Blood Vessel Volumetric Data Pipeline

笔记本： Cornell Univ.
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1. Skeleton Extraction
    - Perform 3D median filter on 3D structure stack（radius：2）；
    - Enter \Step1 - Vessel_skeletonization，Run：

```
GU_extractVesselness_Skel('sampledata\mouse1_fineStack_Hz_740-
675um_6pt5mW_00001_med2.tif');
```

    - Use 'mouse1_fineStack_Hz_740-675um_6pt5mW_00001_med2_skelInterp.tif' as skeleton.

2. Channel Split

- Enter Vitural Env: conda activate dataprocess

```
python bidirectional_tiff_deinterleaver.py 'E:\AES Data\20250604 practice wild
type mouse blood vessel volume imaging\mouse
imaging\mouse1_AES_dualPort_50pt4Hz_684-732um_3pt4mW_0pt53mW_00001.tif' 'E:\AES
Data\20250604 practice wild type mouse blood vessel volume imaging\mouse
imaging\file1' --num-chunks 5
```

- Perform median filtering(radius:1), then Generate MIPs of 6 planes

```
python process_volume_median_mip.py
```

3. Find segment in Skeleton

- Use 'mouse1_fineStack_Hz_740-675um_6pt5mW_00001_med2_skelInterp.tif' as skeleton. Perform temporal-color encode, then record start, end, and possible waypoint of each segment.
- Save Start and end point in Segments.txt
- Find segments with SegmentsExtraction.m
- Segments Prompt saved to SegmentsPrompt.txt

4. Kymograph extraction with \Step4 - Kymograph_Extraction\kymograph_from_file.py

```
python kymograph_from_file.py
```

5. Nonlinear Transform Extracted Kymograph

- Transform Extracted kymograph with \Step5 - Nonlinear_Transform\nonlinear_transform_of_3d_graph_segment.m
- \Kymograph_Transformed_cut to modify kymo length

6. Calculate blood flow speed
    - For multi-segments calculation, LSPIV_parallel_simple_script_batch.m
    - Find proper parameters for each segments, LSPIV_parallel_simple_script_singlesegment.m
    - Plot speed, LSPIV_parallel_simple_script_speed_plot.m