PRACE 24th Call for Proposals Supports High-Gain Scientific Research and Industrial Innovations

The 24th Call for Proposals for PRACE Project Access received 62 eligible proposals, of which 31 were awarded, a total of 2.136 billion core hours. This brings the total number of Project Access projects awarded to 947 since 2010. Taking into account the four multi-year proposals from calls 20 and 22, and the 10.21 million core hours reserved for Centres of Excellence, the total amount of computing time awarded by PRACE to date has reached approximately 35 billion core hours.

The proposals awarded under the 24th Call are led by principal investigators from 13 different countries including international collaborations with team members from countries like the USA and China.

Among the awarded proposals, seven scientific domains are represented: 10 proposals are linked to the fields of Chemical Sciences and Materials, 8 to Fundamental Constituents of Matter, 3 to Engineering, 3 to Earth System Sciences, 3 to Universe Sciences, 2 to Biochemistry, Bioinformatics and Life Sciences, and 2 to Mathematics and Computer Sciences.

Two projects are awarded under the “Industry Access Track”, which earmarks 10% of the total resources for proposals with principal investigators from industry.

Details of a selection of awarded proposals are highlighted below:

Structure and dynamics of ion-channel modulation by lipophilic drugs was awarded 70 569 600 core hours on **Piz Daint at ETH Zürich/CSCS (Switzerland)**. The Principal Investigator of the project is Prof. Lucie Delemotte from KTH Royal Institute of Technology, Sweden. The project intends to explore the conformational cycle of human ion channels and the lipophilic drug binding. The performed simulations can provide new information for drug designs intended to treat neurological disorders.

Multimessenger signals of binary neutron-star merger remnants, led by Dr Philipp Moesta from the University of Amsterdam, Netherlands, was awarded 48 045 000 core hours on **SuperMUC-NG at GSC/LRZ (Germany)**. The project focuses on general-relativistic magnetohydrodynamic simulations of the neutron star mergers in order to predict the corresponding electromagnetic and nucleosynthetic signatures.

Simulating footprint formation, from Humans to Dinosaurs was awarded 15 000 000 core hours on **Joliot-Curie Rome at GENCI/CEA (France)**. The Principal Investigator of the project is Dr Peter Falkingham from Liverpool John Moores University, United Kingdom, who will lead the simulation and modelling of the foot-substrate interaction in order to explore the mechanics of footprint formation to better understand and interpret fossil tracks. The simulations will enable visualization and quantification of the track-forming process.

HySProp (Hydrogen and Sustainable fuel Propulsion for the future of Aviation) was awarded 19.531.800 core hours on **Joliot-Curie Rome** and 16 028 375 core hours on **Joliot-Curie KNL at GENCI/CEA (France**) as an “Industry Track” project. The Principal Investigator of the project is Dr Stephane Richard from Safran Helicopter Engines, France, and will together with his team develop advanced 3D simulation tools for sustainable fuels and hydrogen combustion. This project intends to contribute to the understanding of sustainable aviation fuels and hydrogen impact on the spinning combustion technology, which is a first step towards the decarbonisation of aviation.

Standard Model Heavy Flavour Physics from Lattice QCD, led by Prof. Gregorio Herdoiza from Autonomous University of Madrid, Spain, was awarded 108 000 000 core hours on **HAWK at GCS/HLRS (Germany)**. The project aims to use Lattice QCD techniques to push the precision of key Standard Model predictions for the physics of the charm quark in order to put ever more stringent constraints on that part of the flavour sector.

High-fidelity simulations of isolated and installed jets using a high-order discontinuous Galerkin method was awarded 31 364 800 core hours on **JUWELS Cluster at GSC/JSC (Germany)**. The project and the team are led by Dr Margarida Moragues Ginard from the Basque Center for Applied Mathematics (BCAM), Spain. The project will address the problem of jet noise by performing high-fidelity, massively parallel, aeroacoustic simulations of isolated and installed jets.

Modeling the Regulation of Motors by Microtubule-Associated Proteins has been awarded 117 662 006 core hours on **Marconi100 at CINECA (Italy)**. The project's Principal Investigator is Dr Mert Gur from the Istanbul Technical University, Turkey. The team will perform state of the art all-atom level molecular dynamics simulations to explore the mechanism of how MT-associated proteins decorate the microtubules (MTs) and interact with motor proteins on MTs.

Control of Combustion Instabilities Using Non-Equilibrium Plasma in Sequential Combustors is led by Prof. Nicolas Noiray from ETH Zürich, Switzerland. The project was awarded 20 000 000 core hours on **MareNostrum 4 at BSC (Spain)** and will conduct numerical simulations to research the control of combustion instabilities by using the Non-Equilibrium Plasma (NEP) discharge. The project is of high importance in modern gas turbine development in terms of fuel handling and operational flexibility required by prospected energy mix for electricity generation.

All information and the abstracts of the projects awarded under the 24th PRACE Call for Proposals are available on the PRACE website.

The **24th Call** for Proposals for PRACE Project Access (Tier-0) was open from 09 September 2021 until 04 November 2021. Selected proposals will receive allocations to PRACE resources from 1 April 2022 to 31 March 2023.

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