People, animals and even machines learn to perform new tasks all the time. Sometimes there are instructions. More often, though, learning is done through trial and error. Scientists would like to understand the mental processes that underlie that learning, and how it is that the brain learns so effortlessly what computer algorithms require thousands or millions of trials to achieve. Learning in real-world tasks is complicated: The brain has to process many different factors and determine which ones are important for the current task and which should be ignored. When figuring out the best path to the grocery store, for instance, you might take note of the location of a red house but ignore the blue car outside, without ever realizing that you are actively selecting what is relevant for your task. Niv's work has focused on how the brain does this sorting, effectively parsing complex environments into bite-sized chunks that can be acted upon efficiently. With insights from the fields of statistics and machine learning, Niv is developing and testing computational models for how the brain learns what information is relevant to a task and what is a mere distractor, allowing the brain to create simplified representations of tasks that afford rapid solutions. With her colleagues, she has applied these theories to a range of phenomena from human decision making to animal conditioning. For instance, Niv has shown that understanding how the brain parses and represents tasks can help in designing interventions to permanently overwrite and remove unwanted conditioned responses—such as a fear response to a tone that was once paired with a shock—with implications for the treatment of phobias and post-traumatic stress disorder.