



EPI Forum

Paris, 6–7 October, 2025



EPI FORUM



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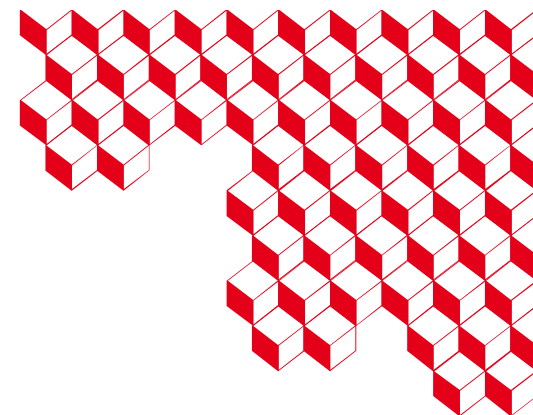




EPI Forum

**October 6, 2025
Paris**

Gold Sponsor



CEA

A key player in scientific and technological research

Dr. Eng. Jean-Philippe Nominé

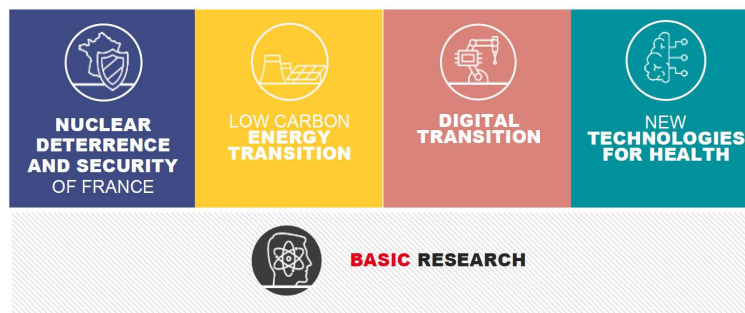
CEA DIF - Computing Centres, Software and Codes Division

jean-philippe.nomine@cea.fr

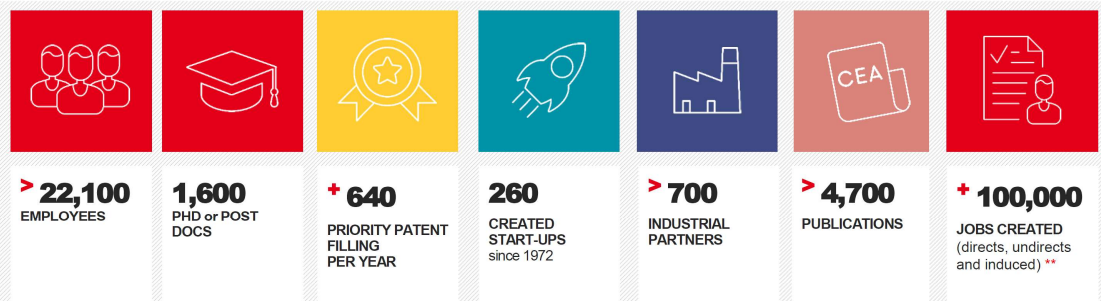
CEA Created in 1945 to master the use of nuclear energy

A strategic positioning, focused on four societal challenges

- **SCIENTIFIC AND TECHNICAL OBJECTIVES** organized in 4 areas which all benefit from **BASIC RESEARCH** activities.



2nd major FRENCH R&D ORGANIZATION



2024 figures.

* Estimated from EARTO Economic Footprint Study of 15 RTOs in 2024.



A THOROUGH INSERTION IN ACADEMIC ECOSYSTEM

Shareholder, operator or partner of

- 14 large-scale research infrastructures
- 32 research infrastructures

HPC @ CEA



Tackling scientific, industrial and societal challenges

Increasing EU HPC sovereignty and access to independant HPC technologies and solutions



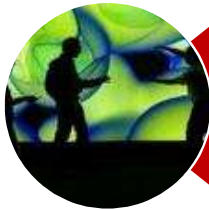
Infrastructures

CEA owns and operates large-scale HPC facilities for research, industry and defence, and delivers related services and support to CEA, FR and EU researchers and engineers



Technologies

CEA also develops HPC technologies – from underlying fundamental research in physics, components and circuits design and related fab processes, to supercomputers co-design, incl. various s/w stack elements



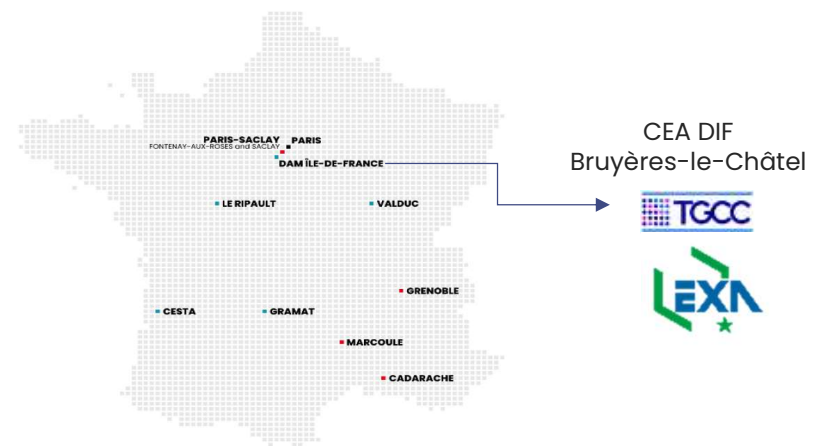
Applications

CEA uses HPC for its missions and programmes, with many scientific and industrial partners, and develops or co-develops a diversity of HPC/HPDA applications

HPC infrastructures sovereignty

HPC services for Research, Industry, Defense

Operating 4 computing centres



HPC infrastructures sovereignty



ON-GOING EVOLUTIONS
QUANTUM COMPUTING
EXASCALE



2025: Pasqal's RUBY cold-atom and Quandela's LUCY photonic quantum computers at TGCC
w/ Qaptiva/QLM emulator and front-end to supercomputers



EuroHPC
Joint Undertaking

The EuroHPC JU has selected the Jules Verne Consortium to host and operate in France the 2nd EuroHPC exascale supercomputer.



Jules Verne consortium:



> Hosting Entity



> Hosting Site



> (NL) Partner

Alice Recoque in 2027
Procurement on-going
Infrastructure ready



ALICE RECOQUE
BEYOND HPC



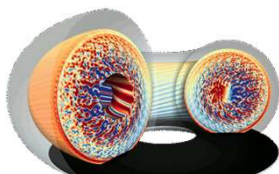
HPC applications



CEA co-develops lighthouse HPC applications with scientific and industrial partners

A few examples:

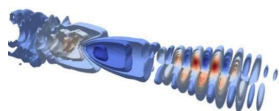
GYSELA



Fusion for energy community

semi-Lagrangian code addressing gyrokinetic full-f global simulations of flux driven tokamak plasmas

WarpX



With ECP/LBNL

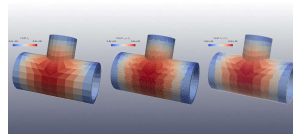
advanced electromagnetic & electrostatic Particle-In-Cell code
Gordon Bell Prize 2022 incl. CEA researchers (simulation of a high-power femtosecond laser onto a hybrid solid/gas target)

2022 ACM Gordon Bell Prize Awarded to a 16-Member Team Drawn from French, Japanese, and US Institutions

ACM, the Association for Computing Machinery named a 16-member team drawn from French, Japanese, and US institutions as recipient of the 2022 ACM Gordon Bell Prize for their project, "Pushing the Frontier in the Design of Laser-Based Electron Accelerators With Groundbreaking Mesh-Refined Particle-In-Cell Simulations on Exascale-Class Supercomputers."

The members of the team are: Luca Fedeli, France Boillod-Cerneaux, Thomas Clark, Neil Zaim, and Henri Vincenti (CEA); Axel Huebl, Kevin Gott, Remi Lehe, Andrew Myers, Weiqun Zhang, and Jean-Luc Vay (Lawrence Berkeley National Laboratory); Conrad Hillairet (Arm); Stephan Jaure (ATOS); Adrien Leblanc (Laboratoire d'Optique Appliquée, ENSTA Paris); Christelle Piechurski (GENCI); and Mitsuhsa Sato (RIKEN).

SALOME

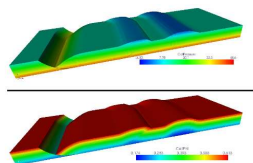


With Electricité de France

open-source scientific computing for conducting industrial physical simulation studies
platform for pre/post-processing, code coupling, distributed computing...



ARCANE



With IFPEN

open-source (since 202A) object-oriented platform to optimize the performance of large parallel computers and manage the complexity of data for non-structured 3D grids - study of plasmas at CEA, of geothermal energy and CO2 storage at IFPEN



From technologies for HPC and QC to solutions co-design

Fundamental and technological research for HPC and QC

Semiconductors, photonics: CEA LETI and CEA LIST

- Chip design, packaging
e.g. participation in EU ARM or RISC V oriented projects like EPI, DARE FPA, TRISTAN



- Photonics
e.g. NET4EXA project (photonics for BXI interconnect)



And also: neuromorphic, near/in-memory computing etc.

Quantum

- Iramis Institute: Quantronics Group (Saclay)
- IPhT Institute: Quantum Information Group (Saclay)
- LETI+CNRS+UGA: spin Si qubits (Grenoble)
Quobly spinoff company



From technologies for HPC and QC to solutions co-design

Long-standing partnership with BULL and technology suppliers

- co-development of technologies and first-of-a-kind systems

- Bullx commercial series from Tera 100 first of a kind 2010



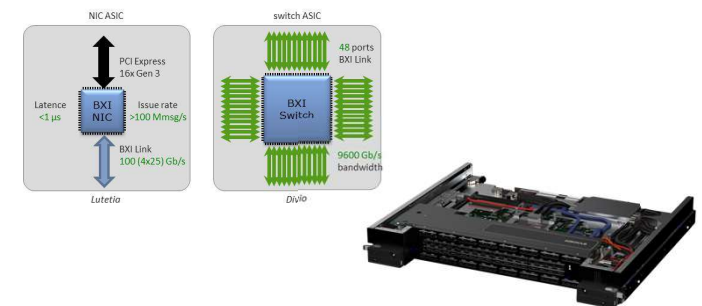
- Sequana commercial series from Tera 1000 – 2015



sequana



- BXI interconnect (now v3)



- Modular infrastructures (containers) by EVIDEN – EXA, 2021 – JUPITER , 2024 !

