# Workshop Proposal to DAC 2016

## 1 Workshop Title

**IEEE International Workshop on Design Automation for Cyber-Physical Systems**

### 2. Workshop Abstract

Cyber-Physical Systems (CPS) are characterized by the strong interactions among cyber components and dynamic physical components. CPS system examples include automotive and transportation systems, smart home, building and community, smart battery and energy systems, surveillance systems, cyber-physical biochip, and wearable devices. Due to the deeply complex intertwining among different components, CPS designs pose fundamental challenges in multiple aspects such as performance, energy, security, reliability, fault tolerance and flexibility. Innovative design automation techniques, algorithms and tools that addressing the unique CPS challenges, such as the fast increase of system scale and complexity, the close interactions with dynamic physical environment and human activities, the significant uncertainties in sensor readings, the employment of distributed architectural platforms, and the tight real-time constraints, are highly desirable. This workshop will present the state-of-the-art research results on the topic of design automation for CPS, and stimulate the CAD researchers to participate in the interdisciplinary CPS research area in the future. In addition to the regular submissions, this workshop will also seek invited submissions/talks from some high profile experts.

### 3. Track

**We will choose two from the following.**

- **EDA**
- **ESS**
- **Design**
- **IP**
- **IoT**
- **Security**

### 4. Topic Area

The topics of interests for this special section include, but are not limited to:

- Design, synthesis and verification of CPS
- Efficient simulation for CPS
- CPS security and privacy
- Real-time system design and scheduling for CPS Security
- EDA tools for large-scale CPS construction
- Cross-layer modeling and optimization for CPS

- High level synthesis for efficient CPS structure
- CPS fault detection and recovery
- Applications of CPS in different fields such as
    - Automotive and transportation systems
    - Smart energy systems such as battery, home, building and grid
    - Smart health
    - Surveillance and response systems

## 5. Workshop Organization Team

Shiyan Hu, Michigan Technological University, shiyan@mtu.edu
Xin Li, Carnegie Mellon University, xinli@cmu.edu
Qi Zhu, University of California, Riverside, qzhu@ece.ucr.edu
Yier Jin, University of Central Florida, yier.jin@eecs.ucf.edu
Bei Yu, The Chinese University of Hong Kong, Hong Kong, byu@cse.cuhk.edu.hk

## 6. Proposed Invited Presenters

Prof. Joerg Henkel, Karlsruhe Institute of Technology (confirmed)
Prof. Tei-Wei Kuo, National Taiwan University (confirmed)
Prof. Edward Lee, University of California, Berkeley
Prof. Alberto Sangiovanni-Vincentelli, University of California, Berkeley
Prof. Marilyn Wolf, Georgia Institute of Technology
Dr. Claudio Pinello, Group Leader, Cyber-Physical Systems, United Technologies.
Dr. Alessandro Pinto, Project Leader, Embedded Intelligence, United Technologies.
Dr. Natarajan Shankar, Principal Scientist, SRI International.
Dr. Hugo Andrade, Principal Architect, National Instruments.
Dr. Huafeng Yu, Senior Researcher, Toyota InfoTechnology Center.
Dr. Martin Lukasiewycz, Bosch.

## 7. Rational

DAC is the leading conference showcasing significant and innovative research works in the field of design automation and EDA tool development. The research topics of CPS have a significant overlap with the DAC themes and there are mutual benefits between the DAC and the proposed CPS Workshop. Design automation tools will help construct more efficient and robust CPS systems, and the CPS field provides important application drivers and opens new research opportunities for the design automation community. However, there are also major differences between the proposed CPS workshop and the regular DAC technical program. While DAC may solicit papers from a number of broad aspects covering different areas of circuit design, EDA tools, and hardware security, the proposed workshop offers a focused forum on the CPS related research from both a theoretical aspect and a practical angle.

Researchers from government, industry and academia have recently understood the importance of CPS and started to realize the gap between the existing solutions/research and the industrial requirements. This fact has recently attracted many researchers of different background to join this area to develop interdisciplinary solutions to solve challenges in CPS and related area. The development of CPS not only impacts our daily life but also directly links to critical infrastructure. The continuing trend of replacing existing isolated industrial controlling system with network supported CPS imposes an urgent request for CPS-oriented forums where researchers can share their findings, discuss new solutions, and come up with collaborative groups for new breakthroughs. We believe this workshop can also attract experts from outside of the traditional design automation community but are interested in solutions for CPS systems.

Recently, Prof. Shiyan Hu and others have organized a CAD for CPS special issue for IEEE Transactions on CAD. The special issue has received strong interests from the design automation community with 21 submissions. Prof. Hu also organized another special issue for IEEE Transactions on Computers regarding smart cities, an emerging CPS research area. The special issue received 41 submissions, many of which are from the design automation community as well. Prof. Xin Li, Prof. Shiyan Hu and Prof. Qi Zhu recently have a special issue proposal approved for ACM Transactions on CPS. They also helped organize an IoT workshop this past August in Shenzhen, China (International Symposium on Design Technologies for IoT). More than 30 researches from the design automation community participated in the workshop. These activities confirms the strong interests from the design automation community in CPS related research, which also motivates us to establish this DAC workshop for discussion and idea exchange. We are also planning a new journal special issue which could possibly invite some selected papers from this workshop for submission.

## 8. Workshop Poster Submission/Review Schedule

Submission Deadline:  Friday, February 19, 2015
Review Deadline: Friday, March 25, 2016
Notification of Acceptance:  Friday, April 8, 2016
Camera-Ready Version: Friday, April 22, 2016
Program Ready: Friday, May 5, 2016