**13 & 14 OCTOBRE  OCTOBER 13 & 14**

# The latest innovations in simulation, HPC, Big Data and AI
# To be presented at Teratec Digital Forum 2020

### October 13 and 14, 2020
### Registration and Information: https://teratec.eu/forum

### Programme details (see below)

**On October 13 and 14, digital version of the next Teratec Forum will present a review of the latest international advances in the fields of simulation, HPC (High Performance Computing), Big Data and artificial intelligence.**
**These technologies are more than ever at the forefront at a time when the need for analysis, research, prototyping, innovation... is all the more necessary for the revival of industry and the economy. And they are taking such due place in sectors as varied as health, industry, aerospace, construction, security, communities...**

The virtual exhibition will thus present **latest technologies proposed by nearly 50 exhibitors** (manufacturers and publishers, suppliers and integrators of hardware, software and services solutions, universities and research laboratories, centers of excellence, competence centers, European research projects, infrastructures and service platforms...). Visitors wishing to deepen their knowledge, to attend demonstrations and be advised by best experts will be able to arrange for **personalized appointments** throughout the forum.
**The plenary session** will address major challenges facing French and European industry for which these innovative technologies will play a key role, with the participation of **Thierry BRETON**, European Commissioner, **Florence PARLY**, French Minister of the Armed Forces, **Trish DAMKROGER**, Vice President, Intel Data Center Group, **Kevin D. KISSELL**, CTO, Google, as well as French and European industry leaders.

**During the technical and application workshops**, renowned international experts and industrialists will explain how they developed and implemented these innovative technologies on main themes of the digital twin in medicine, quantum computing, satellite data serving the environment, AI and scientific computing, Cloud computing and HPC, as well as Exascale.

Finally, **the Numerical Simulation and AI Trophies** will reward one innovative project or a company that has carried out an outstanding operation in the field of numerical simulation, high-performance computing, Big Data or AI. Added to our 5 usual trophies, an exceptional prize will be granted this year: **the COVID-19 Trophy awarded to a product, technology or service providing an effective solution in the management or recovery from a health crisis such as COVID-19**.

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**Sponsors of Teratec Digital Forum 2020**
*Platinum: Atos, Dell Technologies, DDN HPE et Intel*
*Gold: CEA et DoItNow*
*Silver: Arm, Atempo, Genci, Lenovo, Microsoft, Rescale, Xilinx*

## Taking stock of digital simulation, HPC, Big Data and AI

**As unifying event for the entire French, European and international community, the plenary session and workshops will provide the required perspective at a time when computer simulation, HPC, Big Data and AI are central to the current medical research and the economic recovery of industries. The health sector will come as a particular focus to take stock of research, industrial developments or even chart the organization of the management of major health crises.**

- **Plenary session (Tuesday, October 13 - 9:30 am - 11:00 am)**

This session will be a great opportunity to discover the major French and European industrial challenges where these innovative technologies will play a leading role, to enable manufacturers, both large groups and SMEs, to remain innovative and competitive.

With the participation of: Thierry BRETON, European Commissioner, Florence PARLY, Minister of the Armed Forces, Trish DAMKROGER, Vice President, Intel Data Center Group, Kevin D. KISSELL, CTO, Google as well as other French and European industry leaders.

- **Round Table (Tuesday, October 13 - 11:00 am - 12:00 pm)**

Following the plenary session this roundtable will address one topical theme with the participation of representatives from Atos, CEA, DDN, Dell Technologies, DoItNow, HPE and Intel.

- **Workhops**

### Digital twin in medicine: are we [im] patients?
*Tuesday October 13, 2020 - 14h00 - 15h30*

Digital twins allow the medical staff at large to simulate clinical trials as well as interventions, but also used as diagnostic aids and to test various therapeutic strategies in advance. This workshop will present examples of actual applications of the "digital twin" approach in medicine.

Chaired by Philippe Gesnouin Project Officer EIT Health and EIT Digital, Inria, with the participation of:

- *Patient specific cardiac modeling: stakes and advances,* by Philippe Moireau, Senior Research Scientist, Inria
- *How virtual patients' cohorts can support us in identifying the patients who will mostly benefit from our treatments?,* by Sylvia Julien, Digital Biometry Director, Ipsen
- *Virtual Humans for in silico Cardiology Trials using supercomputers,* by Christopher Morton, Business Executive & CEO and Mariano Vázquez, Co-Founder & CTO, ELEM Biotech
- *Digital and Hybrid Twins of Human Models,* by Francisco Chinesta, Directeur scientifique, ESI Group
- *Semantic methods of representing medical concepts,* by Arnaud Rosier, CEO & Co-Founder, Implicity
- *SOFA: an open-source reference for simulation in medicine,* by Hugo Talbot, Coordinator of the Consortium SOFA
- *A Virtual Twin of the Epileptic Brain for Assisting the Surgical Decision,* by Cecile Bonnard, Application manager, 3DS

### Quantum computing: What's new in QuBits?
*Tuesday October 13, 2020 - 16h00 - 17h30*

With an update on the French National Quantum Plan, this workshop will also present some of the most recent developments in quantum computing. Speakers will share their thoughts and successes, covering such diverse technologies as Rydberg atom-based QuBits, Google's quantum supremacy, photonic QuBits, spin QuBits and topological QuBits.

Chaired by Philippe Duluc, Chief Technology Officer, Atos, with the participation of:

- *National Quantum,* by Iordanis Kerenidis, Research Director, CNRS

- *First scaling quantum processors and their applications,* by Georges-Olivier Reymond, CEO, Pasqal
- *Quantum Computing at Google : supremacy and beyond,* by Kevin Kissell, Technical Director for HPC and Quantum Computing, Google Cloud
- *The optical Quantum computing platform at hand based on semiconductor technologies,* by Valérian Giesz, CEO, Quandela
- *Silicium-based quantum computing: challenges and opportunities,* by François Perruchot, Quantum Computing Strategic Marketing, CEA-Leti
- *Topological Qubits – principles and advantages,* by Vivien Londe, Quantum Software Engineer, Microsoft

## Environment and satellite data: from abundance of applications to the surge of structured solutions
*Wednesday October 14, 2020 - 09h00 - 10h30*

National and European initiatives structured for data access will be at the heart of this workshop, with contribution of the Data Terra Research Infrastructure and the DIAS Wekeo Copernicus in particular.

Purposefully varied thematic applications will illustrate the richness of the field (ocean meteorology, coastal dynamics, land use and precision agriculture, urban growth...). This workshop will present a number of ongoing developments involving public and private actors (data access infrastructure projects based on hybrid or interoperable architectures, services for targeted analytics production) or sound cases of virtual laboratories (science test beds or virtual research environments), allowing to test models or algorithms on intensive computing infrastructures.

Chaired by Laurent Boisnard, Sous-directeur adjoint Observation de la Terre, CNES et François Robida, BRGM with the participation of:

- *Deep learning on remote sensing images: a new era for environmental applications,* by Rémi Cresson, Ingénieur, INRAE et David Youssefi, Ingénieur, CNES
- *Satellite data for urban growth,* by Alice Froidevaux, Lead Data Scientist and Thanh-Long Huynh, CEO, QuantCube Technology
- *New-generation hydrodynamics modelling platform for coastal applications,* by Andrea Gilberto Filippini, Ingénieur Chercheur, BRGM
- *Scaling scientific data analysis on HPC or Cloud facilities with Pangeo,* by Guillaume Eynad-Bontemps, Responsable Centre de Calcul, CNES and Tina Odaka, Ingénieur recherche et développement en traitement de larges jeux de données, IFREMER
- *Data and services distributed infrastructure for Earth system observation and modelling,* by Karim Ramage, chargé de mission Architecture IR Data Terra, IPSL/CNRS
- *From EO data and models to a digital ecosystem: WEkEO,* by Alain Arnaud ,Copernicus Director, Mercator Ocean and Frederic Vallois, WEkEO Sales Director, Thales Alenia Space
- *Estimation of River Discharges from SWOT Observations using Data Assimilation and hydraulic Models,* by Sophie Ricci, Chargée de Recherche, CERFACS

## AI in scientific computing: accelerating innovation in industrial and academic domain
*Wednesday October 14, 2020 - 11h00 - 12h30*

Starting with one representative case study of an AI-based recommendation system for music broadcast to the general public, this workshop will explore new uses of data and AI in various fields such as computer simulation, cybersecurity, medical imaging and new academic and industrial opportunities enabled by advances in quantum and neuromorphic technologies.

Chaired by Eric Petit, Research engineer, HPC application specialist, Intel and Michaël Krajecki, Agence de l'Innovation de Défense (AID), with the participation of:

- *Which AI for Defense Industry?,* by David Sadek, VP Research, Technology & Innovation, Artificial Intelligence & Data Processing, Thales
- *Deep Learning for Modeling Physical Processes,* by Patrick Gallinari, Sorbonne Université and Criteo AI Lab.
- *The manufacture of recommended algorithms: a human adventure,* by Thomas Bouabca, Director of Datascience, Deezer

- *Quantum algorithm for ML,* by Iordanis Kerenidis, scientific referee for the French government for Quantum technologies, CNRS
- *Neuromorphic Engineering for Cyber Security,* by Mathilda Rhodes, cyber security and AI researcher, Airbus
- *How Deep Learning became the tool of choice for human level AI in radiology,* by Yaroslav Nikulin, Senior Research Scientist, Therapixel

## Cloud Computing & HPC: A powerful combination driving innovative use cases
***Wednesday October 14, 2020 - 14h00 - 15h30***
Users along with stakeholders in this workshop will address the current complementarity between Cloud Computing and HPC in the areas of mobility, air quality, autonomous vehicle or training.

Chaired by Philippe Bricard, président, UCit, with the participation of:
- *Cloud Computing & HPC: Opposition or Complementarity,* by Philippe Bricard, President, UCit
- *AQMO, an air quality data collection and processing chain,* by François Bodin, Professor, Université de Rennes 1
- *Microsoft Azure, HPC and usage born in the cloud,* by Alexandre Jean, HPC AI Technical specialist, Microsoft et Julien Nauroy, Project Manager for HPC solutions, Renault
- *The 4R golden rules for HPC in the Cloud: Right resources, Right Time, Right Size, Right Price,* by Gilles Tourpe, Business Development Manager HPC and Guillaume Martinat, Lead aerodynamics engineer, Flying Whales
- *HPC cluster on demand and cost control at Storengy,* by Jean-Frédéric Thébault, Senior Model Engineer, Storengy
- *HPC from Desktop to Cloud… An ISV point of view on deployment models,* by Wim Slagter, HPC and Cloud Alliance Director, Ansys
- *Rescale, a PaaS for simulation in the cloud,* by Guillaume Trainar, Sales for Southern Europe, Rescale and Philippe Peron, IT Leader, emotors

## Do you speak Exascale?
***Wednesday October 14, 2020 - 16h00 - 17h30:***
Renowned experts from major computing centers and supercomputer manufacturers will share their vision for the future of the Exascale.
A symbolic barrier for the global HPC community, Exascale computing will undoubtedly be crossed in 2020. But it cannot be limited to such a monolithic definition of performance.
The HPC community will use complementary tools to address a variety of needs in computer simulation, massive data processing and analysis, machine learning and AI, increasingly combined and nested in complex workflows.

Chaired by Guillaume Colin de Verdière, Senior Expert on HPC and Jean-Philippe Nominé, HPC Strategic Collaborations Manager, CEA DAM, with the participation of:
- *CEA vision for exascale computing,* by Jacques-Charles Lafoucrière, program manager, CEA DAM
- *The JSC modular approach to extreme scale computing,* by Dr. Estela Suarez, Senior Scientist and deputy-lead of the Technology Department, Jülich Supercomputing Centre
- *Atos' computing continuum, from high performance computing to edge computing,* by Arnaud Bertrand, Senior Vice President, Big Data & HPC, Atos
- *HPC & AI Convergence,* by Patricia (Trish) A. Damkroger, Vice president and General manager of the HPC organization, Intel
- *Redefining "Exascale": The Third Great Disruption of HPC,* by Steve Oberlin, Chief Technology Officer for Accelerated Computing, Nvidia
- *Data everywhere, Compute anywhere,* by Jean-Thomas Acquaviva, Senior researcher, DDN Storage

## Europa Village, one area dedicated to European HPC ecosystem
*Europa Village is developed in partnership with Inria.*

***New for 2020, the Europa Village brings together all organizations working to develop the European Supercomputing Infrastructure and contributing to the success of European technological innovation in the field of HPC and related areas such as Big Data and AI, particularly in the Horizon 2020 Program framework.***

It brings together centers of excellence, competence centers, European research projects, infrastructures and service platforms, associations and institutional bodies. During the TERATEC Digital Forum, visitors will be in contact with these different organizations to get practical information on added value and services offered by the whole European HPC ecosystem.

***Being present***: AQMO Project; ASPIDE Project; ChEESE; CYBELE Project; ENERXICO Project ; ESIWACE-2 Project; EVOLVE; ExaQUte; EXDCI-2; HPCWE; LEXIS; MONT-BLANC Project; POP-2.


## 6$^e$ Trophies of Simulation and AI 2020
The 6th Trophies of Simulation and AI 2020 are presented in partnership with: Ansys, CEA, Inria, and Smart 4D.

***The 6th edition of this event co-organized by TERATEC and L'Usine Digitale (Groupe Industrie Services Info) will be held on October 13, 2020, from 3:30 to 4:00 pm. These trophies reward an innovative project or one company that has carried out an outstanding operation in the field of computer simulation, high-performance computing, Big Data or AI.***
***In addition to our recognized five trophies, an exceptional prize will be granted for this year: the COVID-19 Trophy.***

***Start-up Award***
Given to a company set up less than 5 years ago that really distinguished itself by innovation in artificial intelligence (AI), intensive computing, numerical simulation, or Big Data.

***SME Award***
Granted to an SME (less than 250 employees, revenue under 50 million euros) as significant user having effectively implemented numerical-computing technology (AI, simulation, data analysis, big data) and changed how it develops, produces, and maintains new products and services, or anticipates their complete life cycle.

***Innovation Award***
Given to an innovative product, piece of technology or service in the field of AI, numerical simulation or data analysis developed by a technology company.

***Co-design Award***
Granted to a pair or group – bringing together a big company, SME, laboratory, start-up, etc. – collaborating on AI and/or numerical computing and/or big data project, whether at the development or implementation stage.

***Public Grand Prix***
Given by the Public and Readers from *L'Usine Digitale* to one of the above nominees in their category; vote Online, **from September 22, 2020**, on www.usine-digitale.fr.

***Covid-19 Award*** [NEW]
To be granted to a product, technology or service developed by a technology company providing their solution in the field of artificial intelligence, digital simulation or data analysis towards managing or exiting the health crisis of COVID-19.