Data Structure Description

The dataset contains neuronal responses of retinal ganglion cells to various visual stimuli recorded in the isolated retina from lab mice (Mus Musculus) using a 61-electrode array.

The data set is contained in the `ret1_data.mat` file which is saved in MATLAB data format. Once loaded, the dataset contains a *structured array* called `sessions`, with each dictionary as:

```
  struct with fields:

     subject_name: 'KO (chx10)'
     session_date: '2008-06-06'
    sample_number: 1
      stimulations: [...]
```

Each structure array element represents a single experimental session with a sample of mouse retina. In a single experimental session, there may be one or more `stimulations` - presentations of movie stimulus to the retina. When present, a single `stimulation` dataset appears as follows:

```
struct with fields:

    stimulus_onset: 1.6906
               fps: 59.9815
          n_frames: 3727
        pixel_size: 8.3000
        stim_width: 640
       stim_height: 480
      x_block_size: 10
      y_block_size: 10
             movie: [...]
            spikes: {...}
```

Here is a short description of each field:

- `fps` - The movie recording frequency in frames per second
- `movie` - An array containing the movie stimulus presented to the mouse retina. The array is shaped as `(horizontal blocks, vertical blocks, frames)`. Refer to movie description below for

details.

- `pixel_size` - pixel size on the retina in um/pixel
- `stim_height` - the height of the stimulus (movie) in pixels
- `stim_width` - the width of the stimulus (movie) in pixels
- `stimulus_onset` - onset of the stimulus from the beginning of the recording session in seconds
- `x_block_size` - size of x (horizontal) blocks in pixels
- `y_block_size` - size of y (vertical) blocks in pixels
- `spikes` - a cell array of spike times for recorded retinal neurons. Each element of the cell array is an array representing the spike times measured relative to the beginning of the recording session in seconds

Each stimulation may be associated with electrophysiology recordings from one or more retinal neurons. The neurons spiking data may be found as a cell array of spike times array in the `spikes` field of the `stimulation` data.

Movie stimulus

The movie stimulus is a white noise rectangular black-and-white checkerboard pattern where the size of a “block” in the checkerboard can differ from stimulus to stimulus. For example, for stimulus of size 640x480, if `x_block_size=1` and `y_block_size=480`, then the stimulus consists of black and white vertical strips and thus can be captured by a numpy array of size `(640, 1, frames)`.