



**Special issue on  
“Emerging Advances in Cyber-Physical Production Systems in the Age of Industry 4.0”**

in *IEEE Instrumentation & Measurement Magazine*, to be published in November 2024

In the age of Industry 4.0, the use of cyber-physical production systems (CPPS) is on the rise in the manufacturing industry. These systems combine physical production processes with digital systems to create a more efficient and connected manufacturing environment. Advanced measurement and sensing systems are key components of CPPS, allowing manufacturers to collect data from physical systems and the environment to optimize production processes. Measurement systems are crucial in CPPS as they collect data from physical systems such as machines, tools, and products. Various sensors, including temperature, pressure, vibration, and displacement sensors, are used to gather data from physical systems. This data can be used to monitor equipment health, identify potential faults, and optimize production processes. Sensing systems, such as cameras, microphones, and radar, are also essential in CPPS to collect data from the environment. This data can be used to monitor the movement of goods, detect anomalies, and optimize production processes.

Measurement protocols and methodologies ensure that the data collected by CPPS is accurate and reliable. These protocols define the types of sensors used, the data collection frequency, and the data processing techniques used to extract useful information. Data processing techniques such as statistical analysis, machine learning, and artificial intelligence are used to extract valuable insights from the large and complex data collected by CPPS. The use of CPPS in manufacturing is rapidly growing, enabling manufacturers to create more efficient and connected production environments. With the help of measurement and sensing systems, CPPS can optimize production processes and reduce waste, leading to increased efficiency and sustainability. The special issue on Emerging Advances in Cyber-Physical Production Systems in the Age of Industry 4.0 aims to provide a platform for researchers and practitioners to share their latest findings, ideas, and experiences on the design, implementation, and optimization of CPPS. The special issue seeks to showcase the latest advances in measurement and sensing systems, measurement protocols and methodologies, and data processing techniques that enable CPPS to operate in a more efficient, connected, and sustainable manner.

List of Topics:

- Use of measurement and sensing systems in cyber-physical production systems (CPPS) for optimizing production processes
- Innovative measurement systems architectures for emerging CPPS systems for smart manufacturing
- Measurement techniques to enable autonomous control in cyber-physical production systems
- Investigating the impact of measurement protocols and methodologies on the accuracy and reliability of data collected by CPPS
- Exploring the types of sensors used in measurement systems in CPPS and their efficacy in collecting data from physical systems
- Statistical analysis in CPPS for identifying potential faults and improving production processes
- Role of sensing systems in monitoring the environment and optimizing production processes in CPPS

- A comparison of different data processing techniques used in CPPS for extracting valuable insights from the data collected
- Advances in measurement and sensing systems in CPPS for creating more efficient and connected production environments
- Future prospects of sensing systems in Predictive Maintenance for in Industry 4.0
- Industry 4.0 technologies and CPPS – Challenges and Limitations
- Future of CPPS on the sustainability of manufacturing processes

Papers should present to the wide audience a general overview of one scientific subject of your interest fitting the Special Issue Topic and really framed in the Instrumentation and Measurement field. Contributions dealing with **Open Problems in Instrumentation and Measurement** are very welcome, also presenting challenging and ambitious solutions, which could be developed by current and advanced technology.

While drafting your paper to be submitted to IMM, you are strongly invited:

- to follow authors guidelines, both for styling and contents: <https://iee-ims.org/publication/iee-imm/new-submissions>
- to make sure your article is properly framed in the field of Instrumentation and Measurement. This could be achieved by properly structuring the Review of the State of the Art and motivations of your work.
- to draft the paper for the general I&M audience.

In general, each paper should contain 3500-5000 words, and present 4-6 figures.

When your paper is ready, please submit it completely through <https://www.editorialmanager.com/IMM/default.aspx>

With your submission, please include a cover letter where you specify that this paper has been submitted for the SI on “Emerging Advances in Cyber-Physical Production Systems in the Age of Industry 4.0”.

#### **Schedule:**

Full-length paper submission: 31-01-2024  
 Revised manuscript due: 31-03-2024

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