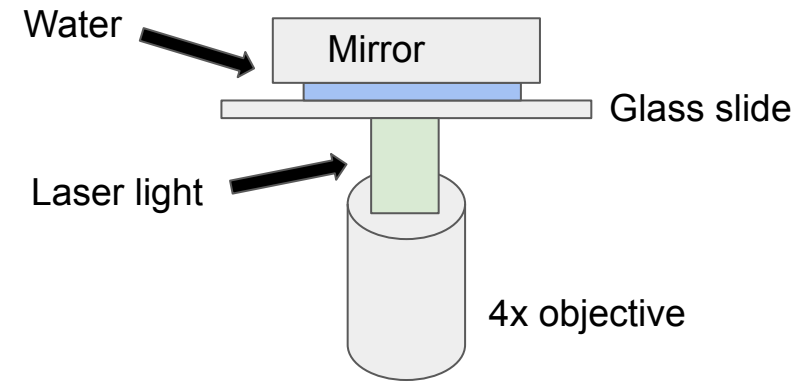
# Illuminating Robots Using the SLM

8/5/2022

# Process Flow:

1. Calibrate the system by displaying dots on the SLM
2. Analyze the dot positions on the microscope image to create a transformation matrix between systems
3. Validate the transformation by displaying more dots and calculating error
4. Place a robot on a glass slide and cover with a partially transparent cover slip
5. Run the program and watch laser spots track the robot



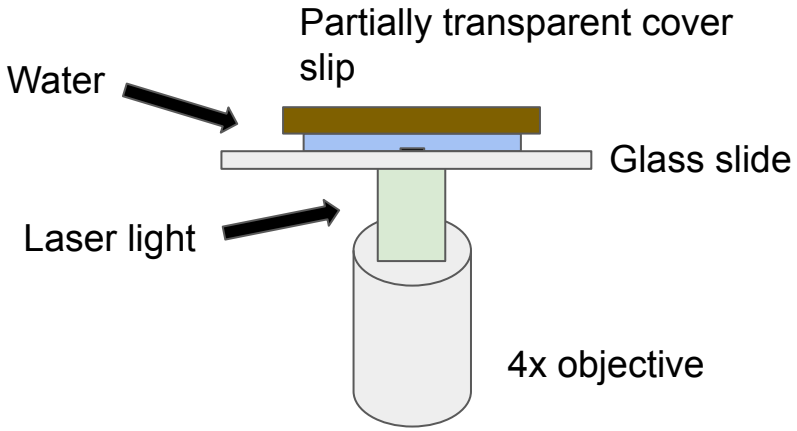



Photo 1: Robot being illuminated

Video 1: Robot being tracked by laser

# Next Steps

- ➔ Getting the robot to move from laser illumination (helping it along with frontlight)
- ➔ Alternatively, using more intense laser so robot moves from its sole illumination
- ➔ Conversion to object-oriented programming
  - ◆ The organization of code around objects such as robots, swarm, PVs and their associated functions; Enables the application of higher-level commands
  - ◆ Swarm → Robot → PVs
  - ◆ Primary data structure - array of object type
  - ◆ Brainstorming Questions:
    - At this stage, how do we want to illuminate the PVs? Do we want a user interface with mouse click inputs, user inputs of commands such as ‘move right, left, illuminate Robot 1’ (use of command line arguments)

Video 2: Robot being tracked by laser

# Conversion to Object-Oriented Programming

| **Class (blueprint that defines an object)** | **Fields (attributes of a class)** | **Methods (functions of the class)** | **Notes** |
|---|---|---|---|
| Robot | Name (integer); Coordinates (integers); PVsList (array of PVs type) | Accessing Contours, Recognising PVs | |
| Reference Robot | Filename (text) | Initialising Image, Accessing Contours | Assuming same type? |
| Swarm | Filename (text); RobotList (array of Robot type) | Initialising Image, Accessing Contours, Recognising Robots | Contour *matching*, Trouble with circles |
| PVs | Name (text), Coordinates (integers); Contour (array of integers) | Creating SLM Image | How to pick out which ones we want illuminated? What's the relationship b/w swarm and PVs (which class does creating the SLM Image belong to)? |