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### Special Issue on Digital Twin Driven Design and Manufacturing

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#### Special Issue on Digital Twin Driven Design and Manufacturing

A digital twin (DT) is the real-time digital replica of a physical entity and system. It enables the seamless integration between digital models and physical devices so that the operation, monitoring, control, and upgrade of the system, as well as personnel training, can be performed in a cyber-physical mixture mode. DTs integrate technologies such as multiphysics multiscale modeling, Internet of Things, smart sensing, machine learning, and model-based control. DTs build a bridge between the physical world and the virtual world by mapping the whole life cycle of physical systems with real-time sensor data, and maintaining the complete digital trace. In the era of Industry 4.0, DT is becoming a powerful engine in the intelligent design of products and intelligent manufacturing. DT enables data-driven design and optimization, evidence based sustainable design, real-time diagnostics and prognostics, plug-n-play customization, and modular improvement.

This Special Issue aims to harvest the latest efforts in fundamental methodologies as well as their applications in DT-driven design and manufacturing.

#### Topic Areas

**Potential topics include, but are not limited to:**

- (1) Fundamental advances in DT technologies
  - Multiphysics multiscale simulations for design and manufacturing
  - Cyber-physical systems design
  - Data-driven design and optimization
  - Smart and efficient sensing mechanisms
  - Physics-based data-driven predictive control
- (2) DT-enabled intelligent design and smart manufacturing
  - DT in human-machine interaction
  - DT in supply chain and logistics
  - DT for product life cycle with Industrial Internet, Internet of Things, and cloud computing
  - DT for optimization of products, systems, and services
  - Fault diagnosis, predictive maintenance, and performance analysis with data analytics and machine learning
  - Digital human modelling in product design, assembly, and manufacturing
  - Ultra-personalized product design and manufacturing
  - Advanced robotics and sustainable intelligent manufacturing system
- (3) DT-enabled data-driven product sustainable design
  - Design for environmental, economic, and social sustainability
  - Design for product carbon footprint and product environmental footprint
  - Evidence based product and process design for cleaner production and circular economy
  - Sustainable impact assessment for product life cycle

#### Publication Target Dates

- Paper submission deadline: **August 31, 2020**
- Initial review completed: **November 30, 2020**
- Special Issue publication date: **June 2021**

#### Submission Instructions

Papers should be submitted electronically to the journal at [journaltool.asme.org](http://journaltool.asme.org). If you already have an account, log in as author and select **Submit Paper** at the bottom of the page. If you do not have an account, select **Submissions** and follow the steps. In either case, at the **Paper Submittal** page, select the [ASME Journal of Computing and Information Science in Engineering](#) and then select the Special Issue **Digital Twin Driven Design and Manufacturing**.

Papers received after the deadline or papers not selected for inclusion in the Special Issue may be accepted for publication in a regular issue. Early submission is highly encouraged. Please also email the Editor, Professor Satyandra K. Gupta, at [guptask@usc.edu](mailto:guptask@usc.edu), to alert him that your paper is intended for the Special Issue.

#### Guest Editors

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