PhD Program between Freie Universität Berlin (FUB) and the China Scholarship Council (CSC)

Open PhD Position at Freie Universität Berlin, offered only to Chinese CSC scholarship candidates 2027

Department/Institute: Biology

Subject area: Evolution

Name of Supervisor: Katja Nowick

Number of open PhD positions: 1 Full-time

Type of the PhD Study: Full-time

Project title: Living with Radiation: Evolutionary Insights from Rodents

PhD Project description:

Understanding the impact of radiation on human and animal health is important, because it directly affects developmental processes, long-term survival, and overall well-being. In fact, high dosage of radiation has been shown to lead to smaller brains and cognitive disabilities in humans and other vertebrates. We have collected rodents in the Chernobyl Exclusion Zone from areas with high radioactivity and from (control) areas with normal background levels of radioactivity. For more than 100 individuals we sequenced the transcriptomes of four different brain regions and liver. In the two different rodent species we analyzed so far, we see clear and distinct signatures of gene expression differences in different regions of the brain. In the PhD project proposed here, we want to understand better, which role transcription factors and non-coding RNAs play in shaping these expression differences. To this end, we will apply methods for testing for natural selection in those genes. We will further construct the gene regulatory networks controlled by them and compare them between individuals from the contaminated versus uncontaminated areas. Finally, we will compare patterns of sequence and network changes in those rodents to other species (e.g. chimpanzees versus humans) and include biomedical data, to gain insights into molecular determinants of brain size and cognitive abilities.

Language requirements:

- IELTS: 6,5 oder TOEFL: 95 ibt

Academic requirements:

You will need a Master's degree in Biology, Bioinformatics, Genomics, Molecular Biology or similar.
You should have experience with bioinformatics methods for the analysis of genomics and
transcriptomics data, computational analysis of gene regulatory networks, programming in R or Python.

Information of the professor or research group leader (website, awards etc.):

Our group studies the evolution of the brain and cognition. Our main focus is on the impact of transcription factors (TFs) and non-coding RNA on differences in transcriptomes, gene regulatory networks, and ultimately the phenotype. TFs are proteins that form gene regulatory networks to regulate the expression of all genes. TFs typically bind to specific DNA sequence motives to control the expression of a few to many other genes. Therefore, evolutionary changes in TFs can potentially have large impacts on the phenotype of a species. Indeed, we demonstrated that some TF genes show significantly more sequence and expression differences between humans and chimpanzees than other types of genes. Intriguingly, some of these fast evolving TFs seem to play a role in brain and cognitive functions.

For more information, visit our website: http://www.nowick-lab.info

Information about the PI:
I did my PhD at the Max-Planck-Institute for Evolutionary Anthropology in Leipzig, Germany. Under the supervision of Prof. Svante Paabo, I studied the functions and evolution of FOXP2, a transcription factor gene involved in language acquisition, in primates. Inspired by the big impact a sequence change in one gene can have on human evolution, I joined the lab of Prof. Lisa Stubbs in the USA for my postdoc, to investigate the largest group of transcription factor genes, the Kruppel-type zinc finger genes, in primates. My work lead to a higher recognition of the importance of gene regulation and the factors regulating it for the evolution of phenotypes, among them cognition in humans.
Since 2011, I lead my own independent research group; in 2016, I became a university professor. I have already supervised 4 postdocs, 10 PhD students, more than 20 Bachelor and Master students.

Please note:
In a first step, the complete application should be uploaded to the online portal (https://fuberlin.moveon4.de/form/60acfece5d328710e40bdbd5/eng) for evaluation by January 15th, 2027.