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Sommario/riassunto	Closed-loop neurophysiology has been accelerated by recent software and hardware developments and by the emergence of novel tools to control neuronal activity with spatial and temporal precision, in which stimuli are delivered in real time based on recordings or behavior. Real-time stimulation feedback enables a wide range of innovative studies of information processing and plasticity in neuronal networks. This Research Topic e-Book comprises 16 Original Research Articles, seven Methods Articles, and seven Reviews, Mini- Reviews, and Perspectives, all peer-reviewed and published in Frontiers in Neural Circuits. The contributions deal with closed loop neurophysiology experiments at a variety of levels of neural circuit complexity. Some include modeling and theoretical analyses. New enabling technologies and techniques are described. Novel work is presented from experiments <i>in vitro</i> , <i>in vivo</i> , and in humans, along with their clinical and technological implications for improving the human condition.