



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

Open PhD position at FUB for CSC scholarship candidates 2018

Please note: the PhD position is only offered to Chinese PhD candidates for application in the framework of the FUB-CSC PhD Program.

<u>Department/Institute:</u>	Department of Mathematics and Computer Science / Institute of Bioinformatics
<u>Subject area:</u>	Medical Bioinformatics
<u>Name of Supervisor:</u>	Prof. Dr. Rosario M. Piro
<u>Number of open PhD positions:</u>	1
<u>Type of the PhD Study:</u>	Full-time
<u>Project title:</u>	Study of the effect of cancer-related structural variants on the ceRNA network (indirect gene regulation)

PhD Project description:

(This project is largely concerned with indirect effects of structural variants in cancer on gene regulation. A previous familiarity with the ceRNA mechanism is not required.)

Recently, a novel layer of endogenous gene regulation has been described. Both coding and non-coding transcripts (e.g. pseudogenes) have been shown to possess indirect regulatory functions by constituting natural “sponges” or decoys for microRNAs (Poliseno et al. 2010; Salmena et al. 2011) that antagonize microRNAs and thus prevent them from downregulating other targets. The context-dependent activity of such competing endogenous RNAs (ceRNAs), both mRNAs and pseudogenes, has been shown to be relevant for cancer (Poliseno et al. 2010; Tay et al. 2011). This raises intriguing questions that this project is aimed to answer: What secondary, microRNA-mediated effects are associated with amplifications of oncogenes (e.g. MYCN in neuroblastoma) and how important are these effects for tumorigenesis? Do oncogenic transcripts act as ceRNAs additionally to encoding for an oncogenic protein? If so, can this mechanism be exploited for therapeutic means? What impact have massive genomic rearrangements (e.g. chromothripsis; Stephens et al. 2011; Rausch et al. 2012) on the activity of microRNAs? Can they lead to the expression of aberrant transcripts that may act as novel microRNA sponges? Does differential co-expression (gain or loss of co-expression of gene pairs in cancer) partially reflect changes in microRNA activity that couple/uncouple transcripts in the ceRNA network? Can specific ceRNAs be targeted to re-establish a balance that may prevent tumor progression?

Language requirements:

IELTS 6.5 or TOEFL 95 ibt.

Academic requirements:

Applicants should have a M.Sc. degree in bioinformatics/computational biology or a highly related field. Alternatively, exceptional candidates from mathematics, computer science or physics might be considered, if they have sufficient knowledge in programming languages and a previous familiarity with applications to biological research topics. Basic knowledge about molecular biology, genetics and other relevant fields is important.

Information of the professor or research group leader:

Rosario M. Piro is an assistant professor (Junior professor) in bioinformatics and principal investigator at the Institute of Bioinformatics and the Institute of Computer Science at FU Berlin. At the same time, he is a member of the Institute of Human Genetics and Medical Genetics at the Charité University Hospital. His research concentrates on computational neuropathology (i.e. computational approaches to study neurological disorders and neuropathologies, including brain tumors) and computational oncology in general (including the development and evolution of cancers in other organs or tissues). Website: <http://rmpiro.net>

Please note: In a first step, the complete application must be submitted to the Beijing Office for evaluation by January 4th, 2018. Please do not contact the professor before. He/She will get in contact with you after having received the complete application via the Beijing Office in January.