Gábor Moussong: From Poincaré to Thurston and Perelman: one hundred years of a conjecture

Modern-day topology grew out of the mathematical works of Henri Poincaré. His famous conjecture, put forward in 1904, was about characterizing the three-dimensional sphere in terms of its homotopy type. The Poincaré conjecture withstood all attemts of proof for nearly 100 years, and functioned as the primary motivating force behind many new developments in twentieth century topology and geometry.

The lecture will explain the conjecture and its significance in the topology of manifolds. A few historically famous unsuccessful early attempts to prove the conjecture will be mentioned. In the 1980's Thurston's theory of geometrization generalized the Poincaré conjecture in a geometric context, and opened up new directions for proving it. Without going into technicalities, the lecture will sketch Hamilton's program and Perelman's results which in the early 2000's led to the proof of both Thurston's and Poincaré's conjectures.