Hi Sally,  
I finally got to a usable form of the imaging analysis (I think). I've attached the code (Culture\_imaging), as well as copies of outputs below.  
  
It has two modes:

1) auto mode, in which it tries to find peaks using a crude threshold, and

2) user-selection mode. User-selection mode is default. Tweaking the program to auto-select with a tunable threshold will take more time than I can spend at the moment.  
If you pass a second argument of "1", it will go auto. For example, if you call Culture\_imaging(filename), you'll be prompted for spots to select. If you call Culture\_imaging(filename, 1), it will go into auto mode. [if you type Culture\_imaging(‘’, 1) , it will prompt you for a filename, and do the auto select]..  
  
  
Outputs (examples attached here):  
1)     A heatmap image of fluorescent spots, and which ones were selected. On the bottom of that image is a histogram that shows how many cells initiated an event in a given frame  
  
2)     A time course of fluorescence for each spot – pretty self explanatory, but can be messy with ‘auto-detect’ on  
  
3)     A crosscorrelogram – this gives a sense of how synchronous the events are. On the xaxis, lags is given in frames. So for the example I sent, it looks like many events occurred within 2-3 frames of each other.   
  
4)     A compilation graph:   
  
a.      A raster of indicating when each fluorescent event started, separated by cell. Gives a rough sense of how synchronous things are.  
  
b.     A histogram of event duration   
  
c.      A histogram of event peak fluorescence   
  
d.     A histogram of event interburst interval (compared within-spot) – thus a measure of event frequency, not synchrony.   
  
Note for all these that ‘time’ is represented by frame #. I couldn’t figure out how to extract the frame duration from the header file in a reliable way.  
  
  
  
The program also spits out some text about average duration, etc.   
  
  
The program saves a \*.mat file (based on the image filename). In there, you have variables for event time (ev\_st), event duration (ev\_dur), peak fluorescence (ev\_peak) the heatmap image, the cross correlation plot, as well as the dF/F traces for each cell (so you could go back and mine the traces for anything you want).   
  
I've tested it with several of the files you sent – I think it should work for most conditions. Give it a test run and let me know if you hit any issues. (it uses the parallel processing toolbox, so let me know if that causes you any grief).  
   
it also requires a secondary program, called tiffread2. I've attached it here, in case you don't have it.  
-A  
  
  
  
  
 