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CINECA SELECTION n. 89/2022 - High Performance Computing (HPC)

The CINECA Interuniversity Consortium announces a selection for **40 permanent positions** with qualified professional skills, to be included within the HPC Structure.

Work environment and context

The HPC Department of CINECA provides the Italian and European scientific community with the most advanced high-performance computing resources, data processing, data management and data preservation systems and tools, specialized scientific technical skills and technology transfer, with the aim of maintaining and supporting the competitiveness of national public and private research. The main supercomputing systems of CINECA are ranked in the highest positions of the "Top500", the list of the most powerful supercomputers in the world.

CINECA is part of all the most important national and European initiatives of infrastructure and development of High Performance Computing and data management, and it is primary partner of the project actions in this area.

The figures sought will be included in the teams involved in the ongoing projects in which CINECA participates as a partner, in many as well as first contractors, including: the activation and development of the cutting-edge technological infrastructures of the "Bologna Technopole", the development of the Supercomputer EuroHPC "Leonardo", PNRR collaborations (EU Recovery and resilient facility), numerous European actions (currently about 50 - among which we mention collaboration with ECMWF, EUROFusion and EUDAT, participation in the Centers of Excellence for application domains relating to the study of new materials, of the terrestrial geophysical system, of complex engineering systems, of Human Brain Project, Destination Earth ...). CINECA also has active collaboration with the Italian and European academic system and with the major national research bodies including: CNR, ENEA, INFN, OGS, ICTP, INGV, SISSA and INAF and shares numerous activities with various public bodies (regional and national) of the system of services aimed at public administrations. CINECA also has collaboration and development agreements in place with some of the major Italian industries and with numerous small and medium-sized enterprises. Part of the positions may contribute to the new collaboration with Italian Ministry of Culture on the Virtual Library.

For a more detailed idea of the activities currently carried out by the HPC Department, you can refer to the latest HPC Report available .

Regarding the PNRR positions, it is possible that some of the position may be directly involved in the following projects: "National Centre for HPC, Big Data and Quantum Computing - ICSC (CUP: D56G22000380006 – Project proposal: CN00000013), National Biodiversity Future Center - NBFC (CUP: D52C22000930006 – Project Proposal: CN00000033), Ecosystem for sustainable transition of Emilia-Romagna - ECOSISTER (CUP: B83D21014180006 – Project Proposal: ECS00000033), Growing Resilient, INclusive and Sustainable -GRINS (CUP: D83C22001280001 – Project proposal: PE0000018); Digital Driven Diagnostics, prognostics and therapeutics for sustainable Health care - D3-4-Health (CUP under assignment – Project Proposal: PNC0000001).

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1 - HPC Specialist

CINECA is looking for highly motivated people to be included in the area of scientific computing (HPC - High Performance Computing Department). The open positions refer to all areas of the HPC structure: "Data Management", "High-level Support", "HPC and Cloud Computing Systems Architectures", "Production and User Support", "Application Development" and "Support for industrial users ".

The selected staff will be included in the reference teams within the HPC Department to carry out the following activities:

- High-level/Application support. Optimization and development of software applications of the academic and industrial communities in the various scientific domains, also through participation in EU-funded projects.

- Exploration of new HPC computing architectures. Study of the evolution of the computing infrastructure and of the potential of new technologies available in the HPC, Cloud and Quantum Computing fields

- Data management and analysis in areas ranging from genomics to in silico medicine, from the environment to monitoring and observation of the earth system, from meteorology to climatology, from data produced by large research infrastructures such as LHC (CERN), Synchrotrons, SKA, ESS,..., also through machine-learning and artificial intelligence methodologies

- First level user support. Management of issues related to the efficient use of supercomputing, cloud computing and storage systems. HPC production management.

- Development of industrial Proof-of-Concept (PoC) and contribution to technological innovation both at Italian and European level, with particular reference to the system of medium-sized enterprises. Development and application support for industrial users

- Support research projects and innovations funded (by the European Commission or by other international or national bodies, such as PNRR projects), assuming responsibility for specific project tasks and work packages

The following skills or experiences are required:

- Bachelor's or Master's Degree in technical, scientific or computational sciences;
- Strong experience in Linux environment;
- Good knowledge of at least one language of programming (C, C ++, Fortran);
- Good knowledge of Python;
- Understanding of High-Performance Computing architectures;
- Knowledge of HPC batch workflow management and setup tools
- Documented professional experience in the use of scientific programming languages and in parallel programming models (MPI, OpenMP, OpenACC, CUDA, OpenCL , HIP, SYCL) or in general knowledge of programming techniques for HW devices;
- Good level of English, spoken and written;
- Ability to interact and build relationships with external stakeholders and the team;
- Attitude to continuous learning to keep knowledge updated necessary;
- Attitude to the public speaking

For the various positions sought as HPC Specialist, the availability of some of the following will constitute preferential titles:
- PhD in scientific disciplines or computational sciences;
- Documented experiences of study or work, ability to work in a team and experience in project management;
- Basic knowledge of the Italian language;
- Experience in porting and optimization of applications on UNIX systems and GPU architectures;
- Experience in Linux administration, software installation (including compiling sources);
- Good understanding of cloud- based technologies (Openstack, Kubernetes , ...);

- Good understanding of the main frameworks for Machine or Deep Learning, such as Tensorflow / Keras, PyTorch,Theano;
- Experience in using source versioning systems (SVN, GitHub / GitLab) and SW development in team;
- Development experience on the Visualization Toolkit VTK, ParaView,Qt;
- Experience in computational neuroscience, preferably with NEST or NEURON/CoreNEURON applications
- Experience of using SQL and non-SQL DBs relational;
- Container management experience in HPC (Singularity) and CLOUD (Docker);
- Experience of using highly parallel scientific libraries (Scalapack , PETSC ..);
- Knowledge of Continuous integration frameworks;
- Knowledge of Unit test and Integration test tools;
- Knowledge of schedulers on HPC systems;
- skills and experiences in numerical and algorithmic fields, knowledge of Quantum Computing principles;

2 - Front-end/Back-end Developer

CINECA is looking for highly motivated people to be included in the area of scientific computing (HPC - High Performance Computing Department). The open positions refer to all areas of the HPC structure: "Data Management", "Application Development" and "Support for industrial users ".

The selected staff will be included in the reference teams within the HPC structure to carry out the following activities:

- Development and management of platforms (e.g. in the field of weather/climate) in the "HPC Data Management" area and for the development of industrial applications.

- Maintenance and evolution of technologies for the management of complex application workflows, and to support the development and testing process, in the HPC SW development group for important industrial partners.

- Support research projects and innovations funded (by the European Commission or by other international or national bodies, such as PNRR projects), assuming responsibility for specific project tasks and workpackages

- Virtual Library activities with Ministry of Culture (Cultural Heritage Digitalization)

Knowledge and possibly documented experience with <u>at least one</u> of these technologies (or equivalent) are required:

- Bachelor's or Master's Degree in technical, scientific or computational sciences
- Ability to problem solving, team work and orientation to the achievement of results;
- Knowledge and possibly documented experience with these technologies (or equivalent):
- Knowledge of the main software development methodologies and modeling standards such as UML;
- Knowledge of principles for modeling REST APIs;
- Knowledge of Javascript/TypeScript;
- Knowledge of Angular (9 or higher);
- Web development experience
- Knowledge of NodeJS;
- Knowledge of Python;
- Good knowledge of SQL;
- Mastery in the use of code versioning systems (Git and GitLab experiences);
- Knowledge and use of the Unix/Linux operating system
- Linux Bash Scripting
- Experience with container-based technologies including Docker and Kubernetes
- Experience with Cloud services like Openstack
- Excellent level of English, spoken and written;
- Ability to interact and build relationships with external stakeholders and the team;
- Attitude to continuous learning to keep knowledge updated necessary;
- Attitude to the public speaking

For the various positions sought, the availability of some of the following will constitute preferential titles:
- PhD in scientific disciplines or computational sciences;
- Documented experiences of study or work, ability to work in a team;
- Basic knowledge of the Italian language;
- Knowledge of one language C, C++, Fortran;
- Knowledge of NoSQL databases and non-relational databases;
- Angular material
- Experience with CI/CD
- Good knowledge of Java;
- Statistics tools like Grafana, Elasticsearch and Logstash
- Experience in Linux administration, software installation (including compiling sources);
- Good understanding of the main frameworks for Machine or Deep Learning, such as Tensorflow / Keras, PyTorch, Theano;
- Experience in using source versioning systems (SVN, GitHub / GitLab) and SW development in team;
- Development experience on the Visualization Toolkit VTK, ParaView, Qt;
- Container management experience in HPC (Singularity) and CLOUD (Docker);
- Knowledge of Continuous integration frameworks;
- Knowledge of Unit test and Integration test tools;

Specifically for Virtual Library activities with Ministry of Culture (Cultural Heritage Digitalization) will constitute preferential titles:
- a specialization in Digital Humanities or Master's degree (or equivalent) in IT methodologies for the humanities or a II level Master's degree in Digital Humanities
- Documented knowledge of information technology techniques for the study and analysis of cultural heritage;
- Knowledge of IT tools for processing multimedia content in Digital Humanities projects;
- Computer skills with particular reference to their possible applications in the Cultural Heritage sector (Web, multimedia, augmented and virtual reality, GIS and database applications, 3D modeling, etc);
- Standards of cataloguing, digitization, metadata management and practices in use internationally for the creation, management and long-term conservation of repositories of manuscripts and digital documents;
- Knowledge of topographic and photogrammetric survey techniques;
- Knowledge of graphic tools;
- Experience in communication (web and social media) of scientific and cultural contents;
- Experience related to Machine learning and Neural Networks issues;
- Programming language skills.

3 - Data Scientist

CINECA is looking for highly motivated people to be included in the area of scientific computing (HPC - High Performance Computing Department).
The open positions refer to all areas of the HPC structure: "Data Management", "Application Development" and "Support for industrial users".

The selected staff will be included in the reference teams within the HPC structure to carry out the following activities:

• Data management and analysis in areas ranging from genomics to in silico medicine, from the environment to monitoring and observation of the earth system, from meteorology to climatology, from data produced by large research infrastructures such as LHC (CERN), Synchrotrons, SKA, ESS,..., also through machine-learning and artificial intelligence methodologies.
• Application development in support to the HPC department industrial users.
• Support research projects and innovations funded (by the European Commission or by other international or national bodies, such as PNRR projects), assuming responsibility for specific project tasks and workpackages.

The following skills or experiences are required:

- Bachelor's or Master's Degree in technical, scientific or computational sciences;
- Background and experience in data science, computer science, computational social science, or related field. Advanced degree preferred;
- Significant and documented data management and research experience;
- Knowledge and experience in statistical and machine/deep learning techniques: GLM/Regression, Random Forest, Boosting, Trees, text mining, social network analysis, CNN, etc.
- Proficiency in programming languages (SAS, STATA, Python, R, and SQL) along with modern data science stack and deep learning libraries (TensorFlow, Keras, PyTorch, or MXNet);
- Ability to problem solving, team work and orientation to the achievement of results;
- Excellent level of English, spoken and written;
- Ability to interact and build relationships with external stakeholders and the team;
- Attitude to continuous learning to keep knowledge updated necessary;
- Attitude to the public speaking.

For the various positions sought, the availability of some of the following will constitute preferential titles:
- PhD in scientific disciplines or computational sciences;
- Documented experiences of study or work, ability to work in a team;
- Basic knowledge of the Italian language;
- Experience in data warehouse or database architecture.
- Experience in design and implementation with Big Data Solutions and distributed applications. Background and experience in data modelling, and database query languages like SQL, Hive, Pig is desirable. Familiarity with Scala, Java, or C++ is an added advantage.
- Strong analytical skills, preferably with experience in econometrics.
- Developer experience in computer graphics and visualization libraries and applications including the Visualization Toolkit VTK and ParaView.

4 - Expert in Project Management in HPC environment (HPC-PMO)

CINECA is looking for highly motivated Project Managers to be included in the area of scientific computing (HPC - High Performance Computing Department). The open position refers to "Project Management Office".

The expected project activities that the selected candidate will carry out may include:
- Preparing budgets of European and National funded projects and supporting proposal writing
- Monitoring of project budgets and reporting costs incurred to the funding bodies;
- Participation in project meetings and reviews, supporting internal technical staff in deliverables and reports drafting and writing, developing dissemination activities.
- Providing training and support to HPC colleagues in project management methodologies to ensure a consistent approach to project delivery according to national and European programme rules;
- Acting as focal point for the collection of the information on active projects, monitoring their periodical progress and report their status by producing a summary for the HPC Director and company Management;
- Participating in periodic meetings with the internal administration offices for the control and progress of projects (SAL), verifying their adequacy, reporting critical issues and proposing corrective actions.

The following skills or experiences are required:

- Master's degree in economics or management, or in scientific disciplines with proven experience in the field management Knowledge and understanding of Project Management Good knowledge in administrative reporting procedures with particular reference to projects funded by national or international bodies
- Experience in using IT tools (Excel, Power Point, etc…) to support of the activities;

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- Excellent written and spoken Italian and English
- Ability to interact both written and verbal with the internal Project Managers and with the Project Officers of the funding bodies
- Developed attitude to the negotiation
- Good problem solving and interpersonal communication skills
- Experience in communicating with institutional stakeholders, including at EU level
- Essential predisposition to teamwork
- Preparation to training and teaching activities.

The availability of some of the following will constitute preferential titles:
- Experience in management European and national funded projects with expertise in the full cycle of Project Management
- Master's degree or specific specializations in the area management area: PMP, PRINCE 2, PM², ISIPM certification or equivalent
- Previous experience in the management of high-level projects complexity
- Knowledge of a community language additional
- Consolidated knowledge of administrative and financial rules both at National and European level , strong experience in reporting of funded National and European projects

Sede legale amministrativa e operativa

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The hiring will take place with permanent contracts; the reference contract is the National Collective Labor Agreement of the Tertiary, Distribution and Services Companies (CCNL delle Aziende del Terziario, Distribuzione e Servizi). The level of employment will be assessed according to the seniority of the candidate and the responsibilities that he/she will be able to assume within the organization.

The workplace is in Italy, in Cineca's office in Bologna (Casalecchio di Reno), Rome, Milan or Naples.

The articulation of the contractually envisaged working hours can be structured according to company needs with a logic of flexibility and efficiency. You may be required to be on-call even on holidays with the possibility of having to go to work.

Applications must be received, under penalty of exclusion, electronically through the website https://pica.cineca.it/cineca by **12 noon on 16/01/2023.** Different application methods will not be accepted.

It is also specified that, under penalty of exclusion, applications must be accompanied by a valid identification document. Any other information on how to present the necessary documentation is indicated on the site https://pica.cineca.it/cineca.

Cineca is an equal opportunities employer. The recruiting process will be handled in accordance with the gender and generational equal opportunities, as well as the employment inclusion of people with disabilities, according to PNRR guidelines and to Cineca's Gender Equality Plan.

The recruitment will be carried out following the selection by qualifications of the applications received and a subsequent interview, to which candidates in possession of the necessary requisites will be summoned at the sole discretion of the selection commission, in accordance with the provisions of the Regulations for the Search and Selection of employees. The CINECA Consortium may avail itself of the support of external companies specialized in the search and selection of personnel and / or Head Hunting.

Membership in the reserved categories, Italian Law 68/99, will be a preferential title.

Casalecchio di Reno, 22/12/2022