CeNT-40-2021

Director of Centre of New Technologies of the University of Warsaw, with the Project Leader, announces the opening of the competition for the position of PhD Student in the Laboratory of Structural Bioinformatics – Centre of New Technologies of the University of Warsaw.

JOB OFFER

Position in the project:	PhD Student
Laboratory:	Laboratory of Structural Bioinformatics
Scientific discipline:	Life Sciences
Keywords:	Bioinformatics, systems biology, phylogeny, protein evolution, protein interaction networks, molecular biology, programmed cell death, apoptosis, innate immunity, yeast, microbiology, RNA-seq
Job type (employment contract/stipend):	Stipend
Part-time/full-time:	Full-time
Number of job offers:	1
Remuneration/stipend amount/month:	4500PLN/month gross (the exact remuneration depends on the doctoral school regulations at which the candidate is/will be enrolled)
Position starts on:	1 January 2022
The maximum period of contract/stipend agreement:	36 months with a possible extension
Institution:	Centre of New Technologies, University of Warsaw
Project leader:	Dr Stanisław Dunin-Horkawicz
Project title:	A systems biology approach to study the role and evolution of molecular pathways related to multicellularity
Competition type:	OPUS 19
Financing institution:	National Science Centre Poland
Project description:	Every organism is composed of cells that are complex molecular machines. These machines are not infallible and due to external agents or internal error, they can start to function in an undesired manner. An example of such malfunction is the disruption of the cell division mechanism that leads to its uncontrolled proliferation. To prevent such a multiplication, cells are equipped with a programmed cell death (PCD) mechanism. This system triggers the "self-destruction" of an affected cell in a way that does not pose a threat to neighboring cells. Unfortunately, sometimes the PCD failsafe mechanism may be also damaged, and in this case, the cell will keep on multiplying in an unrestrained manner – a condition that we know as cancer. Previous studies indicated that neither cancer nor PCD processes are unique to humans. On the contrary, both are observed in a variety of

	multicellular organisms including starfish, freshwater polyp, and fungi. Moreover, it has been shown that the molecular circuits (i.e., groups of proteins acting together) responsible for PCD are also present in bacteria characterized by a complex lifestyle, suggesting that the ancestors of the PCD systems appeared very early in history of life. In this project, we will use computational tools to identify, characterize, and classify the individual components of PCD and PCD-like systems across thousands of the available sequenced genomes. These analyses will enable us to understand the differences in the composition of PCD systems originating from various organisms and to describe the evolutionary processes underlying this diversity. The bioinformatics analysis will result in testable hypotheses which will be the starting point for laboratory studies. First, we will attempt to unravel the function of the PCD-like systems in bacteria. To this end, we will culture selected bacterial species and check how do they respond, at the molecular level, to various conditions such a phage (viruses specific to bacteria) infection, population density, and stress. This analysis will be an important step towards understanding the role of bacterial counterparts of the "self-destruction" systems known from more complex organisms. The second branch of the experimental work will focus on studying the compatibility of PCD and PCD-like systems' components originating from different organisms. To this end, we will use genetic engineering methods to introduce selected components to yeast cells and examine the effects of their presence. As a result, we will understand why some components can act together and others not, and thus we will validate the previous findings obtained with the aid of computational methods.
Key responsibilities include:	- managing yeast/bacterial cultures, performing programmed cell death assays on yeast - participation in the development of bioinformatics pipelines for phylogenetic analysis and protein network reconstructions - drafting manuscripts and results presentation
Profile of candidates/requirements:	- Master's degree in bioinformatics, biology, biochemistry, biophysics, or related discipline - The candidate has to be enrolled at the doctoral school before the date of employment in the project - good knowledge of microbiology and/or molecular biology methods - experience in working in a sterile environment - theoretical or practical knowledge of bioinformatics would be an advantage The competition is open for persons who meet the conditions specified in the regulations on the allocation of resources for the implementation of tasks financed by the National Science Centre for OPUS 19 grant.
Required documents:	1. Cover letter 2. Current curriculum vitae 3. Copy of MSc certificate (if the MSc certificate has not been obtained yet, a certificate/document about the date of MSc defense) 4. Signed information on the personal data processing 5. Recommendation letter from the MSc degree advisor
Inquiries related to the project or position may be sent to:	s.dunin-horkawicz@cent.uw.edu.pl
We offer:	- work in a young research team well-networked with international partners (Germany) - access to the high-end computing equipment (CPU and GPU clusters) - participation in scientific seminars and conferences - competitive salary
Please submit the following documents to:	s.dunin-horkawicz@cent.uw.edu.pl

Recruitment procedure:	Selected candidates will be invited to the interview by email
Application deadline:	30 September 2021
Date of announcing the results:	31 October 2021, at the latest