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Title	:	**MAINTENANCE AND REPAIR OF MICROSCOPES MAINTANED BY NOBIC - STANDARD OPERATING PROCEDURES**
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MAINTENANCE AND REPAIR OF MICROSCOPES MAINTAINED BY NOBIC - STANDARD OPERATING PROCEDURES

1. INTRODUCTION

1.1 OBJECTIVE

This Standard Operating Procedure (SOP) will provide information necessary for maintenance and repair of microscopes maintained by NOBIC. Additional information is provided to encompass additional processing when needed.

1.2 SCOPE

This Standard Operating Procedure (SOP) is applicable to microscopes maintained by NOBIC at LKCMedicine listed in the Appendix and covers matters that are specific to those microscopes.

1.3 RESPONSIBILITIES

Principal Investigator (PI) and Laboratory Manager (LM)
NBIC LM and, if applicable, the PI are responsible for ensuring that all laboratory equipment is maintained in good condition. NOBIC shall conduct periodical checks of equipment performance and keep records of the monitored performance indicators. Record of maintenance and repairs shall be kept in PPMS booking system. The PI, via the LM, is ultimately responsible for ensuring that this SOP (and other applicable NTU-wide and nation-wide guidelines, SOPs and regulations) are adopted in the facilities or research laboratories where the microscopes are installed; ensuring that equipment users know where to obtain a copy of this SOP. The LM determines the necessary training needs, supervises and provides on-the-job training for all the research staff and students using the microscopes; and prepares specific SOPs when required for selected research protocols and equipment use.

Laboratory personnel
This SOP shall be practiced by students, laboratory technologists, research assistants and research fellow upon receipt of training. Laboratory personnel shall be responsible for adhering to the routine maintenance schedule and carrying out other special maintenance tasks as required by the LM/PI and SOPs. It is the responsibility of the users to follow the SOP as described and to inform the LM/PI about any deviations or problems that may occur while performing the procedure.

2. PROCEDURES

All maintenance, calibration and repair must be performed by NOBIC or by service representatives from the equipment's manufacturer and/or supplier which must be arranged via NOBIC.

Risk Assessment of Equipment in order of criticality.

1. Hazard Identification		2. Risk Evaluation				3. Risk Control	4. Contingency Plan
1a.	**1b.**	**2a.**	**2b.**	**2c.**	**2d.**	**3a.**	
No.	**Type of Equipment**	**Existing Risk Control (If any)**	**S**	**L**	**R**	**Additional Risk Control**	
7	Specialized Microscopes	1) Maintained by NOBIC 2) Alternative similar equipment located at either campus	2	1	2	N.A.	Similar equipment available on site and at other campus
12	General Microscopes	1) Maintained by NOBIC 2) Alternative similar equipment located at either campus	1	1	1	N.A.	Similar equipment available on site and at other campus

Basic maintenance monitoring guidelines

1. Equipment should be checked by NOBIC regularly. Regular checks of different thoroughness shall be performed at different intervals so that all system functionalities are checked at least twice a year.
2. Any problems should be noted in PPMS booking system, along with steps taken to remedy the problem.
3. Any service work, whether performed by laboratory personnel or equipment service representatives, should be recorded in PPMS booking system.
4. Users are required to report if they experience or suspect any irregularities in the equipment performance, using the incident reporting form in PPMS booking system or by directly reaching to NOBIC either by email (nobic.facilities@e.ntu.edu.sg), or in person in case the last method is the fastest.

In the event of equipment breakdown

1. Inform NOBIC of the equipment breakdown by filling the incident reporting form in PPMS booking system or by directly reaching to NOBIC either by email (nobic.facilities@e.ntu.edu.sg), or in person in case the last method is the fastest.
2. The LM shall put a notice about the breakdown into PPMS booking system and inform users of the equipment.
3. The LM shall evaluate the breakdown.
4. If the equipment is under warranty, the LM will proceed to raise a warranty claim.
5. If the equipment is not covered by warranty, the LM together with the rest of NOBIC Team will evaluate the feasibility of an in-house repair by NOBIC. If found feasible they will proceed with the repair, if not, the LM will contact the equipment vendor to get an estimate of the cost of a repair by the vendor.
6. NOBIC Director and, if applicable, the PI shall decide whether to proceed with the repair or otherwise.
7. If the equipment has been repaired, the LM shall remove the notice from PPMS booking system and inform the users.
8. The LM shall record the repair information in PPMS booking system.
9. If NOBIC Director and, if applicable, the PI decide not to repair the equipment, the LM shall proceed to decommission the equipment.

3. SAFETY PRECAUTIONS

Personal protective equipment such as lab coat and gloves should be worn during repair of the equipment. The equipment should be disinfected prior to repair and maintenance. All maintenance, calibration and repair must be performed by certified personnel or by service representative from the equipment's manufacturer and/or supplier.

4. INCIDENT REPORTING

Please refer to SOP on laboratory incident reporting and equipment fault reporting for microscopes maintained by NOBIC.

5. REFERENCES:

- The University Safety Manual has several sections relevant to biosafety. Members of the LKCMedicine department are encouraged to access the safety manual on the OHS website: http://www.ntu.edu.sg/ohs/Pages/default.aspx
- Good Laboratory Practice (GLP) Programme

http://www.spring.gov.sg/qualitystandards/accreditation/pages/good-laboratory-practice.aspx

Equipment Fault Reporting Form

Please complete and submit the incident Reporting form to the office of Research Administration and Support Services (RASS).

Part I: Reporter's Particulars	
Name:	Designation:
Email Address:	Contact Number:
Name of Supervisor/Principal Investigator:	Date of incident:
Equipment Location:	Types of faults:
Part II: Briefly describe what happened & how it happened.	
PART III: Acknowledge	
Submitted by: Ken Wong Principal Investigator/Lab Manager	_____ Signature _____ Date

Annex 2 – List of microscopes maintained by NOBIC

#	Microscope	Asset Nr.	Location
1	2-photon microscope - Nemo	5201039736	EMB 07-07-01
2	2-photon microscope - Stuart	5201039315	CSB 12-02P-01
3	2-photon microscope FVMPE-RS	5201001825-0	CSB 10-02N-01
4	High Content Screening Microscope - IN Cell 2200	5201001910-0	EMB 07-07-01
5	High Content Screening Microscope - Operetta CLS	5201002882-0	CSB 11-02T-01
6	Inverted Confocal Airyscan Microscope-LSM800	5201002085-0	EMB 07-07-01
7	Inverted Fluorescence Live Cell closed-box M.-CD7	5201002953-0	EMB 07-07-01
8	Inverted Fluorescence Live Cell Microscope - AO7	5201002952-0	CSB 11-02T-01
9	Inverted Live Cell Confocal Microscope-LSM800 Airy	5201002951-0	CSB 11-02T-01
10	Lightsheet Microscope	5201001728-0	EMB 04-02Y, Zebrafish facility
11	Lightsheet Microscope with Cleared Specimen Option	5201003097	CSB 11-02P-01
12	Slide scanner	5201002503-0	CSB 11-02T-01
13	Stereo Microscope Axio Zoom V16	5201002920-0	EMB 04-02Y, Zebrafish facility
14	TiE inverted fluorescence microscope	5201001736	EMB 03-02Y
15	Upright confocal - Animal Research Facility	5201001704-0	CSB 19-03C-01, ARF
16	Upright Confocal Microscope-LSM800	5201002084-0	EMB 04-02Y, Zebrafish facility
17	Upright fluorescence microscope - Axio Imager M2	5201002921	EMB 04-02Y, Zebrafish facility
18	Upright Fluorescence Microscope - DM5500	5201001542	EMB 03-02Y