

Message from DESTION 2024 Chairs

6th Workshop on Design Automation for CPS and IoT (DESTION 2024)

DESTION provides a premier forum for researchers and engineers from academia, industry, and government to present and discuss challenges, promising solutions, and applications in design automation for CPS and IoT. DESTION 2024 has a broad scope covering techniques and tools for modeling, simulation, synthesis, validation, and verification of CPS and IoT, with a focus on “AI for Design Automation” and “Design Automation for AI”, and their applications in a variety of domains, such as automotive and transportation systems, avionics, robotics, building architectures, grid, and medical devices.

Cyber-Physical Systems (CPS) such as aircraft, automobiles, industrial robots, medical devices, and Internet-of-Things (IoT) applications, promise significant economic and societal benefits. The design, verification, validation, testing, and operation of such systems present several challenges induced by scale, complexity, uncertainty, and many stringent requirements on safety, performance, security, availability, and many other metrics. There has been a drastic shift in the manner in which products are designed in the past few decades, from being predominantly mechanical and having independent components to being cyber-physical with highly interacting components. This has resulted in an explosion in the design complexity, leading to very long design cycle times. For several of the complex systems presented above the design process can last years – involving several redesign loops. To circumvent this issue, the current state of practice relies on “hot-starting” a new design from a known baseline, which unfortunately limits innovation, preventing a detailed exploration of the design space. The design space, on the other hand, is significantly more complex given the interdependent nature of the multidisciplinary design problem. There have been numerous advances in the area of AI for Design Automation methods that have been shown to help in the design of these complex systems, as well as in their autonomous operations. These methods range from natural language processing for requirements engineering, physics-informed models to accelerate simulations, Bayesian methods for uncertainty quantification, probabilistic programming methods to represent designs as a handful of examples. On the other hand, as AI is integrated into a diverse variety of systems such as autonomous vehicles, energy grids, health care, IoTs, and social network platforms, the challenge of design and verification of AI-enabled systems has become extremely important. This has led to new Design Automation for AI methods of interest including network architecture exploration techniques, AI testing and verification methods, simulation tools, ontology-driven design automation, large-language models, heterogeneous simulation integration tools, and neuro-symbolic learning.

The target audience of DESTION 2024 is researchers and practitioners of Cyber Physical Systems (CPS) design methodologies, machine learning, experts from the tool industry, and end-users from systems companies engaged in CPS and Internet of Things (IoT) development. Over the last few years, there has been transformative progress in AI/ML methods such as learning accurate surrogate models, generative AI, efficient design space exploration, testing and verification, and formal synthesis. This progress coupled with the rapidly growing scale and complexity of CPS and IoT has fueled immense interest in the development of design automation tools. The primary emphasis of the Workshop is on discussing and demonstrating new design tool concepts, methodologies, implementations, and case-studies for design, verification and testing of CPS and IoT.

The workshop program comprises 10 contributed research presentations include 1 demonstration, and five invited talks from key researchers from both academia and industry. We thank the DESTION 2024 Program Committee, reviewers, and authors for putting together an exciting workshop program.

DESTION 2024 Organizing Committee

- **Himanshu Neema** (Vanderbilt University, USA)
- **Arun Ramamurthy** (Siemens, USA)
- **Susmit Jha** (SRI International, USA)