Filippo SANTAMBROGIO (U. Paris-Sud)
« *Minimal-Time MFG* »

I'll present a new class of MFG that we have recently been studying with G. Mazanti, S. Dweik, and C. Jimenez.
They consist in the following problem : suppose that agents want to reach a certain target (for simplicity, let's say they want to exit a given domain Ω, the target being $\partial\Omega$), but their speed at each time t is bounded by a quantity K(t,x) which depends on their position x and on the global distribution of players around x at time t. The typical case should be $|x'(t)| \leq 1-\rho(t,x(t))$ where ρ is the density of players, as it happens in the Hughes model for pedestrian motion, the difference with such a model being the rational behavior of the agents which anticipate that ρ will evolve in time, considering that each other agent will also anticipate it. This local case being of course very difficult, most of our results are devoted to a non-local case involving a convolution. Many non-trivial questions also arise when studying a minimal-time control problem with fixed K(t,x), as soon as it is non-autonomous, in particular if one needs to find the optimal assumptions on the regularity of K in t and x separately.
In the talk I'll present the model, the main questions and difficulties, and the main results we obtained in different settings.
Most of the work is ongoing.
This talk is complemented by the talk by G. Mazanti, who will present in more details some interesting examples, with numerical simulations.