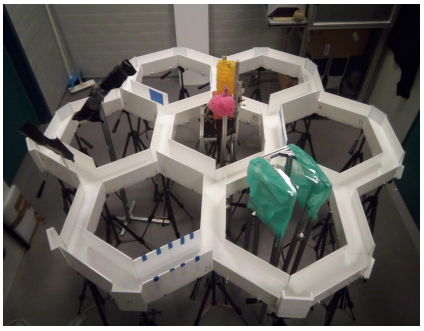
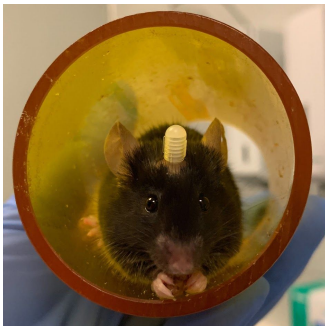
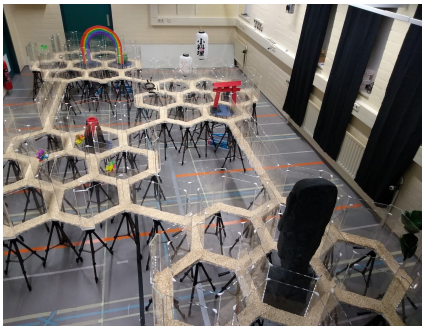
## The Hex Maze: studying how previous knowledge affects the way we learn

Efficient navigation through changing environments requires fast and accurate updating of previously learned representations of the surrounding physical space. Such previous knowledge-networks are thought to be represented by distributed cell assemblies in the prefrontal cortex, and their existence has been shown to facilitate learning and consolidation of new information that updates the knowledge-networks (Tse et al., 2007, 2011). However, it remains unclear whether the activity of prefrontal cell assemblies is necessary specifically during this updating process. We have developed a novel rodent navigation task - the Hex Maze task - that allows the study of gradual buildup of knowledge networks and their updating. The Hex Maze task provides a much more intricate environment than traditional rodent tasks, which allows us to study more complex knowledge networks and their underlying neural processes.

Rodents are trained to find food in the maze equipped with numerous extra- and intra-maze cues. For each animal, the goal location remains the same throughout the training, while the start location varies from trial to trial, encouraging allocentric navigation. We obtain various behavioral measures such as distance traveled, correct vs. incorrect choices, and speed and latency to food node arrival. This allows studying how quickly rodents build a knowledge network (i.e. a cognitive map) of the environment and paves the way for examination of neural correlates for these behavioral measures. Pharmacological manipulations will allow us to evaluate the role of different brain regions during different phases of the task, such as the prefrontal cortex and the hippocampus.

**Experimental Project** Depending on your background you would learn:

- Rodent behaviour
- Pharmacology
- Histology
- Basic Excel/Matlab analysis

**Computational Project** Depending on your background you would learn:

- Advanced path analysis with Matlab/Python (can include Computer vision, Graph-theory based analysis, Deep-learning algorithms)

Internship location: Science Faculty, Donders Institute, Neuroinformatics department
Translational Neuroscience Unit

Contact information: Applications should be addressed to l.genzel@donders.ru.nl with a short description of your background.