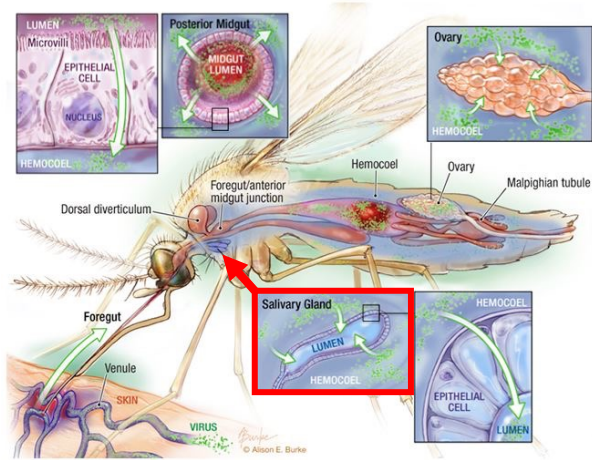


## Vision Guided Mosquito Dissection for the Production of Malaria Vaccine Integration of Computer Vision Methods

There are over 200 million cases of malaria every year globally that results in more than 400,000 deaths.

The disease is caused by a parasite that incubates inside the salivary glands of mosquitoes.

The extraction of these sporozoites from mosquito salivary glands enables the manufacturing of one promising malaria vaccine.

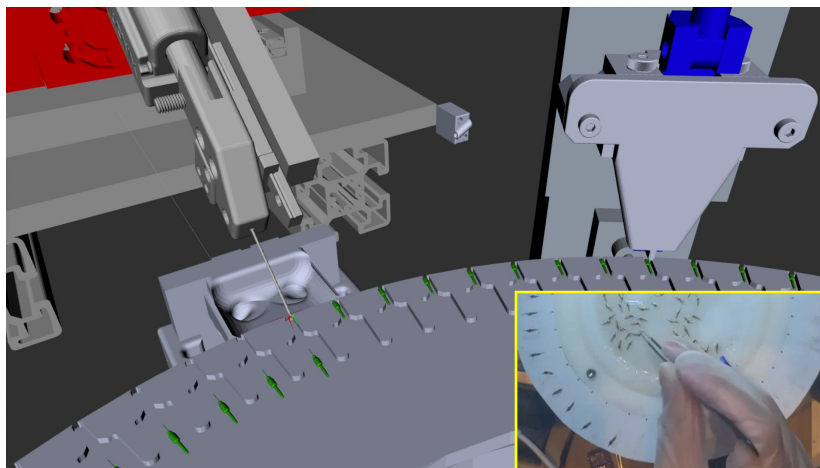


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1

## Vision Guided Mosquito Dissection for the Production of Malaria Vaccine Integration of Computer Vision Methods

An automated dissection process is being developed at LCSR that uses a robotic microsurgical instrument to manipulate mosquitoes.

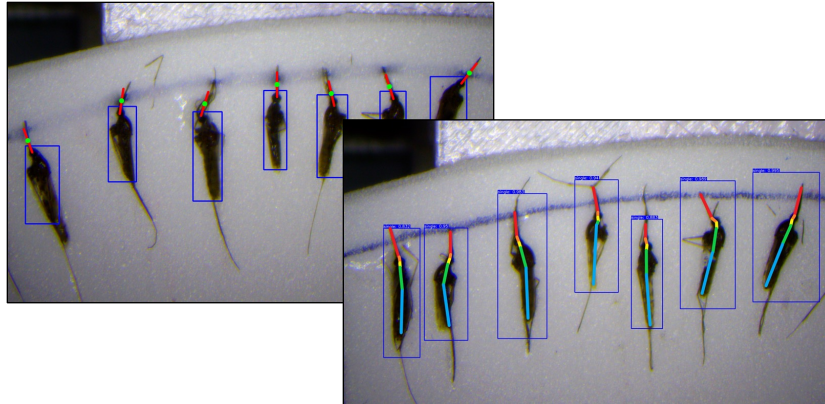


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2

## Vision Guided Mosquito Dissection for the Production of Malaria Vaccine Integration of Computer Vision Methods

The autonomy of the robotic system hinges on sophisticated computer vision methods to detect mosquitoes and their body parts, and to provide quality control during the process.



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3

## Vision Guided Mosquito Dissection for the Production of Malaria Vaccine Integration of Computer Vision Methods



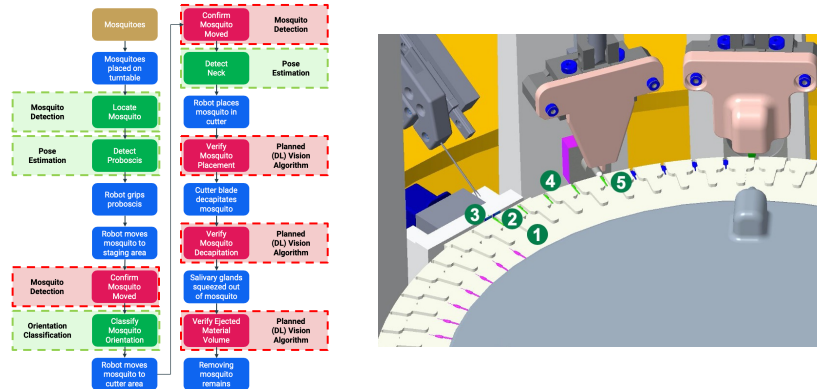
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4

## Vision Guided Mosquito Dissection for the Production of Malaria Vaccine

### Integration of Computer Vision Methods

A number of CV methods have already been implemented (both classical C++ algorithms and deep learning-based methods) but few have been fully integrated into the dissection process.



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## Vision Guided Mosquito Dissection for the Production of Malaria Vaccine

### Integration of Computer Vision Methods

- **What the student will do:**
  - Review existing CV methods
    - Most of them already:
      - are implemented, or have draft implementations,
      - are integrated into the ROS-based software infrastructure
      - have their own Git repository(ies)
      - are documented on the Wiki of their respective Git repositories
      - have training/verification data already recorded and annotated
  - Improve/fix existing algorithms/methods, if not performing well
  - Collaborate with other team members to find best way to integrate into the dissection process and into the system control software
  - Maintain integrity of training/verification data
  - If missing:
    - add ROS software interface
    - finish documentation
    - develop scripts to perform automated training and verification (example scripts are available)

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**Vision Guided Mosquito Dissection  
for the Production of Malaria Vaccine**  
**Integration of Computer Vision Methods**

- **Required skills**
  - C++
  - Python
  - ROS
  - Git
- **Additional useful skills**
  - OpenCV
  - Image Processing
  - Computer Vision (DL)
  - SQL
- **PI**
  - Prof. Russell Taylor
- **Mentor**
  - Balazs Vagvolgyi ([balazs@jhu.edu](mailto:balazs@jhu.edu))

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