Andrea Braides (Universita' di Roma 'Tor Vergata') Multiple scale effects in the passage from discrete to continuum variational problems

The study of variational limits of discrete energies allows to produce multi-scale phenomena from seemingly inoffensive pair potentials. In this way, we may recover continuum energies characteristic of theories of fracture, softening, nonlinear elasticity, phase transitions, non-local damage, etc., as first or second-order limit effects of simple lattice theories as the lattice spacing tends to zero. Conversely, the introduction of a new 'microscopic dimension' leads to original interesting phenomena, that often require a continuum formulation different from the 'classical' ones.