The hamiltonian Lie algebroids of field theories

The initial value constraints of many field theories such as gauge theories can be understood as the momenta associated to the symmetries given by a hamiltonian Lie algebra action. For field theories with external symmetries such as General Relativity, however, this is does not work. Instead, there is the structure of a hamiltonian Lie algebroid. I will give a gentle introduction to hamiltonian actions on symplectic manifolds and their generalization to hamiltonian Lie algebroids. I will then outline how they arise naturally in field theories and explain their relation to equivariant cohomology. This is joint work with Alan Weinstein.