

Constructing a Model of the Cochlea From OCT Images

Checkpoint Presentation

Students: Paul Wilkening and Emily Daggett (Group 2)

Mentors: Russell Taylor and Jin Kang



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Presentation Outline

- ❖ Overview
- ❖ Dependency Updates
- ❖ Progress Report
 - ❖ Bulk Scan Results
 - ❖ Side-view Probe Results
 - ❖ Virtual Fixtures
- ❖ Deliverable Updates
- ❖ Bibliography



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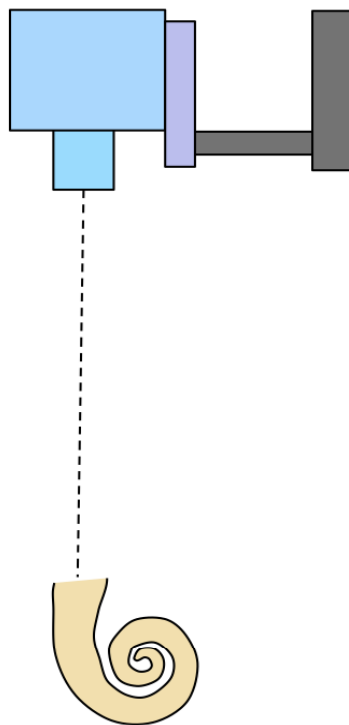
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Bulk Scanner



Side-View Probe

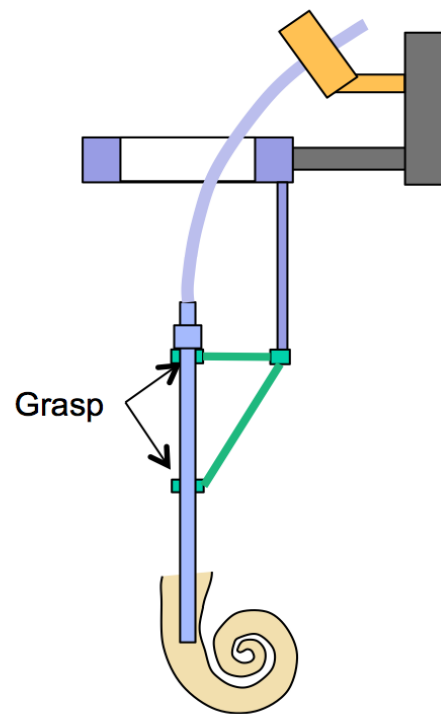


Image credit: R. Taylor



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Updated Dependencies

	Dependency	Plan/Source	Status/Comments
1	Bloodeborne Pathogen Training	Take online class	Done
2	Fire Safety and Hazard Communication Training	Take online class	Done
3	Engineering and Clinical Mentors	Schedule weekly team meeting	Scheduled
4	OCT Bulk Scan	Mingtao	Waiting for Part
5	Side-View OCT Probe	Saumya	Available
6	EyeRobot2	LCSR	Available
7	CISST Libraries	Training	Available
8	Cochlear Phantom	LCSR	Available
9	Dry/Wet Temporal Bones	Iulian	Available
10	Detecting Contours in B-scans	Saumya	Available
11	Control Optimizer Library	Paul	Available
12	Bulk Scan Stitching	Mingtao	Available
13	Side-view Probe Calibration	Iulian	Calibration Completed



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	Demo for Cochlear			2/19				3/18								
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	Model-based virtual fixture															
Final Presentation																

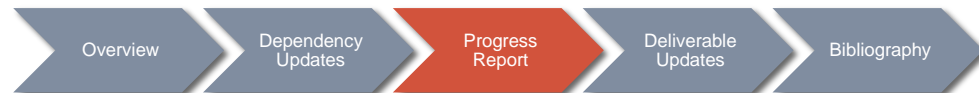
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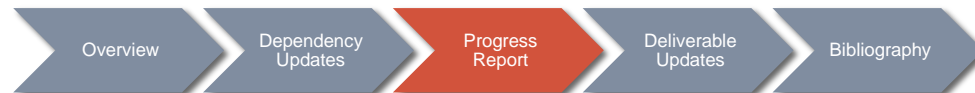
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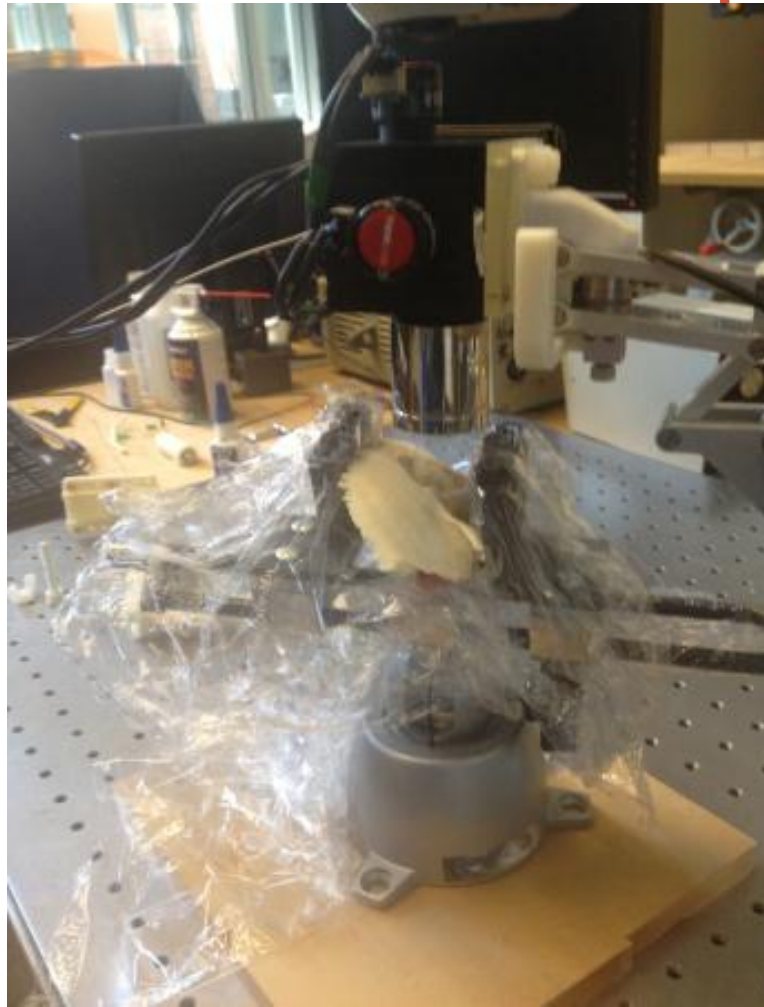
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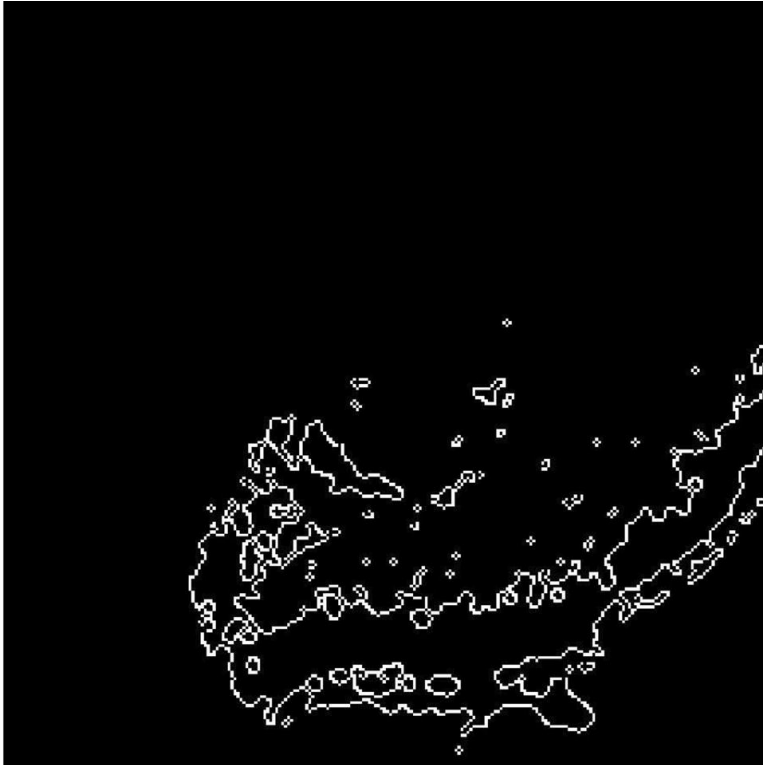
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Bulk Scan Setup



Bulk Scan Model



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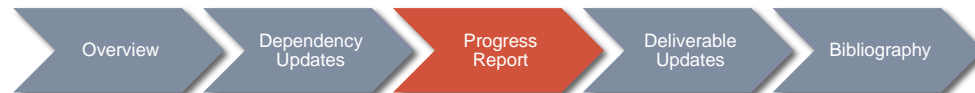
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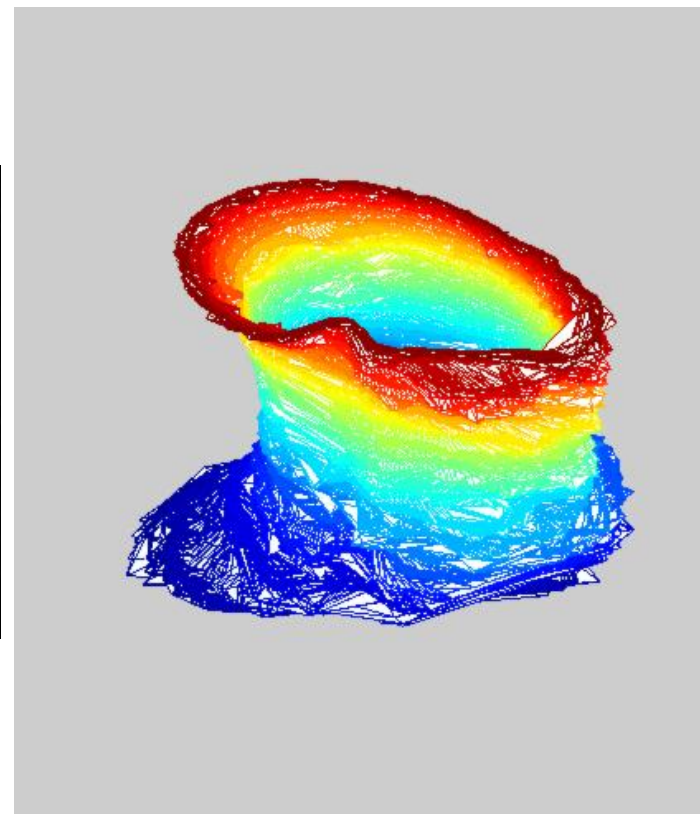
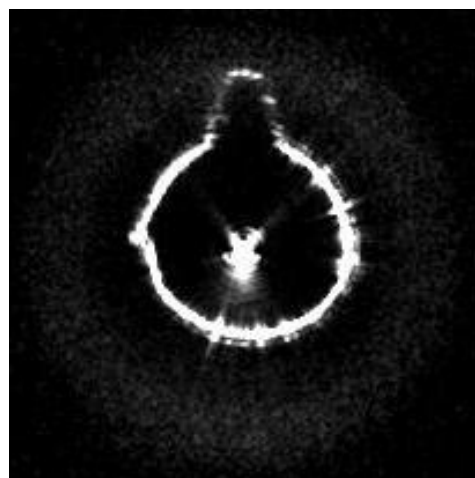
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Side-View Probe



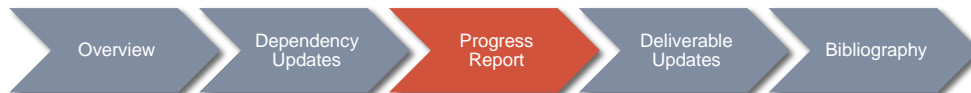
Video credit: Berk Gonenc



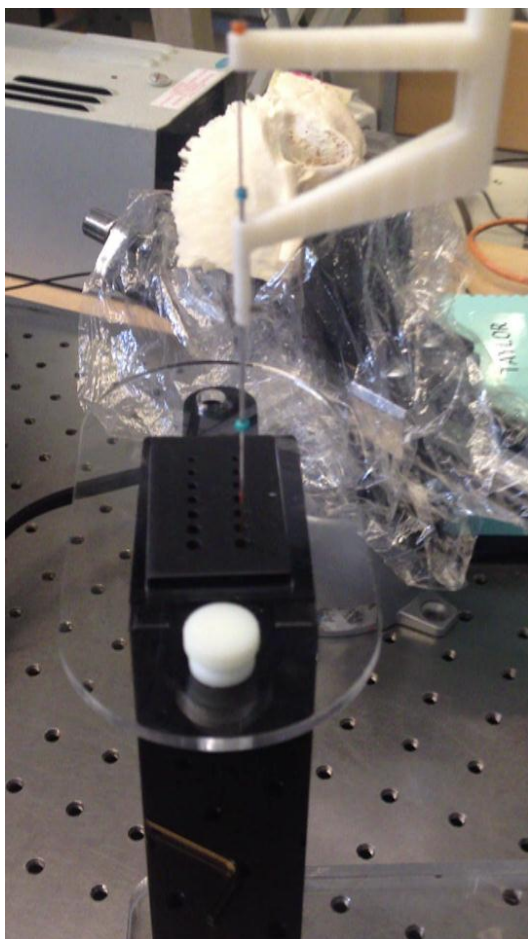
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Side-View Probe Calibration



- Calibrate Position
 - Pivot calibration
- Calibrate Orientation
 - Align with calibration object



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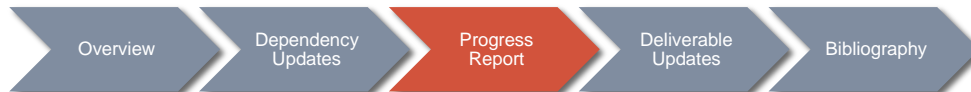
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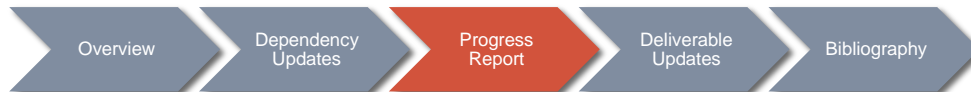
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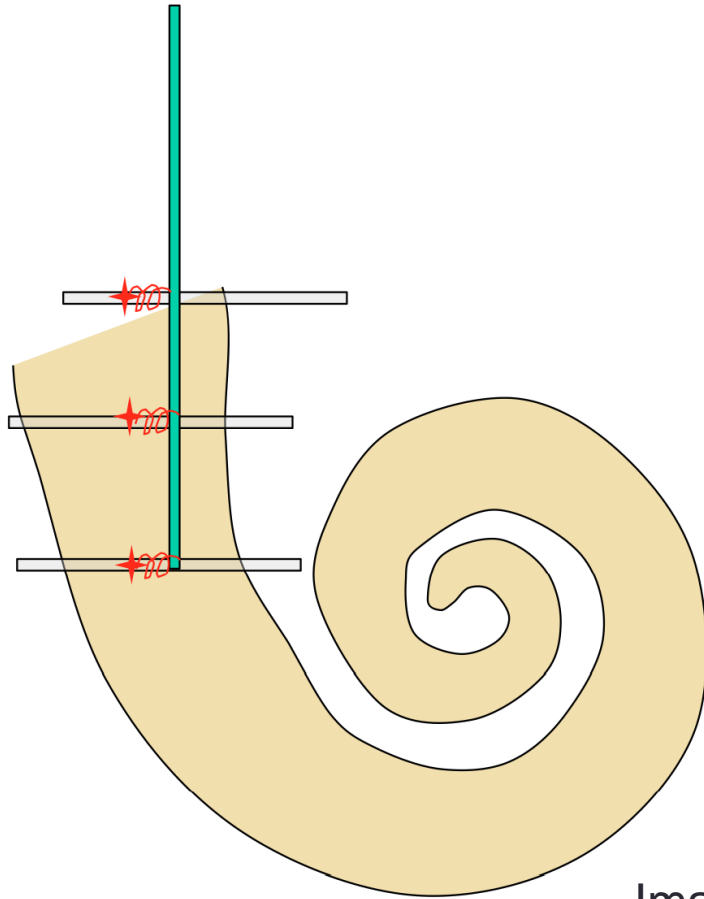
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Virtual Fixture



- For each depth, obtain contour
 - Side-view
 - Bulk
- Find vector from tool to center of cochlea at current depth
- Use these vectors to set up virtual fixture

Image credit: R. Taylor



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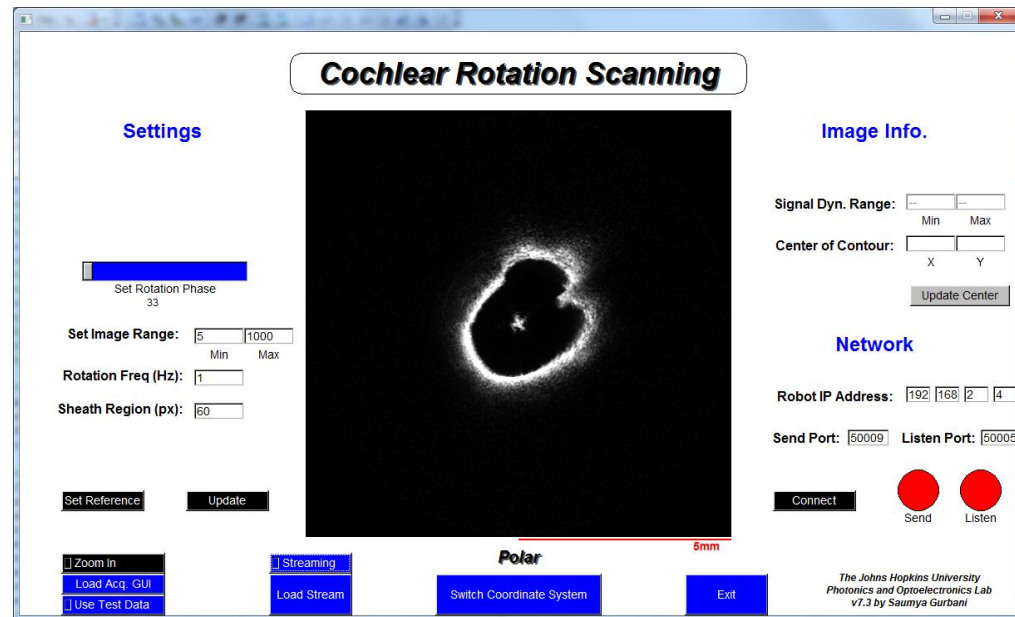
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Side-View Probe GUI

- Set Image Parameters
- Display B-Scans Accordingly
- Contour Center Choice
 - Manually Entered Center
 - Calculated Centroid
- Eliminate Sheath Noise



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Updated Deliverables

Minimal	1. Separate OCT bulk scan and side-view probe models	Done
	2. Working side-view virtual fixture	Done
Expected	1. Registration overlay of OCT bulk scan and side-view probe models	In progress
	2. Working bulk scan virtual fixture	In progress
Maximal	1. Fine-tuned combined model presentation for intraoperative use	In progress
	2. Complete, working, user-friendly system	In progress



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