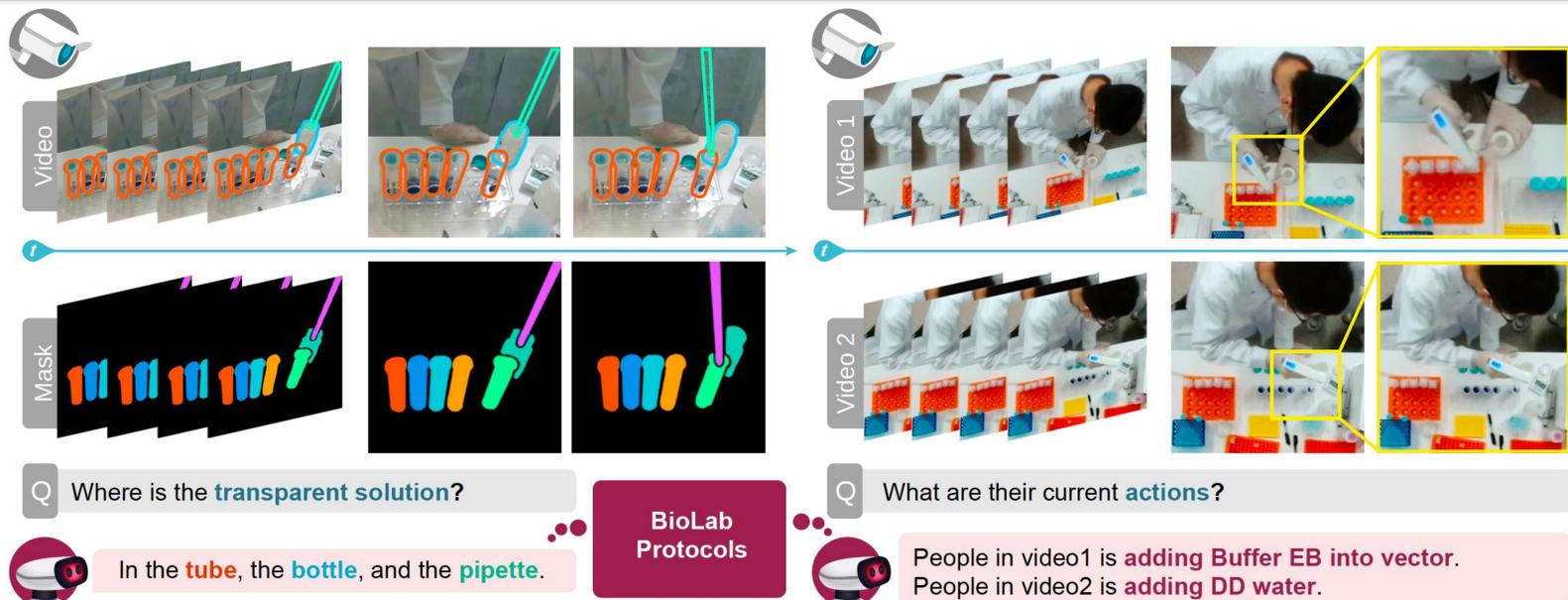




ProBio: First protocol-guided dataset in Biolab



Q Where is the **transparent solution**?

In the **tube**, the **bottle**, and the **pipette**.

BioLab Protocols

Q What are their current actions?

People in video1 is **adding Buffer EB** into vector.
People in video2 is **adding DD water**.

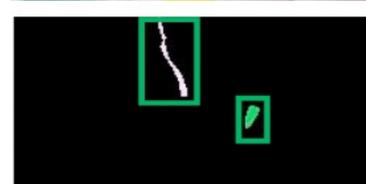
✓ **3,724** practical-experiment, **61** instructions ✓ An overall length of **180.6 hours**
 ✓ **37,537** Human-Object Interaction (HOI) ✓ **213,361** segments in multi-view

BioLab Protocols	Glue Production					
brf_exp: 1. Glue Production prc_exp: 1.1 heat agarose human-object: 1.1.1 open water bath interaction 1.1.2 put agarose into water bath 1.1.3 shake agarose 1.1.4 take out agarose prc_exp: 1.2 mix agarose human-object: 1.2.1 shake agarose interaction 1.2.2 spin agarose	heat agarose		mix agarose			
	open water bath	put agarose into water bath	shake agarose	take out agarose	shake agarose	spin agarose
	time					
Procedure in tasks						
BioLab Protocols						
brf_exp: 1. Vector Transformation prc_exp: 1.1 calculate dosage human-object: 1.1.1 set pipette interaction 1.1.2 dosage 1.1.3 add vector into tube 1.1.4 repeat	calculate dosage	calculate dosage	calculate dosage	Action a	Action a	Action a
	time					
prc_exp: 1.2 Buffer EB preparation human-object: 1.2.1 extract Buffer EB from bottle interaction 1.2.2 blow Buffer EB with pipette 1.2.3 add Buffer EB into tube 1.2.4 repeat	Solution a	Buffer EB in bottle	extract Buffer EB with pipette	add Buffer EB		
	time					

Benchmark and Results

Task 1: Transparent Solution Tracking

Track different liquids that transfer between visually similar and transparent containers.

Task 1	GT			
	Track			

Task 2: Ambiguity Action Recognition

Recognize the perceptually similar actions with divergent semantic meanings across various experiments.

Task 2	Video			
	GT		mix and resuspend <i>E.coli</i>	weigh agarose
Pred		mix and resuspend <i>E.coli</i> ✓	weigh agarose ✓	mix and resuspend bacteria ✓
Task 2	Video			
	GT		add Toxin buffer into column	add DD water into mixture
Pred		centrifuge PCR contents ✗	add Buffer P3 into bacteria ✗	add plasmid into EP tube ✗