

TIME IN CYBER-PHYSICAL SYSTEMS

Thursday, January 31, 2019 12:00 - 1:15 PM (US Arizona)
[College Avenue Commons \(CAVC\) Room 559](#) ([Parking](#))



Professor Aviral Shrivastava
*School of Computing, Informatics –
and Decision Systems Engineering*
Arizona State University

Transportation
Seminar

About the Talk

Cyber-Physical systems are those that tightly integrate physical and computational systems. One of the big challenges in distributed cyber-physical systems is establishing a common notion of time between the physical world and the computational system. Many modern CPS, especially industrial automation systems, require the actions of different computational systems to be synchronized at much higher rates than is possible through ad hoc designs. Fundamental research is needed in synchronizing clocks of computing systems to a higher degree, and even if the clocks are synchronized, designing CPS nodes so that they can perform actions in a synchronized manner is challenging. We need to find ways to specify distributed CPS applications, ways to specify and verify timing requirements on distributed CPS, confident top-down design methodologies that can ensure the system meets its timing requirements in the first go, dynamically creating and dissolving timing domains using differently build components, and much more. In this talk, I will present some of the work that we have done, and some of the ideas that we want to pursue in order to solve the challenge of confident and simplified CPS design (from the timing perspective). We believe that confident CPS design is possible only when the timing requirements of CPS are specified in the application itself, and not as a separate document. It should not be a list of separate requirements, but must be married to the application specification in as natural a way as possible.

About the Speaker

Prof. Aviral Shrivastava is Associate Professor at Arizona State University, where he has established and heads the Compiler and Microarchitecture Labs (CML) (<http://aviral.lab.asu.edu/>). He received his PhD and Masters in Information and Computer Science from the University of California, Irvine, and Bachelors in Computer Science and Engineering from Indian Institute of Technology, Delhi. He is a 2011 NSF CAREER Award Recipient, and recipient of 2012 Outstanding Junior Researcher in CSE at ASU. His works have received several best paper nominations, including at DAC 2017, and a best student paper award at VLSI 2016. Prof. Shrivastava's research lies in the broad area of "Software for Embedded and Cyber-Physical Systems." More specifically, Prof. Shrivastava is interested in topics around i) Compilers and microarchitectures for heterogeneous and many-core computing, ii) Protecting computation from soft errors, and iii) Precise timing for Cyber-Physical Systems. His research is funded by NSF, DOE, NIST, and several industries including Microsoft, Raytheon Missile Systems, Intel, Nvidia, etc. He serves on the organizing and program committees of several premier embedded system conferences.

This seminar is webcast live to a worldwide audience by **ASU Engineering – Global Outreach and Extended Education (GOEE)**. To access the live webcast and archive of previous seminar recordings, please visit: <http://links.asu.edu/ASU-Transportation-Seminar>

Light refreshments will be served. Event is open to the public.



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