



## פרופסור יעל ניב

המכון למדעי המח והמחלקה לפסיכולוגיה, פרינסטון  
אוניברסיטת פרינסטון, ניו-ג'רסי ארה"ב

### Professor Yael Niv

Princeton Neuroscience Institute & Department of Psychology  
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קורס מרוכז | Mini Course

## REINFORCEMENT LEARNING: INTRODUCTION TO A COMPUTATIONAL FRAMEWORK FOR UNDERSTANDING DECISION MAKING

### Abstract

Animals (including humans) base their decisions on past learning from trial and error. Bringing ideas from computer science to bear on neuroscience and psychology, since the 1990's reinforcement learning theory has provided a precise, interpretable computational framework for understanding both learning and decision making. In this mini course, I will give an introduction, from the ground up, to this framework and how it can be used to ask and answer questions about behavior and the brain. I will start with Pavlovian (classical) conditioning, its modeling as prediction learning, and its implementation in dopamine-dependent learning in the basal ganglia. Then we will discuss instrumental (operant) conditioning and different algorithms for adaptive action selection in reinforcement learning, including model-based and model-free learning. In the third and final part of the mini-course, we will discuss extensions based on interests of course attendees. Potential topics include modeling response rates, applications to mental illness, and representation learning.

The Course will be held on Wednesday  
and Thursday, 23 and 24 October 2019  
Hours: 11:00-13:00, 14:00-16:00  
Room 101, Naftali Building  
Tel Aviv University, Ramat-Aviv

הקורס יתקיים בימים רביעי וחמישי,  
24-23 באוקטובר 2019, בשעות:  
16:00-14:00, 13:00-11:00  
חדר 101 בניין נפתלי  
אוניברסיטת תל-אביב, רמת-אביב

כיבוד קל יוגש לפני תחילת הקורס | Light refreshments will be served before the beginning of the course