

**Title:** The Wonders and Threats of the Instrumented World

**Abstract:** Information technology moves rapidly to an increasingly decentralized and collaborative environment (the Cloud) with rich interfaces to the physical world (the Internet of Things and CyberPhysical Systems). In particular, it has been predicted that by 2020 several billions (thousands per person) of electronic devices will be available. These devices will allow making the computing infrastructure invisible to humans and supporting societal scale applications that are unthinkable today. However, even today, we are facing a number of severe challenges in applications such as autonomous vehicles, that should be monitored carefully with respect to safety, security and privacy concerns.

Design of complex distributed system such as a CPS is essentially about connections: Connection of concepts, Connection of objects, Connection of teams. Products of the future will be connected across physical and virtual domains. Connections can produce systems that offer more than the sum of the components but they can also lead to systems that are less powerful, secure and private than the sum of the components or that are so compromised by their interactions that they do not work at all. And this situation is getting worse: a nightmare waiting to occur! An efficient management of interactions among deployed parts of a larger system requires principles that are common to the design methods developed at the bleeding edge of technology. I will point to a number of exciting fields such as Industry 4.0, energy efficiency, synthetic biology, autonomous aircraft and cars where advances are constantly made towards the mastering of distributed, autonomous systems.