

Two PhD Positions at the Università della Svizzera Italiana (USI) in Lugano, Switzerland

Two PhD positions are funded through the new Swiss National Science Foundation (SNSF) research project "Mathematical modeling of credit and equity risk beyond homogeneity and stationarity assumptions: statistical factor models and high-performance data mining". The project is supervised by I. Horenko (USI Informatics Department and Institute of Computational Science), P. Gagliardini (USI Department of Economics), and William Sawyer (ETHZ and Swiss National Supercomputing Centre). The positions will be at USI, and are available starting May 2012.

The Project

Analysis and prediction of financial risks, such as market and credit risks, is one of the central problems in modern economy. The task of adequate mathematical description of the available risk data, which has a very complex nature resulting from the presence of different temporal and spatial (i.e., regional, sectorial and global) scales, is becoming increasingly important in the context of the recent evolutions of the world economy.

The main aim of this project is to develop new methods of time series analysis for parameterizing the risks as a spatially coupled non-stationary and non-homogeneous stochastic process under the influence of global and local impact factors (e.g., gross national product, level of depth, stock market indicators, etc.). Conceptual development of new mathematical models and statistical analysis methods for market and credit risks will go hand-in-hand with the implementation and comparison of various methods on high-performance computing platforms at the Swiss National Supercomputing Centre (CSCS) in Lugano. Resulting methods and algorithms will then be applied to transparent analysis of the available financial databases for identification of statistically significant regional and global inter-dependencies and extraction of the significant external factors influencing the Swiss economy.

Following this new line of research, the doctoral student will investigate and implement new mathematical and statistical methods for credit and equity risk analysis on high-performance architectures, and apply them to realistic financial data. The work will be done in a close collaboration between the USI faculties of Informatics and Economics, and CSCS.

The Candidate

Candidates should possess a master degree and a solid background in one or several of the following areas: applied mathematics, econometrics, computer science, or physics. Strong mathematical background and excellent programming skills (Matlab and/or C/C++) are expected. Only candidates showing excellent creative skills will be considered. The successful candidate will become a doctoral student at USI and must fulfill the enrollment requirements of the USI Informatics or Economics departments' doctoral program.

The Application

Applications, including the CV, a transcript of master studies (with marks) and a letter of intent, should be sent electronically to the

following e-mail addresses: horenkoi@usi.ch, patrick.gagliardini@usi.ch,
and wsawyer@cscs.ch. The application deadline is May 31, 2012.