From Stochastic Differential Games and Kinetic Theory Methods To the Modeling of Behavioral Social Crowds

Nicola Bellomo

http://staff.polito.it/nicola.bellomo/
nicola.bellomo@polito.it

This lecture aims at providing an answer that can be given to the following five key questions:

- ***Why a crowd is a "social, hence complex," system?***
- ***How mathematical sciences can contribute to understand the "behavioral dynamics of crowds"?***
- ***How the crowd behaves in extreme situations such as panic and how models can depict them?***
- ***Can a crowd be subject to large deviations (black swan)?***
- ***Which are the methods and tools to deal with the multiscale features of a crowd can?***

The answer to the key question takes advantage of recent research activity documented in the five titles in the bibliography. The answer opens to challenging research perspectives.

[1] B.N., Knopoff D., and Soler J., On the difficult interplay between life, "complexity", and mathematical sciences *Math. Models Methods Appl. Sci.*, **23** (10) (2013), 1861–1913.

[2] B.N., Bellouquid A., and Knopoff D., From the micro-scale to collective crowd dynamics, *SIAM Multiscale Model. Simul.*, **11(3)** (2013), 943–963.

[3] B.N., Herrero M.A., and Tosin A., On the dynamics of social conflicts: looking for the Black Swan, *Kinet. Relat. Mod.*, 6(3) (2013), 459–479.

[4] B.N. and Gibelli L., Toward a mathematical theory of behavioral-social dynamics for pedestrian crowds, *arXiv:1411.0907v1*, (2014).

[5] B.N. and Bellouquid A., On multiscale models of pedestrian crowds - From mesoscopic to macroscopic, *Comm. Math. Sci.*, (2015), to appear.