PhD Research Fellowship in Informatics

Job description

A PhD Research Fellowship in Informatics (GC for the JVM) is available at the Department of Informatics.

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

No one can be appointed for more than one PhD Research Fellowship period at the University of Oslo.Starting date no later than as soon as possible. No later than 1 January, 2020.

More about the position

Through recent years, we have seen an increase in the number of languages that run on top of runtime systems. JavaScript, Java, C#, Scala, Python, and Go are just a few examples of widely adopted managed languages that run on top of such runtimes. The extensive use of managed languages reveals that application developers want to take advantage of all the benefits of using a runtime system, and also shows that current runtimes' design is mature, providing competitive performance when compared to traditional languages such as C and C++. Therefore, we foresee that runtime system utilization will continue to grow in the future (e.g., GraalVM), suggesting the need for more research in this area. In addition, many research works have shown that memory management algorithms, Garbage Collection (GC) algorithms in particular, can be tuned in order to prioritize specific performance metrics such as latency, throughput, and memory utilization (footprint). With the recent development of new GC algorithms providing ultra-low latency (e.g., NG2C, C4, Shanendoah, ZGC), the memory management landscape becomes more complex. In particular, selecting the correct GC for a specific application is not trivial since each GC provides different trade-offs.

Thus, this PhD proposal addresses the need to study how current GCs perform regarding the above mentioned metrics (i.e., latency, throughput, and memory utilization) to better understand their trade-offs and select the right GC solution.

An example of such trade-off is the need of higher footprint and lower throughput in order to guarantee lower pause times, i.e. lower latency (as is the case with C4, Shanendoah, and ZGC).

Findings on how current GCs behave, for example, with smaller footprints, could affect both migration and other related memory management works (e.g., in dynamic vertical scalability algorithms) which try to reduce the amount of memory used before a JVM live migration or during periods in which applications have low activity. In short, not only current GCs must be studied, but trade-offs must also be ameliorated; for example, this PhD will explore a possible solution which is to use the underlying host operating system to identify unmodified memory pages that could be skipped during a full tracing cycle, thus helping to minimize applications pause times.

The candidate will be supervised by a group of supervisors in the Programming and Software Engineering Group who have broad competence in informatics:

Paulo Ferreira, Professor, Department of Informatics, UiO
Eric Jul, Professor, Department of Informatics, UiO
Rodrigo Bruno, PhD, Systems Group, Department of Computer Science, ETH Zurich

Qualification requirements

The Faculty of Mathematics and Natural Sciences has a strategic ambition of being a leading research faculty. 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.

- Master's degree or equivalent in informatics or a related field
- Foreign completed degree (M.Sc.-level) corresponding to a minimum of four years in the Norwegian educational system
- Prior knowledge and/or practice with system level programming, JVM or Garbage Collection, is considered an advantage
- Documented strong programming skills
- Candidates without a Master's degree have until 31 October, 2019 to complete the final exam

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

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

We offer

- salary NOK 479 600 - 523 200 per annum depending on qualifications in a position as PhD Research fellow, (position code 1017)

* attractive [welfare benefits](#) and a generous pension agreement, in addition to Oslo's family-friendly environment with its 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 educational certificates, transcripts of records
* letters of recommendation
* documentation of English proficiency for International applicants
* list of publications and academic work that the applicant wishes to be considered by the evaluation committee
* names and contact details of 2-3 references (name, relation to candidate, e-mail and telephone 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).

Short-listed applicants may be called for an interview.

Formal regulations
Please see the [guidelines and regulations](#) for appointments to Research Fellowships at the University of Oslo.

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.mn.uio.no/english/research/phd/

According to the Norwegian Freedom and Information Act (Offentleglova) 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
Professor Paulo Ferreira, e-mail: paulofe@ifi.uio.no

For technical questions regarding the recruitment system, please contact HR Adviser Torunn Standal Guttormsen, +47 22 85 42 72, t.s.guttormsen@mn.uio.no

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 1400 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 scientific staff is 75, mostly Full/Associate Professors.

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