1 Postdoc position:

Optimized routing & scheduling for ultra-low latency services

Faculty/department Electrical Engineering, Mathematics and Computer Science
Level PhD degree
Maximum employment Maximum of 38 hours per week (1 FTE)
Duration of contract 1 years, but extendable to 2 years
Salary scale €2552 to €4028 per month gross

Electrical Engineering, Mathematics and Computer Science

Ranked the 52nd best university in the world, according to the QS World University Rankings® 2019, Delft University of Technology excels in civil engineering, mechanical engineering and electrical engineering. 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. The faculty’s excellent facilities accentuate its international position in teaching and research. Within this interdisciplinary and international setting the faculty employs more than 1100 employees, including about 400 graduate students and about 2100 students. Together they work on a broad range of technical innovations in the fields of sustainable energy, telecommunications, microelectronics, embedded systems, computer and software engineering, interactive multimedia and applied mathematics.

The Networks Architectures and Services (NAS) section, part of the Department of Quantum & Computer Engineering in EEMCS, educates and conducts research in the broad area of complex networks, ranging from data communications and Internetworking, to other man-made infrastructures such as road-traffic networks, and to biological, brain, social, and financial sector networks. The emphasis lies on understanding these complex, real-world networks by topological as well as spectral studies. NAS also has expertise in concepts (e.g. routing, robustness) of network architectures, in the performance analysis of quality of service-aware protocols and Internet behaviour, and in strategic and business-oriented challenges for network operators.

Job description

The current Postdoc project will focus on optimal scheduling and routing of heterogeneous traffic with end-to-end requirements, given the graph of the network. This study, motivated by the new 5G telecommunication and IoT paradigms, will use stochastic modelling and queuing theory, in addition to simulations that will complement the mathematical analysis. A first goal is to derive an optimal scheduler, followed by a performance evaluation of available scheduling rules with respect to the optimum. Finally, restricted by end-to-end delays in a network, we investigate which routing strategy, next to a scheduling discipline per hop/router, for a multitude of delay-intolerant flows may result in the best, network-wide solution.
Future machine-to-machine communications will need a) a set of mechanisms to guarantee the Quality of Service (QoS) requirements for industrial communications and control networks and b) the accommodation of heterogeneous traffic (i.e., industrial control traffic with stringent time/jitter bound, rate-constrained traffic with max latency requirement and best-effort traffic) on a single, resilient, Ethernet-based network.

**Ideal candidate**

We are looking for a brilliant postdoc who has experience in stochastic modelling and queuing theory. The ideal candidate is multidisciplinary, well-versed in *probability theory, algorithms, network science*. A background in telecommunications is an advantage, as well as an open mind for a university-company collaboration on this novel 5G theme.

**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.

**Information and application**

For more information about this position, please contact Prof. P. Van Mieghem. To apply, e-mail a detailed CV along with a letter of motivation by 1 January 2019 to P.F.A.VanMieghem@tudelft.nl with cc to Lotte Ophey (L.M.Ophey@tudelft.nl).

When applying for this position, please refer to vacancy number EWI2018-75.