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The Physics of a Thought

Adviser: Alfred Hubler

What drives the emergence of intelligent behavior in self-assembling physical networks? In this project models of the growth and evolution of realistic physical networks in complex environments will be studied. The response of the networks will be analysed in terms of standard definition of intelligence. We will try to understand which forces drive the emergence of intelligent behavior.

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Why do Sand Castles Fall?

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Why do sand castles fall when they dry, whereas adobe bricks gain mechanical strength when they dry. Fractal particle distributions might be the solution to this puzzle. In this project the mechanical properties of fractal particles agglomerates will be modeled as a function of the fractal dimension of the particles and the water content. Adobe bricks are a very low-cost, environmental-friendly building material, but little is known about the reasons for their mechanical strength. This project could help to introduce adobe bricks as a substitute for concrete.