

In this starter talk, I will give an overview of my doctoral research in the field of programmable matter. The main focus is on an extension of the amoebot model: To investigate the aspect of fault tolerance, we propose a new model in which particles can crash [Kostitsyna et al., DNA 28, 2022, <https://doi.org/10.4230/LIPIcs.DNA.28.9>]. A crash of a particle causes the memory of the particle to be reset, and a crashed particle can detect that it has crashed and try to recover using its local information and communication capabilities. Within this new model, we have designed and analysed fault-tolerant algorithms for problems such as shape formation and leader election.