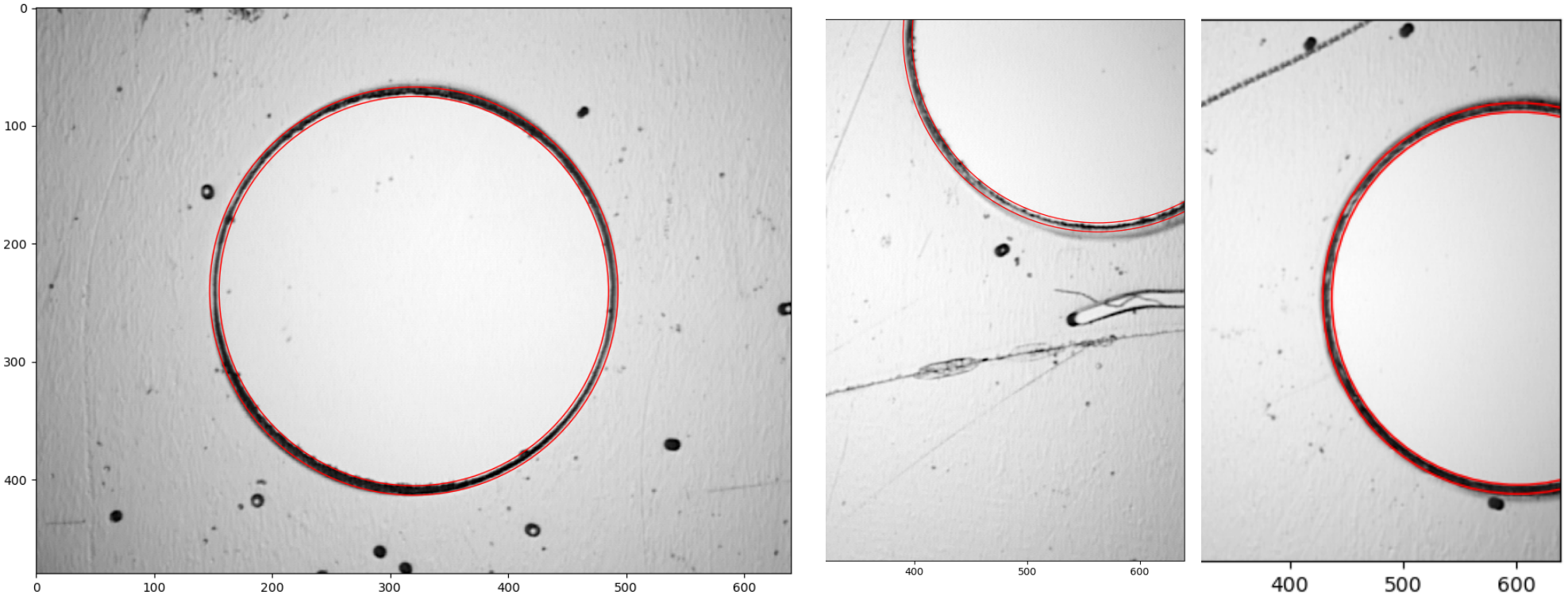
ML/NTD update 19th March

l.millward@qmul.ac.uk

- Datum Alignment
- Coordinate systems + Metadata
- New Dataset
- Distances / Matching

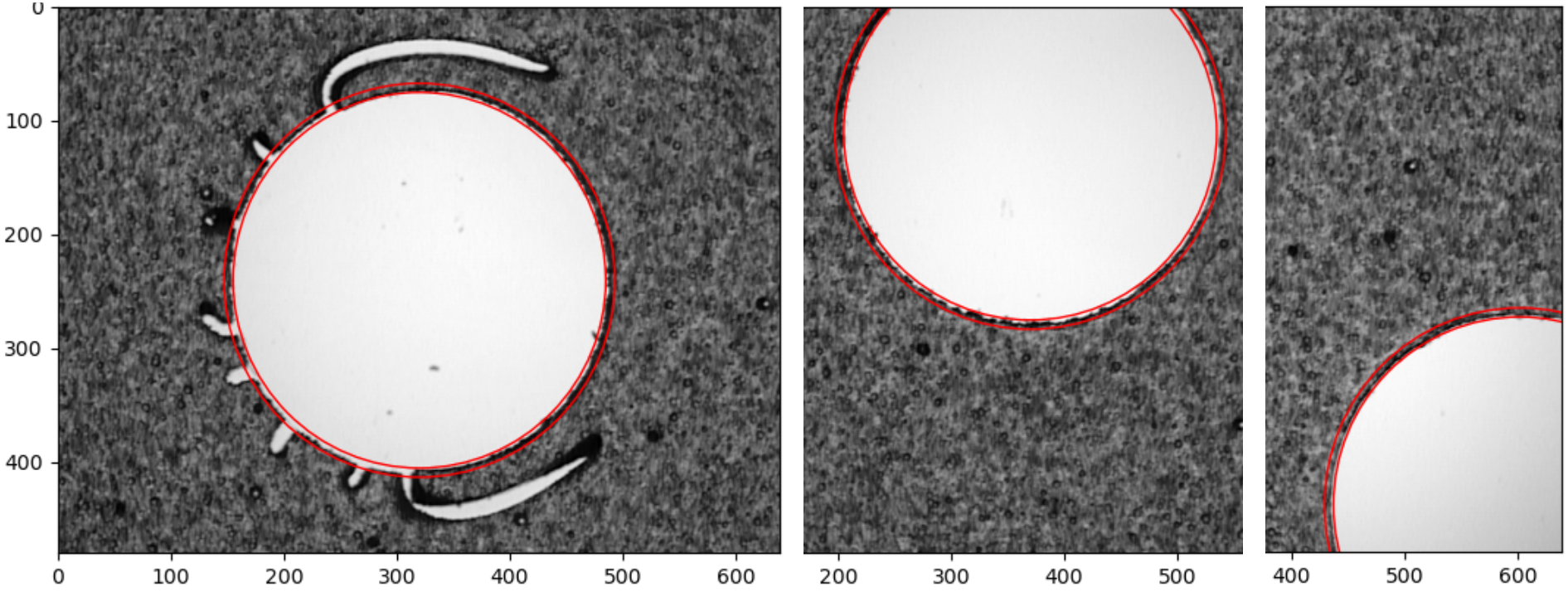
Datum Alignment



- Identification and measurement of alignment holes in all foils / scans. Defined locally.
- Optically aligned ~ 4/8 pixels, R = 165-173 pixels

** Note Any info regarding stack info – ie nominal position of alignment holes / diameter
Want check on pix-resoloution figure

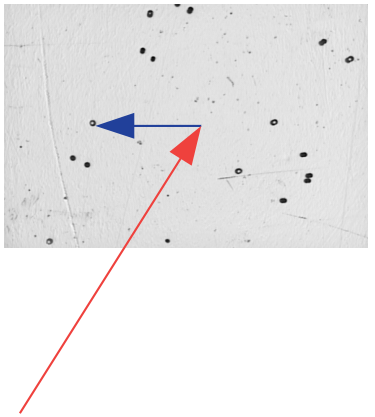
Datum Alignment

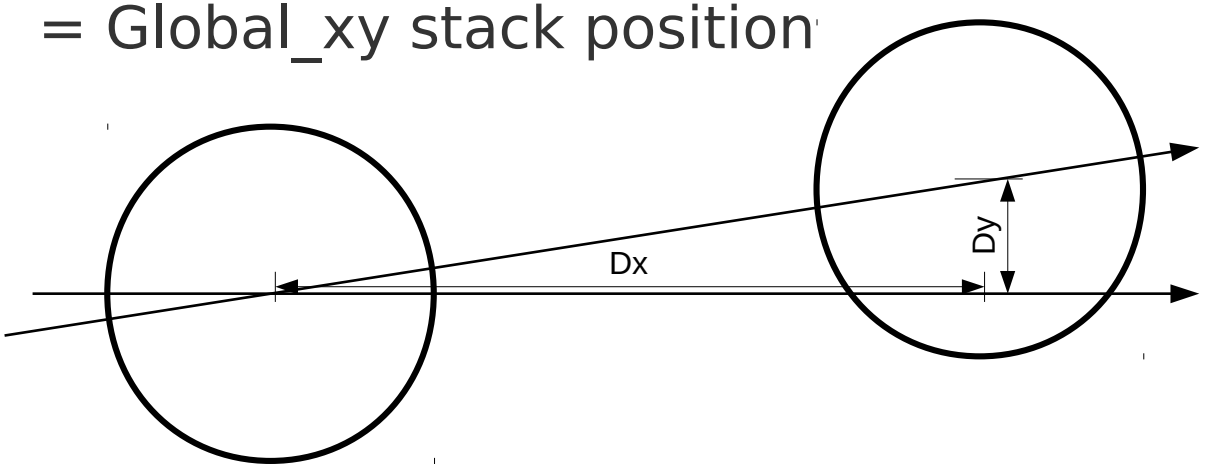


- Performed for all foils/scans

Coordinate system

- ‘Local’ Coordinates (image#,x,y)
- + Image position from metadata
- + Datum alignment (rotation / translation)
- = Global_xy stack position

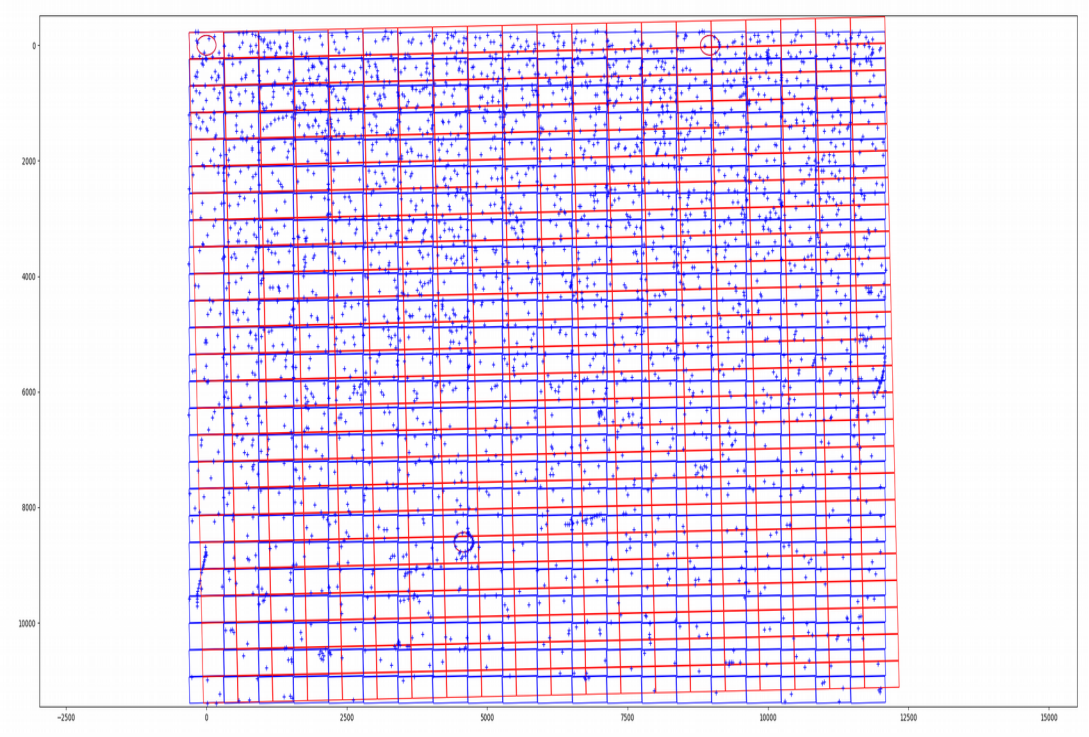




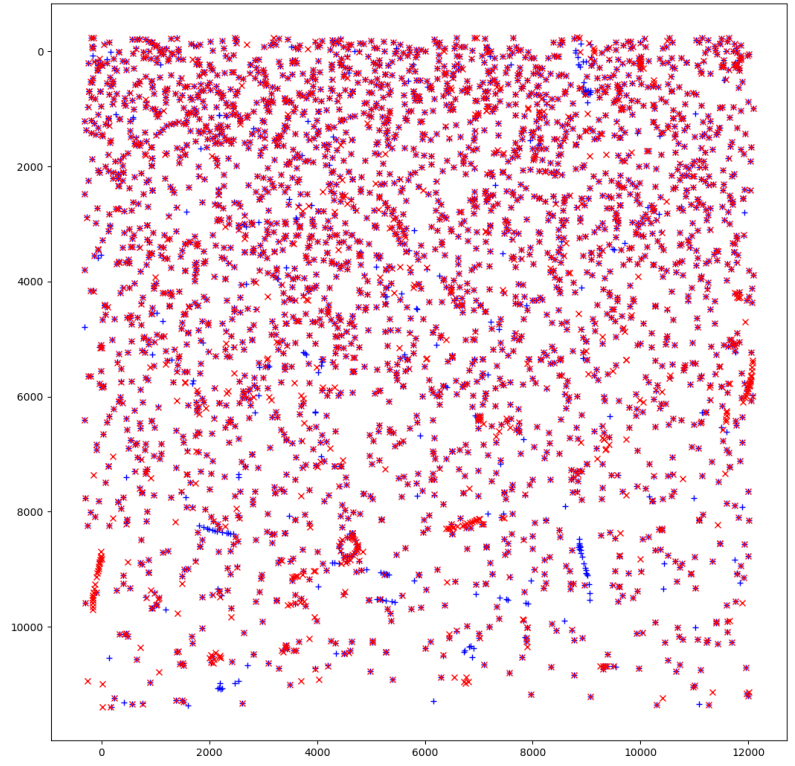
- Translation – so datum 1 becomes the origin (0,0)
- Rotation by angle θ_c so x-axis intercepts datum 3
  Dy/Dx = Tan(θ_c), where (Dx,Dy) are the unrotated coordinates of datum 3

Coordinate system

- Global plotting of images, alignment holes, etch-pits (real/predicted)
- May be helpful in referencing ‘pits’ and tracking / comparing images



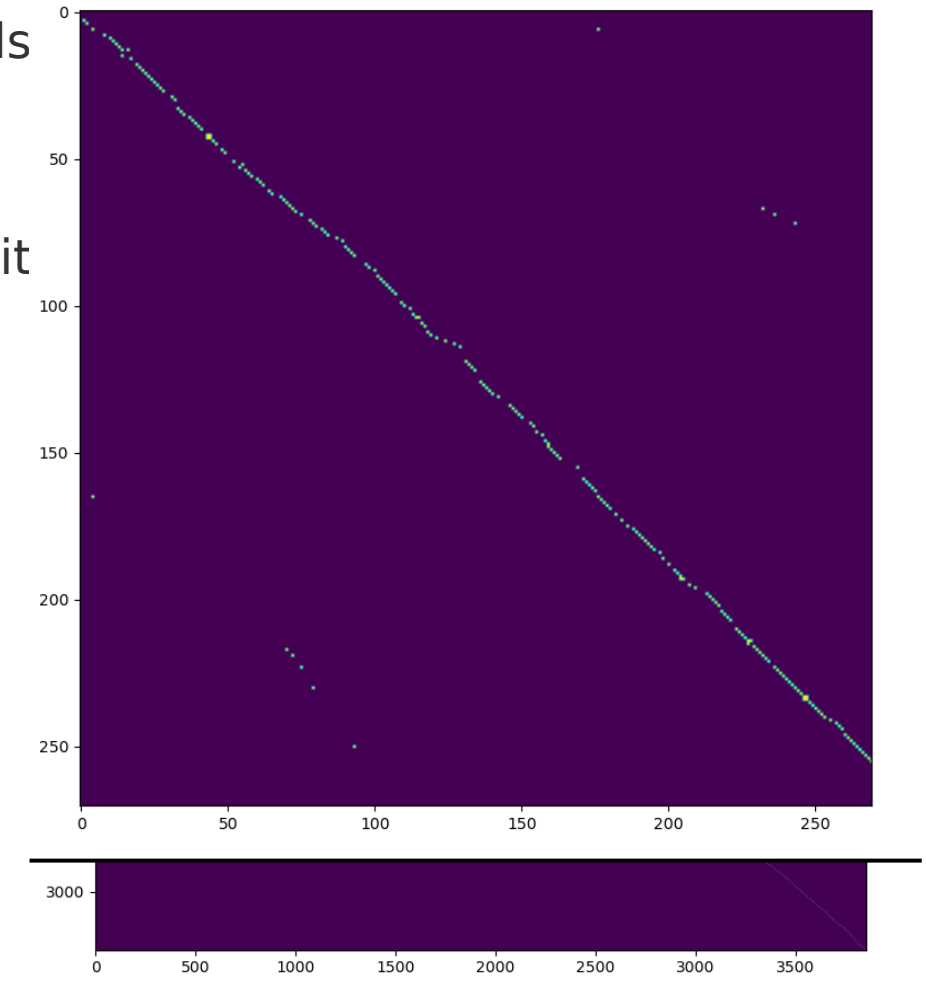
Eg, Alignment between clean-scan and exposed scan, alignment holes, and clean etch-pits



Eg, Global stack positions for ‘etch-pit’ like objects in the clean foil, and its reverse side

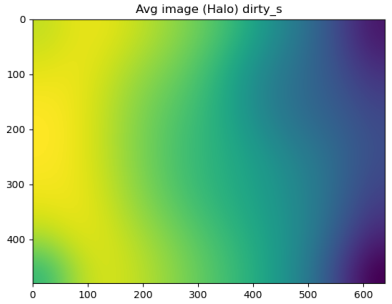
Distances

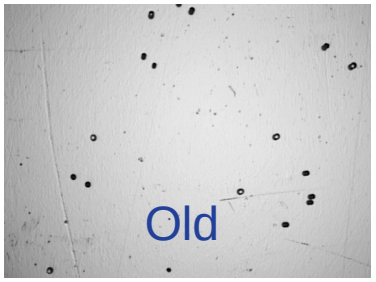
- Global_xy coords allow array based methods for determining ‘closeness’ / distance
  $D_{ij} = |a_i - b_j|$
- Easy to filter / condition, eg, find-nearest, pit within (r<), sort by distance, match
- Applicable to tracking in clean, evaluating clean vs exposed, reverse-side matching
- Less -error prone / fewer edge cases than within image matching.
- Eg; c1_pits ←→ c2_pits , within 6 pixels negligible time for all ~3k pits
  ~ Diagonal as expected, which pits pair up between foils

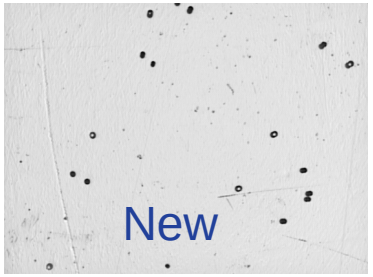


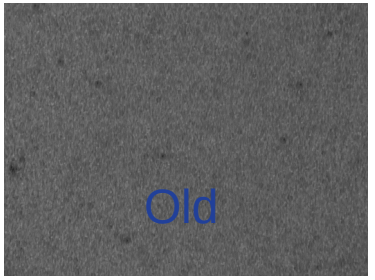
Dataset

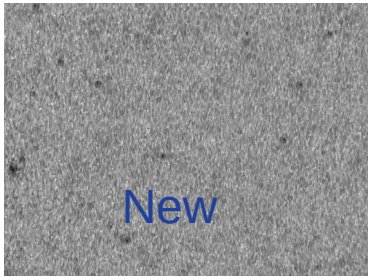
- Illumination Bias removed in pre-processing. Renormalised relative to datset average.



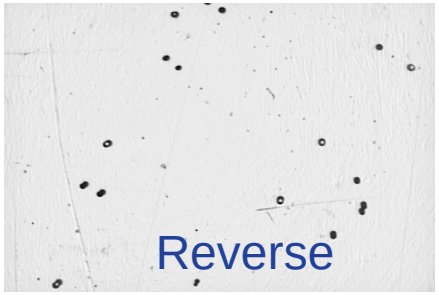


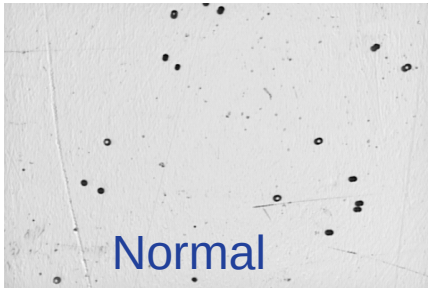






- Reverse orientation scans flipped to preserve relative pit-orientation
  - Rotational channels permutated to preserve same phase/rotation pattern -





Improved clarity im most images. Especially in the halo / dark-field channel (10)

- .TIFF export ~ 3.5Gb zip / 14Gb unzipped

https://drive.google.com/file/d/1YyE2Un67TFMGTJKtXxvDPFPwUD8vFoCu/view?usp=sharing

- Smaller PNG dataset, with aligned 360x360 clean/exposed images also available ~ Gb

https://drive.google.com/file/d/1IuS21MiLOZ8TxLbyPZ0E3ZZ7_4koFKe7/view?usp=sharing