EUMaster4HPC

The first pan-European Master Programme for High Performance Computing

EUMaster4HPC

EUMaster4HPC is an HPC European consortium leading educational activities, funded by the EuroHPC JU

Leading the way in European Supercomputing

EuroHPC JU is a joint initiative between the EU, European countries and private partners to develop a World Class Supercomputing Ecosystem in Europe

EuroHPC Joint Undertaking

EUMaster4HPC

OUTSTANDING CAREER OPPORTUNITIES

EUMaster4HPC is composed of European universities, research/supercomputing centres and industrial partners with the mission of defining a joint curriculum in HPC across Europe and creating a collaborative network leveraging and strengthening the European ecosystem in HPC.

EUMaster4HPC brings together the major players in HPC education in Europe to train **the next generation of highly skilled and talented HPC experts** to drive the European digital transformation.

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HPC IN ACTION

1 Manufacturing

Running simulations, such as for autonomous driving, to support the design, production and testing of new products. This enables safer cars, lighter parts, more efficient processes and innovation.

2 Genomics

DNA sequencing, drug interaction analysis and performing protein assays to support provenance studies.

3 Healthcare

Drug research, vaccine creation and development of innovative treatments for rare and common diseases.

4 Technology for finance

Performing complex risk analysis, high-frequency trading, financial modelling and fraud detection.

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HPC IN ACTION

5 Media and entertainment industry

Animation creation, rendering special effects for films, transcoding huge media files and creating immersive entertainment shows.

6 Aerospace industry

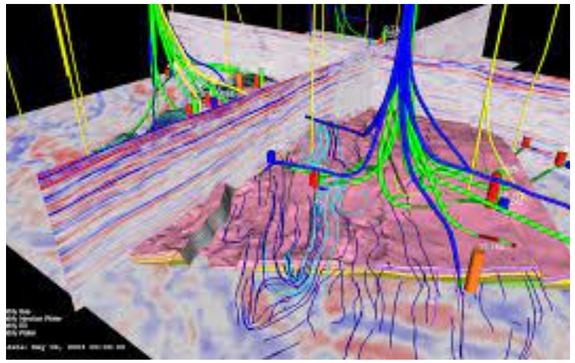
Creation of complex simulations, such as airflow over aircraft wings.

7 Healthcare

Analyse vast amounts of customer data to provide targeted product recommendations and improve the customer experience.

8 Oil and gas industry

Performing spatial analysis and reservoir model testing to predict oil and gas locations, and performing simulations such as fluid flow and seismic processing.



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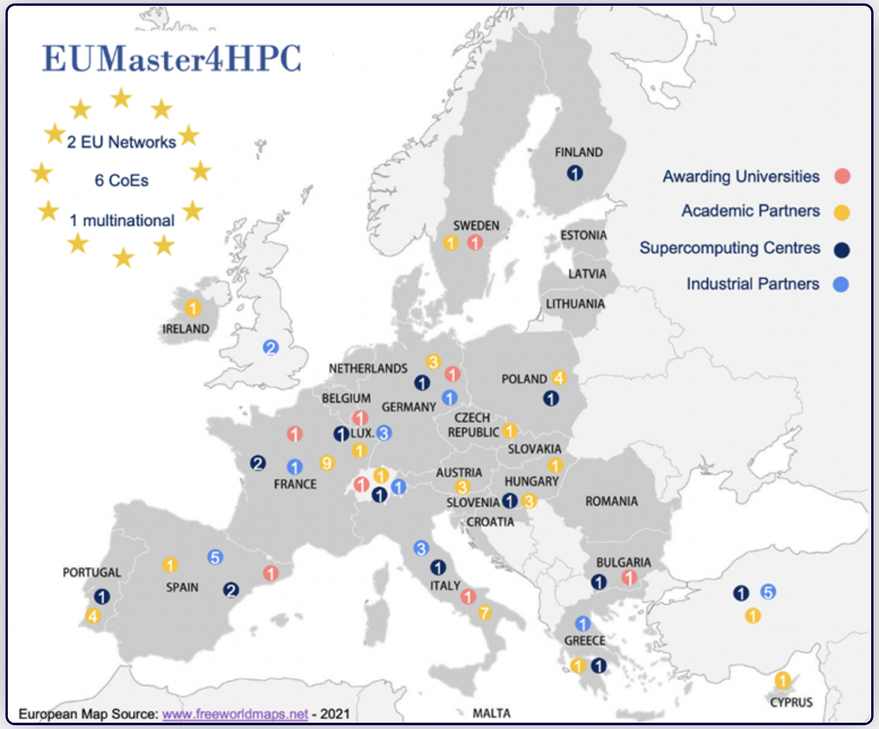
8 AWARDING UNIVERSITIES

1. Sorbonne Université, France
2. Universitat Politècnica de Catalunya, Spain
3. Politecnico di Milano, Italy
4. Università della Svizzera Italiana, Switzerland
5. Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany
6. University of Luxembourg, Luxembourg
7. Sofia University "St. Kliment Ohridski", Bulgaria
8. KTH Royal Institute of Technology, Sweden

21 PARTICIPATING COUNTRIES



29 NON-AWARDING UNIVERSITIES | 16 CONTRIBUTING PARTIES (INDUSTRY AND RESEARCH) | 36 ADDITIONAL SUPPORTING PARTNERS

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WHAT'S IN STORE FOR STUDENTS

2 European diplomas

Mobility

Internship

HPC networking and strong link with the Industry

FUTURE-PROOF PROFESSION

Scholarship

Summer school

Workshops

Academic excellence

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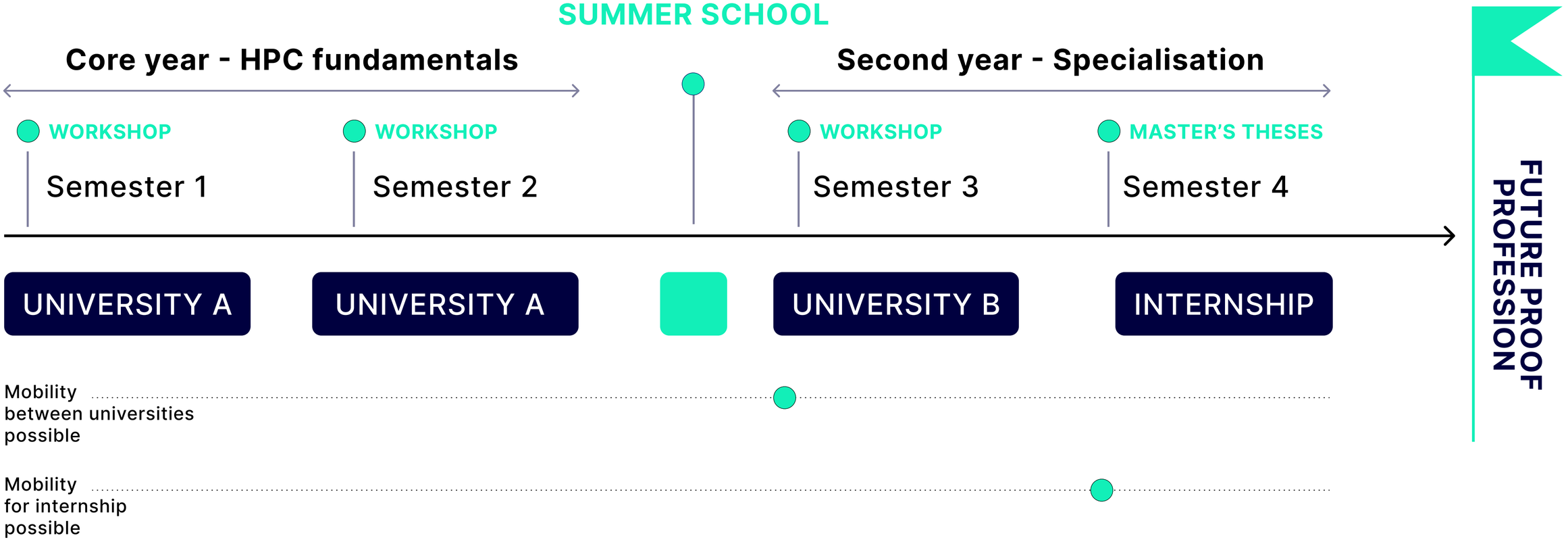
ACADEMIC JOURNEY



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STUDY PROGRAM

1ST YEAR

Fundamentals

- Mathematics and Statistics
- Software Engineering
- Parallel Programming
- Computer Architecture

2ND YEAR

Specialization

- Application Domain Expert
- Numerical and Data Specialist for Science Domains
- Performance Analyst and Advisor
- System Development and Support
- System Architect

- **Internship**

This project has received funding from the European High-Performance Computing Joint Undertaking under grant agreement No 101051997

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COMBINATION OF MOBILITY FROM ENTRY TOWARDS EXIT UNIVERSITY

1ST YEAR	2ND YEAR	GRADUATION
Politecnica di Milano (Italy)	Università della Svizzera Italiana (Switzerland)	DUAL DEGREE
	University of Luxembourg (Luxembourg)	
Sofia University “St. Kliment Ohridski” (Bulgaria)	University of Luxembourg (Luxembourg)	DUAL DEGREE

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COMBINATION OF MOBILITY FROM ENTRY TOWARDS EXIT UNIVERSITY

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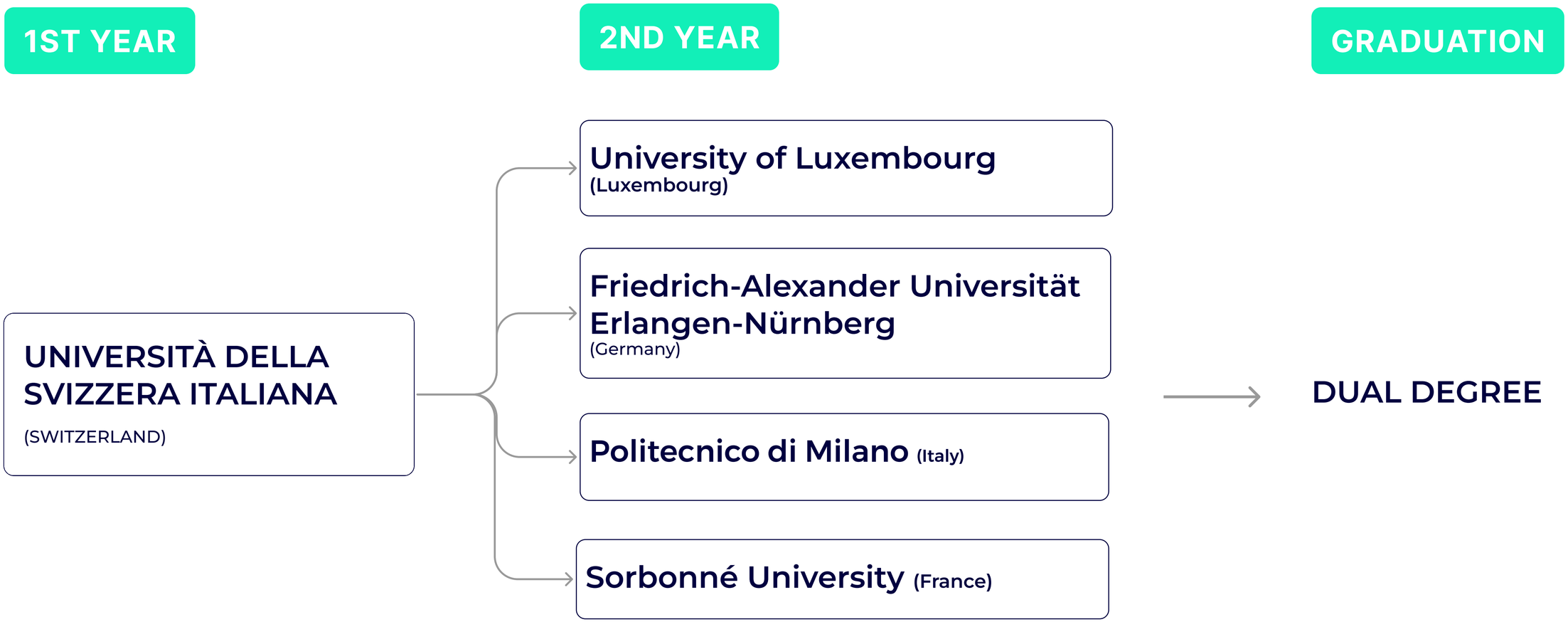

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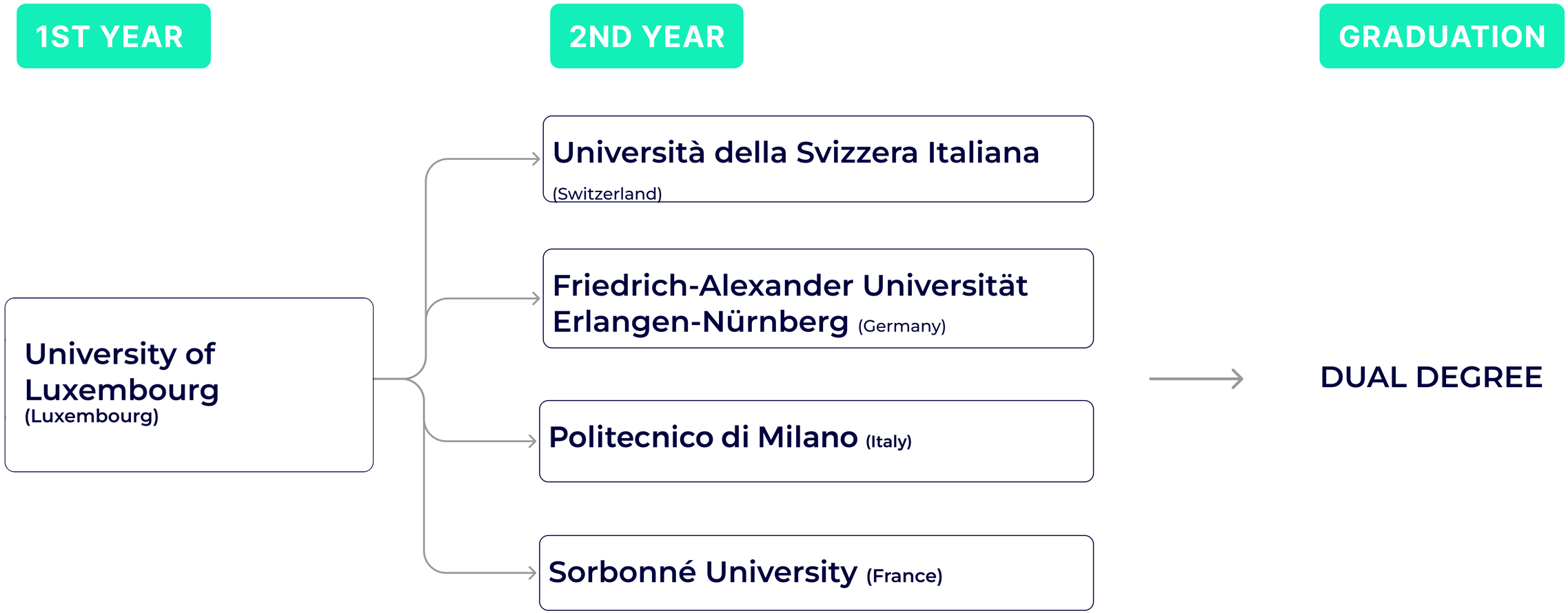
COMBINATION OF MOBILITY FROM ENTRY TOWARDS EXIT UNIVERSITY



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COMBINATION OF MOBILITY FROM ENTRY TOWARDS EXIT UNIVERSITY

1ST YEAR	2ND YEAR	GRADUATION
Friedrich-Alexander Universität Erlangen-Nürnberg (Germany)	Sorbonné University (France)	DUAL DEGREE
Università della Svizzera Italiana (Switzerland)	Friedrich-Alexander Universität Erlangen-Nürnberg (Germany)	DUAL DEGREE
	Sorbonné University (France)	

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INTERNSHIP
IN INDUSTRY AND SUPERCOMPUTING CENTERS

Semester 4

Students will gain a quickly practical experience through internships at partner companies and access to Europe's advanced HPC infrastructure

EUMASTER4HPC WAS FORMED BASED ON THE DEMAND AND NEEDS OF THE INDUSTRY

INDUSTRY IS A MAJOR PARTNER OF EUMASTER4HPC

EUMaster4HPC

SUMMER SCHOOL

between Year 1 and 2

THE AIMS OF THESE ACTIVITY ARE:

LEARNING

- Two weeks of intensive and high-level lectures, project work and collaboration, company cases on a specific chosen HPC topic
- Immersion of students in the subject of the specialty (3rd semester)

NETWORKING

- Meet the community of future HPC specialists and the like-minded people
- Meet the representatives of companies and supercomputer centers
- Exchange experiences with students and create connections for internships and/or future hires

AND TO HAVE FUN :)

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WORKSHOPS

Semester 1, 2, 3

Mandatory three workshops in the middle of semesters 1, 2 and 3

A students' challenge before the start of the workshop (e.g. a hackathon modelled on the hackathons offered by technology vendors to code-development labs)

These projects are proposed and organized by the supercomputer centers

THE AIMS OF THESE ACTIVITIES ARE:

- increasing group cohesion
- immersion of students in the subject of the specialty (3rd semester)
- establishing contacts with companies and supercomputer centers
- enable companies to exchange experiences with students and make connections for internships and/or future recruitment

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LEARNING OUTCOME

NEXT GENERATION OF HIGHLY SKILLED HPC EXPERT

- Demonstrate a broad understanding of artificial intelligence, high performance data analytics, scientific computing, computational numerical analysis, and multidisciplinary knowledge of machine learning and data analytics, computational science - biotechnology, material science, physics, chemistry and mechanics (solid and fluid)

- Demonstrate a broad understanding of parallel programming (including GPU and FPGA), distributed systems, middleware technologies, software engineering, compilers, compiler optimisation, parallel programming design, applications & parallel performance analysis and quantum computing

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LEARNING OUTCOME

NEXT GENERATION OF HIGHLY SKILLED HPC EXPERT

- Demonstrate a broad understanding of application life-cycle, component integration, software stacks (for CPU, GPU, FPGA CRGA), operating systems, kernel development, parallel file systems, high-speed networking, synchronisation, container technologies, virtualisation technologies, integration of HPC and cloud, server administration and infrastructure setup management & security

- Demonstrate a broad understanding of SoC design, NoC design, microarchitecture, memory systems, circuit design (VLSI design flow), power dissipation, low-power design techniques, thermal power models, verification and test, reliability, multiprocessor design, accelerators (GPUs, FPGAs, CGRAs), application-specific architectures, hardware-software codesign, cooling mechanisms, and deployment technologies

EUMaster4HPC

LEARNING OUTCOME

NEXT GENERATION OF HIGHLY SKILLED HPC EXPERT

Cutting-age knowledge in:

- Mathematical modeling and Statistics
- Software Engineering
- Parallel Programming
- Computer Architecture

Strong transversal/soft skills and competencies in order to facilitate the integration into the job market; develop research topics & writing proposals and critically evaluate the problem & analysis skills

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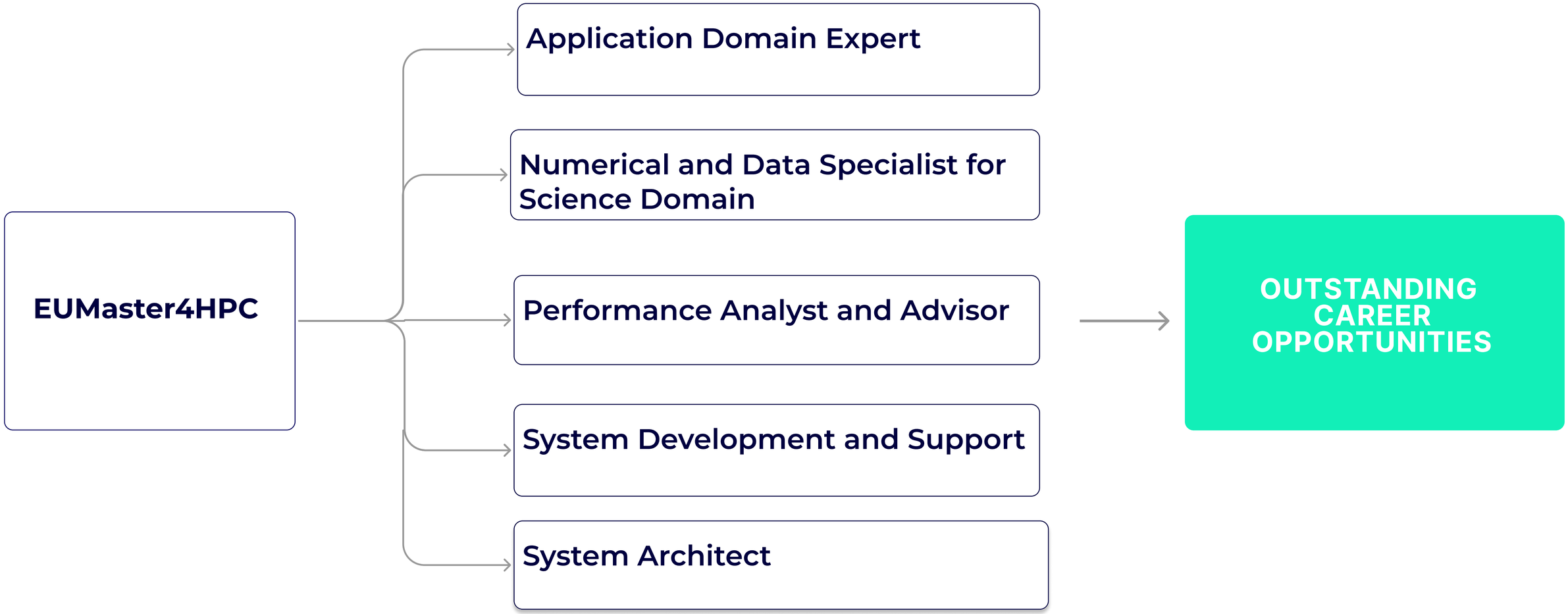
SPESIALIZATIONS



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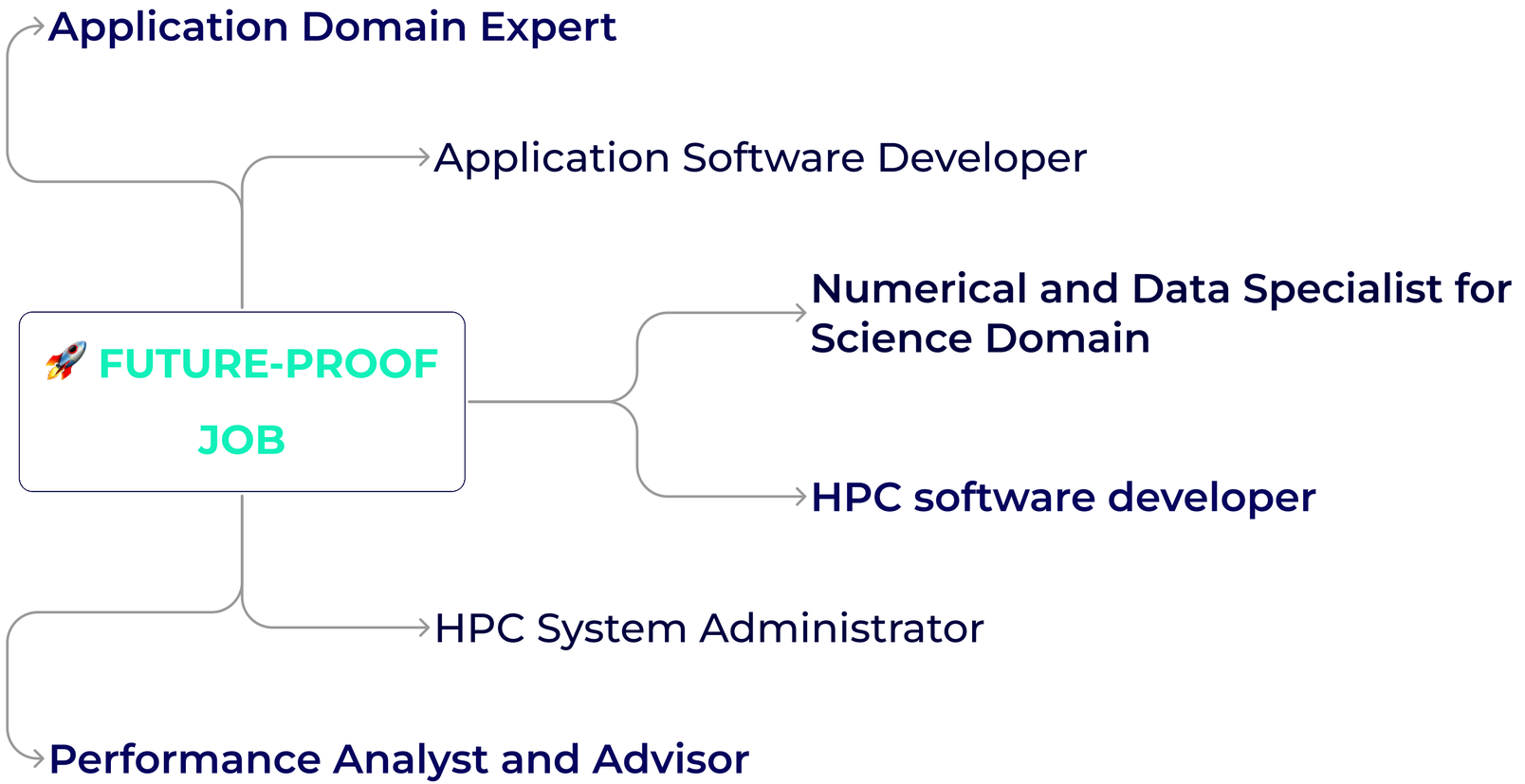
STUDENTS WILL BE ABLE TO WORK (INCLUDING, BUT NOT LIMITED)



Research:

European universities

Other public and private institutes

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WHO CAN APPLY

APPLY by using the online application form

1. **Bachelor's degree (preferably CE/INF)**

   Or equivalent qualification in computer science, relevant scientific or technical field, or mathematics.

2. **English proficiency**

   at least CEFR B2 / TOEFL 85/ IELTS 5 or higher, no more than 3 years old; or a certificate confirming that student have completed an undergraduate/master's degree programme in English).

3. **Commitment to move to another awarding university for the second year of Master's degree**

   The EUMaster4HPC programme is designed to promote student mobility for part of the specialisation during the second year of study.

4. **Knowledge of programming**

   Or more than 2 university courses in computer science from data structures, algorithms, programming or theoretical or technical computer science.

5. **Comprehensive training in technical mathematics: algebra, linear algebra and probability and statistics, functional analysis, numerics, optimisation, simulation / scientific computing**

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HOW TO APPLY

THE APPLICATION PERIOD IS CONTINUOUS

- Check the documents needed to complete the application on the EUMaster4HPC website
- Fill in the application form and attach the documents
- After submitting the application, student will be contacted by the team via email. If deemed necessary by the jury, a face-to-face interview (online) will follow.
- Student will be informed about the selection result via e-mail latest 2 weeks after the end of the current application period.

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SCHOLARSHIP AND TUITION FEES

for eligible students*

- 5.000 € of “Mobility Scholarship” to support expenses inherent to the programme (travel and accommodation)
- the tuition fees are waived

for non-EU/Non-EuroHPC member country

- other scholarships, grants and financial aid
- possibility to receive local scholarships
- tuition fees per awarding university

In order to achieve an inclusive and equal programme, the EUMaster4HPC will waive University fees for the eligible students*.

*Students coming from Member States and Associated Countries that have chosen to become members of the Joint Undertaking and who comply with the programme requisites: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Malta, North Macedonia, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey

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INDUSTRY AND SUPERCOMPUTING CENTERS NEED HPC EXPERT

LUX PROVIDE

BSC Barcelona Supercomputing Center
Centro Nacional de Supercomputación

MELUXINA
HIGH PERFORMANCE COMPUTING IN LUXEMBOURG

DATATHINGS

proximus

EUROPEAN DYNAMICS

HAYS

GOODYEAR

sogeti
Part of Capgemini

Deloitte.

CERATIZIT
GROUP

ArcelorMittal

DUPONT

THALES

LEONARDO
CINECA

EUMaster4HPC

APPLY TODAY!
BE AMONG THE FORWARD-THINKERS AND INNOVATORS OF TOMORROW!

GET IN TOUCH: EUMASTER4HPC@UNI.LU

UNIVERSITÉ DU LUXEMBOURG

Friedrich-Alexander-Universität Erlangen-Nürnberg

KTH VETENSKAP OCH KONST

SORBONNE UNIVERSITÉ
CRÉATEURS DE FUTURS DEPUIS 1257

SOFIA UNIVERSITY ST. KLIMENT OHRIDSKI

UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH

POLITECNICO MILANO 1863

EuroHPC Joint Undertaking