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**Passages from discrete to continuous systems  
allowing for fracture, external forces and heterogeneities**

Passages from discrete to continuous systems of particles have been the subject of research with various approaches for many years. Here we focus on one-dimensional particle systems with non-convex interaction potentials, which allow for the formation of cracks. We consider variational models and their continuum limits by means of  $\Gamma$ -convergence techniques.

Firstly, I will present the main ideas of a recent work with M. Carioni and J. Fischer which allows for external forces that may depend on the material points or on the deformed configuration, i.e. on Lagrangian or Eulerian coordinates, and thus may be related to dead as well as live loads. Secondly, I will show homogenisation results for composite materials that are modelled by either periodically or stochastically distributed non-convex interaction potentials. This is joint work with L. Lauerbach, S. Neukamm and M. Schäffner.