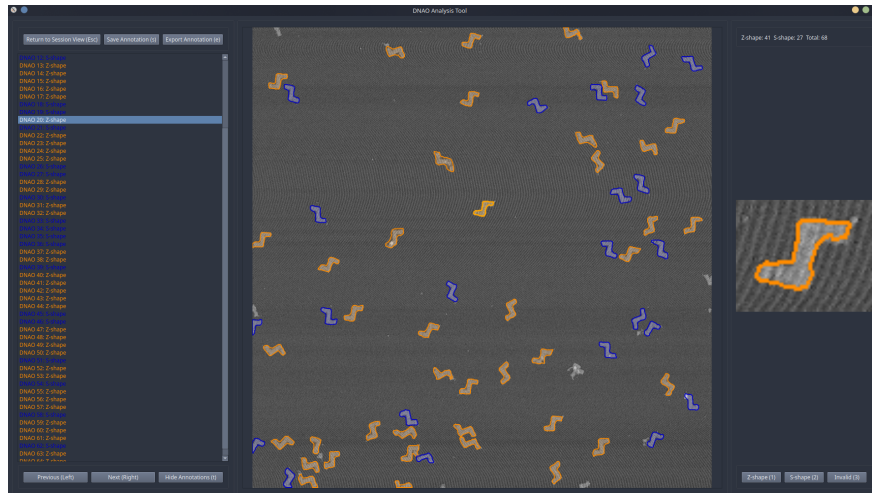


Speeding up DNA-Origami Research using Foundation Models



DNA origami is an important technology for building programmable nanostructures, typically read out with Atomic Force Microscopy (AFM). It works by folding a long DNA scaffold with short staples into target shapes, which are then imaged to assess yield, integrity, and functionalization. Today, researchers still evaluate their experiments by manually annotating AFM images. We built a prototype annotator that leverages Segment Anything (SAM) to segment structures of interest which are then processed further depending on the current task. In this project, we will transform that prototype into a robust, user-friendly software package that accelerates scientists' AFM workflows including fast interactive review, standardized exports for downstream analysis and lightweight deployment on lab machines. Beyond this, the student is encouraged to propose and implement targeted improvements that make the tool more useful in practice, developed in close dialogue with domain researchers.

Goals & Tasks

- Turn the existing prototype into a deployable piece of software
- Extend the tools capabilities using your own ideas

Contact

Paul Plantosar: plantosar@tugraz.at

Qualifications

- Interest in applied machine learning.
- Solid software engineering skills
- Basic knowledge in deep learning and computer vision
- Registered to one of the following:
 - ☐ Bachelor Thesis
 - ✓ Seminar Project
 - ✓ Master Thesis