



PARTNERSHIP FOR ADVANCED COMPUTING IN EUROPE

Access to **National and International** HPC infrastructures

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PRACE what we do

- ▶ **Open access** to world-class HPC systems to EU scientists and researchers
- ▶ **Variety of architectures** to support the different scientific communities
- ▶ High standards in **computational science** and engineering
- ▶ **Peer Review** at European level to foster scientific excellence
- ▶ Collaborate with European HPC **industrial** users and suppliers



PRACE | Tier-0 Systems in 2020



MareNostrum: IBM
BSC, Barcelona, Spain
#38 Top 500



Piz Daint: Cray XC50
CSCS, Lugano, Switzerland
#10 Top 500



NEW ENTRY 2018/2019
SuperMUC NG : Lenovo
cluster GAUSS @ LRZ,
Garching, Germany #13
Top 500

NEW ENTRY 2018
JUWELS (Module 1):
Atos/Bull Sequana
GAUSS @ FZJ, Jülich,
Germany #39 Top 500



NEW ENTRY 2018
JOLIOT CURIE : Atos/Bull Sequana
X1000; GENCI @ CEA, Bruyères-le-
Châtel, France #34 Top 500



MARCONI-100: IBM
CINECA, Bologna, Italy
#9 Top 500

NEW ENTRY 2020
HAWK: HPE Apollo
GAUSS @ HLRS,
Stuttgart, Germany



Close to TOP1 in
aggregated peak
performance



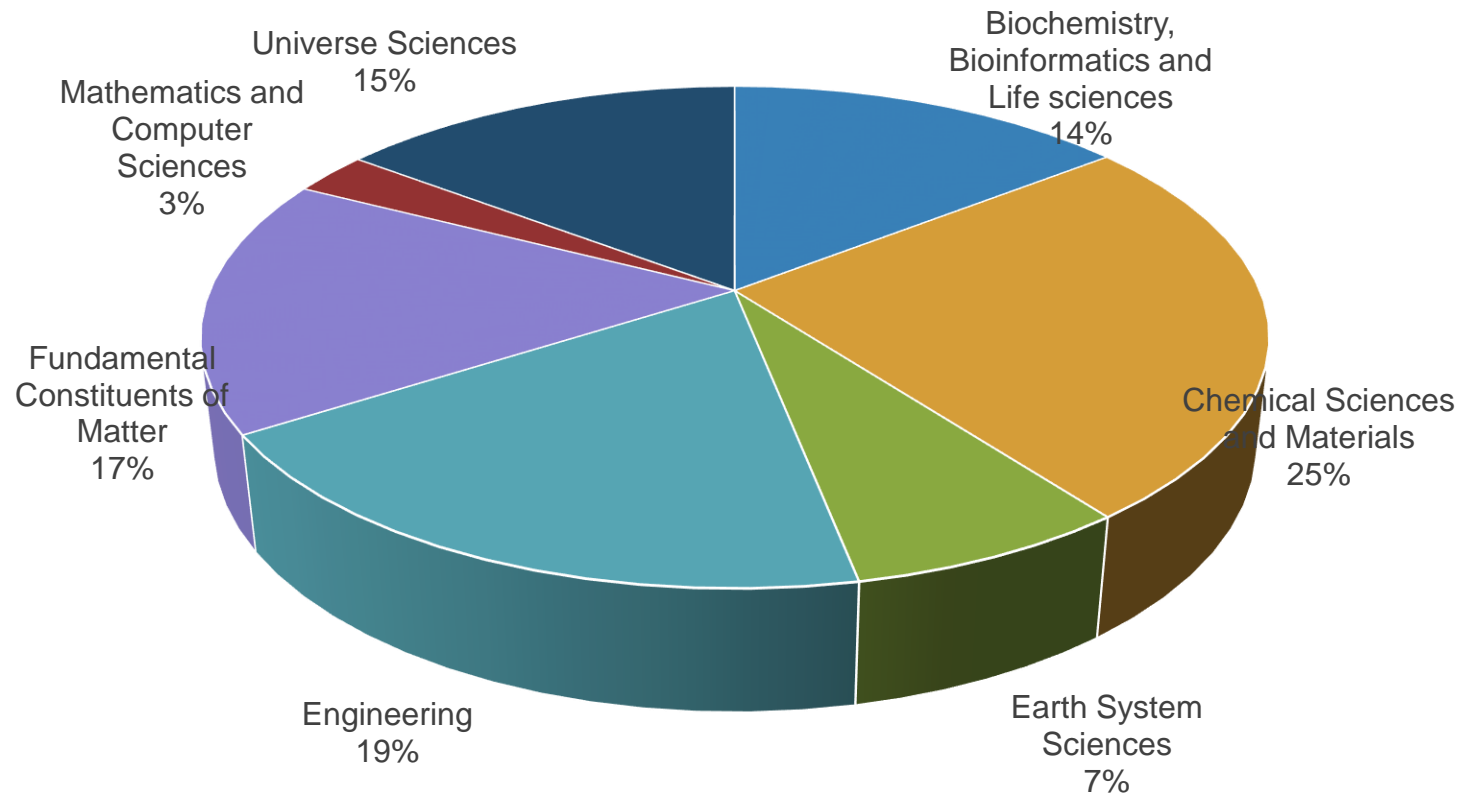
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PRACE facts and figures (2010-2020)

- ▶ 830 scientific projects enabled
- ▶ >28 billion core hours awarded
 - ▶ Of which 63% led by another PI nationality than the HM
- ▶ R&D access to industrial users with >65 companies supported
- ▶ >17 000 people benefiting from PRACE Training



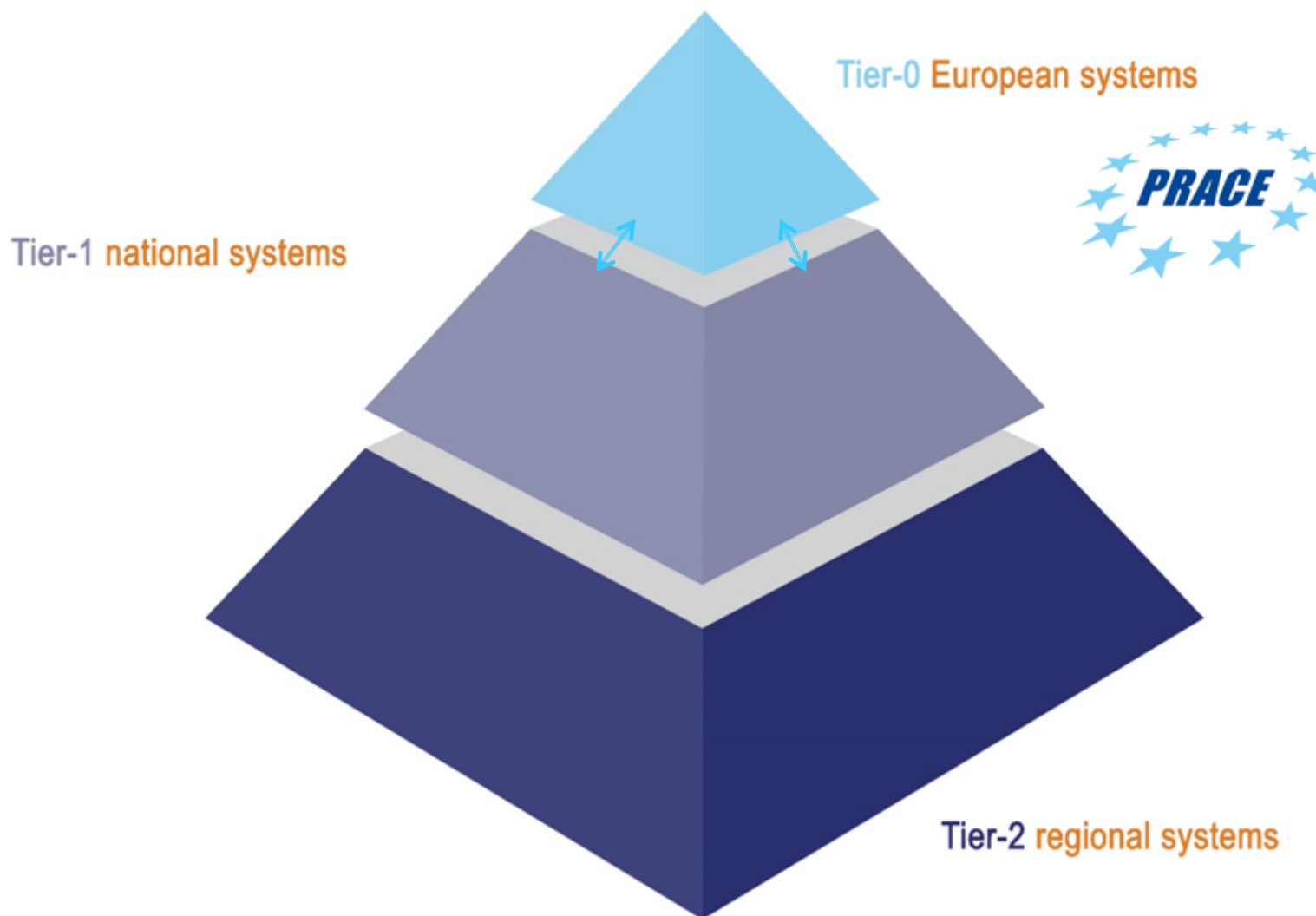
PRACE facts and figures (2010-2020)





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HPC ecosystem





PRACE services

Scope: open research projects for academy and industry, free at the point of usage

- Tier-0 (large scale) Projects Access
- Tier-0 Support programs
- Support to SMEs
- Tier-1 for Tier-0 support program
- Tier-1 Projects Access (DECI)
- Training to HPC users

**Criterion:
Scientific
Excellence**





PRACE under Horizon Europe

- ▶ General, open-access through competitive calls
 - COVID-19 Fast Track
- ▶ Wide offer of training and support for new and not-so-new users
- ▶ Horizon Europe – EuroHPC Joint Undertaking (work in progress)
 - Extended capacities, >10x increase expected
 - Extended services, to serve further users and communities
 - Continued training and support services



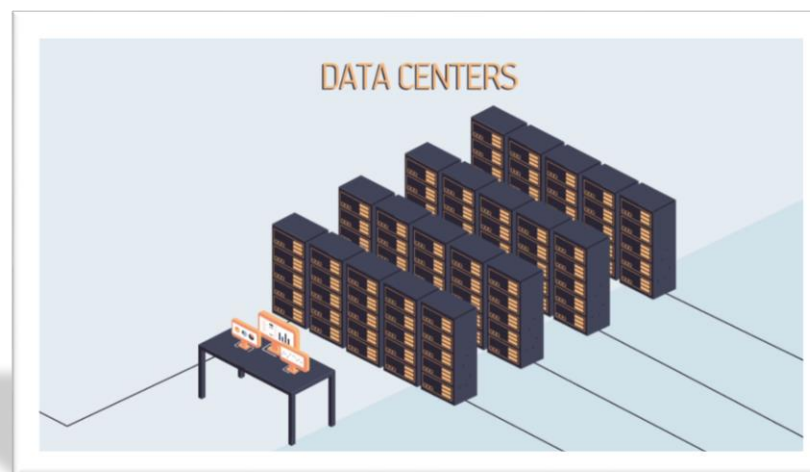
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National Infrastructures for Research and Technology (GRNET) **member of PRACE**

- ▶ GRNET provides advanced eInfrastructures & Services to the Greek academic and research institutions (Universities, Research Centers, Institutes, Libraries, Laboratories, Public Health sector, Classes, Students, Researchers, Network Operation Centers, Citizens):
 - ▶ National and international connectivity
 - ▶ eInfrastructures & services (network, computing, storage) to the community

GRNET: Advanced computational and storage services for the research and higher education community

- ▶ High Performance Computing (HPC) infrastructures (ARIS)
- ▶ Ability to have a full computer operating system and network in seconds (Okeanos)
- ▶ Development of Information Systems at minimum time, dynamic allocation in real time
- ▶ Distribution through the Internet (Amazon style-IaaS)
- ▶ Online file storage and syncing (Pithos+ Service)



GRNET HPC infrastructure (ARIS)



- ▶ Compute Nodes – 533 computational nodes - 535 TFLOPS:
 - ▶ 426 thin nodes: Regular compute nodes without accelerator.
 - ▶ 44 gpu nodes: “2 x NVIDIA Tesla k40m” accelerated nodes.
 - ▶ 18 phi nodes: “2 x INTEL Xeon Phi 7120p” accelerated nodes.
 - ▶ 44 fat nodes: Fat compute nodes have larger number of cores and memory per core than a thin node.
 - ▶ 1 ml node: “8 x NVIDIA Volta V100” accelerators
- ▶ Storage
 - ▶ 2 PB storage space through IBM’s GPFS.
 - ▶ 6PB maximum storage capacity of IBM TS3500 library.
- ▶ Available Software modules on:
 - ▶ Life Sciences, Computational Chemistry/Material Science, Weather Forecast, Engineering, Numerical Libraries, Visualisation Software, Machine Learning, Containers, Big Data,



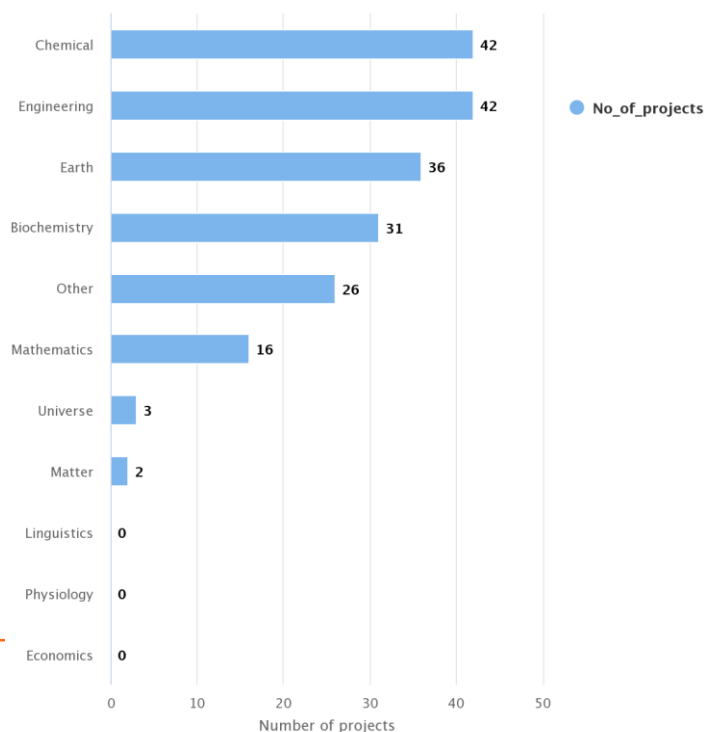
Access to ARIS

- ▶ Access to Greek researchers is provided through submission of proposals for research projects:
 - ▶ periodic invitations announced by GRNET (large production projects)
 - ▶ continuous open call for development or preparation projects.
 - ▶ fast-track procedures for COVID-19 research.
- ▶ In PRACE calls, European researchers can gain access to ARIS
 - ▶ 5% of total CPU time is given to PRACE calls.
 - ▶ Another 3% is given to European researchers through other European projects.
 - ▶ GRNET user support is usually the motivation for researchers to apply for ARIS
- ▶ GRNET operates as PRACE Training Center (PTC) funded by PRACE-6IP project

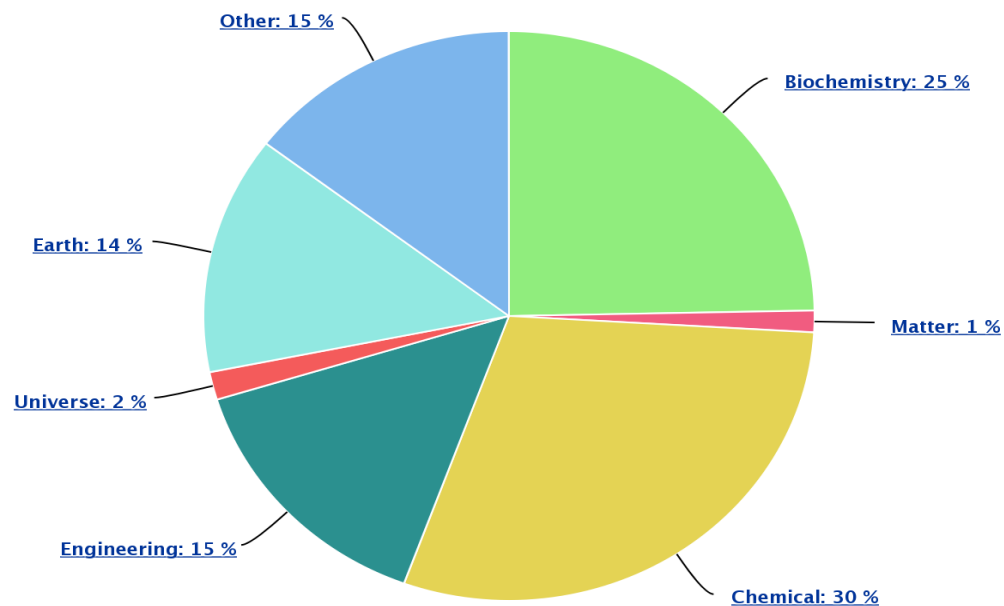
Access to ARIS – Variety of disciplines

- ▶ Statistics of 2019 usage:
 - ▶ Chemical = Material Sciences and Biomolecular
 - ▶ Engineering = Basic Engineering, but also others like chemical engineering
 - ▶ Earth = Meteorology, Climate but also space/satellite data (weather related)
 - ▶ Mathematics = Maths, AI and Computer Science
 - ▶ Matter = Elementary constituents of matter

Number of projects by Field of Science



Usage by Field of Science





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THANK YOU FOR YOUR ATTENTION

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