

Introduction

This year's annual Connected Everything conference is fast approaching. It will take place on 27 September 2023, and we're delighted to use this year's event as a platform to celebrate the success of the Connected Everything Network over the last seven years!

This year the conference will be a full day event split into two parts: the morning session will consist of feasibility study panel sessions, review of our 2050 digital world report, EPSRC led workshops and celebrating the legacy of Connected Everything and much more! We will then follow on with a sandpit event, where we will discuss the future of digital manufacturing and what establish what the next successful network would look like.

In this newsletter, we will be providing you with feasibility study updates, awards, fantastic career progressions and details on upcoming events and activities! Make sure to check out our social media outlets for regular news and updates!

Thank you again for your continued support, hard work, dedication, and participation in the network. We're looking forward to celebrating the success of our network and seeing what the future holds within the digital manufacturing community!

Contents

- Feasibility Studies updates
- Project Team Updates
- Awards
- Connected Everything Celebration & Sandpit Workshop Event
- Connected Everything Briefing Webinar
- Connected Everything Event Call – deadline extended!
- Facilitation guide for using the Equality, Diversity and Inclusion (EDI) cards
- Current publications by network members

Please click on the links given throughout the newsletter for further details.

Feasibility Studies Updates

As our feasibility studies are over halfway through their project cycle, some of the teams have





some exciting updates to share:

University of Newcastle - *Design and Manufacture of Novel 3D Printed Electrodes:*

Manufacturing: The team have successfully produced designed carbon anisotropic 3D cubic lattice structures with pore sizes in the region of 80 - 120 μm and fibre sizes of 20 - 50 μm , with dimensions of 20 x 20 x 0.2 mm in macroscopic scale. They are now testing the feasibility of inherently porous resin (for high surface area redox flow battery electrodes) and nickel based resin (for alkaline stability in water electrolysis).

Design: They have created several new algorithms which facilitate prompt based generation of unit lattice structures, able to be sent directly to 3D printing slicing software without the use of CAD software. These are being integrated into the next version of the Porous Microstructure Generator (https://data.ncl.ac.uk/articles/software/Porous_Microstructure_Generator/20448471).

Prediction: 10000 simulations of diffusion through random porous structures have been generated to train a neural network, with the aim of testing the feasibility of producing a surrogate model for predicting effective diffusivity. The optimisation framework for generalised porous structure optimisation is still in development.

Collaborations: The group are manufacturing the largest designed redox flow battery electrode (structured cubic lattice) to be tested by researchers at Eindhoven University of Technology. A research visit in August/September is required to test electrodes.

Outputs: The PI (Dr Daniel Niblett) has been accepted onto the Northern Accelerator programme, which will help facilitate the understand of how to generate impact or commercialise the software or materials produced during this project.

University of Nottingham - *DOMINOES: aDaptive human-rObot teaMING fOr rEmote tasks:*

The team are finalizing the last steps of an experimental user study to investigate the effects of different mental workload conditions on teleoperation performance. The study will collect a multimodal dataset of rich interaction and physiological data, including movement kinematics, effort, performance, brain data and electrodermal activity. The study took place during August and the results will be gathered for publication afterwards.

The team has also had one workshop paper published:

Aleksandra Landowska, Pablo Lopez-Custodio, Khairidine Benali, Liangju Min, Sue Cobb, Horia Alexandru Maior, Ayse Kucukyilmaz, and Max L. Wilson. "Mental Workload Estimation using fNIRS in Robotic Teleoperation." IEEE ICRA Workshop on Multidisciplinary Approaches to Co-Creating Trustworthy Autonomous Systems, 2023.



University of Liverpool - IMPRESS – reInventing Manufacturing via Products with REconfigurable Shape and Stiffness:

The IMPRESS' team has identified an extremely promising programmable matter agent design that will allow the creation of algorithmically programmable structures with stiffness modulation. They have developed a mathematical model to describe how the stiffness can be dynamically tuned and have manufactured a dozen units to act as a test platform for them to carry out proof-of-concept experiments (see video). Preliminary test results align with our thesis and, if confirmed, show that IMPRESS vision is feasible. To view the video demonstration, please click [here](#).

To view all of our current 6 feasibility study project summaries please visit our website.

Support and guidance

For all the details regarding our feasibility studies please go to our website - <https://connectedeverything.ac.uk/feasibility-studies/>. This will also give you examples of the 20 feasibility studies funded previously.

Contact information

Though our funding call is now closed, if you have any questions regarding the application process in general, please contact the Connected Everything Network Manager, Sarah Afriyie at email: sarah.afriyie@nottingham.ac.uk

To access information on our previous feasibility studies; their publications, demonstrators and lessons learned are captured within their end of project summaries. These can all be accessed on our website - <https://connectedeverything.ac.uk/feasibility-studies/>

Project Team Updates

We would like to congratulate one of our Co-Investigators Nik Watson, who has recently started a new role at the University of Leeds as Professor of Artificial Intelligence in Food!

Here's what Prof. Nik Watson had to say:

"I am delighted to join the School of Food Science and Nutrition at the University of Leeds as a Professor of Artificial Intelligence in Food. Involvement in the Connected Everything Community has enabled me to develop a deep understanding of the opportunities and challenges for digital technologies within all manufacturing sectors including food. The network has focused on fostering the next generation of manufacturing research talent which is something I look forward to continuing in my new role."





Awards

One of our Connected Everything members, [Dr Okechukwu Okorie from the University of Exeter](#) has been awarded a highly prestigious research fellowship from the Royal Academy of Engineering. Awardees will receive a grant of up to £625,000 over the course of five years.



Dr Okorie's project: "A novel circular economy-modelling approach to achieving net zero manufacturing" focuses on the development of a multi-sector, evidence-based modelling toolkit to enable the adoption of circular economy principles in manufacturing, with the aim of meeting the UK's net zero target. Dr Okorie's research will apply a hybrid top-down/bottom-up, novel circular economy-modelling approach to manufacturing sectors to build an evidence-based modelling toolkit needed for net zero manufacturing.

To read the full press release from Exeter, please click [here](#) as well as the press release from the RAE [here](#).

Connected Everything Celebration & Sandpit Workshop Event

Join us to celebrate the successful journey of Connected Everything II; the national academic network for digital manufacturing, followed on by Connected Everything's Futures Sandpit Event! The event will be hosted at the University of Nottingham, further location details will be released soon. The event will take place on 27 September 2023. Time: 9:30 – 16:00pm.

We are extremely excited to celebrate the success of our network, whilst establishing what a future digital manufacturing network would look like! This will be a jammed packed day full of exciting activities including a EPSRC led workshop describing their current and future strategic plans, review of the 2050 digital world report led by Prof. Fiona Charnley, feasibility study panel session led by Prof. Sarah Sharples and much more! For more information and to register please follow the link [here](#).

Please note, we have a small travel fund available for those who may be experiencing accessibility issues. Please contact sarah.afriyie@nottingham.ac.uk for any questions.



Connected Everything online briefing webinar – 15th September 2023

We will be holding an online briefing webinar on the 15th September 2023, 9:00 – 10:00am, and ask that all sandpit participants register for this event. The Webinar will provide individuals with the opportunity to understand what to expect from our sandpit event as well as details on the upcoming funding call that will go live in October. For further details and to register, please visit the link [here](#).

Connected Everything Event Call – Deadline Extended

Connected Everything organises a number of events to support its work, including annual conferences, summer schools and networking events. Due to popular demand, we are delighted to announce that the call for funding has now been extended. This funding is available to support network members deliver their own events in 2023.

The deadline to apply is 30 September 2023 at 5pm. Please note that applications will be accepted on a rolling basis, you do not have to wait for the deadline. For full details and to apply, visit the link [here](#).

Facilitation guide for using the EDI Cards

Dr Peter Craigon and Debra Fearnshaw are delighted to share with us the brand new [website and resources](#) for using the EDI cards, developed at University of Nottingham. The EDI cards were created in 2021/22 through funding from Connected Everything and remains an on-going research project at the University of Nottingham, led by Dr Peter Craigon.

Over the past 6 months with additional funding from University of Nottingham and UKRI Trustworthy Autonomous Systems Hub (TAS) they have developed a digital version of the cards, a facilitation guide for using the cards and a website with additional resources.

The team hopes that these cards and resources will help facilitate discussion and support engagement with EDI.

If you have any questions or comments, please get in touch with Debra or Peter:

Debra Fearnshaw | debra.fearnshaw@nottingham.ac.uk

Peter Craigon | peter.craigon4@nottingham.ac.uk

The header features a teal circular graphic on the left containing the text 'connected everything.'. The background is a cityscape with a network of white lines and circular icons representing various industries and technologies, including a cloud, a heart, a factory, a house, a person, a gear, and a solar panel.

connected
everything.

Publications

As a result of over 6 years funding, our members have now created a wealth of publications to help advance digital manufacturing research. The current list of 30+ publications can be found on the website - <https://connectedeverything.ac.uk/publications>

Join Connected Everything at connectedeverything.ac.uk

- Visit our website to sign up to the network
- Find out about forthcoming events and activities
- Let us know what would be useful to you
- Promote your event through Connected Everything
- Interact with members through our [LinkedIn group](#)
- Watch (or listen) to the huge range of films on our [You Tube channel](#).
- Follow us on [LinkedIn](#) and Twitter - @ConnectedII