

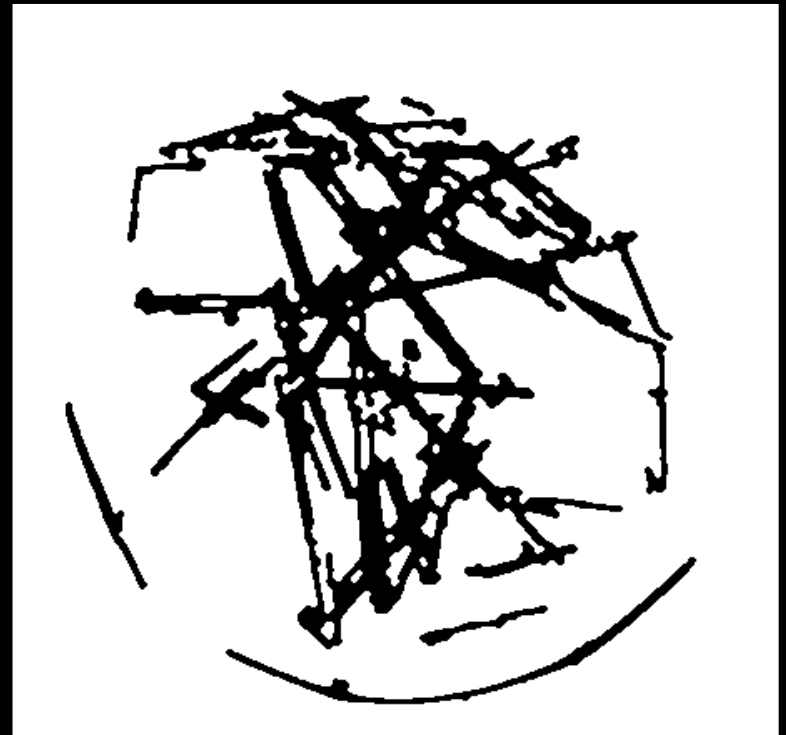
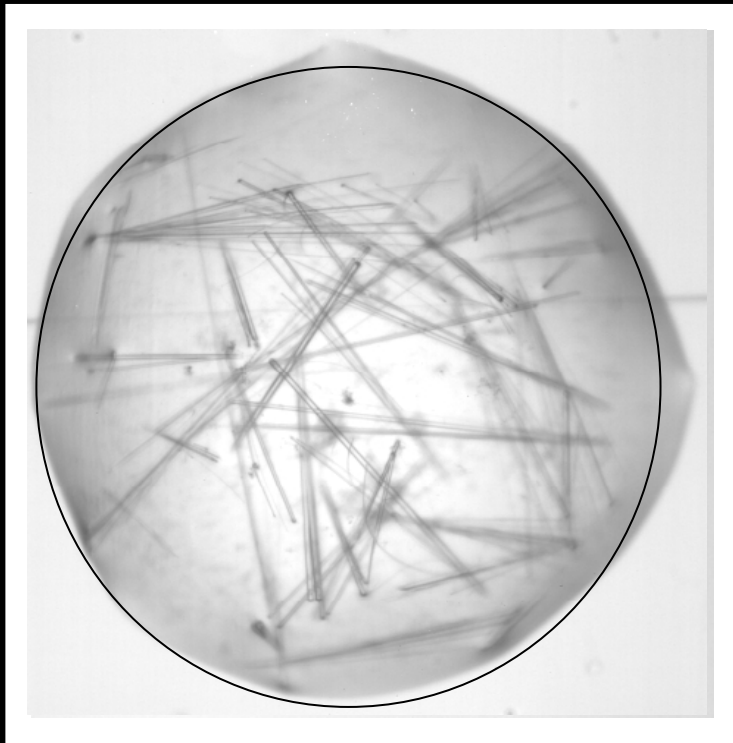
Automated evaluation of crystallisation experiments

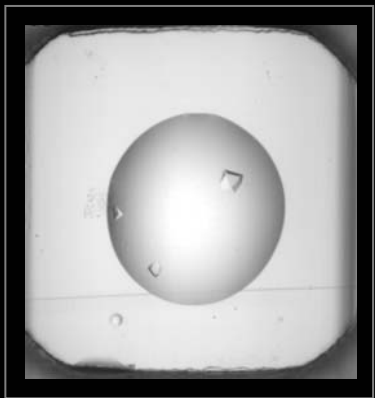


SUMMARY

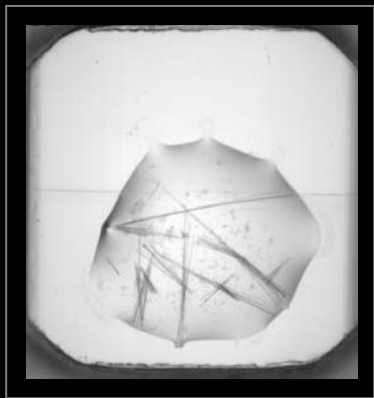
image -> mask -> objects -> classification variables

↓
classify objects
↓
image score

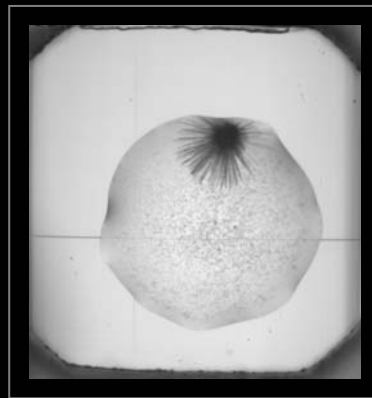




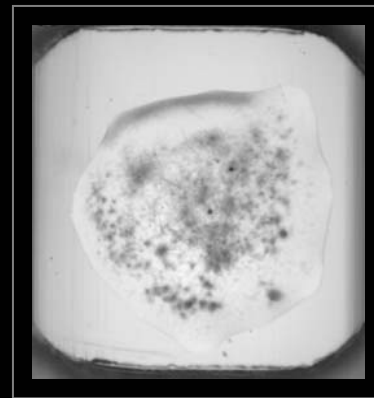
crystals



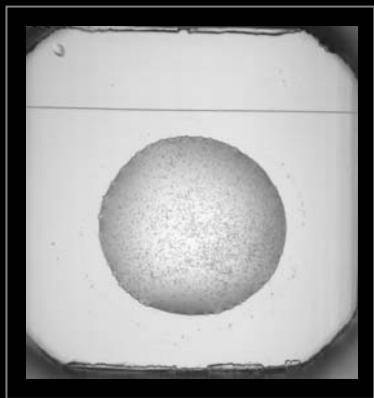
piles of
crystals



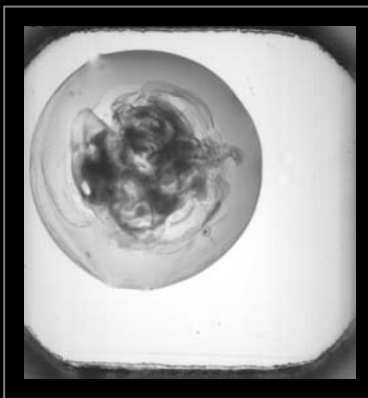
very
interesting



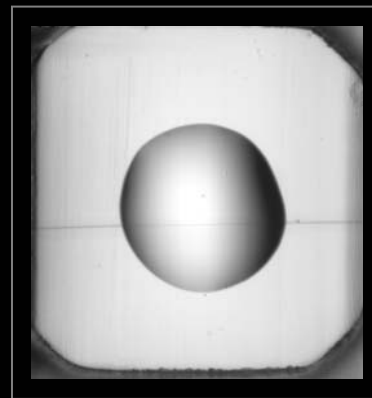
quite
interesting



precipitate



rubbish

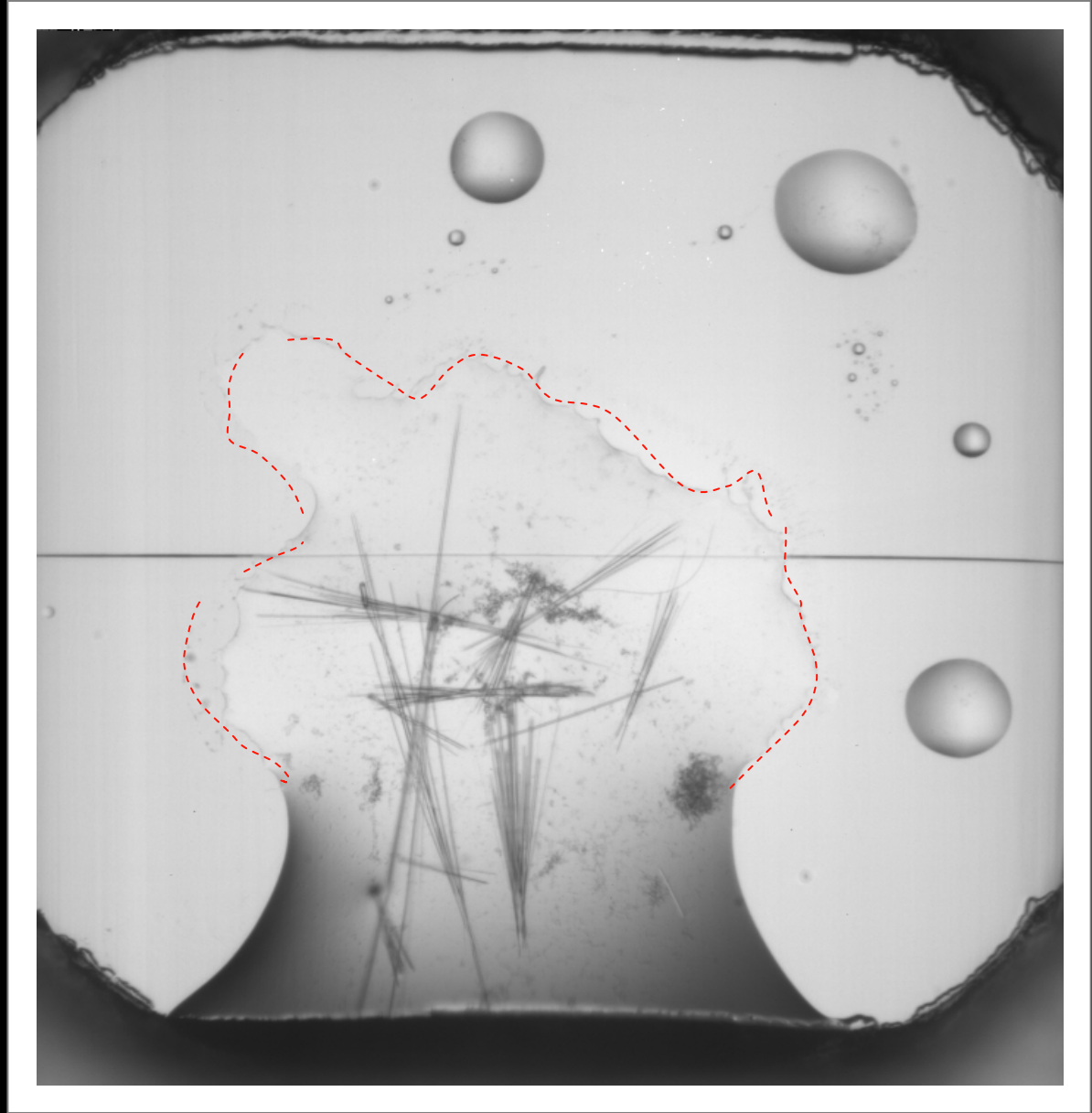


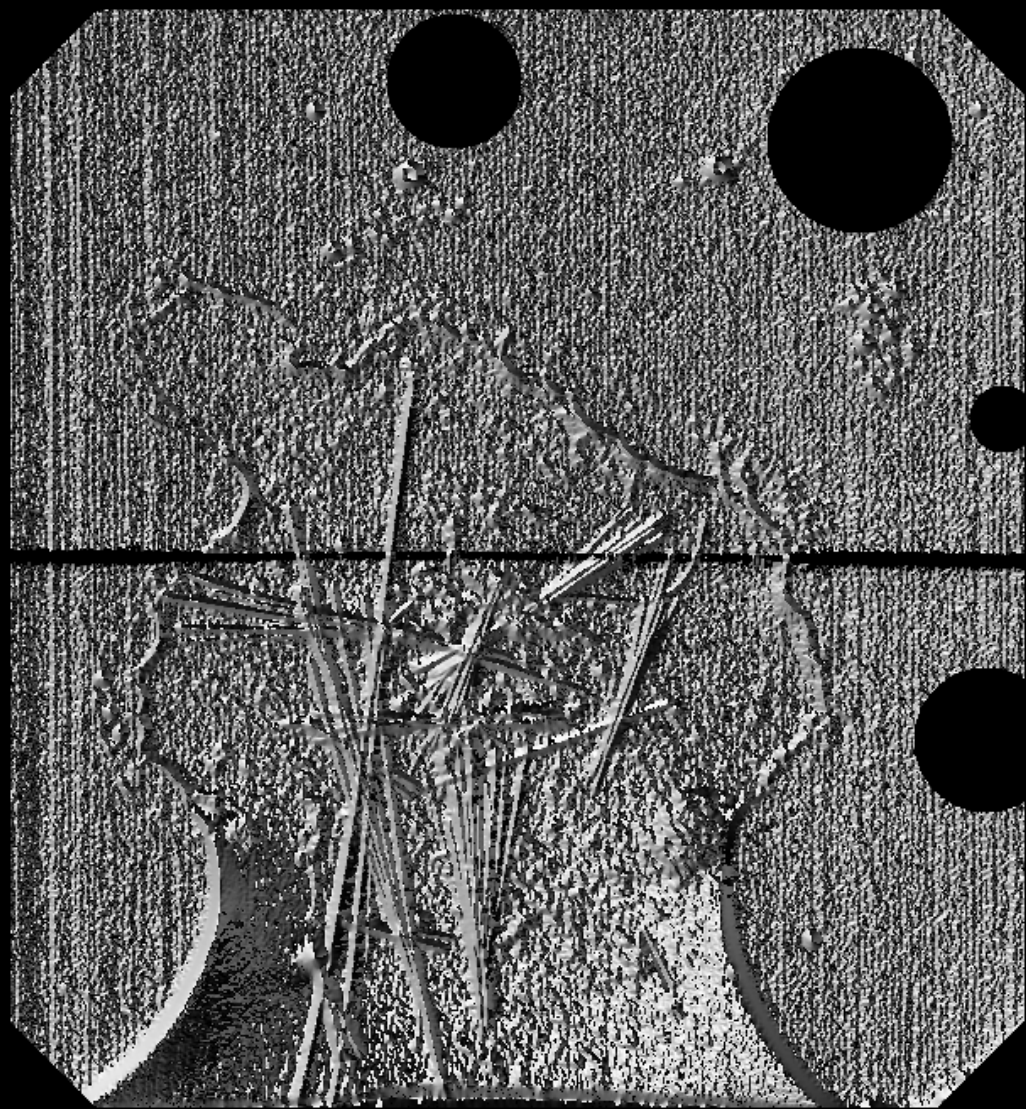
empty

The programme is now written in C rather than fortran

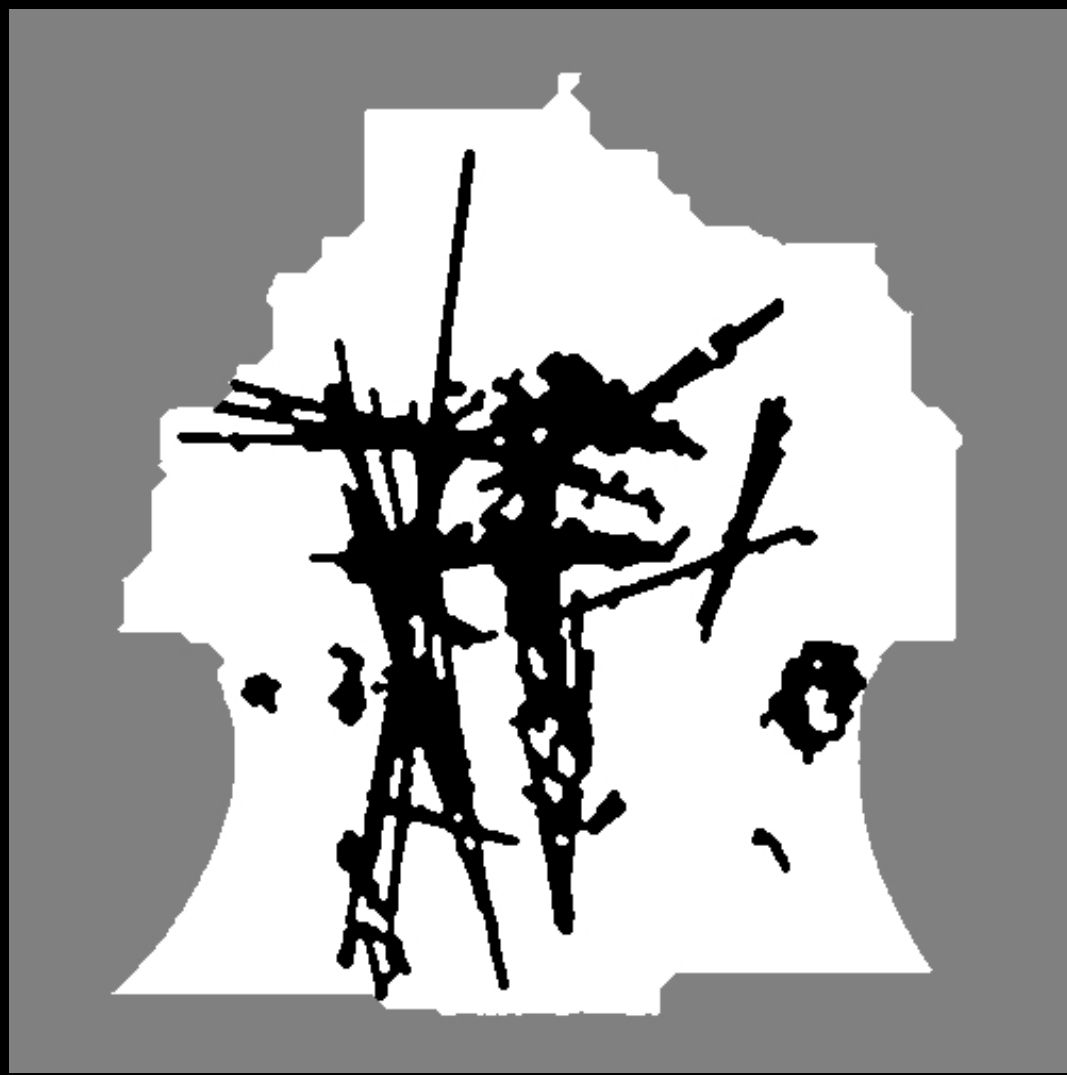
- gave the whole thing a revamp
- will allow different image formats to be used easily
- caused a few problems!

Circular mask is no longer used

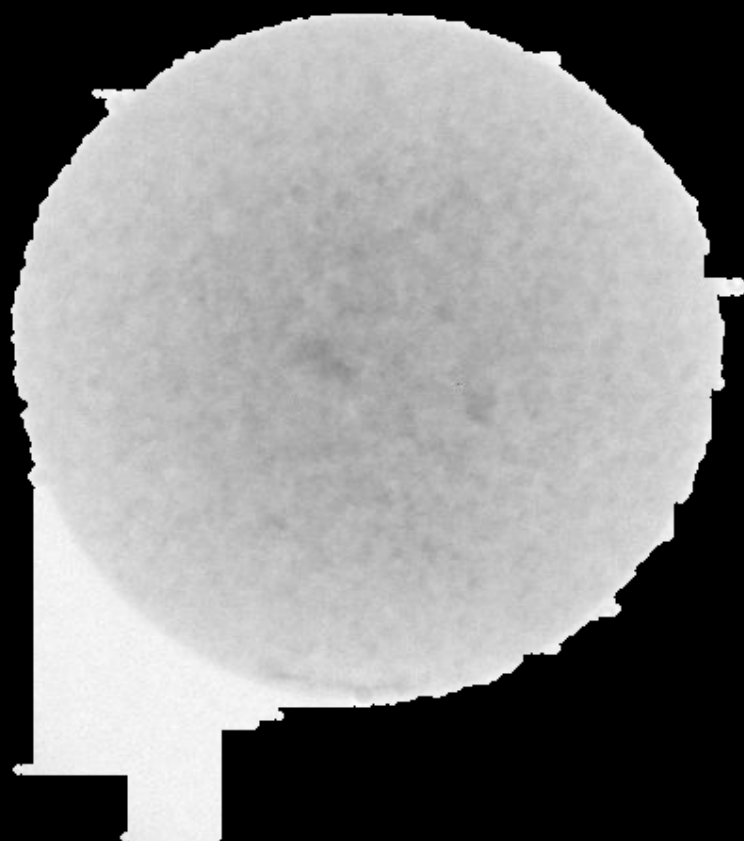


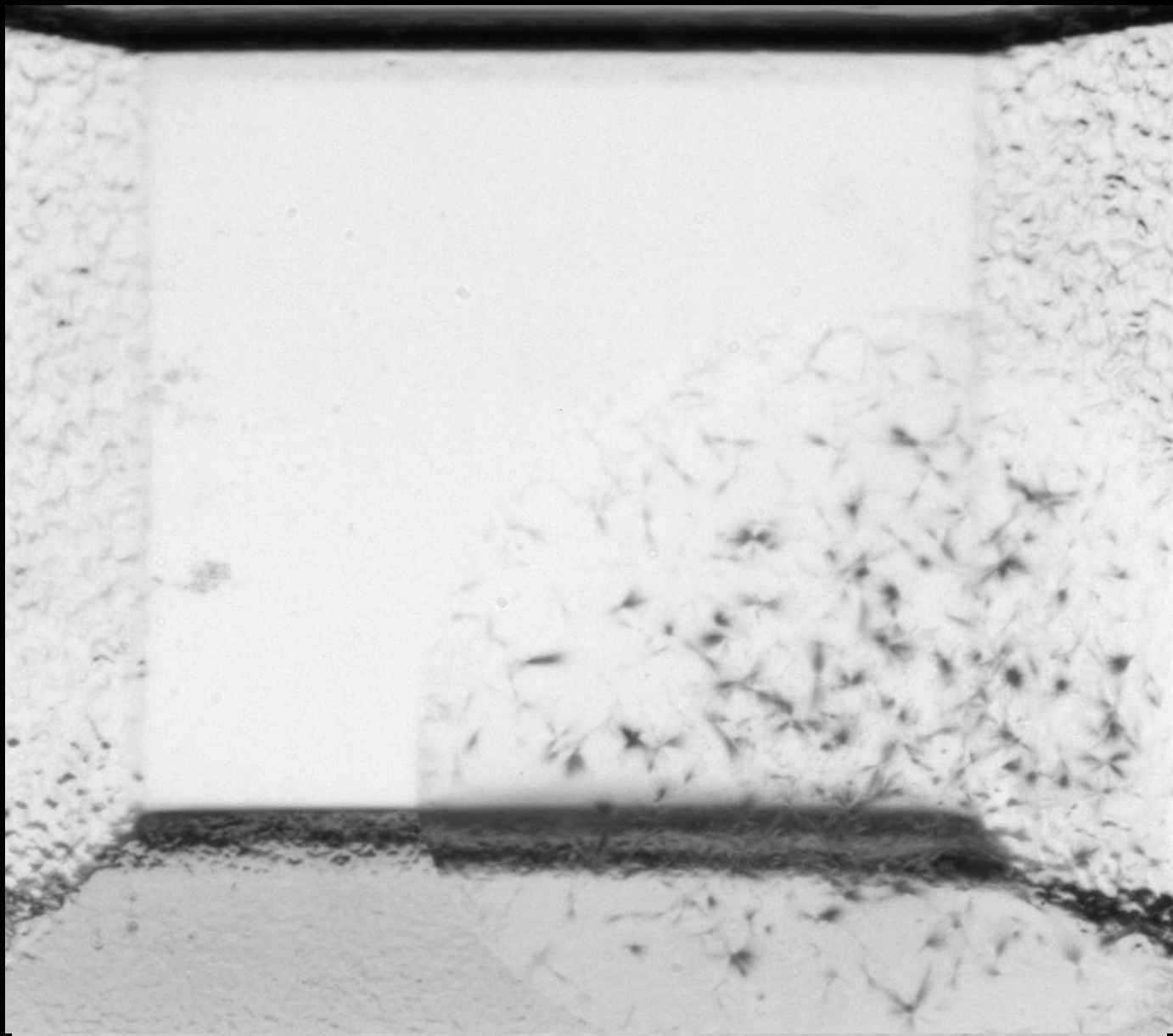






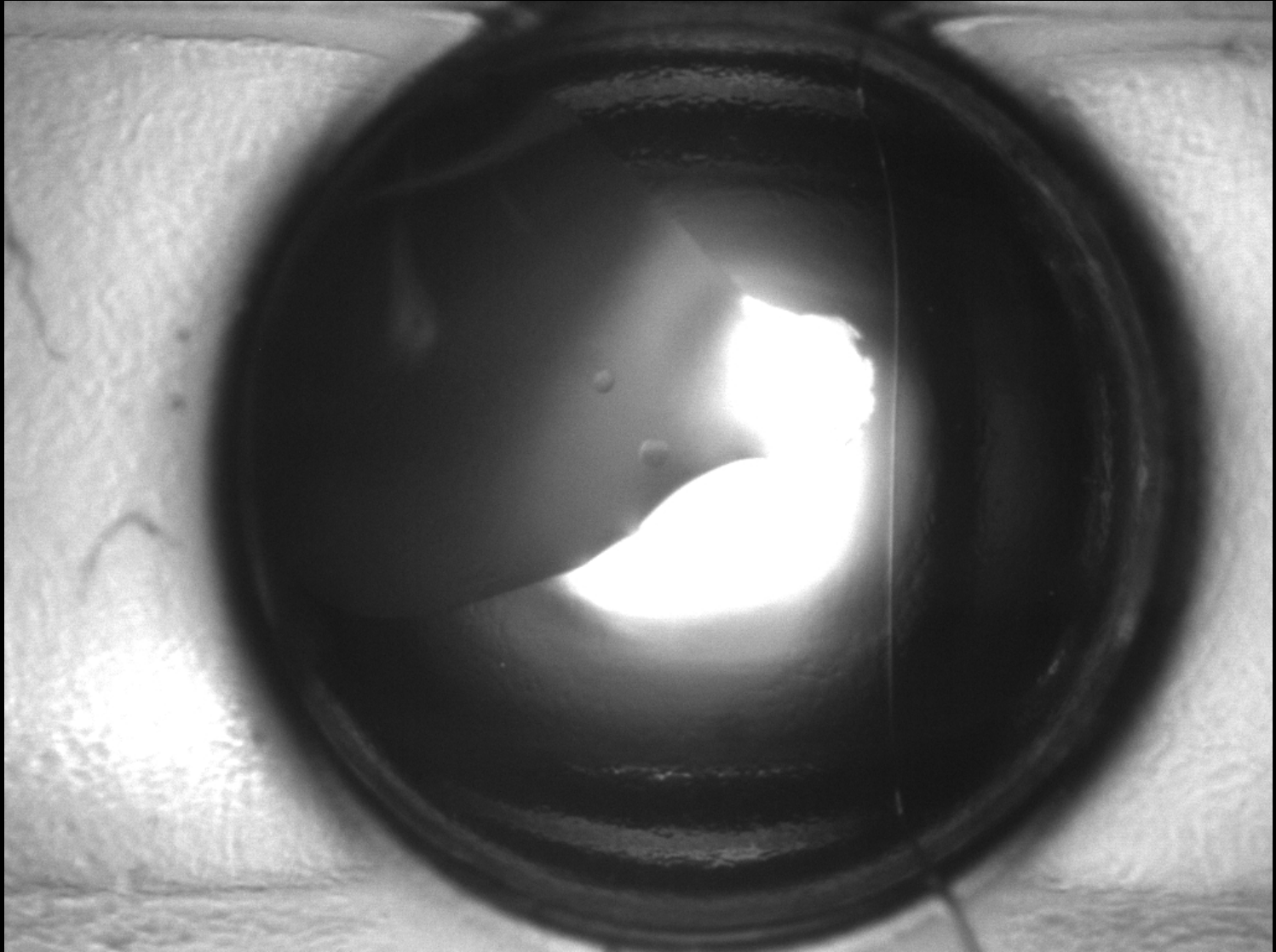








BioTom



RESULTS

>>Ok the problem at the moment is that the test set that I have has
>>been poorly classified - the human classes that I have are: empty,
>>precipitate, interesting precipitate and crystal. Having looked
>>through all the images in the test set the two precipitate classes
>>were not consistent enough to be trustworthy so we have blocked
>>them together into a middle "interesting" class. so to build up an
>>assessment of the results from your classifier I have reduced them
>>down to a similar three levels (see I told you the results should not
>>be relied on!) then I created a truth table (like the one you have
>>asked for below) and this is where i have got the results i have
>>sent...

here is the full table:

>>

>>the woolly level altering is using simply

>>if JW Score ≥ 4 - class 2

>>if JW Score ≤ 2 - class 0

>>otherwise class 1

>>

>> Human 0 1 2 Total

>>-----|-----|-----|-----|-----|

>>Machine 0 (empty) | 850 | 446 | 363 | 51% |

>>-----|-----|-----|-----|-----|

>>Machine 1 (stuff) | 11 | 25 | 21 | 37% |

>>-----|-----|-----|-----|-----|

>>Machine 2 (xtal) | 129 | 369 | 1410 | 75% |

>>-----|-----|-----|-----|-----|

86% 23% 79%

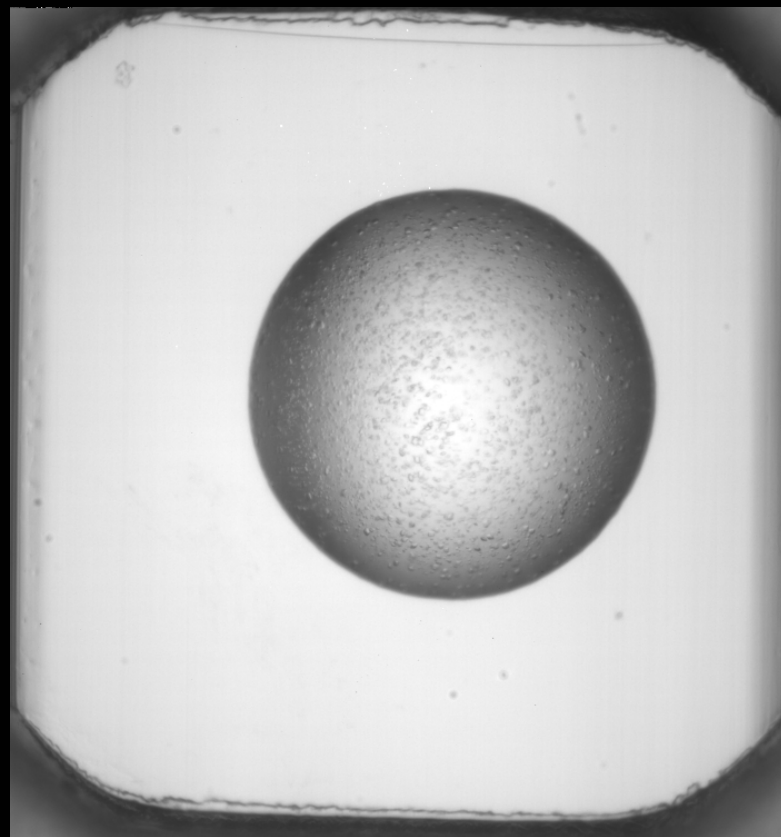
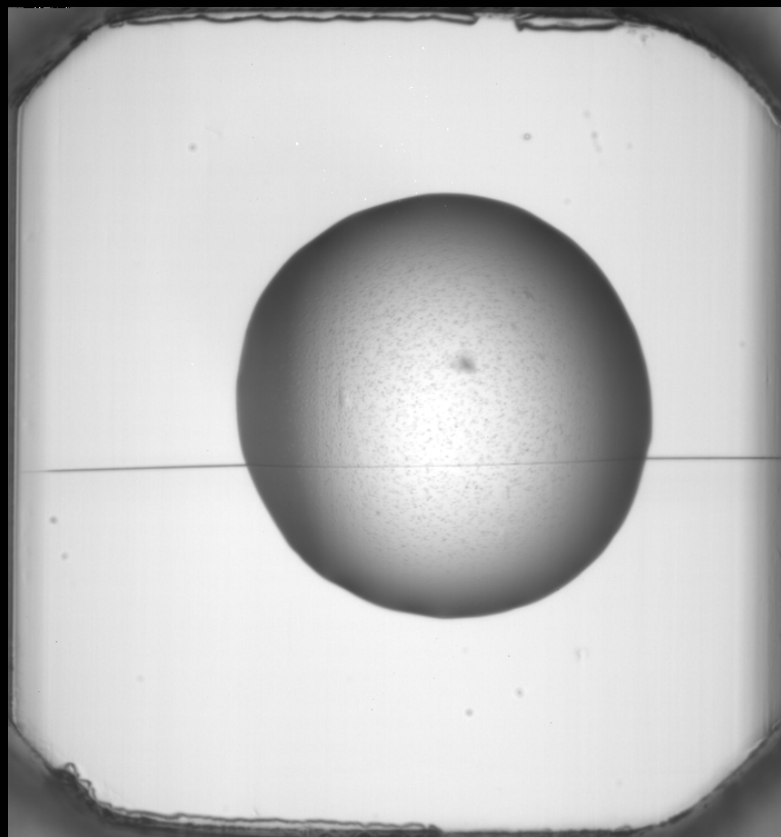
WHAT DOES THIS MEAN?

There are far too many drops being classified as empty!

Actually this is not necessarily true....but if it was

It could only be due to ...

- ...having the wrong cut-off level and not finding the objects
(dark shadows or badly focussed drops)
- ...no objects being classified (if SOM and Bayes classifier
disagree by too much an object is not classified)



WHAT DOES THIS MEAN?

79% of images containing crystals are classified as crystals

86% of empty drops are classified as empty

74% of drops classified as crystals really contain crystals

? % of drops classified as empty really are empty

How can it be improved?

Use information from the whole image as well as object-based classification

Overall image statistics

Texture analysis - local variance

- Fourier transforms (frequencies)

- wavelet analysis

More pre-processing

- histogram equalization

- contrast stretching

