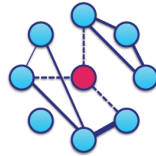


# PhD Student in the Distributed Systems Group

*"Optimizing Distributed Machine Learning Systems"*

**Delft University of Technology, the Netherlands**



Delft University of Technology invites applicants for a PhD position in the Distributed Systems Group in the Department Software Technology of the Faculty of Electrical Engineering, Mathematics and Computer Science.

## **The Distributed Systems Group**

The Distributed Systems group (<http://www.ds.ewi.tudelft.nl>), under the leadership of Prof. Dick Epema, performs world-class research in the design, implementation, deployment, and analysis of large-scale, Internet-based computer systems. It currently has three research lines: scheduling and resource management in distributed computing systems (e.g., in clusters and clouds), big-data analytics (e.g., differential approximate processing), and cooperative systems (blockchain technology, trust and reputation systems). Its research is fundamental, aimed at the development and evaluation of new generic concepts in systems software, and application-driven, motivated by important application areas. Much of it is experimental, validating the proposed new concepts by means of implementation and deployment in prototypes that are used in the real world.

## **The Department Software Technology**

The Department of Software Technology (ST) is one of the leading Dutch departments in research and academic education in computer science, employing over 150 people. The department ST is responsible for a large part of the curriculum of the bachelor's and master's programmes in Computer Science as well as the master's programme in Embedded Systems. The inspiration for its research topics is largely derived from technical ICT problems in industry and society related to large-scale distributed processing, embedded systems, programming productivity, and web-based information analysis.

## **The Faculty Electrical Engineering, Mathematics and Computer Science**

The Faculty of Electrical Engineering, Mathematics and Computer Science (EEMCS) is known worldwide for its high academic quality and the social relevance of its research programmes. Offering an international environment, the faculty has more than 1100 employees (including about 400 PhD students) and more than 3700 bachelor's and master's students. Together they work on a broad range of technical innovations in the fields of electrical sustainable energy, microelectronics, intelligent systems, software technology, and applied mathematics.

## **Job description**

Machine learning (ML) has become the core of many of today's applications, such as self-driving cars and detecting security threats. Due to the large data volume and ubiquitous data sensing from edge devices, e.g., smart phones, machine learning is shifting from the centralized cloud mode to distributed systems where edge nodes can train and update models (a)synchronously. The research objective of this PhD project is to derive scalable distributed algorithms for (deep) machine learning models. The key tasks of this project are: (i) analysing the performance of a wide range of distributed machine learning algorithms on different platformss (ii) exploring and experimenting hybrid computing models between edge nodes and the cloud, (iii) designing algorithms to optimize the tradeoff between computing and communication of distributed learners, and (iv) designing resource management policies for real-time executions of ML applications.

## Requirements

We are looking for candidates who satisfy the following requirements: an MSc degree with excellent results in Computer Science and Mathematics, preferably in distributed systems, theory, or related areas

- experience in writing python and scala code and conducting scientific evaluations through experimentation
- solid knowledge in (deep) machine learning algorithms
- good speaking and writing skills in English

## Conditions of employment

The TU Delft offers a customisable compensation package, a discount for health insurance and sport memberships, and a monthly work costs contribution. Flexible work schedules can be arranged. An International Children's Centre offers childcare and an international primary school. Dual Career Services offers support to accompanying partners. Salary and benefits are in accordance with the Collective Labour Agreement for Dutch Universities. The gross salary for this position ranges from €2325 to €2972 per month.

As a PhD candidate you will be enrolled in the TU Delft Graduate School. The TU Delft Graduate School provides an inspiring research environment, an excellent team of supervisors, academic staff and a mentor, and a Doctoral Education Programme aimed at developing your transferable, discipline-related and research skills. Please visit <http://graduateschool.tudelft.nl/> for more information.

## Information and application

For more information about this position, please contact Prof. Dick H.J. Epema, e-mail: [D.H.J.Epema@tudelft.nl](mailto:D.H.J.Epema@tudelft.nl) or Dr. Lydia Y. Chen, e-mail: [y.chen-10@tudelft.nl](mailto:y.chen-10@tudelft.nl). To apply, please send by e-mail an application letter, a curriculum vitae, transcripts of BSc and MSc degrees, copies of BSc and MSc diplomas, proof of language skills if applicable, and the names of two references by **September 15, 2019** to Dr. C.A. Reijenga, [Hr-eemcs@tudelft.nl](mailto:Hr-eemcs@tudelft.nl). When applying for this position, please refer to vacancy number **EWI2019-27**.