

Figure 1. Investigating brain function based on the neural manifold hypothesis. **A.** The basic assumption is that cortical processing is built upon specific patterns of neural covariation, the neural modes, that result from network connectivity. These neural modes define a neural manifold (shown in panel B), a geometric representation of neural activity. In this view, the activity of single neurons results from the activation of the underlying modes (relative area of the blue/green colors). **B.** The time-varying of a population of three neurons defines a trajectory (black) in the three-dimensional neural space. This trajectory is mostly confined to the neural manifold, a plane shown in gray and spanned by the neural modes. **C.** When comparing neural manifolds from different tasks, we find that they have very similar orientation, indicating the participation of similar neural modes, as it happened for these two reaching and grasp tasks.

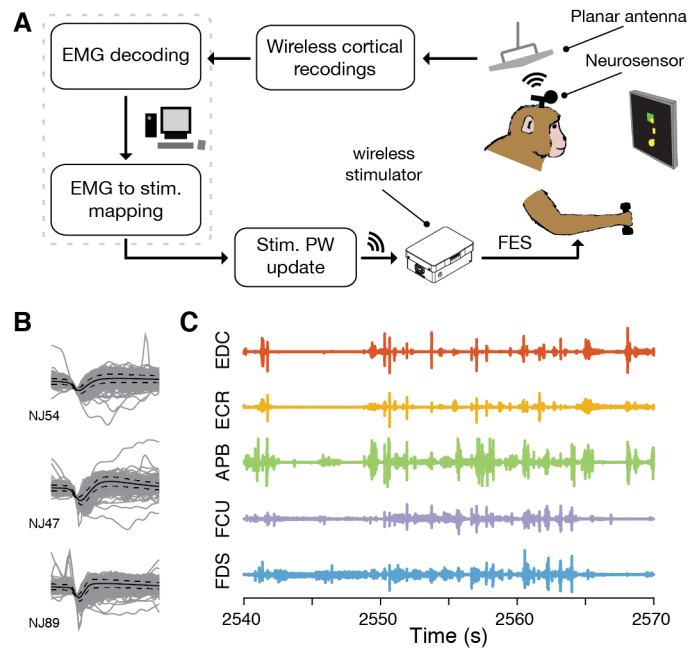


Figure 2. Fully wireless cortically-controlled neuroprosthesis to restore hand function after paralysis. **A.** Block diagram summarizing the implementation of the neuroprosthesis. **B.** Three example neurons recorded wirelessly over 1 h while the monkey moved freely in his house cage; gray traces: 1,000 randomly selected action potential waveforms; black traces: mean and standard deviation action potential waveform over the entire recording period. **C.** Example muscle activity patterns recorded during the same experiment.