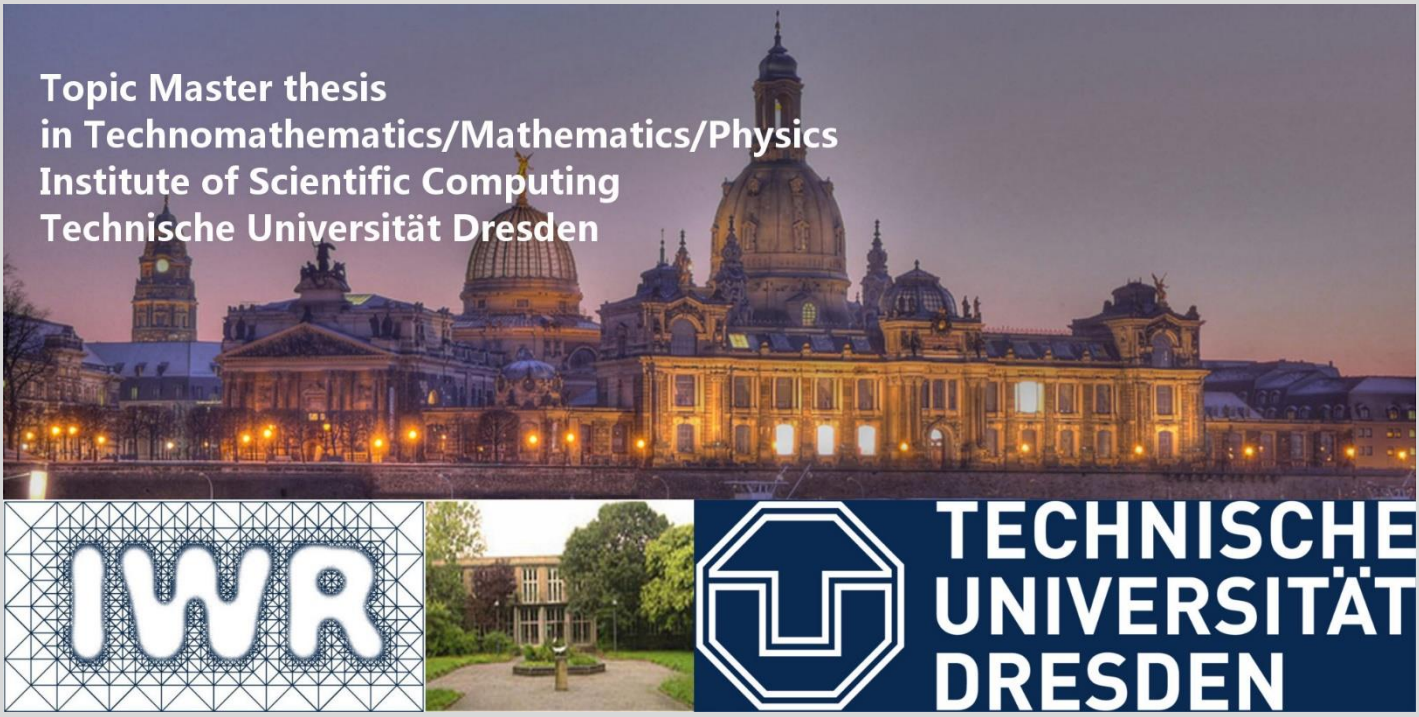
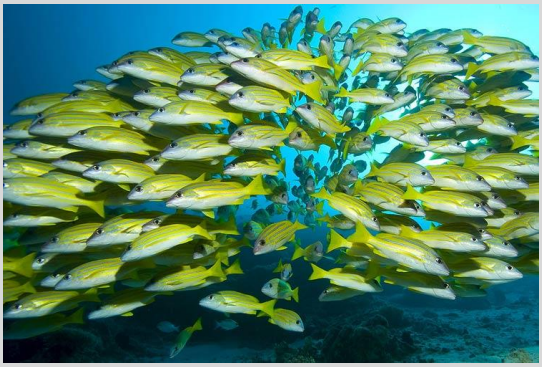


Simple and complex life forms can exhibit remarkably similar collective behaviors over a wide range of length and time scales. Well-known examples are flocking phenomena in swarms of birds and self-sustained turbulent phases in schools of fish that share several qualitative features with the mesoscale dynamics in bacterial suspensions and films. When studying such processes from a physicist's perspective, a main challenge consists in identifying generic models that capture the most essential aspects of their dynamics. Recent theories predict phase separation in such models, remarkable similar to equilibrium theories.



Within the Master thesis, a scalar valued Cahn-Hilliard type equation should be analyzed, implemented in AMDiS and its coarsening behavior compared with the classical Cahn-Hilliard equation.

Knowledge in finite element analysis, mathematical modeling; good programming skills in C++ and interest in interdisciplinary problems on the edge to biology are expected.

We offer close supervision by your advisor and an associated PhD student or PostDoc, with a workplace at the institute and full integration into the research and social activities of the institute.

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Literature:

R. Wittkowski, A. Tiribocchi, J. Stenhammar, R. J. Allen, D. Marenduzzo, M. E. Cates: "*Scalar φ4 field theories for active-particle phase separation"*, Nature Communications, 5 (2014), 4351.