

# **Master Thesis**

## **We can do better than that - Modern variations of UNets**

Collaborate within an international team with strong ties to the German Aerospace Center and contribute to the development of next-generation AI models for the advanced analysis of remote sensing imagery, making contributions with real-world applications to the sustainable development goals, climate change, and natural hazards.

### **Background**

Despite more sophisticated variants (such as e.g. vision transformers), UNets remain one of the most successful models for semantic segmentation. Their simple architecture, versatile and flexible usage, and excellent performance make them the perfect choice in many applications.

### **Project**

Extensions to the basic framework of UNets consisting of an en- and decoder connected via skip-connections have mostly focused on adding more and different types of skip connections, different optimization strategies e.g. involving level-wise losses, etc. However, these are not the only options. The goal of this project is to explore modern variations of UNets that allow a more flexible computation of features.

### **Expected outcome**

- Literature research on existing UNet variations
- Implementation of an approach to extend the basic UNet framework
- Evaluation of the approach on benchmarks, comparison with relevant reference methods

### **Your Profile**

- Scientific curiosity, very good ability to work independently, strong communication skills
- High motivation to deeply explore a given research topic
- Background in computer vision and/or machine learning
- Strong programming skills (python)
- Knowledge in remote sensing is not required

### **Contact**

Ronny Hänsch, [ronny.haensch@dlr.de](mailto:ronny.haensch@dlr.de)

Please feel free to reach out for more topics e.g. on Machine Learning, Deep Learning, Ensemble Learning, Computer Vision, Remote Sensing, Earth Observation, Synthetic Aperture Radar or regarding the option to conduct your Master thesis at the DLR in Oberpfaffenhofen.