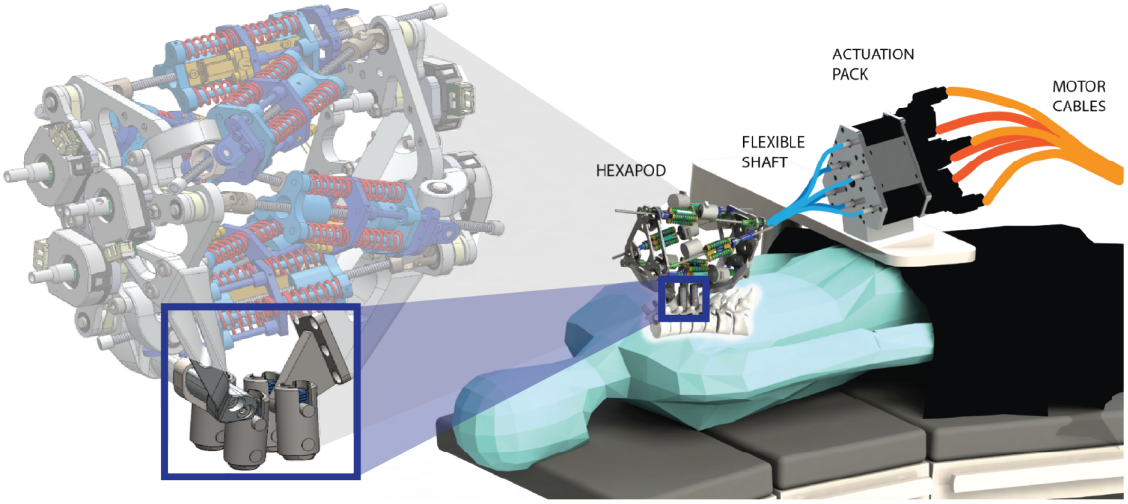
University of Basel
Department of Biomedical Engineering

BIROMED-Lab
Medical Robotics and Mechatronics

Master Thesis: Sterile Locking Interface and Surgical Workflow Development for Surgical Robot

Context: The "in SEA2 SpineBot" Project aims to develop a robotic impedance measurement device capable of assessing the biomechanical properties of the adolescent spine with patient-specific anatomy. This highly interdisciplinary project will be the first of its kind to acquire in vivo data from patients with idiopathic adolescent scoliosis (AIS) during their correction surgery. It is a collaboration with the Children's Hospital of Basel (UKBB) and the Computational Bioengineering Group at ARTOG University of Bern.
A 6 DoF parallel robot has been designed for this purpose and attaches to the vertebrae intraoperatively through pre-installed pedicle screws.



Task description: The aim of this thesis is to develop a sterile pedicle-screw-robot interface and validate its functionality and usability in a series of experiments. Ensuring the functionality this mechanism and incorporating it properly into the surgical workflow is key to the making this system usable. You will work in an interdisciplinary team comprised of medical doctors and engineers.

Workpackages:

- Literature review on state-of-the-art surgical tools and medical devices to explore existing sterile interfacing strategies.
- Test-driven concept development with continuous feedback from medical doctors who are the primary users of this system
- Performance evaluation of the mechanism with mechanical and biochemical tests to assess functionality and sterility parameters.

Info:
Student: TBD
Start: March 2025
Duration: 6 months

Supervision:
Felix Erb
Ayşegül Kılıç
Dr. Lauren Chee
Prof. Dr. Georg Rauter

Contact:
Lauren Chee
lauren.chee@unibas.ch
Hegenheimermattweg 167C
CH-4123 Allschwil

Projectpage:
https://biromed.dbe.unibas.ch