Im-Patch©: Patch the Imaging
Free software for imaging and electrophysiology

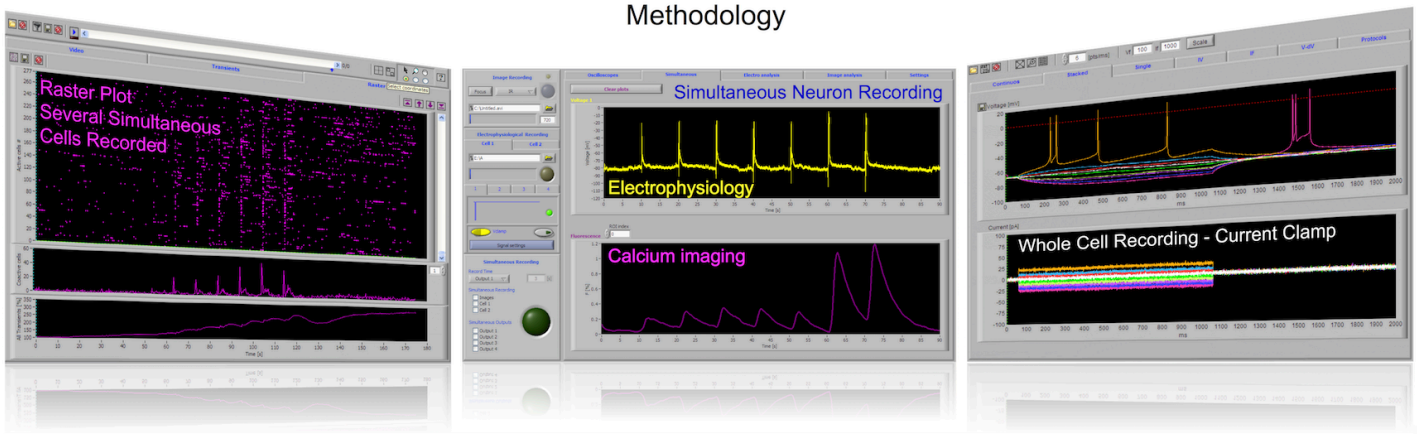
Jesús Pérez-Ortega, Tzitzitlini Alejandre-García, Brisa García-Vilchis, Karla González-Carreón, Elvira Galarraga and José Bargas

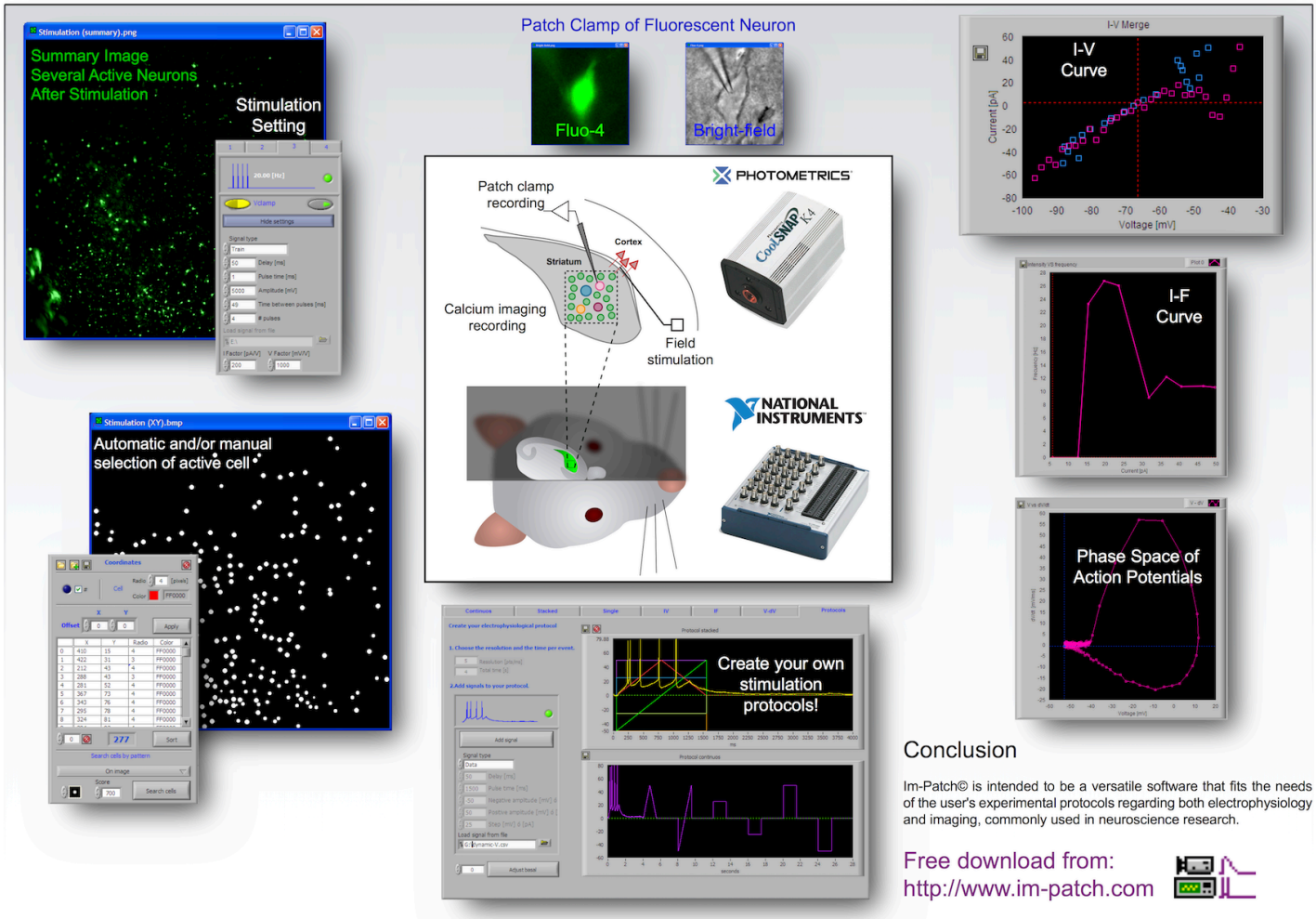
División de Neurociencias - Instituto de Fisiología Celular
Universidad Nacional Autónoma de México - México, CDMX.

Abstract

A current challenge in neuroscience is the study of neuronal microcircuits. Dynamic calcium imaging allows record the activity of dozens of neurons simultaneously. Electrophysiology can be used to record specific target neurons within the circuit. To do imaging and electrophysiology simultaneously we developed, in the LabVIEW™ platform from National Instruments™, a virtual instrument (hardware and software) for acquiring and analyzing data from microcircuit activity. We call it: Im-Patch©. Now it is an open access free software for imaging and electrophysiology. It allows experiments in vitro of brain microcircuits. Besides analyzing microcircuit behavior, both fluorescent and electrical activities of target neurons can be recorded simultaneously. By using transgenic mice, target neurons can be chosen. Now the software allows record(voltage and current) and stimulate two neurons simultaneously (4 inputs and 2 outputs), using two different field stimulus (2 outputs), while acquiring Ca images (fluorescence). Protocols that can be used are: I-V curves (current vs voltage), in current or voltage clamp mode; I-F curves (current vs frequency); phase portraits (to analyze spikes); paired pulses (to analyze plasticity); trains or ramp stimulations; dynamic clamp (personalized stimulations), etc. There are some predesigned modes for different recordings in bright field or fluorescence for imaging experiments, which can be configured (e.g. exposition time per image to avoid photobleaching). The program has features that adjust images in real-time, select cells manually or automatically from the image (coordinates and size), and make a preliminary analysis of the activity of the microcircuit from the last video taken.

Methodology





Conclusion

Im-Patch© is intended to be a versatile software that fits the needs of the user's experimental protocols regarding both electrophysiology and imaging, commonly used in neuroscience research.

Free download from:
http://www.im-patch.com