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The influence of Industry 4.0 on manufacturing research is becoming more and more evident and the submissions to the 16th International Conference on Manufacturing Research (ICMR2018) held in Skövde, Sweden, was no exception. While topics and application areas might range from machining to lean management, themes of Industry 4.0 such as collaborative robotics, simulation, virtual applications and Internet of Things are ever present in the majority of the contributions.

In this special issue of selected, extended and revised articles from ICMR2018 we are happy to present seven original research articles within the wider manufacturing field.

Six different themes of the conference are represented in this special issue.

The Manufacturing Processes theme is represented by 'Automated process planning for turning: A feature-free approach' where Behandish, Nelaturi and Allard from the Palo Alto Research Center, California and Sandvik Cormorant, Sweden describe the application of spatial reasoning and artificial intelligence techniques in the planning of manufacture. The method makes an innovative contribution in that it does not rely on specific configurations of geometry (features) but instead handles arbitrarily complex shapes with the aim of integrating manufacturing processes.

Kolbeinsson, Lagerstedt and Lindblom of the University of Skövde, Sweden address the important question of human-robot collaboration, a central aspect of the Industrial and Collaborative Robotics conference theme. Recognising human-robot collaboration to be a key element of Industry 4.0 the paper classifies levels of collaboration between robots and humans working together on a single task, with the aim of providing a framework into which legal, technical and psychological requirements can be placed.

A European perspective of the challenges of smart technologies is provided by the contribution of Goh, Micheler and Lohse of Loughborough University, UK to the Smart Manufacturing theme. Smart sensor and actuator technology are again considered as a central aspect of Industry 4.0 and this paper presents industrial and academic expert knowledge collected through questionnaires and workshops and concludes that the three main challenges are the perceived risk of novel technologies, complexity of integration and human factors.

The Decision Support Systems theme has long been a very important theme of the conference and is represented here in the modern form of the ontology and rule-based reasoning for intelligent predictive manufacturing (Zhong, Saeidlou, Saadat and Abukar of the University of Birmingham, UK). The work is aimed at predicting deliverability using a neural network approach allowing intelligent machines to automatically infer knowledge from the developed ontology.

Two papers illustrate the important theme of Simulation and Optimisation. Simulation-based life cycle assessment in manufacturing industry is the first of these papers from Liu, Syberfeldt and Strand of the University of Skövde, Sweden. The work

focuses on the evaluation and minimisation of environmental impacts arising from production activities and results in a categorisation of papers from a literature review in terms of the ISO standards definition of Life Cycle Assessment. The second simulation paper addresses the idea of digital twins in an industrial context (Lacomblez, Jeanne, Havard and Baudry, Rouen, France), another important aspect of Industry 4.0. An architecture is described to provide communication between the digital twins of simulation and virtual reality software.

The final paper by De Vin, Jacobsson and Odhe of Karlstad University, Sweden is concerned with the Lean manufacturing theme. In particular, it investigates the transfer between training simulations and the real industrial world using the Karlstad Lean Factory.

The International Conference on Manufacturing Research is organised by the Consortium of UK University Manufacturing and Engineering (COMEH) and has taken place every year but one since its inception in 1985 becoming the major manufacturing research conference in the UK. COMEH represents the voice of Manufacturing in its role as one of the Sectorial Groups of the Engineering Professors Council. The conference is particularly proud of providing a forum for young researchers to present their current work adding to the vibrant and eclectic nature of the conference contributions. Until 2003 the conference was a National conference but in recognition of the large numbers of international delegates, it was accorded the title International. In 2018 it was held outside of the UK for the first time as the conference was organized in Skövde, Sweden.

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