Homogenization of elasto-plastic media

We report on the variational homogenization of heterogeneous media with nonlinear elastic behaviour and plastic response governed by finite plasticity with hardening.
Specifically, assuming the presence of a periodic microstructure, we discuss the Gamma-convergence of the related energy functionals in the limit of vanishing periodicity. The most relevant hurdle is posed by the nature of the plastic variable, which is constrained to be an element of SL(3). The analysis encompasses also the case of perforated media, and it paves the way for the study of more complex systems, such as high-contrast composites. The talk is based on joint work with C. Gavioli and V. Pagliari.