



Computational postdoctoral position in the design of synthetic pathways and regulatory proteins.

Job description

As part of a VUB strategic research project for 'Synthetic biology for the development of microbial cell factories', we are offering a postdoctoral position where the **(re-)design of regulatory proteins** is combined with **modelling their impact on regulation** in dynamic biological systems. The position is associated with two computational groups at the VUB: i) the Bio2Byte group led by Prof. Dr. Wim Vranken, with focus on predicting biophysical protein characteristics and interpreting these predictions in relation to life science problems such as molecular causes of human diseases or protein design (see <https://bio2byte.be/>) and ii) the group of Prof. Dr. Sophie de Buyl (see <https://aphy.research.vub.be/prof-dr-sophie-de-buyl>), with interest in gaining a fundamental understanding of the physical principles that control the emergent properties of biological systems.

The project will assist in designing synthetic circuits to regulate *E. coli* metabolism, especially fatty acid production pathways. The computational work will be closely linked to experimental validation in the laboratory of Prof. Dr. Eveline Peeters (<https://micr.research.vub.be/>), with expertise in developing dynamical pathway regulation through biosensors. Approaches relying on both transcriptional (DNA) and post-transcriptional (RNA) levels will be developed and intertwined in iterative computation/experiment cycles. The project relies both on developing approaches in **bioinformatics**, where regulatory protein data is collected and analysed in relation to DNA/RNA binding, and in **mathematical modelling**, where the combined effect of introducing such regulatory proteins is studied. The end goal is to create general strategies for the efficient production and regulation of metabolites in *E. coli*.

The three groups have an extensive international network of collaborations within and outside of Europe. We offer an open, dynamic and rewarding research environment, focused on teamwork and collaborations, that stimulates initiative taking, discussion and originality.

Profile

You have a Ph.D. degree in sciences or engineering, with further postdoctoral training a bonus. You are analytical, structured, pragmatic problem solver with attention to detail, and have excellent interpersonal and communication skills, as well as many as possible of the following competences:

- Experience in dynamical modelling of biological systems;
- Experience using protein structure and sequence information, including protein structure prediction methods such as AlphaFold2;
- Experience in modelling stochastic processes;
- Experience with handling and integrating large datasets, building bioinformatic tools such as automated analysis pipelines, dashboards and databases;
- Experience with machine learning and/or protein modelling and/or assessing the impact of amino acid mutations and/or structure prediction of proteins complexed with DNA/RNA is desirable;



What we offer

The position is immediately available, for initially 1 year but with possibility to extend. You will be mainly located at the (IB)² Interuniversity Institute of Bioinformatics in Brussels (<http://ibsquare.be/>), Etterbeek VUB/ULB campus, which provides an interdisciplinary environment across sciences and (bio-)engineering.

Applications and further information

Please contact Wim.Vranken@vub.be and/or Sophie.de.Buyl@vub.be for additional information. To apply, please fill in and submit this online form: <https://bit.ly/synbiodesign>, before the deadline of the 15th of June 2023. You have to include 1) a motivation letter detailing your interest and suitability for this position and 2) a CV including at least 2 contacts for references. Additional information can be uploaded via the application form.