the software into a bespoke sensor that will automatically alert the farm when a sheep starts to limp," added Dr Al-Sherbaz.

Its potential as a commercial product is already starting to attract attention - leading to a prime-time appearance in November 2017 on BBC's The One Show - but there is still work to be done.

The main hurdle to this will be reducing the power consumption of the sensor, which in turn reduces both its size and cost. And, says Dr Turner, the team are already part way there, having now honed in on the few useful measures of movement, allowing them to completely ignore the others.

"What we would really like now is to find a commercial partner who can help us miniaturise the sensor and produce them on a scale that is economically viable for sheep farmers."



Biography:

Scott Turner

Scott Turner is Associate Professor of Computing and Immersive Technologies at the University of Northampton with an interest in Applied Computing, especially around Artificial Intelligence, Robotics and Data Analysis. He is also the Chair of the University's STEAM Steering group, with an interest in engaging the public with Computing and Engineering.



Biography:

Ali Al-Sherbaz

Ali Al-Sherbaz is Associate Professor of Mobile and Wireless Technologies at the University of Northampton with an interest in Connected Vehicles, Sensors, Machine to Machine Communications. He has twenty years theoretical and practical experience in researching and teaching at various universities both in the Middle East and in the UK, with good experience in both academic and industrial projects.

Providing an inclusive environment for all learners.

In recent years Sierra Leone has been devastated, firstly by a war that killed more than 50,000 people and, more recently, by the outbreak of Ebola, the aftermath of which continues to have a negative impact upon social and economic conditions across the country.

Determined to take all possible actions to support economic recovery and improve the lives of families, many of whom live in impoverished conditions, the government of Sierra Leone have embarked upon a pathway of educational reform which they see as being essential for the recovery of the nation. Researchers from the University of Northampton recently gained a contract, funded by the NGO Sightsavers, to conduct an investigation into those current conditions in Sierra Leone's schools, which are either supporting or inhibiting the provision of education for all children, including those with disabilities.

Professor Richard Rose, Professor Philip Garner and Dr Brenna Farrow designed research instruments to enable collection of data. During a visit to Sierra Leone, Richard trained field workers in Freetown and made visits to schools, parent groups and other organisations in several districts, conducting interviews and organising focus groups. An intensive week travelling between towns and villages, often along roads that were little

more than mud tracks, helped provide insight into the lives of children and families and added to the more formal data collected through the research.

Richard commented: "The opportunity to work on research that has the potential to assist those who are seeking to improve the lives of children and parents in one of Africa's most disadvantaged countries is a tremendous privilege. The University of Northampton, with a commitment to promoting social change, must remain at the forefront of initiatives such as this if it is to live up to its mission".

Following completion of this project the Ministry of Education, Science and Technology in Freetown were in the process of formulating a plan to address the issues. In November 2017 an Inclusive Education Policy was validated, highlighting ways of reducing exclusion and responding to the diversity of needs of all learners. The research team will be monitoring the progress made over the coming years.

Photos: **Below** - Richard (right) interviewing a local Imam with the support of an interpreter. **Right** - Focus group with a group of disabled workers.





Biography:

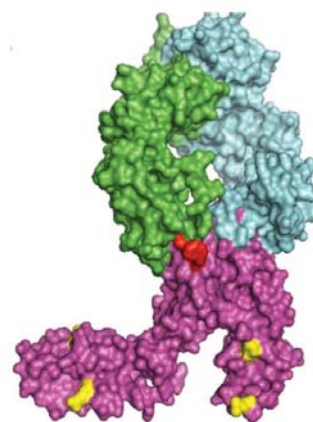
Professor Richard Rose

Richard Rose is Professor of Inclusive Education at the University of Northampton with a particular interest in the promotion of education for social justice and as a means of challenging poverty and exclusion. His research and teaching interests in this area have taken him to many parts of the world and in particular India where he has been working regularly for the last seventeen years.



A circular portrait of Dr. Nishant Kumar, a man with short dark hair and glasses, wearing a dark suit jacket over a light-colored shirt. He is smiling slightly. The background of the portrait is a plain, light color. The portrait is set against a larger background that is a mix of purple and blue with some abstract, glowing patterns.

Dr Lee Machado is Associate Professor in Biochemistry. His research is focused on employing cellular and molecular genetic strategies to address how the host immune system responds to pathogens and cancer. The aim of this work is to increase our understanding of human health and disease and develop rational therapeutic approaches to harness the exquisite specificity and sensitivity of the immune system.



A sustainable approach to wastes management.

With resource consumption increasing globally, there is a need to understand the key challenges in wastes management and to identify strategies for addressing the challenge. This is particularly the case in developing countries such as India, due to rapid urbanisation, lifestyle changes and population growth.

Using households in the south-eastern Indian city of Chennai as the case study, a research project led by Dr Terry Tudor, Associate Professor in Waste Management, sought to examine what were the main resources, if any, that households conserved and also to understand why they practiced these conservation behaviours. The study was able to categorise the environmental behaviours in the city into five main lifestyle groups, ranging from those that conserved the most to those that did not conserve anything. The five main lifestyle groups identified were:

- dedicated environmentalists
- committed environmentalists
- main-stream environmentalists
- occasional environmentalists
- non-environmentalists

Not surprisingly, given the socio-economic pressures faced in Chennai, electricity and water were the main conservation resources identified. Various issues (including the levels of awareness of the households regarding conservation of resources, the amount of time they had to

dedicate to environmental concerns, and the extent to which they viewed the natural environment as being of value), were found to be the main factors that differed in the behaviours of households between the five groups.

Based on these findings, various recommendations for improving practices were suggested. These included:

- the need for awareness raising (but targeted particularly to those households in the 'middle' that could be encouraged to do more);
- encouraging conservation practices by linking rising resource consumption to likely future impacts on health and wellbeing (such as increased pollution and scarcity of resources);
- increasing partnership building between stakeholders at all levels (for example between the local government and the community) to encourage conservation to become successfully embedded in the practices of the households.

Terry commented: "India is truly a fascinating country and I have been fortunate to visit it on a number of occasions. During this time, it has been interesting to see the development and the changes in lifestyles. This project therefore provided a great opportunity not only to study these changes and developments, but also to undertake research with colleagues at the University of Madras".

The project was undertaken with other staff from the University of Northampton including Dr Nigel Freestone, Dr Sindy Banga and Dr Chris Holt, and from the University of Madras in India, including Professor Madha Suresh and Dr G Bhaskaran.

Photo: Littering in Chennai, India



Biography: Dr Terry Tudor

Dr Terry Tudor is Associate Professor in Waste Management in the Faculty of Arts, Science and Technology at the University of Northampton. Terry is also a visiting professor at the University of Brescia in Italy. He is the programme leader for MSc International Environmental Management. His main research interests relate to sustainable consumption and production, building resilience and behaviour change.

Dynamic interactions in high-rise elevators.

High-performance vertical transportation systems of sufficient capacity are vital for sustainable urban development. High-speed high-capacity electric elevators are used in tall office and residential buildings and are a necessity for the elderly and those with mobility issues. The use of lifts for evacuation from high-rise buildings and structures during natural and man-made emergencies has become an important issue, as vibration can compromise the safety of the systems.

The lift engineering research and postgraduate programme at the University of Northampton is led by Stefan Kaczmarczyk, Professor of Applied Mechanics. The main focus of Stefan's research is mathematical modelling and computer simulation to predict how resonance conditions (vibrations), induced by various forces, influence the dynamic behaviour, structural integrity and performance of lift systems in the modern built environment. This research has produced significant impacts. The theory and models developed within the research programme have provided the lift industry with robust design guidelines that have been used to solve technical problems in a number of prestigious building projects worldwide.

Stefan explains: "High-rise buildings subjected to adverse environmental conditions can sway at low frequencies and large amplitudes. Cables and ropes, like those deployed in vertical transportation systems display a range of complex dynamic phenomena that can cause the lift

car to vibrate. Using mathematical models, implemented in high-performance computer software, resonance conditions are predicted so that relevant strategies can be designed to mitigate their effects. Three international patents have been awarded for this work so far."

Much of Stefan's work has been funded by ThyssenKrupp Elevator (TKE) AG, a leading international passenger vertical transportation company. The University's Faculty of Arts, Science and Technology and TKE have established a long-term strategic partnership for cooperation in research and innovation. The results arising from this partnership play an important role in bridging the gap between innovation, research and lift engineering. The project has been running for over four years and has led to increasing research and innovations on both sides.

The research programme has also resulted in the development of two international conference series. Firstly, the annual Symposium on Lift and Escalator Technologies, organized jointly with the Chartered Institution of Building Services Engineers (CIBSE) Lifts Group and the Lift and Escalator Industry Association (LEIA). The second international conference is the biannual Symposium on Mechanics of Slender Structures, organised under the auspices of the Applied Mechanics Group of the Institute of Physics. A new open-access peer-reviewed University journal, *Transportation Systems in Buildings*, edited jointly with CIBSE Lifts Group and LEIA, has been created to provide a forum for disseminating research covering the latest cutting-edge transportation technologies in buildings and associated areas.

Symposium on Lift and Escalator Technologies

www.liftsymposium.org

Symposium on Mechanics of Slender Structures

www.eng.nene.ac.uk/~moss2015/

TSIB Journal

<http://journals.northampton.ac.uk/index.php/tsib/index>

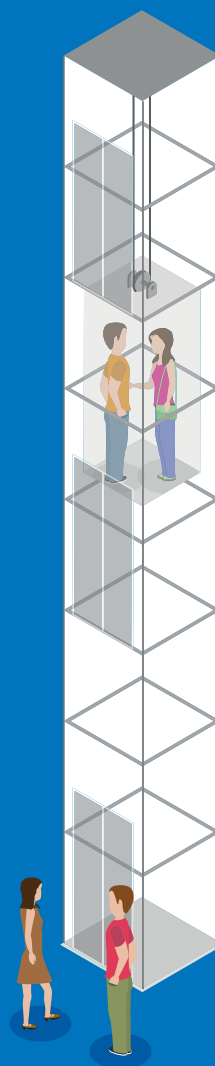




Photo: Symposium 2016 delegates



Biography:

Professor Stefan Kaczmarczyk

Stefan Kaczmarczyk MEng PhD CEng FIMechE is Professor of Applied Mechanics at the University of Northampton and coordinator of the Advanced Technologies Research Group. Stefan's expertise is in the area of engineering dynamics and vibration with particular applications in the mechanics of slender structures, the dynamics of vertical transportation and material handling systems. He has over 30 years' experience in this area and has been involved in collaborative research with a number of national and international partners and has an extensive national and international track record in industrial consulting. He has been awarded a number of international patents for his work and published over 100 papers/ articles in peer-reviewed international journals/ book chapters/ peer-reviewed proceedings associated with major international conferences.

Parent education for families living with autism.

The presence of autism in families can cause significant stress, impacting on social, educational and employment opportunities, as well as outcomes for all concerned. Appropriate parent education has been identified as a major support to families. Dr David Preece, Associate Professor at UoN leads an Erasmus+¹ project to study just this.

The University, along with eight other partners across Europe, is working on this project to develop, implement and evaluate parent education for families living with autism in three south-east European countries where such support is either severely limited or unavailable: Croatia, Cyprus and the Former Yugoslav Republic of Macedonia.

Equity and Social Inclusion Through Positive Parenting (ESIPP) is a three-year project funded through the Erasmus+ programme and running from September 2015 to August 2018.

This project is focused on:

- developing a core curriculum and teaching materials which are locally and culturally appropriate
- using these materials to provide parent education
- developing the skills of local trainers in the three SE European countries so that the education model is sustainable beyond the project lifespan
- evaluating the impact of the project using quantitative and qualitative means

Research data is being collected to evaluate all aspects of the project and initial analysis suggests that the project is proving beneficial. Families report that their understanding of autism - and their children with autism - has increased and that they are able to transfer their learning into practice. Parents have been able help their children develop their communication skills and deal with social situations.

A parent education curriculum, entitled 'Positive Approaches to Autism', has been developed as well as training materials. This programme focuses on the core areas of difficulty in autism and provides parents with empirically-supported strategies to help them understand how their child

with autism perceives the world, to support their child's communication and social interaction, to address their child's sensory sensitivities and need for routine and sameness, and to manage their child's behaviour.

Two cohorts of parents (approximately 120 individuals in total) have been trained in each of the three countries; a further three cohorts (about 180 individuals) will be trained during the project lifespan. David said: "I am really pleased to be coordinating this project, involving academic, practitioner and parent partners from across Europe, including a local Northamptonshire autism charity, and autism educators based in the county. It's great to be involved in something that has such practical applicability, and which is already making a difference in the lives of children on the autism spectrum and those who live with them."

Work is now focusing on ensuring sustainability of the project after European funding ceases. Policy guidelines and recommendations for local, national and international decision-makers will also be developed before the end of the project.



Disclaimer: The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

¹ www.erasmusplus.org.uk



Photo: Individual consultation with a family in the Former Yugoslav Republic of Macedonia



Biography: Dr David Preece

Dr David Preece worked within local authority and health services for people with disabilities for over 30 years. He developed and managed Northamptonshire County Council's services for children on the autism spectrum, which included specialist educational and social care support. He began working at the University of Northampton in 2012, first within the Special Education Needs and Inclusion Division in the Faculty of Education and Humanities, and more recently in the Centre for Research and Education.

Photo: Parent training in Skopje Former Yugoslav Republic of Macedonia



New Spaces: safeguarding students from violence and hate.



In October 2016 Universities UK published their Taskforce Report called 'Changing the Culture' which examined the issues of violence against women, hate crime and harassment against students. HEFCE (the Higher Education Funding Council for England) released £2.45 million to fund projects to address some of the issues. Dr Melanie Crofts, Senior Lecturer in Law, is leading a research project which was awarded £42,180 from this fund.

The project, New Spaces: safeguarding students from violence and hate, is a cross-Faculty (of Business and Law, and Health and Society) collaborative project which has been created in partnership with Northamptonshire Rights and Equality Council and Rape Crisis, the University's Institute for Public Safety, Crime and Justice (IPSCJ), students and former students and experts in the University's Psychology department.

Melanie said: "This was an opportunity not to be missed and I was thrilled when the bid we had put together was one of only 60 across the country which was accepted".

The project aims to develop existing and new institutional policies and strategies to support students in

reporting harassment, sexual abuse, sexual violence and hate crime. It will look at the good practice that already exists and how existing practice can be enhanced. It will use these insights to produce a robust policy and training for staff for when disclosures take place and to develop a package of support for staff to enable appropriate and effective responses to disclosures.

The project will also ensure that the frameworks and training packages developed are suitable for delivery at the University of Northampton's new urban campus, in particular taking into account a new campus environment and changes to the accessibility of staff.

The project will be informed by, and created with, students who wish to participate and act together with staff members. Students' perspectives and experiences will constitute valuable contributions throughout the duration of this project and it is intended that the support package will be embedded in the policy frameworks of the institution for both staff and students. This will be accompanied by ongoing training for existing staff and appropriate induction for new staff. Information relating to the support package would also be contained in both staff and student handbooks and it is intended that activities and information connected to the support package would be embedded in activities in student induction in Welcome Week.



Biography:

Dr Melanie Crofts

Melanie is a Senior Lecturer in Law at the University of Northampton, lecturing since 2001. Currently Programme Leader for the 3 year LLB and Joint Honours Law, she was awarded her doctorate in 2014 which focussed on the implementation of the Public Sector Equality Duties within higher education, with a particular emphasis on race and disability. Melanie has taken an active role in furthering the equality agenda in HE and influencing strategy locally and nationally. She is a member of the Inclusive Student Experience Group, Director and Chair of the Northamptonshire Rights and Equality Council and a member of the Northamptonshire Football Association Inclusion Group. She has been invited to be a member of the ECU Athena SWAN working group influencing national equality policy.

Sustainability in the leather industry.

Sustainability is an important issue in our consumerist society. It is also an important part of the leather making process and a key driver of research. The environment, limited resources, tighter legislation, customer awareness, social, cultural and economic issues are all driving the leather industry to consider various aspects of sustainability.

Dr Anne Lama, Senior Lecturer, is currently working as an industry expert on a United Nations Industrial Development Organisation (UNIDO) funded research project in Kanpur, India, which aims to improve environmental sustainability and efficiency by following best practices for cleaner leather processing.

Anne explained: "For a sustainable business strategy, it is important to measure the social and financial impact along with the environmental aspect. Therefore, it is becoming critical to adopt the concept of 'triple bottom line' and consider all three aspects - social, environmental and economic sustainability - to ensure a sustainable leather industry".

As a result of the project, five eLearning modules have been created by the University of Northampton to educate tannery personnel on: the concept of sustainability; the

importance of certification; and understanding the 'waste hierarchy' model - which recommends prevention first before waste treatment and disposal to minimise waste production and increase revenue. The modules cover restricted substances, the impact of chemicals used on the environment and workers, and highlight the importance of ensuring high quality raw materials in order to add value to leather production, avoiding financial loss due to defects.

Sustainability should not be viewed as only concentrating on the environmental impact of waste and resources, but also consider culture and heritage. A collaborative doctoral study is currently being undertaken by Lucy Skinner in conjunction with The British Museum and funded by the Art and Humanities Research Council, focusing on the characterisation of ancient leather processing. Lucy is a PhD student in the Institute for Creative Leather Technologies, supervised by Anne and Dr Rebecca Stacey from the British Museum with Professor Matthew McCormack as the Director of Studies. Findings from these investigations into historical processes, trade and social context may lead to new solutions to enhance the sustainability aspect of the modern leather industry.



Biography:

Dr Anne Lama

Dr Anne Lama is a Senior Lecturer in the Institute for Creative Leather Technologies (ICLT) at the University of Northampton. Following her undergraduate degree in Leather Technology at the University of Dhaka, she worked as a tannery technician in a leather-finishing department. Having obtained her MSc and PhD degrees from the University of Northampton, she then worked at the Leather Conservation Centre researching on historic leather followed by a stint at BLC Leather Technology Centre as a leather technologist. She has been working in ICLT since 2014, teaching Leather Technology and Sustainability. Her primary research interests include sustainability and historic/archaeological leather.



Photo: working at the ICLT tannery.

**“consider all three aspects
- social, environmental and
economic sustainability
- to ensure a sustainable
leather industry”**

Radon in new homes.

The Radon and Natural Radioactivity Research Group at the University has an international reputation for its continuing work on the health risks of radon, a naturally occurring radioactive gas which can build up inside homes. Radon gas, particularly when combined with smoking, can cause lung cancer and levels in homes in Northamptonshire can be over safe limits.

New homes in Northamptonshire are now built with radon protection, but nobody has yet conducted research to see if this protection is fit for purpose. Robin Crockett, Reader in Data Analysis, and Tony Denman, Professor Emeritus of Medical Physics, are working on an externally-

funded project and have recruited householders in several new estates across Northamptonshire to place free radon detectors in their homes for three months to assess radon levels to test this.

If radon levels in any new house are raised, it is a simple matter to fit an air-pump to a sump as is required by building regulations. But, currently, householders are not well informed about this and do not carry out a radon measurement themselves. The aim of the research is to assess whether current radon protection in new homes is fit for purpose, or whether testing radon levels in new homes should be compulsory during the first year of occupation.

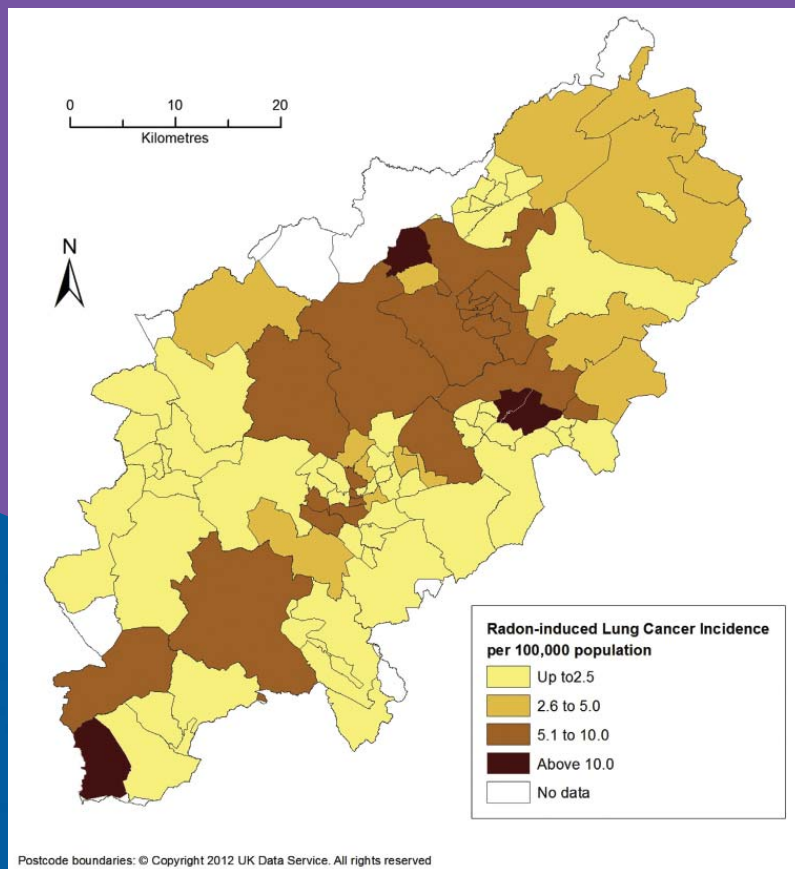
Tony explained: "The Radon and Natural Radioactivity Research Group has looked at a number of different aspects of radon gas: we know it is cost effective to find and protect homes in Radon Affected Areas, such

as Northamptonshire, but what is the relative risk to smokers? And who takes action to measure radon and reduce the level if it is high?

The answer to the last question is only a minority of the population, despite publicity over many years. In the case of new homes, builders do not publicise that Northamptonshire is a Radon Affected Area and, when asked, will say that the homes are built to the required standard and not to worry. This may be true, but no one before has conducted any research in the field to establish it and householders in new homes may be at risk if they do not conduct a radon measurement to check levels.

This research is therefore a valuable project to assess whether the public are at risk and whether public health policy should require testing of new homes."





Calculated annual average radon-induced lung cancer incidence in smokers and non-smokers in Northamptonshire by postcode sector.



Biography:

Dr Robin Crockett

Robin is Reader in Data Analysis in the Faculty of Arts, Science and Technology at the University. He has worked on research projects, including health impacts and geophysics of radon, for about 15 years in conjunction with Profs. Paul Phillips and Tony Denman, and currently leads the radon research at the University. He is a Chartered Member of both the Institute of Mathematics and its Applications and the Institute of Physics and has over 120 publications and is currently writing a book on Fourier Theory for Cambridge University Press.



Biography:

Professor Tony Denman

Tony is Professor Emeritus of Medical Physics at the University. Tony spent 37 years working in the NHS at Northampton General Hospital as Head of Medical Physics before retiring from the NHS in 2007. He has worked on research projects, primarily on the health risks of radon, for around 20 years in conjunction with Prof Paul Phillips and Dr Robin Crockett, and has over 150 peer-reviewed publications, and currently serves on the Science Research Degrees Board. Tony is a Fellow of the Institute of Physics and Engineering in Medicine and a Fellow of the Institute of Physics.

Why cyber risk is about organisational culture and not an 'IT services' issue.

There is a wealth of information citing IT users as a major source of cyber breach in organisations. The UK Government is urging businesses to develop stronger strategies and processes to help combat cyber threat which reportedly costs business £34.1bn per annum in the UK, with an average £10,516 per incident².

ICURe Cyber is a government funded programme to seek commercialisation of University research. The University of Northampton was awarded £35,000 by ICURe Cyber to explore the role of management and organisational culture in risk prevention and mitigation of cyber breach. The University is one of 12 participating Universities. This project is led by Dr Mils Hills, Associate Professor, and Louise Atkinson, Lecturer in Business.

Previous research carried out by Mils on the risk and resilience of cyber threat provides a digestible analogy of the 'immune system' of the body to represent the 'corporate body'. Each component of the biological immune system has a comparable element

within an organisation which can be developed to build 'immunity' against cyber threat.

Louise commented: "I met with industry experts and Senior Managers identifying that a holistic approach to cyber threat is essential. However there is confusion as to how to develop often complex solutions to enable this. The use of the immunity analogy as a tool to guide organisations has received a positive response in the research conducted. It is being developed into material designed to support business strategies building organisational 'immunity' based on data and advice collected during the project."

Louise continued: "Internally, there are plans to develop the learning and teaching in cyber risk within the Strategy course modules as it is increasingly identified as a boardroom issue."

Project outcomes have culminated in the address of senior audiences including board level lawyers at GSMA – the largest commercial mobile network conference globally – and reaching out to readerships of publications including the Huffington Post and various regional and national newspapers.

Outcomes that are set to show significant impact include:

- Shaping the new British Standard (BS31111) on Cyber-security and Resilience and international standards (such as ISO/IEC 27001:2013 - Competence requirements for information security management systems professionals) - Impact measurement through evidence of input and adoption from organisations of the standard
- Collaboration with a BBC radio investigation into NHS and Local Authority cyber-security preparedness – Impact measurement through identification of the investigation results used to develop strategy and policy for the aforementioned organisations.
- Advice and thought leadership to a specialized branch of NATO – Impact measurement through an auditable trail showing advice and liaison resulting in NATO actions
- Support to a funded Home Office (Office of Security and Counter Terrorism) project at the University of Northampton
- Advice to the evolving Waterside Security Strategy

²Figures sourced from a report commissioned by ISP Beaming



Biography:

Louise Atkinson

Louise is a Lecturer in Business at the University of Northampton. She has previously worked in Business Development for Cisco, followed by Product and Business Management for Systemax Europe Ltd managing relationships primarily with software vendors including Microsoft, Symantec, McAfee. With a strong interest in ethics and social innovation Louise is working on a PhD observing business community relations and the perceived social value associated.



Biography:

Dr Mils Hills

Mils is Associate Professor in Risk, Resilience and Corporate Security at the University. Mils received his PhD (1998) and MA (Hons) (1995) in Social Anthropology from the University of St Andrews. He joined the research agency of the Ministry of Defence in 1998. Within a couple of years, he rose from being a contributing researcher in the area of Information Warfare to leading the national research capability in targeting/defending decision-making and business processes (Information Operations). He was later seconded to the Cabinet Office, helping establish the Civil Contingencies Secretariat, building the resilience and security of UK plc. as well as supporting the development of foreign policy, legislation and operational interventions in civilian, defence, intelligence and other activities.

Horizon scanning.

Come September 2018, the University will be freshly installed in its brand new town centre campus. Alongside the more inclusive, engaging, and digitally enhanced teaching curriculum on offer, Waterside will also provide exciting research collaboration opportunities for staff.

In the spirit of this, and to embrace the philosophy of more agile working, three recent professorial appointees made the climb to the roof terrace of the recently completed Senate Building to take the long view on the University's research.



Professor of Social Innovation, Richard Hazenberg is certain the high profile move will further enhance the University's growing reputation for research.

"In the Institute for Social Innovation and Impact alone we've carried out research for some big names over the last year – the Ministry of Defence, G4S and The National Lottery to name just a few. We are also growing our international profile, especially in South East Asia, so it is clear that people are really starting to appreciate the expertise we have here at Northampton. Moving to a new internationally leading campus will only add to that."

All this builds on the most recent Research Excellence Framework (REF), where 'World-leading' research was identified at the University in Allied Health Professions, Art and Design, English Language and Literature, Education, History, Geography and Environmental Studies.



Particularly excited to see the new sports performance facilities - which comprise a biomechanics laboratory and an exercise physiology laboratory - is Professor of Biomechanics Tony Kay.

Housing the very latest technology, Tony and his colleagues will be able to measure a suite of sport- and health-related characteristics, including adaptations in muscle strength, mass and neuromuscular activity; human motion examining balance, gait and force production; changes in blood chemistry; and ventilatory and respiratory responses to different exercise regimes.

"The single campus should enable greater collaboration between University researchers and more opportunities for collaboration with local care providers, clinicians and patients as both Northampton General and St Andrew's hospitals are right next door to campus," said Tony.

The town centre location should also increase research collaborations with the local professional sports teams Northampton Town FC, Northampton Saints, and Northamptonshire County Cricket Club. High end research capabilities like those at Waterside are highly sought after by top level athletes as they look for those difference making boosts in performance.



Professor of History, Matthew McCormack's recent work has explored the relationship between footwear, gender and class in the Georgian period. Matthew is a great advocate for the sort of collaborative working Waterside has been designed to engender.

Nothing epitomises this better than the layout of the new Learning Hub. Dominating the view from the roof terrace, the four storey building blurs the divides by combining resources, staff and spaces that would traditionally be separate.

"Working in Northampton, the historic centre of British shoemaking, led me to think about the history of men's boots, and that helped me to develop new working relationships with the local heritage sector," said Matthew.

"Being located in the town centre, close to the National Shoe and Leather Collections, will be an advantage for me and the topic of shoes allows subjects as diverse as History, Leather and Fashion to work together. Hopefully Waterside will facilitate this."



Senate Building

Senate will act as the main reception for the University and will mainly house teaching rooms, as well as flexible accommodation suitable for guest lectures and events. The learning spaces are designed to encourage students and staff from different subject areas to work together.

There will be a Harvard style lecture theatre, work space for research students and will be the base for the Office of the Vice Chancellor, Graduate School and the Research and Enterprise team.

“The single campus should enable greater collaboration between University researchers”

Photo left to right: **Tony Kay,**
Richard Hazenberg and
Matthew McCormack



How research impact drives excellence in all-inclusive transformational travel.



Societal Travel CIC is a Social Enterprise, created to tackle transportation challenges by analysing travel data and applying transformative innovative solutions. Expanding on work carried out by the LIST (Logistics, Infrastructure, Supply and Transport) Institute for the UK government (DfT)-funded Total Transport initiative, Societal's founding partners are the University and Northamptonshire County Council.

Societal aims to further the University's social impact, targeting the social benefits within its work, delivering empowerment through mobility, well-being from clean air / reduced congestion and healthy transport options, and improved access, generating employment opportunities in key local areas.

Societal Operations Director Liam Fassam said, "We will work with users, procurers and transportation

operators to identify and develop new all-inclusive collaborative ways to deliver crucial services in a cost efficient and sustainable manner; all focussed on the communities and businesses that call Northamptonshire home".

Societal has been formed at a critical period for transport systems; not only transport modes - private/public, personal/shared, car, bus, rail, cycle, walking - but the integrity and sustainability of their operation model are under increasing scrutiny. Both financial and environmental accountability inform Societal's research, leading to methodologies that can have local and global impact.

The field of transformational transport systems research and deployment is developing fast, and strategic directions such as MaaS (Mobility as a Service) and a focus on the role of the IoT (Internet of Transport) can be clearly seen. In addition to incorporating these themes, Societal introduces Mobility as a Societal Solution (MaaS) to create a practical impact on people's travel options.



Biography: Liam Fassam

Liam Fassam is Associate Professor of Supply Chain Geography, and Director of the Institute of Logistics, Infrastructure, Supply and Transport [LIST] at the University of Northampton. Liam is also the Operations Director for Societal Travel CIC with responsibility for financial and operational management, and the strategic direction of the company. Liam has over 29 years' experience within the logistics and supply chain arena and has delivered services to clients such as Apple Inc, European Commission (EC), Hilton, HP, Musgrave group, Lloyds pharmacy and Sodexo. Liam is also engaged as an expert adviser to the European Commission's Horizon 2020 project in the areas of Supply Chain and Food Security, advisor to the UK Government Office for Science around the future of transport and mobility, specialist advisor to the All Party Parliamentary Resource Group on sustainable supply chains, is a member of the European Regional Research Innovation Network (ERRIN) for transportation and holds Fellowships with the Chartered Institute of Purchasing and Supply (CIPS) and Royal Geographical Society (RGS).

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Continued overleaf

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Looking forward.



With the exciting move to our brand new town-centre based Waterside Campus less than a year away, the University of Northampton and its staff and students will be embracing change and adapting to a new working environment. With the new campus comes a whole new approach to teaching and learning, flexible working, contemporary spaces, innovative design and research.

Our already cutting-edge, impactful research will continue with pace as we move to Waterside, and our strong commitment to social enterprise and Changemaker principles will be strengthened. Our ability to produce ground-breaking research will be expanded and built upon as our new campus grows, with new investments, collaborations, partners and funding streams.

With a new campus we enter a new era for the University and one in which research and our researchers, staff and students, grow and develop, playing a key role in the future of the University of Northampton.

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Avenue Campus
St George's Avenue, Northampton
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