INSTITUTE FOR RESEARCH IN BIOMEDICINE

IRB BARCELONA

Co-funded by the European Union

JOB OPENING AT IRB BARCELONA

Postdoctoral Fellow in Biological Data Sciences (ref. PD/24/04)

Created in 2005 by the Generalitat de Catalunya (Government of Catalonia) and the University of Barcelona, IRB Barcelona is a Severo Ochoa Centre of Excellence—a seal that was awarded in 2011.

The institute is devoted to conducting research of excellence in biomedicine and to transferring results to clinical practice, thus improving people's quality of life, while simultaneously promoting the training of outstanding researchers, technology transfer, and public communication of science. Its 25 laboratories and seven core facilities address basic questions in biology and are orientated to diseases such as cancer, metastasis, Alzheimer's, diabetes, and rare conditions.

IRB Barcelona is an international centre that hosts 400 members and 30 nationalities. It is located in the Barcelona Science Park. IRB Barcelona forms part of the Barcelona Institute of Science and Technology (BIST) and the "Xarxa de Centres de Recerca de Catalunya" (CERCA).

IRB Barcelona is seeking a talented and highly motivated **Postdoctoral Researcher** to join the Structural Bioinformatics and Network Biology group (https://sbnb.irbbarcelona.org), led by Dr. Patrick Aloy, to work on **Systems Medicine** approaches in the context of the **CLARITY** European collaborative project.

Viral infections, together with human genetics, constitute major risk factors for developing complex diseases. However, the molecular and physiological mechanisms of how these viral infections cause and contribute to non-communicable disease development are unknown thus hampering prevention and therapeutic approaches. **CLARITY** will take advantage of cutting-edge experimental technologies and artificial intelligence (AI)-driven analytics to elucidate the molecular and physiological mechanisms of how RSV infection (infectious disease) contributes to asthma (non-communicable disease) development.

In particular, we will use modern AI techniques to integrate the generated RSV data with the bulk of current biomedical knowledge and derive RSV perturbation signatures. We will then compare these signatures to those of non-communicable human diseases, and implement a strategy to discover causal relationships between them. Finally, we will identify and validate drug-like molecules with the potential to revert the RSV perturbation induced changes *in vitro*, and provide initial lead compounds for further development.

DUTIES

The successful candidate will work in a very collaborative environment, where he/she will be responsible for the **integration of all the generated data** into the embeddings space of the Chemical Checker (Duran-Frigola et al. Nat Biotechnol 2020; Bertoni et al. Nat Commun 2021) and the Bioteque (Fernández-Torras et al. Nat Commun 2022) as well as the **development of the new signatures to define the perturbed modules**. Additionally, he/she will also be responsible for developing the comparative methods to **link the effects of viral-perturbations to the signatures of non-communicable common diseases**. Finally, he/she will adapt the generative-AI models available in the group to identify or **design new chemical compounds with the capacity to stop the progression from RSV-induced cellular perturbations** to the onset of related non-communicable diseases.

EXPERIENCE, KNOWLEDGE, SKILLS & SELECTION CRITERIA

Must Have - Required

- **Education:** Engineering degree in Computer, Data Sciences or a bachelor in Biosciences. PhD in bioinformatics, data sciences, machine learning or related areas.
- **Experience:** previous experience on the use of machine learning and data science techniques. Strong publications record according to his/her career stage.
- **Skills:**
  - Excellent programming and scripting skills, with deep knowledge of Python.
  - Excellent knowledge of machine learning packages (Scikit, Keras, Pytorch, etc).
  - Competent in the use of HPC systems, virtual machines (OpenNebula) and Grid Containers (Docker, Singularity).
  - Excellent interpersonal and communication skills. Highly motivated. Fluency in English.

Desirable

- **Experience:** Previous experience working with knowledge graphs (KG) and embedding techniques, as well as with biological data and in an international environment.
- **Skills:**
  - Knowledge of AI-based generative models (e.g. VAEs, GANs, Diffusion models, etc)

WORKING CONDITIONS & ENTITLEMENTS

- **Working conditions:** Employed in compliance with Spanish legislation and regulations under a full-time contract. Employees receive the benefits of the Spanish Social Security system covering sickness, maternity/paternity leave and injuries at work.
- **Training and Career:** Postdoctoral researchers joining IRB Barcelona gain access to the Institute's advanced research training and career development opportunities, all within in a competitive international environment. Courses and workshops on themes of particular interest to postdocs are offered regularly by the Institute.
- **International environment:** Nearly 90 Postdoctoral researchers (more than a half non-Spanish nationals) are currently working at IRB Barcelona.
- **Estimated annual gross salary:** Salary commensurate with experience and qualifications.

HOW TO APPLY & SELECTION PROCESS

Applications for the above opening should include a Full CV and Motivation Letter and should apply on https://recruitment.irbbarcelona.org/, Reference: PD/24/04

- **Deadline for applications**: 26/04/2024
  If no suitable candidate is found, the deadline will be extended.
- **Number of positions available**: 1
- **Selection process**
  - **Pre-selection**: Will be based on CV, motivation letter and experience.
  - **Interviews**: Short-listed candidates will be interviewed.
  - **Job offer**: Will be sent to the successful candidate after the interview.

For more information please visit our website at: www.irbbarcelona.org

Note: The strengths and weaknesses of the applications will be provided upon request.

If you, as an applicant, have any suggestion or wish to make a complaint regarding the selection process, please contact us at the following email address: irbrecruitment.suggestions@irbbarcelona.org You will receive a response within a month.