

# Kirill Cherednichenko

## Homogenisation in finite elasticity for composites with a high contrast in the vicinity of rigid-body motions

I will describe a multiscale asymptotic framework for the analysis of the macroscopic behaviour of periodic two-material composites with high contrast in a finite-strain setting. I will start by introducing the nonlinear description of a composite consisting of a stiff material matrix and soft, periodically distributed inclusions. I shall then focus on the loading regimes when the applied load is small or of order one in terms of the period of the composite structure. I will show that this corresponds to the situation when the displacements on the stiff component are situated in the vicinity of a rigid-body motion. This allows to replace, in the homogenisation limit, the nonlinear material law of the stiff component by its linearised version. As a main result, I derive (rigorously in the spirit of  $\Gamma$ -convergence) a limit functional that allows to establish a precise two-scale expansion for minimising sequences. This is joint work with Mikhail Cherdantsev and Stefan Neukamm.