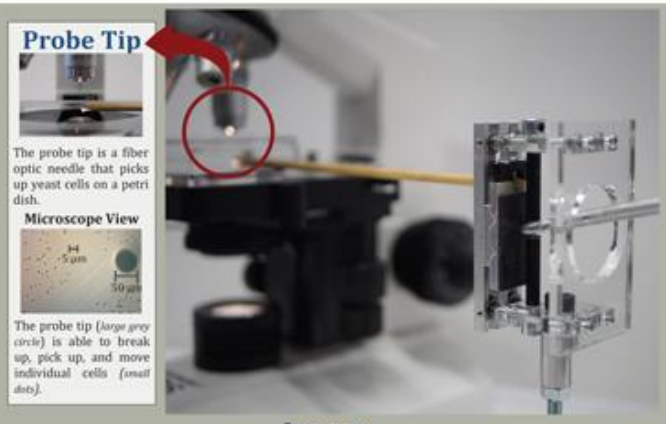
LOW COST YEAST MICROMANIPULATOR



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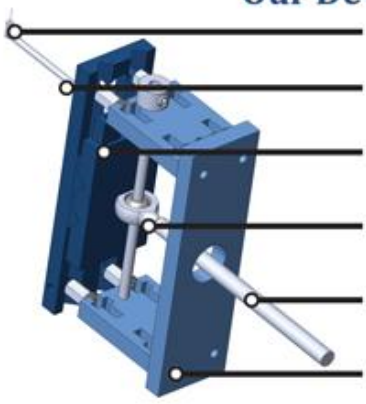
A micromanipulator is a precision mechanical tool that splits up and moves single-celled organisms such as yeast. Attached to microscopes, micromanipulators scale the large movement of the human hand to micron-resolution movement of a probetip.

Impact

Micromanipulators are used to perform experiments to study DNA and genetic mutations. By making a low-cost micromanipulator with minimally modified off-the-shelf parts, we will make the field of yeast genetics more accessible to under-funded labs and undergraduate courses.

Our Device



Needle: Breaks, picks up, and moves individual yeast cells

Rod: Rigidly attached to the plate and holds the needle at the end

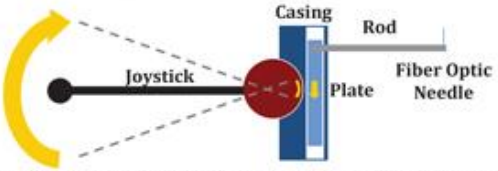
Plate: Translates in two directions as the rod end rotates; rubber surface

Rod End: Held in tension against plate; rotates in two directions with joystick

Joystick: Rigidly attached to a rod end and allows for manual user input

Casing: Restricts motion of plate, holds a shaft for the rod end, and attaches to the mount

Ball–Plate Mechanism



The ball-plate mechanism translates an intuitive joystick movement to a controlled Up-Down and Front-Back movement of the probe tip (2 Degree-of-Freedom). The length of the joystick and radius of the sphere determine the movement scaling.

	Our Device	Competition
Resolution (μm)	25	0.5
Movement Scaling	50:1	400:1
Price	$300	$30,000

Our device has 50x lower resolution, 8x less movement scaling, but costs 100x less than the competition. It is able to pick up and move individual yeast cells. While it lacks non-essential features (*automated movement, electric zapper*) and is harder to use, our micromanipulator is able to perform the essential functions at a fraction of the competition's cost.

WORK SPACE SHOWCASE
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