# Innovative method for individualized T1-based brain networks reconstruction - Technology offer

**Benefits**

- **Brain network topology allows for evaluating neurological disorders**
- **Reconstruction of individual networks based on single morphometric measures**
- **Extension to other methods like positron emission tomography data or metabolite imaging possible**
- **Software may be used directly for (companion) diagnostics or changes in progression**

**Project Status**

- **Proof of concept with >500 persons/patients**
- **Invention ready for use as additional automated MRI software**

**Patents**

- **European priority patent application EP21199049 filed on 2021-09-27**
- **International filing PCT/EP2022/076704**

**Offer**

- **The technology can be licensed or assigned**
- **Collaborations regarding further development very welcome**


**Kontakt:**
Gesellschaft für Innovationsdienstleistungen mbH
Altenhöferallee 3
D – 60438 Frankfurt am Main
Phone: +49 69 25 61 632-0
eMail: matthias.goetz@innovectis.de


Scientists from University Medical Center Mainz (Germany) have successfully developed an innovative a method for reconstructing an individual brain network, based on graph theory in combination with clinically available anatomical MRI data.

The study of the brain's intrinsic connectivity patterns has gained increasing importance. Insights into the brain's network topology are crucial to studying motor, sensory, and cognitive processes, as well as the underlying mechanisms of neurodegenerative diseases like Alzheimer's or Parkinson's Disease or Dementia and other neurological disorders like Multiple Sclerosis or Epilepsy. Therefore, the topological architectural composition between different anatomical regions of the brain needs to be analyzed. Graph theory has become a powerful research tool in this field, enabling the modeling of brain networks and the evaluation of how different brain regions coordinate various functions.

The innovative method involves a method to reconstruct individual T1w-based networks based on single morphometric measures. The inventors applied the method with an exemplary reconstruction based on hippocampal subfields network, but the method can be extended to whole brain or any other brain sub-system. Contrary to diffusion imaging network reconstructions, our method allows for robust morphological characterization of the brain tissues.

The method further allows the assessment of brain molecular and microstructural properties, for example from positron emission tomography data or metabolite imaging.

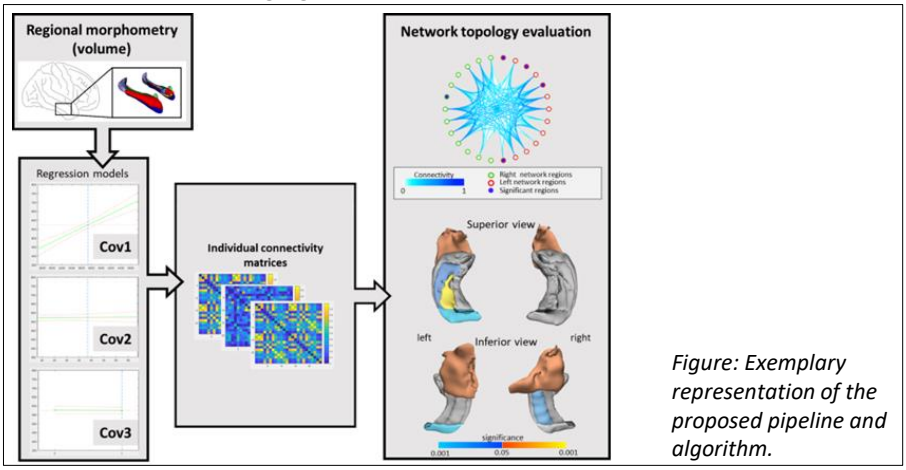


*Figure: Exemplary representation of the proposed pipeline and algorithm.*

The proposed solution could be very attractive as an additional module for commercial MRI software packages. In addition, the invention could be a great opportunity for providers of specialized software solutions for imaging in the neurological area. is The usage of the solution as companion diagnostic is highly recommended. In this case, the method could be used directly for diagnostics and changes in progression. By understanding the disorders mentioned above affect the brain network, doctors may be able to develop more targeted treatments that address the underlying causes of the disorder.

The scientific team and the University Medical Center Mainz would look forward to cooperate with commercial partners to foster further developments that lead to promising applications.