Brain–machine interface (BMI): Direct communication pathway between the brain and an external device. It is also called brain-computer interface (BCI).

Cerebral cortex: The neural tissue that is outermost to the mammalian brain. It plays a key role in perception, cognition, language, decision making, and motor behavior. It is divided into a number of functional subareas including the visual cortex, the auditory and the motor cortex.

Electrocorticography (ECoG): A method of recording electrical brain activity using electrodes placed directly on the exposed surface of the brain.

Electrode array: A device that contain multiple plates or shanks through which neural signals are obtained or delivered.

Electroencephalography (EEG): A method of recording electrical brain activity from the scalp. EEG activity is thought to reflect mainly the currents produced in the dendritic trees of the large pyramidal cells in underlying cortex.

Functional magnetic resonance imaging (fMRI): A noninvasive method for imaging brain activity that uses imaging pulse sequences generated by an MRI scanner. The signal measured is caused by hemoglobin-based changes in blood oxygenation and blood flow that are induced by local neural activity.

Local field potential: Electric potential caused by the electrical currents flowing in and out of neurons within a volume of tissue. It is considered as measuring the activity of presynaptic elements in a given cerebral structure.

Neural prosthesis: A device that can substitute a motor, sensory or cognitive modality that might have been damaged as a result of an injury or a disease.

Neuron: An electrically excitable cell that processes and transmits information by electrical and chemical signaling. Neurons are the core component of the brain.


Machine learning: Computer algorithms that are designed to learn from empirical data without explicit programming.

Neural coding and decoding: Neural encoding refers to the map from stimuli or mental states to neural responses. The main focus is to construct models that attempt to predict neural responses to stimuli or mental states. Neural decoding refers to the reverse map, from neural responses to stimuli or mental states, and the challenge is to predict a stimulus or a mental state from neural responses.

Neural oscillation: Rhythmic or repetitive neural activity in the central nervous system, driven either by mechanisms localized within individual neurons or by interactions between neurons.

Spinal cord: A long, thin, tubular bundle of nervous tissue and support cells that extends from the brain through the spine. It mediates the transmission of neural signal between the brain and the body.

Supra-spinal system: Nervous system innervates spinal cord. Those include cerebral cortex, basal ganglia, brain stem and cerebellum.