Brain machine interfaces (BMIs) are a direct communication pathway between the brain and a man-made device, with an ultimate goal of improving the lifestyle of neurologically impaired subjects. For these systems to operate optimally, some means of bi-directional translation should occur between the signals that the brain uses for its internal communication and those used by the machine to achieve a desired functional outcome.

In this talk, I will discuss some of our recent efforts to establish a readout methodology that translates neural ensemble activity to machine language. I will follow with a brief discussion on how to optimize microstimulation of these ensembles to increase the effectiveness of BMIs. I will conclude with a brief overview of our progress in engineering a wireless, fully implantable system for large-scale neural interfaces to pave the way for deploying BMIs in clinical applications.