September 14, 2016: Peter Michor (University of Vienna), "Infinite-dimensional Lie groups: diffeomorphism groups."

Groups of diffeomorphisms of a manifold M have many of the properties of finite-dimensional Lie groups, but also differ in surprising ways. I review some (or all or more) of the following properties or I do something else:

No complexification.
Exponential mappings are defined but are not locally surjective or injective.
Right invariant Riemannian metrics might have vanishing geodesic distance.
Many famous PDEs arise as geodesic equations on diffeomorphism groups.
There are topological groups of diffeomorphisms which are smooth manifolds but only right translations are smooth.
There are diffeomorphism groups which are smooth in a certain sense (some Denjoy-ultradifferentiable class) but not better (not real analytic).