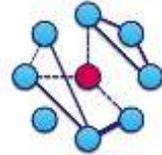# PhD Student in the
Distributed Systems Group

"Toward Resilient Deep Neural Networks"

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
While distributed machine learning, e.g., training neural nets on distributed and decentralize machines, is becoming the core of today's artificial intelligence, concerns of network resilience ever increase. Distributing the algorithm on multiple nodes individual nodes or communication links between nodes might fail or be attacked. Potential consequences are delays, incomplete results, or even incorrect solutions. It is essential for the wide-spread adaption of distributed machine learning to i) quantify the effect of such failures and attacks, and ii) provide suitable protection mechanisms.
In this project, the PhD student shall first design realistic failure and attacker models, evaluate the effect of these failures and attacks, and design defenses that increase the resilience of machine learning in distributed and decentralized systems.

Requirements

The applicant should have a Master degree (or equivalent) in computer science or a related field. Specifically, the project requires a strong background in security, preferably network resilience or network security. In addition, experience in machine learning, statistics, and distributed systems is an advantage. Furthermore, the candidate should have excellent communication skills, the ability to work independently, and a strong drive to conduct outstanding research.

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 or Dr. Stefanie Roos, email: s.roos@tudelft.nl, Dr. Lydia Y. Chen, e-mail: **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 **January 20, 2020** to Dr. C.A. Reijenga , Hr-eemcs@tudelft.nl.