

Modular Test Platform for Synchronized EMG and Motion Capture

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Studying animal models?

Wireless EMG and Multi-angle video capture are useful tools, especially when synchronized.

Need a custom test platform?

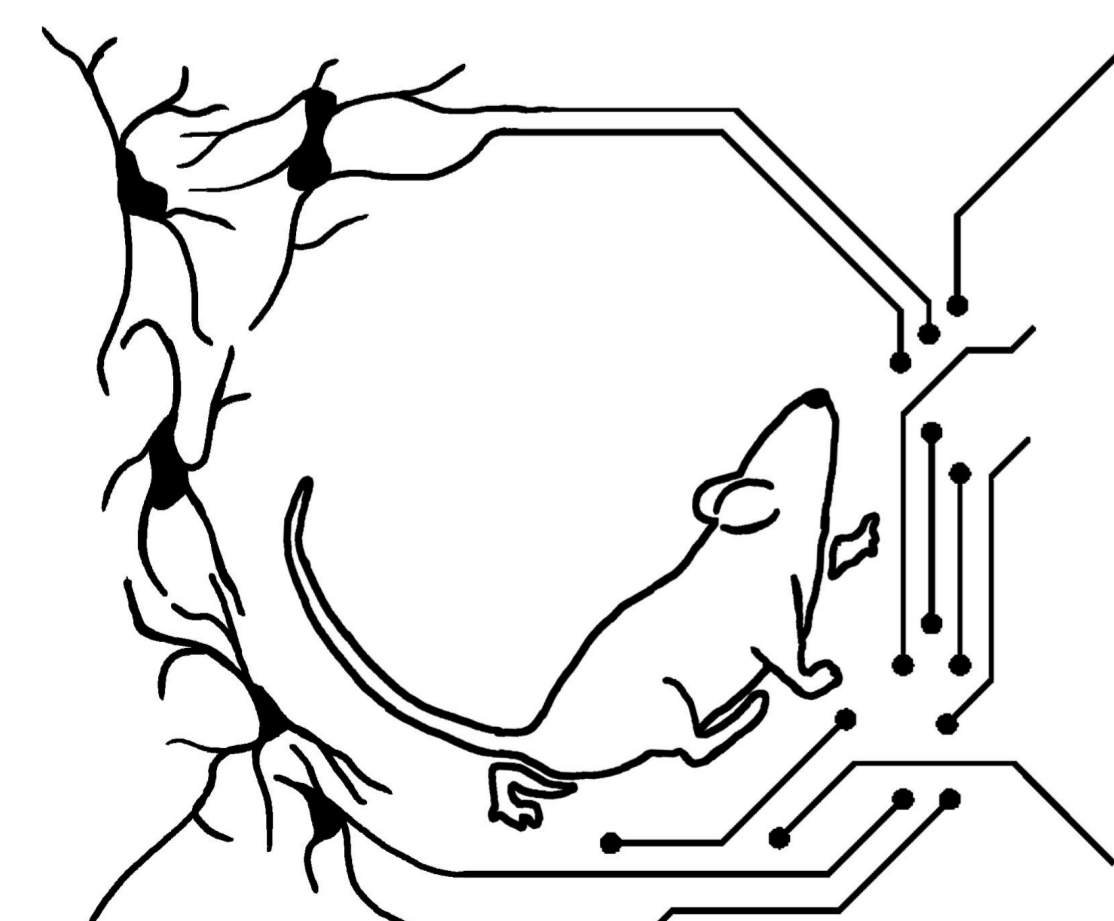
Most commercial options cost many thousands of dollars and are not adjustable to user needs.

This poster summarizes an open-source option that can be employed to overcome these challenges:

The WREATH “Wireless Rodent EMG And Tracking Habitat”

The WREATH was developed with the following requirements:

- Reusable data collection platform
- Quickly swappable test modules
 - Includes magnetic electrical connections for powered experimental setups
- Multiple, adjustable camera angles
- Onboard computer for video capture and module control
 - Can communicate with the modules via SPI, I²C, UART, or GPIO
- LED and GPIO signal output for both visual and electronic means of data synchronization
- Animal safe materials
- Low cost (~\$1,500 for the Data Collection Shell, between ~\$100 and \$500 per test module, depending on complexity)
- Open-source
 - Construction guide, Bill of Materials, code files, and guidance on how to design new test modules available online
- Stylish logo

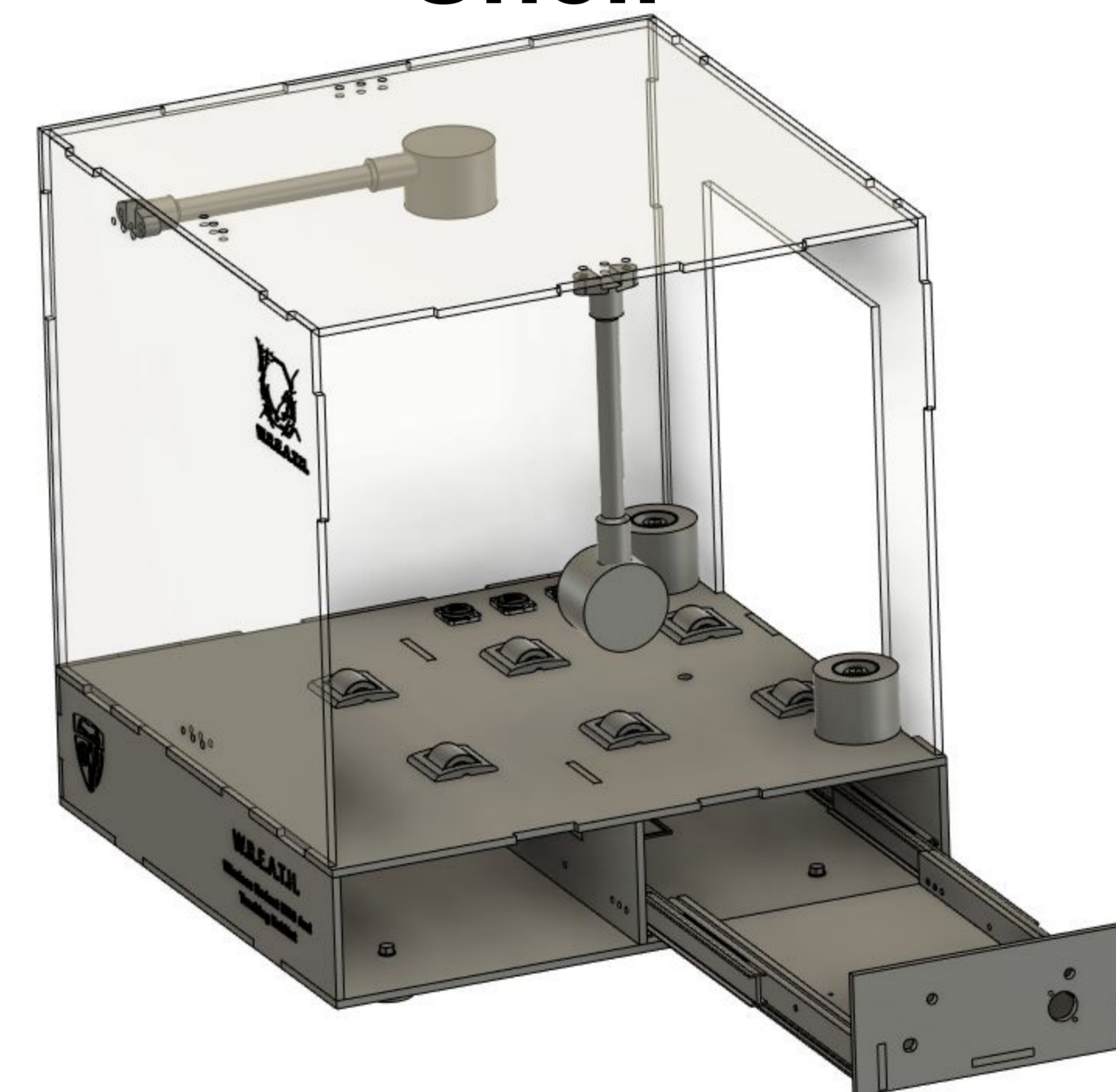


WREATH Logo

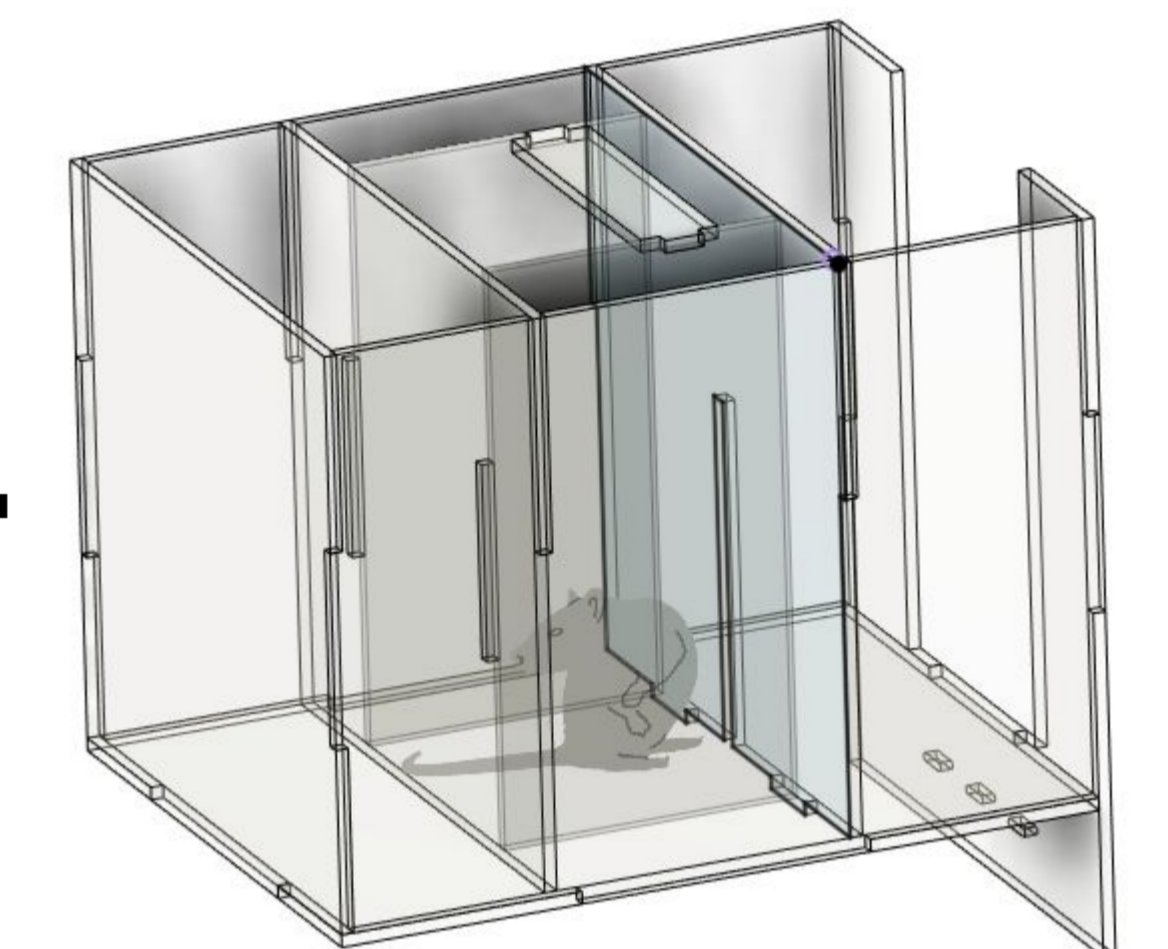


Sample frame from a WREATH video of a rat in the Automatic Wheel Module. Joint markers and skeleton were automatically using the DeepLabCut animal motion analysis package.

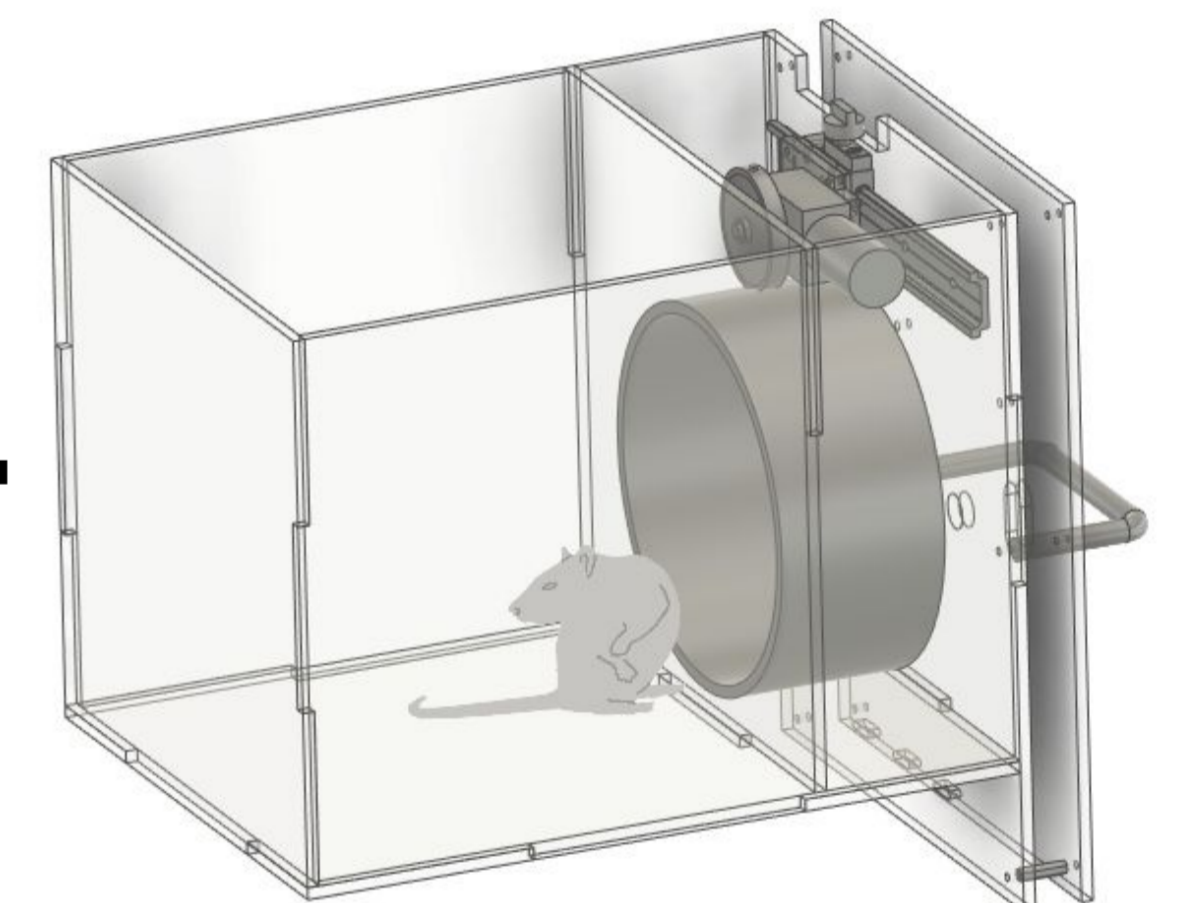
Data Collection Shell



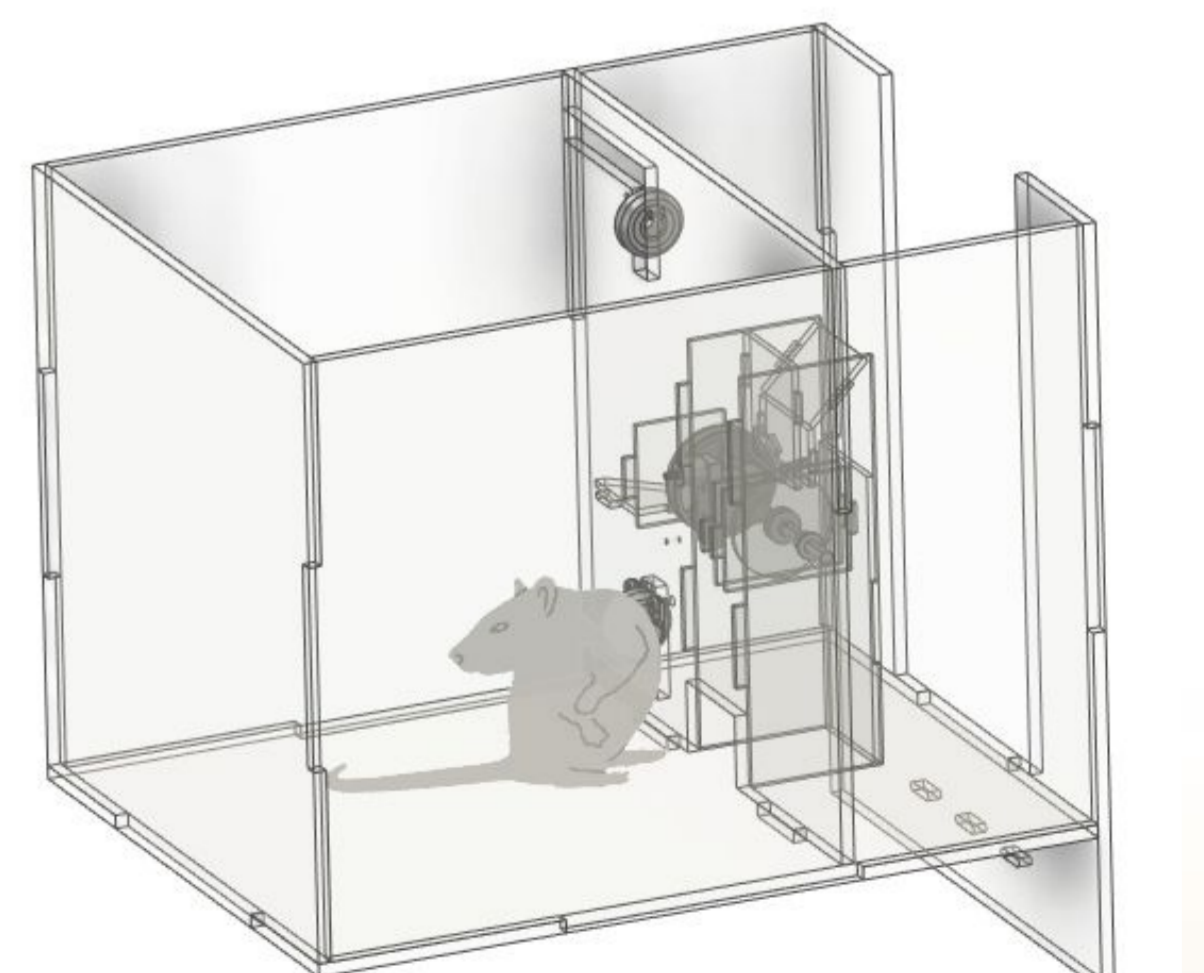
Test Module Examples



Reach and Grab Module



Automatic Wheel Module



Pulley Feeder Module

This platform is already being used with rat models to collect synchronized wireless EMG and video footage data to assess limb position and speed with respect to nerve impulses in reinnervated muscle.