

# Stochastic Differential Games and Kinetic Theory Toward the Modeling of Behavioral Social Crowds

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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, *Math. Models Methods Appl. Sci.*, **25** 2417-2437, (2015).
- [5] B.N. and Bellouquid A., On multiscale models of pedestrian crowds - From mesoscopic to macroscopic, *Comm. Math. Sci.*, **13**(7) 1649–1664, (2015).