Thesis: Computational Models For Hippocampal Replay.

Abstract: The cross-pollination between AI and Neuroscience saw increased interest in the scientific community over the past several decades. From the biological lens, system neuroscientist may borrow ideas from AI when seeking to explain how our brain supports motor skills development, conceptual ideas formation and perception. From the computational perspective, computer scientists may incorporate recent brain research discoveries in working on complex machine learning challenges. The 2006 discovery of the hippocampal place-cell replay phenomenon opened an interesting research frontier in which AI and system neuroscience are used together in a complementary manner to gain better understanding of “human like” learning. In this survey, we will review the field progression, the biological foundations and current work seeking to uncover how the brain processes information and the underlying computational model used for spatial navigation and planning.

Committee:

- Professor Asohan, Amarasingham, Mentor, The City College Of New York
- Professor Robert M. Haralick, The Graduate Center
- Professor Zhigang Zhu, The City College Of New York