Some geometric aspect of the Navier-Stokes equations

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This talk is based on some joint work with Prof. Shizan Fang and Dr. Jiawei Li. In this talk, I will explain several geometric quantities derived from the Navier-Stokes equations: the geometry of the vorticity and the helicity, the Bakry-Emery curvature and the vorticity decay in turbulence, and a description of vorticity cascade. In the last part of the talk, I will go beyond the physics context and to talk about the Navier-Stokes equations on a manifold, and single out the significance of the Ikeda-Watanabe connection and various Ricci curvatures.