**CERF Fellow Report 2015 for Flavio Toxvaerd**

This project is still ongoing and therefore there are still no tangible research results to report, nor any activity or output related to the project (such as seminars of papers). Below, I will briefly outline the state of progress on my proposed research.

As explained in the original research proposal, it is my aim to study rumours and information transmission in real and financial markets by using the tools of mathematical epidemiology and couple them with decision theoretic analysis familiar from economics and finance. Within this context, I want to study how information transmission processes can influence the price and volume dynamics in markets. At its heart, this project is an interdisciplinary endeavour. This means that there are many possible avenues one can follow in modelling the phenomena of interest.

Upon having surveyed the relevant literature, I have decided that a very interesting approach to follow is that of computer simulation in the tradition of cellular automata. In such models, agents are located on a two-dimensional grid and in each period is called upon to make a decision, such as a trade. The key assumption in this type of analysis is that individuals' decisions are functions of the neighbourhood they inhabit. For example, suppose an agent hears information from his/her immediate neighbours and makes trading decisions based on this information. Since different individuals live in different locations (and thus have potentially different neighbours and information), they will typically make different decisions. On the other hand, to the extent that neighbourhoods are overlapping, decisions in one part of the landscape can over time spill over and influence faraway individuals. It is this kind of dynamics that I want to study.

On a practical level, I have decided that the best programming environment for this analysis is that provided by the software package *Mathematica* (from Wolfram Research). There is a wealth of existing and very useful work on social simulation using this package (see e.g. Gaylord and D'Andria, 1998), which will become extremely useful for carrying out the simulations. I am in the process of learning the details of their code in order to adapt it to my purposes.

Bibliography:

Gaylord, R. J. and L. J. D'Andria (1998): Simulating Society: A Mathematica® Toolkit for Modeling Socioeconomic Behavior, *Springer*.