**IRF LM Suite Risk Assessment V2.7 – reviewed 22/6/2021**

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| **Sign below to acknowledge that you have read and understood the risk assessment and consent to follow the guidance within.** |
| **Name** | **PI/Dept** | **Equipment Type** | **Relevant RA contents number** | **LM suite room number** | **Signature** |
|  e.g. Sandra Ashton |  IRF | Nikon A1R | 1 | 2 |   |
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**This document is intended as a complete assessment of the risks to anyone working in the IRF LM Suite – please read the entry for the equipment you will be using and review all hazard appendices. The LM Suite contains compressed gas cylinders and metal halide lamps – even if you are not directly working with these items, you must be familiar with the risks they pose and the required action in case of an emergency.**

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| **Equipment** | **Microscopy Suite Room number** |
| 1. **Nikon A1R Confocal**
 | **2** |
| 1. **Zeiss LSM510 Confocal**
 | **2** |
| 1. **BioRad E2100 Confocal**
 | **1** |
| 1. **Zeiss Axioplan 2 Widefield**
 | **1** |
| 1. **Nikon Ni-E Widefield**
 | **3** |
| 1. **Zeiss Axiovert 200M Widefield**
 | **3** |
| 1. **T-SPIM**
 | **3** |
| 1. **Hamamatsu Nanozoomer RS2.0 Slide Scanner**
 | **Lobby** |

**LM Suite hazards (Mandatory reading)**

**Compressed gas**

**Risk**

Explosive Decompression and CO2 release: Compressed gas is stored under very high pressure – a failing regulator poses an explosive decompression risk and CO2 release can cause asphyxiation.

Crushing injuries: Gas cylinders are very heavy and can cause severe injury if moved without appropriate care.

Frostbite/freezing injury: Liquefied gas can cause frostbite or freezing on contact with skin or eyes.

**Control measures**

Explosive Decompression and CO2 release: Compressed gas cylinders are fitted with regulators certified for specific pressure and annotated with an expiry date. Regulators are replaced by a trained member of staff upon expiry and the university conducts regular checks to ensure regulator integrity. Clear instructions are provided to users for normal operation during training on a system that has a gas supply; written instructions are provided (located at the workstation for each gas-supplied system) indicating the order in which valves should be opened and the appropriate pressure to set. This control measure mitigates potential frostbite/freezing injuries.

Crushing injuries: Cylinders are only to be moved with the appropriate equipment by Site Services or IRF staff – facility users must not interact with a cylinder except to open the regulator for gas supply during imaging **only after being shown how to do so by IRF staff**.

**Emergency procedure**

Explosive Decompression and CO2 release: All individuals in the Light Microscopy Suite are to immediately exit to the corridor, closing doors behind them. The area should be isolated for at least one hour before the cylinder is removed and the regulator replaced.

Crushing injuries: Immediately contact a first aider on x0909.

Frostbite/freezing injury: Inform IRF Staff. Treat affected skin with warm water (35-40C) to re-warm. Rinse affected eyes with eyewash for 15 minutes and seek medical assistance.

**LM Suite hazards (continued) (Mandatory reading)**

**Metal Halide & Mercury Lamps**

**Risk**

Lamp rupture and mercury vapour release: If handled improperly Metal Halide and Mercury lamps can rupture, releasing mercury vapour into the air. Mercury is highly toxic if inhaled or on skin contact.

Burn injuries: Mercury lamp casings have an inbuilt heat sink, meaning they operate at very high temperatures and can burn the skin if prolonged exposure occurs.

**Control measures**

Lamp rupture and mercury vapour release: Lamps are replaced only by the LM Specialist once they have reached their rated hours of usage.

Burn injuries: Mercury lamp housings are located at the rear of the microscope chassis and as such are not interacted with when working with the microscope. Users are instructed not to reach over or around a mercury lamp when it is operating.

**Emergency procedure**

Lamp rupture and mercury vapour release: If the lamp bulb ruptures (it will emit and audible “pop” sound and the fluorescent emission will immediately cease), all individuals must immediately exit the Light Microscopy Suite, closing doors behind them. The area must be isolated for at least one hour. Wearing PPE (gloves, lab coat, eye protection), the lamp housing must be removed by a trained member of staff and relocated to a fume hood for containment. A mercury containment kit can be used by the appropriate staff member to collect any settled mercury for disposal. Any individual exposed to mercury must be given immediate medical attention.

Burn injuries: In the event of prolonged contact with the lamp housing; inform IRF staff, rinse contact point in lukewarm-to-cold water for 20 minutes. Seek medical attention if a serious burn occurs.

**Glass**

**Risk**

Cut/stick injuries: Glass slides could present risk of a severe cut or stick injury if broken.

**Control measures**

Cut/stick injuries: Users are advised to handle any slides with caution and transport them in a suitable container such as a plastic box or cardboard slide holder

**Emergency procedure**

Cut/stick injuries: Inform IRF staff. A first aid box is kept in the IRF office in the case of a cut or stick from broken glass. For severe injuries pressure should be applied using gauze from the first aid supply and a first aider called.

1. **Nikon A1R confocal** **(LM Room 2)**

The Nikon A1R is an inverted confocal microscope fitted with an environmental control chamber and uses solid state laser diodes. It is fitted with a metal halide lamp for fluorescent sorting via the eyepieces. Please read the identified hazards below and the mandatory hazards above.

**Hazards**

*Lasers*

**Risks**:

Laser damage to the eye:The lasers of the Nikon A1R can cause damage if focused into the eyes

Transmission arm permitting laser transmission: The transmission arm of the microscope can be pushed back, allowing the laser emission to transmit through the sample and potentially enter the eye if the user leans over the system

**Control measures**:

Laser damage to the eye:The system is fitted with a laser interlock preventing the lasers from emitting unless the scanhead lightpath is selected (laser light can never enter the eyepieces)

Transmission arm permitting laser transmission: Users are trained by LM IRF staff and should always return the transmission arm to the lowered position so that it blocks light that has passed through the sample. Users should not interact with the sample or stand over the microscope whilst the laser is emitting.

*Immersion oil*

**Risks**

Irritation of eyes and skin: Immersion oil is an irritant if on the skin or eyes

**Control measures:**

Irritation of eyes and skin: If on the skin, wash with soap and water. If in the eyes, rinse with the eye-wash station located at the entrance to the main lab (01.50), inform IRF staff and seek medical attention if irritation persists.

1. **Zeiss LSM 510 confocal (LM Room 2)**

The Zeiss LSM510 is an inverted confocal microscope and uses gas lasers (HeNe, Argon) It is fitted with a mercury lamp for fluorescent sorting via the eyepieces. Please read the identified hazards below and the mandatory hazards above.

**Hazards**

*Lasers*

**Risks**

Laser damage to the eye:The lasers of the Zeiss LSM510 can cause damage if focused into the eyes

Transmission arm permitting laser transmission: The transmission arm of the microscope can be pushed back, allowing the laser emission to transmit through the sample and potentially enter the eye if the user leans over the system

**Control measures**

Laser damage to the eye:The system is fitted with a laser interlock preventing the lasers from emitting unless the scanhead lightpath is selected (laser light can never enter the eyepieces)

Transmission arm permitting laser transmission: Users are trained by LM IRF staff and should always return the transmission arm to the lowered position so that it blocks light that has passed through the sample. Users should not interact with the sample or stand over the microscope whilst the laser is emitting.

*Immersion oil*

**Risks**

Irritation of eyes and skin: Immersion oil is an irritant if on the skin or eyes

**Control measures:**

Irritation of eyes and skin: If on the skin, wash with soap and water. If in the eyes, rinse with the eye-wash station located at the entrance to the main lab (01.50), inform IRF staff and seek medical attention if irritation persists.

1. **BioRad E2100 confocal (LM Room 1)**

The BioRad E2100 is an upright confocal microscope and uses gas lasers (HeNe, Argon). It is fitted with a mercury lamp for fluorescent sorting via the eyepieces. Please read the identified hazards below and the mandatory hazards above.

**Hazards**

*Lasers*

**Risks**Laser damage to the eye:The lasers of the BioRad E2100 can cause damage if focused into the eyes

**Control measures**Laser damage to the eye:The system is fitted with a laser interlock preventing the lasers from emitting unless the scanhead lightpath is selected (laser light can never enter the eyepieces)

*Immersion oil*

**Risks**

Irritation of eyes and skin: Immersion oil is an irritant if on the skin or eyes

**Control measures:**

Irritation of eyes and skin: If on the skin, wash with soap and water. If in the eyes, rinse with the eye-wash station located at the entrance to the main lab (01.50), inform IRF staff and seek medical attention if irritation persists.

1. **Zeiss Axioplan 2 widefield (LM Room 1)**

The Axioplan 2 is an upright widefield microscope fitted with a mercury lamp. Please read the identified hazards below and the mandatory hazards above. Please read the identified hazards and the mandatory hazards in Appendix 1.

**Hazards**

*Immersion oil*

**Risks**

Irritation of eyes and skin: Immersion oil is an irritant if on the skin or eyes

**Control measures:**

Irritation of eyes and skin: If on the skin, wash with soap and water. If in the eyes, rinse with the eye-wash station located at the entrance to the main lab (01.50), inform IRF staff and seek medical attention if irritation persists.

1. **Nikon Ni-E widefield (LM Room 3)**

The Nikon Ni-E is an upright widefield microscope fitted with a metal halide lamp. Please read the identified hazards below and the mandatory hazards above.

**Hazards**

*Immersion Oil*

**Risks**

Irritation of eyes and skin: Immersion oil is an irritant if on the skin or eyes

**Control measures:**

Irritation of eyes and skin: If on the skin, wash with soap and water. If in the eyes, rinse with the eye-wash station located at the entrance to the main lab (01.50), inform IRF staff and seek medical attention if irritation persists.

1. **Zeiss Axiovert 200M widefield (LM Room 3)**

The Zeiss Axiovert 200M is an inverted widefield system fitted with a mercury lamp. Please read the identified hazards below and the mandatory hazards above.

**Hazards**

*Immersion oil*

**Risks**

Irritation of eyes and skin: Immersion oil is an irritant if on the skin or eyes

**Control measures:**

Irritation of eyes and skin: If on the skin, wash with soap and water. If in the eyes, rinse with the eye-wash station located at the entrance to the main lab (01.50), inform IRF staff and seek medical attention if irritation persists.

1. **T-SPIM (LM Room 3)**

The T-SPIM is a dual-sided light sheet system comprised of optical components mounted to an assembly board. Please read the identified hazards below and the mandatory hazards above.

**Hazards**

*Lasers*

**Risks**Laser damage to the eye:The lasers of the T-SPIM can cause damage if focused into the eyes

**Control measures**Laser damage to the eye:The system is fitted with a laser interlock connected to a removable lightproof enclosure – the lasers cannot be engaged unless this enclosure is fitted over the system

1. **Hamamatsu Nanozoomer RS2.0 (LM lobby)**

The Hamamatsu Nanozoomer RS2.0 is a fully enclosed slide scanner. Please read the identified hazards below and the mandatory hazards above.

**Hazards**

*Slide tray*

**Risks**Pinch injury: The slide holder tray of the Nanozoomer RS2.0 is a potential pinch risk if the user catches a finger when it is closing

**Control measure**Pinch injury: Users are trained and advised to keep their fingers clear of the slide tray when they press the green button to retract it