Anne Churchland, PhD
Associate Professor
Movements, Decisions, and Wholistic Behavior

Anne K. Churchland received her Ph.D. in neuroscience from the University of California, San Francisco, advised by Dr. Stephen Lisberger. She then did a postdoctoral fellowship with Dr. Michael Shadlen at the University of Washington in the Physiology and Biophysics Department. Her postdoctoral work focused on mechanisms of decision making in nonhuman primates and included both experimental and theoretical work. The latter was funded by a Pathways to Independence (K99) Award from the National Eye Institute. In 2010, she became an assistant professor at Cold Spring Harbor Laboratory. In starting her own laboratory, Professor Churchland began studying decision making using rodent models to take advantage of emerging tools for circuit dissection which are readily available in rodents. Since then, her laboratory has been a major player in bringing behavioral paradigms to rodents that have been successful in elucidating neural mechanisms in primates. These include perceptual decision making and multisensory integration.

Since joining Cold Spring Harbor Laboratory, Professor Churchland has been the recipient of awards from the McKnight Foundation, the Pew Charitable Trusts, the Klingenstein-Simons Foundation, the John Merck Fund and the Chapman Foundation. She received the Janett Rosenberg Trubatch career development award from the Society for Neuroscience (2012) as well as the Louise Hanson Marshall Special recognition award (2017). She is a co-founder of the International Brain Laboratory, a collaboration of 21 experimental and theoretical neuroscientists. She has played an organizational role in many conferences including the Computational and Systems Neuroscience conference (cosyne) and the Canonical Computations in Brains and Machines conference. She maintains a website (anneslist.net) to promote women in systems and computational neuroscience.

Abstract: When experts are immersed in a task, do their brains prioritize task-related activity? Most efforts to understand neural activity during well-learned tasks focus on cognitive computations and task-related movements. We wondered whether task-performing animals explore a broader movement landscape, and how this impacts neural activity. We characterized movements using video and measured neural activity using widefield and two-photon imaging. Cortex-wide activity was dominated by movements, especially uninstructed movements not required for the task. This held true throughout task-learning and for extracellular Neuropixels recordings that included subcortical areas. Our observations argue that animals execute expert decisions while performing richly varied, uninstructed movements that profoundly shape neural activity.