



SIERRA



GROUND-TRUTH COLOUR STANDARDISATION

FOR PATHOLOGY AI

AI GROUNDED IN REALITY

The ground-truth colours in pathology are real data, from real patients that require diagnostics based upon reality for accurate and reliable healthcare. Only by utilising colour management techniques that have the ability to create standardised and ground-truth coloured images, irrespective of whole slide imaging (WSI)

scanner source, will AI truly be able to make these life-changing decisions with complete colour certainty.

To address these challenges FFEI has developed the Sierra colour calibration toolkit – correcting colour using a unique biologically stained slide-based device and DICOM compliant ICC colour profile.



ENSURING WSI SYSTEMS PRODUCE IMAGES THAT ACCURATELY REPRESENT THE STAIN USED

Colour calibration and standardisation is complex. A significant degree of variation in colour exists between different WSI systems. In addition, the method by which WSI systems observe colour is different from the way the human eye does, thus images need to be processed to interpret these differences.

BRINGING COLOUR FIDELITY TO DIGITAL PATHOLOGY DEVICES

Sierra ensures colour fidelity throughout the imaging process. The goal of this is to provide confidence that the colour is representative of the 'true colour' of the tissue sample and not digitally altered by the scanning process. This provides a guarantee that a pathologist, analyst or AI is working from ground-truth, standardised data.

HOW IT WORKS MAKING USE OF ICC-STANDARDISED COLOUR PROFILES TO CALIBRATE WSI DEVICES

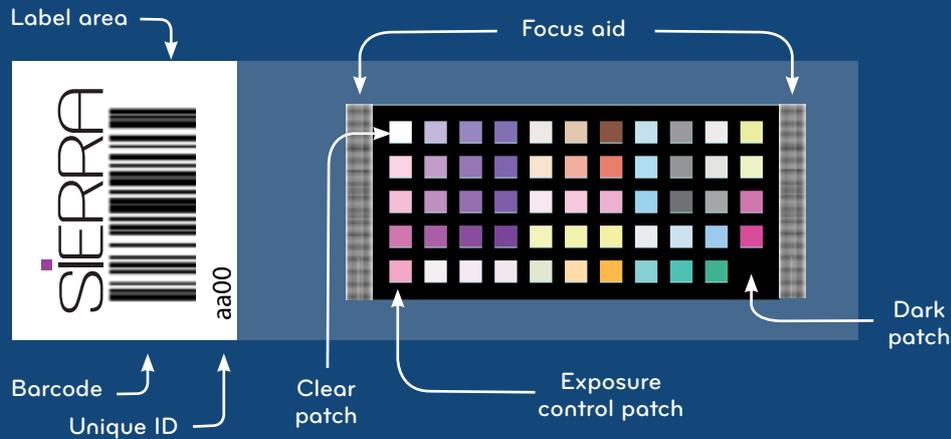


THE SIERRA SLIDE*

Formatted like a pathology slide, so compatible with WSI scanners:

- Small patches of biopolymer bind pathology stains = tissue mimicry
- Creates gamut of pathology colours with reduced metamerism
- Stained with same protocol as for pathology

* This device complements the FDA guidelines for interoperability and simple adoption.



WSI DEVICE MANUFACTURERS

Enhance the accuracy of your scanners and the digital images they produce by colour calibrating them to a unique industry standard ICC profile – bring uniformity to images: product range-to-product range, scanner-to-scanner.



AI SOFTWARE DEVELOPERS

Train and run your digital pathology AI software using accurate, standardised data that reflects ground-truth colour – regardless of scanner used or device manufacturer.



PHARMACEUTICAL

Ensure time-to-market efficiency for new pharmaceuticals by ensuring stringent and competitive GLP, allowing for enhanced next-gen data analysis whilst maintaining ROI for current WSI infrastructure.

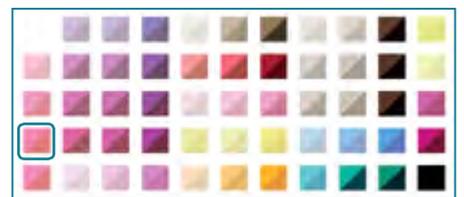
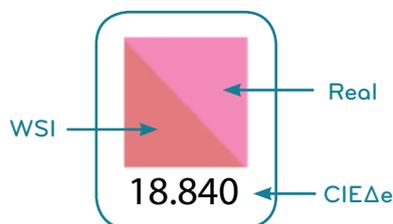
COLOUR UNIFORMITY AND RELIABILITY MAXIMISE AI ACCURACY

No manipulation of pathological data is required for colour fidelity – all images, irrelevant of source, remain digitally unaltered and are of ground-truth colour as standard.

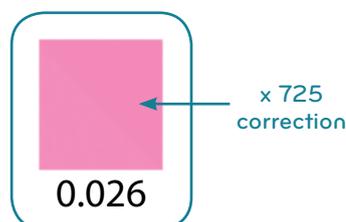
To understand the impact of colour management using this ground-truth calibration slide method, in some instances the colour is improved more than 700+ fold.

It shouldn't be acceptable for a medical device to have over a 700 fold error in any aspect of its function.

BEFORE



AFTER



DEPLOYMENT OPPORTUNITIES FOR SIERRA COLOUR CALIBRATION SLIDE

Often colour calibration is discussed as an 'end of process' activity. In reality colour calibration can be performed at many stages of WSI production and lifecycle.

- **RETRO PROFILING** –Manufacturers can colour calibrate their installed base as part of routine software upgrades.
- **PRODUCTION** – Manufacturers can test and calibrate every scanner at the point of production.
- **TECHNICIANS** – Every lab armed with its own calibration slide and software can test and calibrate their scanners – checking them on a regular basis to ensure accuracy and uniformity.
- **FIELD SERVICE ENGINEERS** – Engineers have the ability to ensure their entire scanner portfolio remains in calibration alignment.
- **DEVELOPMENT** – Calibrate scanners being used for AI.
- **GO-TO-MARKET** – Facilitate means of measuring and calibrating all scanners used by clients to ensure quality of data and accuracy of AI software.

CALIBRATE Measure and calibrate scanners to ICC profile	INTEGRATE Ensuring your database can easily access accurate WSI data	MANAGE Ease of use to ensure digital images remain consistent and accurate
ICC colour profile based upon real biological stains	Design software that uses images from any scanner with metadata to correct colour difference	No expertise and little time required to scan and calibrate
WSI device independent – confidently use any vendor scanner and know any changes are due to pathology not machine variation	A simple file of consistent architecture that can be read alongside any vendor file format – DICOM compatible	Bespoke software applet for intuitive management of data
Colour management shows ground truth – standardised to real colour	Apply to any scanner with no affiliation to that scanner vendor – freedom to market accurate, scanner-agnostic AI	Simple, effective addition to field service engineer toolkit
Correction of colour to ground-truth – does not change pathology	Utilise FFEI expertise to simplify integration further	Can easily adopt universal method without expensive and inhibiting vendor contracts
Always guarantees that colour after service is same and accurate as fresh from production	Increasing the accuracy of digital pathology image data	Colour standardisation of all digital images regardless of scanner manufacturer, range or device

FFEI LIFE SCIENCES

FFEI designs and manufactures innovative imaging technologies that enable our partners to fast track their concepts into market leading life science laboratory products.

We have an impressive reputation for developing sophisticated solutions from concept to delivery. Whether the challenge is WSI colour calibration or creating ultra high-resolution micro

scanning mechanisms for digital pathology – FFEI has the capability.



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