Ph.D. position in RNA bioinformatics

UNIVERSITÄT LEIPZIG

The new research group of Zasha Weinberg seeks a Ph.D. student to continue a highly successful, multi-paper research program to discover novel structured non-coding RNAs (ncRNAs). Structured non-coding RNAs include such fundamental examples as ribosomes and other types of ribozymes, spliceosomal RNAs, regulatory sRNAs, microRNAs, riboswitches and many others. The discovery of novel structured RNA classes creates precious opportunities to better understand RNA biochemistry and structure; provides tools for biotechnology applications; and has often revealed exciting new biology.

A powerful approach to finding novel RNA classes has been comparative genomics founded on analysis of covariation, which is a telltale pattern of mutations that results from the evolution of a conserved, structured RNA. This method depends on large datasets of genomic and metagenomic sequence data, and such data has recently expanded massively.

You will exploit this dramatic increase in available data with proven and new computational analytic methods to find novel classes of ncRNAs. You will analyze computer predictions to find the most promising ncRNA candidates, and generate hypotheses for their function that can be tested by experimental biologists in collaborations. Software by Dr. Weinberg is already in place from previous work that enables searches for novel ncRNAs. However, you will write scripts to implement improved techniques.

ADDITIONAL DETAILS

The most-relevant bioinformatics papers showing previous results are:

- Weinberg, *et al.*, (2017) Detection of 224 candidate structured RNAs by comparative analysis of specific subsets of intergenic regions, *Nucleic Acids Research*, 45:10811-10823. (`http://www.ncbi.nlm.nih.gov/pubmed/28977401`)

- Weinberg, *et al.*, (2015) New classes of self-cleaving ribozymes revealed by comparative genomics analysis, *Nature Chemical Biology*, 11:606-10. (`http://www.ncbi.nlm.nih.gov/pubmed/26167874`)

Two examples of the most surprising novel ncRNAs resulting from Dr. Weinberg's earlier analysis:

- ncRNAs that have extraordinarily complex structures or are extremely highly transcribed: Weinberg, *et al.*, (2009) Exceptional structured noncoding RNAs revealed by bacterial metagenome analysis, *Nature*, 462:656-9. (`http://www.ncbi.nlm.nih.gov/pubmed/19956260`)

- riboswitch RNAs that bind the ion fluoride: Baker, *et al.*, (2012) Widespread genetic switches and toxicity resistance proteins for fluoride. *Science*, 335:233-235. (`http://www.ncbi.nlm.nih.gov/pubmed/22194412`)

SKILLS & QUALIFICATIONS

- Proficiency with UNIX and a scripting language such as Perl or Python. Additionally, proficiency with relational databases and C/C++ is desirable.

- Excellent written and spoken English.

- Strong background in bioinformatics, and solid knowledge of molecular biology and biochemistry.

- Interest in solving biological problems using computational approaches, and enthusiasm for basic science.

- Desire to learn and to develop own opinions and ideas, to gradually take charge of project. Critically evaluates own ideas and results and those of others.

- A Master's degree or equivalent in bioinformatics, computer science, a biological science or a related discipline before beginning the Ph.D.

THE ENVIRONMENT

You will be advised by Dr. Zasha Weinberg, as part of the larger bioinformatics group of Prof. Dr. Peter Stadler at Leipzig University (`http://www.bioinf.uni-leipzig.de`). The group is international and friendly, with a diverse range of research interests represented, especially those related to RNA.

Leipzig is a pleasant and affordable city, with lots of art and culture. In fact, it's the fastest-growing city in Germany (e.g., `http://goo.gl/aPrpC9`).

DATES / TIMES / FUNDING

- Ideal start date is May 2018, but flexible.

- Salary is based on the TV-L pay rates, level E13, at 65%.

- The position is expected to run for 3 years, and is funded for this duration by the DFG (German Research Foundation).

HOW TO APPLY OR GET MORE INFORMATION

Questions or applications should be sent to Zasha Weinberg at zasha@bioinf.uni-leipzig.de. Electronic applications should include the following in PDF format:

- a short summary of research interests (half a page),

- your Master's thesis (if complete/nearly complete) or an abstract of it (if still pending),

- a copy of your transcript of records for university education (should list courses and grades, but does not have to be official or certified),

- curriculum vitae (CV) and

- names and contact information for one or ideally two references.

The evaluation of applications will begin on Feb. 20, 2018, and will continue until a suitable candidate has been found.