



SMM HANDBOOK OF WHS REGULATIONS

INFORMATION FOR STAFF, STUDENTS AND USERS

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New users of the facility will be asked read this booklet and sign the WHS Compliance Form to indicate that they understand the information and will abide by the regulations.

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I. EMERGENCY CONTACT DETAILS

Please note: For all external numbers dial 0 first then the number.

Service	Number
Emergency Services (Police/Fire Brigade/Ambulance)	0-000
University Security Service EMERGENCY	9351 3333
University Security Service Enquiries	9351 3487
Poisons Information Centre	0-131 126
Campus Infrastructure & Services Desk	9351 7838
Risk Management Office	9351 2451 9351 5244
Radiation Safety Officer	9351 7722
University Health Service	9351 3484

SMM contacts	Name	Room	Number
Safety Officer	Takanori Sato	142	9351 7541
Laboratory Manager	Eleanor Kable	128A	9351 7566
First Aid Officers	Vijay Bhatia Kara Hanna	116B 219	9351 7529 9351 2351
Local Fire Warden	Matthew Foley	111A	9351 7565

II. GENERAL SAFETY INFORMATION AND GUIDELINES

1. Emergencies

- In case of an emergency, contact any of the listed staff members below.
- For first aid, see the first aid officers (contact details on page 2). FIRST AID KITS are found in the preparation laboratories and tearoom (Room 235).
- Report safety incidents to the Safety Officer.
- Report all floods, faulty electrical equipment etc to the Safety Officer or the Laboratory Manager.

Laboratory Manager

Eleanor Kable

Section Managers

Scanning electron microscope
 Transmission electron microscope
 Visualisation lab and confocal microscopes
 Biological specimen preparation laboratory
 Materials specimen preparation laboratory
 Laboratory, room 227
 Light and optical laboratory
 Cell culture laboratory
 Molecular preparation laboratory
 Atom probe microscopy laboratory
 X-ray Computed Tomography

Vijay Bhatia
 Hongwei Liu
 Pamela Young
 Naveena Gokoolparsadh
 Jacob Byrnes
 Vijay Bhatia
 Pamela Young
 Minh Huynh
 Minh Huynh
 Takanori Sato
 Matthew Foley

In the case of a fire

- Use a FIRE EXTINGUISHER if necessary. FIRE BLANKETS can be more efficient if a small fire occurs in a fume hood. DO NOT TAKE PERSONAL RISKS. If a fire extinguisher is used, notify the Safety Officer IMMEDIATELY so that it can be refilled.
- If the fire emergency alarm system is activated you may be required to evacuate the building. The alarm operates in two stages:
 1. A BEEPING sound of increasing loudness will be heard. Secure your workplace by turning off all non-vital equipment and securing all dangerous processes. Collect or lock away your personal belongings. Get ready to evacuate.
 2. A WHOOPING noise and an EVACUATION message will be heard over the system. Move directly to your nearest exit, or proceed as directed by a warden. Do NOT use the lifts.
- Assembly area during working hours (9am to 5pm) is the Madsen Building car park and after hours in front of Madsen Building (Eastern Avenue). Do not re-enter the building until clearance is provided by the Fire Warden.

2. Responsibilities

All staff, students and Users are required to:

- Observe the safety regulations and procedures outlined in this booklet.
- Perform a risk assessment (RA) on their projects. Read relevant Safety Data Sheets (SDS) and attach to the RA. Follow all guidelines in the SDS including handling, storage and use of the chemical.
- Read the risk assessment of each equipment and laboratory prior to starting work.
- Become familiar with the location and operation of safety devices in the work area.
- Not let anyone else into the facility using your key access card.
- See one of the safety officers if in doubt regarding a safety matter.
- Wear personal protection equipment such as safety glasses and gloves where required.

3. Discipline

- Any person found damaging or improperly using any safety equipment or defacing safety signs and instructions will be liable to prosecution.
- Animals/pets are not allowed in the centre unless the Director has granted special permission. Guide dogs are an exception.
- Unsafe conduct e.g. skateboarding, bicycling, or playing ball games is not allowed.
- Appropriate dress and covered footwear must be worn at all times. Bare feet or open footwear such as sandals and thongs are NOT acceptable in the laboratories.

- Fire exits, corridors, aisles, doorways and stairs must be kept clear at all times.
- No eating or drinking is allowed in laboratories or in the basement.
- No lab equipment should be taken out of labs, including lab coats and safety glasses.
- University regulations prohibit smoking in any building.

4. Definition of “Category 1, 2 and 3” at the SMM

Category 1 (Cat 1)

- Cat 1 is the status Users have once they begin a short training course or one-on-one training with an SMM staff member.
- Users are only allowed to work between the hours of 9am and 5pm.
- While using the equipment or the lab, Users must be supervised by their contact person or another staff member.
- Users who attend a New User Meeting (NUM) with a subsequent activated project automatically attain Cat 1 status.
- Initial training is often discussed and organised at the NUM.

Category 2 (Cat 2)

- Users must have successfully completed a Cat 2 assessment with an SMM staff member.
- Users understand that Cat 2 status pertains only to each lab or piece of equipment.
- Users are permitted to work independently during the hours of 9am to 5pm.
- Users are deemed sufficiently competent with equipment use to start up, work safely and responsibly, and shut down unsupervised.
- If a User encounters problems, the Duty Microscopist is to be contacted.
- Users will inform their SMM project contact person/s of any difficulties during instrument sessions, and arrange additional training/revision of skills if required.
- Users will not attempt to train or demonstrate the equipment to others.

Category 3 (Cat 3)

- Users have successfully completed a Cat 3 assessment for the particular equipment.
- Users are allowed 24-hour access only to a particular laboratory or piece of equipment.
- Users are very competent with the equipment, and can solve small problems independently.
- Users comply with the specific WHS issues regarding working after hours.
- Cat 3 Users will not attempt to train or demonstrate the equipment to others, irrespective of their advanced level of competency.

5. Additional safety information

Additional safety information can be obtained from the University of Sydney's Safety Health & Wellbeing website at <http://sydney.edu.au/whs/>

III. LABORATORY SAFETY RULES

Specific guidelines exist for each laboratory, and it is expected that Users of these laboratories become familiar with and adhere to these rules.

1. Electron microscope rooms

- Do not go behind the machines unless authorised.
- Use approved cryogenic gloves and safety goggles whenever handling liquid nitrogen.
- Report any problems to the Duty Microscopist or Laboratory Manager.

2. Light & optical microscope rooms

- All microscopes are to be left in standard operating conditions after use. This information is available in each of the machines user manuals (beside each machine).
- If you break a glass slide on a microscope, please notify the Duty Microscopist and dispose of the broken glass into the sharps bin (each room has one). This must also be noted in the comments in the on-line log for each machine. If you cut yourself on broken glass please immediately notify a First Aid or Safety Officer.
- The biggest safety hazard in the light & optical microscope rooms is the mercury lamps. If a mercury lamp explodes, immediately evacuate everyone from the room and shut the door. Notify the safety officer and the Duty Microscopist immediately. Mercury is most dangerous in the vapour form. Once cooled it can be cleaned up (under supervision) with relative safety.
- All lasers installed on the microscopes are covered and contained. No User is allowed to remove any of these covers. Only trained authorised personnel are allowed remove the laser covers.
- In the Multiphoton lab, you will be assigned a category of use for the lasers. You will sign a form prior to using the machine, which will inform you as to your User category and what you are permitted to do. This form will be kept on file and updated as required.

3. Biological specimen preparation laboratory

All Users must adhere to the rules below and indicate they have read and understood the rules by signing their name in the book (kept in lab) before beginning any work in the lab.

General rules

- Covered footwear must be worn at all times.
- Lab coats must be worn at all times; borrow one if necessary.
- Please consider other users and call/email to cancel microtome and CPD bookings you can't keep.
- Log all machine usage.
- All samples, bottles etc. must be labelled with user name, specimen and date. Unlabelled containers will be discarded.
- Use pencil for labelling specimen vials (pens and markers wash off in the solvents).
- Balances are to be kept clean. Wipe up excess chemicals on the pan.
- NEVER use razor blades directly on benching. Use dental wax to dissect tissue out.
- Work over moist paper towelling when sawing or filing resin blocks; the dust is harmful.
- Don't leave anything on the hotplates unattended.
- NO naked flames are permitted in the lab at any time. Speak to a staff member if you need to use a Bunsen burner.

Fume hoods and ovens

- All resin must be polymerised in the oven prior to disposal.
- Everything with resin must be in a box, and not unprotected on the oven shelves or floor.
- Both fume hoods are to be left on at all times. Please inform a staff member if a fume hood is off or displaying an error message.

Chemicals

- No chemicals are to be taken away from the laboratory. All chemicals must be used in accordance with the safety recommendations of the laboratory.
- If you are using a chemical for the first time, please read its Safety Data Sheet (SDS) before using it. The SDS folder is located on the top left shelf next to the door in room 113.

- All procedures involving fixatives, Cacodylate buffer, osmium tetroxide (OsO_4), resin, chloroform and HMDS must be done in a fume hood (including the first 2 changes of solution after OsO_4 fixation).
- All weighing and solution preparation of chemicals classed as 'IRRITANT' or as 'TOXIC' should be performed in a fume hood. Please inform lab staff before preparing a solution using a TOXIC chemical.
- Forceps and embedding moulds must be wiped with ethanol to clean off excess resin.

Chemical spills

- When working with resin (always in the fume hood), cut a small square of bench roll to work on as spilling drops of resin is inevitable. When finished, place the bench roll square in the oven to polymerise.
- Osmium spills (in fume hood) must be covered generously with full cream powdered milk (in fume hood) and the lab staff, along with our safety officer Takanori Sato (ph. 02 93517541), must be informed. Once the osmium is fully reacted with the milk, the soiled area should be wrapped up, labelled and placed in the garbage bin.
- DO NOT attempt to clean an osmium spill that has occurred outside the fume hood! Evacuate the lab and inform a staff member immediately.
- If you spill a solution other than osmium when working in the fume hood, inform lab staff who will replace the bench roll.

Clean-up procedures

- Broken glass must be discarded in the yellow sharps containers.
- Wash hands with soap and water. Don't use solvents.
- If a work area must be left unattended for an extended period of time, please leave a note indicating your name and when you will return.

Glassware

- Glassware must not be removed from the lab.
- For routine work, never mix Osmium solutions in glassware. Use the graduated plastic pipettes to add equal volumes of OsO_4 and buffer.
- Please clean up any glassware that you use in the lab. Either wash it and leave it on the draining rack or place it in a dishwasher draw with the red 'dirty' sign on it.

Fridges and freezers

- Don't store anything you won't use within the next couple of weeks.
- Don't store your solutions on the "SMM Stock Solution" shelf.
- Keep toxic solutions in the left fridge, leaving the right side of the fridge for non-toxic solutions, such as buffers and immuno-chemicals.
- Open the glutaraldehyde or OsO_4 stock bottles in the fume hood ONLY.

Waste disposal

- Anything contaminated with resin (gloves, benching, pipettes, vials) must be polymerised in the oven before disposal.
- Waste epoxy (Epon, Spurr's) resin dilutions (50/50) must be discarded into resin: ethanol waste container provided, before changing to 100% resin (don't polymerise 50/50 resin solutions).
- Waste LR white resin dilutions (50/50) must be discarded into the LR white resin: ethanol waste container provided, before changing to 100% resin (don't polymerise 50/50 resin solutions).
- Waste glutaraldehyde and paraformaldehyde should be disposed of in the glut/paraformaldehyde waste container, located in the grey cupboard to the left of the fume hoods.
- Waste ethanol and acetone should be disposed of in the ethanol/acetone waste container, located in the grey cupboard to the left of the fume hoods.
- Waste sodium cacodylate should be disposed of in the sodium cacodylate container, located in the grey cupboard to the left of the fume hoods.
- Osmium waste (along with the first two washings after osmium fixation) is put into osmium waste container in the fume hood.
- Uranyl acetate solutions are disposed in uranyl acetate waste container, located below the sink next to the staining area.
- Aqueous lead solutions should be put into lead waste container, located below the sink next to the staining area.
- Ether, chloroform and HMDS should be evaporated in fume hood prior to cleaning container.
- Please consult with lab staff before disposing of any other chemical waste.
- Gloves and consumables should be disposed of only in bins lined with a blue bag.

- The disposal of biological waste material should first be discussed with lab staff and the SMM Safety Officer, Takanori Sato (ph. 02 93517541).

4. Materials specimen preparation laboratory

Hydrofluoric acid

- Hydrofluoric acid (HF) is highly toxic and requires extreme care. HF can only be used in the laboratory after explicit training and subsequent approval by Jacob Byrnes. Without this training, the use of HF is strictly not permitted. Covered footwear, appropriate gauntlets, apron and face protection must be worn. As with all dangerous substances, please read the SDS before use.
- For trained Users, specific rules of use are as follows:
 - In the materials preparation lab, HF can only be used during working hours between 9am and 5pm (after-hours or use on public holidays is prohibited).
 - Calcium gluconate gel is located on the right side frame of the fume hood and must be ready for use in the case of a WHS incident.
- Contact the Materials Specimen Preparation Section Manager Jacob Byrnes for more information.

Chemicals

- No chemicals are to be taken away from the laboratory. All chemicals available in the laboratory must be used in the laboratory under the supervision of the laboratory manager and in accordance with the safety recommendations of the laboratory.
- All acids must be stored in the acid cabinet.
- Always add acid to water – never the other way!
- All preparation of chemical solution must be done in the fume hood.
- Clearly label all containers used in the fume hood with your name and acid type.

Chemical spills

- All major spills must be reported to the Safety Officer, Takanori Sato (ph. 02 93517541).
- Major spills must be absorbed in vermiculite (middle top shelf right back of the fume hood). Once absorbed, place waste in a labelled container for disposal.
- If you spill acid on your skin rinse immediately with tap water for few a minutes, contact a First Aid Officer.
- If you spill HF on your skin, immediately remove any contaminated clothing and rinse thoroughly with cold running water for 15 minutes and then apply “calcium gluconate gel” liberally to the affected area. The gel is stored on the right hand side frame of the fume hood. Contact a Poisons Information Centre or a medical centre (page 3).

Waste disposal

- There are waste containers under the fume hood. Make sure you use the correct drum.

Clean-up procedure

- Wash hands with soap and water. Don't use solvents.
- Clean benches when you finish using them.
- If a work area must be left unattended for extended periods, please leave a note indicating your name and when you will return, and clearly label all reagents left at your workspace.

5. SEM laboratories and the liquid nitrogen storage room

- Gas cylinders must be secured before connection to equipment or use.
- Unless permission is given, only SMM staff should transport and connect gas cylinders.
- Always use eye protection when transporting and working with liquid nitrogen.
- Only authorised personnel are permitted to dispense liquid nitrogen from the 240-litre dewar.
- Do not remove SEM mount lifters from microscope rooms or laboratories.
- When your projects are complete, remove your specimens from the storage desiccators.

6. Heat treatment laboratory (Room 227)

- No User or staff member can enter this lab without appropriate induction by the Section Manager.
- Use of ovens at high temperatures:
 - Autoclaves must be used as the closed containers for reactions at temperatures above 100°C. The autoclaves should contain less than 2/3 of their full capacity with a liquid reactant.

- A green card should be completed and left on the oven, which indicates the temperature, operator, emergent operation and the A/H contact details.
- If you need to alter any settings on the ovens, please contact the Users (as indicated on the green card) and make the appropriate arrangements.
- Liquid and flammable chemicals should be stored in the specially assigned cabinets.
- Volatile chemicals should be used in fumehoods.
- Glass and sharps should be disposed of in appropriate bin.

7. Cell culture laboratory (Room 132)

- Users of this lab must complete the Cell Culture Risk Assessment form and await approval from the WHS Committee before proceeding. Please allow a minimum of 5 working days for the processing of your form. You will be notified by email and provided with the name of a contact person who will show you the procedures in the laboratory.
- Please note that cell cultures, Genetically Modified Organisms (GMOs) and or viruses analysed in this laboratory by other Users can pose significant WHS risks, so it is pertinent that you are aware and respect the safety of colleagues and peers whilst working. On occasions there may be temporarily increased WHS risks (such as GMO viruses, for instance). In such cases, appropriate signage will be posted to promote awareness.

Contact personnel for this laboratory:

Minh Hyunh	Ph. 9351 7525	Room 111A
Eleanor Kable	Ph. 9351 7566	Room 128A

- To use this laboratory you must have training by nominated trainers who will be assigned to you at your new user meeting. At this time you are considered to be a Cat 1 User. To work unsupervised and have your access card upgraded for working after hours, you need to complete the Cat 3 assessment. Please contact cell culture lab personnel to arrange this.
- The laboratory must be kept clean at all times to ensure minimum risk of contamination.
- Designated lab gown (blue) for cell culture lab should be worn at all times.
- Dirty glassware should be rinsed, soaked in bleach solution for 10–15 minutes and placed on the side of the sink to be drained.
- The refrigerator is to be used only for solutions associated with your use of the laboratory. We trust that you will use it only for short-term storage (1–2 weeks).
- All chemicals/buffers/solutions must be labelled with your name, identification of chemical/solution, and the date. Unlabelled solutions will be discarded. If opening a bottle of medium/PBS/trypsin make sure it is then aliquoted out or labelled as to when opened and by whom.
- There are two biosafety cabinets in the laboratory. The BH2000 biological safety cabinet, biohazard hood, is to be used for general cell culture assays that do not involve the use of carcinogens/toxic chemicals.
- The Gelaine Cytosafe, cytotoxic drug safety hood, is to be used when carcinogens/toxic chemicals are employed. These cabinets should be booked online prior to use.
- If there is a spill in these cabinets, (including under the grill or walls), it must be cleaned after use and logged into your instrument session. In addition, during work hours (9am to 5pm) you should verbally notify cell culture lab personnel.
- Do not adjust the pressure of the CO₂ tank (it should only be at 2–3 psi). If it is running low notify the Duty Microscopist or cell culture contact personnel.
- Ensure that there is always water (milliQ or distilled) in the vessel in the CO₂ incubator (note this controls the humidity level for your cells)
- The 5% CO₂ incubator should be opened as little as possible, therefore short experiments such as trypsinisations, short incubations should be done in the other incubator. This will ensure the unnecessary loss of CO₂.

8. Molecular preparatory laboratory (Room 130)

- General laboratory rules apply.
- Bench tops must be left clear after use, and all wastes appropriately disposed of.
- All equipment must be booked online prior to use.
- Read each instrument manual and risk assessment (RA) before use.
- Please place gels onto glad wrap first and not directly onto the exposure platform in the gel reader.

- Wipe surface of gel reader with distilled water after use, and dry with paper towel.
- Clean bacterial spills using 70% ethanol.
- Do not leave bacterial plates or cultures for more than 24 hours in the incubators.
- Used agar plates must be bagged and autoclaved before disposal.
- Any RNA/DNA samples and PCR products can be stored in the -80°C freezer (Room 123) and MUST be clearly labelled with name, date and contents.
- Turn off instruments after use, except for the spectrophotometer, which will be left on until the end of the day.

IV. RISK ASSESSMENT

For cell culture laboratory Users, the cell culture risk assessment (separate link on the SMM website) must be filled out and approved before commencement of any work. This must include all hazardous and toxic compounds accompanied by their SDS and disposal procedures. These must be continually updated throughout your project, i.e. no new compounds or assays to be introduced into the laboratory until approval is given.

All other laboratory Users must submit a generic project risk assessment, listing all chemicals brought into the SMM and proposed disposal and transport procedures. Users without existing risk assessments (RAs) must complete the template project RA (separate link on the SMM website). Projects will not be approved without the provision of such adequate WHS information.

V. CARCINOGENIC AND HIGHLY TOXIC CHEMICALS

SDS should always be read, understood and supplied before using a new chemical. This information can be obtained from the University of Sydney's ChemAlert II online data base or specific vendor websites. Furthermore, SDS for carcinogens and highly toxic chemicals that are commonly used must be provided by Users of the cell culture laboratory.

It is important that all waste is disposed of in a safe and environmentally friendly manner. Do not discard toxic wastes or sharps down sinks or in the bins. They must be discarded in the appropriate waste disposal containers provided. If you are unsure how to dispose of your waste, seek help from any of the contact personnel responsible.

Biohazard waste bags are provided in the appropriate laboratories; these are to be autoclaved prior to putting in general waste. Under no circumstance should toxic substances be placed in these bags or the autoclave. If you are unsure how to dispose of your waste, seek help from any of the contact personnel responsible.

VI. INCIDENT REPORTS

If you have an accident or incident (near miss or potential accident), you must notify the Duty Microscopist as soon as possible. One of our first aid officers will be alerted to assist you immediately. All accidents, injuries, illnesses and near misses are to be reported using the Incident and Injury Reporting functionality on myHRonline.

<https://riskware.sydney.edu.au/login.aspx>

This online reporting has replaced the paper-based process for reporting incidents and injuries. As students don't have access to myHRonline, it is the responsibility of their supervisor to report any incident and injury on their behalf. The name of the supervisor should be entered in the "Reported To" field in Step 1. In the case of an accident occurring out-of-hours, please call security immediately.