**ANY TOOL or modifications that are shared across multiple tools**

V.1.3.1.1

* Resolves an issue affecting the calculation of the bit depth of images imported using Bio-Formats in batch processing tools.
* Implementation of a quantile outlier detection method.

V1.3.1

* Fixes a bug that impacted the generation of the batch field homogeneity table when QUAREP WG3 tools were selected.
* Improves the display of vertical and horizontal profiles across the intensity center in the QUAREP WG3 tool.
* Adds a summary .xls file to the PSF Profiler and Batch PSF Profiler tools for use with the Metrolo2Omero ImageJ Macro by Ioannis Alexopoulos (available at: https://github.com/jalexop/Metrolo2Omero).
* Resolves an issue with the Show About button in the Main MetroloJ\_QC bar (this bug had been previously fixed but was inadvertently reintroduced in version 1.3.0).
* Adds an error dialog to prevent the analysis from fully stopping if a previous analysis with the same title was already generated.
* A general setting is introduced to override the input image bit depth control. MetroloJ\_QC tools are validated only for 8-16 bit images, and results with 32-bit images are not verified.
* The option to open images as virtual stacks is now enabled when using the batch versions of the various tools.

V1.3.0

* A log table summarizing how input images are processed has been introduced.
* The user interface ergonomics have been improved.
* Any generated .xls file now includes the microscope, detector, and filter set parameters, as well as the algorithm parameters.
* Preset values can now be modified by the user.
* The main output PDF report is saved in a subfolder, while any additional data is stored in a separate "data" subfolder.
* The ability to work with multiple image files (such as .lif files) has been added, using the series names.
* The behavior of the algorithms when the saturation exclusion option is selected and saturation is detected has been revised.
* For clarity, the dialogs use the term "bead identification" to refer to the process of detecting multiple beads within a single image, whereas "bead detection" pertains to how a single bead is detected in an image containing only that bead (prior to calculating its center coordinates)
* Controls have been added to batch tools, ensuring that all analyzed images have the same number of channels

V 1.1.3

* Fixes a bug that occurred when attempting to analyze an unsaved file (which prevented the creation of a FileInfo object).
* The main formulas used in the tools are included in the final report, except for those pertaining to the Camera Noise tool and the Variation Coefficient tool.

V 1.1.2

* The final analysis parameters table includes details on the operating system, Java versions, and ImageJ versions, along with the operator's name and the report date.
* The Microscope Info table displays the file creation date and acquisition date (when available), as retrieved from BioFormats.
* Resolves issues related to accessing resources, specifically the PNG images of the tool used for the report.

**Field Illumination Tool (FORMELY FIELD ILLUMINATION HOMOGENEITY) & BATCH**

V.1.3.0

* User-provided input parameters are now managed as "filter sets" instead of "microscopes," although they remain unchanged. Users can now name these filter sets, which were previously referred to as channel#.
* The isointensity images have been updated to fix a bug related to the legend for the 90-100% zone (this bug also existed in the original MetroloJ plugin). Legends are now managed in an overlay.
* Some analyses from QUAREP-LIMI WG3 have been introduced and will be displayed if a general optional setting is selected.

V 1.1.3

* Fixes some bugs on the final analysis parameters table

V 1.1.2 as compared to original metroloJ plugin:

* Uses multiple channel images (up to 7 channels). Use of single channel images is still possible.
* Saturated images can be discarded from analysis. However, if subtle saturation is affecting images, this can be removed using a Gaussian blur.
* Adds some metrics (as defined in Faklaris et al. 2021)
* The reference zone used for metrics calculation can be chosen. This is either the 100% intensity zone or the last isointensity image bin zone (eg. 90%-100% intensity if bins number is 10). In the original MetroloJ plugin, the reference zone is the bottom-rightest pixel of the image having the maximum intensity.
* Introduces advanced report parameters:
* Possibility to highlight outside specs measurements
* Full control on produced data (pdf, excel files and analysis images).
* Setup information (including acquisition date read from metadata) is provided
* Analysis parameters are listed for the sake of traceability
* A batch mode is provided. Mind that all analysed images should have the same number of channels. In batch mode, the excitation/emission wavelength data is not traced in the final reports.

**AXIAL RESOLUTION TOOL (formerly Z profiler).**

V 1.1.3:

* Adds a "Swap Dimensions" checkbox to the main menu, along with a listener to retrieve the desired XZY or YZX stack.

V 1.1.2 as compared to original metroloJ plugin:

* Enables the analysis of multichannel images.
* Considers the dimension order (XYZ, XZY, etc.).
* Applies different formulas for axial resolution calculation.
* Provides a summary of the analysis parameters used.
* Displays setup information, including acquisition date from metadata.
* Lists analysis parameters for traceability.

**PSF PROFILER tool & BATCH**

V1.3.0

* The issue between annuli and crop factor has been reconsidered, and the handling of inconsistencies between these two parameters has been revised.
* A new method for bead center detection (Centroid) has been introduced.
* The overall display of the PSF XY, ZY, and XZ views has been updated (through the use overlays).
* The Batch tool now generates a raw results file, including outlier values (when the “remove outliers” option is selected).
* The main dialog has been streamlined with buttons, and only the parameters essential to the algorithm are requested for clarity.

V 1.1.3

* Fixes a bug that occurs when annuli around beads touch the image edges. In such cases, the enlarged ROI is not created, preventing a null error.
* When the input dataset contains a single channel, the bead channel identification box in the main menu is disabled.
* Fixes a bug that arises when annuli drawn around beads for background estimation touch the image edges.
* Updates the LUT of the PSF views when the “inverted square root image of the PSF” option is selected.

V 1.1.2 as compared to original metroloJ plugin:

* Supports multi-channel images (up to 7 channels). Note that selecting multiple single-channel images from open windows is no longer possible.
* Allows for the use of images containing multiple beads. Rejection criteria ensure that bead images are not compromised or cropped. A 2D image shows the analyzed beads, and a spreadsheet with bead coordinates is generated.
* The user-specified bead size is compared with the recommendations from Faklaris et al. 2021.
* Signal-to-background ratio estimation is provided, though background is only estimated, not removed.
* Information is provided on whether the dataset meets the Shannon-Nyquist criterion.
* Saturation is analyzed, and an option is available to exclude saturated channels from the analysis if desired.
* Different formulas for spatial resolution are applied, with the formulas displayed in the final report section.
* A lateral PSF asymmetry ratio is calculated.
* Advanced reporting options include:
* The ability to highlight measurements outside specifications.
* Full control over output formats (PDF, Excel files, and analysis images).
* Square root images of the XY, XZ, and YZ projections for enhanced PSF inspection.
* Setup information, including acquisition date from metadata, is displayed.
* Analysis parameters are listed to ensure traceability.
* A batch mode is available, with the condition that all analyzed images must have the same number of channels and the same excitation/emission wavelength specifications.
* The final report provides the average R² and signal-to-background ratio (SBR) of the aggregated beads.

**Co-Registration tool (formerly Co-alignement) & BATCH**

V1.3.0

* The original (legacy) center detection method has been reconsidered, and the user is alerted to potential bias by displaying the detected "ellipses" (beads) used to derive the bead's center coordinates. A second method (centroid) is introduced to bypass this issue.
* The calculation of the polar resolution distance (also known as the "reference distance") has been corrected as per the request from QUAREP-LIMI.
* The overall display of the two-color XY, ZY, and XZ views has been updated.
* The Batch tool now generates a raw results file, including outlier values when the "remove outliers" option is selected.
* The main dialog has been simplified with buttons, and only the parameters essential to the algorithm are requested for clarity.
* As per beads identification, potential bead doublets can now be excluded

V1.1.3

* Fixes a bug linked to the use of File.separator to specify “/” in the reportSection class. This was changed to “/” but macOS compatibility has to be checked.

V 1.1.2 as compared to orginal metroloJ plugin:

* Supports multi-channel images (up to 7 channels). Note that selecting multiple single-channel images from open windows is no longer possible.
* Allows the use of images containing multiple beads, with rejection criteria ensuring that identified bead images are not compromised or cropped. A 2D image shows the analyzed beads, and an Excel file with bead coordinates is generated.
* The user-provided bead size is compared with the recommendations from Faklaris et al. 2021.
* Signal-to-background ratio (SBR) estimation is included, though background is only estimated, not removed.
* Provides indications on whether the dataset meets the Shannon-Nyquist criterion.
* Saturation analysis is provided, with an option to exclude saturated channels from the analysis if desired.
* The report specifies the exact reference distance used, based on the wavelength-associated resolution values for full traceability.
* Different formulas for spatial resolution are applied, with the relevant formula indicated in the final report section.
* Lateral and axial ISO21073 co-registration accuracies are calculated.
* Advanced reporting options include:
  + The ability to highlight measurements outside specifications.
  + Full control over the output format, including PDFs, Excel files, and analysis images.
* Setup information, such as acquisition date read from metadata, is displayed.
* Analysis parameters are listed to ensure traceability.
* A batch mode is available, where all analyzed images must have the same number of channels and share the same excitation/emission wavelength specifications.

**CAMERA NOISE**

V1.3.0

* To enhance clarity, the main dialog has been divided into sections for noise and "temperature pixels." Additional options have been introduced to improve the display of temperature pixel frequency images.

V 1.1.3

* The identification of abnormal pixels now utilizes multiple threads.
* The scale bar for the abnormal pixels map has been corrected and is expressed as a percentage.
* If no abnormal pixels are detected, the scale bar will not be displayed, and the distribution table will indicate a "none found" message.
* Introduces the option to artificially set the dynamic range of the noise map to 0-6e-.

V 1.1.2

* Supports single-channel or multiple-channel inputs (for multiple camera setups).
* Provides noise metrics, including offset, DSNU, median, and RMS noise.
* Detects warm, cold, and hot pixels, along with distribution and frequency analysis.
* Displays setup information, including acquisition date from metadata.
* Lists analysis parameters to ensure traceability.

**Variation coefficient tool**

V 1.1.2 as compared to original metroloJ plugin:

* Supports multi-channel images (up to 7 channels/detectors), while still allowing the use of single-channel images.
* Saturated images can be excluded from the analysis.
* Advanced reporting options are introduced, providing full control over the output data (PDF, Excel files, and analysis images).
* Displays setup information, including acquisition date from metadata.
* Lists analysis parameters to ensure traceability.

**TESTS tool**

V 1.3.0:

* New tools are available to test bead identification parameters, utilizing either intensity thresholding or ImageJ's maximum finder tool. The "threshold" bead identification tool can also be used to set the threshold detection parameters related to bead detection.
* A tool has been introduced to visualize how the signal-to-background calculation associates with detected ROIs.

**DRIFT PROFILER TOOL**

V 1.3.0:

* Introduces a series of analyses to measure the displacement of beads over time.