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Quaternionic Kähler manifolds.
Quaternionic Kähler geometry is one of the classical Riemannian geometries with special holonomy group. It includes hyper-Kähler geometry as a special case. I prove some basic results about quaternionic Kähler manifolds, discuss examples and conjectures.

The twistor space of a quaternionic Kähler manifold.
There exist three natural bundles over a quaternionic Kähler base which carry interesting Einstein geometries. As an example, I concentrate on the special geometric structures of the twistor bundle: (pseudo-)Kähler-Einstein metric and holomorphic contact structure.

Special geometry of Euclidean supersymmetry.
It is well known in physics that supersymmetry imposes restrictions on the geometry of the target manifolds of supersymmetric field theories on Minkowski space-time. These restrictions depend on the number of independent supersymmetries and on the field content of the theory. The special geometry associated to theories with 8 real (rigid) supersymmetries is special Kähler and hyper-Kähler geometry. Here I discuss the special geometry of supersymmetric theories on Euclidean space, based on my joint work with Thomas Mohaupt (Jena) and his group.