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2-YEAR POSTDOCTORAL JOB OFFER

We are seeking for a highly motivated person to join us at the Institut Botànic de Barcelona on a 2-year postdoctoral contract to work on the recently-funded project: **The rise of giant genomes in land plants: uncovering the evolutionary processes driving genome obesity (GIANTS)**

BRIEF SUMMARY OF THE PROJECT

Interest in plant genome size (i.e. the total amount of DNA in the unreplicated haploid nucleus) has grown exponentially as the biological, evolutionary and ecological significance of this key biodiversity trait is increasingly recognised. Such interest underpinned by the staggering diversity of genome sizes encountered across eukaryotes, and in land plants in particular, which ranges over 2,400-fold.

Despite the many existing taxonomic caveats, an outstanding diversity of plant genome sizes has been uncovered in land plants so far. However, such a range is in striking contrast with the distribution of plant genome sizes, which is clearly skewed towards the lower end on the scale, illustrating the dominance of small and very small genomes. Given the biological and evolutionary constraints associated to having a large genome, with direct implications on plant resilience, this project will focus on two main goals, investigating **(i) how plant genomes expand to gigantic proportions (i.e. $1C \geq 30$ Gb), and (ii) how are they organised**, delivering critical understanding of the processes involved in genomic obesity.

It is known that in absence of polyploidy, genomes can expand through the accumulation of different types of repetitive elements, including DNA transposons, satellite DNA and retroelements (mainly LTR retrotransposons). In plants with relatively small genomes, the bulk of genomic landscape is usually dominated by very few lineages of repetitive elements. In contrast, in plants with giant genomes, the results obtained so far indicate that their genomes are more heterogeneous, and include a diverse array of DNA repeats, each in relatively low abundance, with no particular element dominating the genome. This supports a scenario of continued DNA accumulation over time rather than arising from recent bursts of amplification, combined with deficient rates of DNA removal.

This project will exploit high-throughput sequencing and cytogenetic approaches combined with large-scale genome size surveys to identify from a phylogenetic perspective where and how giant genomes have evolved and how are their genomes structured, providing critical insights into the evolutionary dynamics of plant genome obesity. We will conduct a timely comparative genome analysis in a taxonomically diverse set of taxa, where giant genomes are currently known to exist, including pteridophytes (Psilotaceae), monocots (Melanthiaceae) and eudicots (Loranthaceae and Santalaceae).

Person Accountabilities

- (i) To develop research questions within the project research context, leading individual research.
- (ii) Analysing detailed and complex genomic data from a variety of sources, and generate original ideas by building on existing concepts.
- (iii) Develop, establish, and pursue appropriate analytical protocols, techniques and bioinformatic pipelines to support research.
- (iv) Regularly write research articles for scientific journals and reviews.

Person Specification

- (i) Hold a relevant PhD/D.Phil, together with post-qualification research experience.
- (ii) Experience with NGS sequencing data and genetics. Demonstrate sufficient specialist knowledge in the discipline (or similar research fields) to develop the proposed research programme and methodologies.
- (iii) Proven bioinformatic skills. Detailed knowledge of problems, literature and appropriate methodologies in bioinformatics (e.g. Python, C++, R environment)
- (iv) Strong track publication record and good scientific writing skills.
- (v) Familiarity with the existing literature and research in genomics.
- (vi) Ability to lead and motivate undergraduate and MSc students to independently plan and manage a research project.

Contact for enquiries: Interested candidates should send a CV and a one-page motivation letter to Jaume Pellicer. jaume.pellicer@ibb.csic.es