Ph.D. position : Two-dimensional models in queues and risk: exact analytic methods

In the framework of the project 'Two-dimensional models in queues and risk', funded by the Dutch Research Foundation NWO, there is a PhD position available in the Stochastic Operations Research group at the Department of Mathematics and Computer Science in Eindhoven University of Technology, in The Netherlands.

The research topic brings together two, related, areas of applied probability: queueing theory and insurance risk. In both areas, one-dimensional stochastic processes are well understood. However, in queueing theory one is usually faced with a network of interconnected and interacting resources, or with several classes of interacting customers; and thus one needs to study multidimensional stochastic processes. Similarly, in insurance risk one often needs to study several, related, books of a company, and the capitals of different companies are often linked via reinsurance contracts -- again giving rise to multidimensional stochastic processes. In both areas, only few two- or higher-dimensional systems have allowed an exact analysis.
Our main goal is to develop mathematical tools for the analysis of two-dimensional stochastic processes, and thus get a deeper insight into the intricate interactions which occur in, e.g., queueing systems and insurance risk processes.

The project is methodologically oriented. We shall develop three sets of methods, viz.,
T1: exact analytic methods;
T2: asymptotic techniques (heavy traffic); and
T3: rare-event analysis and simulation.

Important problem instances are coupled/parallel processors and their counterpart in insurance risk, and Ornstein-Uhlenbeck processes. Two PhD students have just started their research in T2 and T3; we have a vacancy for T1.

o Job requirements:
Candidates are expected to be fluent in English, both oral and in writing, and have an excellent background in (applied) mathematics, as evidenced by an MSc degree in preferably (applied) mathematics, or possibly econometrics, operations research or electrical engineering. Strong knowledge of applied probability and analysis is highly desirable.

o Terms of employment:
PhD candidates are appointed as temporary university employees for a four-year period (based on an initial one-year contract, with a three-year extension after a positive evaluation as to whether the research is expected to result in a PhD degree after four years). The terms of employment are governed by the Collective Labor Agreement of Universities in The Netherlands, with a monthly salary starting at 2083 Euro in the first year, and increasing to 2664 Euro in the fourth year, and an additional 8% holiday allowance and 8% end-of-year bonus. For further details, please refer, e.g., to http://w3.tue.nl/en/services/dpo/conditions_of_employment/tue_conditions_of_employment/

o Information:
For further information, please contact one of the following persons:

Prof.dr.ir. Onno Boxma (o.j.boxma@tue.nl)
Dr. Stella Kapodistria (s.kapodistria@tue.nl)
Prof.dr. Sindo Nunez Queija (nunezqueija@uva.nl)

o Application:
In order to apply, please send a detailed curriculum vitae, along with a brief cover letter motivating your interest, to one of the above-mentioned persons.

o Application deadline:
July 3 2015.