

Title: First steps towards fault-tolerant shape formation in the amoebot model

The amoebot model is a distributed computing model of programmable matter. It envisions programmable matter as a collection of computational units called "amoebots" that utilize local interactions to achieve tasks of coordination, movement, and conformation.

In this talk I will discuss our current research progress on fault-tolerant shape formation in the amoebot model. Apart from work by Di Luna et. al. on "Line-Recovery by Programmable Particles", as far as we know, we are the first to investigate this topic in more detail.

In our model we assume fair, sequential activations, and in each activation the adversary may set the state of the activated amoebot to the a special "error" state. Furthermore, we assume for the time being that the seed particle will not fail.

In order to gain initial insights into useful strategies towards fault-tolerance in this model we examine the hexagon formation algorithm (NANOCOM '15) with the additional assumption of a finite number of errors. In this talk I will discuss some of the ideas we have developed for a protocol that we think will always recover completely after a finite number of errors and thus ultimately lead to the formation of a hexagon.