The Delft Center for Systems and Control of the Delft University of Technology, The Netherlands, announces an open position for a PhD position on the topic

**Analysis and Verification of Stochastic Hybrid Systems**

**Mechanical, Maritime and Materials Engineering**

The 3ME Faculty trains committed engineering students and PhD candidates in groundbreaking scientific research in the fields of mechanical, maritime and materials engineering. 3ME is the epitome of a dynamic, innovative faculty, with a European scope that contributes demonstrable economic and social benefits.

**Department description**

The Delft Centre for Systems and Control (DCSC) coordinates the education and research activities in systems and control at Delft University of Technology. The Centre's research mission is to conduct fundamental research in systems dynamics and control, involving dynamic modelling, advanced control theory, optimization and signal analysis. The research is motivated by advanced technology development in mechatronics and microsystems, sustainable industrial processes, transportation and automotive systems, and physical imaging systems. The group actively participates in the Dutch Institute of Systems and Control (DISC).

**Job description**

Stochastic Hybrid Systems (SHS) are dynamical models that are employed to characterize the probabilistic evolution of systems with interleaved and interacting continuous and discrete components.

The formal analysis, verification, and optimal control of SHS models represent relevant goals because of their theoretical generality and for their applicability to a wealth of studies in the Sciences and in Engineering. Indeed in a number of practical instances the presence of a discrete number of continuously operating modes (e.g., in fault-tolerant industrial systems), the effect of uncertainty (e.g., in safety-critical air-traffic systems), or both occurrences (e.g., in models of biological entities) advocate the use of a mathematical framework, such as that of SHS, which is structurally predisposed to model such heterogeneous systems.

In this project, we plan to investigate and develop innovative analysis and verification techniques that are directly applicable to general SHS models, while being computationally scalable. The first stage of the study entails mostly analytical work: the project aims at generating results that are both theoretically formal and computationally attractive. It will furthermore develop dedicated software for the analysis of SHS.

The theoretical and computational outcomes will be tested in or applied to a number of studies, in particular to models drawn from Biology. This latter stage will thus involve the collaboration with researchers from the Computer Science or the cooperation with experimentalists from the Life Sciences.

**Requirement**

We are looking for a candidate with an MSc degree, or equivalent (expected graduates are also welcome to apply). We are seeking a candidate with a strong background and interest in (applied) mathematics, probability theory, and/or systems theory. The candidate is expected to be involved
in fundamental research at the boundary of several research domains. A good command of the English language is also required.

**Conditions of employment**

We offer the opportunity to do fundamental research on scientifically challenging topics and to acquire a premier doctoral curriculum in Systems and Control Engineering. The PhD student will work in collaboration with other researchers.

TU Delft offers an attractive benefits package, including a flexible work week, free high-speed Internet access from home, and the option of assembling a customized compensation and benefits package (the ‘IK’). Salary and benefits are in accordance with the Collective Labour Agreement for Dutch Universities.

The appointment will be for up to 4 years. As an employee of the university the PhD student will receive a competitive salary starting at EUR 2042 gross per month in the first year and rising to a maximum of EUR 2612 gross per month based on a full-time appointment, as well as excellent secondary benefits in accordance with the Collective Agreement (CAO) of the Association of Universities in the Netherlands. Assistance with accommodations can be arranged.

**Information and application**

If you are interested in this position, please send, along with a brief cover letter,

1. a detailed curriculum vitae,
2. copy of official transcript for your BSc and MSc course program with corresponding grades,
3. a publication list and copies of the two most relevant articles (if applicable),
4. names and addresses of (at least) two reference persons,
5. and all other information that might be relevant to support your application

to Dr. Alessandro Abate (email: a.abate@tudelft.nl)

More information on this position can be obtained from Dr. Alessandro Abate at http://www.dcsc.tudelft.nl/~aabate.

The position will remain open until filled, however evaluations and possible interviews of candidates will start as early as Spring 2010.