# CENTRAL UNIVERSITY OF RAJASTHAN

## CORRIGENDUM

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**CURAJ/Purchase/Tender/R/F.149/2023-24/1258** **Date-18-07-2023**

## CORRIGENDUM

This is with reference to the tender notice no. CURAJ/PURCHASE/TENDER/2023-24/902/dated 21/06/2023 for the supply & installation of **High-Performance Laser Scanning Confocal Microscope under HEFA Grant** at Central University of Rajasthan. The Technical Specifications mentioned in the earlier tender document has been revised as mentioned below:

| Sl. No. | Feature | Revised Technical Specification |
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| 1. | Confocal microscope | We require full motorized research inverted laser scanning highly sensitive confocal microscope suitable for BF/DIC/Fluorescence applications. The microscope should be capable of doing the following applications:<br>Fixed cell and long-term live cell biological samples including plant samples; should be capable of doing- Z stack, co-localization, bleaching, PA-GFP activation, advanced 3D imaging, Super resolution imaging, 3D deconvolution, time-lapse, 3D rendering, FRET, FRAP, time lapse imaging, etc. The microscope should be fitted with all the latest and necessary hardware and advanced software for the above-mentioned applications and analysis. The machine and the associated software should be fully upgradable to any future application not mentioned above, but falls under the capabilities of the instrument being supplied. The further upgradations of microscope and all other components must be onsite. |
| 2. | Band pass fluorescent filters | Fully motorized filter assembly with high efficiency narrow band pass fluorescence filters for green fluorescent protein (GFP), yellow fluorescent protein (YFP), DAPI/Hoechst, Tetramethyl rhodamine (TRITC)/Texas Red/Cy3/Rhodamine/ mCherry/Cy3.5/Alexa fluor 595 or more/better ones. |
| 3. | Scanners | High Speed two / three scanner galvanometer/linear galvanometric/ resonant scanner or **better technology to achieve best scanning speed as required.** |
| 4. | Scanning Speed | Frame rate of minimum **30 fps or better @ 512X512** full format without compromise on the lateral and axial resolution and should be able to perform fast dynamic live cell time lapse imaging with a high speed of at least **400 fps or better @512X16 resolution**. |
| 5. | Scanning Zoom | In between 0.8 X to 40X with steps of 0.1X or better. |

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| 6. | Scanner & Scanning Rotation | The scanner should have "ROI" scan capability for fast scan. Maximum scan resolution should be at least 8Kx8K or better per channel and should reduce to 16X16 resolution. Free rotation (180 degrees or better) |
| 7. | Scanning Field | **18 mm** field of view (FOV) or better. |
| 8. | Objectives | High resolution plan apochromatic confocal grade objectives of 10X/0.4 or better, 20X/0.75 or better, 40x/0.95 oil/dry or better, 60/63x/1.40 oil immersion or better must be offered.<br>Fully automated DIC attachments for all objectives should be offered. |
| 9. | Pinholes | Motorized Variable Pinhole adjustable. |
| 10. | Beam Path | Laser point scanning and confocal detection unit with **built-in/Separate**. Spectral PMT or HyD/GaAsP Spectral detectors. All detectors should be capable of working in Intensity and Spectral mode Imaging. Scanner unit should have laser ports for **UV(405 nm),** VIS, and **IR** lasers. It should include highly efficient excitation laser suppression beam splitting device with low angle of incidence dichorics. |
| 11. | Detectors | Should be capable of simultaneous detection and separation of at least 4 fluorophores out of which minimum 4 or more fluorophores should be based on highly sensitive GaAsP / HyD detectors with QE 45% or more.<br>**Photon counting/frequency domain should be available/desirable with High sensitive detectors.**<br>System should be capable of working in Channel and Lambda mode for Spectral live cell imaging and online spectral separation. (X Y Z, T, λ).<br>Transmitted-PMT (TPMT) detector for laser based morphology/DIC should be offered. |
| 12. | Spectral Detection | All detectors available with the LSM system should be in **Spectral/ in combination of Spectral and Filter based** in nature with resolution of 5nm or better. |
| 13. | Data depth | 8-bit and 16-bit available. |
| 14. | Stands/Frame | Fully Motorized Inverted Fluorescence Research Microscope for BF/DIC/Fluorescence preferably with dedicated touch screen TFT display/or better one for controlling motorized components of the microscope.<br>12V 100W Halogen/LED illumination for transmitted light & 120W/130W metal halide illumination or better one for fluorescence should be offered.<br>Motorized 6 position DIC nosepiece, Universal Motorized **Condenser NA 0.5** or better with modules for DIC, 6 position fluorescence turrets for accommodating fluorescent filters for sample visualization and camera-based imaging should be offered. |

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| 15. | Z Drive | High precision Z-focus drive with step size of 10 nm or better.<br>A Peizo / Galvo stage should be included with the 5 nm and travel range should minimum 300µM. |
| 16. | XY Stage | Programmable motorized X-Y scanning stage. Universal sample holders for slides 35/60 mm Petri dish with multipoint, tile and mosaic imaging software. |
| 17. | Laser module | Long life diode lasers/ solid-state lasers 445/448 nm, 488nm, 514/515nm, 561nm, 594nm (optional) and 638/640 nm or white light laser to cover almost all visible range applications.<br>**All individual laser lines (except the white light laser) should have at least 20mW or better / input power**.<br>A dedicated 405/408 nm laser with a minimum of 30 mW should be included or better.<br>All the lasers/ visible lasers quoted in main and option should essentially be controlled by AOTF for precise switching between the lasers and ROI Imaging/Photomanipulation. |
| 18. | System platform | An active anti-vibration table with compressed air damping/independent active air compressor control should be provided, which should accommodate all the components of the microscope offered including the on-stage incubator, scanner.<br>laser rack should be provided |
| 19. | Scientific CMOS Camera | Minimum 4.0 MP camera with quantum efficiency of 80% or more. Camera should meet the speed of **80 FPS** (with camera link) or better. Camera should have a resolution of 2K*2K. |
| 20. | NIR Imaging | **NIR imaging capability with additional 685/730/755nm laser or equivalent <u>laser</u> and a dedicated NIR <u>GaAsP/HYD</u> detector or <u>better</u> high sensitive <u>point scanning base</u> detectors for acquiring NIR images till 850 nm.** |
| 21. | FLIM Imaging | The quoted system should be upgradable to multiphoton/Light sheet/TIRF and fluorescence life-time imaging (FLIM). |
| 22. | Live Cell Imaging | System should be quoted with on-stage Incubation system with facility with hypoxia and hyperoxia capable incubator and with Following specifications of on-stage incubator<br>On-stage Incubator:<br>Humidity Control: At 37°C humidity can be regulated in the range 55 to 90% or better. Humidity Set-point Resolution: 2% or better.<br>Temperature Control: Temperature Range: From ambient ± 5°C to ± 50°C or better.<br>$CO_2$ Control: $CO_2$ is digitally regulated in the range 0-18% or better and actively controlled by a Infra-Red $CO_2$ sensor or better sensor. Accuracy ± 0.3% or better.<br>$O_2$ Control: $O_2$ is digitally regulated in the range 2-80% or better and should be monitored with optical oxygen sensor or better sensor. Accuracy ± 0.4% or better.<br>flow rate 0.5 ml/min or better<br>Accessories: Two $CO_2$, Two $N_2$ and Two $O_2$ cylinders, with three |

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| | | | regulators one for $CO_2$ Cylinders, one for $N_2$ Cylinders and one for $O_2$ Cylinders. Suitable wall mounted gas cylinder bracket, for 6 cylinders. A table to accommodate all the components of the $CO_2$, $O_2$, Humidity and temperature controller. Should offer all necessary tubing's.<br>Programmable CO2 (and /or) O2 cycles with Data logging and touch control.<br>Incubation system should be able to be controlled by confocal software or touch or microscope's TFT display.<br>The sample holder must support and Offer all the necessary incubation chamber holders should support and accommodate universal slides sizes and types, live cell culture imaging plates/consumables like cell culture imaging slides, multi-well plate inserts (6 well to 96 well plate), round plates/dishes (of all sizes like 35mm, etc).<br>. Should have at least 5 independent or more temperature channels: which will control chamber base, chamber lid, objective heater, sample temperature sensor and room temperature sensor.<br>. 20X/0.75 or better Water immersion objective for live cell imaging.<br>. With three objective heaters with dedicated temperature controller.<br>. The system should be equipped with essential hardware (autofocus IR-LED/IR-LASER, adaptors for holding multiwall plates) and software required for high content automated multifield, multi-channel, temporal and three-dimensional imaging in multiwell plates (6, 12, 24, 48, 96-well plates).<br>. The system should have the ability to design the experiment as per user requirements for live cell imaging experiments, like pause the experiment, change of frame rate, change of speed and resolution, regulation of CO2 and temperature etc. |
| 23. | Control computer and Monitor | | <u>One Online workstation for acquisition and analysis</u> must have highest possible configuration at the time of delivery. It should be tested and configured to the confocal microscope software completely.<br>Processor: Latest 64 bit control computer with Intel Xeon Processor,<br>RAM: DDR RAM 128 GB or better,<br>Hard Disk 1: 480 GB SATA SSD system drive (Windows and confocal microscope software) or better.<br>Hard Disk 2: HDD: 4 TB upgradable to 8TB or better,<br>Others: DVD, Super Multi SATA +R/RW, Gigabit Ethernet, It should have inbuilt Wi-Fi, Bluetooth; 2 Thunderbolt ports (TB3); |

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| | | | should have USB 2.0/3.0ports to support fast data transfer, Keyboard, mouse, webcam and mouse pad must be supplied.<br>OS: Win 10 Professional 64 bit or Window 11, USB 2.0/3.0, Fire wire, 38" IPS with LED-Backlight or better @ 60 Hz resolution or better.<br>Graphics: 64 GB graphics card or better.<br><u>One offline workstation for analysis</u>:<br>Processor: Latest 64-bit control computer with Intel Xeon Processor,<br>RAM: DDR RAM 64 GB or better,<br>Hard Disk 1: 480 GB SATA SSD system drive (Windows and confocal microscope software) or better.<br>Hard Disk 2: HDD: 4 TB upgradable to 8TB or better,<br>Others: DVD, Super Multi SATA +R/RW, Gigabit Ethernet, It should have inbuilt Wi-Fi, Bluetooth; 2 Thunderbolt ports (TB3); should have USB 2.0/3.0ports to support fast data transfer, Keyboard, mouse, webcam and mouse pad must be supplied.<br>OS: Win 10 Professional 64 bit or Window 11, USB 2.0/3.0, Fire wire, 32" IPS with LED-Backlight or better, @ 60 Hz resolution or better.<br>Graphics: 16 GB graphics card or better.<br>Separate branded computer tables must be offered to online and offline computer. |
| | 24. | Imaging software | One complete acquisition and analysis software's for online system and one analysis software for offline system must be offered, which should be compatible to visualize, analyses, edit, process, and save the confocal images and video clips.<br>Software should be capable of controlling Motorized components of microscope, confocal scan head, and laser control including AOTF and Image acquisition & processing for confocal and super resolution imaging.<br>Saving of all system parameters with the image for repeatable/reproducible imaging.<br>Line, curved line, frame, Z-stack, Time series imaging capabilities.<br>Real ROI bleach/ROI bleach for FRAP, Photo-activation/conversion experiments.<br>FRET imaging as well as Quantitative data analysis capability. **FRET** imaging should be possible and life time-based species separation.<br>Standard geometry Measurements like length, areas, angles etc. including intensity measurements.<br>Co-localization and histogram analysis with individual parameters.<br>Automated dye recognition/separation software.<br>Spectral un-mixing with fingerprinting/real time unmixing for |

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| | | | separation of overlapping excitation/emission spectra of fluorophores.<br>. Co-localization analysis, and histogram analysis with individual parameters.<br>. 2D automated image analysis, measurements and object tracking.<br>. Advanced 3D software to display 3D image data stacks with measuring tools, 3D Visualization & multichannel volume rendering 3D stacks, re-construction, measurements across z stack, movie co-localization with histogram analysis, intensity profiles for quantification. It should have function like shadow projections, transparency projection, surface rendering and clipping.<br>. Dedicated Sample Navigator tool for Macro Imaging and Free ROI selection should be part of the software. Tile scanning and stitching module (with hands free stage control) should be included for large sample imaging.<br>. Free Software upgradation should be provided from the company side for at least 5 years after warranty terms gets over.<br>. The acquisition module should also include 2D- and 3D-object tracking.<br>. The analysis software should include the modules required for automated analysis of high content data.<br>. The high content analysis software should at least include object detection and quantitation modules for **all sample holders (should support all plate types).** |
| 25. | Enhance resolution imaging | | The quoted system should be Online Hardware-software Based Super Resolution Imaging:<br>**Fully automated dedicated hardware and software based, real-time and online Super resolution attachment with suitable highly sensitive Detectors for complete Vis Spectrum. Super resolution detection must be on GaAsP/HYD /multi-pixel detectors for high speed and high sensitive imaging**<br>The system should be able to work in Super resolution mode or better sensitivity and Confocal Mode for normal imaging.<br>Should be able to achieve Lateral resolution of 120 - 140 nm and Axial resolution of 200 - 300 nm **or better.**<br>The claim should be supported by white paper and brochure.<br>Detection should be based on dedicated GaAsP or high sensitive detectors for SR imaging.<br>Any dye used for confocal system can be used for imaging without changing sample preparation techniques/protocol.<br>Should be able to perform live cell SR Imaging.<br>All laser lines for Confocal Imaging should be used for imaging in SR mode.<br>Frame rate of 30 fps or better @ 512X 512 full formats.<br>. SR mode should be able to perform 2D / 3D images, time series, tiling / mosaic, ROI imaging, multiple location imaging.<br>. A dedicated 100X objective/ 1.4 N.A oil or better for super |

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| | | resolution imaging.<br>. Simultaneous two-color detection should be possible or more colors in super resolution mode.<br>. Should offer 200 ml of confocal grade NON-FLUORESCING/ultra-low fluorescence immersion oil |
| 26. | Power | 220–240 V AC, 50–60 Hz. |
| 27. | Operational temperature and dehumifier | 22°C ± 3°C; and<br>The supplier must supply a Dehumidifier, with microcomputer based controller with auto cut off and cut-on facility, auto defrost every 2 hours , auto shutdown during power cut, Digital humidistat, Inbuilt defrost, inbuilt compressor protection, provision for user settable and digital readout for relative humidity of the range 30% to 90 %, one touch humidity setting and display, buzzer when tank over flow and sensor open, with 2 ton capacity or better, humidity indication temperature indication and tank overflow indication, The unit should be fully mobile and works independently without attendant and should be on wheels. |
| 28. | Certification | The confocal microscope should be duly licensed copy, and the vendor should produce certificate for the software license. |
| 29. | Warranty | Warranty-**<br>● Three Year Onsite Comprehensive Warranty.<br>● **Post warranty: Comprehensive Maintenance Contract (CMC)/warranty for another three years should be quoted separately including third party items. In case, vendor provides the warranty, the principal should certify (authenticate) the CMC/extended warranty.** Appropriate documents must be attached along with the bid, in this regard.<br>● Bidder/supplier needs to quote separate rate for four years Annual Maintenance Contract (AMC) after expiring of three-year CMC i.e. for 7th, 8th, 9th & 10th year.<br>**Note:- Cost of CMC for 4th to 6th year will also be considered for evaluation of total cost/price of the equipment for deciding the lowest responsive bidder. Rigorous training of staffs initially and later and application support should be free.) |
| 30. | Optional Item | Optionally quote for dedicated SR modules equivalent to SIM+STROM/PALM or STED to achieve Lateral resolution of 30-50 nm and Axial resolution of 100 - 120 nm or better/equivalent. |

*** (The bidder must provide the quote for optional items separately)**

**Manpower requirement:**

A qualified **and trained** technician should be deputed by the vendor for the period of one year from the date of successful installation.

**All other terms and conditions will remain same.**

Registrar