

Speaker: **Charles Collot** (CY Cergy Paris Université)

Title: *Singularity of the 2d Keller-Segel system formed by the collision of two collapsing solitons in interaction*

Summary: The two-dimensional Keller-Segel system admits finite time blowup solutions, which is the case if the initial density has a total mass greater than  $8\pi$  and a finite second moment. Several constructive examples of such solutions have been obtained, where for all of them a perturbed stationary state undergoes scale instability and collapses at a point, resulting in a  $8\pi$ -mass concentration. It was conjectured that singular solutions concentrating simultaneously more than one solitons could exist. We construct rigorously such a new blowup mechanism, where two stationary states are simultaneously collapsing and colliding, resulting in a  $16\pi$ -mass concentration at a single blowup point, and with a new blowup rate which corresponds to the formal prediction by Seki, Sugiyama and Velazquez. We develop for the first time a robust framework to construct rigorously such blowup solutions involving simultaneously the non-radial collision and concentration of several solitons, which we expect to find applications to other evolution problems.