

Open PhD-position at Ghent University

*Robust Modelling and Optimisation in Stochastic Processes Using Imprecise Probabilities,
with Application to Queueing*

- **Last application date:** until filled
- **Department:** EA08 (Department of Electrical Energy, Systems and Automation) and EA07 (Department of Telecommunications and Information Processing)
- **Degree:** MSc in Engineering, Computer Science or Mathematics
- **Occupancy rate:** 100%
- **Vacancy type:** wp

Job Description

The PhD project aims at learning to make robust probabilistic inferences and decisions in dynamical systems, in a systematic and foundational manner, and to apply the results to buffers and queues. Such buffers and queues abound in computer networks, telecommunication systems, operating systems, ...

A process is called stochastic when its time-evolution is to some extent uncertain. To model and reason with such uncertainty, we use methods from probability theory. This allows us to analyse the behaviour of these processes, and to design or influence them in order to make their behaviour optimal or desirable. One crucial problem is that most often we are not only uncertain about the processes themselves, but also about the validity of the probabilistic models we use for studying them. The theory of imprecise probability is a recent development of probability theory that is designed to dealing with this so-called model uncertainty in a robust way. The PhD student will first of all be involved in further developing this general theory, all the while concentrating on techniques that are useful for, and tailored towards, working with stochastic processes. At the same time, the developed methods and techniques should be validated in the practically important area of queueing applications for communication systems.

The proposed research is a cooperation between the SYSTeMS (Systems, Control and Modelling of Systems) and SMACS (Stochastic Modelling and Analysis of Communication Systems) research groups at Ghent University (Faculty of Engineering and Architecture). The SMACS group (4 professors, 7 postdocs and several doctoral researchers) has established a very strong international reputation in queueing theory and stochastic modelling, and is actively involved in performance evaluation for telecommunication systems and networks. The SYSTeMS group (4 professors, 3 postdocs and several doctoral researchers) has played a very active and internationally recognised pioneering role in the development of imprecise probability methods, and continues to do so.

Job Profile

- The candidate is expected to perform high-quality scientific research aimed at obtaining a PhD degree. The research is to be conducted under supervision and guidance of the staff members of the SYSTeMS and SMACS groups (Gert de Cooman, Joris Walraevens and Stijn De Vuyst), in an open intellectual environment with priority to creative thinking and room for discussion. Strong interaction between all staff members and all researchers is a hallmark of the SYSTeMS and SMACS groups.
- The candidate must hold a Master degree (or equivalent) at the time of hire, in engineering, computer science or mathematics.
- The successful candidate must have a strong mathematical background on probability and/or stochastic processes.
- Knowledge of imprecise probability theory or queueing theory would be considered a plus.

Job Offer

- Start of contract: fall 2012
- Duration: 2 years, extendable to 4 years
- A stimulating dynamic working environment

Apply

An application should enclose a C.V. including a list of courses followed and the grades obtained, a short motivation statement explaining your interest in this PhD position, and the names of two persons (preferably professors or researchers with whom you have interacted) who are willing to provide a recommendation letter for your application. Applications should be sent to Prof. Gert de Cooman (gert.decooman@UGent.be). For questions about the scientific content of this job offer, please contact Prof. Gert de Cooman (gert.decooman@UGent.be), Prof. Joris Walraevens (jw@telin.UGent.be) or Dr. Stijn De Vuyst (sdv@telin.UGent.be).

The position is open until filled. To ensure full consideration of their application, interested candidates are encouraged to apply as soon as possible.