



Partnership for Advanced Computing in Europe

International HPC Summer School 2017

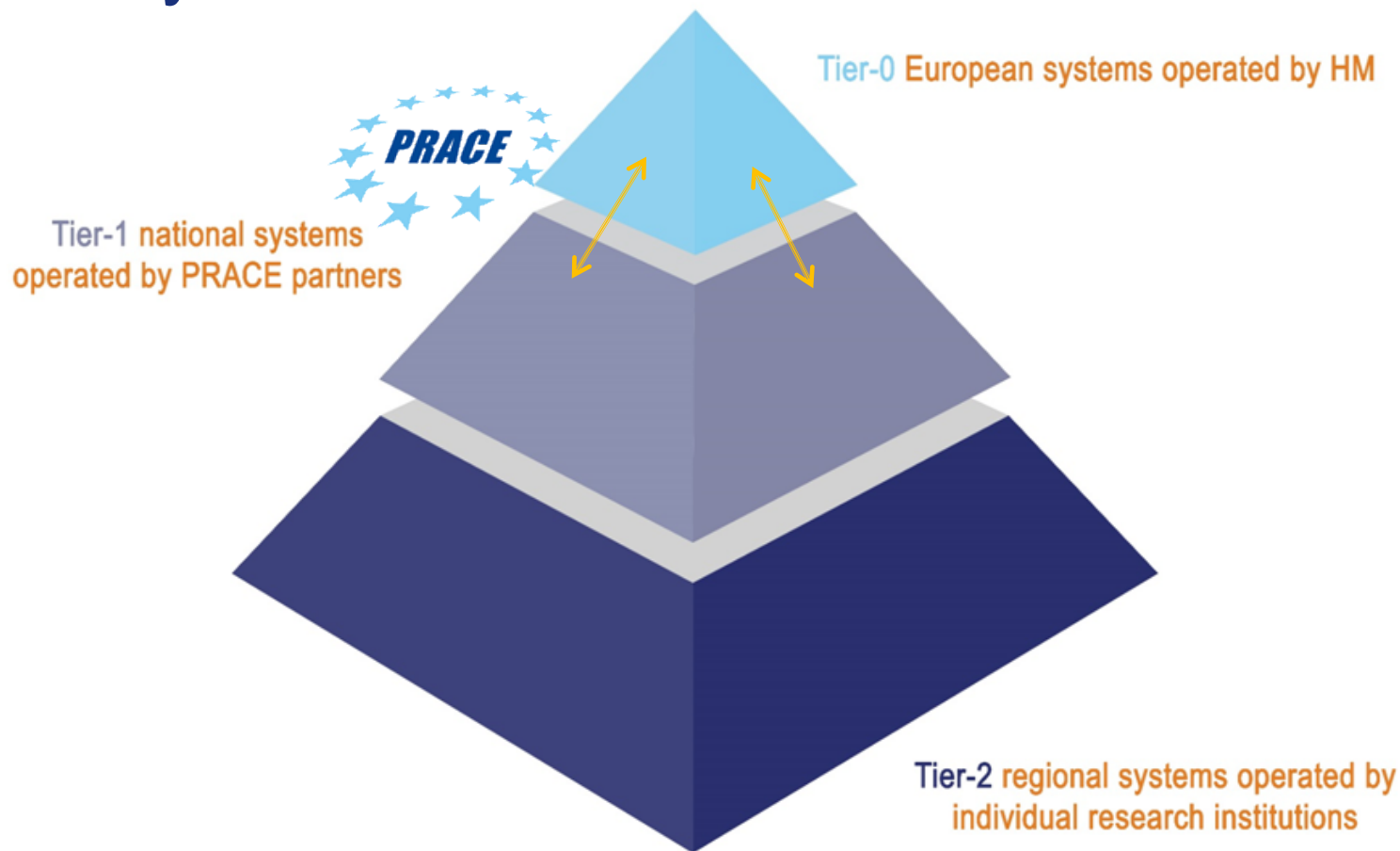
Boulder, June 26, 2017

Erik Lindahl
PRACE Board of Directors





HPC Pyramid





**Criterion:
Scientific
Excellence**

PRACE Tier-0 Systems



MareNostrum: IBM
BSC, Barcelona, Spain

**#13 on
Top500**



**#85 on
Top500**

CURIE: Bull Bullx
GENCI/CEA
Bruyères-le-Châtel, France

NEW ENTRY 2016



Piz Daint: Cray XC 30
CSCS
Lugano, Switzerland

**#3 on
Top500
Jun17**

**#21 on
Top500**

JUQUEEN: IBM
BlueGene/Q
GAUSS/FZJ
Jülich, Germany



SuperMUC: IBM
GAUSS/LRZ
Garching, Germany
#40 on Top500

Hazel Hen: Cray
GAUSS/HLRS,
Stuttgart, Germany

**#17 on
Top500**



**#14 on
Top500**

MARCONI: Lenovo
CINECA
Bologna, Italy



PRACE Achievements to-date

- ▶ More than **500** scientific projects enabled
- ▶ Over **14** thousand million core hours awarded since 2010
- ▶ Of which **63%** are trans-national
- ▶ R&D access to industrial users with **>50** companies supported
- ▶ More **10 000** people trained by 6 PRACE Advanced Training Centers and others events
- ▶ More **60** Pflop/s of peak performance on 7 world-class systems
- ▶ **24** PRACE members, including 5 Hosting Members (France, Germany, Italy, Spain and Switzerland)





Access through PRACE Peer Review



Free-of-charge BUT required to publish results at the end of the award period



Preparatory Access (2 or 6 months)



SHAPE Programme (2 or 6 months)



Project Access (12, 24 or 36 months)

**Criterion:
Scientific
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PRACE TRAINING

Seasonal Schools

- Have been running since 2008
- Offering top-quality face-to-face training events
- Organised around / all over Europe
- Topics range from generic intermediate to advanced
- From programming techniques to more specialised topical schools



Recent Seasonal Schools

► 27 - 30 September 2016

PRACE Autumn School 2016, Austria - Modern HPC Development for Scientists and Engineers

► 10 – 12 April 2017

PRACE Spring School 2017, Sweden - HPC in the Life Sciences



PATC Programme

- ▶ 79 courses, 215 training days
- ▶ New courses on forward-looking topics
 - ▶ New hardware and programming paradigms
 - ▶ Data science
- ▶ Collaboration with CoEs on several courses



PRACE Advanced Training Centres (PATCs)

BSC - Barcelona Supercomputing Center (Spain)
CSC - IT Center for Science (Finland)
CINECA - Consorzio Interuniversitario (Italy)

EPCC at the University of Edinburgh (UK)
GCS - Gauss Supercomputing Center (Germany)
MdS - Maison de la Simulation (France)

Programme: August 2016 to January 2017

August 2016

- Advanced OpenMP [EPCC]
- GPU Programming with CUDA [EPCC]

September 2016

- High Performance Molecular Dynamics [CINECA]
- Introduction to CINECA HPC System [CINECA]
- Introduction to High Performance Computing with C [CSC]
- Introduction to High Performance Computing with Fortran [CSC]
- Advanced MPI [EPCC]
- Object-Oriented Programming with Fortran [EPCC]
- Single node performance optimisation [EPCC]
- Advanced Fortran topics [GCS]

October 2016

- Parallel Programming Workshop [BSC]
- Python for computational science [CINECA]
- Data Intensive Analyses [CSC]
- Introduction to Parallel Programming [CSC]
- Practical Software Development [EPCC]
- Advanced Parallel Programming with MPI 3.1 [GCS]
- VI-HPS Tuning Workshop [GCS]
- Code optimization and debugging [MdS]

November 2016

- Earth science simulation environments [BSC]
- Debugging and Optimization of Scientific Applications [CINECA]
- HPC Methods for Computational Fluid Dynamics and Astrophysics [CINECA]
- Introduction to Parallel Computing with MPI and OpenMP [CINECA]
- Hybrid MPI/OpenMP Programming [MdS]

December 2016

- GPU Programming with OpenACC [CSC]
- Node-level Performance Engineering [GCS]
- Programming on GPUs [MdS]

January 2017

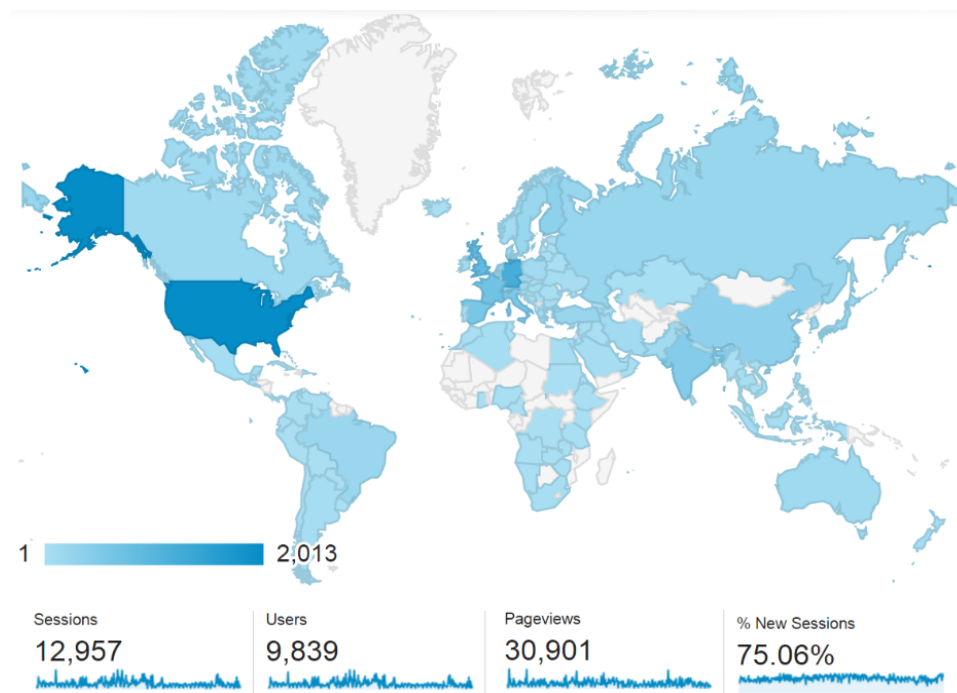
- Administration of Petaflop Machine [BSC]
- Material science codes on innovative HPC architectures: targeting exascale [CINECA]
- Python in High-Performance Computing [CSC]
- Efficient Parallel IO on ARCHER [EPCC]
- Introduction to hybrid programming in HPC [GCS]
- Advanced Visualization with Paraview [MdS]
- Parallel linear algebra [MdS]

www.prace-ri.eu

The Implementation Phase of PRACE receives funding from the EU's Seventh Framework Programme (FP7/2007-2013) under grant agreement RI-312763 and from the EU's Horizon 2020 Research and Innovation Programme (2014-2020) under grant agreement 653838.

Training and Events Portal

- ▶ www.training.prace-ri.eu
- ▶ Single hub for the PRACE training events, training material and tutorials
- ▶ Number of page views increased by 25% and number of users by 45% since 2014





Future Training Activities

- ▶ On-demand events addressing the needs of the CoEs
 - ▶ Needs for basic, intermediate, and advanced training
- Launch of Massive Open Online Courses (MOOCs)
 - *Introduction to HPC, coordinated by EPCC*
 - *Management of massive data, coordinated by Univ. Ljubljana*
- PRACE Training Centres (PTCs)
 - *Cover basic and advanced needs across Europe*



PRACE Summer of HPC (SoHPC)

Goal: To inspire the next generation of software engineering, system administrators, and general users of HPC

Summer of HPC

Partnership for Advanced Computing in Europe (PRACE)

Want to spend the summer working abroad at a European High Performance Computing Centre?

Then the Summer of HPC is for you!

Applications open January 25th 2013

Like, join or follow us on Facebook, LinkedIn or Twitter to get the latest announcement

[More](#)

CALLING LATE STAGE UNDERGRADUATES AND EARLY STAGE POSTGRADUATES

Would you like to spend the summer working abroad at a European High Performance Computing (HPC) Centre?

Have you got an interest in programming and are eager to improve your skills?

Have you a passion for visualising data in novel ways to grab the attention of the general public?

Have you a desire to learn and share your knowledge of HPC through blogging, video creation and use of social media?

If you have answered yes to any of these questions then the Summer of HPC is for you. Read on to find out more information about the programme.

The countries where students may be placed are:

Country	Organisation
Czech Republic	VSB-TUO
Denmark	UHP
Hungary	RIIP
Ireland	ICHEC
Italy	CINECA
Serbia	IPB
Slovenia	ULFME
Spain	BSC
Turkey	UNHM
UK	EPCC

ABOUT PRACE

The Partnership for Advanced Computing in Europe (PRACE) is an international non-profit association with its seat in Brussels. The PRACE Research Infrastructure (RI) provides a persistent world-class High Performance Computing (HPC) service for scientists and researchers from academia and industry. The Implementation Phase of PRACE receives funding from the EU's Seventh Framework Programme (FP7 2007-2013) under grant agreements n° RI-263493 and n° RI-312763.

HPC is the application of the world's fastest computers (super computers) to computationally intensive problems. Some common applications include astrophysics, climatology, health sciences, biomedical science, and engineering.

ABOUT SUMMER OF HPC

Summer of HPC is a PRACE programme that offers summer placements at HPC centres across Europe. Up to twenty top applicants from across Europe will be selected to participate. Participants will spend two months working on projects related to PRACE technical or industrial work and produce a visualisation or video of their results. The programme will run from July 1st to August 30th, with a kick-off training week in Edinburgh attended by all participants. Rights, accommodation and a stipend will be provided to all successful applicants; all you need to bring is your interest in computing and some enthusiasm! Prizes will be awarded for the best participants.

PARTICIPATING IN SUMMER OF HPC

Applications are welcome from all disciplines. Previous experience in HPC is not required, as training will be provided. Some coding knowledge is a prerequisite but the most important attribute is a desire to learn, and share, more about HPC. A strong visual flair and an interest in blogging, video blogging or social media are desirable. Applications will open at the end of January 2013.

Further information on the application process will be delivered through the Summer of HPC Blog: www.summerofhpc.prace-ri.eu, Facebook: www.facebook.com/SummerofHPC and Twitter: www.twitter.com/SummerofHPC.



PRACE Summer of HPC (SoHPC)

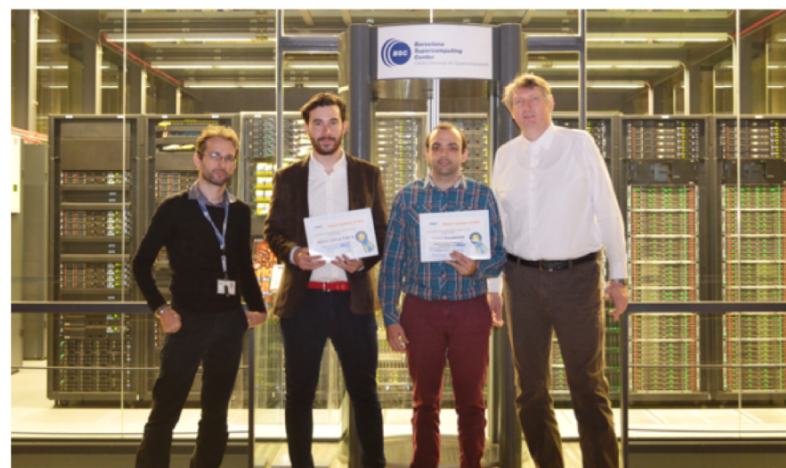
SoHPC 2015

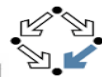
- ▶ 9 Partners/Sites
- ▶ 80 applications
- ▶ 20 Students chosen
- ▶ Training week in Barcelona
- ▶ 2 Month internship
- ▶ 2 Award winners



SoHPC 2016

- ▶ 10 Partners/sites
- ▶ 110 applications
- ▶ 21 students chosen
- ▶ *Training week in Juelich*
- ▶ *2 month internship*
- ▶ *2 Award winners*





University of Ljubljana



IT4Innovations
national
supercomputing
center



Fakulteta za
informacijske študije
Faculty of information studies



PRACE



THE CYPRUS
INSTITUTE



NATIONAL CENTRE FOR
SUPERCOMPUTING
APPLICATIONS



KØBENHAVNS
UNIVERSITET

