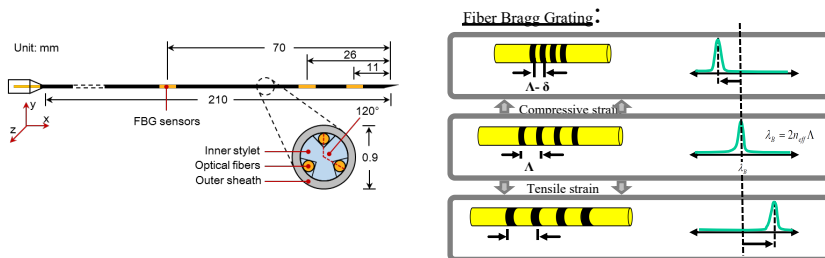


### 3D Real-time FBG-based Needle Shape Estimation

- This project aims to determine the shape of a flexible needle with asymmetric bevel tip inserted into tissue from measured curvature data using integrated FBG sensors.
- **What Students Will Do:**
  - Build and calibrate sensorized needle using optical fibers (Fiber Bragg Gratings – FBG)
  - Develop experimental setup with C-arm (2D, 3D)
  - Conduct experiments



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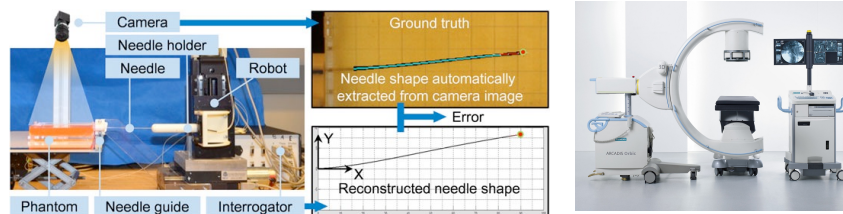
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### 3D Real-time FBG-based Needle Shape Estimation

- **Deliverables:**
  - Sensorized needle and calibration matrix
  - MATLAB code for the reconstruction model.
  - Experimental results
- **Group Size: 1-2**
- **Skills:**
  - Required: Good analytical skills, Programming (Matlab, C/C++), CAD
  - Desired: Kinematics, Control Theory, ME design, Prototyping,
- **Mentor:** Dimitri Lezcano, Profs. Jin Seob Kim, Iulian Iordachita



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