

Presenter: Rogério Guimarães, rotating in Perona lab

Title: The Manhattan Maze – Modeling Mice Navigation in a Flexible Maze Environment

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Abstract: In the wild, mice need to rapidly learn the routes between home and food to forage and escape efficiently. Our previous study showed that mice can learn 10-bit choices in a complex binary labyrinth after only 10 reward experiences – a learning rate 1000-fold higher than the prevalent two-alternative-forced-choice (2AFC) tasks. Here we further explore and model their learning capacity using a novel, three-dimensional Manhattan maze, which can be easily reconfigured to up to 2^{121} permutations. Rapid learning was consistently observed in our pilot data: the mice could potentially learn more than two maps of 21-choices and flexibly switch between them across days. We also found that different categories of mazes posed dramatically different challenges to the animals, which could not be explained by simple Markov Models.