Development Of The RELevator For Exploring 3 Dimensional Spatial Representations Of Rodent Hippocampal Place Cells
A Bit of Background

- What is a Hippocampal Place Cell?
- Defining dimensionality of encoding by these cells
- Why do we care?

Figure adapted from L. Colgin et al
*Nature Reviews Neuroscience* 2016

Eichenbaum *Current Biology* 2000
Morris et. al *Nature* 1982
Previous Attempts At Uncovering Dimensionality

- Dimensional implications in rodents
- What errors do these paradigms present?
- Isolating a z-axis
- How do we compensate for these errors?

Hayman et. al *Nature Neuroscience* 2011
Our Solution

- The Rodent Elevator (RELevator)
- Multiple possible level-dependent tasks
Software/Hardware

- Hall Effects Sensors
- Raspberry Pi
- Arduino Uno
  - AMIS 30543
  - Servo 1
- Arduino Uno
  - Servo 2
- Arduino Uno
  - Capacitive Sensor
- Stepper Motor
How Does It Look?
A Possible Level-Dependent Task
Is This Feasible?

- Several rats have already demonstrated learning!
- Stress test preliminary results
What Do We Hope To Do Next?

- Chemical lesion studies
- Electrophysiological recordings
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Questions?