

# IEEE CASS Seasonal School 2018 on Enabling CAS Technologies for Industrial IoT at the Core of Industry 4.0

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The Winter School “Enabling CAS Technologies for Industrial IoT at the Core of Industry 4.0” supported by 2018 CASS (circuit and systems society) seasonal school program, was held at the Department of Information Engineering (DII), University of Pisa, Italy, the 13 and 14 December 2018. The school was organized by Prof. S. Saponara from University of Pisa, and Dr. Y.-K. Chen research scientist at Alibaba group, both co-founders of the CASS Special Interest Group on IoT.

The summer school had about 40 participants from industries and from universities and research centers. Teleconference connections allowed remote participations also from US and Australia.

This seasonal school offers lessons in the field of CAS for the emerging topic of Industrial Internet of Things (IIoT), which is at the core of the industry 4.0 revolution. The uniqueness of this school vs. other schools on IIoT has been (1) the focus on industrial applications (CAS solutions for logistics and digital supply-chain, product and process digitization, healthcare, automotive and intelligent transport systems) and (2) beside lectures from IEEE DLs (Distinguished Lecturers) and IEEE Fellows, the seasonal school included industry speakers, operating in the CAS domain. Industrial lectures were held by people from both industrial providers of IIoT circuitual solutions (e.g. Intel by R. Mariani and Y.-K. Chen, Calceo by M. Canale, Ingeniars by C. Giunti, Quantavis by G. Iannaccone, Keysight by D. Di Marzio and J. Sarrade, Freespace by A. Monorchio) or IIoT system integrators (Huawei by R. Flamini, Dyson by M. Cosci, IDS by R. Cioni, Sofidel by A. Congi, Cubit by S. Giordano).

There were also 3 lessons from IEEE Academic DLs on “Compressed Sensing for Parsimonious Compression and Security in IIoT” by R. Rovatti, and “Measurement Performance of Sensor Systems towards Autonomous Vehicles” by S.

Saponara, and by an IEEE Industry DL “Challenges and Opportunities of CAS on IIoT” by Y.-K. Chen.

The school was introduced by the IEEE Italy Section President Prof. B. Tellini, and by the DII Director Prof. G. Anastasi.

Lecturers discussed new trends in IIoT technologies with special focus on industry 4.0 applications which pose new challenges in terms of circuits and systems for: high-frequency and energy-efficiency measurements, machine learning and data analytics techniques for IIoT, edge and cloud-based computing, sensors interfacing and conditioning, low-power signal processing, wireless networking, functional safety and cybersecurity for IIoT safety-critical applications. The latter include several application domains such as: logistics, robotics, aerospace, healthcare, automated and connected mobility, agriculture 4.0, industry 4.0.

As a matter of fact, two hundred billion of smart objects will be part of the IIoT in the next few years. This scenario paves the way to innovative business models and will bring new experiences in the way we manage mobility of people and goods, industrial production, and healthcare. The challenge is offering products, services and comprehensive solutions for the IIoT, enhancing smart home, smart factory, autonomous driving cars and much more, while at the same time ensuring the highest safety standards.

References to the contents of the school can be found in the IEEE CASS publication [1], free available in electronic form for IEEE CASS members.

[1] Enabling Technologies for the Internet of Things: Wireless Circuits, Systems and Networks, Ed. S. Saponara, River Publishers 2018, ISBN: 9788793609747,  
[https://resourcecenter.cas.ieee.org/publications/ebooks/CASPUB005\\_0.html](https://resourcecenter.cas.ieee.org/publications/ebooks/CASPUB005_0.html)



Fig. 1: IEEE CASS Seasonal School participants at the University of Pisa, 13-14 Dec. 2018, organized by S. Saponara and Y.K. Chen



Fig. 2: IEEE CASS Seasonal School during an industrial lecture (Julian Sarrade from Keysight Europe)