Job Reference

604_23_LS_CB_R0

Position

Master Student – Computational Biology (R0)

Data de tancament

Dimecres, 31 Gener, 2024
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Job title: Master Student – Computational Biology (R0)

About BSC

The Barcelona Supercomputing Center - Centro Nacional de Supercomputación (BSC-CNS) is the leading supercomputing center in Spain. It houses MareNostrum, one of the most powerful supercomputers in Europe, was a founding and hosting member of the former European HPC infrastructure PRACE (Partnership for Advanced Computing in Europe), and is now hosting entity for EuroHPC JU, the Joint Undertaking that leads large-scale investments and HPC provision in Europe. The mission of BSC is to research, develop and manage information technologies in order to facilitate scientific progress. BSC combines HPC service provision and R&D into both computer and computational science (life, earth and engineering sciences) under one roof, and currently has over 900 staff from 55 countries.

Look at the BSC experience:
BSC-CNS YouTube Channel
Let's stay connected with BSC Folks!

We are particularly interested for this role in the strengths and lived experiences of women and underrepresented groups to help us avoid perpetuating biases and oversights in science and IT research.

Context And Mission

The candidate will join Alfonso Valencia’s lab (Computational Biology) within the Life Sciences Department at the Barcelona Supercomputing Center. The project will focus on the molecular basis of cancer and other complex diseases. To do so, the candidate will apply classic and novel Matrix Factorization techniques to understand the genomic heterogeneity observed between patients having the same disease subtype.
Matrix factorisation (MF) techniques represent one of the most interesting approaches to modelling complex patterns of variability. This class of unsupervised methods aim to reveal the low-dimensional structure of the input data while preserving as much information as possible [Stein-O'Brien, 2018]. In our context, MF techniques focus on decomposing the molecular data of a patient cohort into a set of latent components that can be interpreted as its most elementary building blocks. This approach provides an accurate description of the internal characteristics of selected patients and thus a natural way to detect and establish different subpopulations of individuals sharing similar genomic alterations. MF has been approached from many different perspectives, imposing different constraints to shape the properties of the final set of latent components. Among the most common methods are principal component analysis (PCA), which defines components as principal directions of variability, or independent component analysis (ICA), which imposes statistical independence between components. In addition, non-negative matrix factorisation (NMF) [Lee, 1999] is becoming a popular technique among data analysts, since it provides a parts-based representation of the input data by imposing positive values on the model matrices. Finally, more recent work has extended these classical approaches, providing solutions from a systems biology point of view. In particular, in [Carbonell-Caballero, 2021] the authors showed that a simultaneous deconvolution of gene expression and signalling pathway activity can naturally explain why patients with a very heterogeneous genomic profile can develop the same type of cancer.

The selected student will focus on applying traditional and novel MF techniques to understand the genomic heterogeneity of cancer and other complex diseases. Throughout this internship, the student will learn the basis of transcriptomic analysis in computational biology, as well as other more advanced downstream methods that provide more explainable and mechanistic interpretations about impaired biological processes along disease progression.

**Key Duties**

- Complete a master’s thesis in bioinformatics.
- Participate in internal group meetings and other scientific discussions

**Requirements**

- **Education**
  - Degree in Mathematics, or any related field

- **Essential Knowledge and Professional Experience**
  - Knowledge in modelling data from different science domains
  - Knowledge in mathematical modelling, statistical inference and linear algebra
  - Knowledge of R and/or Python programming

- **Competences**
  - Good communication and presentation skills
  - Ability to work both independently and within a team
  - Fluency in spoken and written English
Conditions

- The position will be located at BSC within the Life Sciences Department
- We offer a full-time contract (37.5h/week), a good working environment, a highly stimulating environment with state-of-the-art infrastructure, flexible working hours, extensive training plan, restaurant tickets, private health insurance, support to the relocation procedures
- Duration: Open-ended contract due to technical and scientific activities linked to the project and budget duration
- Holidays: 23 paid vacation days plus 24th and 31st of December per our collective agreement
- Salary: we offer a competitive salary commensurate with the qualifications and experience of the candidate and according to the cost of living in Barcelona
- Starting date: February

Applications procedure and process

All applications must be made through BSC website and contain:

- A full CV in English including contact details
- A Cover Letter with a statement of interest in English, including two contacts for further references - Applications without this document will not be considered

In accordance with the OTM-R principles, a gender-balanced recruitment panel is formed for every vacancy at the beginning of the process. After reviewing the content of the applications, the panel will start the interviews, with at least one technical and one administrative interview. A profile questionnaire as well as a technical exercise may be required during the process.

The panel will make a final decision and all candidates who had contacts with them will receive a feedback with details on the acceptance or rejection of their profile.

At BSC we are seeking continuous improvement in our recruitment processes, for any suggestions or feedback/complaints about our Recruitment Processes, please contact recruitment [at] bsc [dot] es.

For more information follow this link

Deadline

The vacancy will remain open until a suitable candidate has been hired. Applications will be regularly reviewed and potential candidates will be contacted.

OTM-R principles for selection processes

BSC-CNS is committed to the principles of the Code of Conduct for the Recruitment of Researchers of the European Commission and the Open, Transparent and Merit-based Recruitment principles (OTM-R). This is applied for any potential candidate in all our processes, for example by creating gender-balanced recruitment panels and recognizing career breaks etc.
BSC-CNS is an equal opportunity employer committed to diversity and inclusion. We are pleased to consider all qualified applicants for employment without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age, disability or any other basis protected by applicable state or local law.
For more information follow this link