

Digital Innovation Research Beacon

# Newsletter

Summer 2015

Welcome to the  
Digital Innovation  
Research Beacon  
Newsletter Summer 2015

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# In the *Spotlight*

For the second year in a row, a PhD student from the Department of Computing, Engineering and Technology was selected as a finalist for the **Spotlight on Research** award at the *11th London Hopper Colloquium 2015*. **Leanne Willis** (pictured) attended the event which was held at the British Computer Society offices in London in May earlier this year. The *London Hopper Colloquium* is an annual one day event which celebrates the achievements of women in the field of computer science and technology. Leanne said "I was really proud and excited to be selected as one of the finalists and to be able to represent the University at such a prestigious academic event."

**Dr. Sharon McDonald, Reader in the Department of Computing, Engineering and Technology**, and Leanne's supervisor, says that having a finalist in this competition two years running is a testament to the quality of our students' research; the other finalists were, in the main, from Russell Group universities.

Beginning her studies at the University with an undergraduate degree in Business Computing, Leanne discovered she had a real flare and passion for the subject of user experience design. Her supervisor, Sharon, encouraged her to pursue this further and, having taken this advice on board, Leanne is now in the final stages of her PhD.



Leanne's research is within the field of usability evaluation which is a key part of the software development process. Her area of expertise is the Retrospective Think-aloud protocol and Leanne is the first person in this field to investigate the impact of the elicitation procedures on data validity and downstream utility. The research that Leanne is undertaking has the potential to have a significant impact on the field of usability evaluation methods in both the practitioner and research communities.

On the basis of her written submission about the topic of her PhD thesis, Leanne was selected to give a presentation in front of an audience of over 65 professionals. Speaking about her experience at the event, Leanne said: "It was a great opportunity to present my research in a friendly and supportive environment and to hear from guest speakers who have had a major impact in their field of research." Building on this accolade, having already had a paper published in the prestigious Human Factors and Ergonomics Society conference, Leanne intends to pursue a career in academia. More recently she has submitted a journal article to Behaviour and Information Technology which she hopes will be accepted and published in the near future.

When asked about Leanne, Sharon commented that "she represents a real success story for the department, her academic achievements are excellent and through her Academic Tutor work on the final year, User Experience Design module Leanne has become a real inspiration to our undergraduate students."

Leanne's achievement is a real triumph in light of the University's commitment to the Athena SWAN charter which was established by the Equality Challenge Unit in 2005. The charter's stated aim is: Recognising advancement of gender equality: representation, progression and success for all. Leanne



believes that competitions like the Hopper Colloquium's Spotlight on Research are great tools to promote and encourage women in STEM subjects. Discussing the subject of women in the scientific community Leanne said: "There needs to be more visibility of the research women do within these subjects and to promote these women as role models in order to challenge the preconceptions people have about working in these areas."

# amap test hydrogen-fuelled prototype car

automotive & manufacturing advanced practice

Hydrogen fuelled cars have quickly progressed from drawing board to test track, through a European funded research program supported by a team of top engineers at AMAP.

The University of Sunderland's Institute for Automotive and Manufacturing Advanced Practice (AMAP) has created a prototype car - with an engine adapted to mix hydrogen with traditional fuel to demonstrate the technology in practice as part of an EU project with Gateshead College.

The purpose of AMAP's research is to reduce the damage caused by fossil fuels in automotives, with their harmful impact on health and the environment. Early findings of the hydrogen-fuelled vehicle in action have revealed reductions in environmental impact and improvements in fuel economy.



Research results were shared at the HyTrEc Conference in Aberdeen on 20 and 21 May 2015. HyTrEc – which stands for Hydrogen Transport Economy for the North Sea Region – arranged the conference to mark the project's conclusion.

Over the two days delegates from industry, government, public sector and academia met to network and discuss the next steps for the sector. Delegates included project partners and organisations such as Hyundai UK, the Fuel Cells and Hydrogen Joint Undertaking, UK H2 Mobility and the German National Hydrogen Organisation (NOW GmbH).

AMAP's petrol/hydrogen hybrid was one of several hydrogen vehicles on show, with others including a fuel cell range extended electric van. For the test AMAP adapted a 1.6 litre petrol engine Nissan Qashqai, with 5 speed Manual Transmission, to mix hydrogen with petrol in varying amounts.

The demonstrator vehicle was set up and calibrated before being tested on Gateshead College's Zero Carbon Futures (ZCF) Performance Test Track. This allowed the team to evaluate different hydrogen mixes and select the most suitable ones for emissions testing. During these tests the vehicle was subjected to hill starts and high speed running.

With the road evaluation complete the vehicle was transported to ZCF's Automotive Centre of Excellence and placed on a rolling road for emissions testing using a standard MOT exhaust analyser. The team observed exciting and potentially very beneficial emission improvements when comparing oil samples taken before and after the tests.

AMAP's research estimated that mixing 32% to 50% hydrogen into a petrol fuel will reduce CO<sub>2</sub> 29% by volume, CO 75% by volume and hydrocarbons by 52%.

Additionally, the team's findings suggest that adding Hydrogen to the fuel mix increases fuel range from 42 mpg to 57mpg. This is based on travelling 208 miles from 16.25 litres, giving a range of 823 miles per tank of petrol.

**Dirk Kok, Research Fellow at AMAP and project lead technologist** commented: "We estimated the range of the hydrogen tank in the demonstrator vehicle to be 120 miles with a 50/50 petrol / hydrogen mix, which is more than enough to carry out deliveries around a city during one day.

"Mixing hydrogen into the fuel stream dramatically improves emissions performance and range per tank of fuel. This is important not only for environmental reasons but because this element of the fuel stream is the most heavily taxed.



"Adding more hydrogen into the fuel stream may not improve matters further and indeed the optimum may be around 35% to 40%. More testing will be required to establish this.

**Roger O'Brien, Director of AMAP** at the University of Sunderland added: "The relatively low cost of the conversion suggests that this may prove a viable option for cleaning up petrol tailpipe emissions. We are considering combining this with other technologies in future to provide for methods of switching to lower emission regimes in urban and city centre areas where stop-start driving is even more polluting. There are still infrastructure issues of course, but for fleet operators, who are doing routes from a central hub or depot, the technology we have used could be a deployable solution very quickly and easily.



"Oil and gas are dominant fuels in the energy and transport sectors, benefiting from regular investment in research and development. Funding to research and test alternative solutions, particularly hydrogen is scarcer, despite its potential economic and environmental benefits. There is still a long way to go to bring about such changes to the vehicles we all

drive, and another project we are working on with EU partners called Hyacinth is looking at social acceptability of some of these new technologies. It is an area AMAP is heavily involved in.

"With funding from the HyTrEc project, Dirk and our team at AMAP were able to develop and test a mixed fuel hydrogen demonstrator vehicle, as part of a work package managed via Gateshead College Zero Carbon Futures centre. This is exactly the type of game-changing work that we are capable of at AMAP, researching the next generation technology to advance manufacturing, in the North East region and beyond."

To view the video, visit : [https://youtu.be/kWeASmqq\\_d4](https://youtu.be/kWeASmqq_d4)

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# Off to a flying start

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Earlier this year, University of Sunderland **Engineering student Jennifer Parkins** was announced as the face of a campaign to showcase North East business to passengers at Heathrow Airport.

The photograph of Jennifer, on her four-year Mechanical Engineering degree course was chosen as the winner from high quality images submitted by 50 businesses to a competition staged by

the North East LEP. The LEP secured free advertising space worth £500,000 at Heathrow for six weeks from May 18 to show the North East as a great place for companies to invest, grow and prosper.

A total of ten images of North East companies were chosen to appear in promotional videos that will be shown on digital platforms at departure lounges and gateways across Heathrow, with Jennifer's winning image fronting the campaign on two poster sites at Terminal 4 and 5.



**Paul Woolston, North East LEP Chair**, said: "The final images, including the overall winner Jennifer Parkins from the University of Sunderland, we felt captured perfectly the breadth of expertise and the strength of innovation and skills driving forward new growth in sectors vital to the North East economy."

Jennifer, from Jarrow, is just about to start the Sandwich year of her university degree course at Nissan. To increase her employability skills, she is leading the way on the University of Sunderland's entry into the Formula Student project. One of Europe's most established educational motorsport competitions, it aims to inspire and develop enterprising and innovative young engineers.

"Universities from across the world are challenged to design and build a single-seat racing car from scratch," said Jennifer. "The project has been fantastic in terms of building up experience from electronic design and shaping concepts, to rolling up my sleeves and doing manual work. Studying at Sunderland has created so many opportunities and I have taken up every one. I wanted to use my time at university to make me the best person possible at the end, so that I would be more attractive to future employers and hopefully walk into a job when I graduate."

**Andy Atkinson, Head of Advertising** at the University of Sunderland, said: "I'm so pleased that the photograph we submitted of Jennifer has won this prestigious competition; she is a powerful role model for young people considering a higher level career in engineering, a sector in which the North East excels."

# Re-igniting a passion for research

A group of computing staff with predominantly 'student-facing' roles who previously found it difficult to develop their own research because of the demands of teaching or academic leadership responsibilities, have this year come together in a new project funded by the Digital Innovation Beacon called 'Employable-Me!'.

The 'Employable-Me!' project, specifically created to tap into this significant under-exploited source of research experience and expertise in the department, is undertaking an early requirements study into the design of a mobile phone application to enable Level 3 Computing Suite students (formerly known as "top-ups") to engage more effectively with Sunderland Futures to improve their employability.



**Caron Brown and Dr Les Kingham**

This new research team, includes **Dr Sheila Garfield, Caron Brown, Dr Les Kingham, Michael Lawrence and Dr Shell Young** and is co-managed by **Dr Susan Jones, Team Leader for the Data Engineering Team and Dr Sharon McDonald, Reader and Digital Innovation Beacon Theme Leader for Technology Enhanced Living/HCI**. This research collaboration also supported by **Anita Aggarwal, Director of Intel Institute of Higher Education Nairobi**, an important University collaborative partner, includes academic

**Geoffrey Gitonga** who heads up computing at Intel, making this a truly international collaboration going forward.

This year the 'Employable-Me!' research team have carried out two cross-cultural studies, the first developing repertory grid techniques to investigate students' personal constructs around their own 'employability' and what it means to be a computing professional and the second looking at innovative approaches to engaging users in the design of persuasive mobile interfaces. These studies have involved B.Sc. Applied Business Computing students on campus here in Sunderland and students on the same programme at Intel Nairobi, delivered by the computing departments' Transnational Education provision.

From the outset, 'Employable Me!' has deliberately taken an inclusive and highly flexible approach to project delivery. Ongoing research mentoring to the team has been provided by Dr Sharon McDonald and Dr Shell Young's Ph.D research into the use of repertory grids has enabled her to train other members of the team in the fundamentals of the techniques involved. The international reach of the team has been facilitated through Dr Susan Jones's strong partnerships with colleagues at Intel, developed through her role as Centre Leader.

Integration of all team members in the studies of 'Employable-Me!' has been achieved through the creation of small, manageable units of activity that staff could readily assimilate into their substantive roles, and which joined together, supported the development of studies which ultimately will deliver a coherent set of research outputs. As Dr Jones explains, "...re-igniting a passion for research with teaching colleagues who have research qualifications and experience is easy, the hard part is helping these colleagues who through their professional approach 'always put students first', to integrate their research activity in ways which doesn't compromise their broader range of professional activities."

Not surprisingly the dynamic of the 'Employable-Me!' team also attracted other collaboration across the department and FAS including support from our now **Emeritus Professor, Helen Edwards** into the use of structured techniques underpinning a literature review on persuasive interfaces and the data analysis skills of **Dr Ken McGarry**. The project has also had a significant impact upon the student experience, as the training provided by Dr Shell Young on repertory grids was also attended by Ph.D researchers who are now utilising these techniques in other domains, including investigating the factors affecting older people's use of e-banking services and Level 3 students who volunteered to take part in the piloting of the 'Employable-Me!' design workshops were also provided with training in Persuasive Interface Design as part of the Sunderland Futures initiative.

**Dr Gary Unthank, Team Leader of the Information Systems Engineering team**, whose support in helping 'Employable-Me!' team members in managing their workloads and contracts was critical to the success of the collaboration, sees this project as an exemplar in ensuring that as many staff as possible are engaging in and contributing to the department's research profile, as he comments, "...if we are to meet our research targets for the 2020 REF it is important that all staff are supported in developing their research. Projects like 'Employable-Me!' with its inclusive and flexible approach, provides a workable mechanism which will enable us to do this and at the same time ensures that we provide high quality student experiences underpinned by a strong research culture in the department".

If you would like to re-ignite your passion for research please contact departmental team leaders in Computing and Engineering, **David Knapton, Gary Unthank and Susan Jones** who will be happy to help you take the next steps to joining a research team appropriate to your interests [david.knapton; gary.unthank; susan.jones@sunderland.ac.uk].

# Project Progress

A small team of researchers in the Department of Computing, Engineering and Technology is developing a mobile application that will assist students in locating library resources while promoting curiosity and divergent browsing behavior. This proof of concept research project will examine the extent to which untapped data held in the library database can facilitate serendipitous information seeking using computer vision, cloud and smart device technology.

**Andrew Smith, Senior Lecturer in Computing** is leading the project and **Dr. Shell Young** is conducting requirements research. **Dr. Sharon McDonald, Reader and leader of the Technology Enhanced Living Research theme** is providing ongoing research mentoring and support.

The project represents Andrew's first foray into research. Reflecting on the process thus far he comments: "The support from the Beacon, library and CET staff has been fantastic. Things have moved quickly since the Beacon application was accepted and over the summer we've done some extended research, conducted a range of experiments and started work on a prototype interface. With the new term starting we hope to engage with more students and I look forward to sharing the research with colleagues via the Beacon seminars."

**Dr. Gary Unthank, Team Leader of the Information Systems Engineering team**, is also lending his considerable systems development expertise to the project and is pleased to see new research collaborations being forged within the department. Dr. Unthank comments, "going forward we need more collaborative partnerships, such as this, within the department if we are to ensure a healthy and robust REF 2020 Return. It is also fantastic that this specific team are focused on enhancing the students' experience in using a significant, university resource."

# Inspiring a new *vision for the future* through research

In November 2015, **Professor Helen Edwards**, newly appointed Emeritus Professor for the Department of Computing, Engineering and Technology is being funded by the Digital Innovation Beacon to travel to Nairobi, Kenya to Chair an inaugural research conference at INtel Institute of Higher Education, one of the University of Sunderland's most esteemed and longstanding collaborative TNE partners.

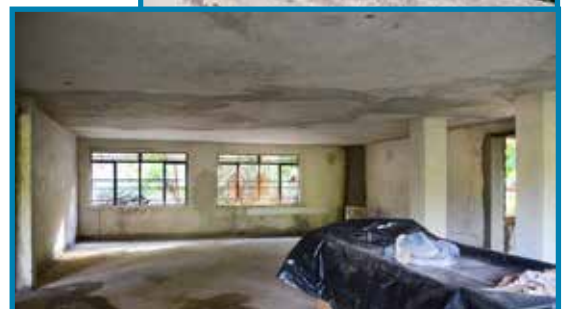
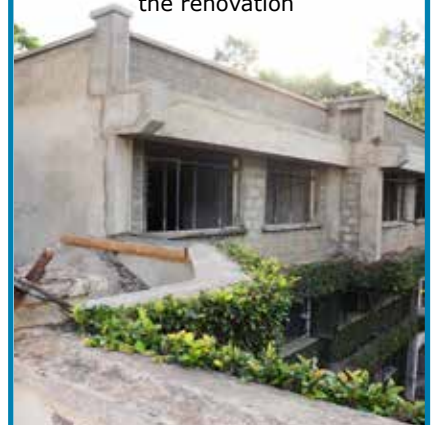
The conference entitled, "Creating Futures Through Research: Meeting Challenges, Embracing Opportunities and Delivering Impact", will be used to formally mark and showcase the opening of INtel's new postgraduate teaching and learning facilities. Going forward this new capital investment will enable INtel to begin the process of transforming key aspects of its academic staff base to enable it to achieve its goal of becoming a research active provider of high quality higher education in Nairobi, in line with the Kenyan 2030 vision for the university education sector needed to support a rapidly expanding knowledge-based economy.

To enable this long term shift in strategic focus, INtel has undergone a major extension of its estate which includes the creation of a new third floor, incorporating purpose built conference facilities, four new classrooms, a roof-top learning and recreational space, all supported by state of the art technologies and including a new video conference facility.

One of the key goals of this inaugural collaborative research conference will be to inspire academic staff at INtel to engage in research activity to help develop and embed a research culture. In particular, to provide INtel staff interested in undertaking Ph.D research with the University of Sunderland, with an introduction to the research process and the steps involved in engaging in and completing a Ph.D or a Professional Doctorate.

The conference will also provide an opportunity to promote dialogue between INtel, senior alumni and strategic partners, including the British Council and the Commission for University Education. It will also raise awareness of the impact of the Kenyan 2030 vision and the role that INtel will play in the new HE sector.

The INtel Institute of Higher Education in Nairobi, Kenya prior to the renovation



The conference organisation committee includes: Conference Chair, Emeritus Professor Helen Edwards, **Ms Anita Aggarwal, Principal of INtel College** and **Dr Susan Jones, Centre Leader for Computing Programmes** delivered at INtel. A call for proposals to participate in the conference was issued to all INtel staff, alumni and postgraduate students in August 2015 with the aim of encouraging as many as staff and students as possible to celebrate their academic achievements and to inspire those new to research or those hoping to develop a research career, to begin to share and shape their ideas in a supportive scholarly setting.



In order to encourage new and prospective researchers in particular, all contributions to the conference will subsequently be compiled for publication into a set of Conference Proceedings which will be uploaded on the University of Sunderland SURE Open Access Research Repository in early 2016.

Dr Susan Jones, Centre Leader for INtel comments, "...the support of the Digital Innovation Beacon is critical in helping this highly valued collaborative partner to take its first tentative steps into developing its own research culture and agenda but also underpins what will be an exciting and stimulating international research partnership in the future".

The inaugural collaborative research conference will take place from Friday 6th to Sunday 8th November 2015 and will be the first significant event to be staged in INtel's new conference facility. It will provide an opportunity to publicise the ongoing partnership between INtel and the University of Sunderland. It will also help raise the University's and dCET's research profile in the Kenyan context; this is important in the changing HE landscape in East Africa. Participants from UoS will include Prof Helen Edwards (Conference Chair) and Dr Susan Jones (Centre Leader); the overall target of participants for the conference is 50 delegates. The delegates will be drawn from senior and full time INtel staff, part-time tutors, postgraduate students and alumni and guest speakers from INtel's senior alumni.

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## Robot tutors make learning fun



**Lynne Hall, Reader in the Department of Computing, Technology and Engineering** is part of the EMOTE project. This is an EU project focused on empathy-based robotic tutors. Lynne and the rest of the consortium have been researching how robot tutors that respond to learners can offer a new and exciting approach to learning. Human teachers respond to a myriad of cues. A key aspect for the human teacher-learner experience is empathy, with teachers understanding when learners are confused or puzzled and responding appropriately. Now, with the advent of social robotics, robot tutors will be able to do just that.

In the EMOTE project, a new generation of robot tutors has been developed that empathise with 11-13 year old children. For example, Susie (one of the robot tutors) will sense when a learner may be having difficulty with a task, will ask if the child needs help and then respond accordingly. The consortium have developed two applications to use with their robot tutors. Firstly, a treasure hunt, where children can learn about map reading and following directions. Secondly, a game about environmental considerations, learning about resources and effective ways to use them to support cities. Both of these games will be demonstrated later this year at ICT 2015 Innovate Connect Transform (20-22 October 2015, Lisbon).

The robot tutors have personal, human elements that enable them to interact with and engage children to enhance and support their learning in a more natural way than earlier technologies. With the robots exchanging emotional cues with the children, the learning experience becomes much more fun and engaging. Children have used the robot tutors in real classroom and field trip settings, engaging with them and enjoying this novel learning experience.

The project was recently interviewed on the BBC, a link to the interview is below:

<https://www.dropbox.com/s/ywpaeddzqtdpenj/Learning.mp4?dl=0>



# In profile: PhD research students

**Julius Onyancha**, PhD student, Department of Computing, Engineering and Technology, supervised by Dr Valentina Plekhanova and Dr David Nelson



Julius holds a BSc in Applied Business Computing and MSc in Information Technology Management from the University of Sunderland. He has previously worked in the Telecommunication and Digital Marketing Sector for over five years.

It is through his experience in digital space that Julius commenced a PhD programme in October 2014 to address noisy web data problems. Noisy web data is an important facet of any website, the level of noisiness impacts user experiences. The proposed work defines the level of noisy web data and considers it as a critical variable to end users. His research work aims to develop a noisy web data reduction tool capable of learning different types and levels of noisiness. Currently, Julius is also working on a position paper to define an in-depth background of the proposed work.

**Muhammad Sheikh**, PhD student, Department of Computing, Engineering and Technology, supervised by Dr David Baglee and Professor Ahmed Elmarakbi

Muhammad Sheikh completed his B.S Electronics engineering in 2008 and MSc Electrical engineering from Staffordshire University, UK in 2011 and now working towards his PhD from the University of Sunderland. Muhammad's primary research area is Energy storage systems and he published a paper entitled "Voltage balancing of supercapacitor string using rectifier diode" in an international journal in 2014.

New emerging battery technologies and the need to make them efficient and safe prompted him to do further research on energy storage systems and he chose to investigate unseen conditions of batteries after crash/collision, so in his PhD Muhammad is working on a project, "New system to detect signs of thermal runaway after collision".



Muhammad's paper "A Novel Approach For Predicting Thermal Runaway In Electric Vehicle Batteries When Involved In A Collision" is accepted for the ASME, IMECE 2015 conference which will held in Texas, USA at the end of this year.

Muhammad is developing his teaching profile and actively participated in the "Preparing to teach" course held within the University of Sunderland. Muhammad's aim is to apply for associate fellowship of the HEA so he can be an academic after he finishes his PhD and work for both industry and education.

# Publications

## Articles

**Baglee, D.**, Jantunen, E., & Bravo, I. (2015). A review of the essential elements linked with the adoption of condition-based maintenance. *International Journal of Process Management and Benchmarking*.

**Baglee, D., Knowles, M.**, Kinnunen, S., & Galar, D. (2015). A proposed maintenance strategy for a wind turbine gearbox using condition monitoring techniques. *International Journal of Process Management and Benchmarking*.

**Burn, K.**, Robinson, E., & Dixon, D. (2014). Introducing fundamental concepts of control: A case study in robot force control. *International Journal of Mechanical Engineering Education*, 42(4), 320-339. doi: 10.1177/0306419015574223

**Cox, C., Tindle, J., & Burn, K.** (2015). A comparison of software-based approaches to identifying FOPDT and SOPDT model parameters from process step response data (In Press). *Journal of Applied Mathematical Modelling*. doi: 10.1016/j.apm.2015.05.007

**Elkady, M., Elmarakbi, A., & MacIntyre, J.** (2015). Integration of Vehicle Dynamics Control Systems with an Extendable Bumper for Collision Mitigation (In Press). *International Journal of Automotive and Mechanical Engineering*.

**Elmarakbi, A.**, El-Safty, S., Martorana, B., & **Azoti, W.** (2015). Nanocomposites for Automotive Enhanced Graphene-based Polymer Materials and Multi-Scale Approach (In Press). *International Journal of Automotive Composites*.

Habchi, C., Khaled, M., Lemenand, T., Della Valle, D., **Elmarakbi, A.**, & Peerhossaini, H. (2014). A Semi-Analytical Approach for Temperature Distribution in Dean Flow. *Heat and Mass Transfer*, 50(1), 23-30.

Khaled, M., Gad ElRab, M., Habchi, C., Al Shaer, A., **Elmarakbi, A.**, Harambat, F., & Peerhossaini, H. (2015). Analysis and Modeling of the Thermal Soak Phase of a Vehicle – Temperature and Heat Flux Measurements. *International Journal of Automotive Technology*, 16(2), 221-229.

Khaled, M., Ramadan, M., **Elmarakbi, A.**, & Fourment, L. (2015). Simulation of Incremental Forming Processes Using a Thermo-Mechanical Partitioned Algorithm. *Key Engineering Materials*, 651-653, 1331-1336.

Khaled, M., Ramadan, M., **Elmarakbi, A.**, Harambat, F., & Peerhossaini, H. (2014). Underhood Aerothermal Management of Leakage Zones - Temperature Measurements. *WIT Transactions on Engineering Sciences*, 83, 303-311.

**McDonald, S., Zhao, T., & Edwards, H. M.** (2015). Look who's talking: evaluating the utility of interventions during an interactive think-aloud (In Press). *Interacting with Computers*. doi: 10.1093/iwc/iwv014

Mollon, V., Bonhomme, J., **Elmarakbi, A.**, Vina, J., & Arguelles, A. (2015). Comparison of numerical, empirical and local partition methods in ADCB specimens (In Press). *International Journal of Automotive Composites*.

Yla-Kujala, A., Marttonen, S., Karri, T., Sinkkonen, T., & **Baglee, D.** (2015). Inter-organizational asset management: Linking an operational and a strategic view. *International Journal of Process Management and Benchmarking*.

## Books, book sections and chapters

**Humphries, L.** (2015). The role of interactive technology in prosocial mobile games for young children. In P. Kommers, P. Isaias, & T. Issa (Eds.), *Perspectives on Social Media: A Yearbook* (pp. 165-173): Routledge.

## Conference watch: papers, posters and proceedings

**Baglee, D.**, Marttonen, S., & Galar, D. (2015). *The need for Big Data collection and analyses to support the development of an advanced maintenance strategy*. Paper presented at the DMIN'15, The 11th International Conference on Data Mining, Las Vegas, Nevada, USA.

**Elkady, M., & Elmarakbi, A.** (2015). *Enhancement of Occupant Safety in Offset Frontal Vehicle Collision: Using Novel Mathematical Modelling Alongside Vehicle Dynamics Control Systems*. Paper presented at the 24th International Technical Conference on the Enhanced Safety of Vehicles (ESV2015), Gothenberg, Sweden.

**Elmarakbi, A.** (2015). *Novel Composite Materials for Automotive Applications: Concepts and Challenges for Energy-Efficient and Safe Vehicles*. Paper presented at the 10th International Conference on Composites Science and Technology, ICCST/10, Lisbon, Portugal.

**Elmarakbi, A.**, & Martorana, B. (2015). *Graphene-based Composite Materials for Automotive*. Paper presented at the 20th International Conference on Composite Materials, ICCM20, Copenhagen, Denmark.

**Haddad, K., & Baglee, D.** (2015). *Using Augmented Reality in Manufacturing Firms and its Impacts on Knowledge Transfer*. Paper presented at the 16th European Conference on Knowledge Management - ECKM 2015, University of Udine, Italy.

**Irons, A.**, & Powton, D. (2015). *The Impact of Gender in Computer Security*. Paper presented at the The 8th International Conference on Cybercrime Forensics Education and Training, Canterbury Christ Church University, Canterbury.

Khaled, M., Ramadan, M., **Elmarakbi, A.**, & Fourment, L. (2015). *Simulation of Incremental Forming Processes Using a Therm-Mechanical Partitioned Algorithm*. Paper presented at the 18th International ESAFORM Conference on Material Forming ESAFORM 2015, Graz, Austria.

Khaled, M., Ramadan, M., **Elmarakbi, A.**, & Harambat, F. (2015). *Analytical Determination of Louvered-Fin Heat Exchanger Thermal Performance in Relation with the Air Flow Statistics*. Paper presented at the 6th International Symposium on Advances in Computational Heat Transfer, CHT-15, Piscataway, USA.

Mollon, V., Bonhomme, J., **Elmarakbi, A.**, Vina, J., & Arguelles, A. (2015). *Comparison of numerical and local partition methods in ADCB specimens*. Paper presented at the ICCS18 - 18th International Conference on Composite Structures Lisbon, Portugal.

**O'Brien, R.**, Veldsman, W., & **Elmarakbi, A.** (2015). *The development of a robotic Low Stress No Distortion (LSND) welding system suitable for achieving real world applications with practical examples.* Paper presented at the 18th International Conference on Joining Materials, Helsingor, Denmark.

**O'Brien, R.**, Veldsman, W., & **Baglee, D.** (2015). *The development of an industrial robotic Low Stress No Distortion (LSND) welding system.* Paper presented at the IIW International Conference, High-Strength Materials - Challenges and Applications, Helsinki, Finland.

**O'Brien, R.**, Veldsman, W., & **Elmarakbi, A.** (2015). *The development of an industrial robotic Low Stress No Distortion (LSND) welding system.* Paper presented at the 68th IIW Annual Assembly & International Conference, Helsinki, Finland.

**Sheikh, M.**, **Baglee, D.**, **Knowles, M.**, **Elmarakbi, A.**, & **Al Hariri, M.** (2015). *A Novel Approach for Predicting Thermal Runaway in Electric Vehicle Batteries when Involved in a Collision.* Paper presented at the ASME International Mechanical Engineering Congress and Exposition; Crashworthiness in Transportation Systems, Houston, Texas, USA.

Simon, V., Galar, D., & **Baglee, D.** (2015). *eMaintenance Platform for Performing Data Fusion Mutation on Machine Tools.* Paper presented at the DMIN'15, The 11th International Conference on Data Mining, Las Vegas, Nevada, USA.

## Beacon Seminars

The Beacon welcomes your suggestions for speakers for the **15/16 Beacon Research Seminar series**. These take place, typically, on a Tuesday lunch time. All staff and students are welcome and lunch is provided.

The 14/15 series saw presentations from Professor Russell May on trends in digital technology and associated challenges in digital forensics; Dr Chris Bowerman on terrorist networks and how to detect them; Steve Caughey, MD of Arjuna Technologies Limited on The Regional Data Exchange; Paul Wright of FleetM8 and Phil Blythe of Newcastle University discussing vehicle telematics and Liz Gandy & Stuart Dixon on software to automate the extract of 3D motion capture data.

If you have any suggestions for speakers, would like to volunteer to present or if you have any queries about the Beacon seminars, please contact Paula Wilkinson, Faculty Admin Assistant, on ext. 3205 or [Paula.Wilkinson@sunderland.ac.uk](mailto:Paula.Wilkinson@sunderland.ac.uk).

