

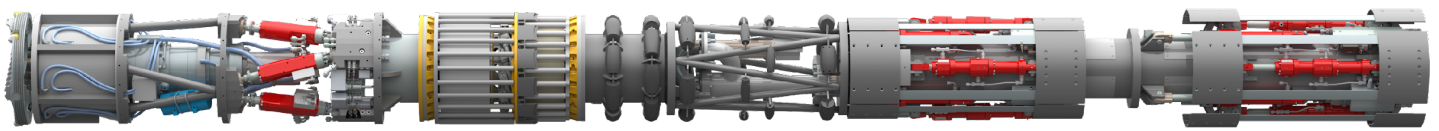
# Research Theses at PBL & Swissloop Tunneling

Bachelor-, Semester- & Master Theses Opportunities in the Electrical Engineering Team

## Overview

Are you looking for a bachelor-, semester or master thesis? Are you interested in conduct research on existing technology and improve it? Do you want to work in a big team and a challenging environment?

Swissloop Tunneling is opening positions for research theses on various fields of electrical & software engineering, control systems and embedded systems. Join the team and collaborate with other students from different backgrounds to develop the most innovative tunnel boring machine (TBM) in the world and compete with it for Elon Musk at the *Not-A-Boring-Competition*.

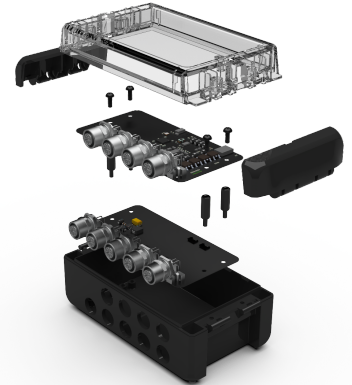


## Electrical Engineering & Embedded:

- PCB design for modular subsystem boards
- Embedded programming of modular subsystem boards
- CAN/LAN communication between main unit and modular subsystem boards
- Robust cable management

## Control Systems:

- Feedback control loop and simulation for subsystems
- Automating entire control of the TBM & closed loop integration (i.e. kalman filter, recursive estimation, MPC)
- Testing strategy (ensuring functionality of state machines and control loops)
- Investigation of best sensors and actuators (i.e. optical gyros, waterleveling sensors, rotary encoders, hydraulic & electrical motors)



## Software:

- Main unit software integration of all systems (state machines, multi-threading)
- Telemetry GUI displaying navigation, sensors (i.e. ReactJS, Websockets)
- CI/CD DevOps (design & implementation of efficient & robust CI/CD pipeline)

