Christophe Prange (CNRS and Paris Cergy University)

About some recent developments
in the regularity theory of the Navier-Stokes equations

In this talk I will focus on two related aspects of the regularity theory for the three-dimensional Navier-Stokes equations: quantitative regularity estimates on the one hand and concentration estimates, i.e. localized lower bounds, for blow-up solutions on the other hand. This connection enables in particular a quantification of Seregin's 2012 regularity criterion in terms of the critical L^3 norm. A counterpart of this is that we are able to give lower bounds on the blow-up rate of certain critical norms near potential singularities in the wake of Tao's work in 2019. In the last part of the talk, I will explain how concentration can also be proved for certain geometrical quantities near potential singularities. This talk is based on recent works in collaboration with Tobias Barker (University of Warwick).