

# Digital Technologies for Manufacturing Innovation: Embracing Industry 4.0

30 November — 1 December 2015  
The University of Nottingham

**EPSRC**

Engineering and Physical Sciences  
Research Council

**Innovate UK**



The University of  
**Nottingham**

UNITED KINGDOM · CHINA · MALAYSIA

# WELCOME

---



It gives me great pleasure to welcome you to the “Digital Technologies for Manufacturing Innovation: Embracing Industry 4.0” seminar hosted by the Institute for Advanced Manufacturing at The University of Nottingham.

The Industrie 4.0 initiative, launched in April 2013, has created significant international momentum and captured the attention and imagination of industrial communities and research policy makers worldwide. Whilst the UK has not led the industrial debate, the UK research community has been very proactive in defining the basic research agenda through participation in a number of EPSRC and EU-funded programmes and projects. The aim of the seminar is to promote UK research in this rapidly growing area, demonstrate to industry some of the current results from the world-leading research conducted by UK research teams and provide a forum for charting future directions in developing the national manufacturing informatics research strategy. The programme provides a rich academic and industrial content with presentations from leading UK companies and research teams working to develop the next generation digital technologies for manufacturing. On behalf of the organising committee I should like to thank all speakers and delegates for their contributions to this exciting event.

**Professor Svetan Ratchev**

# SPEAKERS | DAY 1

---



## **Alan Norbury** Siemens PLC

Alan Norbury is the Central Technology Officer for Siemens industrial activities — a leading global supplier of industrial plant and software, manufacturing automation and drive technologies to industrial customers across the UK and Ireland.

Alan started his career as an Apprentice in Siemens Congleton in 1978 moving into the role of Technical Specialist where he specialised in automation and low voltage products. In 1992 Alan spent time in Germany acting as Global Account Manager for key accounts such as Philip Morris and ICI.

He later became the UK Product Specialist for a number of advanced technologies, developing into the role of Applications Specialist primarily focussing on the UK OEM market. Alan setup a team of Application Specialists in 1997, a team of pre-sales technical consultants located around the UK and Ireland providing advice to customers on the best use of Siemens Industrial technologies.



## **Harald Egner** Manufacturing Technology Centre

Harald Egner is EU and Research Partnerships Manager at the MTC, part of the High Value Manufacturing Catapult. In this role Harald is responsible for the creation of synergistic schemes between the MTC (TRL 4-7) and its research partners (TRL 1-3/4) as well as growing MTC engagement in European collaborative research programmes. Prior to this Harald's work at Fraunhofer in Stuttgart took him from the early stages of automation in the early 1980s to design for automation and into product development. His focus in the 1990s was very much on customer driven product development and relevant methodologies such as QFD. With his arrival at the MTC Harald brought along the ideas and developments of Industrie 4.0 in Germany which have been adapted in the MTC. He also is an active member of various EC work groups in digital manufacturing.



## Michele Nati

### Digital Catapult

Michele Nati, PhD, is currently Privacy and Trust Technical Lead at the Digital Catapult, an innovation centre for accelerating UK SMEs in the data and Internet of Things areas. Michele is contributing to the creation of a Trust Framework Initiative encompassing legal, commercial and technical aspects aiming to foster personal data sharing while maintaining user privacy and trust. Previously, Michele was a Senior Researcher at University of Surrey 5G Innovation Centre, where he was Co-Investigator and Technical Leader in a number of Internet of Things EU Projects, including SocIoTal (<http://sociotal.eu>) and IoT-Lab (<http://www.iotlab.eu>). His main interests were the development of privacy-aware communication and crowdsourcing solutions for Internet of Things data collection and sharing, with particular emphasis on context-awareness and mobile smartphone sensing technologies and communication. Before joining the University of Surrey, Michele obtained a PhD in Computer Science, working on large testbeds for Wireless Sensor Networks; he was visiting researcher at the Northeastern University of Boston and worked as a research engineer for a number of SMEs.



## Henry Anson

### The Manufacturer

Henry Anson is Managing Director at Hennik Research, publisher of *The Manufacturer* and the *Lean Management Journal*. He is responsible for all commercial activities, linking board level manufacturers with suppliers to this sector in a timely and appropriate manner.



## **Steve Brambley**

### **GAMBICA**

Steve Brambley is a Deputy Director at GAMBICA, the Trade Association for Instrumentation, Control, Automation and Laboratory Technology in the UK.

He is responsible for representing the Industrial Automation sector to a diverse range of stakeholders including UK and European government, national and international standards bodies, the media, other industry associations and institutions and end users.

Steve brings experience from the automotive industry, having worked for the Michelin Tyre Company and the Dana Corporation in roles across manufacturing, quality, logistics and engineering. He has a degree in Mechanical Engineering from Loughborough University.



## **Rhia Visavadia**

### **Engineering and Physical Sciences Research Council**

Rhia Visavadia is a Portfolio Manager for the Manufacturing the Future theme at EPSRC. She is responsible for the Engineering Design, Engineering Approaches to Operations Management and the Digital Manufacturing priority areas. Prior to EPSRC, she completed an MRes in Medical Imaging at Imperial College London and BSc in Chemistry at the University of Bath.



## **Susan Reiblein**

### **Hewlett Packard Enterprise**

Susan Reiblein is a Manufacturing Industry Consultant for Hewlett Packard Enterprise. She has worked in the IT industry for 30 years working with clients to shape business and IT strategies to gain alignment for the future of the organization. Working across industry sectors Susan brings experience of multiple technologies in multiple sectors to address client issues. The approach Susan takes to all her clients is to focus on the business challenges, not the technology, blending new with old technologies in innovative ways. Susan has represented the UK in research missions in Japan and Sweden.





## **Mark Skilton** PA Consulting

Mark Skilton is an accomplished business technology leader who has worked for many fortune 500 companies in over 20 countries, across private and public industry sectors. Mark is currently a Digital Expert at PA Consulting with experience in leadership innovation and strategy for digital platforms, big data, cloud computing, interoperability, metrics monetization and cyber security. He is also a Professor of Practice in Information Systems Management at Warwick Business School. He has worked at board level in strategic vision and corporate planning for Business and digital media solutions in a broad range of companies. He is the author of two books on building Digital Enterprise for Palgrave Macmillan Digital Economy series and a co-collaborator on several International Standards.



## **Bhoopathi Rapolu** Cyient Europe Limited

Bhoopathi Rapolu is the Head of Analytics, EMEA at Cyient and responsible for Customer Engagement, Solution Development and Business Development. He has over 15 years of experience in Business Intelligence and Technology Management, and has spent the last several years in evangelizing the integration of Operational Real Time technologies with IT technologies primarily for Manufacturing, Aerospace, Transportation, Medical, Utilities and Telecom industries.

Bhoopathi is an active speaker, author and blogger. He has published articles on leading media publications including *The Guardian*, *Information Age and Engineering & Technology Magazine*. He has spoken on 'the impact of BI and Big Data solutions on society in general and industry in specific' at several international and regional forums. Details available at: [www.bhoopathi.com/speaking](http://www.bhoopathi.com/speaking)

Bhoopathi holds an Engineering Degree and MBA in Systems and Strategy from the Indian Institute of Technology (IIT), Kharagpur, India.



## **Nicky Athanassopoulou**

### **IfM-ECS Cambridge**

Nicky is Senior Industrial Fellow at IfM Education and Consultancy Services (IfM ECS). Prior to joining IfM-ECS, Nicky spent 12 years in high-technology companies. She has held a number of project management, new product development, technology and business development roles. She is a member of the team responsible for developing innovative services to support small and medium-sized manufacturers and high-tech start-up businesses in the UK. Nicky has worked with many small, medium and large size organisations across different industries including, engineering, food, defence, software and telecoms. She has helped companies develop their strategy, innovation, technology and product development processes. She also participates in European consortia and collaborates with university research groups to develop strategic research and technology roadmaps to facilitate the commercialisation of novel technologies and new engineering approaches. Nicky has a BSc in Physics from Athens University, and a MPhil and PhD in Solid State Physics from Cambridge University.



## **Ben Sheridan**

### **British Standards Institute**

Ben Sheridan is leading the UK's efforts to underpin innovation in Industry 4.0 by UK manufacturing through the development and adoption of standards. He has worked at BSI for a number of years, collaborating with industry and other stakeholders to develop standards in support of innovation in a variety of technologies including synthetic biology, cell therapy manufacturing, advanced materials, and energy harvesting technologies. Ben has a strong background in science and technology strategy development, building on a number of roles at the National Physical Laboratory, and as an electronic device design engineer at Philips Semiconductors. Prior to this, Ben did a BSc in Physics, and a PhD in Solid State Physics from the University of Liverpool.

# AGENDA

---

## Day 1: Monday 30 November

10am Registration

10.30am **SESSION 1: OPENING ADDRESS**

Chair: Svetan Ratchev, The University of Nottingham

**Vice-Chancellor's Welcome**

Sir David Greenaway, Vice Chancellor, The University of Nottingham

**A Vision into the Future of Manufacturing – Industry 4.0**

Alan Norbury, Siemens plc

**Catapult Viewpoint**

Harald Egner, HVM Catapult

Michele Nati, Digital Catapult

**Review of the Use and Benefits of Industry 4.0 in the UK**

Henry Anson, *The Manufacturer* and Steve Brambley, GAMBICA

12.15pm Lunch

1.15pm **SESSION 2: UK RESEARCH LANDSCAPE**

Chair: Sarah Sharples, The University of Nottingham

**EPSRC Manufacturing the Future**

Rhia Visavadia, Engineering and Physical Sciences Research Council

**EPSRC project presentations (funded programme presentations)**

**Industrial Research Perspective**

Susan Reiblein, Hewlett Packard Enterprise

Mark Skilton, PA Consulting

Bhoopathi Rapolu, Cyient Europe Limited

3.30pm Break

4pm **SESSION 3: UK APPLIED RESEARCH LANDSCAPE**

Chair: Lynne McGregor, Innovate UK

**European Roadmap for ICT Architectures for Manufacturing**

Nicky Athanassopoulou, IfM-ECS Cambridge

**BSI: Standards for Industry 4.0**

Ben Sheridan, British Standards Institute

**Innovate UK project presentations (funded programme presentations)**

6pm **EXHIBITION AND NETWORKING SESSION**

8pm **EVENT DINNER**



---

## Day 2: Tuesday 1 December

- 8.45am **SESSION 4: INTERNATIONAL RESEARCH AGENDA AND INDUSTRIAL INNOVATION: MANUFACTURING SYSTEMS, PROCESSES AND TECHNOLOGIES**  
Chair: Svetan Ratchev, The University of Nottingham
- EFFRA Manufacturing Roadmap**  
Chris Decubber, European Factories of the Future Research Association
- Rolls Royce**  
Chris Beadle
- IBM**  
Neil Toussaint
- BAE Systems**  
Andy Schofield
- Laing O'Rourke**  
Graham Herries
- ATS Applied Tech Systems**  
Martin Kelman
- 10.45am Break
- 11am **DISCUSSION: INDUSTRY 4.0 – THE UK'S CHALLENGES AND OPPORTUNITIES**  
Facilitator: Peter Marsh, author of *The New Industrial Revolution*  
Rapporteur: Nicky Athanassopoulou, IfM-ECS Cambridge
- 12 noon **DISCUSSION: INDUSTRY 4.0 – MAKING IT HAPPEN**  
Facilitator: Peter Marsh, author of *The New Industrial Revolution*  
Rapporteur: Steve Brambley, GAMBICA
- 1pm **CLOSING REMARKS**  
Svetan Ratchev, The University of Nottingham
- 1.15pm Lunch and event close

# SPEAKERS | DAY 2

---



## Chris Decubber

### European Factories of the Future Research Association

After obtaining his master of electro-mechanical engineering at the University of Leuven, Chris got involved fairly quickly in European research, coordinating a project under the Brite-Euram III programme of FP4, back in 1994.

Now Chris is Technical Director at EFFRA, where he is in charge of the FoF 2020 roadmap and the project portfolio management of the FoF PPP. Chris also coordinates the development of an exploitation toolkit for the FoF PPP.



## Chris Beadle

### Rolls Royce

Chris is VP Manufacturing Engineering and Improvement at Rolls Royce with accountability for manufacturing engineering and improvement across the Marine Supply Chain and 20 operations facilities in Asia, Europe and the Americas. Previous roles at Rolls Royce have included Head of Manufacturing Engineering based in Alesund, Norway and Chief Manufacturing Engineer for Product Introduction.



## Neil Toussaint

### IBM

Neil is an IBM Distinguished Engineer with a background in solving challenging technical problems affecting complex, enterprise class, IT systems and delivering innovative solutions. He is currently focussed on developing technology and capabilities to deliver production grade, enterprise class managed services on the cloud and helping client optimise their systems and workloads to exploit Cloud Computing economics of "pay as you use", agility (always on and available) and massive scalability.

Neil is a member of the IBM Academy of Technology Leadership Team, IBM's premier grouping of its top 100 world-wide scientists and technicians and is called upon as an Expert Witness to resolve disputes in the IT Industry.



## **Andy Schofield**

### **BAE Systems**

Andy Schofield is the Head of Manufacturing and Materials Engineering in the Military Air and Information business within BAE Systems. He is responsible for the development, deployment and subsequent governance of all engineering processes, technology and capability used across a variety of military aircraft products. He has experience of the full lifecycle of the aircraft products ranging from conceptual studies for future aircraft projects through to providing support to aircraft in operational service. Andy also represents BAE Systems on a number of advisory groups within the Aerospace Technology Institute and interfaces with a number of High Value Manufacturing Catapult Centres in the UK.



## **Graham Herries**

### **Laing O'Rourke**

Graham became Director of Systems Integration in Laing O'Rourke's Engineering Excellence Group in September 2013. As an industry specialist, Graham has been selected as a member of Laing O'Rourke's Engineering Excellence Group (EnEx.G), a cross-disciplinary, industry-recognized group of professionals who provide added value solutions to targeted projects for the Laing O'Rourke Group. He is Project Coordinator of the recently awarded EU H2020 OPTIMISED project. This €7m EU research grant will develop and deploy IoT technologies and analytics to optimise manufacturing scheduling and performance, whilst also assessing energy demand response as a critical input to manufacturing planning.

Previously, Graham was Head of the Software Centre of Excellence with Rolls-Royce, a world-leading provider of integrated power systems in the civil aerospace, defence aerospace, marine, energy and nuclear sectors. Graham received a BEng in Communications Engineering followed by a PhD at Leeds Metropolitan University. He is a Chartered Engineer, and Fellow of the IET.



## **Martin Kelman** ATS Applied Tech Systems

Martin Kelman is Senior MOM Consultant at ATS Applied Tech Systems. He has worked in the MOM industry for the last 20 years, working in both process and discrete industries. For the last 10 years he has been working exclusively in the aerospace industry solving industry challenges of deploying global rollout of MES systems, shop-floor integration and PLM and ERP integration.

Martin also is involved with research and development in MES adoption, the Internet of Things for manufacturing and Industry 4.0 with the Manufacturing Research Centre in Coventry, UK.



## **Peter Marsh** author of *The New Industrial Revolution*

Peter Marsh is the author of *The New Industrial Revolution: Consumers, Globalization and the End of Mass Production*. He is a speaker on modern manufacturing, having given talks on this topic in the past two years in countries including the US, UK, South Korea, China, Italy, Germany and Lithuania. In 2015, Peter started MadeHereNow, a website about UK manufacturing. From 1983 to 2013 he worked as a journalist at the Financial Times where his most recent job was manufacturing editor. Peter has a degree in chemistry from The University of Nottingham. His other books have covered microchips (*The Silicon Chip Book, Abacus*), robotics (*The Robot Age, Abacus*) and the space industry (*The Space Business, Penguin*). Before working at the FT, Peter was employed as a journalist at the *Luton Evening Post*, *Building Design* magazine, and *New Scientist*.

# EPSRC PROJECT PRESENTATIONS

---

## **EPSRC Centre for Innovative Manufacturing in Through-life Engineering Services**

Project PI: Raj Roy, Cranfield University

Project presentation: Jorn Mehnert, Cranfield University

## **EPSRC Centre for Innovative Manufacturing in Intelligent Automation**

Project PI: Mike Jackson, Loughborough University

Project Presentation: Neils Lohse, Loughborough University

## **Evolvable Assembly Systems—Towards Open, Adaptable and Context-Aware Equipment and Systems**

Project Lead: Svetan Ratchev, The University of Nottingham

## **Knowledge Driven Configurable Manufacturing (KDCM)**

Project Lead: Robert Harrison, University of Warwick

## **Miniature Flexible & Reconfigurable Manufacturing System for 3D Micro-products**

Project Lead: Xichun Luo, University of Strathclyde

## **Metrology concepts for a new generation of plasma manufacturing with atom-scale precision**

Project Lead: Timo Gans, University of York

## **Self-Resilient Reconfigurable Assembly Systems with In-process Quality Improvement**

Project Lead: Darek Ceglarek, University of Warwick

## **Transforming the Adoption of Product Service Systems through Innovations in Applied Gaming Technology**

Project Lead: Tim Baines, Aston University

Project presentation: Ali Bigdeli, Aston University

## **The Language of Collaborative Manufacturing**

Project Lead: Ben Hicks, University of Bristol

## **Cloud Manufacturing—towards Resilient and Scalable High Value Manufacturing**

Project Lead: Svetan Ratchev, The University of Nottingham

## **Intelligent Decision Support and Control Technologies for Continuous Manufacturing of Pharmaceuticals and Fine Chemicals**

Project Lead: Ivan Andonovic, University of Strathclyde

Project presentation: Alison Cleary, University of Strathclyde

# INNOVATE UK PROJECT PRESENTATIONS

---

## **INFINite varieTY in confectionary manufacturing using new automation technology (INFINITY)**

Project Lead: Mondelez UK R&D Limited

Project presentation: Jules Risser, Mondelez UK R&D Limited

## **Improving Premium Steel Manufacturing through Automation**

Project Lead: Tata Steel UK Limited

Project presentation: David Meehan, TDL Systems Limited

## **HTP-Control: Development of in-process analysis and control systems to increasing the sustainability of UK steel manufacturing**

Project Lead: Tata Steel UK Limited

Project presentation: Nicolas Bantin, IS Instruments

## **Automated Manufacturing Process Integrated with Intelligent Tooling Systems (AutoMan)**

Project Lead: Ultra Precision Motion Limited

Project presentation: Frank Wardle, Ultra Precision Motion Limited

## **Augmented Manufacturing Reality**

Project Lead: Fully Distributed Systems Limited

Project presentation: Fahim Syed, HSSMI

## **The Virtual Engineer - Maintenance and Operational Management program for future food packaging**

Project Lead: Stork

Project presentation: David Brown, University of Portsmouth

## **Direct Digital Deployment of Manufacturing Systems (3Deployment)**

Project Lead: Fully Distributed Systems Limited

Project presentation: Daniel Vera, University of Warwick

## **Towards Zero Prototyping of Factory Layouts and Operations Using Novel Gaming and Immersive Technologies**

Project Lead: Alstom Limited

Project presentation: Nadir Ince, Alstom Limited

## **Virtual Exhaust Prototyping System (VExPro)**

Project Lead: Unipart Eberspacher Exhaust Systems Limited

Project presentation: Paul Ross, Unipart



---

### **Supply Chain Connectivity**

Project Lead: Unipart

Project presentation: Barry Johnson, Coventry University

### **Thermally Treated Recycled Glass as a Vibratory Finishing Abrasive Technology**

Project Lead: Vibraglaz (UK) Limited

Project presentation: Mike Morgan, Liverpool John Moores University

### **Using Gaming Technology to Digitise Complex Manufacturing Knowledge (DEMO)**

Project Lead: Airbus Group Limited

Project presentation: Pablo Bermell-Garcia, Airbus Group Limited

