

INVITATION FOR TENDER FOR SUPPLY OF EQUIPMENT

Sealed tender offers are invited in two separate sealed covers (Technical and Commercial offers) from eligible manufacturers/suppliers or their direct Indian agents for the supply of the following equipment.

Sl. No	Items	Quantity	Unit Price	Total Price
1	High Resolution 3D Microscope for Detection of Malicious Circuits	1		

Please send offers, ALONG WITH DESCRIPTIVE CATALOGUE/ BROCHURE. The validity of the bid should be at least four months (120 days) or more from the date of the opening of this tender. Please ensure that your quotation reaches not later than **02.03.2018 at 15:00 Hrs** at the following address:

**Dr. Debdeep Mukhopadhyay, Associate professor, Computer Science and Engineering Department
Indian Institute of Technology Kharagpur – 721 302, West Bengal, India**

Earnest money of **Rs. 4,00,000/-** is to be deposited in the form of Account payee Demand Draft in favour of IIT Kharagpur, payable at Kharagpur, India. Any bid which is not accompanied with an EMD shall be summarily rejected. Earnest money deposited will be forfeited if the tenderer withdraws or amends its tender or impairs or derogates from the tender in any respect within the period of validity of its tender. No interest will be paid on the earnest money of the unsuccessful bidders.

Tender Reference	IIT/SRIC/CSE/NUS/DM/2017-18/EQ-1, Dated:07.02.2018
Price of Tender Document	NIL
Last Date and Time for submitting the tender document	02.03.2018 at 15:00 Hrs (Indian time)
Time and Date of Opening of Technical Bids	02.03.2018 at 16:00 Hrs (Indian time)
Place of Opening Tender	Computer Science and Engineering Department, Indian Institute of Technology Kharagpur – 721 302, West Bengal, India
Address of Communication	As stated above
Contact Telephone Numbers	+91- 3222 - 282352
E-mail	debdeep@cse.iitkgp.ernet.in

Technical Specifications for High Resolution 3D Microscope for Detection of Malicious Circuits

Tender offers are invited from the reputed principal manufacturers or their exclusive authorized distributors/suppliers (foreign firms or their Indian representative companies) for high resolution 3D Microscope with necessary attachments / accessories as per the following technical specifications.

I. Basic Features:

- (a) Should be used to examine surface and sub-surface areas of both conductive and non-conductive samples easily with sample surface modifications at nano- and micro- scale. The samples could be metallic, ceramic, semiconductor, or polymeric. The samples could also be either magnetic or non-magnetic.
- (b) Both 2D and 3D characterization of a wide range of material types in both high and low voltage using various types of suitable detectors.
- (c) Must be capable of doing *in situ* dynamic experiments.

II. Material Deposition:

- (a) Configurable fully automatic gas injectors (with automated arm) for deposition of Pt , C , SiOx, and for enhanced milling & etching minimum of 2 etching lines. Micro-stage Movement should be X = 20 mm or more, Y = 20 mm or more, Z = 20 mm or more.
- (b) Imaging: The system should be capable of sequential as well as simultaneous patterning/ imaging using Ion and Electron beams.

III. Stage and Chamber:

- (a) 5-axis Eucentric motorized stage with stage movement of $X \geq 100$ mm; $Y \geq 100$ mm; $Z \geq 20$ mm; with Step size ≤ 100 nm; Rotation = 360° (continuous); Tilt = -4° to 60° or more allowing eucentric tilt (mechanical) for all angles and all working distances. The XY repeatability should be ≤ 1.0 μ m.

Along with regular eucentric motorized X, Y, Z, Rotation & Tilt movements, the system must have additional Z-axis precision movement of at least 10 mm or more to enable working distance variation/adjustment to get high resolution imaging even at tilted condition for various samples.

- (b) Multipurpose Specimen holders required to mount different types of sample.
- (c) Ports: At least 15 spare ports on chamber and one spare port on door for attaching accessories

- (d) Oil free Vacuum system: Fully automatic oil free vacuum system consisting of Ion getter pumps for gun and column, Turbo-mechanical pump, oil free backing pump, pneumatic valves and gauges in column, chamber, pumping and backing line.
- (e) Chamber vacuum: Base vacuum $\leq 6 \times 10^{-6}$ mbar ($\leq 5 \times 10^{-5}$ mbar in ≤ 10 minutes)
- (f) Analytical working distance 8.5 mm or lower.

IV. Ion Source and Optics:

- (a) Ion source and column: Suitable column with Ga liquid metal ion source with provision for beam and aperture alignment, adjustable stigmator, variable scan speed and blanker for blanking.
- (b) Source lifetime: Should be ≥ 3000 hours.
- (c) Imaging Resolution: 3 nm or better at 30 KV.
- (d) Magnification: From $\leq 300X$ to $\geq 500,000X$ (Continuously variable)
- (e) Accelerating Voltage: $\leq 500V$ for polishing to 30 kV, continuously variable.
- (f) Beam Current: Continuously Variable from ≤ 1 pA to ≥ 100 nA
- (g) Scanning Dwell time per pixel - Minimum dwell time ≤ 50 ns; maximum 1 sec
- (h) Electrostatic Beam Blanker.

V. Electron Source and Optics:

- (a) Source and Column: Electron column with Schottky thermal field emitter with provision for beam and aperture alignment, adjustable stigmator, variable scan speed, etc.
- (b) Magnification: From $\leq 12X$ to $\geq 20,000,000X$ (Continuously variable).
- (c) Accelerating Voltage: Lower Limit : 20 Volts or less Higher 30 kV or Higher should be Continuously variable .
- (d) Probe current: From ≤ 12 pA to 100 nA or more.
- (e) Provision for beam deceleration/Beam booster for high resolution imaging at lower KV.
- (f) Hybrid type objective lens (combination of electromagnetic & electrostatic) for distortion free imaging during milling and high resolution imaging of magnetic samples.
- (g) Resolution: 1 nm or better at 15 kV.
- (h) Image store resolution of 32k x 24k or more.
- (i) Variable pressure range up to 133 pa to give imaging of non-conductive sample without conductive coating

VI. Detectors:

- (a) Everhart Thorley detector (secondary electron detector) for high vacuum electron beam imaging.

- (b) In-Column or In-lens detector for getting high resolution secondary electron imaging at High vacuum mode.
- (c) BSE Detector.
- (d) VPSE detector for getting secondary electron imaging at VP mode.
- (e) Cathode luminescence Detector for electron imaging.
- (f) Charged Couple Device (CCD) 2 nos: Infra-Red-CCD camera for viewing the chamber .One for FESEM & other for milling.
- (g) Specimen current monitor with faraday Cup for measuring probe current.

VII. Accessories:

- (a) Chiller unit.
- (b) Compressor.
- (c) Control panel integrated to keyboard for manually controlling various Electron/ Ion beam parameters.
- (d) Joystick for stage control.
- (e) 5 rolls of carbon conducting tape
- (f) Specimen preparation Kit.
- (g) Appropriate online UPS with 1 hour back up.
- (h) Au & Pt Sputter Coater Unit for FE-SEM quality samples

VIII. Future Upgradability: The system should be capable to be upgraded with below mentioned features:

- (a) Microanalysis for elements in the sample
- (b) Electron Beam Lithography (EBL) with pattern generation facility
- (c) Nano-manipulator

IX. Warranty: Comprehensive warranty of the complete system should be 36 months from the date of successful installation & handover, and 24 months optional extended warranty.

X. Please submit the necessary installation requirements details along with the technical bid

XI. The manufacturer should have at least 5 installations of the similar system in India. Please submit the proof of installations.

XII. The supplier must have service centre with efficient service supports on the quoted system nearer to IIT Kharagpur with sufficient nos. of service engineers.

GENERAL TERMS & CONDITIONS

PLEASE SPECIFICALLY INDICATE THE FOLLOWING POINTS IN YOUR QUOTATIONS AND COMPLY THE TERMS AS MENTIONED HEREUNDER:-

1. TENDERS ARE INVITED COMPLYING THE REQUIREMENT FOR TENDER AS DETAILED IN THE TENDER SPECIFICATION TO BE SUBMITTED IN THE COMPANY'S / FIRM'S LETTERHEAD NEATLY PRINTED / TYPED DULY SIGNED BY AUTHORIZED PERSON WITH THE SEAL OF THE BIDDERS. ALL ENVELOPS CONTAINING THE TENDER SHOULD BE PROPERLY SEALED. SEPARATE ENVELOPS SHOULD BE USED FOR TECHNICAL AND PRICE BID AND INDICATION TO THEIR EFFECT MAY PLEASE BE SUPERSCRIBED ON THE ENVELOP.

THE FOLLOWING DOCUMENTS ARE REQUIRED FROM THE INDIAN AGENTS OF FOREIGN FIRMS:

- 1.1 FOREIGN PRINCIPAL'S PROFORMA INVOICE INDICATING THE COMMISSION PAYABLE TO THE INDIAN AGENT AND NATURE OF AFTER SALES SERVICE TO BE RENDERED BY THE INDIAN AGENT.
- 1.2 COPY OF THE AGENCY AGREEMENT WITH THE FOREIGN PRINCIPAL INDICATING THE NATURE OF AFTER SALES SERVICES, PRECISE RELATIONSHIP BETWEEN THEM AND THEIR MUTUAL INTEREST IN THE BUSINESS.
- 1.3 PLEASE ENCLOSE THE DOCUMENT(S) RELATED TO THE ENLISTMENT OF THE INDIAN AGENT WITH DIRECTOR GENERAL OF SUPPLIES & DISPOSALS (DGS & R) UNDER THE COMPULSORY REGISTRATION SCHEME OF MINISTRY OF FINANCE.
2. TECHNICAL CATALOGUE/LEAFLET SHOULD BE ENCLOSED WITHOUT FAIL. PROVIDE COMPLIANCE STATEMENT WITH RESPECT TO THE TECHNICAL SPECIFICATIONS MENTIONED ABOVE.
3. PLEASE CONFIRM WHETHER YOU ARE AUTHORISED TO QUOTE ON BEHALF OF YOUR PRINCIPALS AND IF SO, PLEASE ENCLOSE A COPY OF SUCH AUTHORISATION WITH YOUR QUOTATION.
4. **PRICE BIDS FOR FOREIGN FIRMS:** PRICES ARE TO BE QUOTED ON 'EX-WORKS' DULY PACKED OR ON "FCA/FOB" INTERNATIONAL PORT" BASIS AND ALSO INCLUDING AGENCY COMMISSION PAYABLE TO YOUR INDIAN AGENTS, IF ANY SHOWING CLEARLY THE FOLLOWING BREAK UP:-
 - I) EX-WORKS PRICE
 - II) PACKING & FORWARDING
 - III) FREIGHT
 - IV) ANY OTHER RELEVANT EXPENSES.
 - V) TAXES PAYABLE BY THE INSTITUTE

INSURANCE WILL BE PAID BY OUR INSTITUTE SEPARATELY AND SHOULD NOT FORM PART OF THE QUOTED PRICE.

PRICE BIDS FOR INDIAN FIRMS: PRICES ARE TO BE QUOTED ON F.O.R., IIT KHARAGPUR, ON DOOR DELIVERY BASIS CLEARLY SHOWING THE BREAK UP.

5. **PERIOD OF VALIDITY:** BIDS SHALL REMAIN VALID FOR ACCEPTANCE FOR A PERIOD OF 120 DAYS FROM THE DATE OF OPENING.
6. INDIAN AGENTS ADDRESS AND PERCENTAGE OF AGENCY COMMISSION INCLUDED IN ABOVE F.O.B./EX-WORKS PRICE. (THIS WILL BE PAID TO THE INDIAN AGENTS IN INDIAN RUPEES ONLY AND NOT IN **FE**). PLEASE ENCLOSE COPY OF AGENCY AGREEMENT ENTERED INTO WITH YOUR

PRINCIPALS INDICATING THE NATURE OF AFTER SALES SERVICES OF INDIAN AGENTS, PRECISE RELATIONSHIP & MUTUAL INTEREST IN THE BUSINESS.

7. **MEASUREMENTS/WEIGHT:** NETT/GROSS OF THE CONSIGNMENT. IN CASE OF AN ORDER, YOU SHALL USE AIR WORTHY PACKAGE (AS APPLICABLE) DULY CERTIFIED WITH DOCUMENTS – PLYTO – SANITARY CERTIFICATE (AS PER QUARANTINE ORDER 2003).
8. **SCOPE OF SUPPLY:** SHOULD INCLUDE FREE INSTALLATION AND COMMISSIONING
9. **PAYMENT TERMS FOR FOREIGN FIRMS**

The offer will be made on a single currency and only one PO will be issued for the entire scope of the supply.

A) 90% PAYMENT THROUGH SIGHTDRAFT/FORIGN DEMAND DRAFT/LC (EXCEPTIONAL CASES)/SWIFT TELE TRANSFER AFTER RECEIPT OF STORE IN GOOD ORDER AND CONDITION AND 10% AFTER SUCCESSFUL INSTALLATION & COMMISSIONING.

B) BANK CHARGES ON LC/SD (WITHIN INDIA APPLICANT ACCOUNT AND OUTSIDE INDIA TO BENEFICIARY ACCOUNT).

PAYMENT TERMS FOR INDIAN FIRMS

A) 100% PAYMENT THROUGH CROSSED ACCOUNT PAYEE CHEQUE / ELECTRONIC TRANSFER AFTER RECEIPT OF STORE IN GOOD ORDER & CONDITION AND SUCCESSFUL INSTALLATION & COMMISSIONING.

B) ENSURE MENTIONING

i) BANK DETAILS OF THE BENEFICIARY, GST NO. AND PAN NUMBER

ii) FULL NAME AND ADDRESS OF THE BENEFICIARY ON WHOM ORDER HAS TO BE PLACED

10. WHETHER ANY EXPORT LICENCE IS REQUIRED FROM YOUR GOVERNMENT, IF SO, PLEASE CONFIRM WITH DETAILS.
11. COUNTRY OF ORIGIN OF THE GOODS IS TO BE MENTIONED.
12. THE INSTITUTE SHALL PROVIDE THE CONCESSIONAL CUSTOMS DUTY AND EXCISE DUTY EXEMPTION CERTIFICATE AS PER GOVT. NOTIFICATION NO. 51/96 CUSTOMS DATED: 23.07.1996 AND CENTRAL EXCISE DUTY EXCEMPTION IN TERMS OF GOVT. NOTOFICATION NO. 10/97 – CENTRAL EXCISE DATED: 01.03.1997 AS AMENDED FROM TIME TO TIME.
13. **LIQUIDATED DAMAGES:** THE STORES SHOULD BE DELIVERED / DISPATCHED TO DESTINATION AND READY FOR OPERATION NOT LATER THAN THE DELIVERY DATE SPECIFIED. IT THE SUPPLIER FAILS TO DELIVER ANY OR ALL THE STORES OR PERFORM THE SERVICE BY THE SPECIFIED DATE, LIQUIDATED DAMAGES AT 1% PER MONTH OR PART THEREOF IN RESPECT OF THE VALUE OF STORES WILL BE DEDUCTED FROM THE CONTRACT PRICE SUBJECT TO A MAXIMUM OF 5%. ALTERNATIVELY, THE ORDER WILL BE CANCELLED AND THE UNDELIVERED STORES PURCHASED FROM ELSEWHERE AT THE RISK AND EXPENSE OF SUPPLIER.
14. **PATENT RIGHTS:** THE SUPPLIER SHALL INDEMNIFY THE PURCHASE AGAINST ALL THIRD PARTY CLAIMS OF INFRINGEMENT OF PATENT, TRADEMARK OR INDUSTRIAL DESIGN RIGHTS ARISING FROM USE OF THE GOODS OR ANY PART THEREOF IN INDIA.

15. ONLY THOSE BIDDERS WHO'S BIDS HAVE BEEN TECHNICALLY FOUND ACCEPTABLE WILL ONLY BE INVITED FOR PARTICIPATION IN THE PRICE BID.
16. THOSE BIDDERS WHO DO NOT RECEIVE ANY COMMUNICATION FOR PARTICIPATION IN PRICE BID OPENING MEETING MAY PRESUME THAT THEIR BID HAS NOT BEEN ACCEPTED BY THE INSTITUTE.
17. CONDITIONAL OFFER WILL NOT BE ACCEPTED.
18. LATE TENDERS I.E. TENDER RECEIVED AFTER THE DUE DATE AND TIME OF SUBMISSION AS MENTIONED ABOVE SHALL NOT BE ACCEPTED.
19. BIDDERS TO ENCLOSE THE FOLLOWING DOCUMENTS:-

A) CURRENT INCOME TAX AND SALES TAX CLEARANCE CERTIFICATES (GST No.), AND PAN NO.

B) BANKER'S SOLVENCY CERTIFICATE

C) SUMMARY OF AUDITED STATEMENT OF ACCOUNTS FOR THE LAST THREE YEARS TO BE ENCLOSED AND FINANCIAL HIGHLIGHTS AND THE KEY PERFORMANCE DURING THE LAST THREE QUARTERS TO BE ENCLOSED AS PER FORMAT:-

COMPANY'S KEY PERFORMANCE

DESCRIPTION	JAN. TO MARCH	APRIL TO JUNE	JULY TO SEPT.
GROSS REVENUE			
PROFIT BEFORE TAX			
PROFIT AFTER TAX			
RETURN ON INVESTED			
CAPITAL (ROIC)			

D) CUSTOMER SATISFACTION CERTIFICATE FROM ONE SUCH ORGANIZATION IS TO BE ATTACHED WITH THE TECHNICAL BID AND PRICE BID.

E) NAME AND ADDRESS OF MINIMUM THREE CLIENTS TO WHOM SUCH EQUIPMENT HAVE BEEN SUPPLIED SHOULD BE MENTIONED.

20. **WARRANTY / GUARANTEE:** COMPREHENSIVE WARRANTY OF THE COMPLETE SYSTEM SHOULD BE **36 MONTHS FROM THE DATE OF SUCCESSFUL INSTALLATION & HANDOVER, AND 24 MONTHS OPTIONAL EXTENDED WARRANTY** AFTER THE GOODS (OR ANY PORTION THEREOF AS THE CASE MAY BE) HAVE BEEN DELIVERED AND COMMISSIONED TO THE FINAL DESTINATION.
21. THE INSTITUTE DOES NOT BIND ITSELF TO OFFER ANY EXPLANATION TO THOSE BIDDERS WHO'S TECHNICAL BID HAS NOT BEEN FOUND ACCEPTABLE BY THE EVALUATION COMMITTEE OF THE INSTITUTE.
22. ALL TENDERS (UNLESS OTHERWISE SPECIFIED) ARE TO BE SUBMITTED / HANDED OVER TO **DR. DEBDEEP MUKHOPADHYAY, ASSOCIATE PROFESSOR, COMPUTER SCIENCE AND ENGINEERING DEPARTMENT, INDIAN INSTITUTE OF TECHNOLOGY, KHARAGPUR - 721 302** AND ACKNOWLEDGEMENT TO BE OBTAINED.

IMPORTANT

1. IIT Kharagpur authority may accept or reject any or all the bids in part or in full without assigning any reason and does not bind itself to accept the lowest bid. The Institute at its discretion may change the quantity / upgrade the criteria / drop any item or part thereof at any time before placing the Purchase Order.
2. Promptly make arrangements for repair and / or replacement of any damaged item (s) irrespective of settlement of claim.
3. In case of any dispute, the decision of the Institute authority shall be final and binding on the bidders.
4. For any query pertaining to this bid document correspondence may be addressed to **Dr. Debdeep Mukhopadhyay, Associate professor, Computer Science and Engineering Department** at the address mentioned above.

LAST DATE FOR SUBMISSION OF SEALED BIDS: 02.03.2018

- 1) Please Note that the Institute remains closed during Saturdays & Sundays and all specified government holidays.
 - 2) Fax, e-mail Tender will not be accepted.
 - 3) The General Terms and Conditions as stated above relate to supply of stores / equipment /assets etc. and for specific service other terms and conditions of the Institute will apply.
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