WEEK 3!

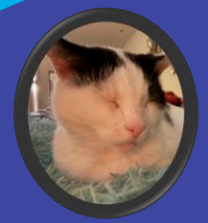
Tiffany Marcus

ABOUT ME!

I am going into my senior year at UCF as a computer science major!



I've been on the UCF competitive programming team for two years!



My cat, Toby!

PROJECT 18: SCENE-GRAPH REASONING AND UNCERTAINTY QUANTIFICATION FOR SURGICAL VISUAL QUESTION ANSWERING

With Dr. Laura Brattain

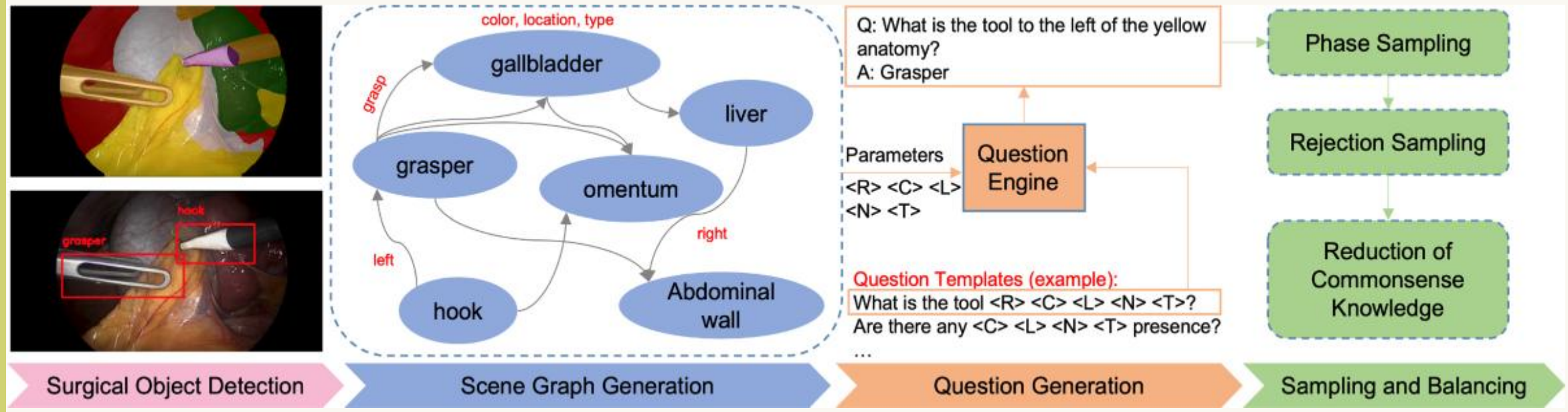
WHAT ARE THE MAIN APPLICATIONS?

Learning!

- Gives training surgeons access to immediate answers

Post-surgery review for optimization

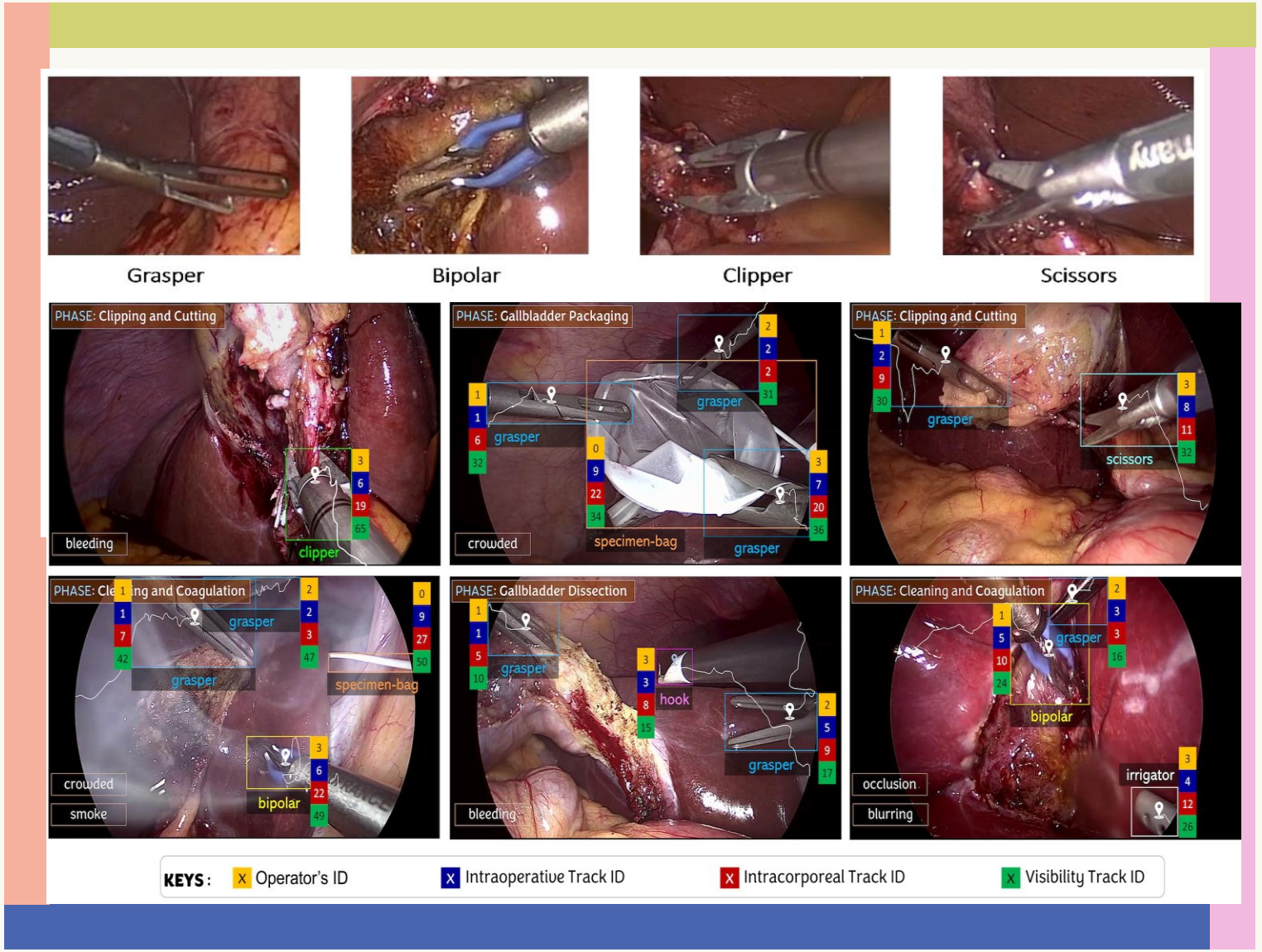
- Several surgeons have expressed interest in this tool to review their own work to find areas of improvement

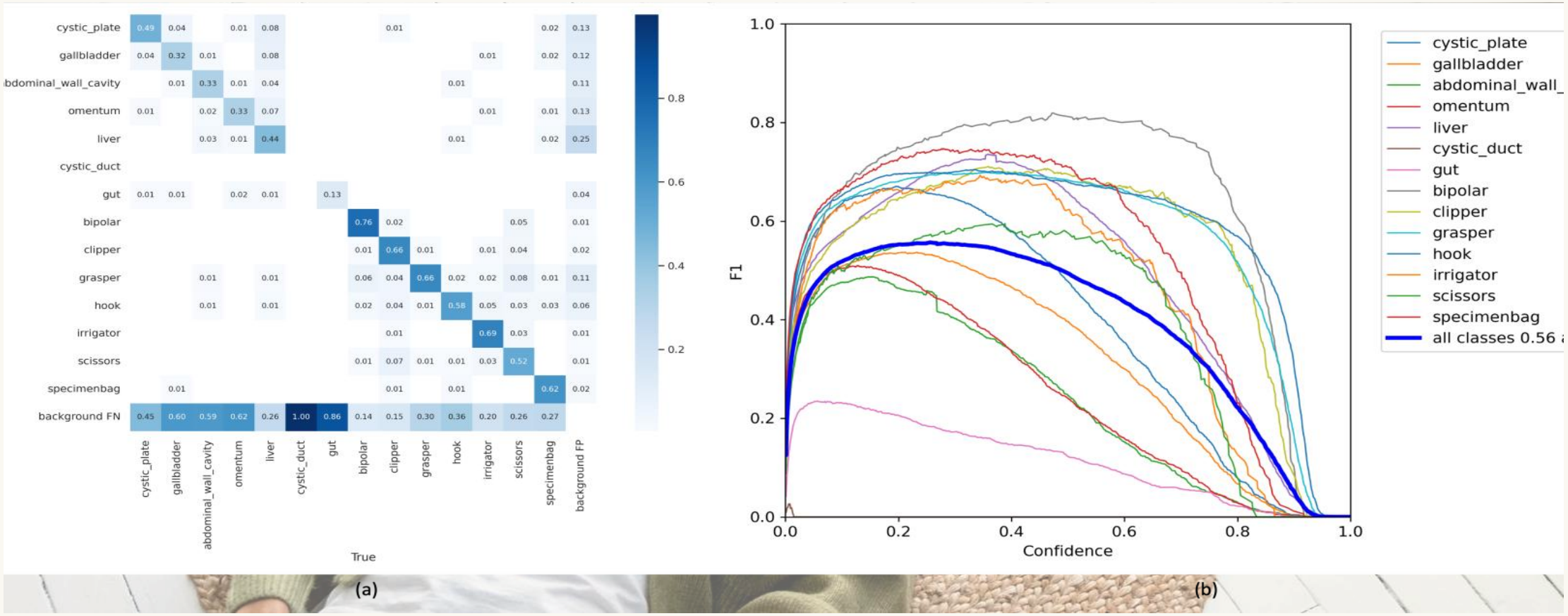


WHAT IS SURGICAL VQA?

CONVERT EXISTING ANNOTATIONS INTO STRUCTURED VQA QUESTION-ANSWER PAIRS

From Chloec80 Dataset

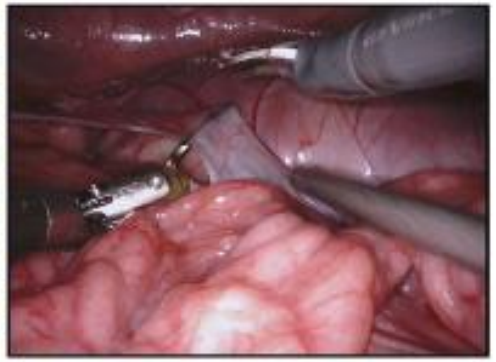




UNCERTAINTY QUANTIFICATION

Using CLIP!

SCENE-GRAPH REASONING AND UNCERTAINTY QUANTIFICATION FOR SURGICAL VISUAL QUESTION ANSWERING WITH DR. LAURA BRATTAIN



Questions

Q1: what organ is being operated?
Q2: what is the state of bipolar forceps?
Q3: what is the state of suction?
Q4: where is bipolar forceps located?
Q5: what tools are operating the organ?

Answers

A1: kidney
A2: retraction
A3: tissue manipulation
A4: bipolar forceps is located at left-top
A5: the tools operating are bipolar forceps, monopolar curved scissors, and suction

Plan

1. Become familiar with Surgical VQA, surgical datasets, and uncertainty quantification.
2. Reproduce the selected Surgical VQA method by Yuan et al.
3. Organize the datasets into a common image/frame-level format.
4. Convert existing annotations into structured VQA question-answer pairs.
5. Apply the reproduced Surgical VQA method to the new VQA datasets.
6. Evaluate performance across question types.
7. Add uncertainty quantification to measure model confidence.
8. Compare the scene-graph–based model against a vision-language baseline (e.g., BLIP-2 or LLaVA-Med) to assess the value of structured surgical knowledge.