Retinal **E**ye **M**otion **M**easurement and **I**mage **D**istortion **E**limination (REMMIDE) User Instruction

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This software is provided for research purposes only. Details of the algorithm are provided in our publication, please cite it for your research studies that uses this software.

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Software Installation:

Windows:

Double-click the file **REMMIDE Installer_web.exe** and click **Install** to begin the installation. You can leave all the settings as the default.

Linux:

1) In the terminal navigate to the folder containing **REMMIDEInstaller_web.install**
2) Type **`sudo -H ./REMMIDEInstaller_web.install`** to begin the installation.
3) At the end of installation, the installer displays the **product configuration notes** dialog box, which contains information necessary for setting your path environment variables. Make sure setting these environment variables properly. For more information on setting environment variables, check MATLAB Runtime Path for Deployment.

Run software:

Windows:

- **Option 1:**
  1) Navigate to the folder containing your standalone executable, if you used default settings in installation, you could find the installed application at **C:\Program Files\University of Pittsburgh\REMMIDE\application.**
  2) Double-click **REMMIDE.exe** to run the software.
- **Option 2:**

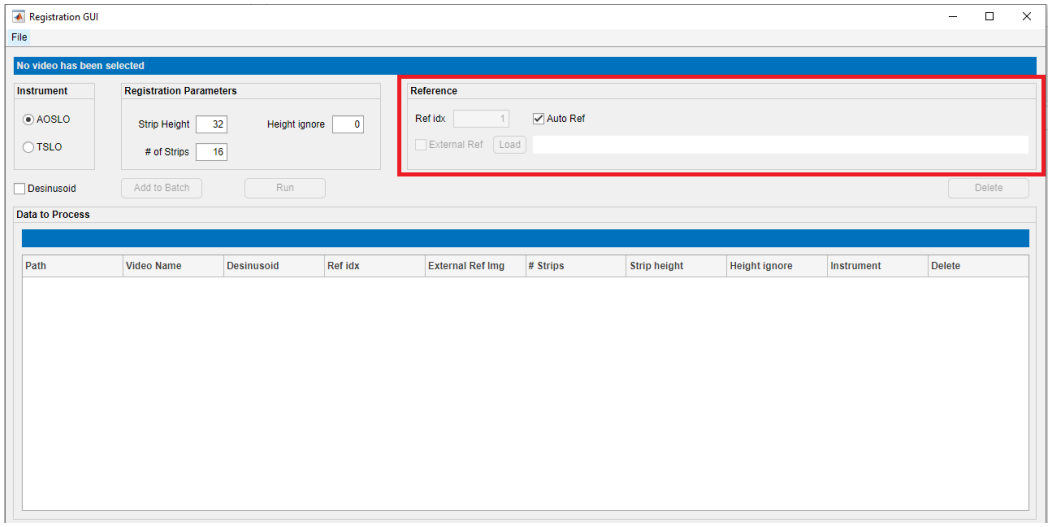
  if you created desktop shortcut during installation, just double-click **REMMIDE.exe** from desktop to run it

Linux:

1) In the terminal navigate to the folder containing your installed application, if you used default settings in installation, you could find the installed application at **usr/University_of_Pittsburgh/REMMIDE/application/**
2) Type **`./REMMIDE`** to run the software

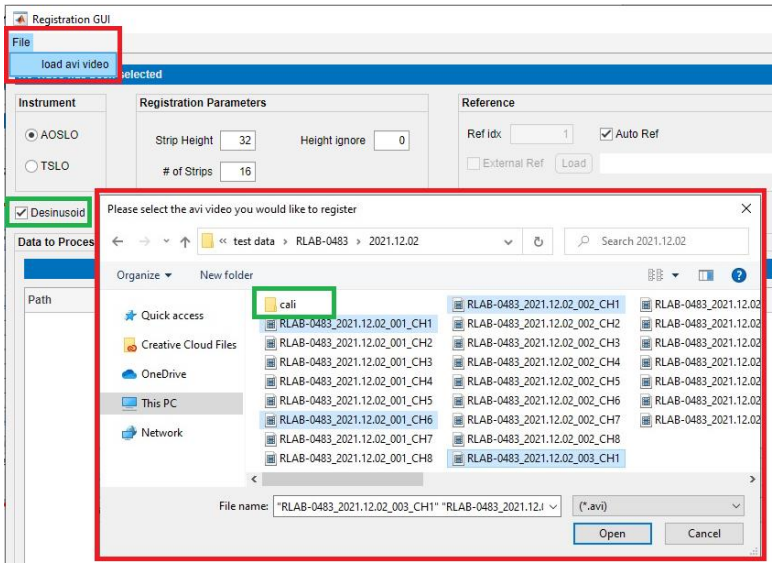
Follow the steps below to register your data when you run the software:

1. **Select "Reference" preference:**



- **Auto Ref**: no reference information needs to provide; the system would automatically select one frame from the image sequence as reference image.
- **Ref idx**: manually select a frame (specified by index number) from the image sequence as refence image.
- **External Ref:** use an external image as refence image; need to click the "**Load**" button to specify **the path and name of the external image**

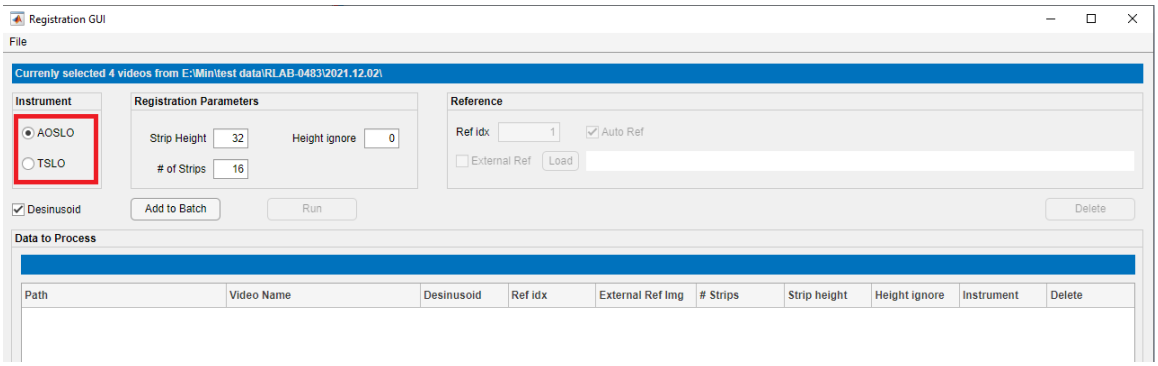
2. **Click "File"->"load avi video" to add data which need to register**



1) if **"Auto Ref"** is checked in step 2, **multiple videos** can be selected in this step, otherwise, only one video can be selected

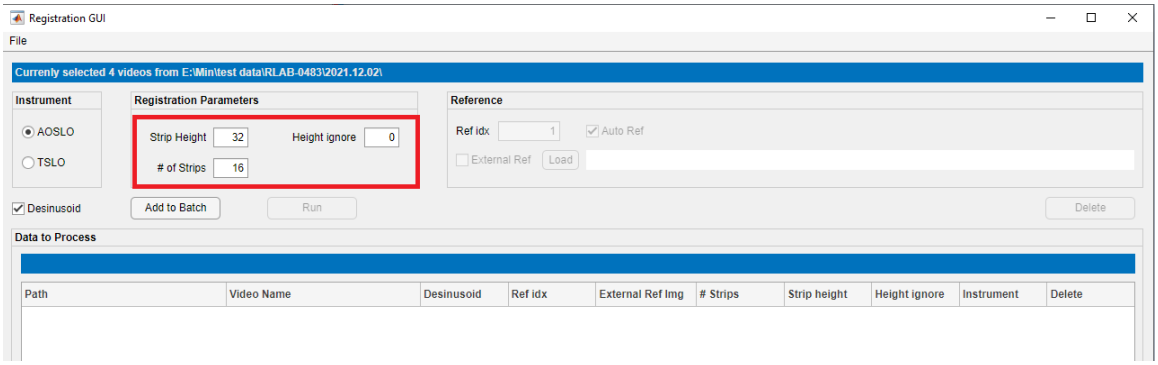
2) if "**Desinusoid**" is checked, please make sure there is a sub folder named "cali", and the corresponding desinusoid matrix is under that sub folder.

3. **Select DAQ "Instrument" type:**



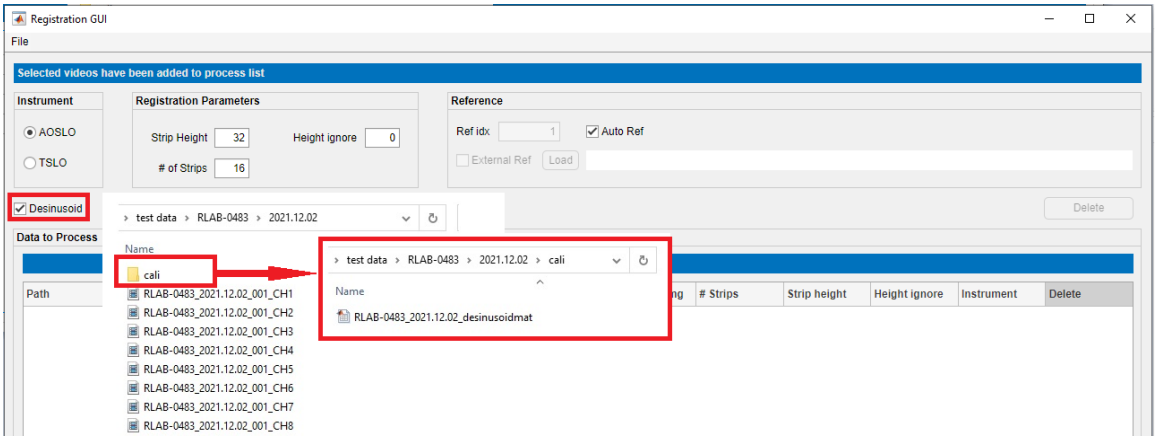
- **AOSLO**: data collected by AOSLO
- **TSLO:** data collected by TSLO

4. **Change "Registration Parameters" as needed:**



- **Strip Height:** the height of each strip
- **Height ignore:** how many rows from top of the image will be ignored due to return path artifact. In our case, enter 0 for AOSLO data, and 16 for TSLO data.
- **# of Strips:** how many strips you would like to divide each image frame into

5. **Check "Desinusoid" if need to desinusoid the data:**

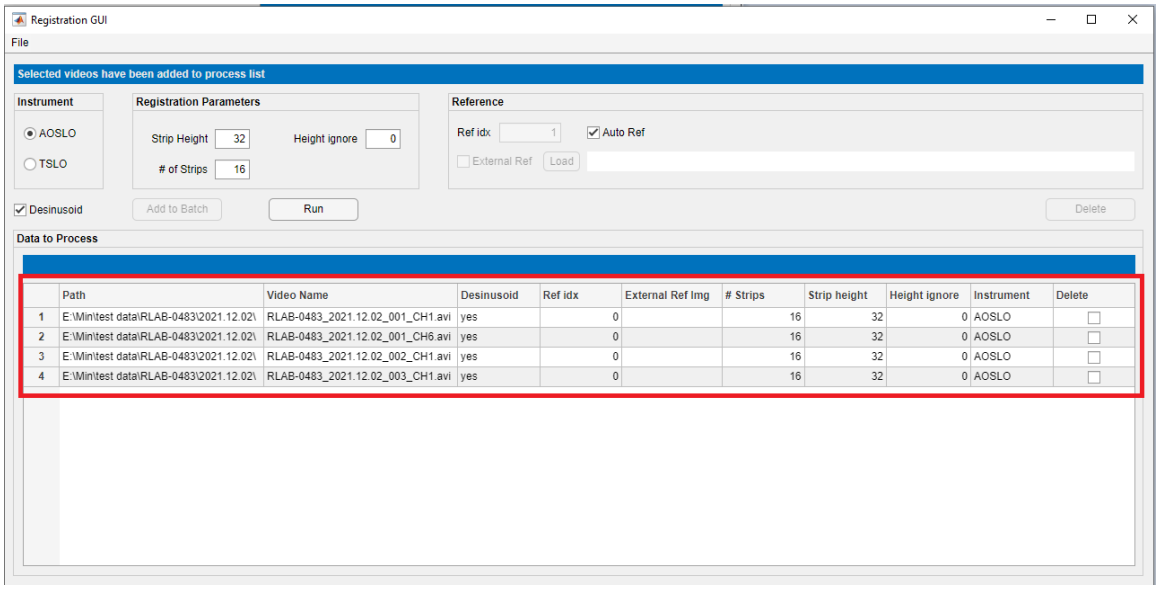


- if "Desinusoid" is checked, please make sure:

1) a sub folder named ”cali” is under the same path where the video data is located, and the corresponding desinusoid matrix is under that sub folder.
2) the video data that has been selected is raw video data.

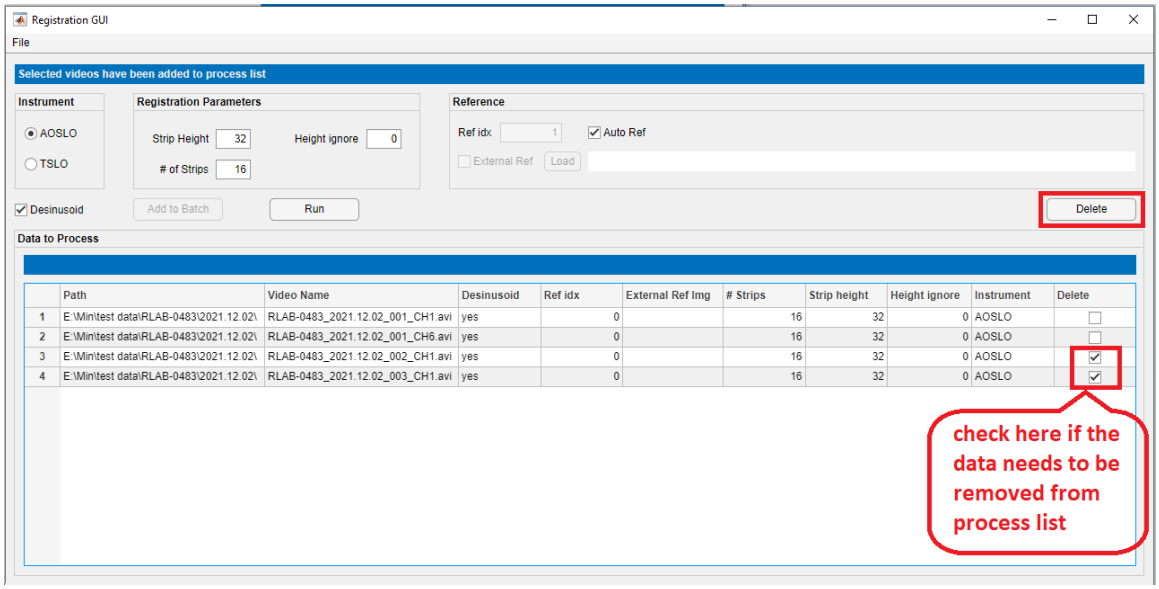
* “**Desinusoid**” function is available only if “**Auto Ref**” is checked

6. **Click “Add to Batch” button**, the data selected in step 3 would be added to “**Data to Process”** list



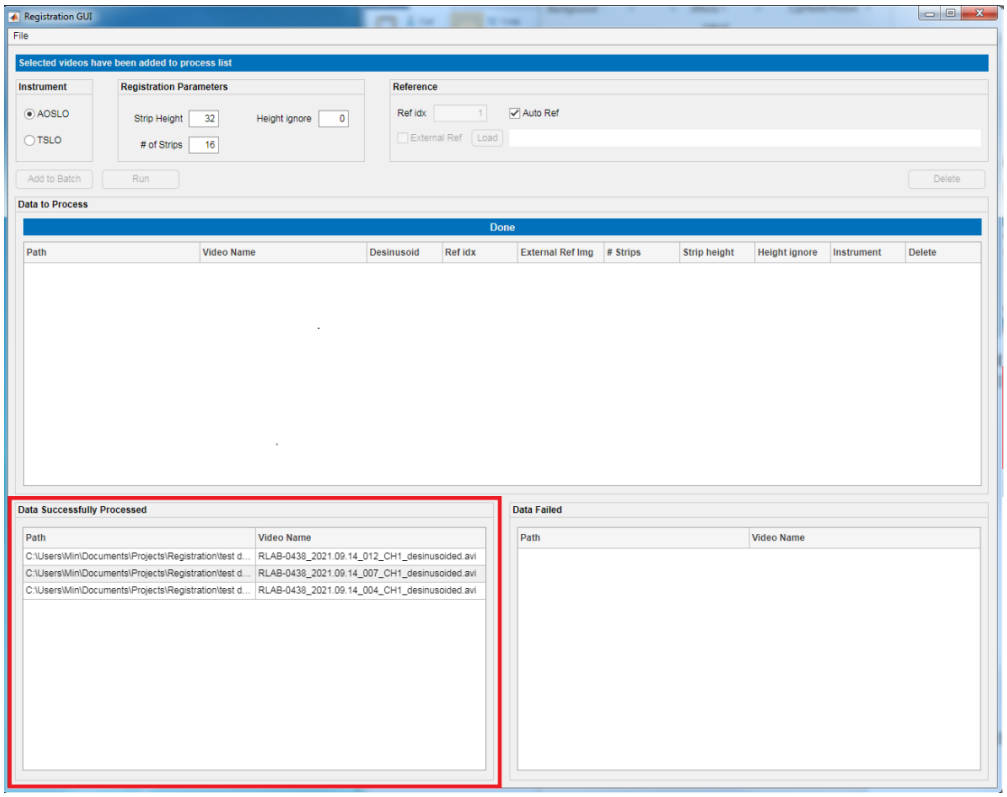
7. **Repeat step 2 to 6** to add all the data which need to register

8. **Carefully check all the data have been added to “Data to Process” table list**, if any data has been added by mistake, just check the **“Delete”** box in **“Data to Process”** table, and click the **“Delete”** button to remove it**.**

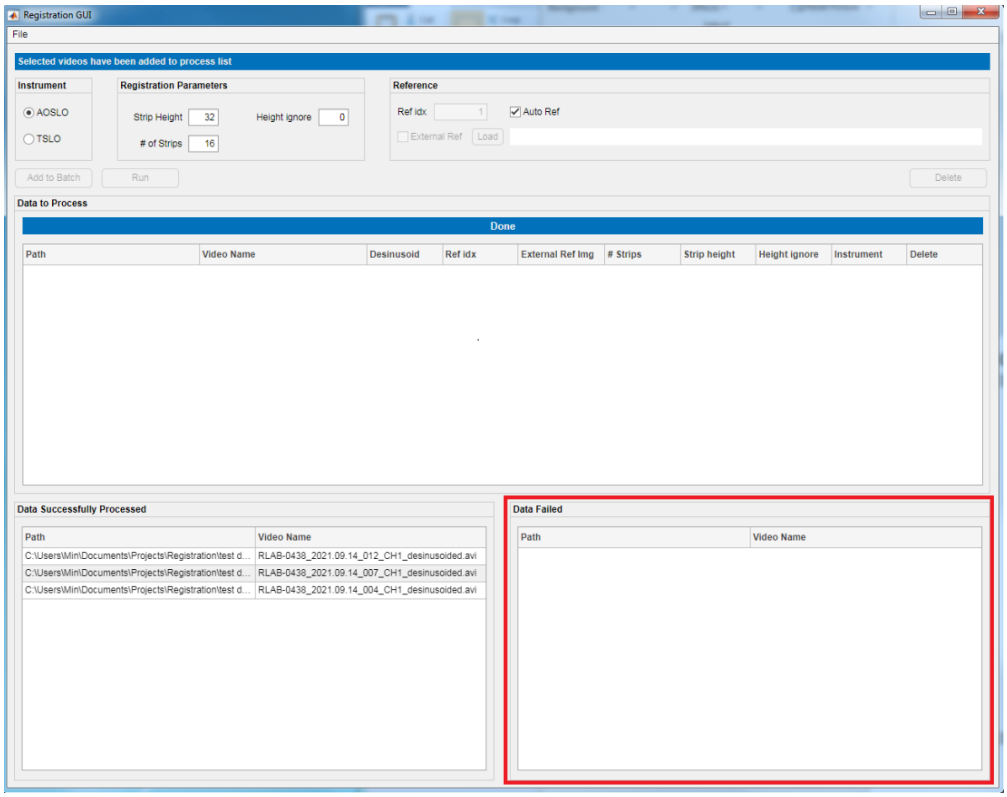


9. **Click “Run” button to register the data**

10. Data that has been successfully registered would be listed in **“Data Successfully Processed”** table



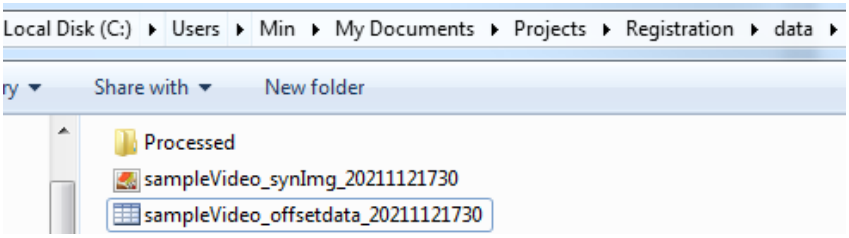
11. Data failed would be listed in **“Data Failed”** table



Output results

If the registration succeeds, you will see following outputs under the path:

- A synthetic reference image named ***synImg_ yyyymmddhhmm.tif**.
- A .mat file named ***_offsetdata_yyyymmddhhmm.mat.** The following information included in this .mat file:
  - **strip_offsets:** a N*3 matrix. The 1st column is the offset in vertical direction (y coordinate), and the 2nd column is the offset in horizontal direction (x coordinate), and the 3rd column is the corresponding NCC value.
  - **goodframes:** indices of all well tracked frames, which exclude distortion and blink frames.
  - **numheight_ignore**: how many rows from top of the image needs to ignore when run registration
  - **numstrips**: number of strips each image frame was divided into
  - **stripheight**: stripheight used to run the registration
  - **original_refImg**: reference image used to register the video
  - **ref_idx**: the index of frame from the video which is used as reference image (index starts from 1). If you are using an external image specified in step 2 "**External Ref**", then ref_idx = 0.
  - **strip_starts**: starting location of each strip from original image frame
  - **orig_vid_name**: original video name
  - **syntheticImg**: synthetic reference image
  - **startblink**: frame index of blink starts
  - **endblink**: frame index of blink ends
  - **bstartstrip**: strip index of blink starts
  - **bendstrip**: strip index of blink ends



- Cropped average image named ***crop_avg_img_th*.tif,** which is saved under subfolder /Processed. This average image is cropped using default parameters. You can adjust it using our image cropping GUI "REMMIDE-crop.exe**"**