

Department of Electrical and Computer Engineering

**Title: “*The Intelligent (Cyber-Physical) Sensor Revolution:
from theory to practice*”**

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Abstract:

Cyber-Physical Systems (CPSs) are gaining more and more pervasive in embedded system applications and are becoming a very innovative cognitive solution for the monitoring and control of smart environments (home, cars, cities etc.). Such systems are generally composed by a possibly large and heterogeneous set of small, power efficient yet computationally capable units endowed with sensing/actuating, processing and various communication abilities so as to be able to learn, adapt and interact proactively with the environment/system under sensing. Interestingly, in the recent years, the pervasive dissemination of such CPSs and the need to satisfy their increasing demands for autonomy, energy-awareness and reliability have led embedded designers and users to move towards smart solutions providing CPS units with self-adaptation, management and healing functionalities, e.g., to autonomously adapt the application behavior of units in response to changes affecting the mounted sensors (e.g., faults, ageing effects) or the environment the CPS is deployed in (e.g., time-variant non stationary scenarios). This talk will present some new intelligent technological solutions and mechanisms under development jointly between STMicroelectronics and Politecnico di Milano, DEIB dept. and show how they represent the key ingredients needed to design the current and future generation of smart cyber-physical systems and derived applications based on STMicroelectronics heterogeneous sensors and micro controllers/microprocessors. In particular, aspects related to the study and design of smart cyber-physical systems, the investigation and design of adaptive and cognitive computational-intelligence techniques able to learn, adopting artificial neural networks and operate in nonstationary/evolving environments and the deployment of credible networked intelligent cyber-physical systems able to operate in smart environments will be introduced.

Biography:

Danilo Pietro Pau is Senior Principal Engineer, Senior Member of Technical Staff at Advanced System Technology, STMicroelectronics, in Agrate Brianza Italy. Since Danilo's appointment as System Engineer at STMicroelectronics on 1994, he has tutored and advised more than 40 undergraduate and graduate interns (on computer science and electronic engineering) and few PhD's students. He currently serves as coordinator of the Technical Staff Community in STMicroelectronics, a 130+ group of talented technical experts. He received the Electronic Engineering degree from Polytechnic of Milan, Italy on 1992. On 1991 he joined STMicroelectronics on Advanced System Architectures as contractor engineer on HD decoder hardware design HD-MAC compliant. From 1994 onward worked on MPEG2 video processing and memory reduction architectures for Set Top Box and Mobile application processors. Next his efforts were on MPEG2 consumer video encoding and transcoding. Since 2002, he coordinated in UK a highly experienced graphics research team, working on algorithms and architectures for embedded 3D graphics. He joined on 2003 among few companies

the just born Khronos OpenGL-ES standardization committee. Then he expanded his interests on 2D vector scalable embedded graphics based on tile based rendering. He is serving as co-chair MPEG Compact Descriptors for Visual Search ad-hoc group. He holds many European, USA and Japan granted patents, as well as international publications that he has presented on numerous occasions at international engineering conferences. He is Senior Member IEEE and has participated to European funded projects (CAMMI, ASTUTE, VENTURI, CSI, FASTER), most of them still running.