Andrea Puglisi - Research activity

I have studied for many years the statistical mechanics of fluidized granular materials (kinetics, hydrodynamics, structure, non-equilibrium properties). Building upon my experience with granular models, I have investigated some problems in the more general field of non-equilibrium statistical mechanics for steady states (fluctuation-response relations, large deviation theory for stochastic processes, fluctuations of currents and entropy production). In all my works I have mixed up numerical simulations (Molecular Dynamics and Monte Carlo) together with analytical approaches (Boltzmann equation, hydrodynamics, stochastic processes). From 2010, thanks to a FIRB-IDEAS grant, I have set up a laboratory for granular experiments where I have led a large part of my recent activity. A second line of research which I have been conducting in the last 6-7 years is the study, by means of information theory and agent-based numerical models, of the dynamics of language and of artificial communication systems.