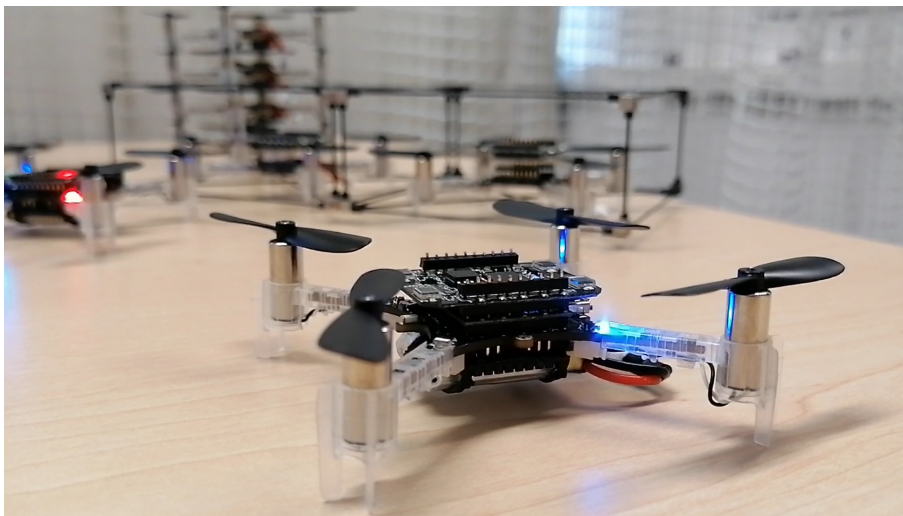




Thesis (B.Sc. / M.Sc.) Drone Swarms and Dynamic Structure Formation

Drone swarms offer many possibilities for applications such as transportation, disaster relief operations, environmental exploration or ad-hoc communication networks. Although the capabilities of individual drones are limited, drone swarms on the other hand promise robust solutions via collaboration, e.g. by making multiple drones form a larger structure as needed.

At the same time, breakthroughs in Reinforcement Learning (RL) that combine classical RL approaches with the deep learning paradigm have achieved good performance not only in many simulated complex single-agent problem domains such as Atari games or robotic benchmark tasks, but also in the cooperative multi-agent domain.



At BCS Lab's Dronelab, you will have the opportunity to work with Crazyflie 2.1 drones. You will investigate how to physically realize morphological swarms on real drones and cooperative swarm behavior for the fulfillment of high-level tasks, ideally aiming at a publication in relevant venues. You may also investigate how to apply RL techniques to achieve complex morphological behavior in simulations and on real drones. Finally, you are encouraged to realize your own ideas.

Some of the following may help depending on your specific topic:

- Knowledge of control / deep learning
- Experience with embedded systems, Python, C
- Experience with 3D printing

For further information, please contact Kai Cui.

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