LEBANON CAMERA CLUB

Strip Photography Technique

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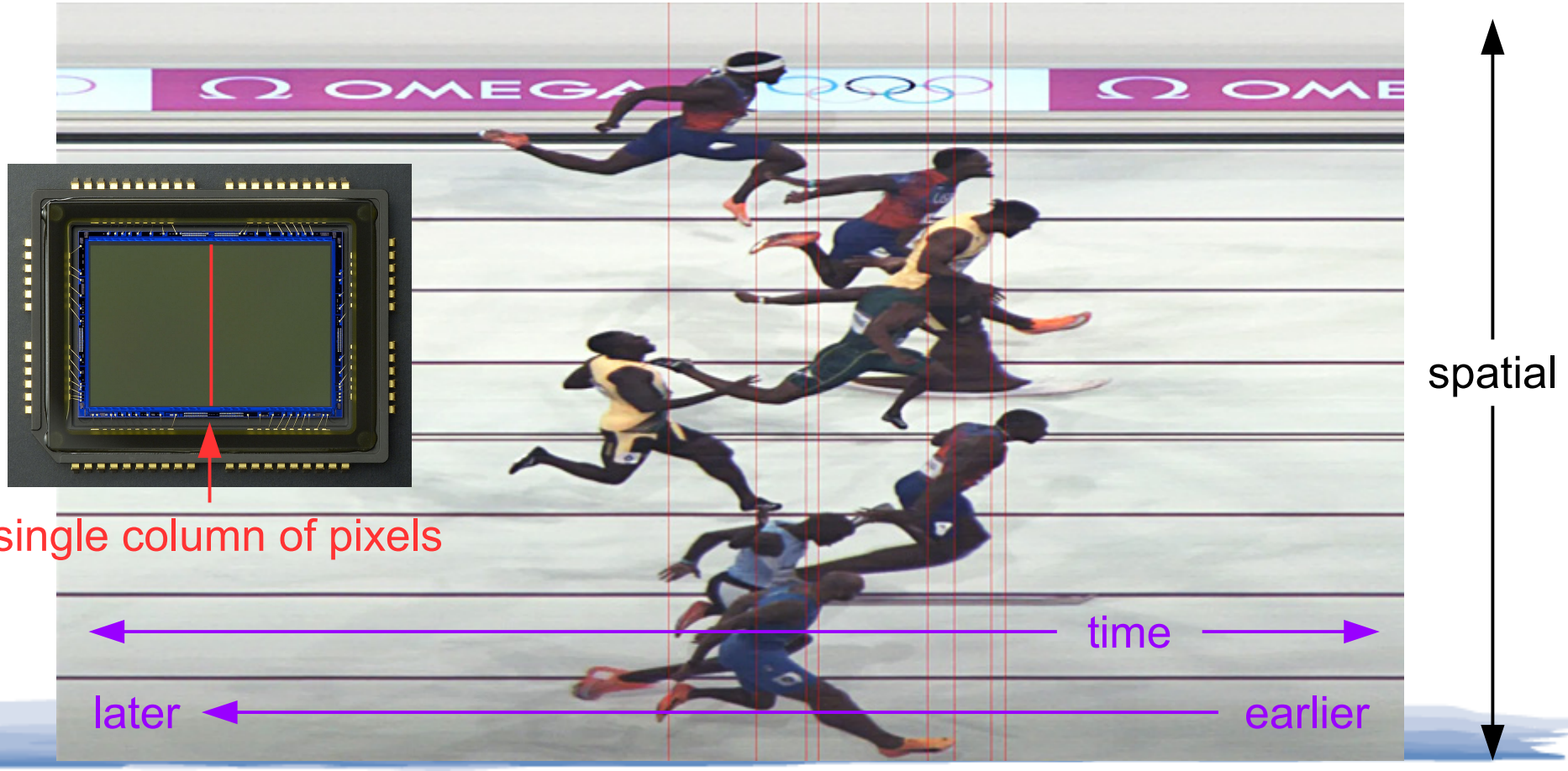
Strip Photography Technique

Introduction

Note: Strip photography features a stationary slit (or a linear sensor), with multiple exposures combined to produce an image where one axis is time.

- Strip photography technique
  - 2D image as sequence of 1D images over time
  - Slit-scan is similar, but slit moves → both axes spatial (usually)

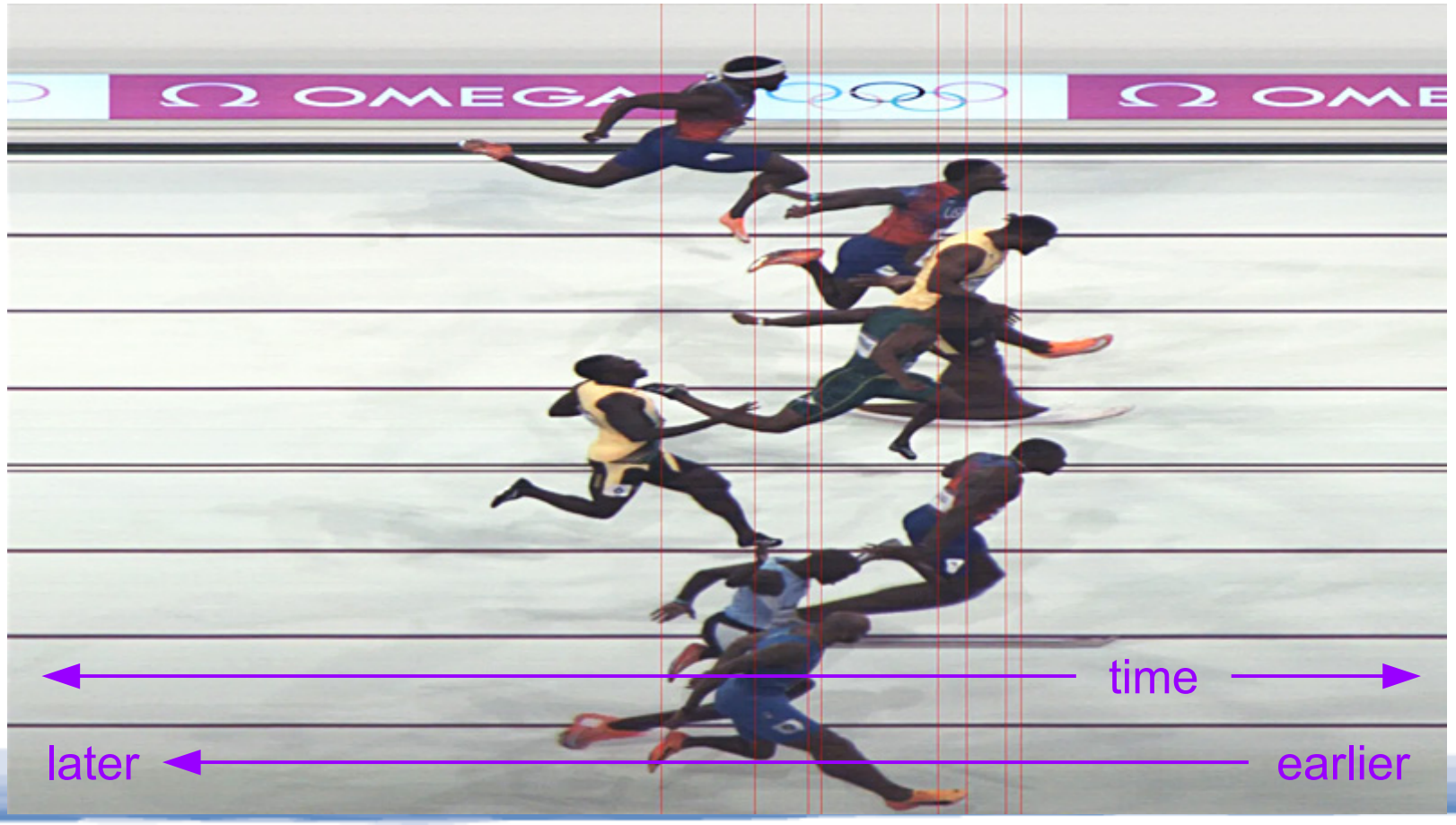


Strip Photography Technique

Introduction

- Applications
  - Photo finishes
    - Note the distortion of arms and legs due to motion

Note: Strip photography is commonly used for photo finishes in sports, but it can also produce some interesting, bizarre, and beautiful photographs.



Strip Photography Technique

Introduction

Note: Subject movement depends on the primary rotation axis, subject tilt/offset from the primary rotation axis, and any additional translation or rotation.

- Applications
  - Distortion
    - Type depends on subject movement
    - Amount depends on speed and frame rate

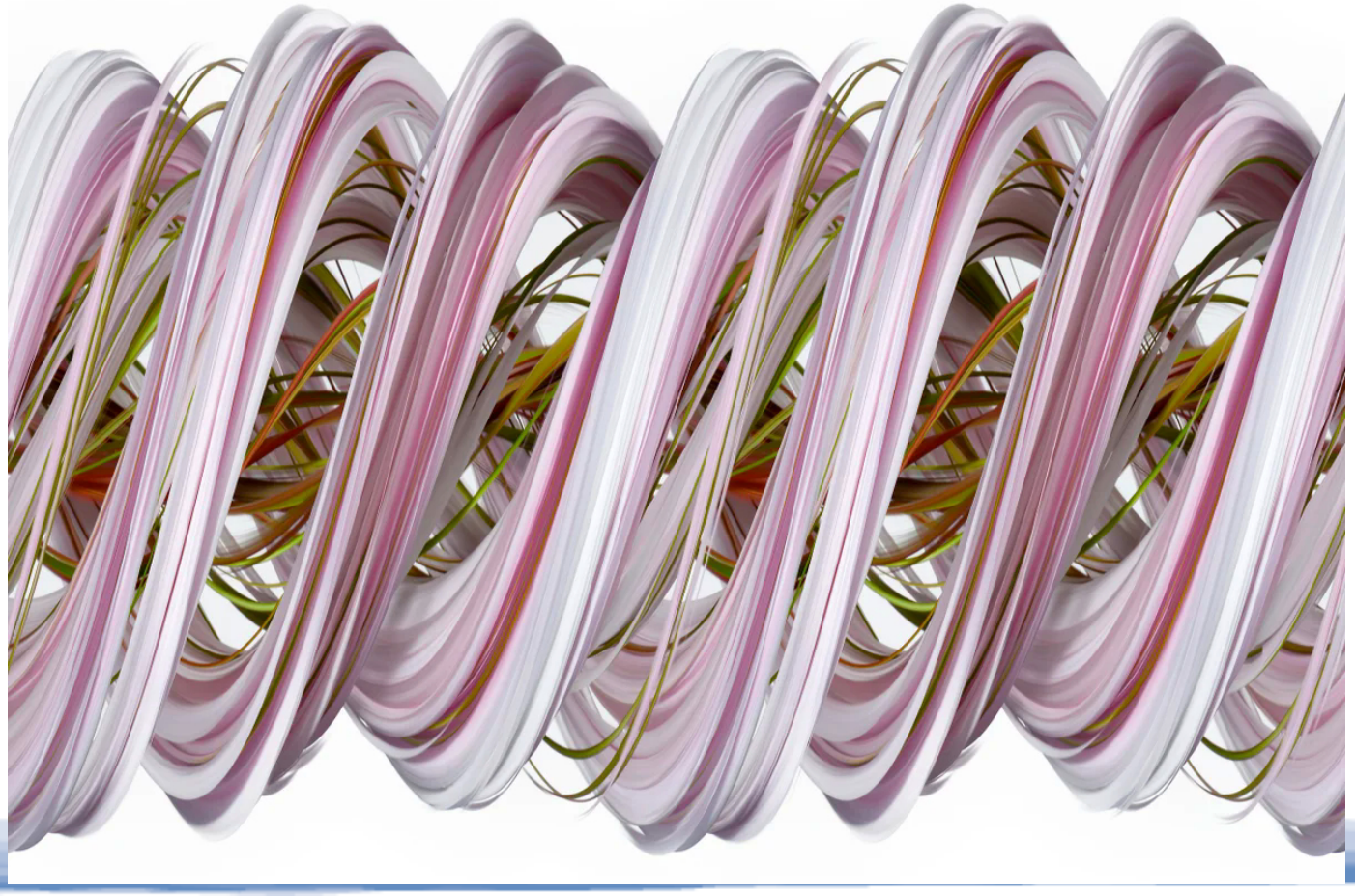
LEGO pieces shot with a rotation axis parallel to the optical axis

Strip Photography Technique

Introduction

Note: Twisty image subjects may be rotated multiple times, which results in repeats in the image. Adding another type of motion can prevent repeats.

- Applications
  - Twisty images
    - Extreme distortion with axis of rotation perpendicular to slit

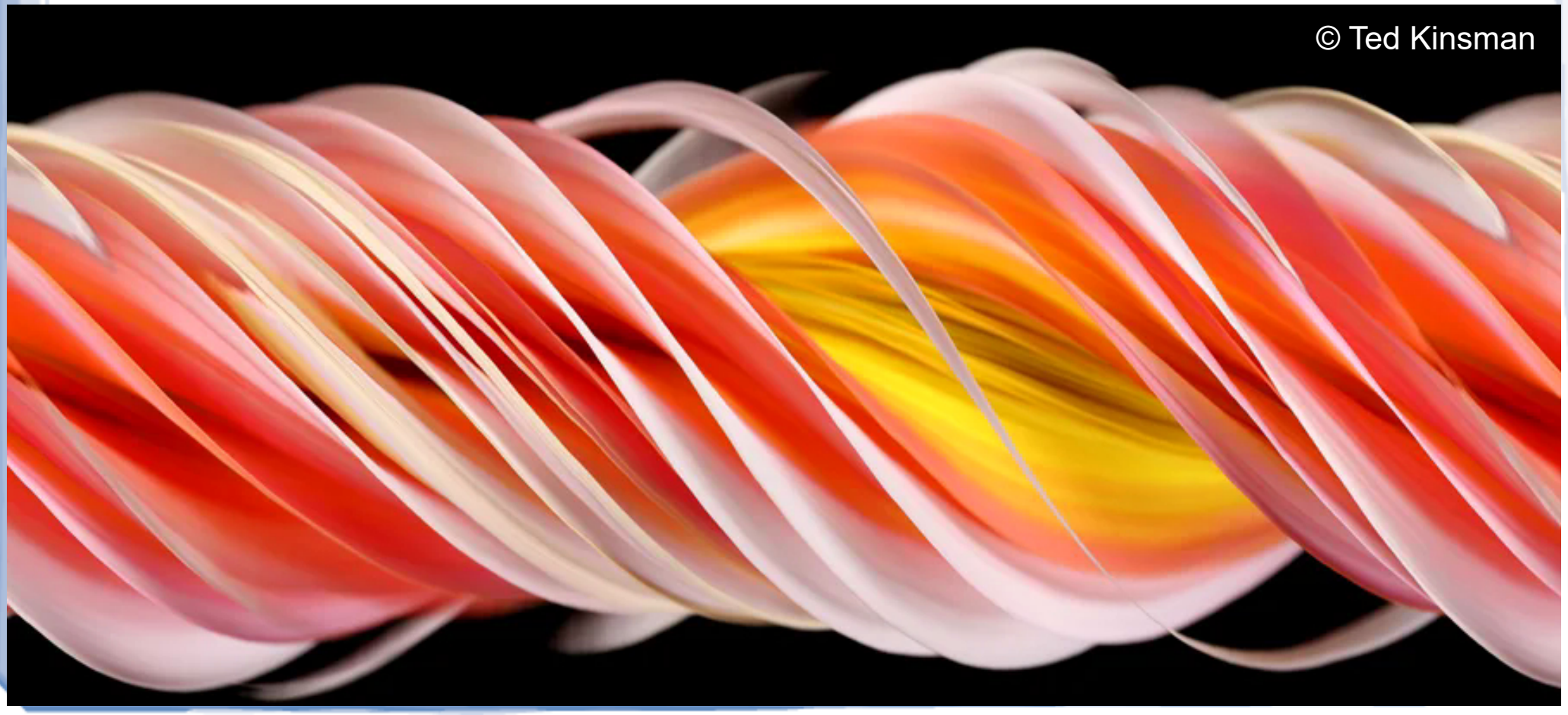


Strip Photography Technique

Introduction

- Applications
  - Twisty images
    - Extreme distortion with axis of rotation perpendicular to slit

Note: Twisty images are usually very wide—they are often resized to compress the width.

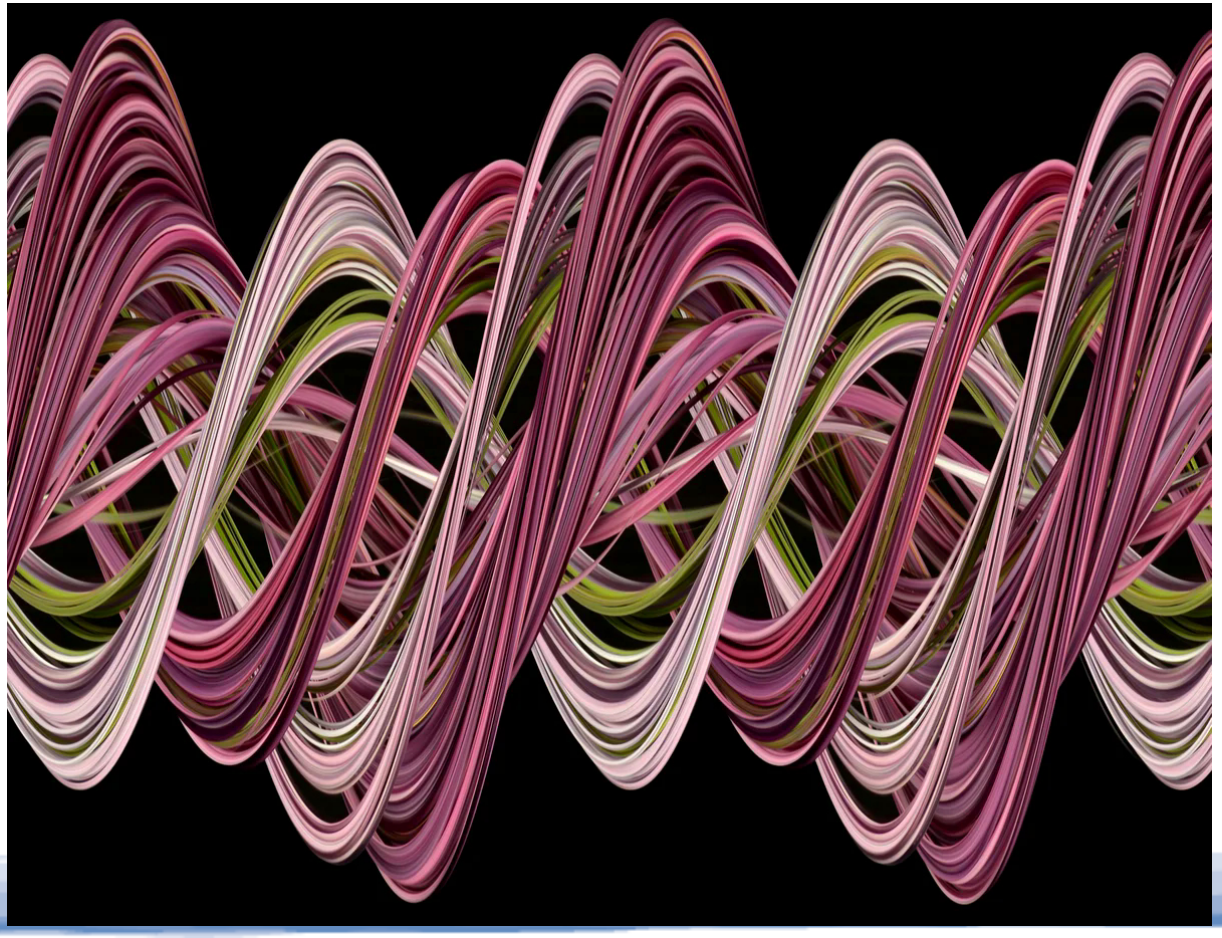


Strip Photography Technique

Introduction

Note: This image and the previous two appeared in a *Scientific American* article: “Slit-Scan Technique Presents a Twist on Flowery Photography” from December 10, 2020.

- Applications
  - Twisty images
    - Extreme distortion with axis of rotation perpendicular to slit



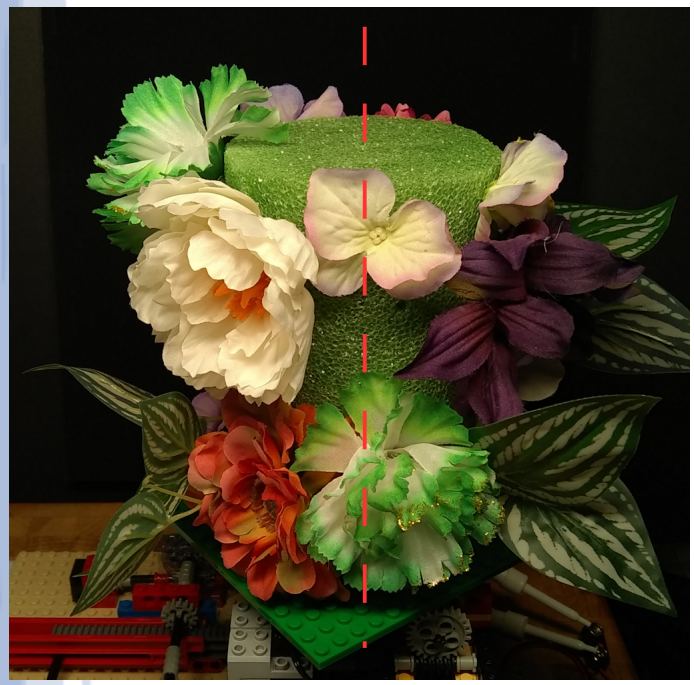
Strip Photography Technique

Introduction

Note: An accurate flattening of a cylinder requires the subject to be perfectly circular and rotated about the center axis. Also, the vertical slit must align with the rotation axis.

- Applications
  - Converting a cylindrical image/object to a 2D image
    - Cylinder rotation axis coincident with slit orientation

axis of rotation



floral foam cylinder with attached artificial flowers

some distortion because subject wasn't perfectly circular

strip photograph of rotating floral foam cylinder showing how a curved surface can be flattened

Strip Photography Technique

Introduction

- Applications
  - Frozen (striped) background for moving object
    - Slit captures one slice of stationary background continuously
    - Moving object captured normally (if proper frame rate)

Note: If the frame rate is too slow the subject will be compressed, and the strips will not contain contiguous subject data. If the frame rate is too fast the subject will be elongated.

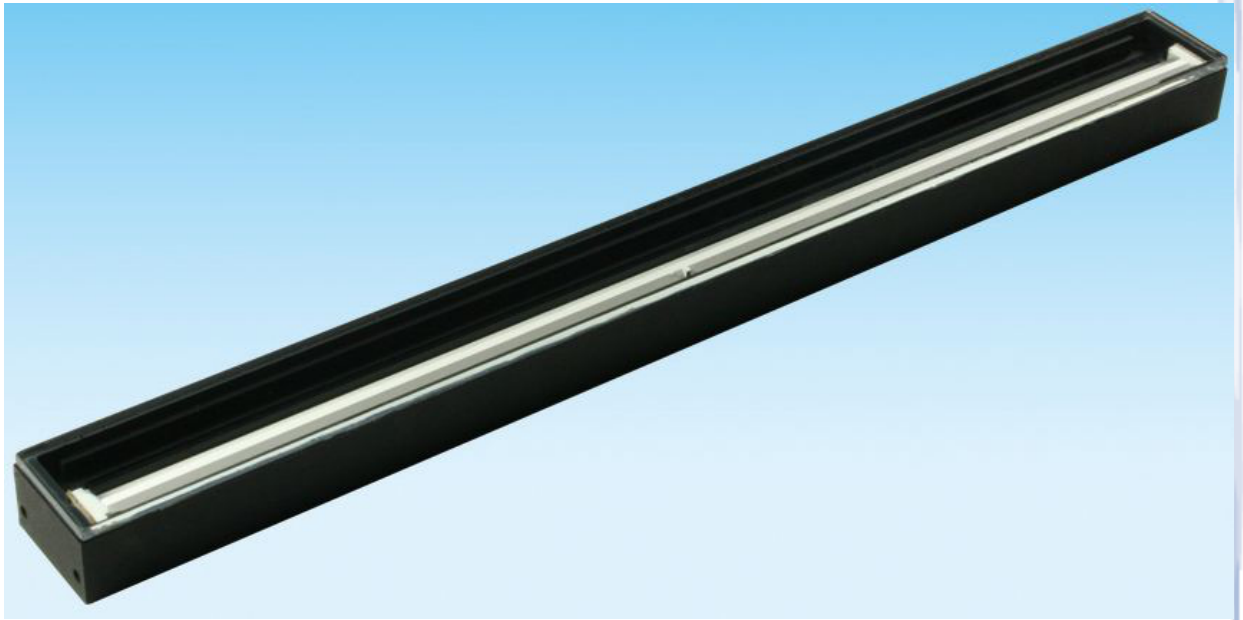
Strip Photography Technique

Equipment

- Linear sensor camera
  - Line scan camera
    - Single line of pixels

Note: Contact image sensors work in close proximity to the subject, as in a scanner. Anything away from the glass is blurry.

JAI monochrome line scan camera



Toshiba contact image sensor used for scanners

Strip Photography Technique

Equipment

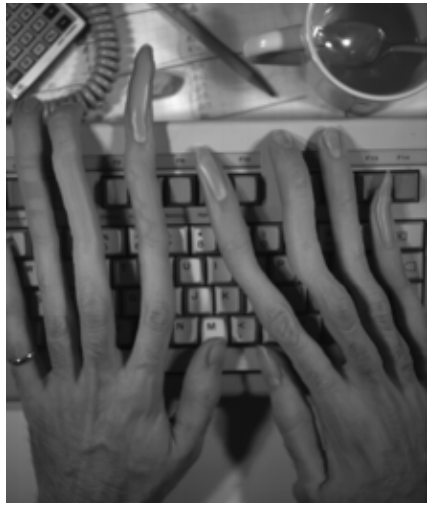
- Physical slit
  - Mainly for film
    - Stationary slit (strip) → move the film or combine multiple exposures
    - Moving slit (slit-scan) → both axes spatial, but moving objects distorted

Note: Slit-scan was originally used to produce panorama photos → moving slit was the 'iris' which allowed very wide images. It can resemble strip photography if objects are in motion while the slit is moving.

Lomography camera modified for strip photography → film moves during exposure

© stratski

© Glogger



slit-scan image → moving hands produce distortion

slit-scan panorama

© Vince Sellars

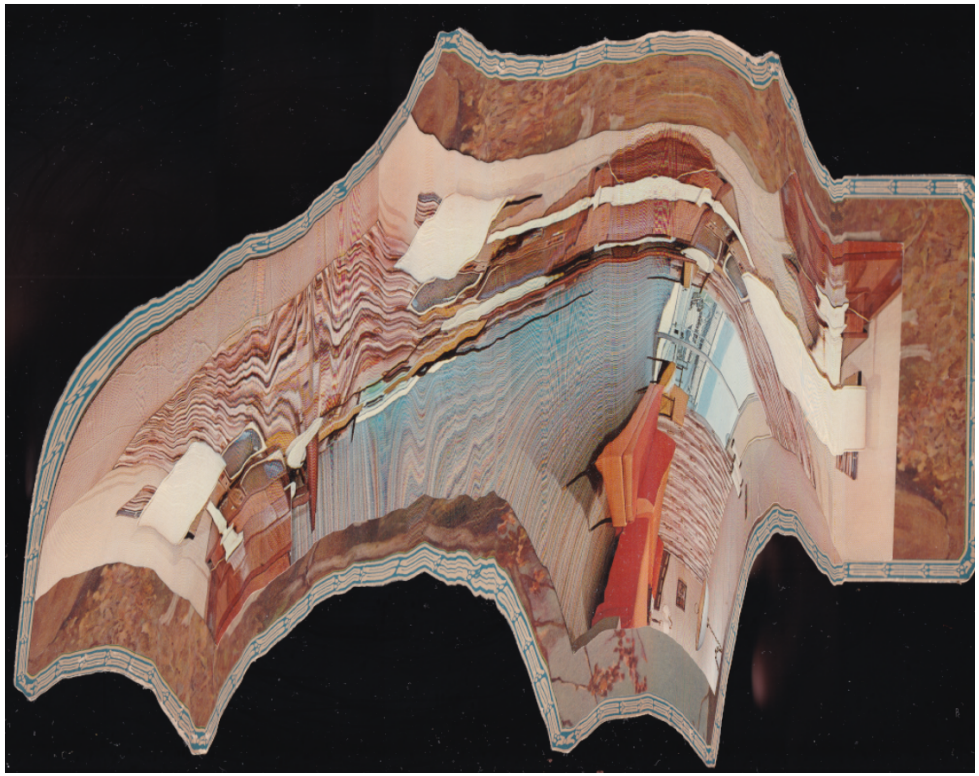
Strip Photography Technique

Equipment

Note: Scanography is the technique of using scanners as 'cameras'. Scanners can be used to produce realistic images, collages, and abstract images.

- Electronic slit-scan
  - Scanner/copier
    - Moving linear sensor = moving slit → can produce distortion

postcard used for scanner rotation test



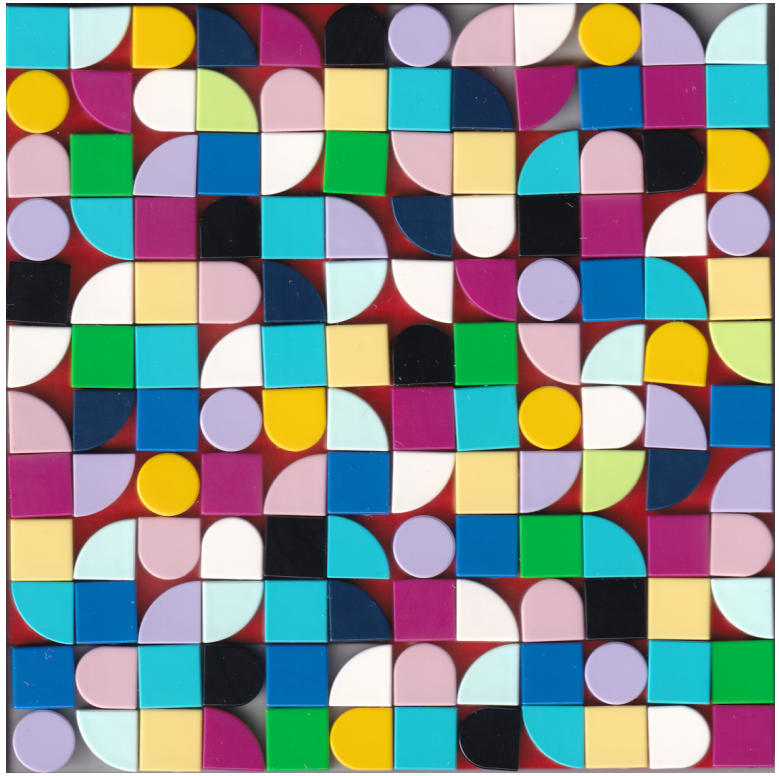
manually rotated postcard while scan was taking place

Strip Photography Technique

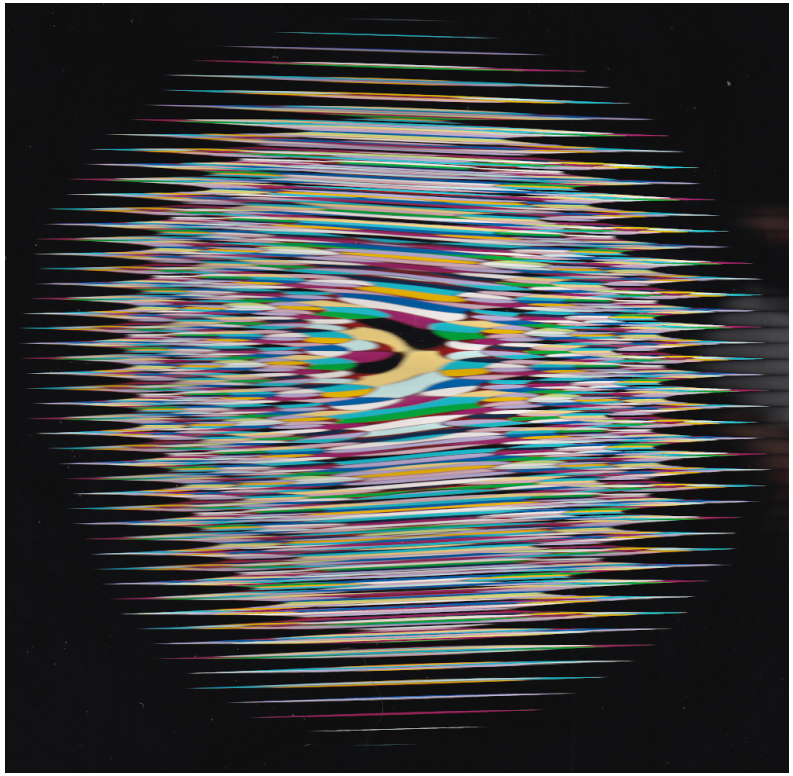
Equipment

Note: There are various subject manipulation techniques used while scanning to produce different types of distortion: stretch, compress, reverse, warp, etc.

- Electronic slit-scan
  - Scanner/copier
    - Moving linear sensor = moving slit → can produce distortion



LEGO target used for second rotation test



motorized rotation of target while scanning

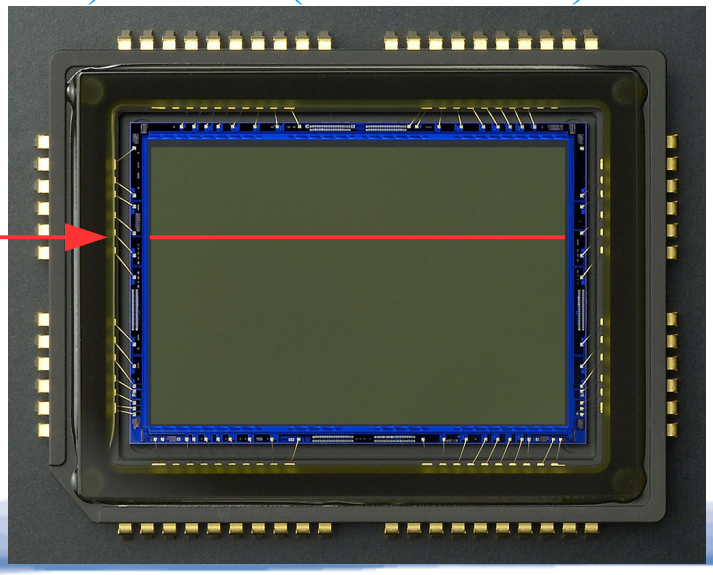
Strip Photography Technique

Equipment

Note: It can be difficult to know where the best row/column is without a lot of experience. Even then, tweaking may be needed for optimal effect.

- Digital camera that makes movies
  - Single row/column of pixels from each frame put together
    - Stationary slit (strip)
    - Con: collecting much more data than needed
    - Pro: can choose a different row/column when processing
  - Settings
    - 24/30/60 frames per second
    - Full HD (1920 x 1080) or 4K (3840 x 2160) resolution is common

single row/column of pixels extracted from frames



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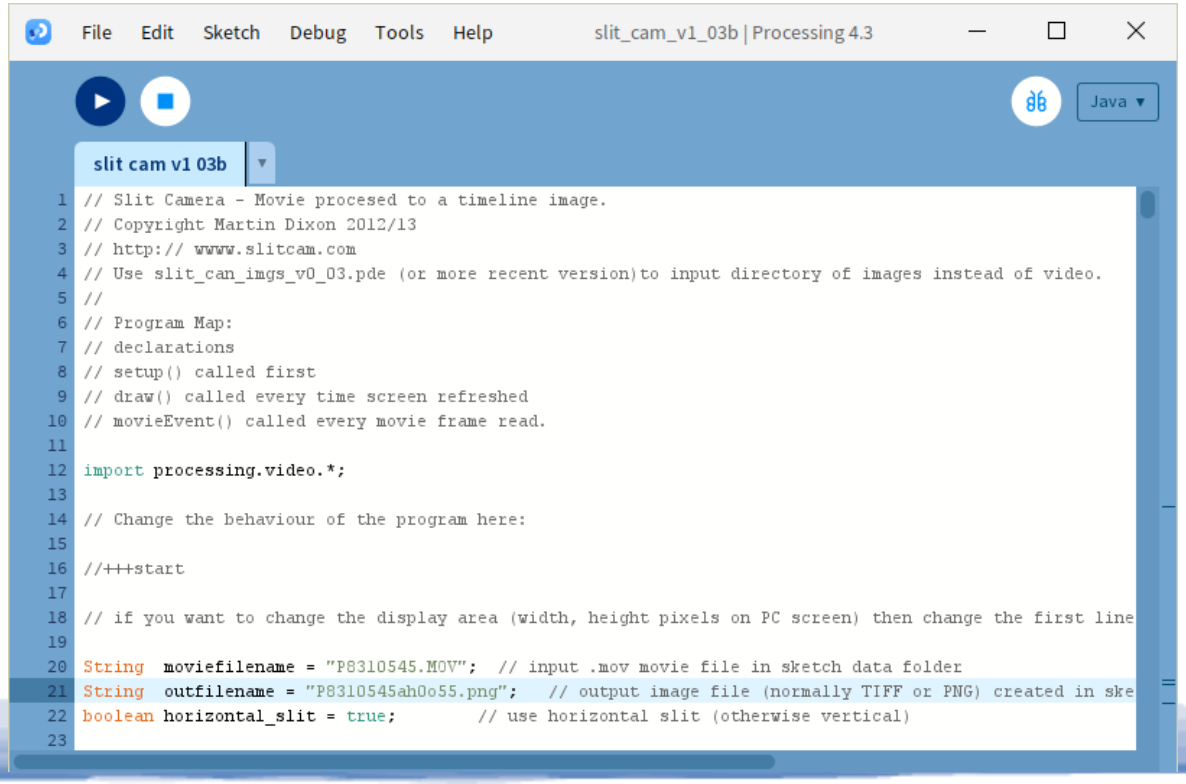
Equipment

Note: *Processing* is a flexible software sketchbook and a language for learning how to code. It is free to download at processing.org

- Software
  - Several apps
    - They seem to come and go, unfortunately: *artgram*, *slit_cam*
    - *Slit Scan Camera*: https://apps.apple.com/tr/app/slit-scan-camera/id1625934084
    - I use old *slit_cam* code that runs in the *Processing* program



edit the program to specify:

- input & output file names
- horizontal/vertical slit
- slit location in frame
- number of frames

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Example

Note: Any camera that can make movies is fine. Macro lenses are good for detail, but any lens will work.

- Setup
  - Olympus OM-1 mark II + Olympus 60mm macro
    - I use 30 fps or 60 fps depending on subject rotation speed
    - I'm recording full HD, but use whatever resolutions are available

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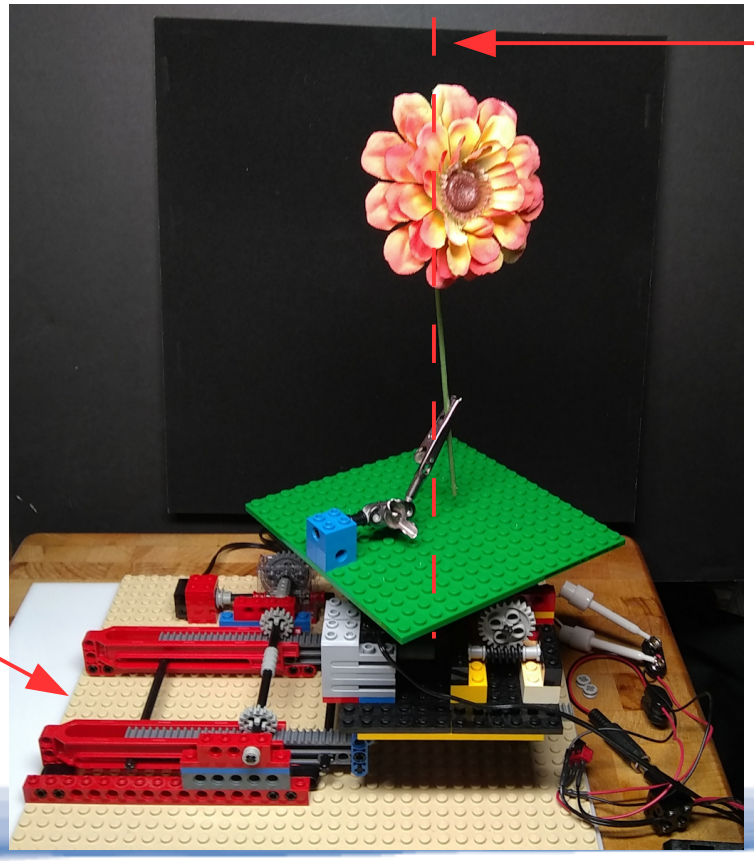
Example

Note: I have a light above the subject, located between the subject and the camera. I also use a low light if the subject needs more light from below. I prefer a black background, but there are very nice images with a white background.

- Setup
  - Rotation device
    - I'm using a motorized rotator built from LEGO
    - Want 3 to 4 seconds for 360° rotation



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Example

Note: Artificial flowers can be too shiny, and they may have a fabric texture which isn't ideal.

- Setup
  - Subject
    - Flowers are the most common, but other objects might be interesting
    - Want multiple colors/tones and some texture
    - Want changing geometry as subject rotates

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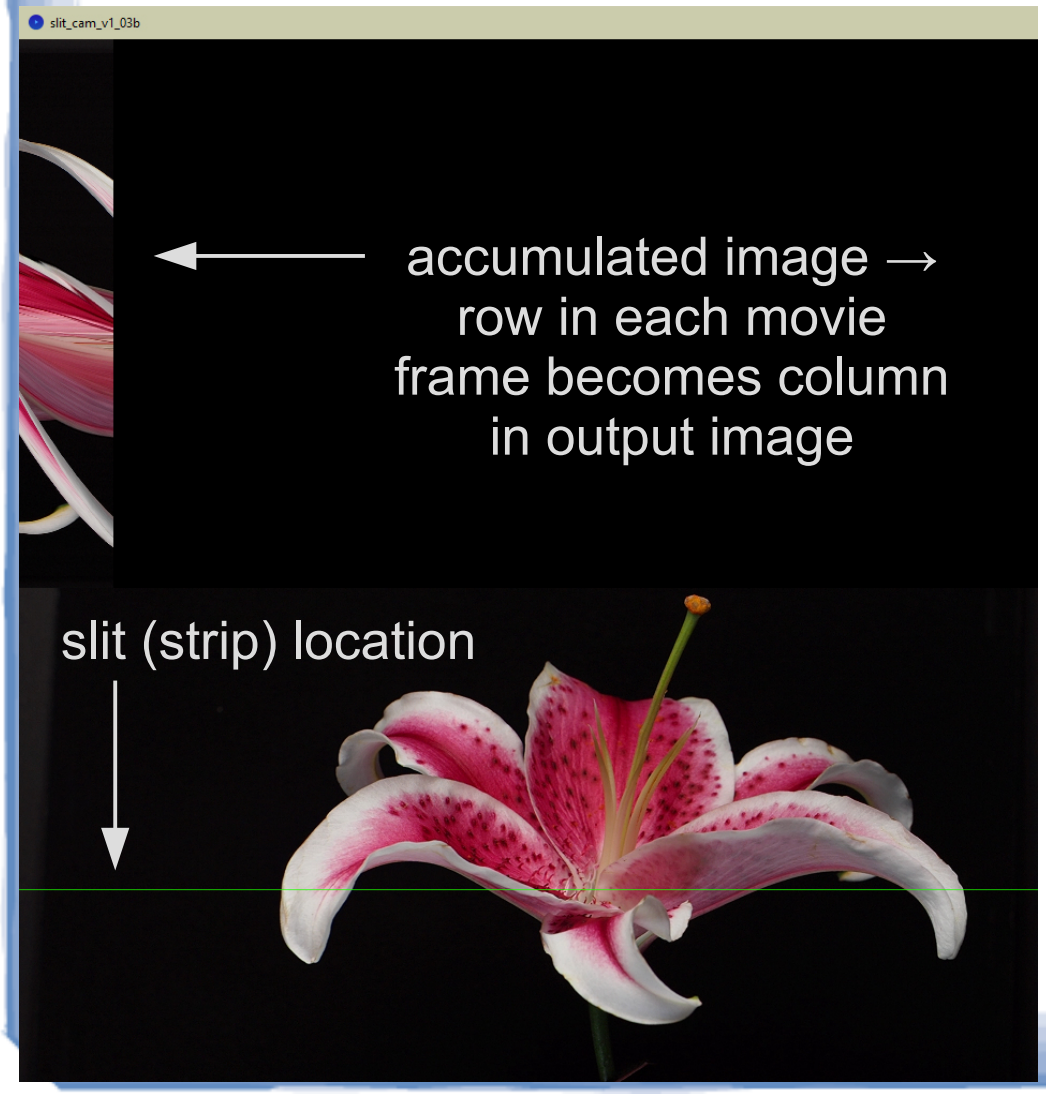
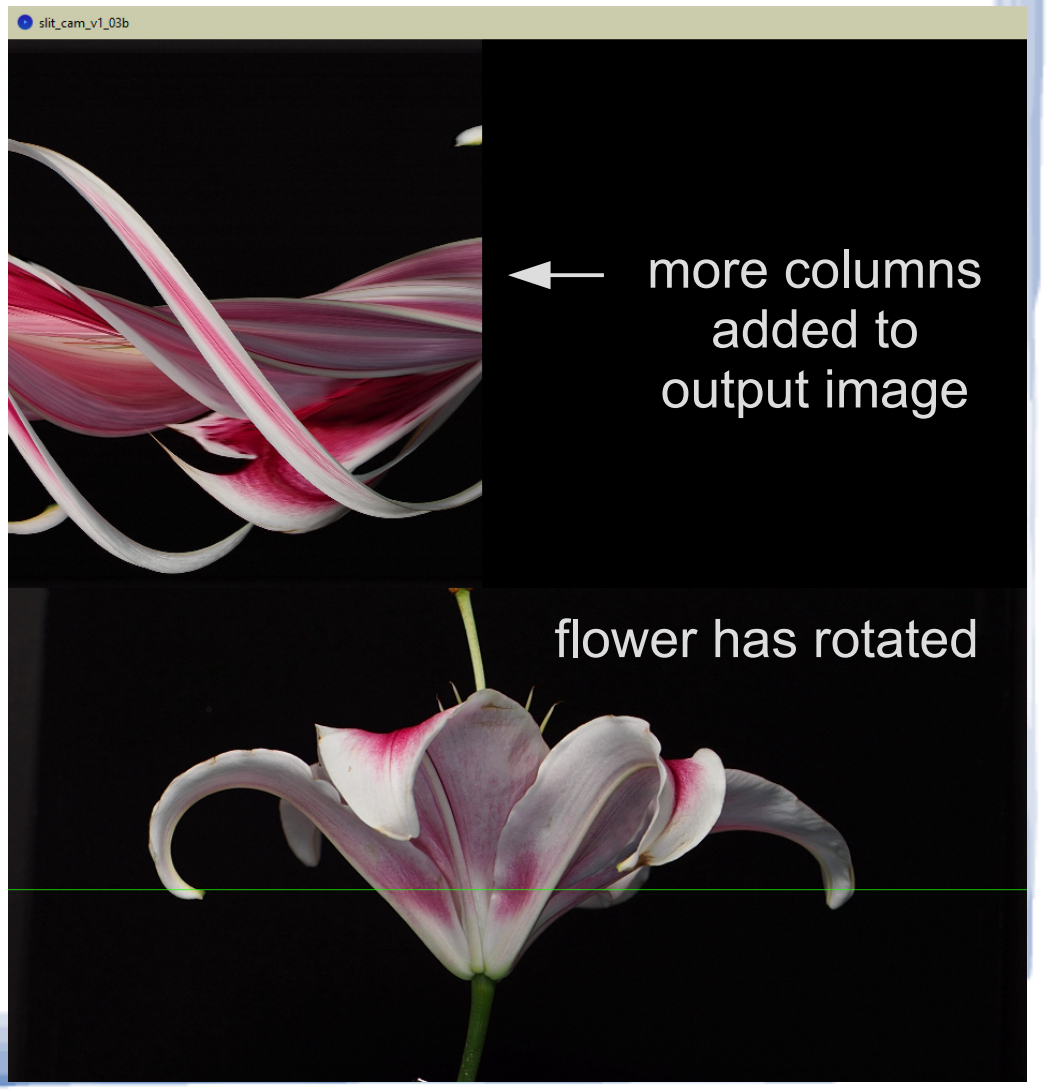
Example

- Make movie, run *slit_cam*





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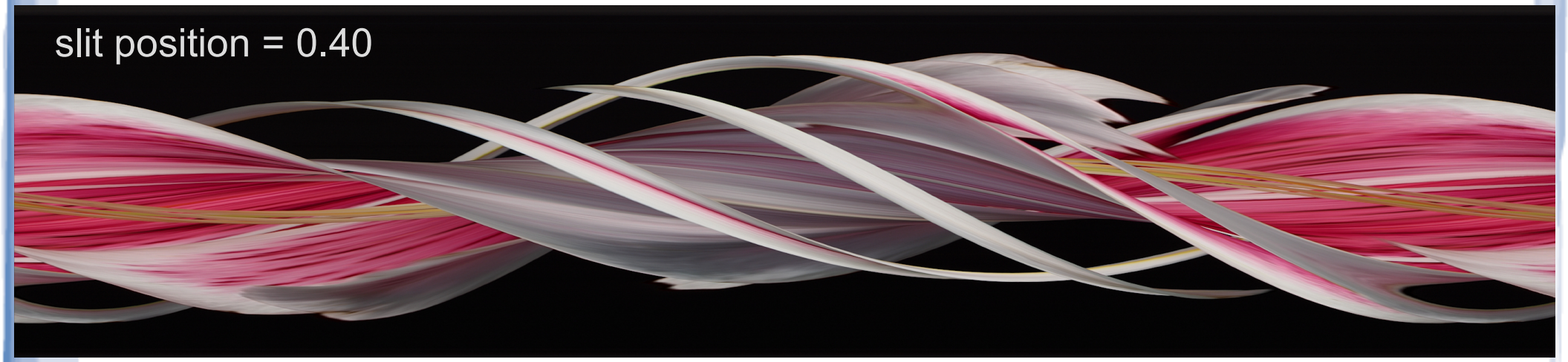
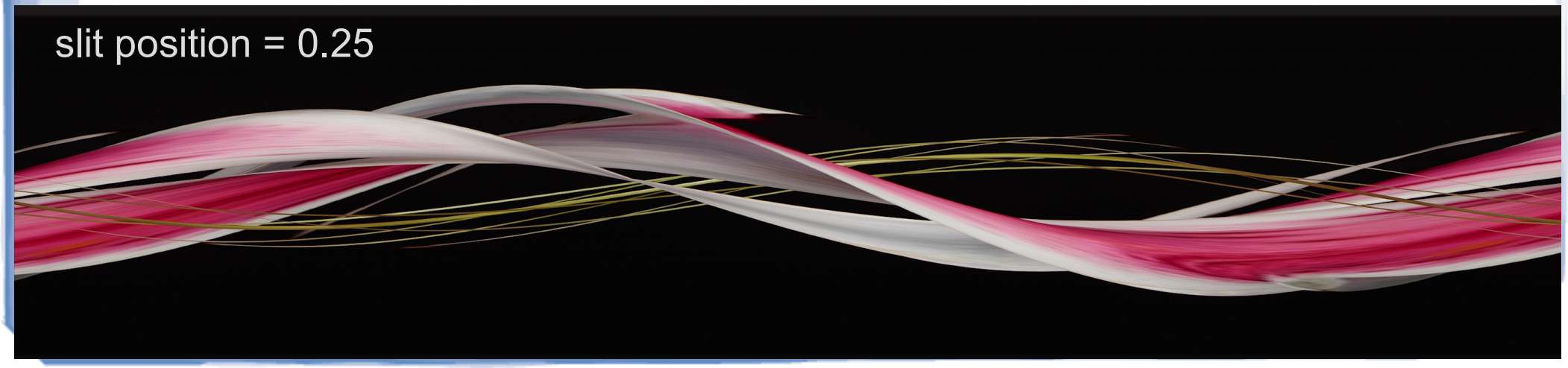
Example

Note: Lighting, subject structure, and subject orientation to the axis of rotation are also very important.

- Results
  - Slit position has a huge effect on the output image





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Example

Note: Lighting, subject structure, and subject orientation to the axis of rotation are also very important.

- Results
  - Line position has a huge effect on the output image
  - Resize to compress the width & crop

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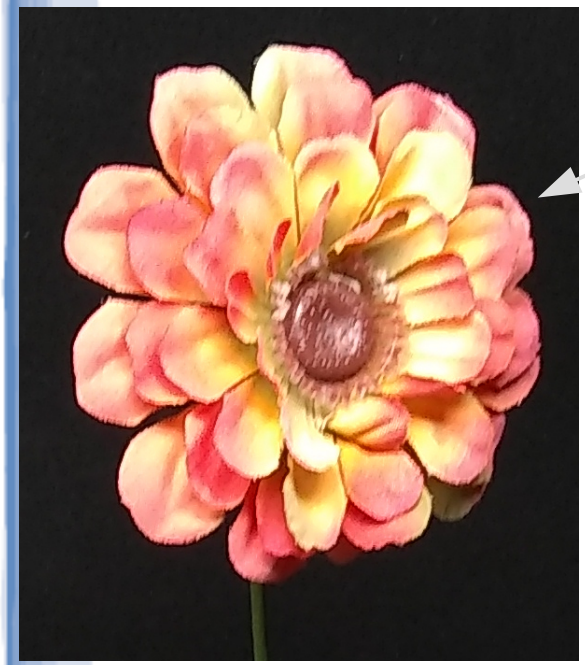
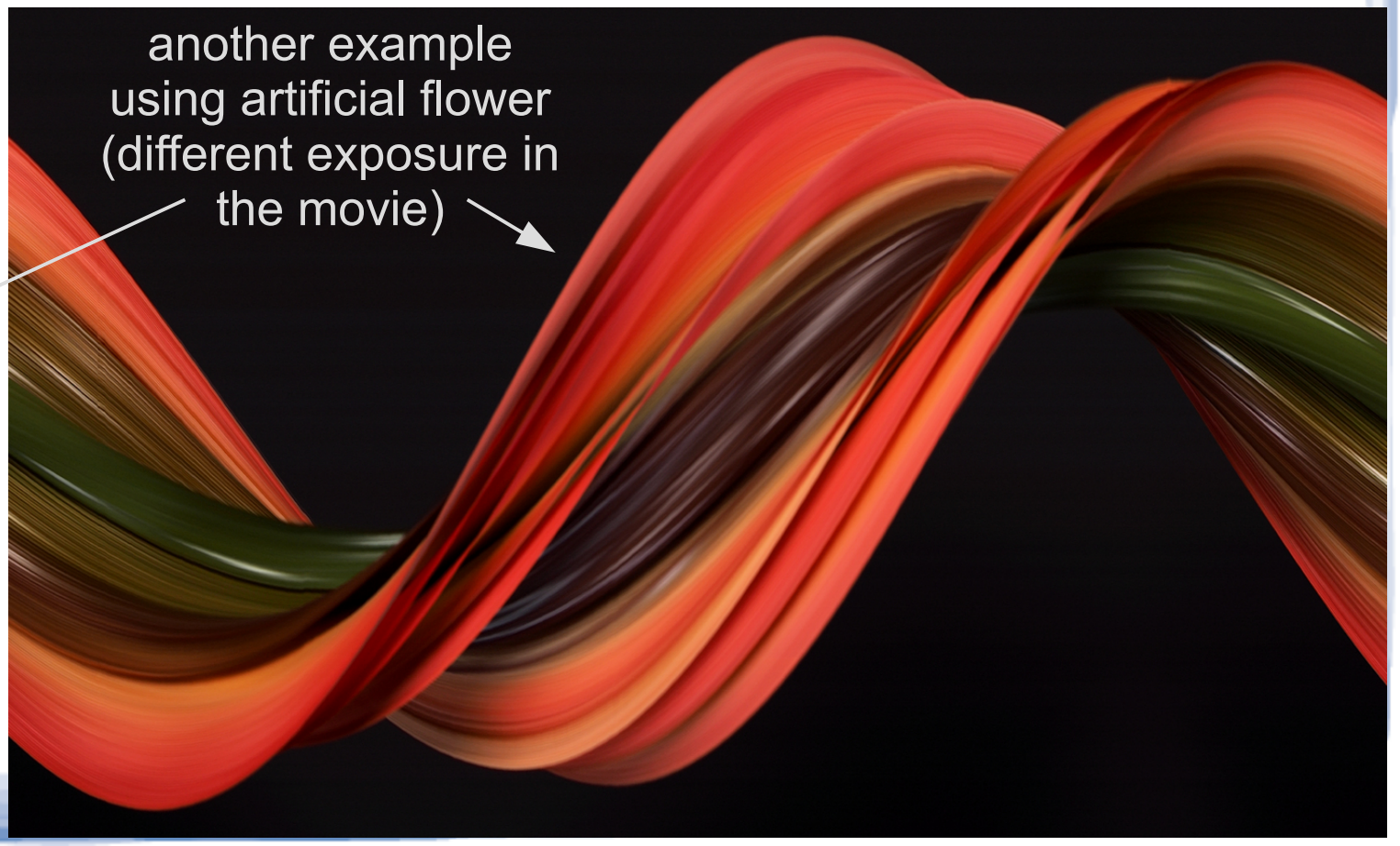
- Results
  - Line position has a huge effect on the output image
  - Resize to compress the width & crop





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