3D Real-time FBG-based Needle Shape Estimation

- This project aims to determine the shape of a flexible needle with asymmetric bevel tip which is inserted into tissue, in combination with measured curvature data by the FBG sensors.

- **What Students Will Do:**
  - Build and calibrate sensorized needle
  - Finalize needle shape by mathematical model
  - Develop experimental setup with C-arm
  - Conduct experiments

![Diagram of FBG sensors and needle](image)

- **Deliverables:**
  - Sensorized needle and calibration matrix
  - MATLAB code for the models
  - Experimental results

- **Size group:** 2

- **Skills:**
  - Required: Good analytical skills, Programming (Matlab, C/C++), CAD
  - Desired: Kinematics, Control Theory, Electronics, Prototyping,

- **Mentors:** Dr. Jin Seob Kim, Dr. Sungmin Kim, Dr. Iulian Iordachita