

# **Through digital enterprise technologies and intelligent manufacturing to innovation factories in the field of cyber-physical systems**

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***Symposium on Innovative Approaches to Engineering Education***

*June 27, 2013, Budapest, Hungary*

*within the*

***2013 Annual Meeting of the International Council of Academies of Engineering  
and Technological Sciences (CAETS)***

*June 26-28, 2013, Budapest, Hungary*

*Digital Enterprise Technologies (DET)*, i.e. the collection of systems and methods for the digital modeling of the global product development and realization process in the context of life cycle management, constitute effective tools not only for researchers and practitioners, but are used more and more in the education, as well. However, in the engineering fields all forms of training within the lifelong learning require some hand-held, direct experiences with the materials, equipment, machines, not mentioning the experience in the team work. This is why *Learning Factories* are established all over the world both at the leading universities and consulting companies.

The presentation introduces the “*Initiative on European Learning Factories*” established in May 2011, with the main goals of exchanging knowledge and experiences, a sustainable integration of research and teaching, improving the education of students as well as experts and managers from industry by establishing standards and using the strengths of all partners, including GTT BME and SZTAKI.

The *SmartFactory* established in SZTAKI serves not only educational purposes, but through the integration of DET and physical elements of a manufacturing enterprise, is suitable to convey research activities in production planning, scheduling and control in a combined physical-virtual environment, and to demonstrate the results to representatives of the industry. The setting represents an ideal environment for investigating *Cyber-Physical Systems (CPS)*, i.e. systems featuring a tight combination of, and coordination between, the system’s computational and physical elements, in order to balance between aspects of optimisation, autonomy and cooperation. The presentation shortly introduces the concepts of Digital Enterprise Technologies and Learning Factories and highlights the main trends and activities in these fields. Moreover, through the *SmartFactory* of SZTAKI, it will be illustrated, how the combination of these concepts can lead to an *Innovation Factory* for researching Cyber-Physical Systems in production.