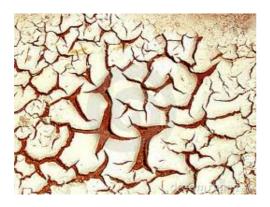create permanently deformable cloth. Therefore it it is required to use deformable springs. One way of creating a spring that may be permanently deformed is by introducing hysteresis.

Project: model the fabric of your own choice using masses and permanently deformable springs. Simulate its static and dynamic behaviour, apply a permanent deformation by, for example, throwing a ball with high velocity at it, and visualize the result. Show the dynamic behaviour before and after impact.

Link: http://www.cs.ucl.ac.uk/research/vr/Projects/3DCentre/cloth_simulation_links.htm

Simulating the cracking of a clay layer

After an area has been flooded by a river a thin layer of clay is left behind. When this layer dries the clay crackles in a typical pattern. The same kind of pattern can be seen on old paintings and pottery.

In this project you are asked to generate this kind of pattern by modelling the clay as a set of particles and springs. Springs will break when a maximum force is exceeded.

Simulate how the cracking proceeds over time. Also, experiment with various types of springs and particle placement strategies in order to generate different types of patterns. Don't hesitate to use huge numbers of particles.

Literature: Studies of *crack* dynamics in *clay* soil II. A physically based model for crack formation. H.J. Vogel, H. Hoffmann, A. Leopold, K. Roth.

Smoothed particle hydrodynamics (SPH)

With SPH the dynamic behaviour of liquids or gasses may be simulated. For example, how does it look when a bucket of water is poured into a rectangular box, or how does it look when a stone is dropped into a bucket of water? In the past Navier-Stokes equations were used to answer these questions but nowadays the SPH method is used,