Forum Teratec

28 & 29 juin / June 2016
ECOLE POLYTECHNIQUE
PALAISEAU - FRANCE

THE INTERNATIONAL MEETING FOR SIMULATION AND HPC

Digital Simulation
and Internet of Things

Big Data and HPC applications never cease to amaze! For this **Teratec Forum 2016 "technology" workshop,** we turn the spotlight on "**HPC, Connected Objects, and IIoT Infrastructures**".

This workshop will focus on the new high performance infrastructure and simulation technologies integrated into the IIoT infrastructures that will increasingly be used in the complex systems of tomorrow.
Objective: to illustrate new fundamental and revolutionary simulation techniques that can be used in a wide range of sectors, from automotive, energy, and civil engineering to health, multimedia, and defence… and the list goes on! Here, we will look at applications in agriculture, BIM, acoustics, and health.

■ **Workshop7 - HPC Technologies & Industrial Internet of Things (IIoT) infrastructures - 2pm to 5.30pm**
Chaired by Jacques DUYSENS, ANSYS Inc.

■ **Predictive analysis and the digital twin** or how the combination of predictive analysis methods and system simulation can be used in an IIoT context to improve industrial resource management throughout the Product Life Cycle (PLC).
With: Bernard DION, Chief Technical Officer, Systems Business Unit, ANSYS

■ **BIM, IoT and simulation for the buildings and cities of tomorrow:** Using digital data and tools is now a key part of every stage of a project, from design, operation, and management to policy-making and communication.
With: Alain ZARLI, R&D Directorate - European Affairs, CSTB

■ **Intelligent diabetic socks for foot ulcer prevention using model reduction** (See Focus below)
With: Vincent LUBOZ, Research Engineer, TEXISENSE

■ **Agriculture at the crossroads of IIoT and HPC,** because the challenges faced by agriculture are more relevant than ever, this presentation illustrates possible solutions when modeling and data assimilation tools are used with IIoTs.
With: Marion CARRIER, Modeling Engineer, CYBELETECH

■ **Case on predictive maintenance by acoustic data analysis in an industrial environment:** This analytic platform has shown its effectiveness in optimising production unit availability in an industrial group, reducing failure diagnosis times, and making maintenance operations more efficient.
With: Jean-Michel FREY, Research Engineer, SOGETI HIGH TECH

■ **The Infrastructure of Petabyte-Scale Scientific Data Archiving.** This presentation will analyse issues around the explosion of the amount of data to be stored and the related expectations.
With: Bradley KING, Chief Architect, SCALITY

<u>Focus</u>:
"Smart Sock" for diabetic foot ulcer prevention using model reduction.
By Vincent LUBOZ, Research Engineer, TEXISENSE

Plantar ulcers are a common complication of diabetes, due to reduced sensitivity in patients as a result of neuropathy. Deep ulcers develop when the pressures applied to the foot cause severe internal deformation near the bone structures. These tissue deformations need to be closely monitored to ensure effective prevention.

Crédit photo Texisense

Biomechanical models of the foot can be used to assess the deformations inside the foot and determine the risk of ulcer formation according to pressures measured on the surface of the foot.
These pressures are monitored using a **sock equipped with textile sensors**.

This 100%-textile sock is embedded with sensors that can measure the pressure around the foot and send this information, via bluetooth, to a microcontroller that evaluates the risk for the patient. This evaluation is based on a biomechanical model of the foot composed of a **Finite Element Mesh**, which reproduces the soft tissues and integrates the bones in the form of a digital clone of the patient, providing a simulation of the internal deformation produced by the pressures measured by the sock.
If these deformations exceed a certain cellular tolerance threshold, a warning is sent to the patient's smartphone, alerting them to the risk and prompting them to change their posture or check their foot. Model reduction techniques allow the biomechanical computing time to be reduced, providing an effective real-time means of everyday plantar ulcer prevention.

This is one of the eight workshops on offer at the Forum on Wednesday 29 June. For more information, see here.

Visitors at the Teratec Forum will also find:

- **Plenary sessions** on Tuesday June 28, devoted to the technological challenges and diversity of uses of simulation and Big Data.

- **The exhibition,** 28 and 29 June, a trade fair of almost 80 stands, bringing together the key players in simulation and HPC.

- **The Digital Simulation Awards:** Six Digital Simulation Awards will be given in recognition of outstanding accomplishments in digital simulation, HPC, and big data analytics.

- **European Research Café**: An all new area dedicated to European research projects and initiatives in the fields of digital simulation, HPC, and Big Data. INRIA is a partner of the European Research Café *(Café Européen de la Recherche).*

- **Collaborative Project Area:** Bringing together twenty collaborative research projects approved by the Competitiveness Clusters ADVANCITY, ASTECH, CAP DIGITAL, SYSTEMATIC, and VEGEPOLYS.

- **SiMSEO will be at the TERATEC Forum to present the use of simulation in enterprises ranging from the very small (VSE) to small and medium (SME) and mid-sized businesses.** Throughout the two days of the **Forum,** educational sessions for VSEs, SMEs, and mid-sized business will be held, aimed at helping decision-makers identify the opportunities that simulation offers and weigh the industrial stakes.

REGISTER NOW: Workshop registration

Forum Teratec

Tuesday 28 & Wednesday 29 June 2016
Ecole Polytechnique, Palaiseau

Complete information online at: Teratec Forum

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