



Press release

Paris, July 12, 2021

Continuing the fight against COVID-19: GENCI and Inria take a new step

In the wake of the French government's decision to progressively reduce restrictive sanitary measures, it is important to continue the scientific momentum in the fight against COVID-19. Thus, GENCI and Inria announce the deployment of their combined expertise to pursue the implementation and achievement of results in high-impact research projects.

After being selected in 2020 to receive a donation of computing resources as part of the [AMD COVID-19 High Performance Computing Fund](#), established by AMD to support global research institutions to accelerate medical research against the global pandemic, GENCI and Inria are taking a new step forward.

These two operators, committed to French scientific excellence, have announced the integration of the system, equipped with AMD EPYC™ processors and AMD Instinct™ Accelerators, into the national GRID'5000/SILECS infrastructure at the École Normale Supérieure in Lyon (France), and also its implementation

These donated servers¹ are now available to the scientific community. Thanks to the responsiveness of Inria's experts and the quality of the support provided to users, several major projects will benefit from these new resources. Among these projects, we can mention:

- **The optimization of data analysis tools for lung medical imaging, using artificial intelligence technologies**, led by Emilie Chouzenoux within the project team Optimisation, Imagerie et santé (OPIS) team of the Inria Saclay - Île-de-France and CentraleSupélec-Université research center. Since the beginning of the COVID-19 pandemic, this team has worked on the development of several tools implementing advanced deep-learning techniques to help with **the prognosis of COVID-19 patients**. We have to mention the **AI-Severity tool** (ScanCovIA project, partnership with Institut Gustave Roussy, Kremlin Bicêtre, Owkin), **which aims to anticipate, from the first visit, whether a patient will develop a mild or severe form of the infection**, and the **MASC-Net tool** (partnership with University Politehnica of Bucharest), **which allows physicians to finely and automatically localize lung lesions in chest scans of COVID-19 patients**. The team now wishes to take advantage of

¹The AMD donated servers include 10 hybrid computing nodes, equipped with AMD Radeon Instinct™ MI50 Accelerators and 2nd generation AMD EPYC™ CPUs.

the computing resources of the AMD powered server to improve the performance of MASC-Net by integrating new databases recently made available to the academic public.

Contact : emilie.chouzenoux@inria.fr

- **Evaluation of (de)containment strategies via simulations of local epidemic transmission from individual movements followed by statistical studies on the results of the Covid-19 epidemic spread.** The "Monte Carlo" method used will simulate the daily movements of the population of a typical city by adding probabilities of contamination. This project was set up in the framework of a partnership initiated by ASCII (the Analysis of Intelligent and Cooperative Stochastic Interactions center directed by Denis Talay and Nicolas Gilet) with several other Inria teams (Agora, Alpine, TriBE), the National Geographic Institute (IGN) and the CMAP laboratory of the Ecole Polytechnique. The IGN provides building characteristics (business, point of interest, home) as well as individual characteristics (household type, gender, age) collected in different databases (IGN, INSEE, RATP, City of Paris, OpenStreetMap).

Contacts: nicolas.gilet@inria.fr and denis.talay@inria.fr

- **The TINKER-HP team led by Jean-Philipp Piquemal, who has contributed significantly to scientific research since the announcement of the pandemic, is also mobilized. TINKER-HP allows the modeling of complex systems with up to millions of atoms.** A COVID-19 project has already been carried out in 2020, with the objective of modeling dynamic molecular simulations using advanced force fields. It is the fastest approach currently operational and available to perform state-of-the-art molecular dynamics simulations with a high-resolution polarizable energy model to model viral infection mechanisms in the most realistic detail.

Contact: jean-philip.piquemal@sorbonne-universite.fr

Philippe Lavocat, CEO of GENCI, Jean-Frédéric Gerbeau, Deputy Director General for Science at Inria, and Mario Silveira, Vice President EMEA and General Manager of AMD, expressed their hopes following this new step: "Research against COVID-19 must continue to reach the moment for a return to normal life. The work undertaken using the AMD powered servers is emblematic of this ambition". "Inria is delighted with the launch of this new calculator, which is accessible to the entire community. It is a new step in the fight against COVID-19, a fight for which we have been mobilizing our expertise for over a year".

GENCI and Inria against COVID-19

Since March 2020, GENCI has been making its national and European resources (via PRACE) in HPC, AI and data storage (Occigen, Joliot-Curie and Jean Zay supercomputers) available to researchers fighting COVID-19. At this, time, more than 40 research projects worldwide on COVID-19, ranging from epidemiological studies, the virus replication process inside our cells, massive screening of molecules to high-precision CFD simulations of droplet propagation, have benefited from GENCI's computing hours and support.

For its part, Inria set up an internal mission from March 2020 that accompanied the launch of some thirty projects against COVID-19, in cooperation with actors of the health crisis (clinicians, epidemiologists, hospitals, public authorities). Some of these projects have

implemented Artificial Intelligence methods requiring significant computing resources (deep-learning for thoracic imaging analysis, automatic processing of medical reports, etc.).

About GENCI

Created by the French government in 2007, GENCI is a large scale Research Infrastructure, public operator organization that aims to democratize the use of digital simulation through high-performance computing combined with artificial intelligence, to support French scientific and industrial competitiveness.

GENCI has three missions:

- To implement the national strategy aiming at equipping French scientific open research with high-performance computing , storage and massive data processing resources associated with AI technologies, in conjunction with the three national computing centers;
- To support the creation of an integrated HPC ecosystem on a national and European scale;
- To promote digital simulation and HPC to academic research and industry.

GENCI is a civil company owned 49% by the French government, represented by the Ministry of Higher Education and Research, 20% by the CEA, 20% by the CNRS, 10% by the universities represented by the Conference of University Presidents and 1% by Inria.

About Inria

Inria is the French national research institute for digital science and technology. World-class research, technological innovation and entrepreneurial risk are its DNA. In 200 project teams, most of which are shared with major research universities, more than 3,500 researchers and engineers explore new paths, often in an interdisciplinary manner and in collaboration with industrial partners to meet ambitious challenges. As a technological institute, Inria supports the diversity of innovation pathways: from open source software publishing to the creation of technological startups (Deeptech).

Contacts

GENCI press contact: Nicolas Belot - nicolas.belot@genci.fr - +33(7)60999510 | www.genci.fr

INRIA press contact : Laurence Goussu – laurence.goussu@inria.fr – 06 81 44 17 33

Scientific contacts :

Emilie Chouzenoux, OPIS, Inria : emilie.chouzenoux@inria.fr

Nicolas Gilet and Denis Talay, ASCII, Inria: nicolas.gilet@inria.fr and denis.talay@inria.fr

Jean-Philip Piquemal, Sorbonne University: jean-philip.piquemal@sorbonne-universite.fr

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