research positions
starting September 1st, 2021

(E13 TV-L, non-permanent positions)

Your Tasks

ALPACA is an EU-funded international training network (ITN) that deals with the design and implementation of algorithms in the field of computer-aided pangenomics ("computational pangenomics"). Genome can be understood as sequences ("words") over the letters A, C, G, T. The alphabet of nucleotides is huge and the number of possible sequences is astronomical. However, related species differ only in a few places. This allows large amounts of similar genomes (e.g. those of all humans, or all coronaviruses, etc.) to be treated efficiently as a set of sequences. The underlying graph models have only recently become the subject of research. These include compression, the design of efficient algorithms for processing, and artificial intelligence methods for evaluating the pangenome graphs. As very little is currently known about pangenome comparison, the results of this project will be crucial for future research.

1. Development of pangenome graph-based feature spaces for the application of deep learning. Although possessing universal power in theory, deep learning has so far not been studied for the analysis of genomes very thoroughly. Pangenome graphs give rise to intriguing feature spaces that represent large collections of individual genomes. As a consequence, deep learning can be applied for detecting prevalence for diseases in humans and for virulence and resistance to medical treatment of pathogens, such as viruses (e.g. Corona) and bacteria (e.g. from the gut microbiome).

2. Development of methods for the comparison of two or more pangenomes represented in form of graphs. Based on simple structural properties of the graphs, of attributes of the sequences contained, or of its functional content, alignment-free measures for pangenome similarity or distance shall be developed. These measures will be implemented, tested and exemplarily applied to pangenomic data. The result will be a software tool for quantitative graphs, of attributes of the sequences contained, or of its functional content, alignment-free measures for pangenome similarity or distance shall be developed. This tool will be of great importance for future research.

The third-party funder requires the following: Applicants may have spent a maximum of 12 months in Germany in the past three years.

Your Profile

We expect

 completed relevant academic university degree (e.g. master) in computer science, bioinformatics or mathematics
 good knowledge of the English language (written and oral)
 experience with the implementation of efficient algorithms for the analysis of bioinformatic high throughput data
 experience in the development and analysis of methods of bioinformatic data analysis
 strong communication skills, independent, style of work and high individual initiative
 published in refereed journals

Preferable qualifications

 current publication activity
 completed relevant academic university degree (e.g. master) in computer science, bioinformatics or mathematics
 experience in the development and analysis of methods of bioinformatic data analysis
 experience with the implementation of efficient algorithms for the analysis of bioinformatic high throughput data
 communication activity

Due to the project requirements, the applicant must not have a PhD or have worked in research for more than four years after graduation.

Remuneration

Salary will be paid according to Remuneration level 13 of the Wage Agreement for Public Service in the Federal States (TV-L). As stipulated in § 2 (1) sentence 1 of the WageAct (Government Agreement on Salary and Conditions of Employment), the length of contract may differ in individual cases. The employment is designed to encourage further academic qualification. In principle, the two full-time positions may be changed into part-time positions, as long as this does not conflict with official needs.

Bielefeld University is particularly committed to equal opportunities and the career development of its employees. It offers attractive internal and external training and further training programmes. Employees have the opportunity to use a variety of health, counselling, and prevention programmes. Bielefeld University places great importance on a work-family balance for all its employees. For full consideration, your application should be received via either post (see postal address below) or email (a single PDF document) sent to aschoen@cebitec.uni-bielefeld.de before January 31st, 2021. Please mark your application with the identification code: wiss20288. Please do not use any names or identifiers in the body of the email, and do not attach any documents. The application portfolio will be destroyed at the end of the selection procedure. Further information on Bielefeld University can be found on our homepage at https://www.uni-bielefeld.de. Please note that the possibility of privacy breaches and unauthorized access by third parties cannot be excluded. The information on the processing of personal data is available at https://www.uni-bielefeld.de/Universitaet/Aktuelles/Stellenausschreibungen/2015_DSG-Hinweise_english.pdf.

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Bielefeld University has received a number of awards for its achievements as an equal opportunity employer and has been recognized as a family-friendly university. The university welcomes applications from women. This is particularly true with regard both to academic and technical posts as well as positions in information technology as well as the skilled crafts and trades. Applications are handled according to the provisions of the state statutes on equal opportunity. Applications from suitably qualified handicapped and severely handicapped persons are explicitly encouraged.