



BIOMEDICAL SCIENCE FOR THE BENEFIT OF SOCIETY

PhD Position: Computational analysis and modeling of evolutionary processes

Centre for Genomic Regulation (CRG)

The Institute

The Centre for Genomic Regulation (CRG) is an international biomedical research institute of excellence, based in Barcelona, Spain, with more than 400 scientists from 44 countries. The CRG is composed by an interdisciplinary, motivated and creative scientific team which is supported both by a flexible and efficient administration and by high-end and innovative technologies.

In April 2021, the Centre for Genomic Regulation (CRG) received the renewal of the '[HR Excellence in Research](#)' Award from the European Commission. This is a recognition of the Institute's commitment to developing an HR Strategy for Researchers, designed to bring the practices and procedures in line with the principles of the [European Charter for Researchers](#) and the [Code of Conduct for the Recruitment of Researchers](#) (Charter and Code).

[Please, check out our Recruitment Policy](#)

The

role

We are looking for a PhD student candidate to join the 'Evolutionary Processes Modeling' group. The ideal candidate should be highly motivated and eager to work on evolutionary and biological problems and to learn about the use and development of computational, statistical and machine learning approaches.

The Group

Cancer is a genetic disease, subject to population genetics forces like mutation, selection and stochasticity. Our group is particularly interested in how the evolution and survival of cancer cell populations relies on mutation influx and in how we can identify cancer driver events from observed mutation data. To this end, we develop mathematical and computational approaches to estimate mutation rates, tumor growth dynamics and selection. Analysis of the mutational processes acting in cancer genomes allows us to learn about carcinogenic mutagens (<https://www.biorxiv.org/content/10.1101/2023.12.06.570467v1>), while studying the spatial genetic heterogeneity of tumors tells us about the tumor mode of growth (<https://www.biorxiv.org/content/10.1101/2023.12.10.570995v1>). Estimates of the strength of selection in cancer allow a prioritization of genes and non-coding regions by their disease relevance, with the ultimate goal of promoting therapeutic advances. Coding sequences of cancer tumors not only exhibit positively selected mutations that drive cancer (www.nature.com/articles/s41588-019-0572-y), but there also exists a small fraction of genes that the tumor cannot afford to lose (www.nature.com/articles/ng.3987). In addition to genes, cancer driver loci can occur in the non-coding part of the genome (www.nature.com/articles/s41467-017-00100-x).

We are also interested in mutation rates and selection inference in the context of human genetic variation, including polymorphisms (<http://www.nature.com/articles/ng.3831>; academic.oup.com/mbe/article-abstract/36/8/1701/5475505) and *de novo* variants (www.nature.com/articles/s41467-020-17162-z). Here, a particular focus of the group lies on the description of purifying selection in humans and across species, accounting for mutational processes as well as the effects of genetic drift.

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The Evolutionary Processes Modeling lab was established in October 2018 and is part of the “Bioinformatics and Genomics” program at the CRG. Further information can be found at <https://weghornlab.net/> and at www.crg.eu/en/programmes-groups/weghorn-lab.

Whom would we like to hire?

We are looking for a PhD student to join the lab to help elucidate cancer evolutionary dynamics using population genetics predictions and simulations together with published and unpublished cancer sequencing data. Research interests within the field of population genetics but outside this specific topic will also be considered.

Must Have

- The ideal candidate should be highly motivated and eager to work on biological problems using theoretical and computational approaches

Education and training

- Candidates should have a University Degree and a master's degree in physics, mathematics, statistics, genetics, bioinformatics, computer science or related disciplines within the European Higher Education System (minimum 300 ECTS) or equivalent by October 2024

Languages

- The candidate needs to be proficient in English

Technical skills

- You have experience with computer programming (preferably R and/or python)

Competences

- The ideal candidate should be highly motivated and eager to work on biological problems using theoretical and computational approaches.

The Offer

- **Contract duration:** 4-year PhD position
- **Estimated annual gross salary:** Salary is commensurate with qualifications and consistent with our pay scales.
- **Target start date:** October 2024.

We provide a highly stimulating environment with state-of-the-art infrastructure and unique professional career development opportunities. To check out our training and development portfolio, please visit our website in the [training section](#).

We offer and **promote a diverse and inclusive environment** and welcome applicants regardless of age, disability, gender, nationality, ethnicity, religion, sexual orientation or gender identity.

The **CRG is committed to reconcile a work and family life** of its employees and is offering extended vacation periods and the possibility to benefit from flexible working hours.

Application Procedure

All applications must include:

1. A motivation letter addressed to Dr Donatè Weghorn.
2. A complete CV including contact details of two referees.

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3. Transcripts from Bachelor and Master studies.

All applications must be addressed to Dr. Donate Weghorn and be submitted online on the CRG Career site - <http://www.crg.eu/en/content/careers/job-opportunities>

Selection Process

- **Pre-selection:** The pre-selection process will be based on qualifications and expertise reflected in the candidates' CVs. It will be merit-based.
- **Interview:** Pre-selected candidates will be interviewed by the Hiring Manager of the position and a selection panel if required.
- **Offer Letter:** Once the successful candidate is identified the People department will send a Job Offer, specifying the start day, salary, working conditions, among other important details.

Candidates may address scientific enquiries to dweghorn@crg.eu.

Deadline: Please submit your application by August 2nd, 2024.

Suggestions: The CRG believes in ongoing improvement and promotes a culture of feedback. This is one of the reasons we have in place, at your disposal as a candidate, a mechanism to gather your suggestions/complaints concerning your candidate experience in our recruitment processes. Your feedback really matters to us in our aim at creating a positive candidate journey. You can make a difference and help us improve by letting us know your suggestions through the following form. <https://recruitment.crg.eu/webforms/recruitment-contact-form-suggestionscomplaints>



HR EXCELLENCE IN RESEARCH

