



News

Welcome to the Autumn 2017 edition of the Centre for Industrial Sustainability Newsletter

Maybe it's age, but the start of the new academic year comes around ever faster. We will soon be seeing our new PhD researchers arriving – and making the 3rd years feel old and feel panic as they start the last year and bring their research to its normal conclusion in a fantastic thesis. Which reminds me to point you to that part of the website where you can find the PhD theses; these are often much longer than you might want to read, but also much more in depth than we get the chance to read normally. They are worth visiting, even if you cheat and read the introductions and conclusions only, because 3 years thinking about one problem only means there should be some insight in sight. Find the PhD theses [here](#).



This summer we have seen our researchers gathering data about 3D printing business models in China, about hacking actions that lead to sustainability, about the African institutions tasked with improving industrial sustainability in their country. We have seen them win global competitions for the most innovative solution to use 2nd life EV batteries (well done Na Jiao).

In my own work, we have finished our input to the Jurgen Maier 'Industrial Digitization Review' for the UK government, and as soon as that goes public the group of experts will be sharing our input report on how the so-called Industry 4.0 will impact on, and be impacted by sustainability goals for industry.

When we began this large endeavour of building research on Industrial Sustainability, it seems that we would be happy creating new knowledge, building tools that industry could really use, and developing great people all of which would eventually make a difference. But it seems to me that the on-rushing train of future challenges, whether it be climate change, soil health, pervasive plastics, or equity, is not yet being matched by an equally powerful response. So we are re-focusing our efforts to generate impact sooner rather than later. We are increasingly pushing our tools into businesses and helping them, we

Events

Sustainability Leadership Lab on Business Model Innovation

17 - 18 October 2017,
Madingley Hall

CIS in collaboration with the Cambridge Institute for Sustainability Leadership are running the third annual Lab on Business Model Innovation, featuring a keynote speech from Ryan Gellert, General Manager EMEA at Patagonia. Delegates can join the Lab as a standalone course or as credit towards a Postgraduate Diploma in Sustainable Business.

[More details](#)

Peak Programme 2018

15 - 19 January 2018,
YHA Castleton Losehill Hall, Derbyshire

Please note that places are limited and this event is by invitation only. If you are interested in participating in the programme, please contact [Dr Maria Holgado](#) to register your interest and check whether there are any remaining places. [More information](#)

Congratulations to our new Doctor of Philosophy in Engineering graduates

[Pu \(Jacky\) Liu](#) passed his PhD viva in July 2017. Jacky's thesis concentrated on reducing the environmental impact of wind turbine blades. This research included investigating the wind turbine blade waste inventory, understanding

are working with governments, and various other project bids that will remain quiet for the time being. It is an exciting moment, when we can take much of our hard-won knowledge and scale the use to improve resource efficiency, build more sustainable business models and begin the larger journey of transforming into a genuinely sustainable industrial system. For example, we are trying to increase our entrepreneurial activity and get more students into start-ups, either during or directly after their studies. I would welcome any thoughts on how we might do this better, faster and cheaper.

I hope to see you soon

Steve

Professor Steve Evans, Director of Research, Centre for Industrial Sustainability

WFSGI World Cycling Forum 2017



[Steve Evans](#) was a keynote speaker and Q&A moderator at the first [WFSGI World Cycling Forum 2017](#) on 7-8 June 2017 in Porto, Portugal. Steve also provided the welcome and the wrap-up and summary on both days. The World Cycling Forum main theme – consumer centricity and increasing speed to market - was addressed by presentations from academics and representatives from various industries, including Adidas, Carlsberg, Porsche and Alvanon. [More](#)

Steve Evans talks about how to love factories at Hay Festival

Steve Evans' talk at the Hay Festival on Friday 2nd June explored how the industrial system is (slowly) changing, what will change when we learn to make things within planetary limits and why free energy is ignored. He also explained how to be an environmental optimist and how to love factories. Watch the video [here](#)

Sustainability Cohort

the environmental impact of wind turbine blades during its whole life cycle and quantitatively assessing the end-of-life options for wind turbine blades.

Daniel

Summerbell passed his PhD viva in September 2017. Daniel's thesis was on CO2 Emissions from the cement industry. His research examined the main sources of CO2 emissions from the cement industry and identified opportunities to reduce them. He collaborated closely with a local cement manufacturer to perform an in-depth analysis of their factory.

New Arrivals



Lia Marchi is a visiting student at CIS. Lia is from the Department of Architecture, University of Bologna (Italy) and has just started her second PhD year. She is researching the environmental and landscape compatibility of industrial facilities, with a particular focus on Agro-food industries. The study aims at combining into a unique key the aesthetic-perceptual interferences of the settlement with the landscape, its physical impact onto the main environmental matrices, and the social effects on nearby communities. The research goal is to contribute in defining sustainable conversion

The 1st Summer Gathering of the **Sustainability Cohort** was held in Cambridge in July 2017. On Friday 28th, around 30 participants gathered at the Institute for Manufacturing, University of Cambridge, for an afternoon discussing Industry 4.0 and post-globalisation implications for industrial sustainability, a set of mini talks on sustainable energy systems, systems thinking, new ways of living and decision making involving sustainability aspects and a panel followed by Q&A on career transitions and academic career management. The broad range of topics discussed exemplifies the variety of sustainability-oriented research carried out by Cohort members. There was a chance to follow-up conversations while wearing some "international attire" during the Garden Party organised on Saturday 29th. Many thanks for all the participants attending either or both days. Special thanks for the grill cook, Ioannis Mastoris, for sharing his cuisine art with all!

TransTextile Report



Curie Park from CIS has completed a project with leading Sri Lankan garment manufacturing companies to transform waste streams into high value products through innovative remanufacturing processes and new business models. The report has been spread to industry practitioners and has been successful in attracting several further collaboration opportunities. A feasibility study of the 3D printing idea has been applied in conjunction with a Canadian 3D printing

start-up, while the UK business plan for the High-Press Fibre Panel has been shortlisted for the Cambridge Enterprise Business Competition. An expanded version of TransTextile, a creative innovation hub proposal for a wider range of industrial waste, is in application with Thammasat University in Thailand. Download the report [here](#)

Best Paper Award at the British Academy of Management Conference

Doroteya Vladimirova, Martin Geissdoerfer, Miying Yang (CIS), Mohamed Zaki (Cambridge Service Alliance), Christopher Turner and Ashutosh Tiwari (Cranfield University) won the Best Paper Award for a developmental paper in the track Sustainable and Responsible Business at the British Academy of Management Conference BAM2017 for their paper entitled "A Conceptual Framework for Sustainable Re-distributed Manufacturing Business Models based on Data-driven Decision Making". This paper concluded the collaborative feasibility study "Digital Re-distributed Manufacturing Studio" as part of the RECODE Network. Congratulations on team success!

Applied Energy - ICAE 2016 Best Paper Award

Miriam Benedetti received the "Applied Energy - ICAE 2016 Best Paper Award" from the Editorial Board of Applied Energy and the

policies and measures of both existing and future industrial facilities, by providing modular and case-by-case adaptable design suggestions.

Publications

Baptista, A.J., Lourenço, E.J., Peças, P., Silva, E.J., Estrela, M.A., Holgado, M., Benedetti, M. and Evans, S. MAESTRI Efficiency Framework as a Support Tool for Industrial Symbiosis Implementation. WASTES conference. CRC Press – Taylor & Francis Group

Li, Y., Holgado, M., Benedetti, M., Evans, S. Conceptual Analysis of Eco-Efficiency and Industrial Symbiosis: Insights from Process Industry. Smart Innovations, Systems and Technologies
DOI: 10.1177/0963662517695056

Liu, W., Evans, S. (2017). "The Impact of Additive Manufacturing on Sustainable Business Models from the Value Perspective", R&D Management Conference, KU Leuven, Belgium

Liu, W., Evans, S. (2017). "A Study of Resource-efficient Technologies for Cities of the Future to be Sustainable", Procedia Manufacturing, 15th Global Conference on Sustainable Manufacturing, Haifa, Israel

Liu, W., Zhang, B Y. (2017). "The Characterization of the Roman Curse Tablet", AIP Conference Proceedings, 3rd International Conference on Chemical Materials and Process (ICCM 2017), Beijing, China

Liu, W., Evans, S. (2016). How Companies Respond to the Emergence of 3D Printing Technology?, Industrial Efficiency 2016 Conference, ISSN: 2001-7987

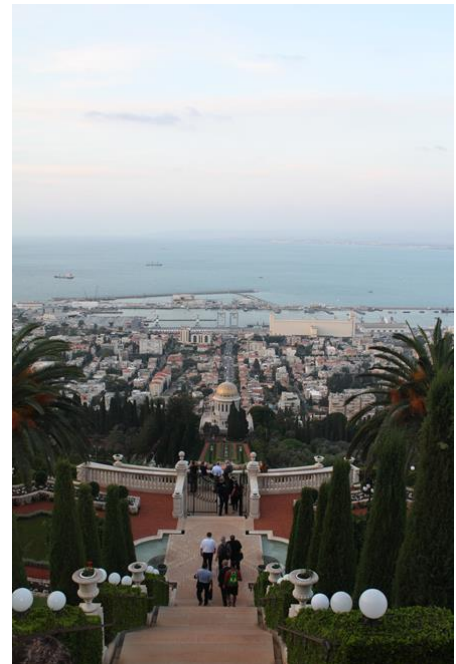
Smart, P., Hemel, S., Adams, R., Lettice, F. & Evans, S. Pre-paradigmatic Status of Industrial Sustainability: A Systematic Review. International Journal of Operations and Production Management

Summerbell, D., Khripko, D., Barlow, C., & Hesselbach, J. (2017). Cost and carbon reductions from industrial

scientific committee of the International Conference of Applied Energy (ICAE). The award was assigned last August during the 2017 ICAE for the paper "Explorative study on Compressed Air Systems' energy efficiency in production and use: First steps towards the creation of a benchmarking system for large and energy-intensive industrial firms", written in collaboration with the University of Rome Tor Vergata, the University of Tuscia and ENEA (the Italian National Agency of New Technologies, Energy and the Environment). The paper was published in 2017 in Applied Energy as an extension of a conference paper presented at the 2016 ICAE.

15th Global Conference on Sustainable Manufacturing

Kirsten Van Fossen and **Wen Liu** presented at the 15th Global Conference on Sustainable Manufacturing (Sep 25-27) in Haifa, Israel. The conference covered a range of subject areas -- Kirsten presented in the Entrepreneurial Initiative session and Wen in the Strategy session. Haifa is the home of the Baha'i gardens on Mount Carmel (pictured here), a holy site for a number of religions, and especially for the Baha'i Faith.



Second Life for Retired Batteries from Electric Vehicles



demand-side management: Study of potential savings at a cement plant. Applied Energy, 197 100-113. apenergy.2017.03.083

Summerbell, D., Barlow, C. Y., & Cullen, J. M. (2016). Potential reduction of carbon emissions by performance improvement: A cement industry case study. Journal of Cleaner Production, 135 1327-1339. https://doi.org/10.1016/j.jclepro.2016.06.155

Yang, M., Vladimirova, D., Evans, S. (2017), Creating and Capturing Value through Sustainability: The Sustainable Value Analysis Tool, Research-Technology Management, Vol 60, Iss 3, pp 30-39

Zhang, W., Shi, Y., Yang, M., Gu, X., Tang, R., Pan, X. (2017), Ecosystem evolution mechanism of manufacturing service system driven by service providers, International Journal of Production Research. Vol. 55, No. 12, pp. 3542-3558.

Zhang, X., Liu, C., Li, W., Evans, S., & Yin, Y. (2017). Effects of key enabling technologies for seruseru production on sustainable performance. Omega, 66 290-307. omega.2016.01.013

Conference Papers

Litos, L., Borzillo, F., Patsavellas, J., Cockhead, D., Salonitis, K., 2017. Management Tool Design for Eco-efficiency Improvements in Manufacturing – A Case Study. Procedia CIRP, Complex Systems Engineering and Development Proceedings of the 27th CIRP Design Conference Cranfield University, UK 10th-12th May 2017.

Litos L., Yi, Y, Salonitis K., Tsoutsanis P., Patsavelas J. 2017. Improving the curing cycle time through the numerical modeling of air flow in industrial continuous convection ovens. The 50th CIRP Conference on Manufacturing Systems (CMS), in Taichung, Taiwan 3rd-5th May 2017

Liu, W., Evans, S. (2017). The Impact of Additive Manufacturing on Sustainable Business Models from the Value Perspective. R&D Management Conference, KU Leuven, Belgium

Na Jiao won first runner-up and the best originality award for the international competition on Second Life for Retired Batteries from Electric Vehicles held in Hong Kong. [More](#)

Competitive Advantage in the Digital Economy Forum 2017

CIS doctoral researcher **Wen Liu** participated in the Competitive Advantage in the Digital Economy Forum organized by the University of Warwick in Venice, Italy on 1-3 June 2017. This forum brought together multi-disciplinary thought leaders and researchers to build capacity for cutting-edge research in an intimate environment and focused on three research areas: Smart Service Systems, Privacy and Trust, and Digital Innovation. Wen gave a presentation on the Impact of 3D Printing Technology on Digital Innovation in the Sharing Economy. It is significant to learn more about how the specific business models offered by 3D printing providers affect the overall digital economy and the way that digital innovation is carried out.



British Academy of Management Conference



Catherine Tilley presented a paper at the British Academy of Management Conference at Warwick University. The paper, called 'How do companies resolve the tensions created by introducing environmental and social sustainability to their decision-making?'. She also presented a paper titled 'How do executives navigate the radical uncertainties of building environmentally and socially sustainable businesses? A study of framing in decision-making' to the CRUISSE (Challenging Radical Uncertainty in Science, Society and the Environment) conference at University College London'. Both papers drew on Catherine's analysis of 45 decisions made in 17 organisations, and presented six different strategies which executives use to resolve the tensions these presented.

Conferences in China

Miying Yang, a former CIS researcher and currently Lecturer in Engineering Management (E&R) at the University of Exeter, attended the following conferences:

- Guest speaker and session chair at the 13th Global Manufacturing and China Conference (GMC 2017) in Hangzhou, China on 9-10 September. **Pu Liu**, a PhD student from CIS, also attended this conference.



- Miying ran a workshop at the Global Entrepreneurship Summer School (GESS 2017) in Tongji University, Shanghai,

China on 30-31 August, on using the **Sustainable Value Analysis Tool** to identify, and then reduce waste along food supply chains, as well as to identify the hidden value and trigger recycling and reuse of food wastes.

- On 3-6 September Miying presented at the "Building Energy and Technology Perspective in China and the UK" workshop in Xi'an University of Architecture and Technology, China.

New Award: IUK Aurora

AURORA is a collaborative research group supported by Innovate UK that is investigating the potential to use additive manufacturing technology to remanufacture train wheels for the London Underground. The project has been running for approximately 15 months and has reached a point where additional support is required to assist the AURORA partners to understand the business model implications that might result from the adoption of the technology changes. The Centre proposes to run a series of nine intervention workshops to enable the AURORA parties to understand the value exchanges that are currently and could or are planned to take place as a result of adoption of the new technology. This will be supported by off line research into similar potential models. The Centre will also carry out deeper analysis of the product and service activities and then work to build a set of value propositions to support the various parties so that they can understand the range of business models that they might consider and work to build suitable business cases to allow for the selection of the most appropriate versions.

Contact **Ian Bamford** for more information

New Opportunities

Na Jiao is currently doing a Dubai Business Internship, a ten-month business internship supported by His Highness Sheikh Mohammed, the Ruler of the Emirate of Dubai. The purpose of the programme is to deliver business internships, business training and cultural understanding to build young graduates into future business leaders.

Moving On

Dee Dee Frawley has joined the University of Cambridge Civil Engineering Division as Communications Coordinator for the Centre for Smart Infrastructure and Construction.

Miriam Benedetti will be moving to a new job at the end of October, as Senior Researcher at EURAC (European Academy), a research centre based in Bolzano, Italy where she will be collaborating with the Institute for Renewable Energy and leading the creation of a new research group on Industrial Energy Efficiency.

Centre for Industrial Sustainability
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www.ifm.eng.cam.ac.uk/research/industrial-sustainability/