PhD Research Fellowship in Formal Methods for Probabilistic Programs

Job description
Position as PhD Research Fellow in Formal Methods for Probabilistic Programs available at the Department of Informatics.

The fellowship period is for 3 years and is devoted to research education. Candidates may be offered one additional year by the Department of Informatics; the 4 years position then entails a compulsory work load of 25% that consists of teaching and supervision duties.

Starting date no later than 1 October, 2021.

No one can be appointed for more than one PhD Research Fellowship period at the University of Oslo.

Job description
The main purpose of this PhD position is to investigate the applicability of symbolic execution techniques for probabilistic programs.

Probabilistic programs are used to derive statistical information from uncertain data such as real-world observations. Software systems which need to handle uncertain data can be found in, for example, security, robot control systems and machine learning algorithms. Probabilistic programming aims to make probabilistic data available to programmers.

Symbolic execution is a technique for program analysis, based on executing programs with symbolic input values. By doing so, this technique is able to systematically explore the different execution paths of a program for all input values. Symbolic execution is used for both software testing and software verification. In this project, we explore the concepts and applicability of symbolic execution for probabilistic programs.

The project will be executed in the context of the Formal Methods group at the department, which develops and applies techniques for formal modelling and analysis in a range of problem domains. Of particular relevance is our participation in REMARO, a European MSCA PhD training network on reliable robotic control systems. The project will be supervised by Prof. Einar Broch Johnsen and further involves international collaborators Prof. Andrzej Wasowski (IT-University of Copenhagen, DK), Prof. Alexandra Silva (University College London, UK) and Prof. Ina Schaefer (Technical University of Braunschweig, DE).

This is an exciting position for candidates interested in combining logic and statistics with programming in their PhD research, and who have enjoyed topics such as foundations of programming languages, probability theory and statistics, executable models and operational semantics, formal methods and concurrency theory.

Qualification requirements
The Faculty of Mathematics and Natural Sciences has a strategic ambition to be among Europe’s leading communities for research, education and innovation. Candidates for these fellowships will be selected in accordance with this, and expected to be in the upper segment of their class with respect to academic credentials.

Required qualifications
- Applicants must hold a Master’s degree or equivalent in a field of mathematics, computer science or informatics which is relevant for this position, such as mathematical logic, statistics, formal methods, programming language theory, concurrency theory or software engineering.
- Foreign completed degree (M.Sc.-level) corresponding to a minimum of four years in the Norwegian educational system.
- A solid background in theoretical computer science is an advantage.
- Good knowledge in programming language theory and semantics, logic, statistics or probabilistic systems and programming languages, and experience with theorem provers, static analysis, formal methods techniques and software development will be considered an advantage, when candidates are ranked.
- Applicants must be fluent in oral and written communication in English.
- Applicants should submit a statement about their research interests indicating why this PhD topic fits their interest and background. This statement of research interest should not exceed one page.

Candidates without a Master’s degree have until 15 August, 2021 to complete the final exam.

Personal skills:
An independent and well-structured working style, as well as a good teamwork spirit.

Grade requirements:
The norm is as follows:
- the average grade point for courses included in the Bachelor’s degree must be C or better in the Norwegian educational system
- the average grade point for courses included in the Master’s degree must be B or better in the Norwegian educational system
- the Master's thesis must have the grade B or better in the Norwegian educational system
- Fluent oral and written communication skills in English.
- English requirements for applicants from outside of EU/EEA countries

The purpose of the fellowship is research training leading to the successful completion of a PhD degree.

The fellowship requires admission to the PhD programme at the Faculty of Mathematics and Natural Sciences. The application to the PhD programme must be submitted to the department no later than two months after taking up the position. For more information see:

http://www.uio.no/english/research/phd/
http://www.mn.uio.no/english/research/phd/

We offer
- Salary NOK 482 200 - 526 000 per annum depending on qualifications and seniority as PhD Research Fellow (position code 1017)
- Attractive welfare benefits and a generous pension agreement
- Vibrant international academic environment
- A stimulating, flexible, and creative work environment in a research group with strong links both within academia and to industry
- Career development programmes
- Oslo's family-friendly surroundings with their rich opportunities for culture and outdoor activities

How to apply
The application must include:

- Cover letter - statement of motivation and research interests
- CV (summarizing education, positions and academic work - scientific publications)
- Copies of the original Bachelor and Master's degree diploma and transcripts of records
- Documentation of English proficiency
- Letters of recommendation
- List of publications and academic work that the applicant wishes to be considered by the evaluation committee
- List of reference persons: 2-3 references (name, relation to candidate, e-mail and phone number)

The application with attachments must be delivered in our electronic recruiting system, please follow the link "apply for this job". Foreign applicants are advised to attach an explanation of their University's grading system. Please note that all documents should be in English (or a Scandinavian language).

Applicants may be called in for an interview.

Formal regulations
Please see the guidelines and regulations for appointments to Research Fellowships at the University of Oslo.

No one can be appointed for more than one PhD Research Fellowship period at the University of Oslo.

According to the Norwegian Freedom of Information Act (Offentlighetslova) information about the applicant may be included in the public applicant list, also in cases where the applicant has requested non-disclosure.

The University of Oslo has an agreement for all employees, aiming to secure rights to research results etc.

The University of Oslo aims to achieve a balanced gender composition in the workforce and to recruit people with ethnic minority backgrounds.

Contact information
For further information please contact:
Prof. Einar Broch Johnsen, email einarj@ifi.uio.no

For questions regarding the recruitment system, please contact HR Adviser Torunn Standal Guttormsen, phone:+47 22854272, e-mail:t.s.guttormsen@mn.uio.no

About the University of Oslo
The University of Oslo is Norway's oldest and highest rated institution of research and education with 28 000 students and 7000 employees. Its broad range of academic disciplines and internationally esteemed research communities make UiO an important contributor to society.

The Department of Informatics (IFI) is one of nine departments belonging to the Faculty of Mathematics and Natural Sciences. IFI is Norway's largest university department for general education and research in Computer Science and related topics.

The Department has more than 1800 students on bachelor level, 600 master students, and over 240 PhDs and postdocs. The overall staff of the Department is close to 370 employees, about 280 of these in full time positions. The full time tenured academic staff is 75, mostly Full/Associate Professors.