Doctoral (PhD) student position in systems and network biology (bioinformatics)

Research group

The successful candidate will be part of a bioinformatics research team active within the fields of network biology, cancer, and biomarker development. The team adjoins Science For Life Laboratory http://scilifelab.se/. SciLifeLab, being a collaboration of four major Swedish universities, has become a national center of high-throughput technologies for biomedicine and relevant data analysis. It has attracted a large constellation of experts in major areas of bioinformatics, genomics, transcriptomics, proteomics, imaging etc. This community together with experimental researchers of MTC and other departments of Karolinska Institute constitute a productive environment for the planned research education project of the PhD student. Department of Microbiology, Tumor and Cell Biology (MTC) at Karolinska Institutet conducts research and teaching in immunology, infection biology, cell biology and cancer. MTC has about 430 active employees, including 100 PhD students, 50 postdoctoral researchers and 26 professors. The multidisciplinary environment and the national and international collaborations help bridging basic and translational research.
The student will be supervised by assoc. prof. Andrey Alexeyenko. For more information about the research, see http://research.scilifelab.se/andrej_alexeyenko/.

The project and the duties of the student

The PhD studies at Karolinska Institute correspond to 4 years of full-time studies. The research education will include algorithm development and writing scientific software as well as attending courses and seminars, literature review, statistical analysis, participation in journal clubs, and presentation of own results at meetings. Other responsibilities include development of methodology and work routines, and preparation of scientific manuscripts.

We, together with a potential PhD student, could consider a project in one of the following areas:

1. Networks combining molecular and phenotypic data;
2. Molecular heterogeneity of tumors and cancer therapy;
3. Causality in network models;
4. Network topology analysis;
5. Prognostic signature and biomarker discovery;
6. Functional annotation and analysisof high-throughput datasets;
7. Information theoretic network models.

Within the research project, the PhD student will apply existing and novel methods of statistics and graph theory to prediction and analysis of biological networks. Beyond the theoretical understanding of biological systems, a goal would be to develop practically useful, statistically and biologically valid biomarkers, such as predictors of cancer disease outcome – either in general or given a specific treatment (including s.c. companion diagnostics). The multiple previous attempts to use for this purpose high-throughput data directly were controversial and often unsuccessful. Meanwhile, the idea of generalizing such data to the level of pathways has gained popularity. In particular, we develop methods, which would utilize our algorithm and software for network enrichment analysis. The network-based pathway scores should then characterize biological samples (patients) using lists of genes that were mutated, copy number altered, differentially expressed, or hyper/hypo-methylated. The final step might be building and validation of predictor and classifier models.

Skills and personal qualities

The candidates are expected to have high level of motivation to solve scientific problems by developing and applying advanced analytical tools. Good presentation and communication skills are important as well. The successful candidate will have a background in computer science/ statistics/ mathematics/ and either biology or medicine. This can imply formal education in one field and certain experience in the other. Fluency in programming is required (choice of language is unspecified). Knowledge of basic concepts and routines of cancer biology, biostatistics, and network analysis is highly desirable for the work in the multidisciplinary environment.

Assessment criteria

A selection will be made among qualified applicants based of the ability to benefit from doctoral education. Karolinska Institutet uses the following bases of assessment:

- Documented subject knowledge of relevance to the area of research;
- Analytical skills;
- Other documented knowledge or experience that may be relevant to doctoral studies in the subject.

The evaluation will be based on a summarized assessment of the applicant's qualifications.

Terms and conditions

The student will receive salary on conditions of doctoral employment during the four years of the project.

An external stipend can be used according to

http://ki.se/en/staff/doctoral-students-with-external-scholarships

See more information at

http://ki.se/en/staff/doctoral-education

Application

The following documents are required:

- A motivation letter and curriculum vitae sent to andrej.alekseenko@scilifelab.se;
- Copies of degree certificates and any other relevant certificates;
- Copies of degree project thesis (an English abstract should be available) as well as any previous publications.

Entry requirements for doctoral education at KI

To be eligible for doctoral education following requirements has to be met:

General entry requirements

A person meets the general entry requirements for doctoral/third-cycle/PhD education (according to Higher Education Ordinance Chapt 7, secti on 39) if he/she:

1. has been awarded advanced/second-cycle/master qualification (i.e. master degree) or
2. has satisfied the requirements for courses comprising at least 240 credits of which at least 60 credits were awarded in the second-cycle/master level, or
3. has acquired substantially equivalent knowledge in some other way in Sweden or abroad.

Specific entry requirements

Proficiency in English equivalent to the course English B/English 6 at Swedish upper secondary school:

Proficiency in the English language can be documented by an internationally recognized test such as TOEFL or IELTS, see web-link below for more information.

Applicants who meet the general entry requirements (1 or 2 above) from a university in one of the Nordic countries fulfill the requirements in English.
For more information regarding general and specific entry requirements:
http://ki.se/en/education/entry-requirements-eligibility-for-doctoral-education requirements-eligibility-for-doctoral-education

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Karolinska Institutet is one of the world´s leading medical universities. Its mission is to contribute to the improvement of human health through research and education. Karolinska Institutet accounts for over 40 per cent of the medical academic research conducted in Sweden and offers the country´s broadest range of education in medicine and health sciences. Since 1901 the Nobel Assembly at Karolinska Institutet has selected the Nobel laureates in Physiology or Medicine.