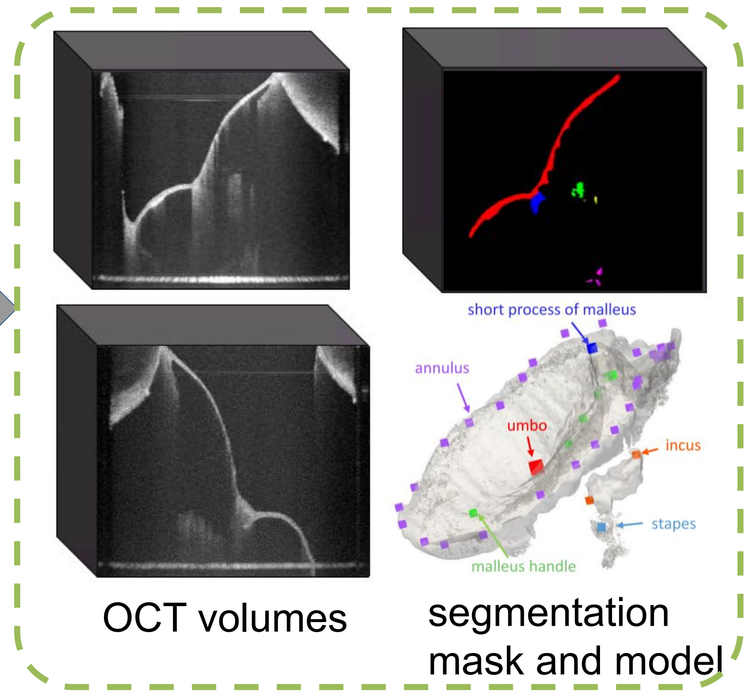
# Master thesis

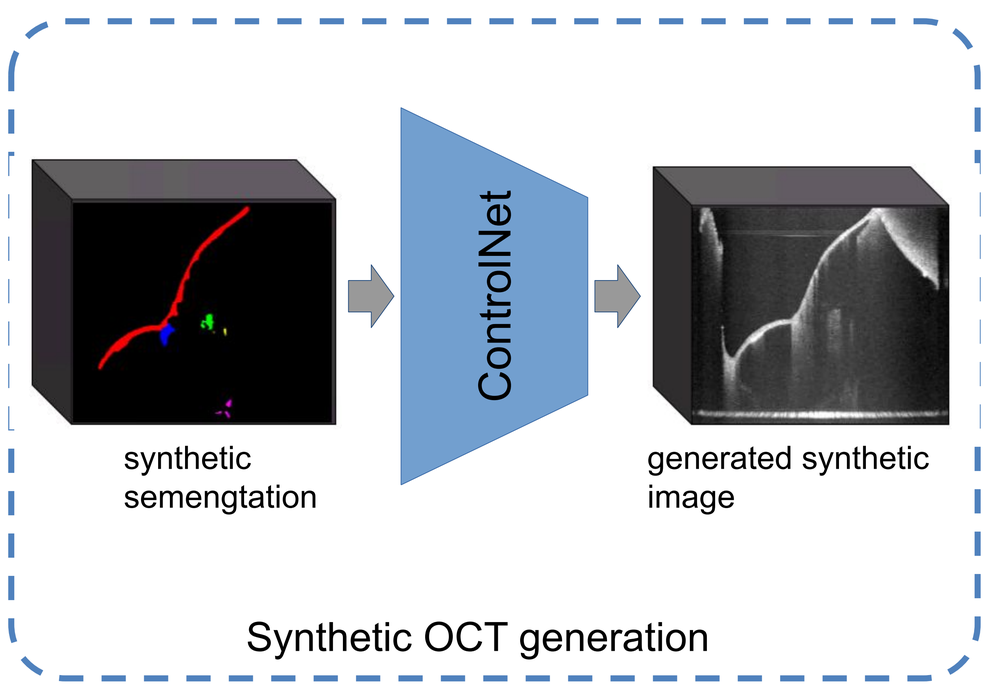
# OCT data synthesis with diffusion models


OCT data collection




OCT volumes

segmentation mask and model




synthetic semengtation

generated synthetic image

Synthetic OCT generation

## Context

Obtaining diverse tissue-label from Optical Coherent Tomography (OCT) data is challenging. Generative approaches like diffusion has shown to generate images with high fidelity and diversity. For the surgical application, these diffusion models can be leveraged to obtain data but controlling the structure of certain anatomy is important. In this project, diffusion models are explored to generate OCT data in a controlled fashion.

## Tasks

- Understanding the OCT dataset and basics of generative modeling
- Generating synthetic OCT segmentation masks with Blender
- Fine-tuning/pre-training of diffusion models on the OCT data
- Evaluation on downstream tasks:
  - registration
  - segmentation

## We are looking for

- Motivated students interested in working with generative models and medical images
- Very good programming knowledge (Python)
- Basic knowledge in Deep learning / Computer Vision
- Ability to communicate research output via presentations, reports etc.

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Supported by:
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University Hospital Carl Gustav Carus Dresden
Carl Gustav Carus Faculty of Medicine, TU Dresden
Helmholtz-Zentrum Dresden-Rossendorf

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