PhD fellow in efficient monitoring of event-based systems for security and privacy violations

Deadline: June 30, 2020

Career levels: PhD student

Keywords: Compilation, Data management, Networking / Distributed computing, Runtime performance / Optimisation, Safety and Security, System Software

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Department of Computer Science, Faculty of Science at University of Copenhagen is offering a PhD scholarship in Data Management Systems commencing 01.09.2020 or as soon as possible thereafter.

Description of the scientific environment

The DMS group conducts computer systems research in areas emerging with new challenges in data management. Projects include actor-based transactional database systems, scalable event-driven systems, scalable graph/semantic data analysis systems, data analysis on many-core systems. The group is keen on validating their work experimentally. More information of the research group can be found on the group website: https://di.ku.dk/dms.

The DMS group is formed by researchers from the Software, Data, People & Society (SDPS) Section, which research in software, process and data management systems, and methods for the development of software systems suited for the people developing and using them, thereby creating value for society. The research is often carried out in an interdisciplinary context and in collaboration with industry.

Project description

Ensuring security and privacy for event-based systems consisting of distributed components, requires effective tools to monitor events and message flows in run-time systems. In particular, we are interested in distributed actor runtime, e.g. Akka and Orleans. The focus of the PhD project is on developing novel foundations, prototyped as tools, for automatic generation of run-time monitors from the formal specification of security policies, and describing obligations and prohibited behavior. It builds on successful previous work by the research group, such as scalable event stream processing, declarative process models for security protocols, and program synthesis. This methodology will support efficient verification of distributed reactive systems, tracking event paths at run-time to detect specified prohibited patterns and pro-actively enact controllable actions in order to meet obligations. The PhD project will also investigate efficient monitoring in the context of edge computing, and trade-offs between computation cost and guarantees of security and privacy. The results of the PhD project are expected to be published in top venues in relevant research fields.

The successful candidates are expected to have strong system building skills as well as abstract thinking abilities.

This PhD project is part of the PAPRiCaS project funded by Independent Research Denmark.

Principal supervisor is Professor Yongluan Zhou, Department of Computer Science, zhoun@di.ku.dk. Co-supervisor is Associate Professor Boris Düdder, Department of Computer Science, boris.d@di.ku.dk.

Job description

The position is available for a 3-year period and your key tasks as a PhD student at SCIENCE are:

To manage and carry through your research project
- Attend PhD courses
- Write scientific articles and your PhD thesis
- Teach and disseminate your research
- To stay at an external research institution for a few months, preferably abroad
- Work for the department

Formal requirements
Applicants should hold an MSc degree in Computer Science with good results and good English skills. As criteria for the assessment of your qualifications emphasis will also be laid on previous publications (if any) and relevant work experience.

Terms of employment
The position is covered by the Memorandum on Job Structure for Academic Staff.

Terms of appointment and payment accord to the agreement between the Ministry of Finance and The Danish Confederation of Professional Associations on Academics in the State.

The starting salary is currently at a minimum DKK 331,125 (approx. €43,750) including annual supplement (+ pension up to DKK 53,811). Negotiation for salary supplement is possible.

Application Procedure
The application, in English, must be submitted electronically by clicking APPLY NOW below.

Please include
- Cover Letter
- CV
- Diploma and transcripts of records (BSc and MSc)
- Other information for consideration, e.g. list of publications (if any),
- 1-3 reference letters (if any)

The University wishes our staff to reflect the diversity of society and thus welcomes applications from all qualified candidates regardless of personal background.

The deadline for applications is 30 June 2020, 23:59 GMT +1.

After the expiry of the deadline for applications, the authorized recruitment manager selects applicants for assessment on the advice of the Interview Committee. Afterwards an assessment committee will be appointed to evaluate the selected applications. The applicants will be notified of the composition of the committee and the final selection of a successful candidate will be made by the Head of Department, based on the recommendations of the assessment committee and the interview committee. The main criterion for selection will be the research potential of the applicant and the above mentioned skills. The successful candidate will then be requested to formally apply for enrolment as a PhD student at the PhD school of Science. You can read more about the recruitment process at http://employment.ku.dk/faculty/recruitment-process/.

Questions
For specific information about the PhD scholarship, please contact the principal supervisor Professor Yongluan Zhou, Department of Computer Science, zhou@di.ku.dk.

General information about PhD programmes at SCIENCE is available at http://www.science.ku.dk/phd.