

Automating the Fuel Element Visual Inspection Process at the NCNR Reactor

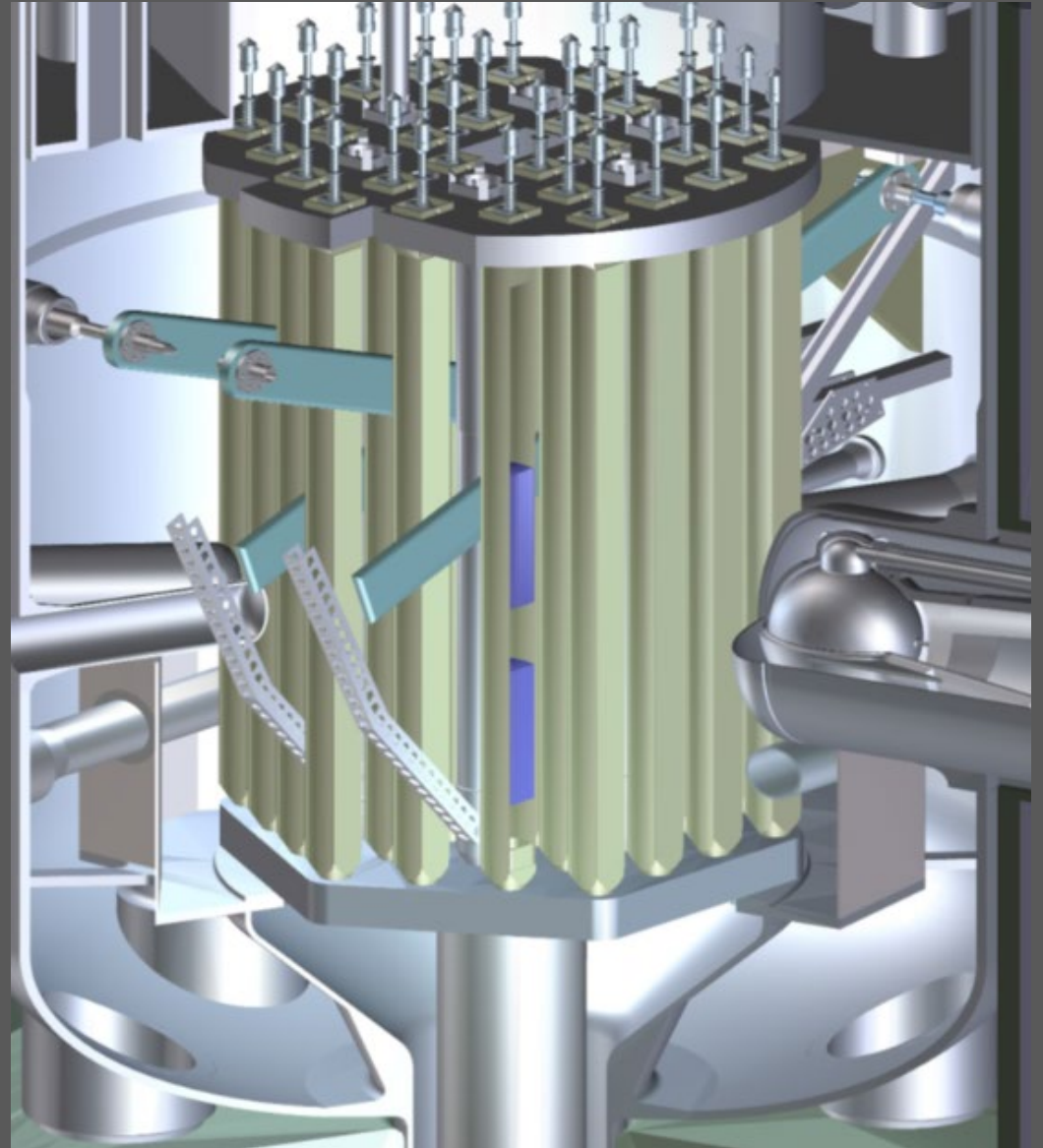
By: Benen Crombie

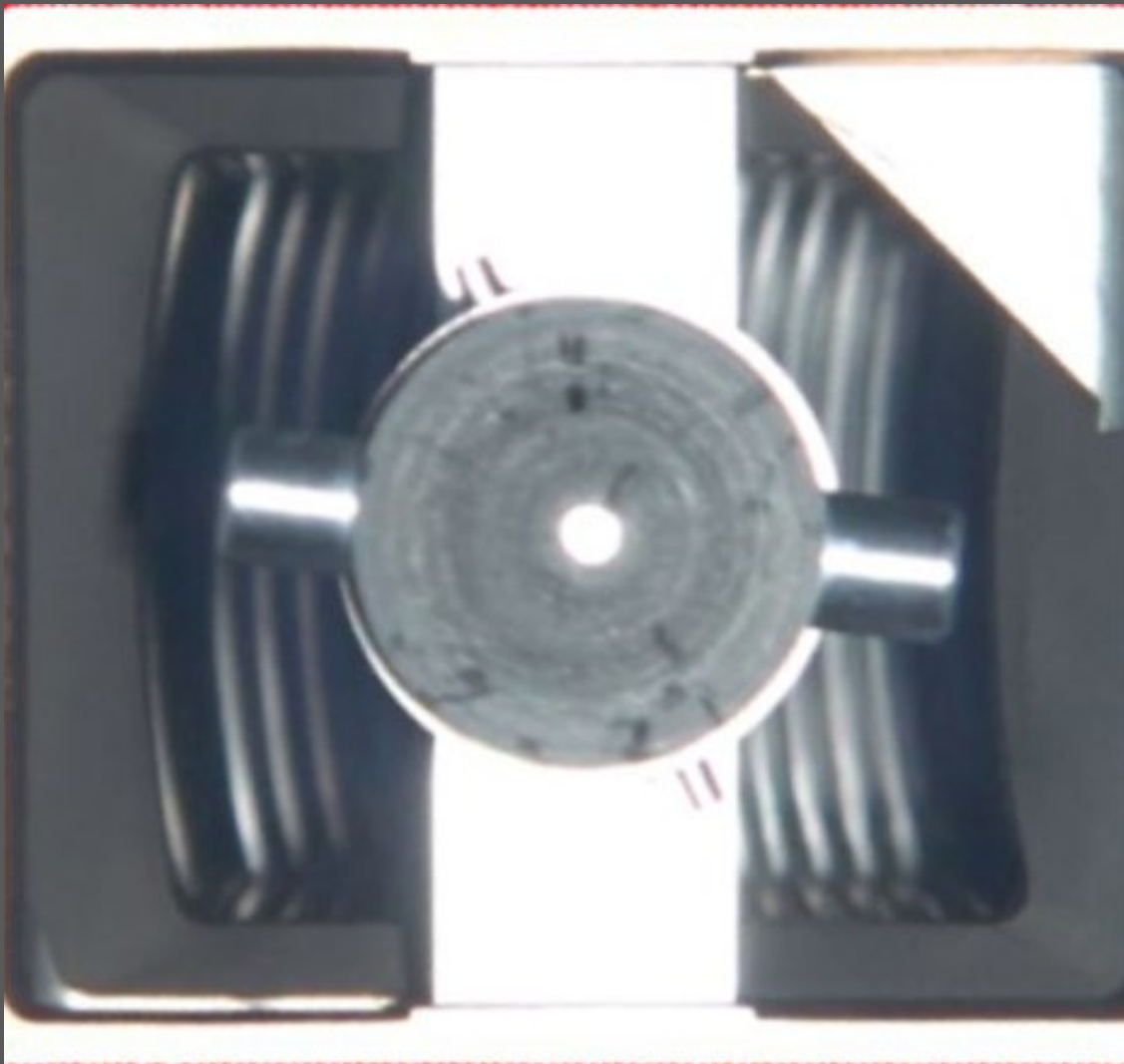
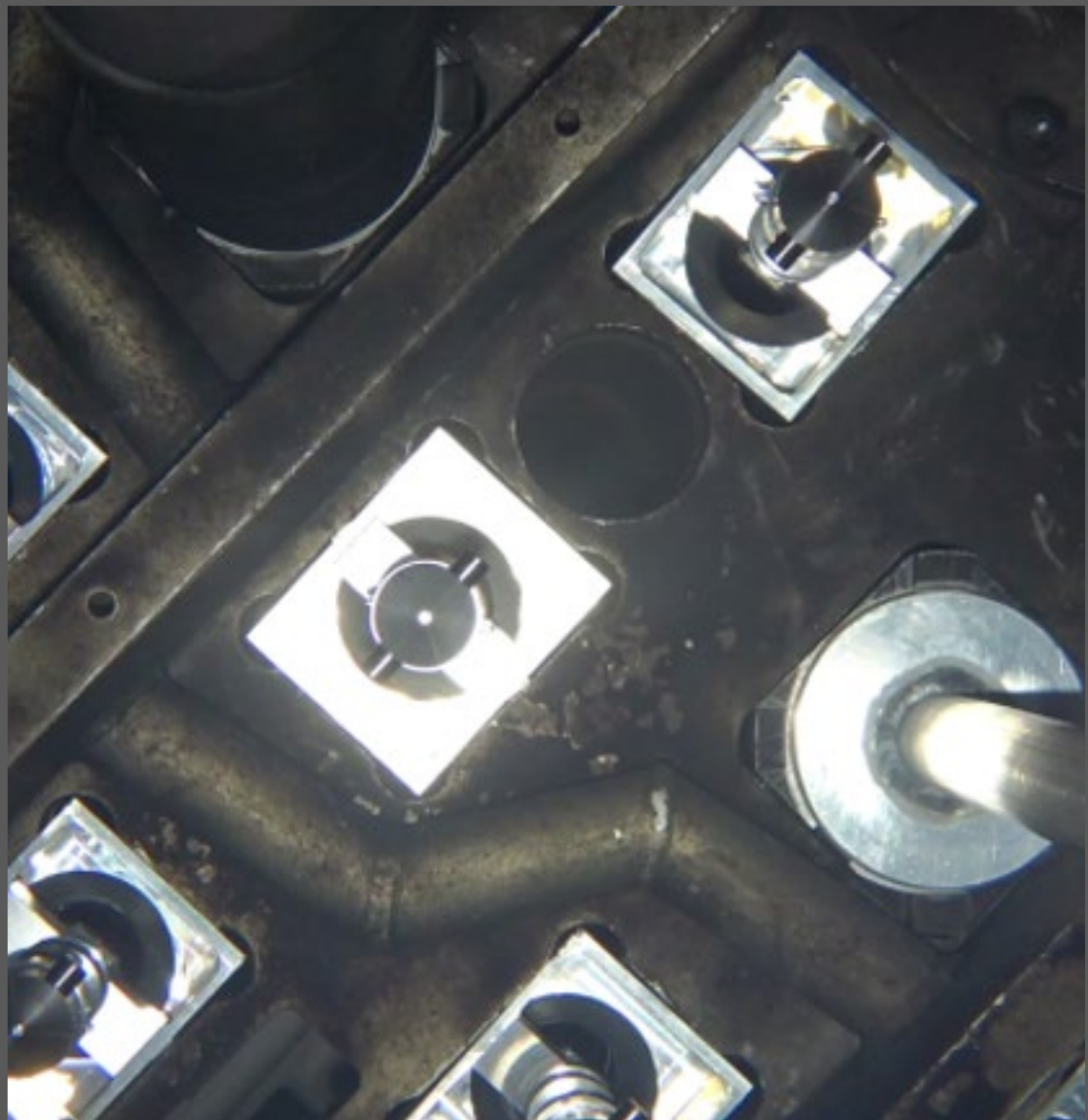
NCNR/Reactor Engineering

Mentor: James Whipple











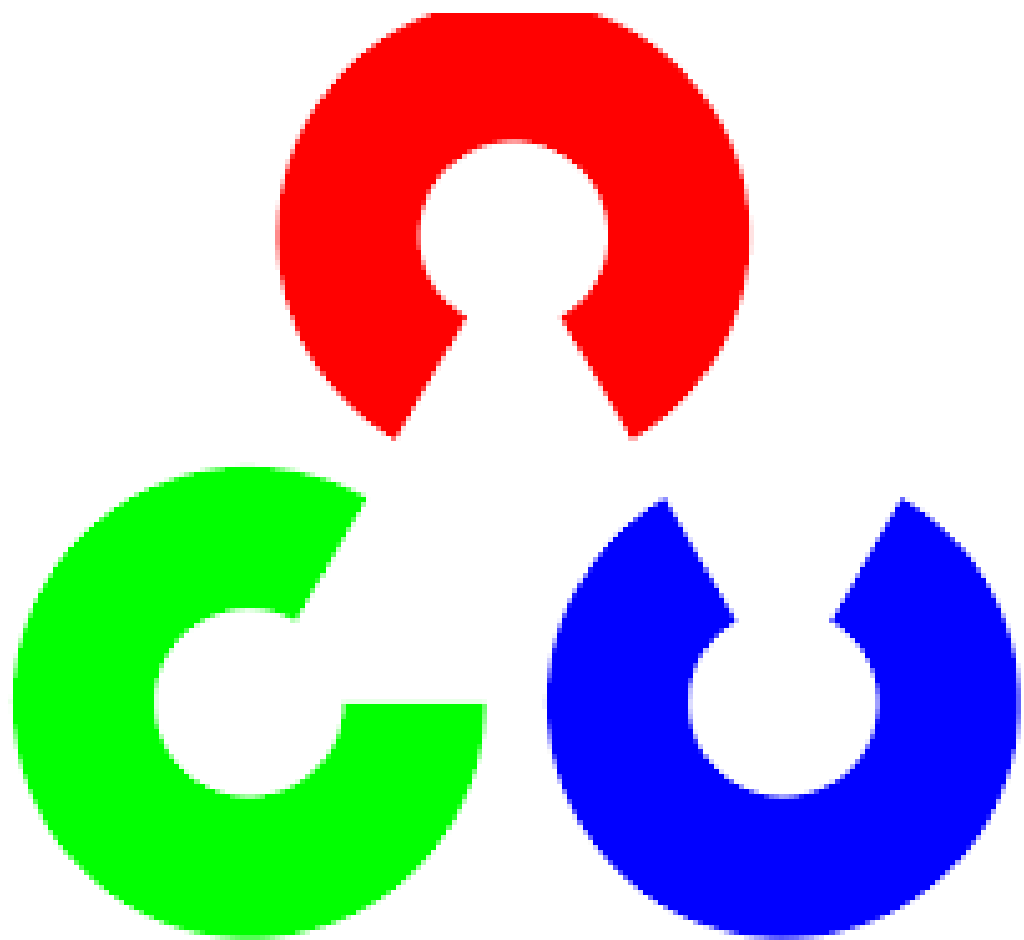


D-7

	66
	66
ABS (DELTA)	0
ACCEPTED ABS (DELTA) ≤ 2	X
REJECTED ABS (DELTA) > 2	

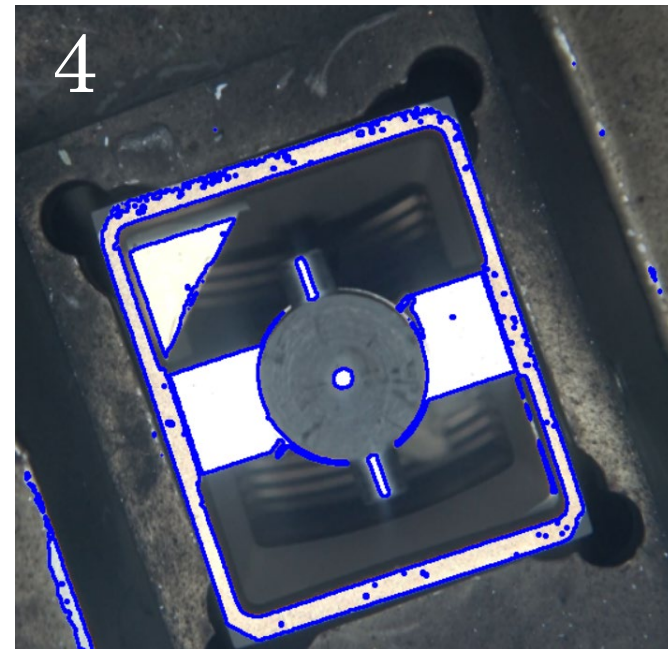
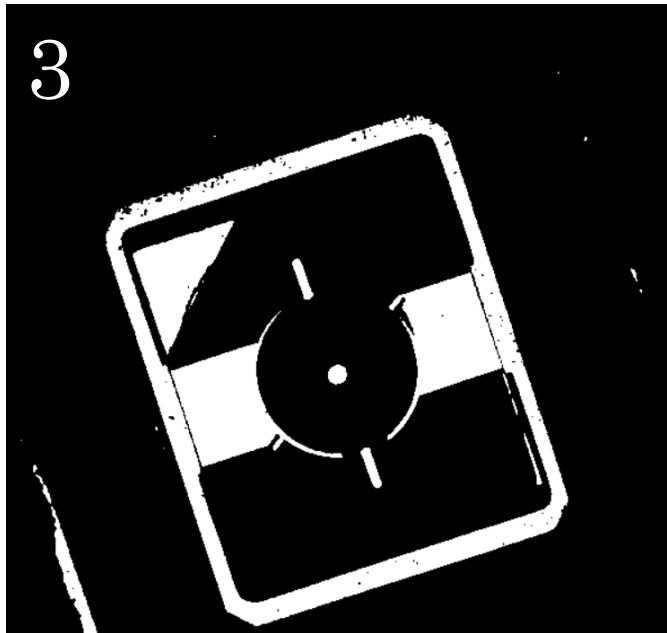
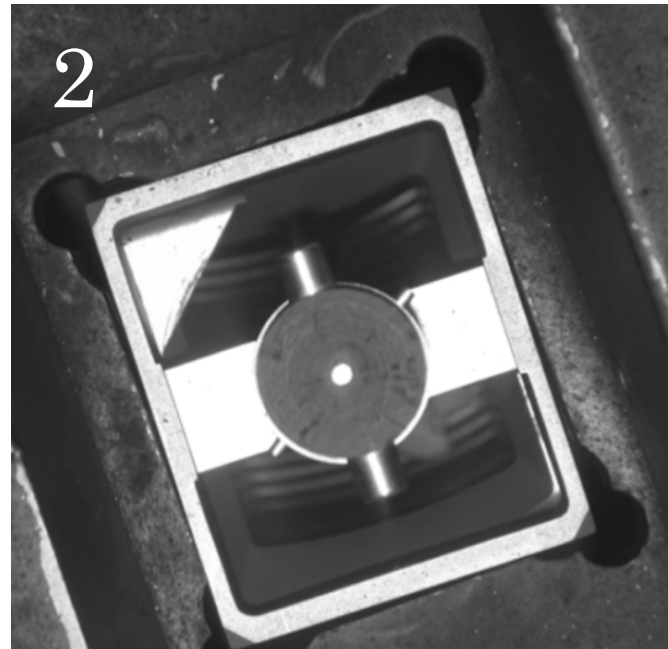
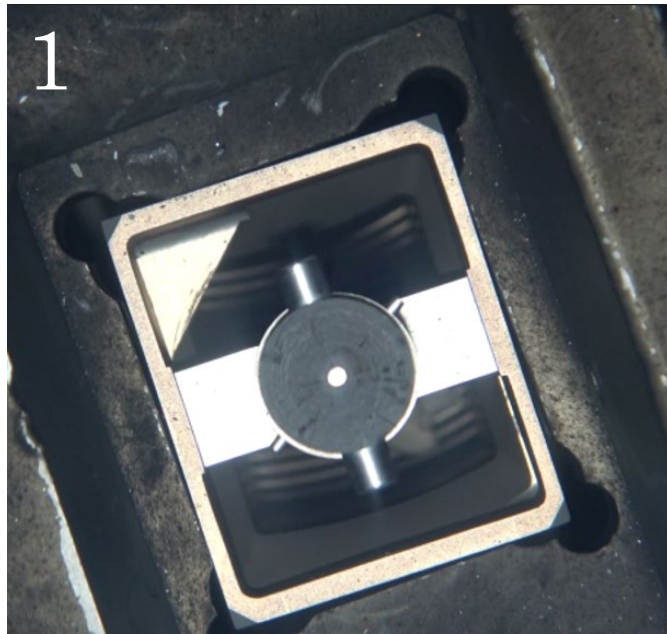
Automation Process

1. Image Processing
2. Video Processing
3. Viewing Results/GUI

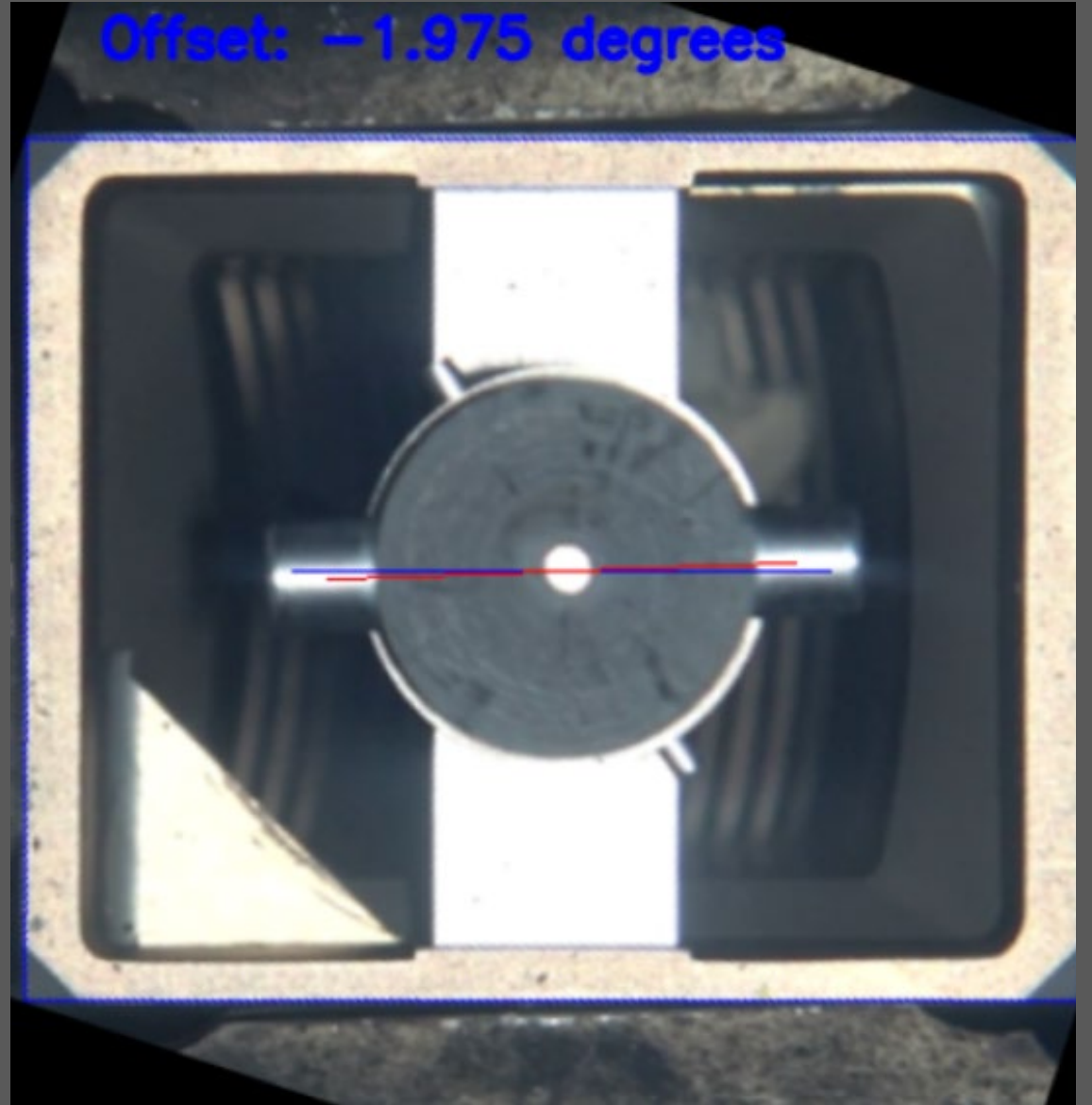
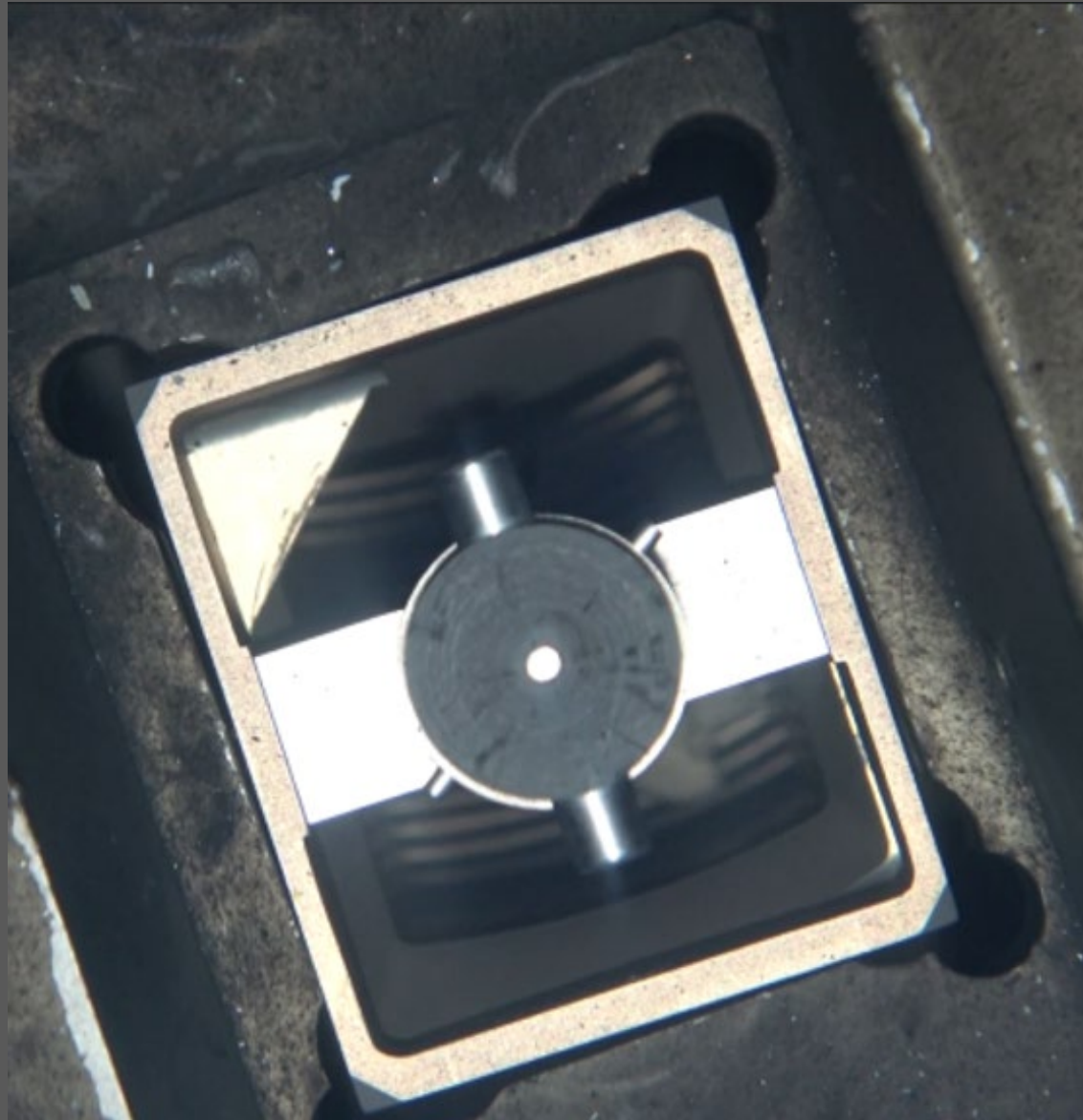


OpenCV

Image
Processing

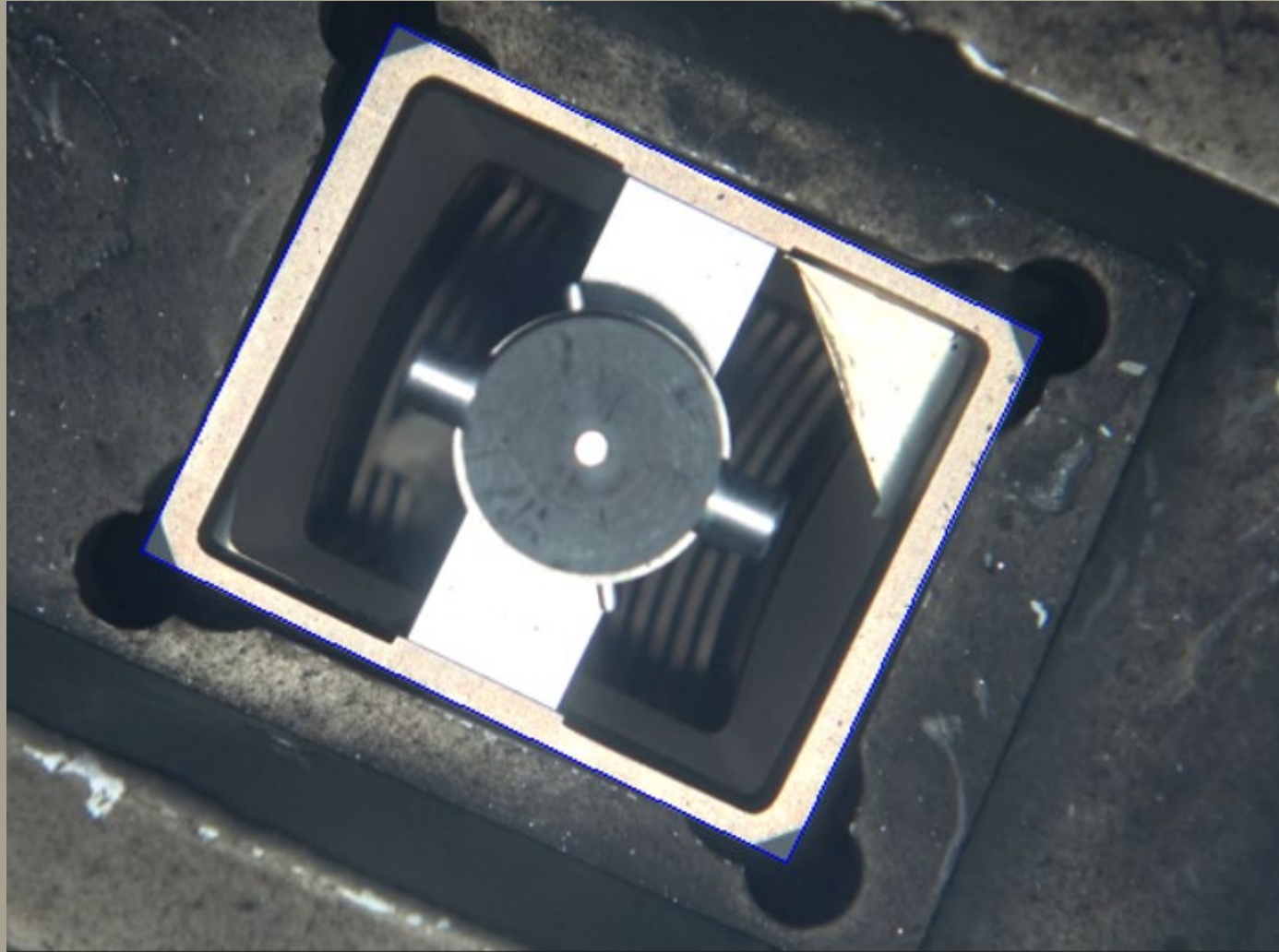


Contour
detection



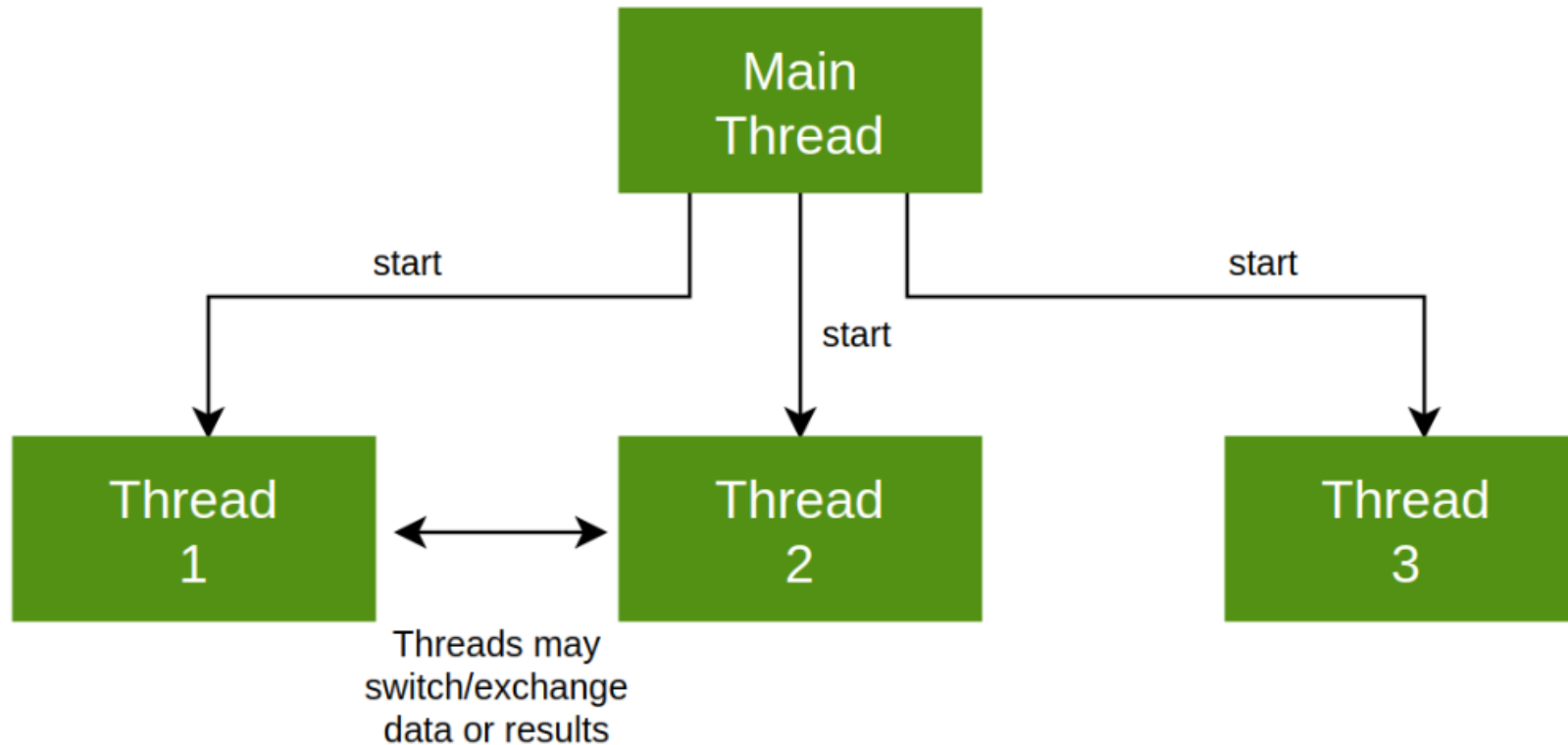


Video Processing



Processing
the Video
Quickly

Multiprocessing/Threading

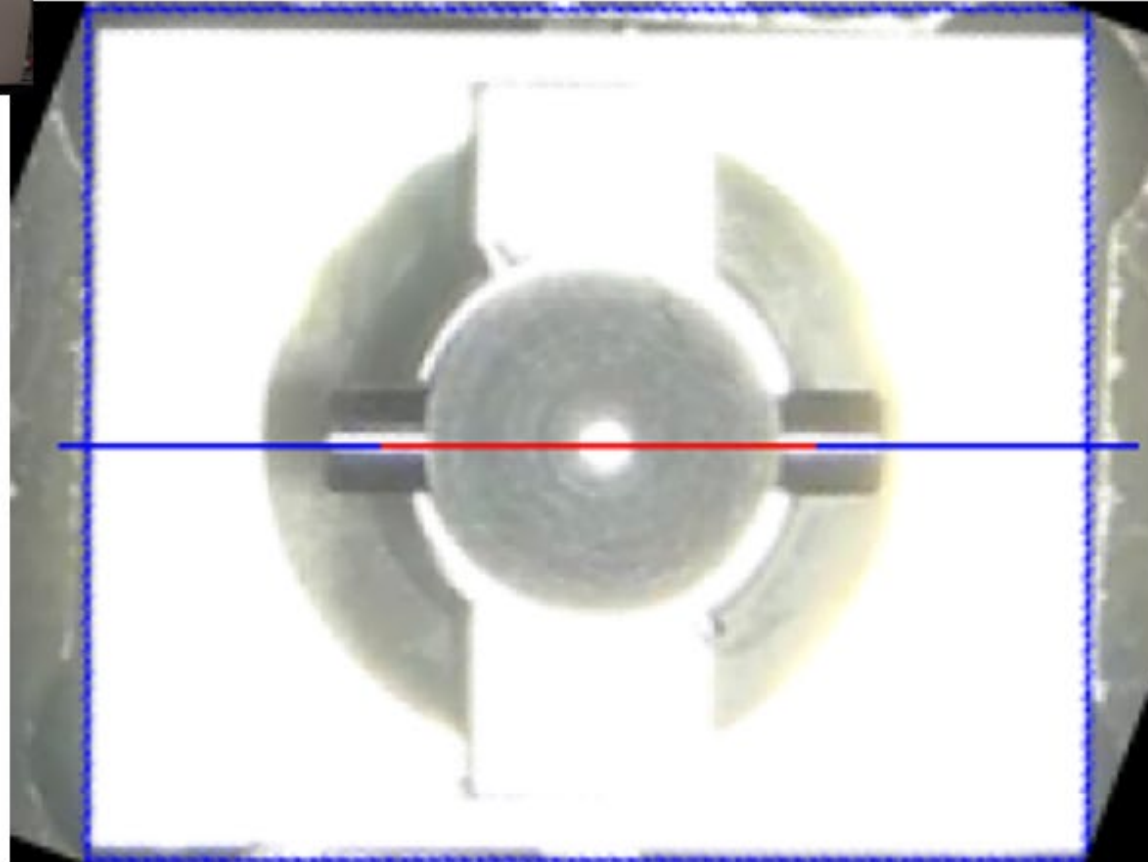




Tkinter

Viewing
Results

F-3



Offset: 0.0 degrees -- ACCEPT

Time Stamp: 0:47:54

Select Video File (Inspection):

Process Image Files

Video File (Inspection): C:/Users/Bcrom/OneDrive/Desktop/NIST/ImageVid/vid3.MP4

Select Video File (Matching Labels):

Video File (Matching Labels)C:/Users/Bcrom/OneDrive/Desktop/NIST/ImageVid/flashcards.MP4

Start Program

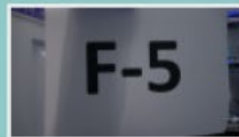
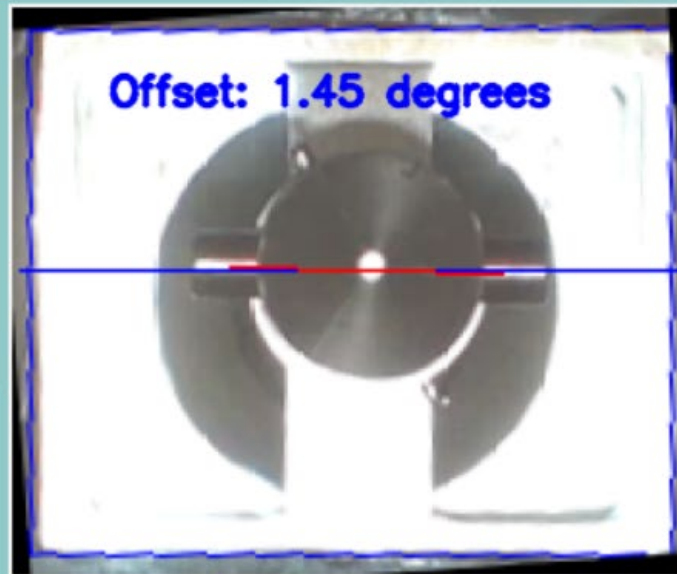
Finished in 192.84 second(s)

Select a Fuel Element

Show Frame/Update

Previous

Next



Open Video

Process Current Frame

-3 sec

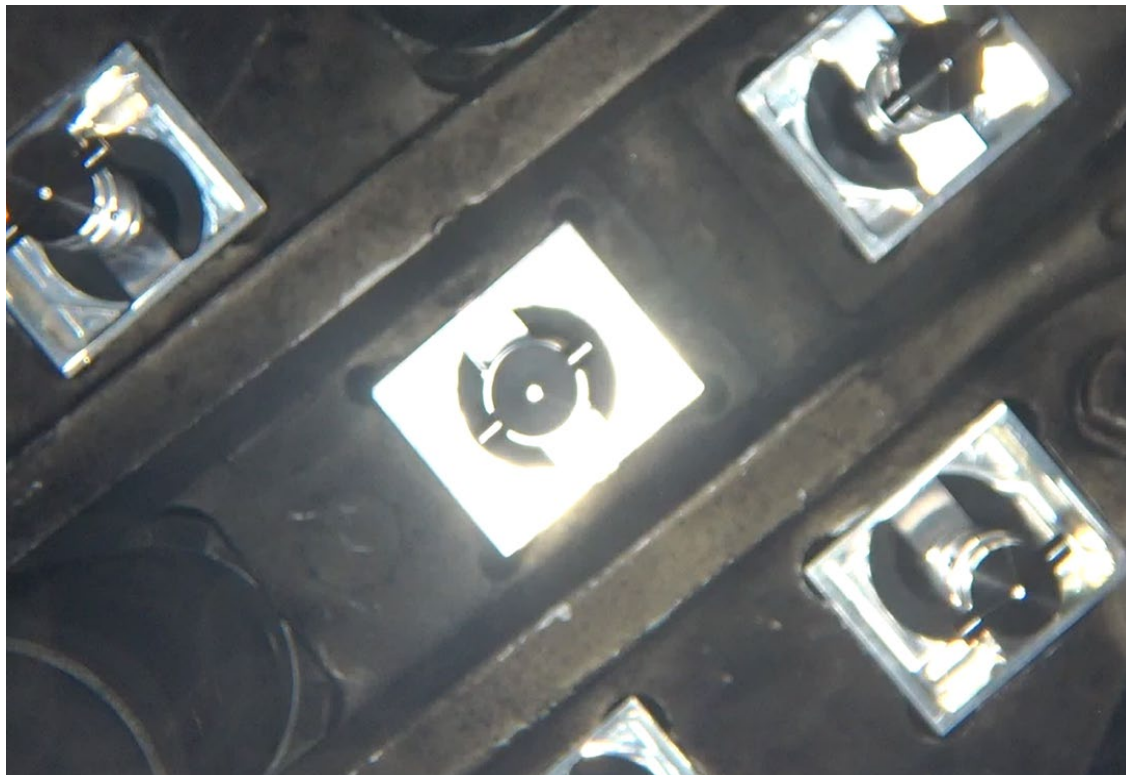
-30 sec

1:00:02

+30 sec

+3 sec

- Glare
- Time Optimization
- Limited Data



Challenges

Acknowledgements

- Mentor James Whipple
- Samuel MacDavid
- Susana Texiera
- Joseph Dura
- Julie Borchers
- NCNR Surf Students



Questions
