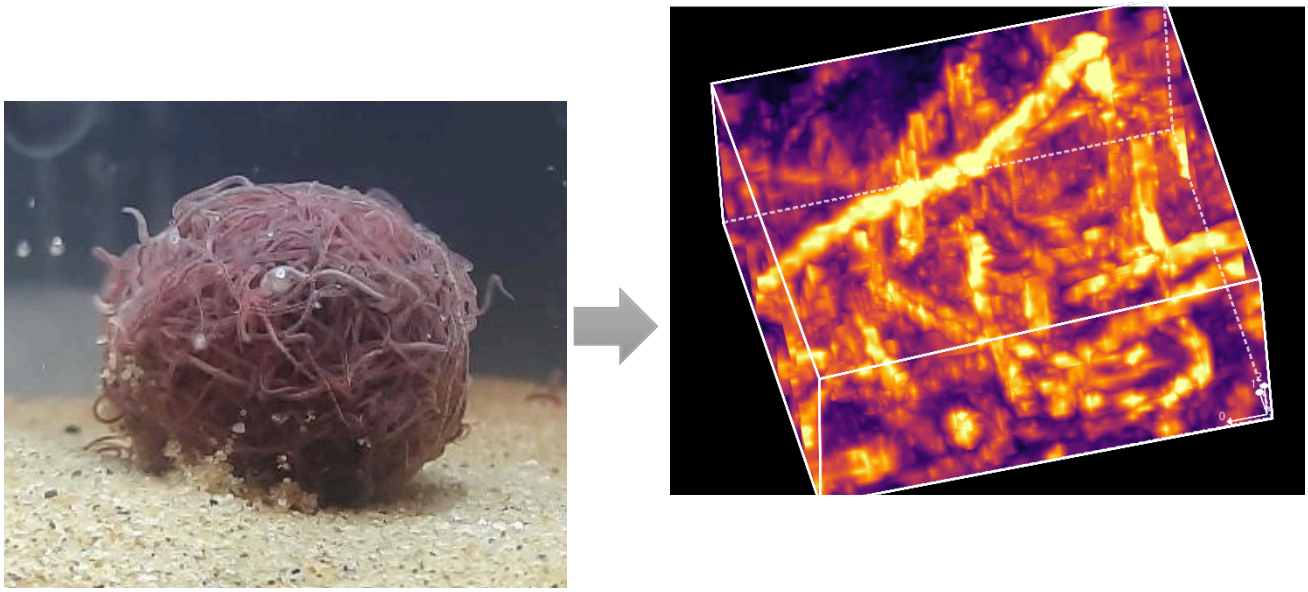
3D MRI-image tracking of a worm "blob"



In our research, we investigate self-assembled balls of aquatic T. Tubifex worms. We use these worms as a model system to investigate the mechanical properties of 'active polymers'. [1] Recently we have done measurements in an MRI to gain access to the internal structure of the blob of worms. Eventually, we hope to match the mechanical properties of the worm blob to the internal structure/conformation of the worms.

For this project, you will receive the raw data from the MRI (consisting of essentially a 3D array with pixel[2] values relating to the relaxation time of these pixels). From this data first, the separate worms need to be isolated. If that is done successfully, we are then interested in some physical quantities for each worm, like the curvature of the worms, the number of contact points with the other worms, and the way the worms are entangled.

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[1] Worm blobs as entangled living polymers: from topological active matter to flexible soft robot collectives (DOI: 10.1039/D3SM00542A)

[2] Technically these are called voxels for an MRI.