Deep Zoom Image Production & Publishing - UPDATE#13 - AI Assisted Feature Classifier

SEM and Macro Photography



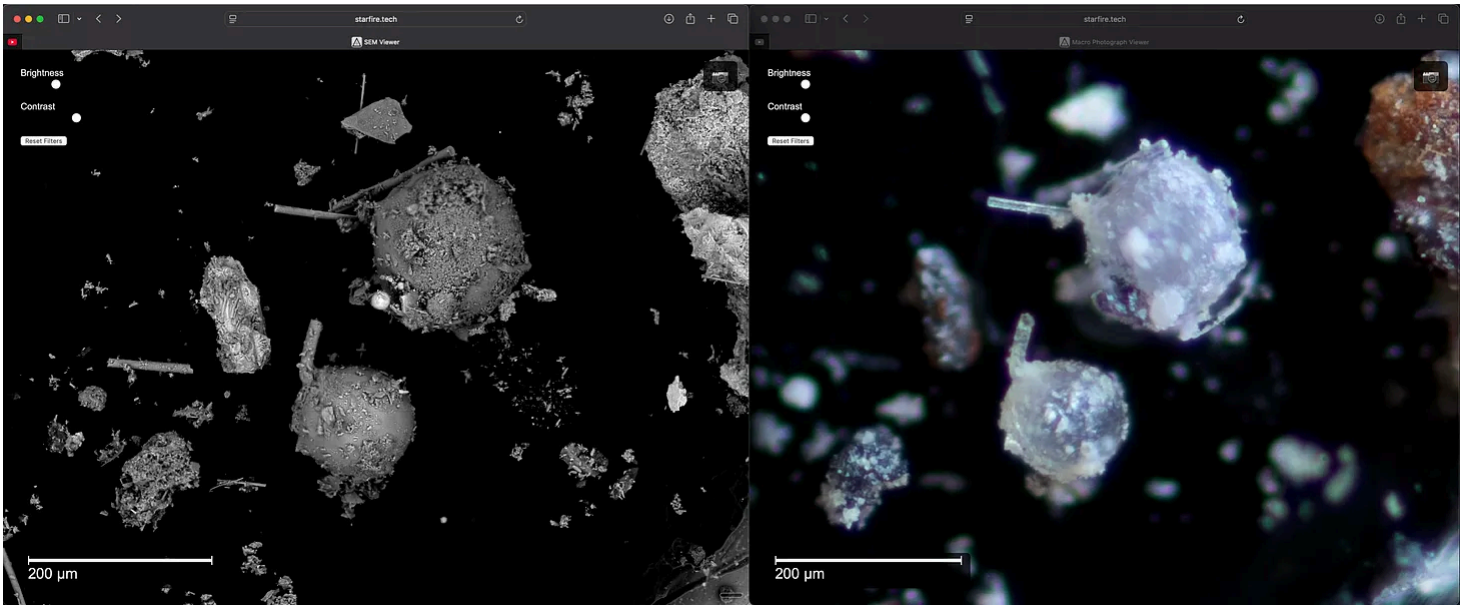
BOB GREENYER

MAY 14, 2026

36 32 2 Share

Thanks to inspiration from Walt Bobrowski, I have worked this week on trying to get to a point of being able to share very large macro photography and SEM images online for people to review. It started as a bit of a team effort, with Walt's work getting the ball rolling and some effort by Jan and AJ at Elia Foundation, with me finishing it off these past few days to a point where I'm happy to share it.

This is becoming a process whereby it will be far easier to let a much wider audience delve into data on any device that they have. It is especially nice to use on a tablet. Here is a close up of a few features on the two demonstration pieces.



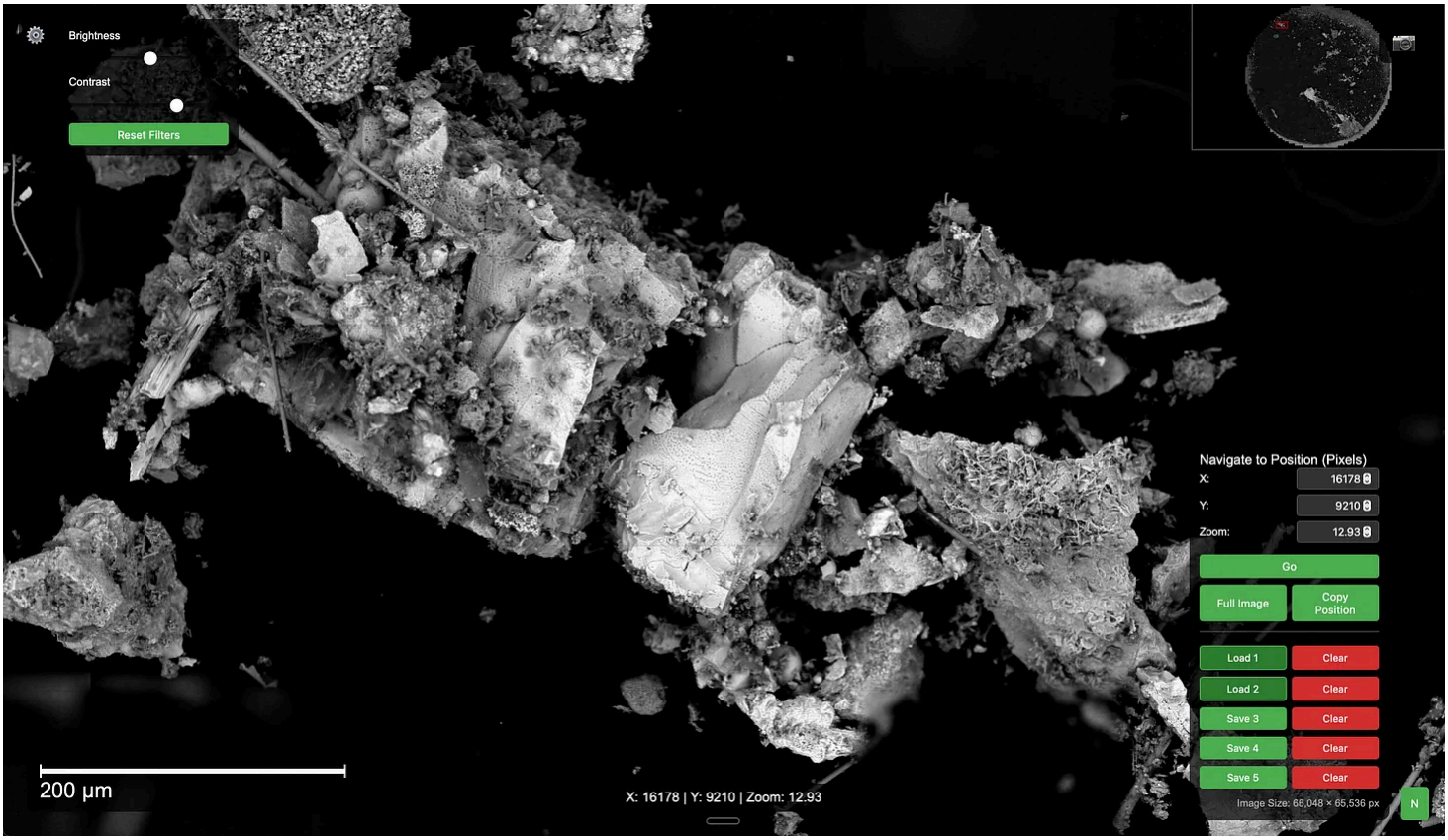
The problem is, it will take a HUGE amount of storage, the SEM takes 23.19GB on the server - I cannot host many of these before I start having to pay monthly for a lot more space!

Check out the SEM / Macro photograph Deep Zoom Images of the ‘Patricia 2001 Sample’

I hope you enjoy it, tell me what you think you find …

UPDATE#1 - Save and Copy Positions!

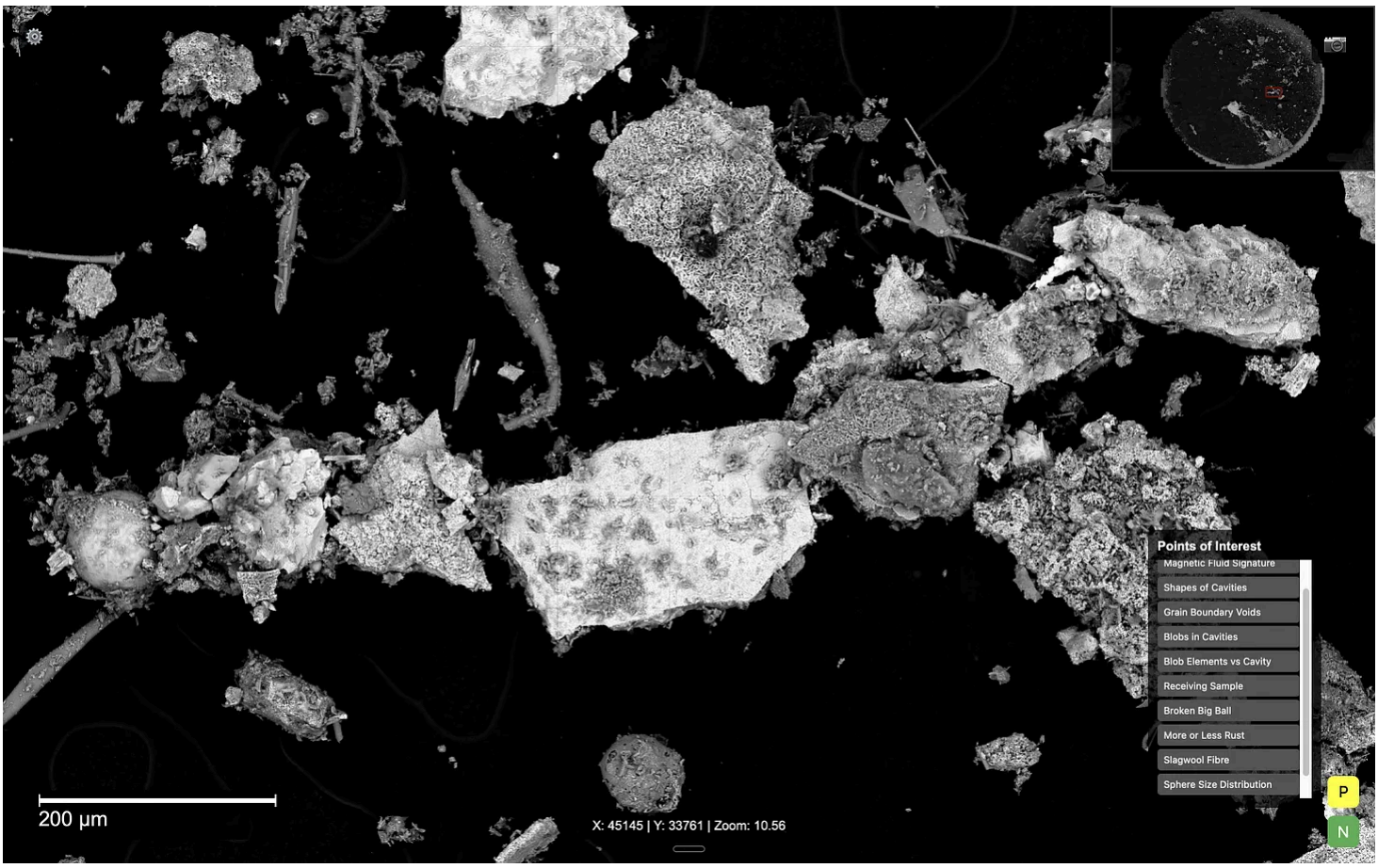
I have implemented the ability to save x, y, and zoom positions as well as contrast /brightness settings. There is also a ‘Copy Position’ button so that people can record and share locations of features inside these large images for discussion and analysis.



UPDATE#2 - Points of Interest System

I have now built a point of interest selector that allows you to immediately go to one of these areas and see a near full-screen panel of analysis and/or other information related to that part of the sample. Clicking on the window removes it. This is very

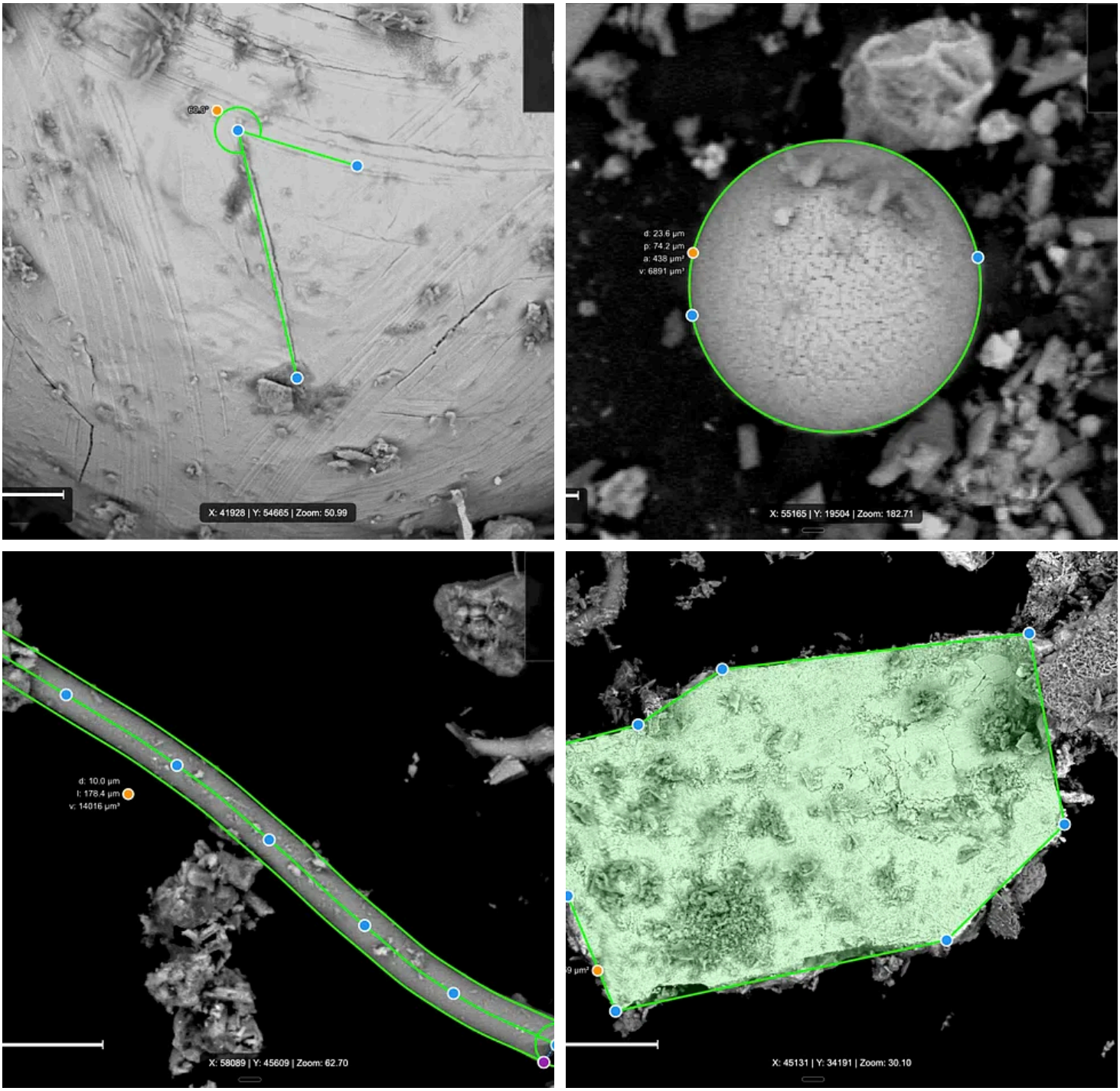
powerful and flexible and will be of great use in future deep zoom image analysis allowing all kinds of people to really understand what they are looking at.



UPDATE#3 - Comprehensive Measurements

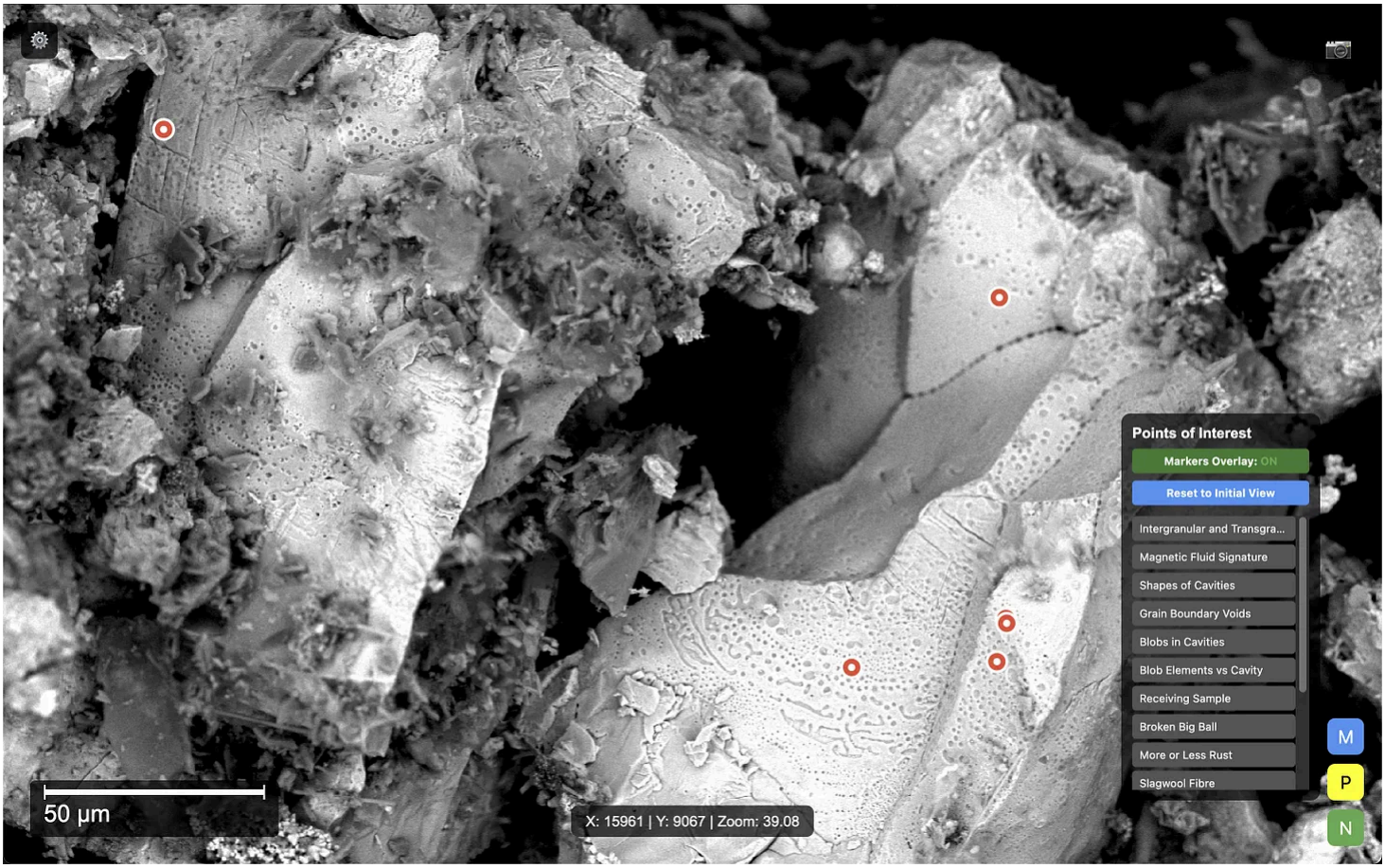
Today I designed and developed a simple to use but comprehensive measurement system including:

- line length
- circle; diameter, perimeter, area as well as volume of a sphere
- area of a irregular polygon
- angle
- curved cylinder; length, diameter and the volume



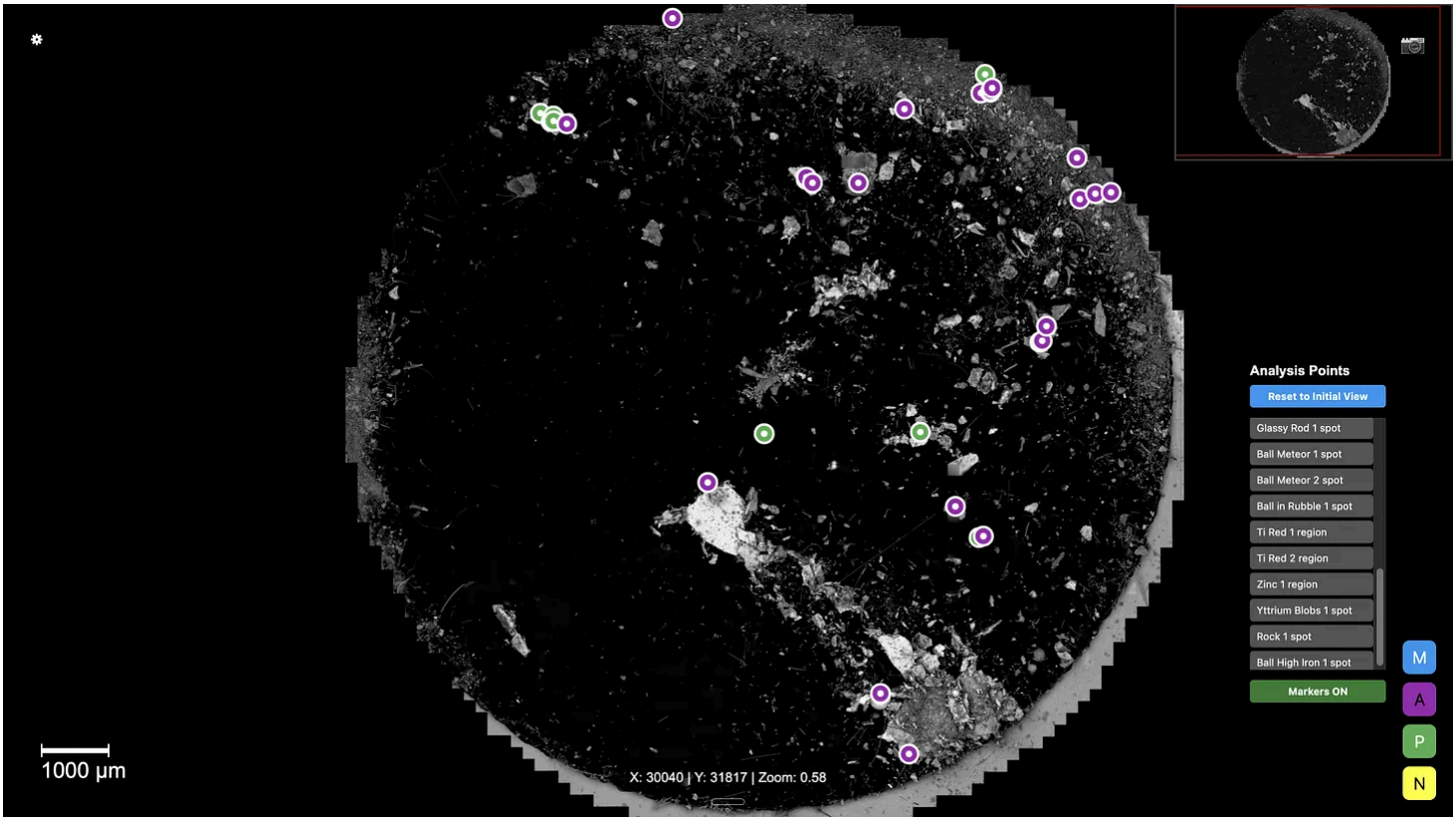
UPDATE#4 - Points of Interest Overlay Toggle!

I have added overlay clickable markers to the points of interest panel (which now appears first and populated), which can be toggled on and off, making it even easier to review the data.

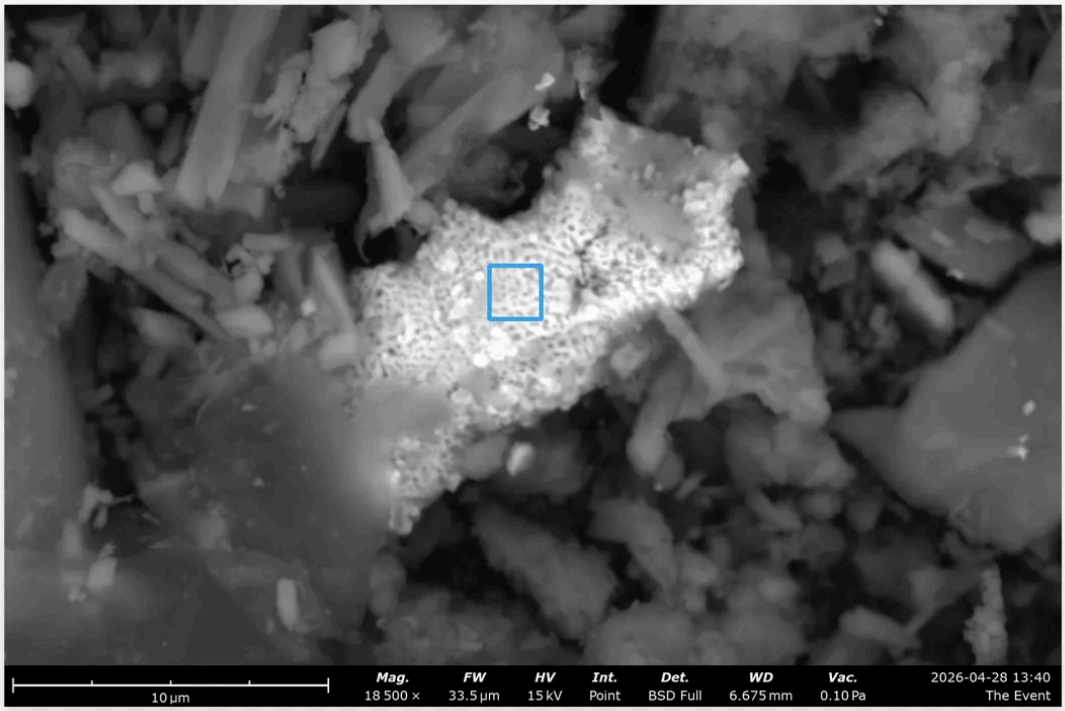


UPDATE#5 - Raw Analysis Panel With Markers

I developed some Python scripts to process the raw microscope analysis files into clean easy-to-read HTML files. I then built a new panel with an associated marker toggle, to allow the user easily access and reference where these various analyses took place.


Analysis Points
Reset to Initial View
Glassy Rod 1 spot
Ball Meteor 1 spot
Ball Meteor 2 spot
Ball in Rubble 1 spot
Ti Red 1 region
Ti Red 2 region
Zinc 1 region
Yttrium Blobs 1 spot
Rock 1 spot
Ball High Iron 1 spot
Markers ON
M
A
P
N
1000 µm
X: 30040 | Y: 31817 | Zoom: 0.58

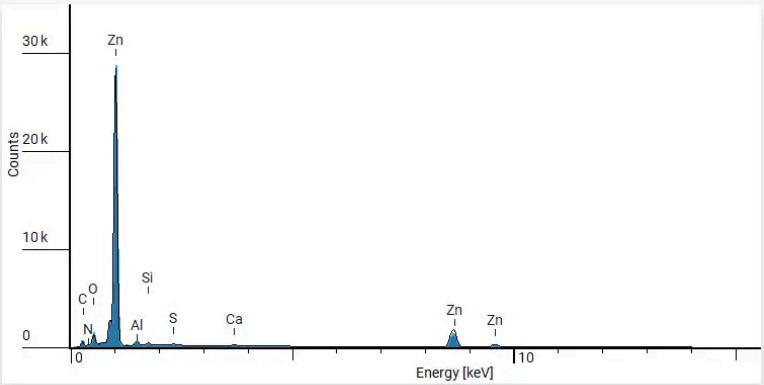
Zinc_analysis_1_region

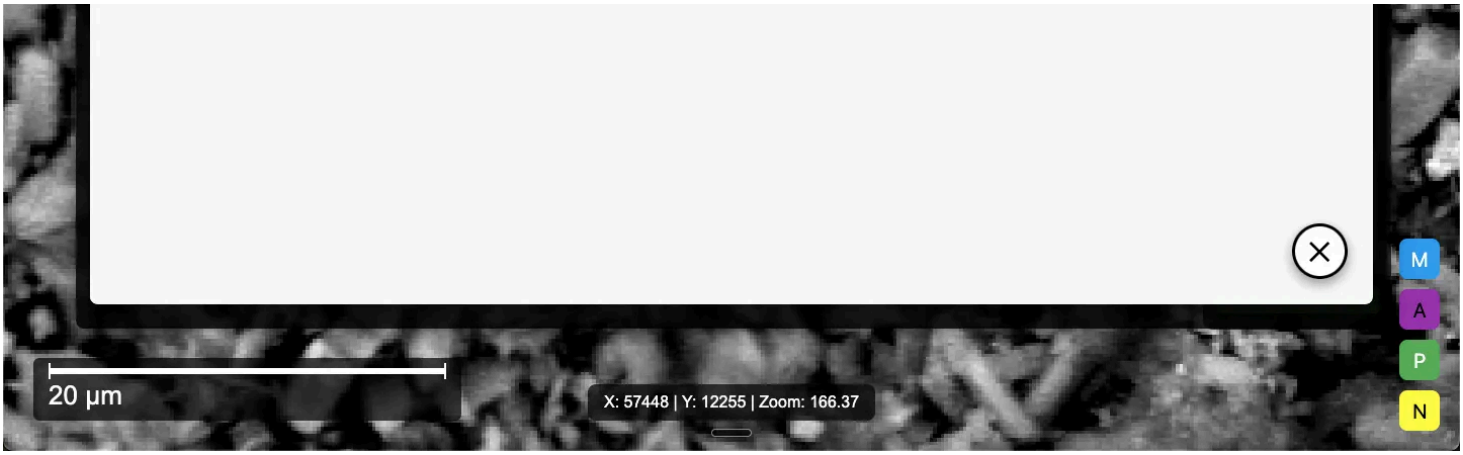


Elemental Composition

Element	Atomic %	Weight %
Carbon	22.68	6.20
Nitrogen	0.31	0.10
Oxygen	13.73	5.00
Aluminum	3.42	2.10
Silicon	1.41	0.90
Sulfur	0.96	0.70
Calcium	0.99	0.90
Zinc	56.51	84.10

Spectrum





UPDATE#6 - Raw Analysis Panel With Markers!

his is a major update that allows people to find things in the dust, investigate them, and record measurements and considerations, including reference links (make sure you have space after the link), into easily accessible buttons that can be exported as small CSV files for sharing. Any new measurements added can be made viewable on the overall map by turning on the markers for the measurements

I have even made a little sample CSV for you to load in (it actually pre-loads now), which you can download here:

See what you can find and send me the CSV of your analysis. Perhaps I will include it in a presentation.

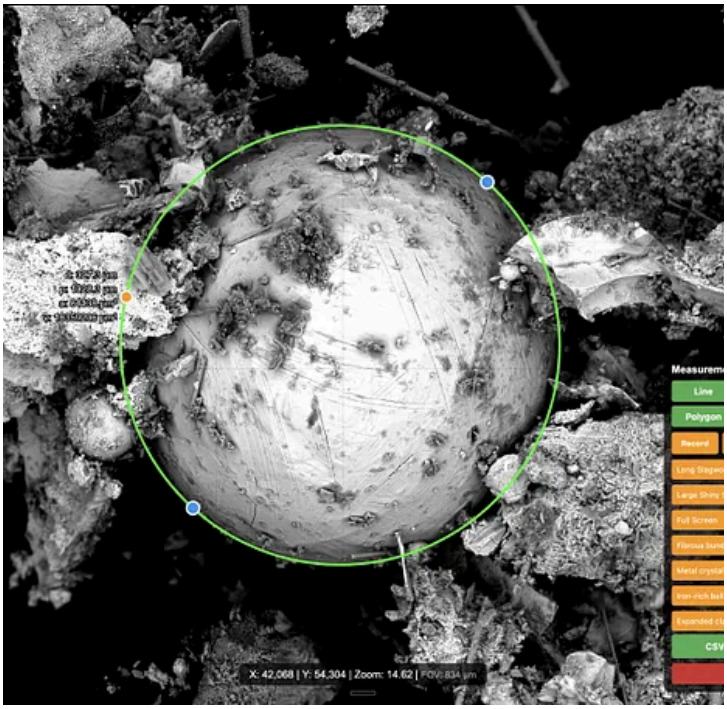


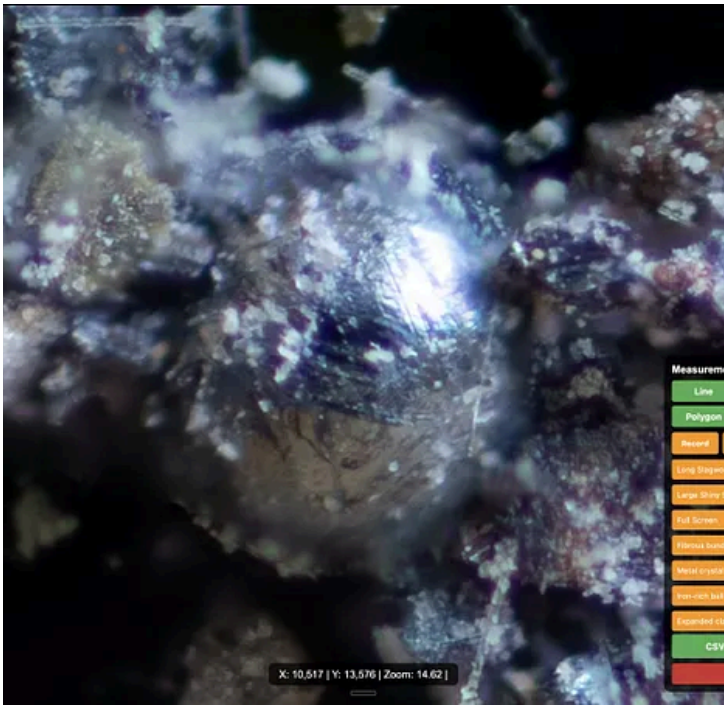
UPDATE#7 - MASSIVE UPDATE!

- Completely overhauled interface with consistency across the board.
- Keyboard shortcuts with help
- Capture images now allows for choice of overlays

and...

you can SWITCH between SEM and Colour Macro Photography - this makes it much easier to see what is what.





UPDATE#8 - Global improvements

Huge amount of work improving the functionality, usability, and appearance of the overall web application. Many improvements to how simple text entered into the description, will appear as rich layout in the viewer.

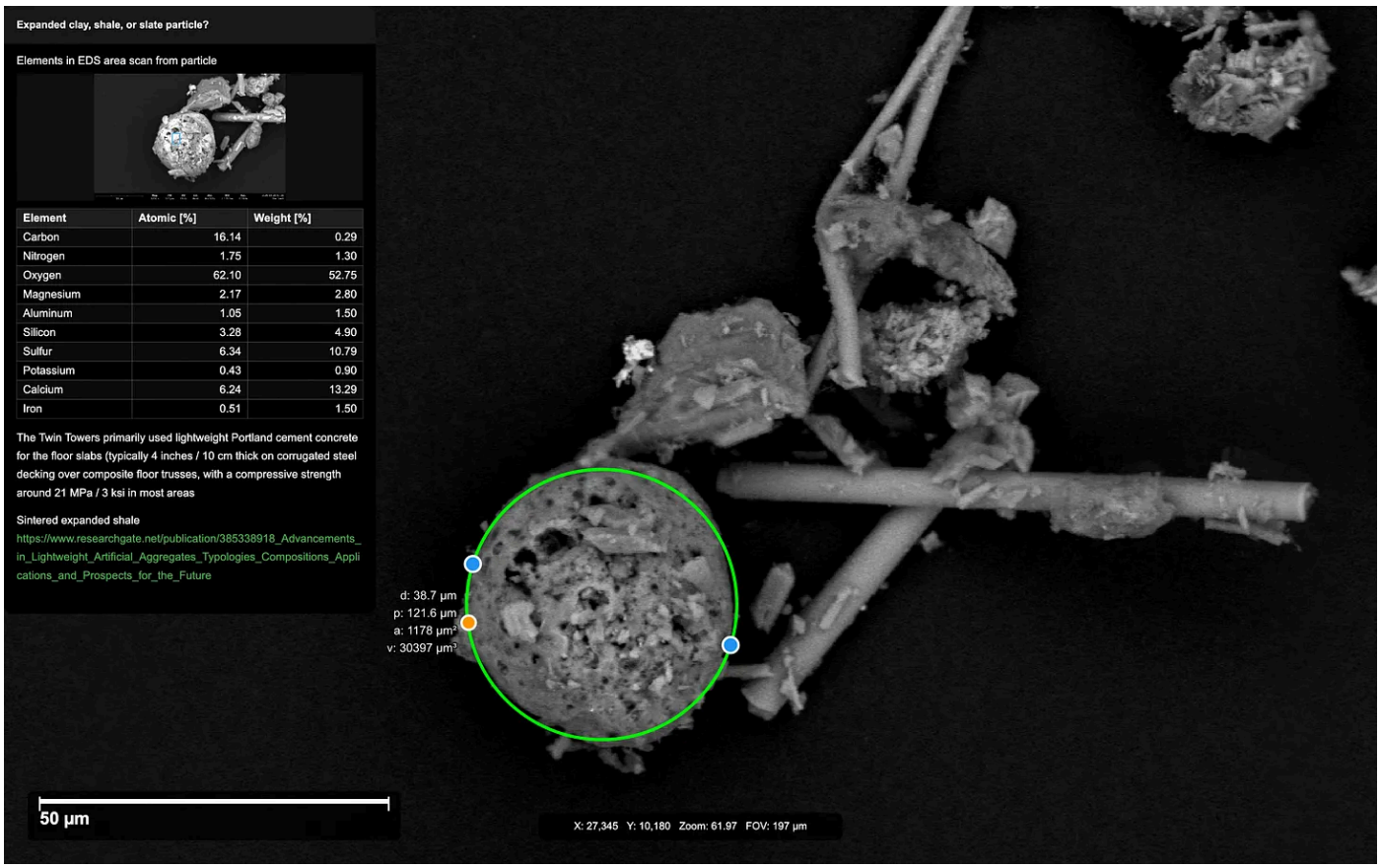
Here are just some of the updates.

Description popup

- Tab-separated CSV data now renders as a proper HTML table with header row, borders, and alternating row shading
- Numeric columns (Atomic %, Weight %, etc.) right-aligned with tabular figure spacing so decimal points line up
- Relative image paths (e.g. `P/image.jpg`) are now detected and embedded, not just `https://` URLs

Canvas screen capture

- Tables, embedded images, and links all render correctly in captures (previously showed as raw CSV text or were missing)



- YouTube embeds show their thumbnail *plus* the URL printed below it in green for later reference



Measurement markers

- Type badge (LINE / CIRCLE etc.) is now the same height as the orange name button in all browsers.

Marker SVG style

- Measurement markers now use the same pin/circle SVG style as POI and Analysis markers, retaining their blue/white colour scheme

Scrollbars

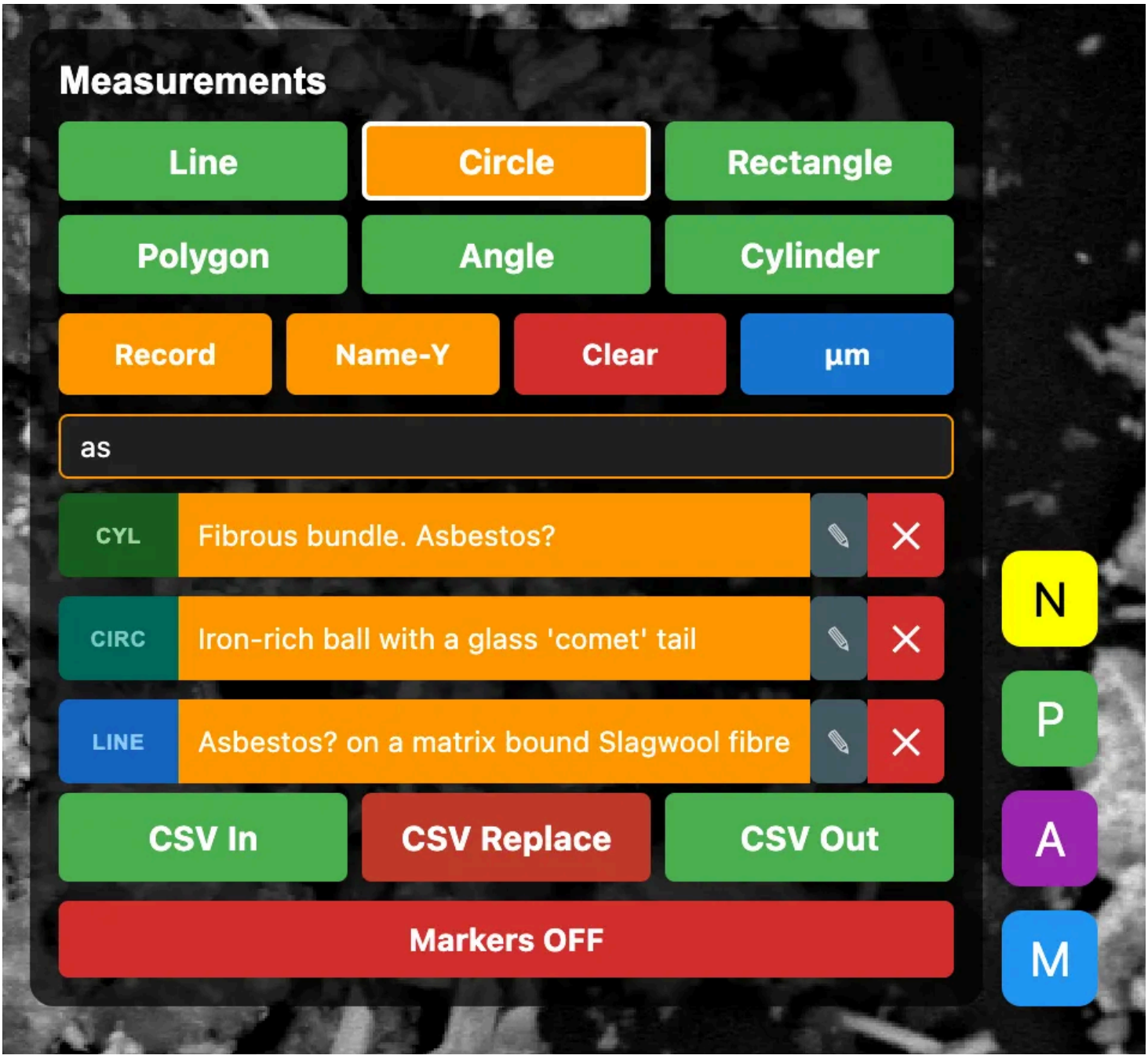
- Global thin scrollbar applied across all browsers

Filters panel

- Brightness and Contrast slider tracks explicitly styled (custom track + thumb pseudo-elements) so they are clearly visible against the dark panel background in all browsers

Measurements panel

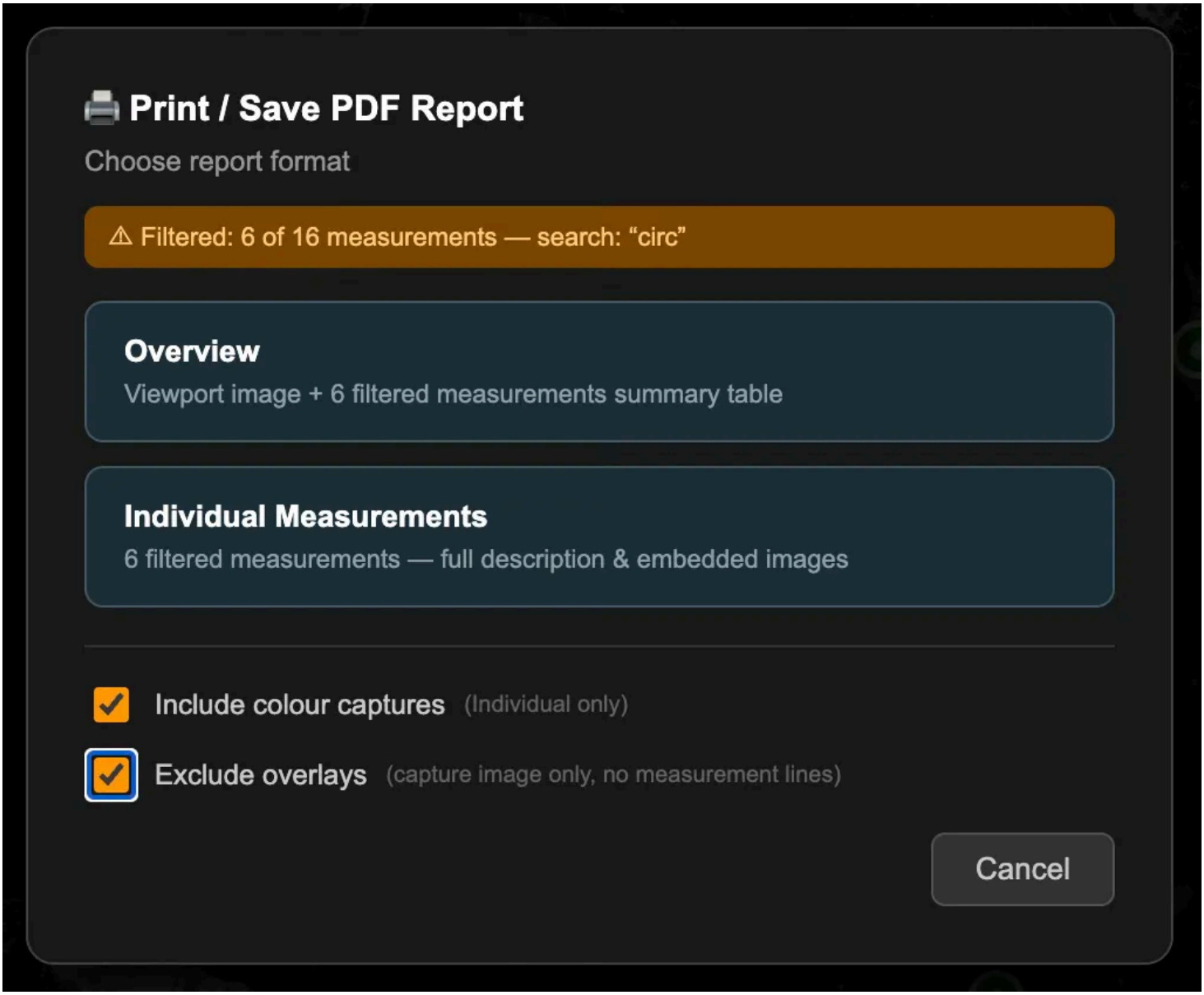
- Ability to filter measurements by type or name by just typing into a box.
- Ability to edit name and content of the description for measurements
- Ability to not just input previously captured CSVs and append them to the list, but also to replace the list with the CSV that you are loading in
- Ability to name and choose where you save the CSV output.



UPDATE#9 - Report Printing and User Guide

Report Production

- **Filter-aware output** — the report now only includes measurements matching the active search or tag filter, with a note in the header showing how many were filtered from the total
- **Statistics table** — the overview report now includes a table at the bottom showing count, mean, min, max, and standard deviation grouped by measurement type
- **Title above image** - in individual mode, each measurement's name now appears prominently above its viewport capture rather than below
- **Colour captures** - new *Include colour captures* checkbox; when ticked, each measurement is shown with SEM and colour images side by side
- **Exclude overlays** - new *Exclude overlays* checkbox; captures can be taken as clean images without SVG measurement markers
- **A4 pagination** - images are now prevented from splitting across page breaks; they push to a new page if they would otherwise be cut



Measurement Panel

- **Clear filter button** - a × button sits to the right of the search input and clears it in one click

Overlay Markers

- **Filter-aware measurement markers** - when a search or tag filter is active, only matching measurements show their blue overlay markers; the rest are hidden
- **Filter-aware POI markers** - the same behaviour applies to green POI markers when filtering in the P panel

- **Filter-aware Analysis markers** - same for purple Analysis Point markers when filtering in the A panel

User Guide

- **New comprehensive guide** - a full 17-section HTML user guide replaces the old image-insertion guide, opened with the T key; covers all panels, tools, keyboard shortcuts, measurement types, and workflows

Keyboard Shortcuts

- p / P swap - lowercase p now opens the Points of Interest panel; uppercase P activates the Polygon tool (previously reversed, which was counterintuitive)

UPDATE#10 - Advanced tools for data analysis + usability improvements

Intensity Profile Panel - Floating panel plots a live pixel-intensity graph along any Line measurement; auto-updates when switching between SEM and colour images.

Classification tags - For people reviewing bulk raw analysis, it is now easy to specify things as unclassified, confirmed, suspect, or rejected. This is a key and powerful tool that will allow experts to confirm validity of particular types of features.

Statistics Script Plots - Found under the statistics drop down, these display every cylinder measurement as a status-coloured dot on a calibrated axis, instantly showing which fibres pass the WHO diameter (≤ 3 μm) and aspect-ratio (≥ 3:1) thresholds required for asbestos identification.

Measurement body drag - Any measurement can be moved as a whole by dragging directly on its line, filled area, or shape geometry.

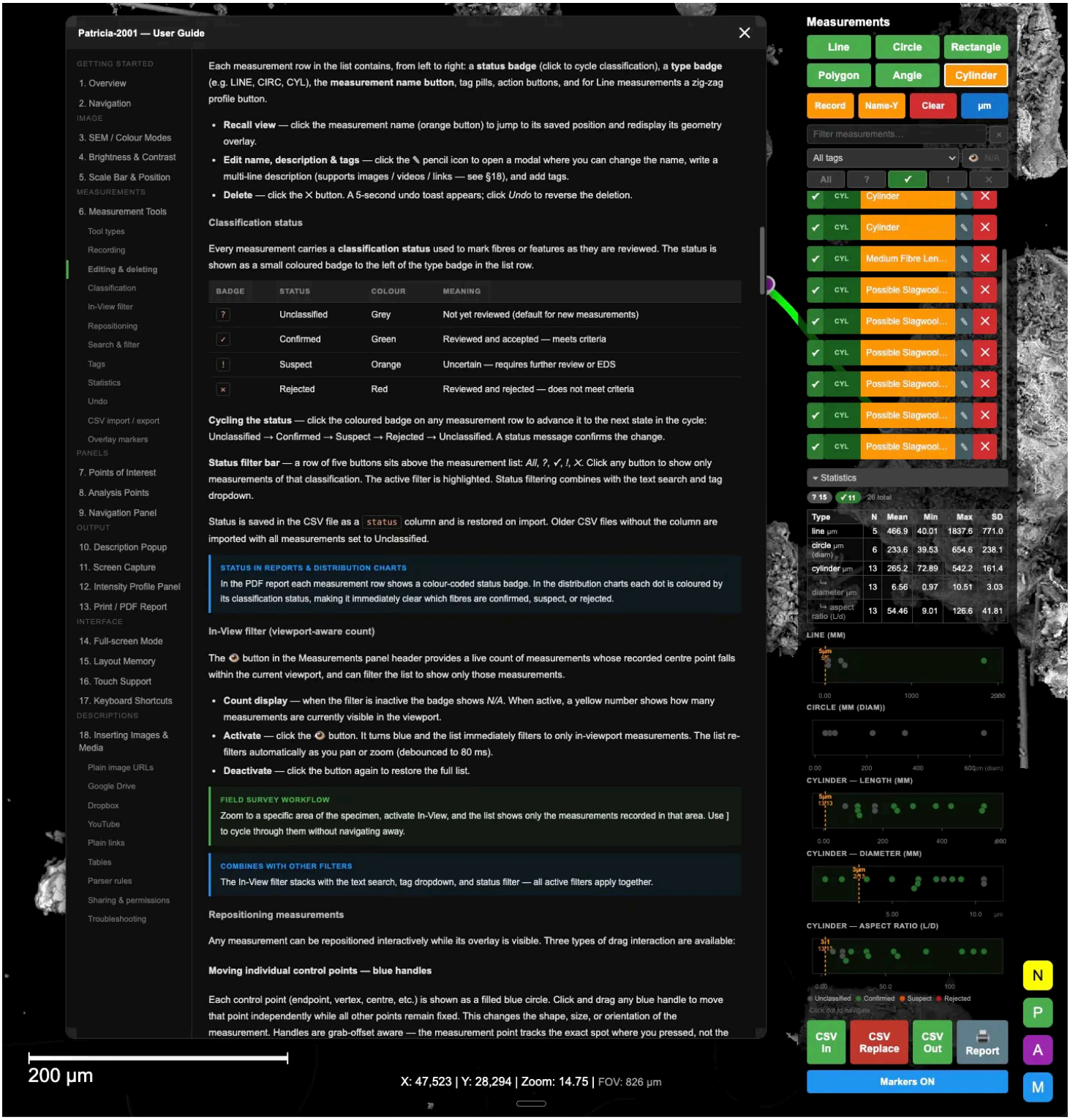
Polygon/cylinder nodes - You can have anywhere from 2 to 9 nodes on polygons and cylinders now. User adjustable.

Handle precision - Endpoint and label handles no longer jump on grab; the cursor stays exactly where you clicked.

Measurement body drag - Measurements can now be repositioned by clicking and dragging anywhere on green lines or in the area enclosed by Circle or Polygon

Marker pulse on hover - Hovering over any row in the Measurements, POI, or Analysis panels brings to the top and pulses its corresponding map marker with a smooth one-second sine-wave animation, ±25% in size.

User guide updated - Guide (T) expanded to cover all new features and added new troubleshooting entries



UPDATE#11 - Now packs native 16-bit Phenom support, multi-dataset switching including your local assets!

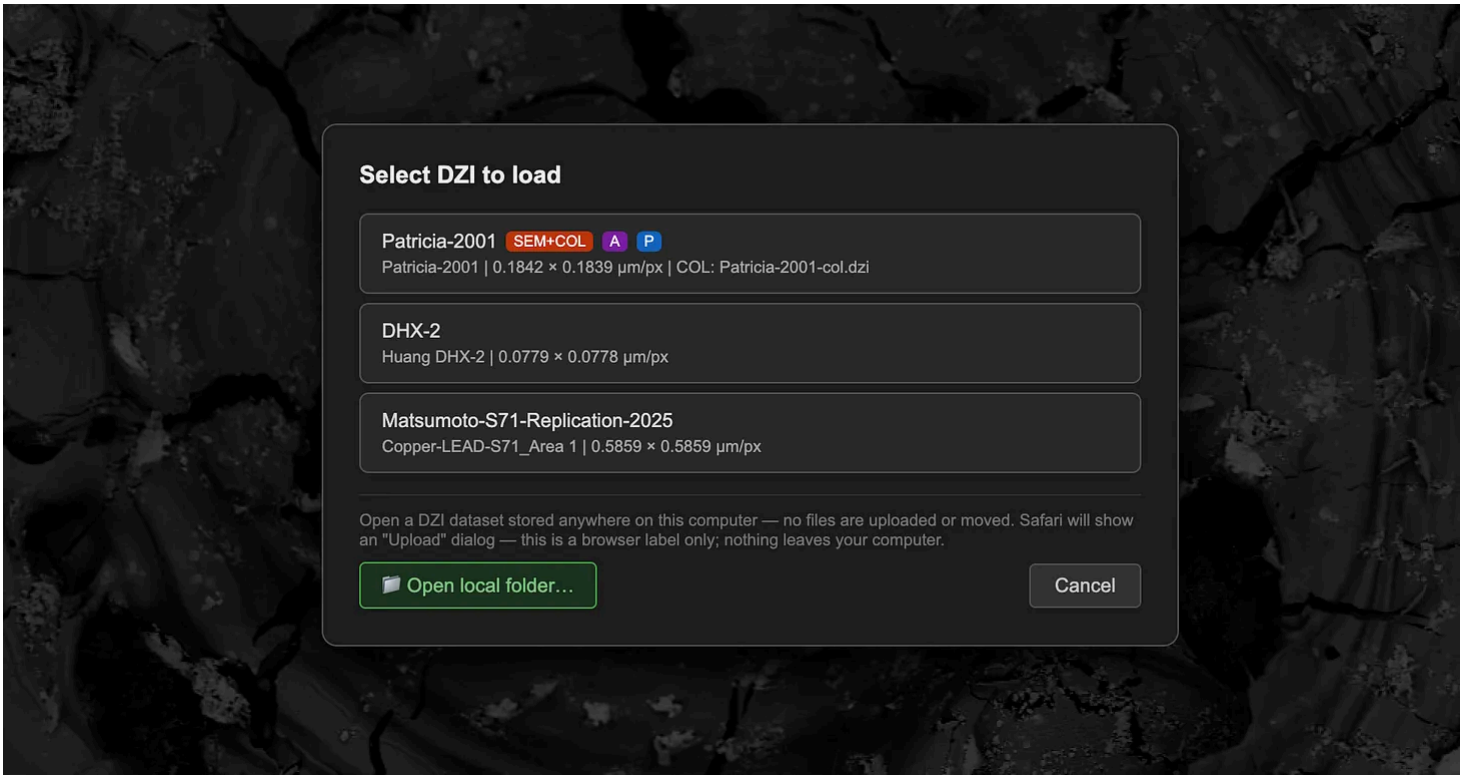
Firstly, I'm going to call this Deep Zoom Image Viewer and Data Analysis tool

Patricia-2001

after the person and sample that inspired me to produce it.

MASSIVE KEY FEATURE!

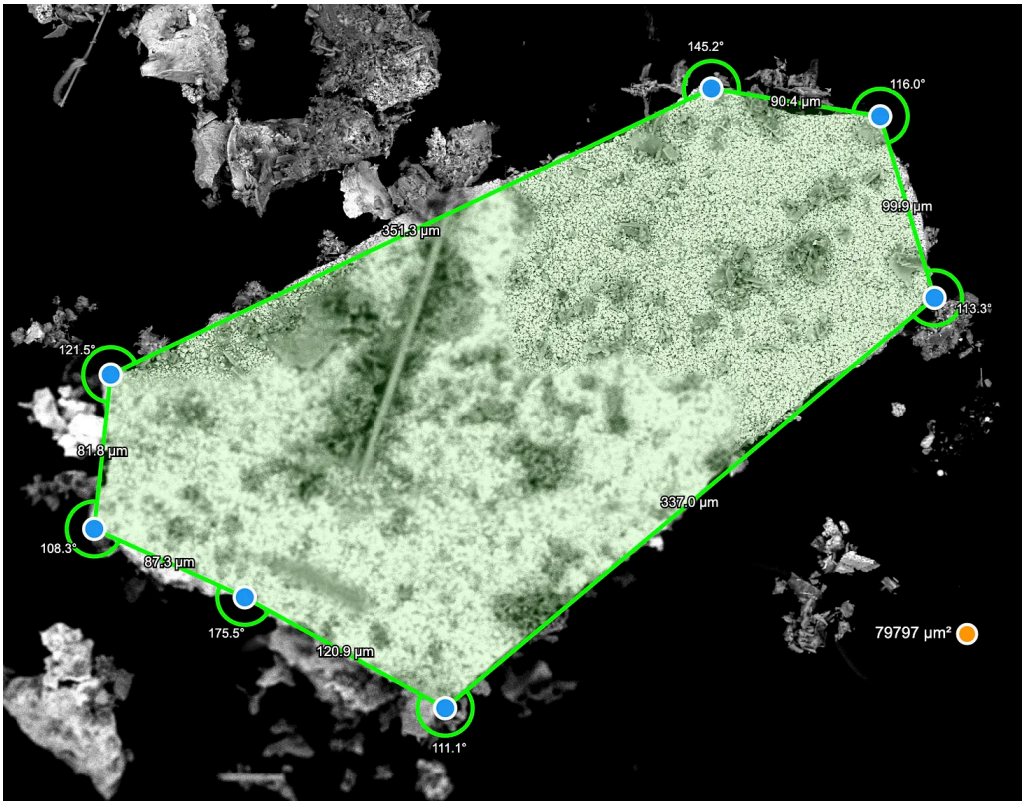
Loading other datasets - including your own off-line ones!



- You can now load any of several different datasets from a single file chooser button (📂 or I key) - the viewer adapts automatically, showing or hiding the Colour, POI, and Analysis buttons and calibrated scale, only when that data actually exists for the chosen dataset.
- DZI files exported directly from a Thermo Fisher Scientific microscope, like the **Phenom XL** in native **16-bit TIFF** format, ***load without any conversion or pre-processing*** - just point the manifest at the exported file and it just works, including pixel width/height calibration, exposure settings and map name!
- The N / P / A panel buttons in the corner now stack neatly together with no gaps when some panels aren't available for the current dataset.

Measurements

- **Rectangle rotation** - rectangles can now be rotated freely using red corner handles (blue handles still resize).
- **Side/arm length labels and outer angles** (L button) - toggle on-screen measurements showing the length of each edge of a rectangle, each side of a polygon, the arms of an angle measurement and outer angels on polygons.



- **Three-state tool toggle** - clicking a measurement tool again deactivates it cleanly, hiding the drawing overlay. Clicking it a third time brings everything back, including the intensity profile if you were using the line tool.
- **Starter measurements** - a dataset can now ship with a pre-loaded set of reference measurements that appear automatically when you open it the DZI in the viewer, without needing a full Points of Interest folder set up.

Interface polish

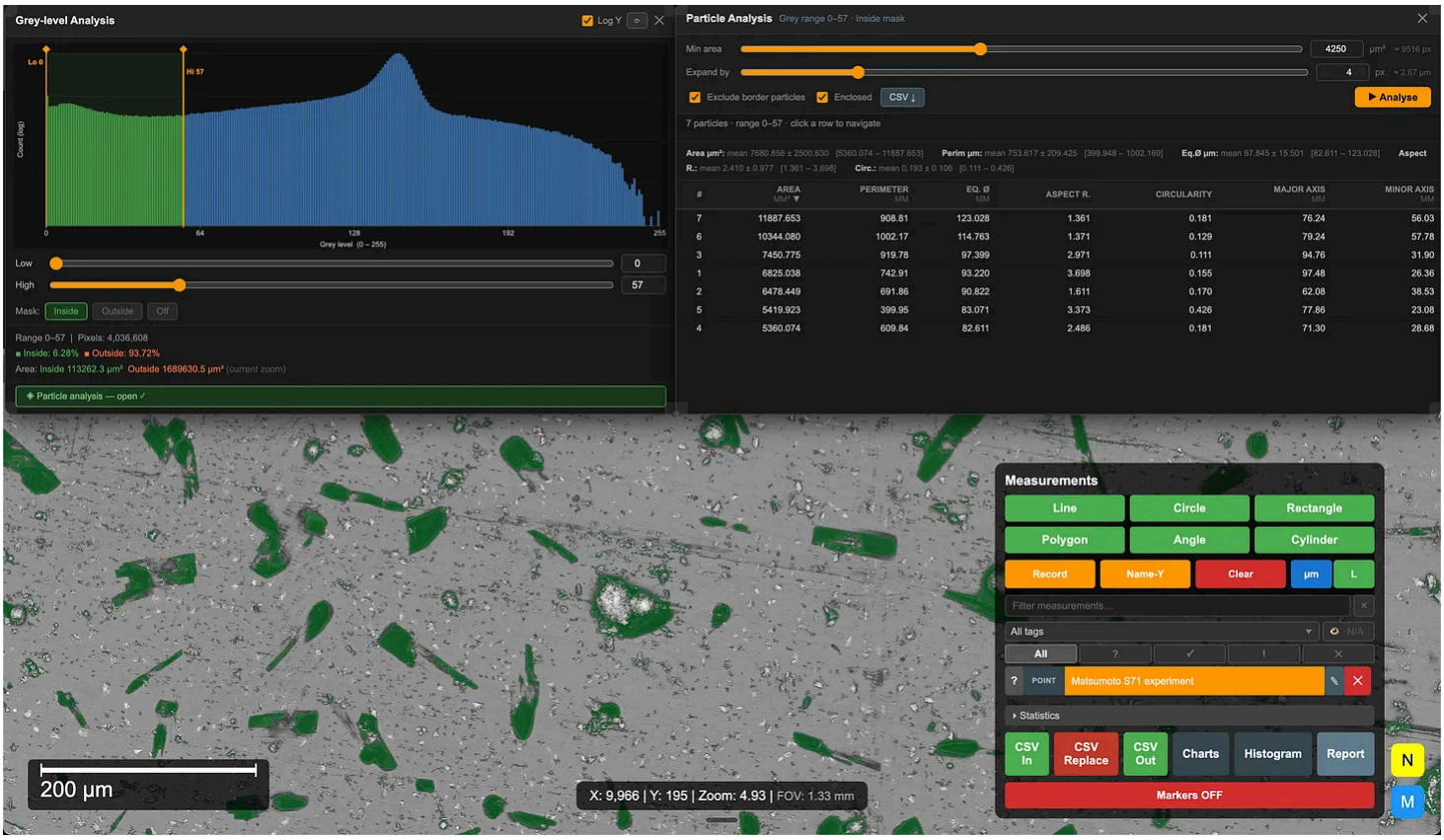
- The keyboard shortcuts popup (? button) now auto-dismisses after 10 seconds, and pressing ? again closes it immediately.
- Copyright notice and support links added to the shortcuts popup.

UPDATE#12 - Selection of pro features added and better navigation

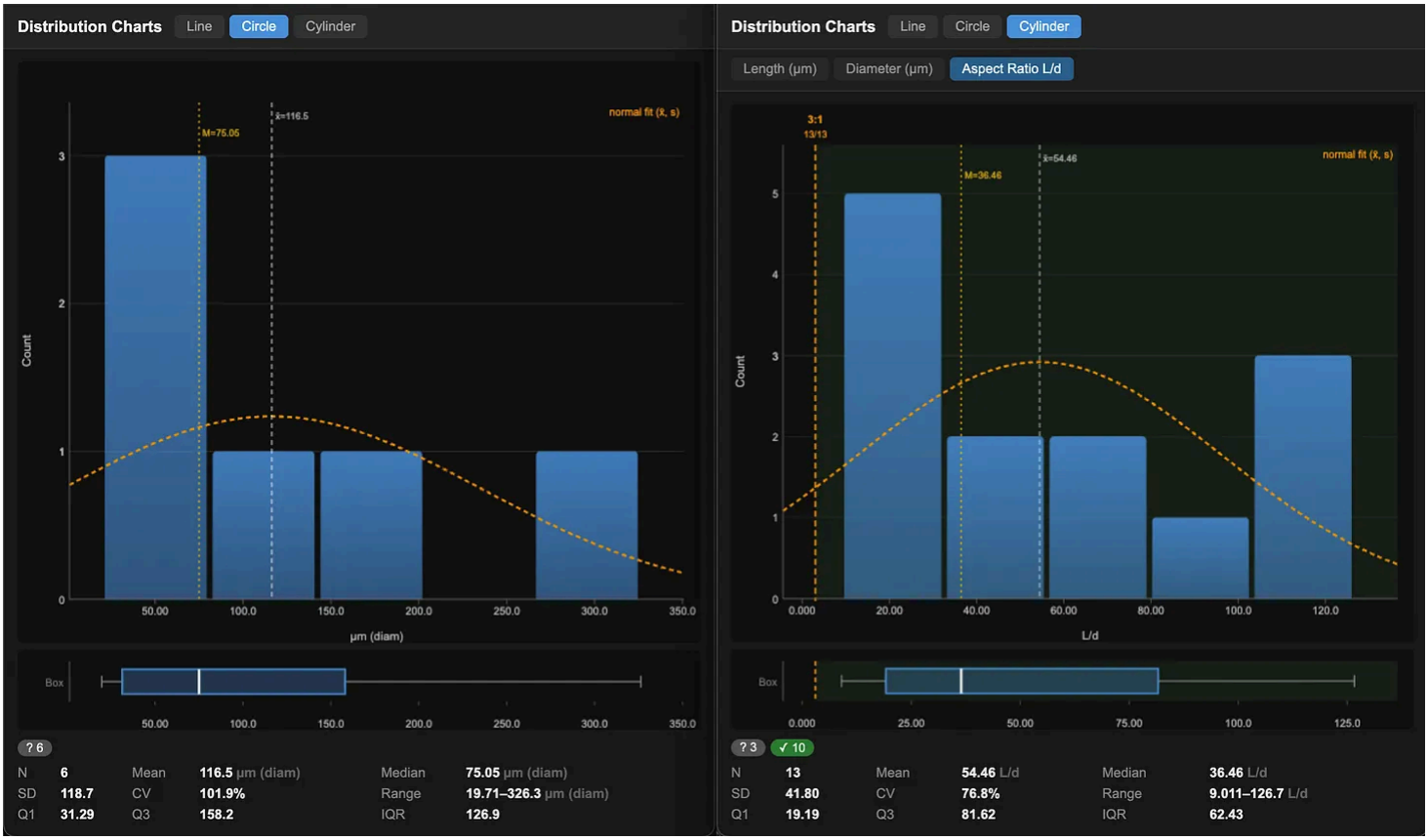
- **Grey level analysis with upper and lower bounds**, inside and out of selected range
- **Measurement Distribution Charts with Statistics** (Prints on dedicated report)
- **Particle analysis tool with export**
- **Real time intensity profile width-averaged cross-section in Rectangle tool**
- Sub-pixel bilinear interpolation overlay for smooth rendering at high zoom levels
- **Shift+drag rubber-band zoom for fast navigation to a specific region of interest**
- **Registration between SEM and COL now near perfect**
- Bug identified in live presentation fixed

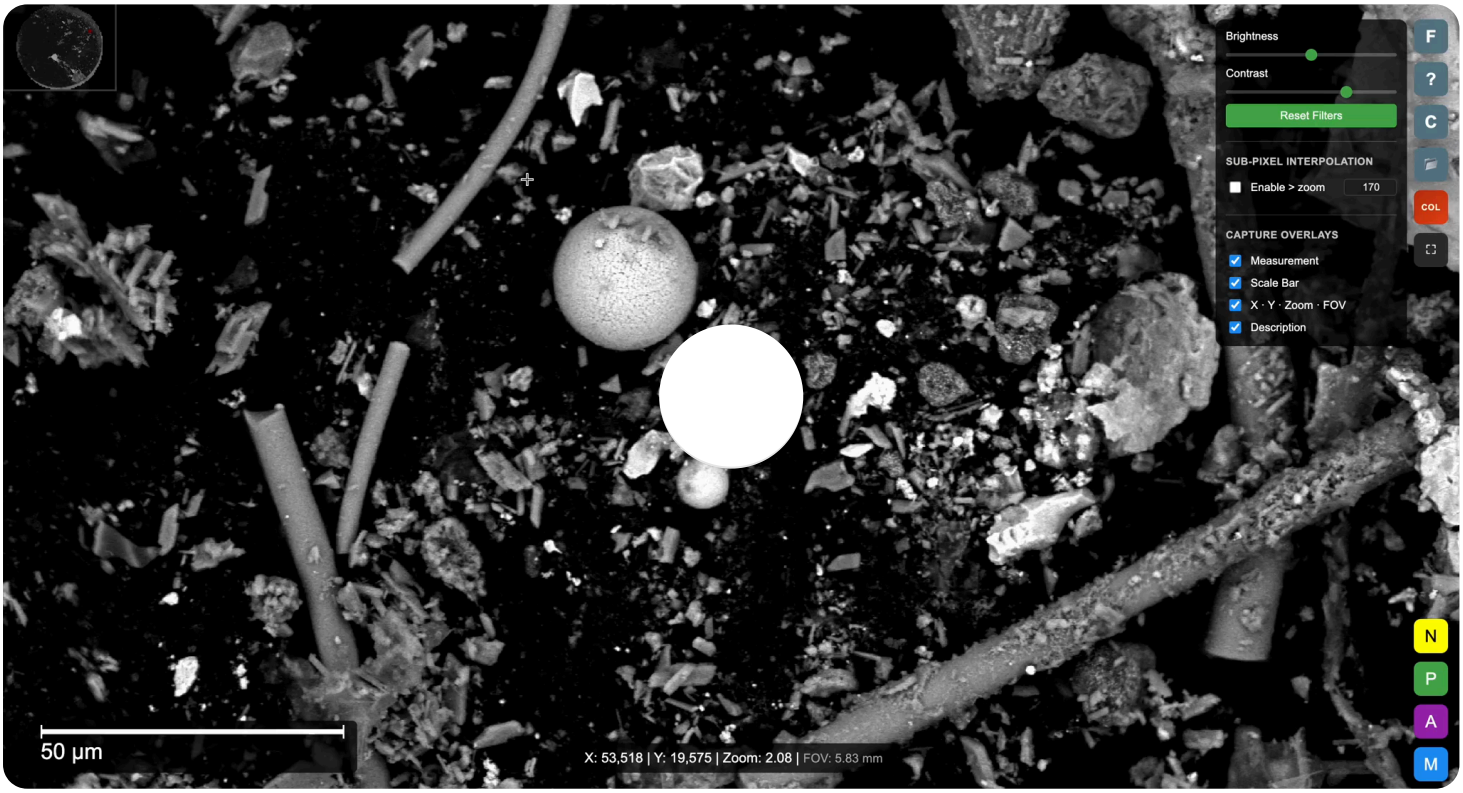
User guide updated

Grey level analysis with upper and lower bounds



Measurement Distribution Charts with Statistics

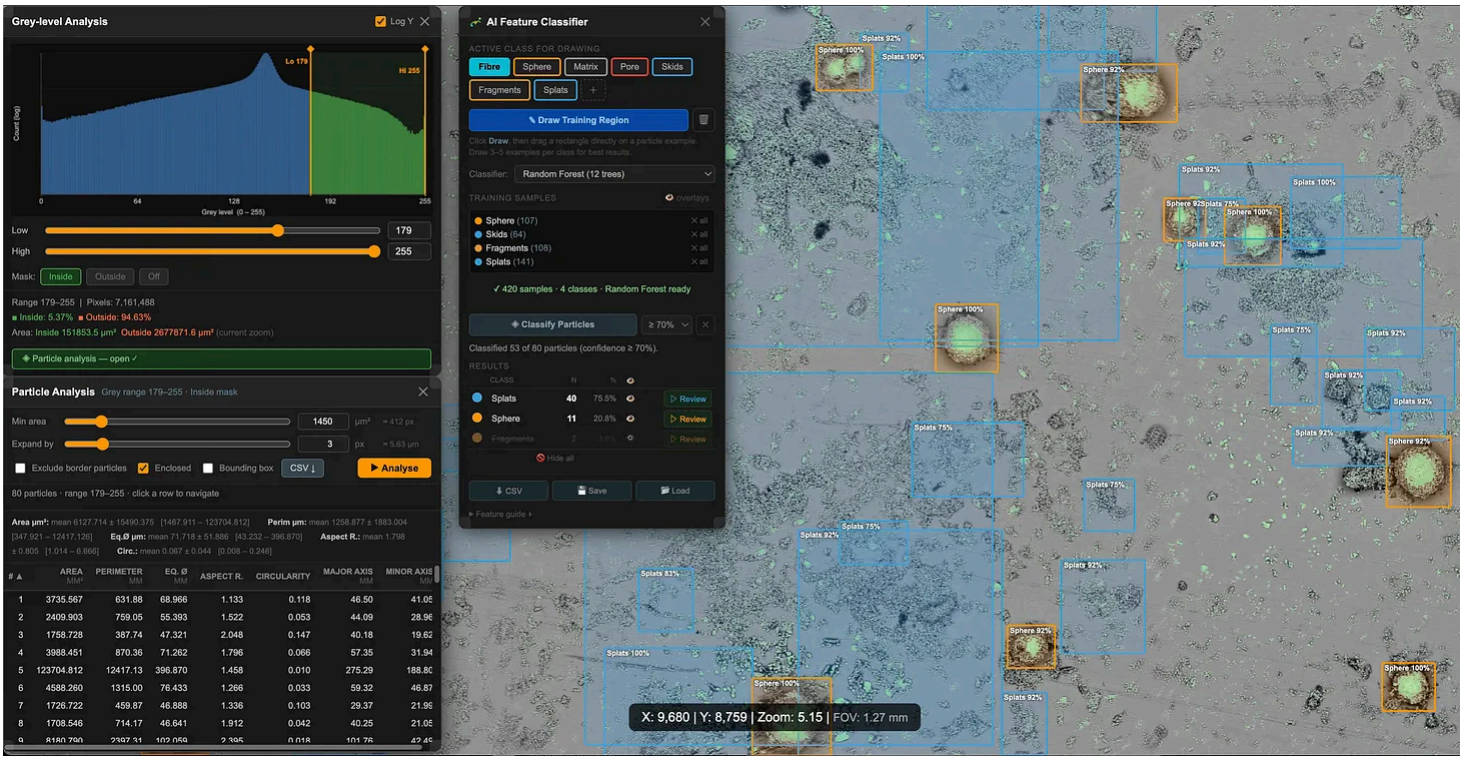


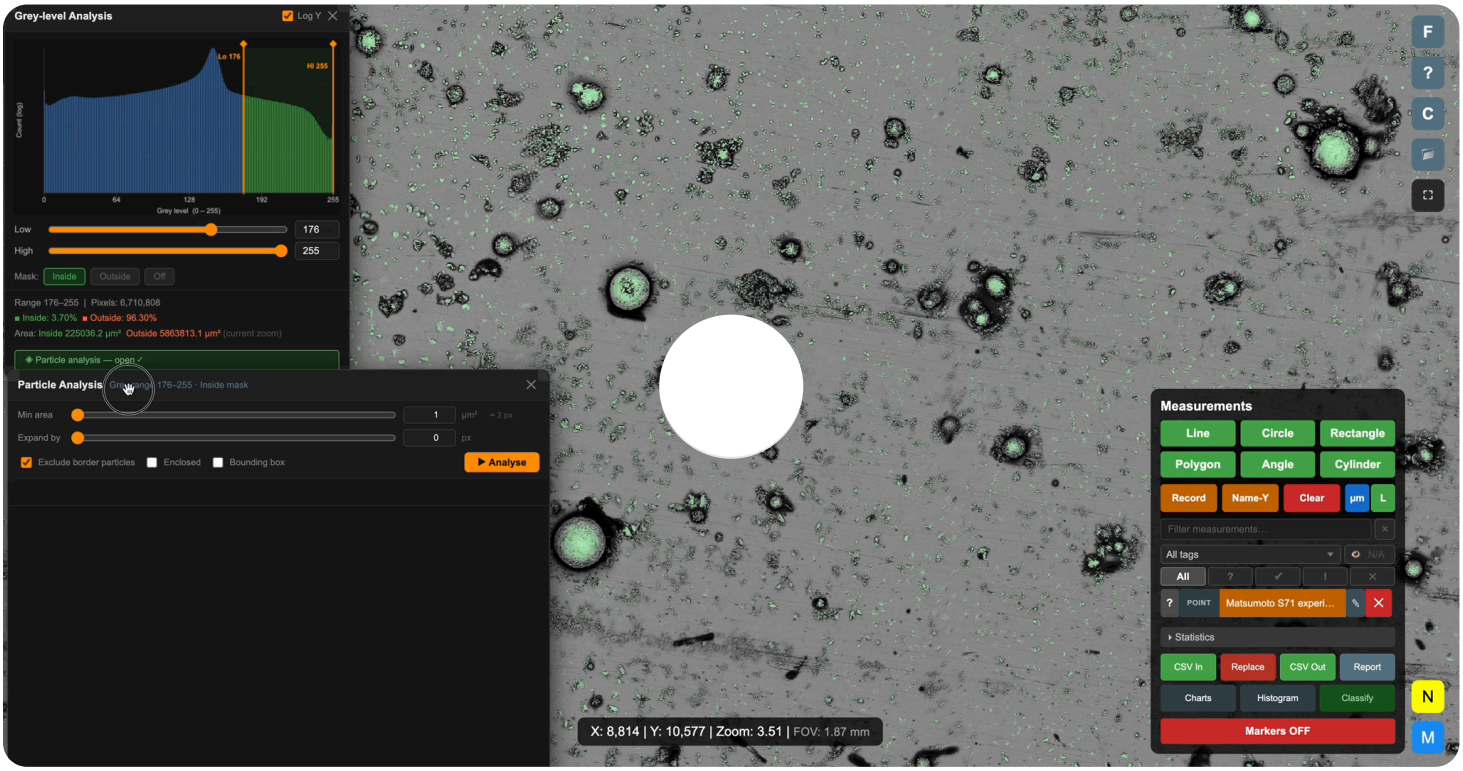


UPDATE#13 - AI Assisted Feature Classifier

Huge feature, allows you to train the tool with a user defined and hand picked collection of SEM features and then, with the use of the Grey Level and Particle Analysis tools, you can detect similar features in the data.

Training data can be saved to use in the analysis of future samples of a similar type, to compare and contrast.





Remote View is a reader-supported publication.
To receive new posts and support my work,
consider becoming a free or paid subscriber.

Type your email... Subscribe



36 Likes · 2 Restacks

Discussion about this post

Comments Restacks

Write a comment...

Rob Belcham 15 May

Liked by Bob Greenyer

Wow the detail in that SEM image is astounding, so many spheres and rods. I'm curious as to what this is and how it was produced. Thanks for sharing.

LIKE (5) REPLY SHARE

2 replies by Bob Greenyer and others

Simeon Hein 18 May

Liked by Bob Greenyer

Wow! I love this. It's like we don't even have a clue of what's right in front of us all the freakin' time. And we think we're so smart. Well done!

LIKE (3) REPLY SHARE

4 replies by Bob Greenyer and others

30 more comments...

© 2026 Robert William Greenyer B.Eng. (Hons.) · Privacy · Terms · Collection notice
Substack is the home for great culture