

# WORKSHOP ON DIGITAL MANUFACTURING – PAST, PRESENT AND FUTURE

## Workshop Presenters:

**Prof. Prasad KDV Yarlagadda OAM**  
Science and Engineering Faculty  
Queensland University of Technology,  
Brisbane, Australia

**Prof. Seeram Ramakrishna**  
Department of Mechanical Engineering  
National University of Singapore  
Singapore.

## Description

An interactive workshop created by Prof. Prasad Yarlagadda to explore and develop your knowledge and awareness of Digital Manufacturing concepts. The workshop will give participants the opportunity to talk about practical, deployable advanced and digital manufacturing strategies to their respective industry sectors and research activities. The aims of the workshop are to provide a forum for scientists, engineers, scholars and students to exchange ideas and update technical knowledge Around Digital Manufacturing, as well as to provide a platform where joint and collaborative research can be formulated for mutual benefit. The workshop welcomes participations and contributions from those involved in both theoretical research and practical applications of all aspects of digital design and manufacturing technologies for manufacturing innovation.

## Target Group

Manufacturing Executives, Researchers, Academics and Decision Makers who want to understand about Digital Manufacturing and learn to transform traditional manufacturing industry to Digital Manufacturing Industry.

## Duration

½ - 1 day

## Structure and Content of the Workshop:

The scope of the workshop covers a broad spectrum of areas with multi-disciplinary interests Primarily in the field of Digital Manufacturing, and secondary technologies for future manufacturing activities, such as additive manufacturing, sensor technology, big data analytics, Internet of things, robotics, cloud computing, and nanotechnology. The workshop includes, but not limited to the following:

- Introduction to Digital Manufacturing
- Research and current Status of Digital Manufacturing
- Module 1: Digital Manufacturing Applications to SME Sector
- Module 2: Interactive Session on Sharing Participants Experiences around Digital Mfg.
- Module 3: Digital Manufacturing Applications to Automotive and Aerospace Industry
- Module 4: Digital Manufacturing Applications of Health Care Sector
- Module 5: Impact of Industry 4.0 in its context to Digital Manufacturing, IoT and Wireless Mfg.
- Module 6: Impact of Developments in ICT, Big Data Analytics on Future of Digital Manufacturing
- Concluding Remarks

## **SUMMARY OF WORKSHOP ON DIGITAL MANUFACTURING – PAST, PRESENT AND FUTURE**

Increasingly the convergence of natural environment (land, water, air and life), built environment (housing, buildings, transportation and infrastructure) and digital environment (computing power, the internet, big data, and technology) is shaping the economies and societies. Smart living is taking root. Mass customization of products and services is preferred over mass production. Businesses wish to serve an individual customer at a competitive cost comparable to the mass production cost, with shortest possible development time and production time. This requires manufacturing to change from a more labour intensive processes to information technology enabled mechanical processes

Digital manufacturing is a broader concept of manufacturing innovation in which the digital and material advancements enable the organisations to conceive products in a desired style and quantity in times scales shorter than the conventional methods while efficiently managing the entire product life cycle. It is about defining manufacturing processes, and managing manufacturing process information via full digital product definition. It encompasses visualization, manufacturing simulation, ergonomic and human factor analyses, holistic view of product and process design, and product design sensitive to the process constraints and capabilities. The digital manufacturing is also gaining acceptance among the traditional businesses in consumer goods, fashion, packaging, transportation, automobile, aerospace, machine tools and healthcare sectors as they see advantages over the conventional manufacturing methods. Digital manufacturing caters for production on demand in pre-determined quantities, and better control over production cost and product quality. This helps in reduction of processing steps and material waste, and efficient use of resources such as materials, water and energy. Well-known global companies such as DaimlerChrysler, Rolls Royce, Toyota, Delphi, Boeing and Lockheed Martin are leveraging digital manufacturing to increase production throughput, reduce lead times, lower capital and operating costs, better use of facilities, improved product quality and reliability, and customized innovations specific to the markets.

It is conceivable that in the future a wide range of products will be developed virtually, and customized manufacturing is vogue. They are enabled by easy to use digital interfaces and internet to design, simulate, plan and execute production from anywhere, at anywhere and anytime. There will be open source software and hardware platforms for collaborate creation and production of sustainable products. They will be powered by big data analytics, high performance cloud computing, and life cycle assessment based design of sustainable products. In other words creating, designing and manufacturing sustainable products at speeds beyond imagination! The more complex a product and its manufacturing operations are, the more valuable is the digital manufacturing. Although the benefits of digital manufacturing are significant, it is in early stages and more innovations are needed in its development and usage. The digital manufacturing is widely believed as frontier for new innovations and technology start-ups.

In addition, Digital Manufacturing is a broader concept of innovation in which the digital and other advancements enable the company to conceive products in a desired style and quantity in time scales shorter than the conventional methods while efficiently managing the entire product lifecycle. It is about defining manufacturing processes and managing manufacturing process information via full digital product definition. It encompasses visualization, manufacturing simulation, ergonomic and human factor analyses, holistic view of product and process design, and product design sensitive to the process constraints and capabilities. This workshop emphasizes the need and driving forces for adopting digital manufacturing, transformation of traditional economy to digital economy present applications and future scope of digital manufacturing due to developments in ICT, IoT and Big Data Analytics.