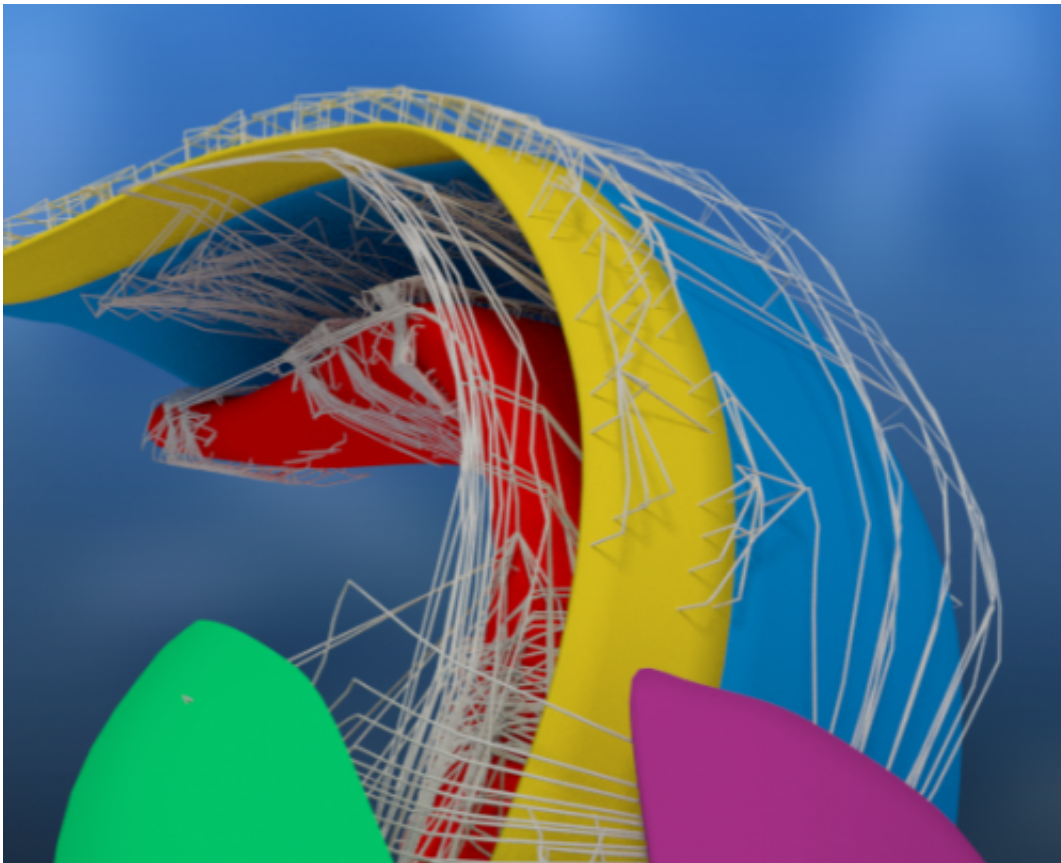


A glimpse into the 3D brain: How memories form

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3D image of the hippocampus of a rat

People who wish to know how memory works are forced to take a glimpse into the brain. They can now do so without bloodshed: RUB researchers have developed a new method for creating 3D models of memory-relevant brain structures. They published their results in the

trade journal *Frontiers in Neuroanatomy*.

The way neurons are interconnected in the brain is very complicated. This holds especially true for the cells of the [hippocampus](#). It is one of the oldest brain regions and its form resembles a sea horse (hippocampus in Latin). The hippocampus enables us to navigate space securely and to form [personal memories](#). So far, the anatomic knowledge of the networks inside the hippocampus and its connection to the rest of the brain has left scientists guessing which information arrived where and when.

Signals spread through the brain

Accordingly, Dr Martin Pyka and his colleagues from the Mercator Research Group have developed a method which facilitates the reconstruction of the [brain](#)'s anatomic data as a 3D model on the computer. This approach is quite unique, because it enables automatic calculation of the neural interconnection on the basis of their position inside the space and their projection directions. Biologically feasible network structures can thus be generated more easily than it used to be the case with the method available to date.

Deploying 3D models, the researchers use this technique to monitor the way neural signals spread throughout the network time-wise. They have, for example, found evidence that the hippocampus' form and size could explain why neurons in those networks fire in certain frequencies.

Information become memories

In future, this method may help us understand how animals, for example, combine various information to form memories within the hippocampus, in order to memorise food sources or dangers and to remember them in

certain situations.

More information: Pyka M, Klatt S and Cheng S (2014): Parametric Anatomical Modeling: A method for modeling the anatomical layout of neurons and their projections, *Front. Neuroanat.* 8:91, [DOI: 10.3389/fnana.2014.0009](https://doi.org/10.3389/fnana.2014.0009)

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