CHR2 event detector/analysis LabView and Python Integration Proof of concept

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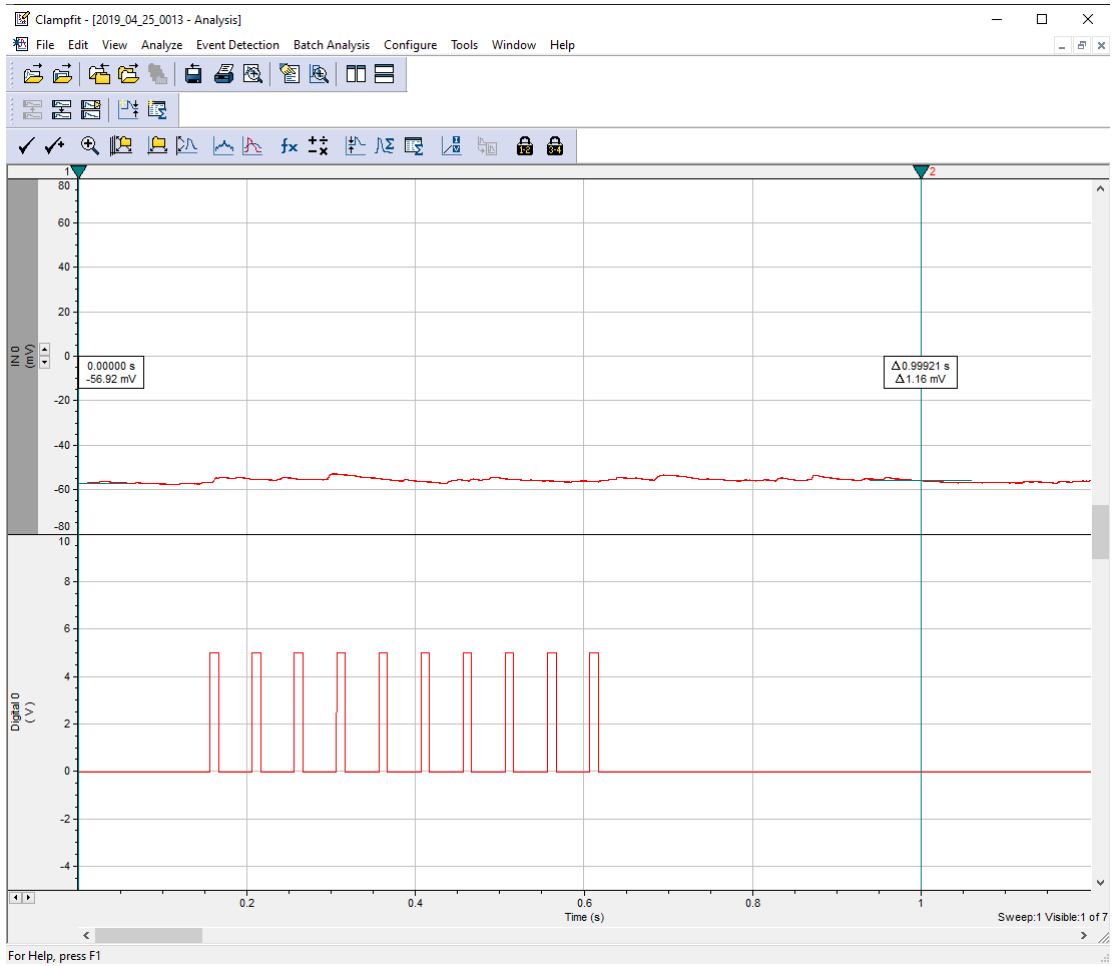
Overview of solution steps

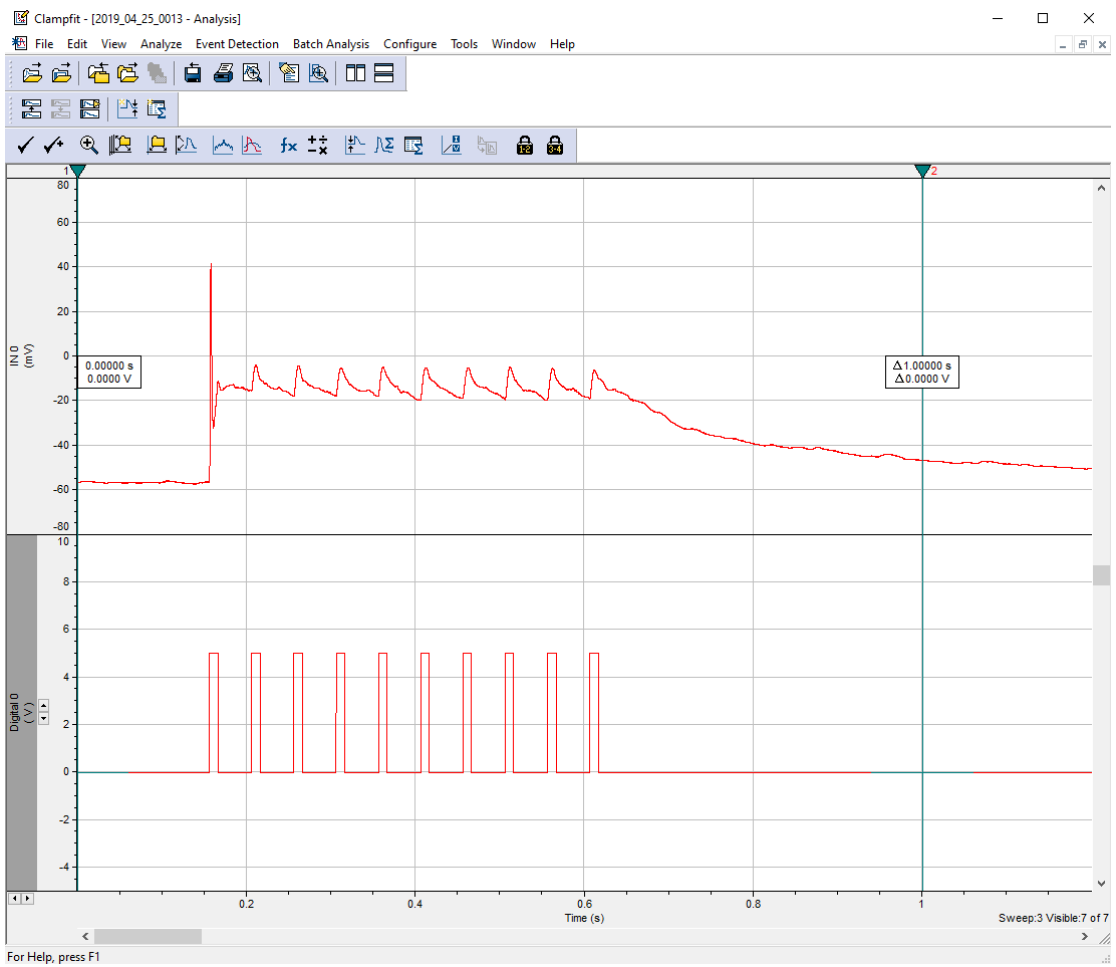
1. Loads a current clamp trace with the digital stimulus waveform into LabView
2. Passes this data to a python session for time locked event analysis
3. Simple test determines if membrane activity is CHR2+ (based on timing and magnitude of response to stimulus)
4. Passes extracted information about the stim response back to LabView
5. LabView displays a green light if CHR2 was detected in that trace

Input data (time, membrane potential, digital stimulus waveform)

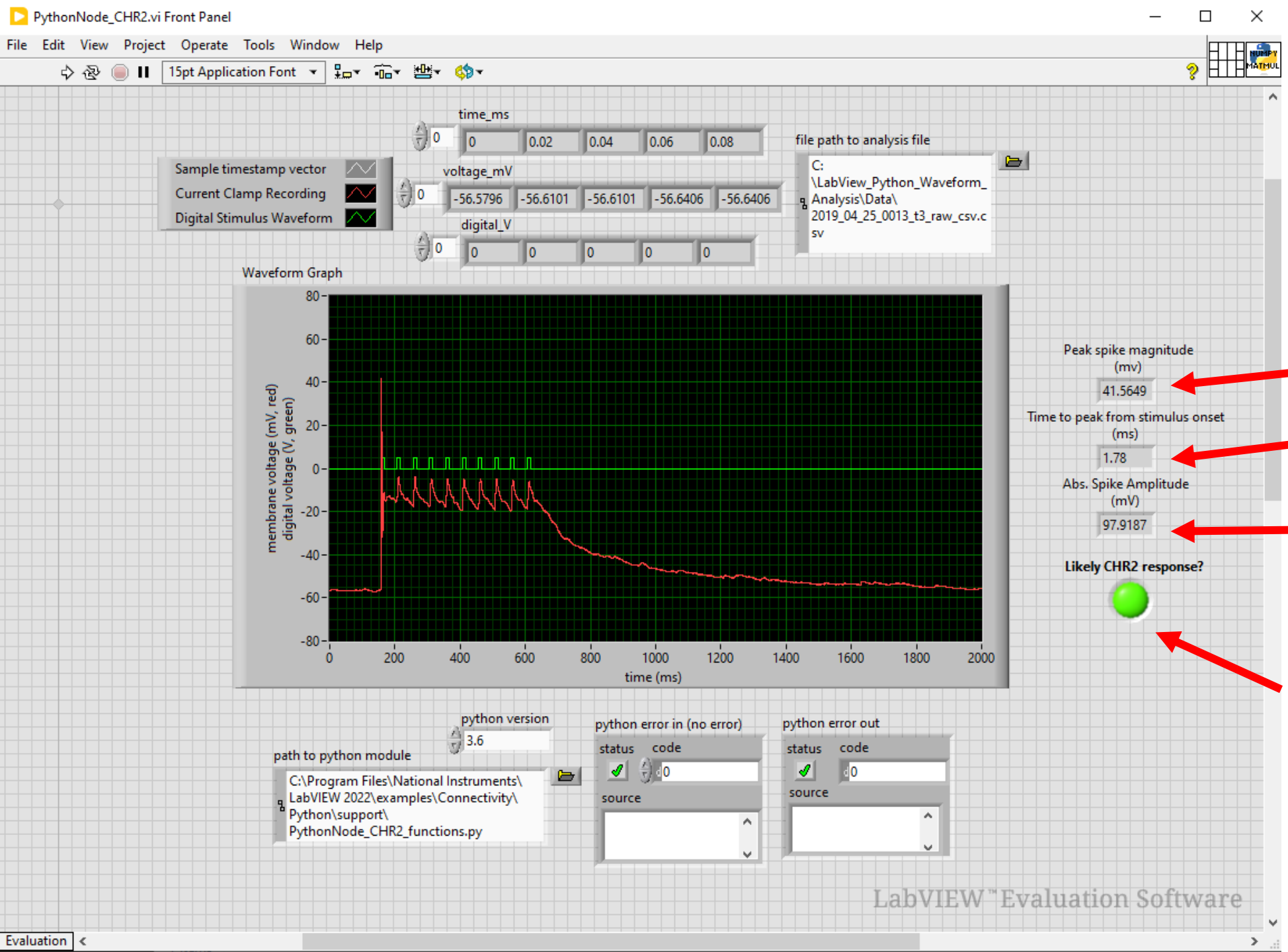
CSV of traces extracted from CHR2 recording (data collected in Guler lab)



NO ChR2 response
(Light path shutter is closed)



Classic ChR2 response example

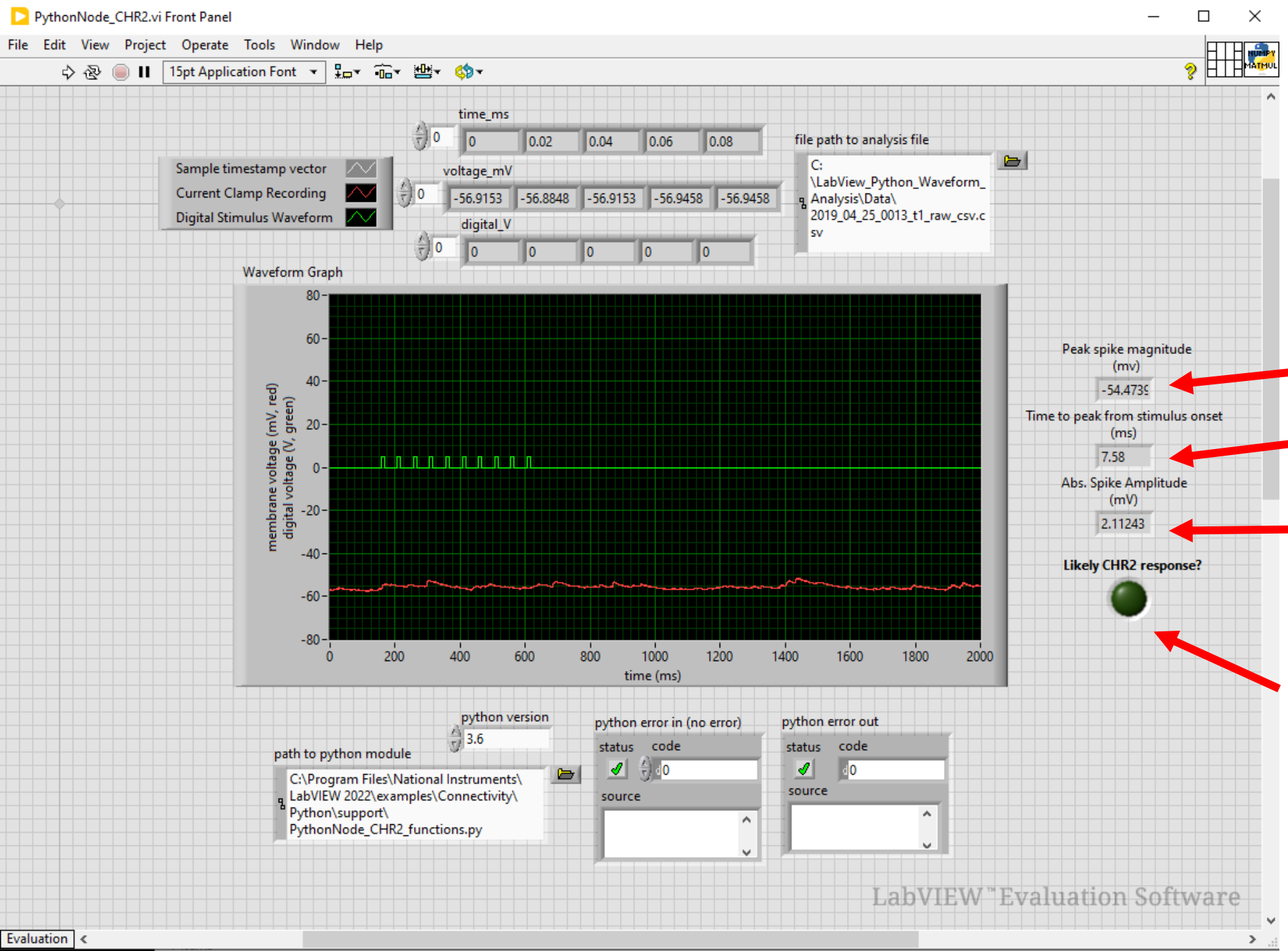


Strong action potential/spike ✓

Fast enough to be CHR2 driven ✓

Large spike ✓

CHR2 response successfully detected!



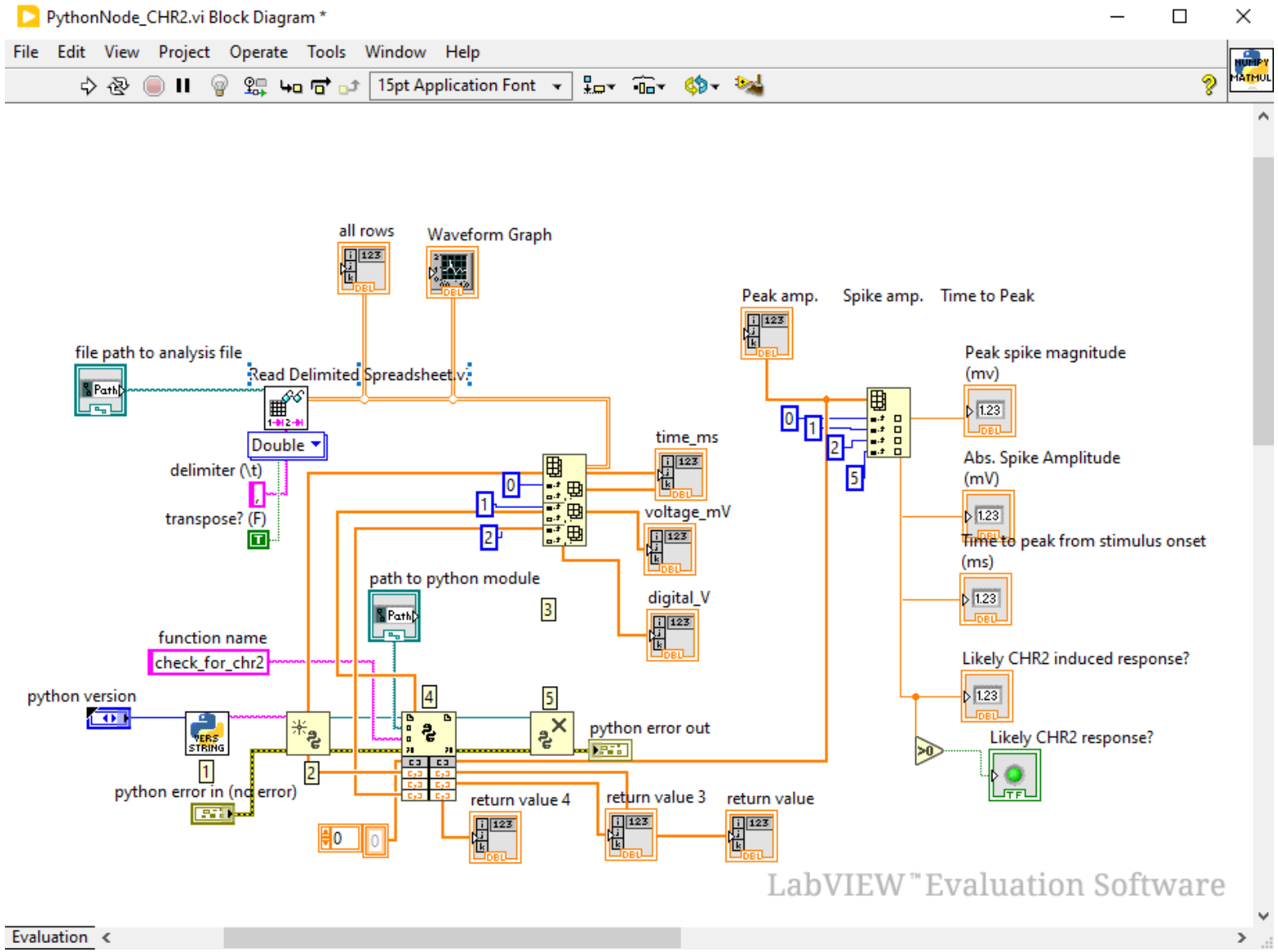
Doesn't pass 0 mV

Too slow to be CHR2

Low amplitude/silent membrane activity

CHR2 response not detected!

Block graph for LabView
Passes arrays to Python session for analysis



Note: sincerest apologies for poor graph formatting and verbose/vestigial indicators etc.

Credit/Acknowledgements

Source code and more information at:

https://github.com/src8wc/Labview_Python_CHR2_Proof_of_Concept

LabView 2022Q3:

https://www.ni.com/en-us/shop/labview.html

Python v3.6.0, with NumPy:

https://ipython.org/ https://numpy.org/

Helpful examples and discussion for integrating a python session into a LabView VI:

https://www.ni.com/en-us/support/documentation/supplemental/18/installing-python-for-calling-python-code.html

https://forums.ni.com/t5/LabVIEW/Python-Node-in-LV2018/td-p/3797256