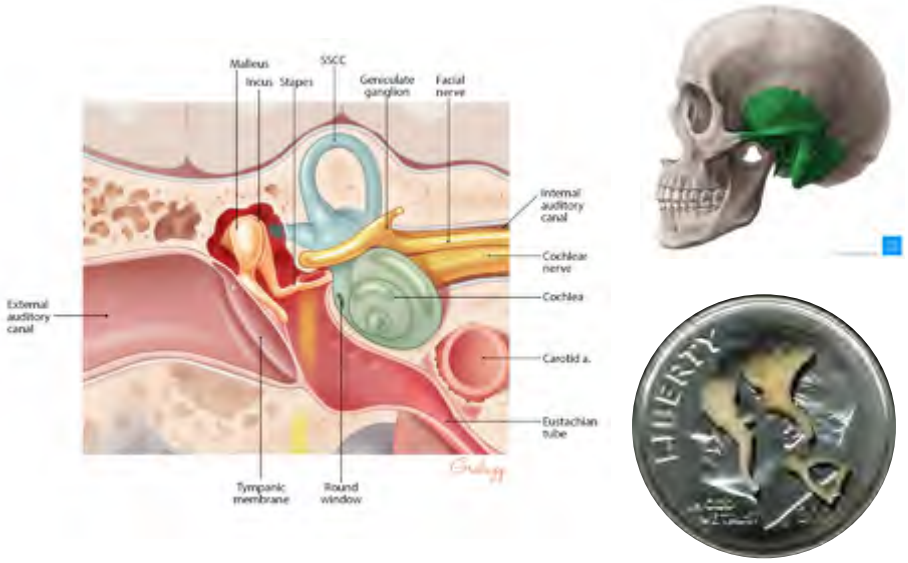
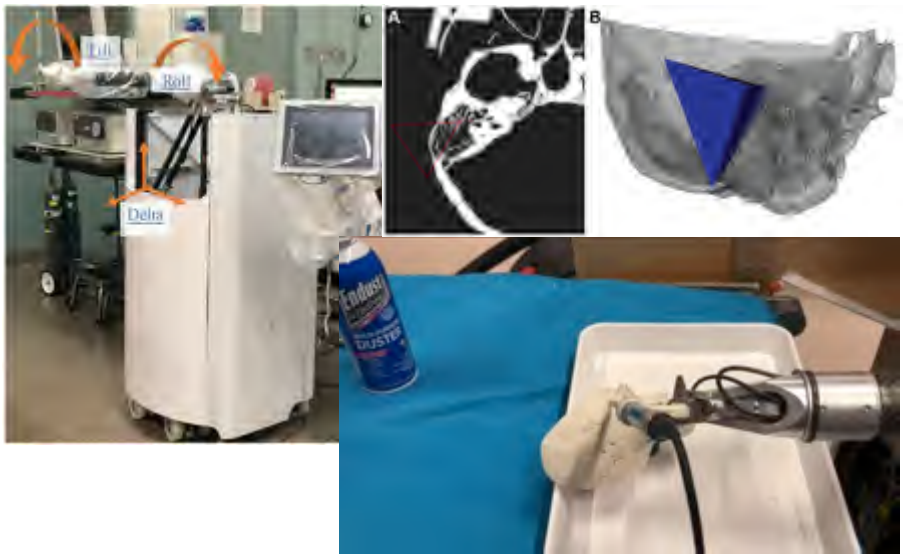
Automated Segmentation of Temporal Bone CT Imaging for Robot-Assisted Microsurgery



1

Automated Segmentation of Temporal Bone CT Imaging for Robot-Assisted Microsurgery



2

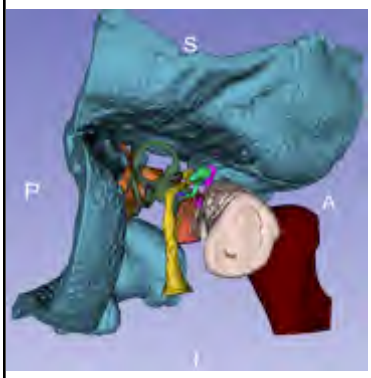
Question:

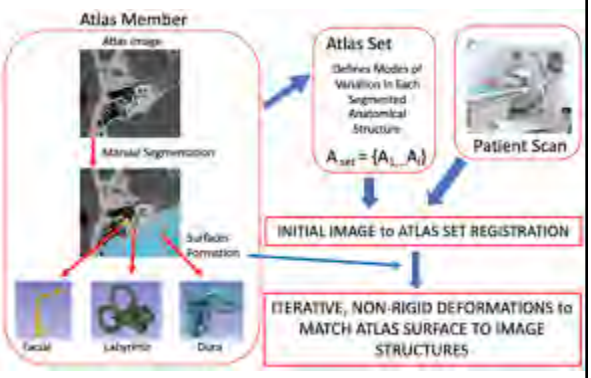
Can we accurately highlight critical structures of the temporal bone to prevent damage during surgery?

3

Automated Segmentation of Temporal Bone CT Imaging for Robot-Assisted Microsurgery

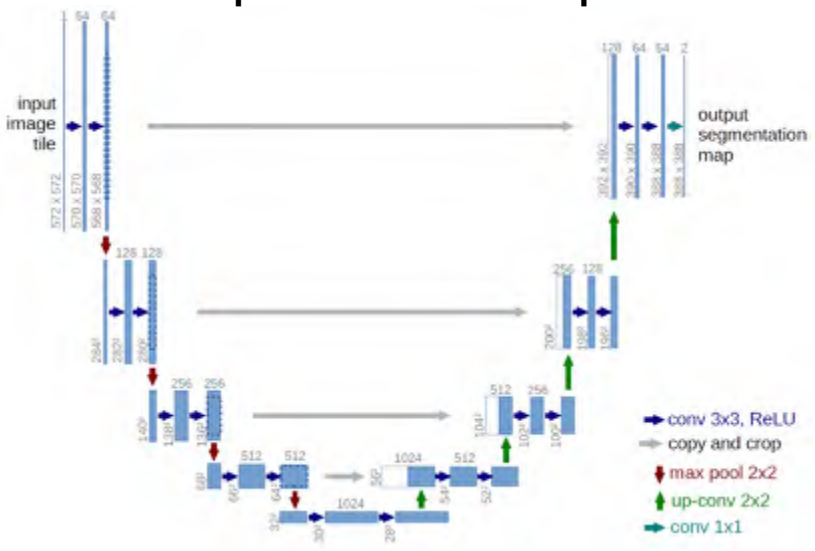
- **Current work:** Segmentation propagation technique matches groundtruth segments with varying accuracy
- **Problem:** Propagation heavily depends on the quality of the template segments and relies on time-consuming deformable registration techniques





4

Moving Forward:
Image segmentation using deep learning computer vision techniques



5

Automated Segmentation of Temporal Bone CT Imaging for Robot-Assisted Microsurgery

- This project aims to employ deep learning methods to automatically identify critical anatomical structures in temporal bone CT scans, that will aid in developing a robot-assisted microsurgical system for lateral skull base surgery.
- **What Students Will Do:**
  - Explore existing deep learning strategies for medical image analysis
  - Develop and validate new deep learning algorithms
  - Contribute to publishing results
- **Deliverables:**
  - Minimum: Code for performing CT segmentation
  - Expected: Report and validation of deep learning model predictions compared to groundtruth segmentations
  - Maximum: Publish abstracts and manuscript of results
- **Group Size:** 2-3
- **Skills:** Deep learning, medical image analysis, Python
- **Mentors:** Dr. Francis "Pete" Creighton (fcreigh1@jhmi.edu), Dr. Russell Taylor (rht@jhu.edu)

6