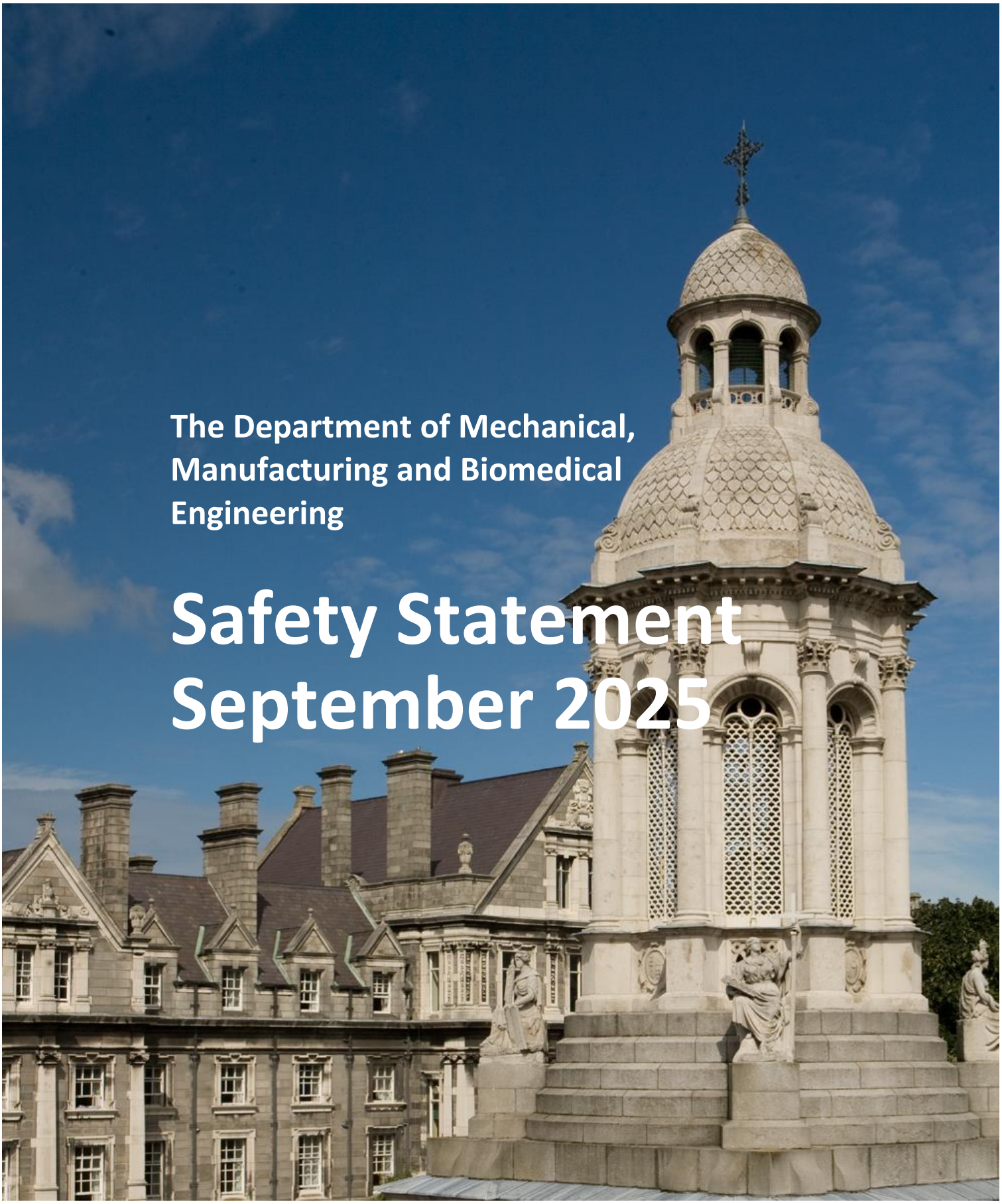
Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin



The Department of Mechanical, Manufacturing and Biomedical Engineering

Safety Statement September 2025

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University Safety Office

The University Safety Office assist and advise the University community, in ensuring, so far as is reasonably practicable, the health, safety and welfare whilst at work of all employees and students, and the safety of authorised visitors and members of the public entering Trinity College.

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University Safety Office https://www.tcd.ie/safetyoffice/

Section 0 Introduction and Safety Policies

The purpose of this document is to provide information for all staff and students in the Department. The health and safety of staff, students and visitors is important. The Safety, Health and Welfare at Work Act 2005 requires that you take all precautions, as far as is reasonably practicable, to avoid endangering yourself or others by your activities.

This Departmental Safety Statement along with Codes of Practice for the Department areas are set out below and you must read, understand, and abide by them.

This Safety Statement supplements the University Safety Statement and University Policies which are accessible on the Trinity College Dublin's website.

For the Trinity Centre for Biomedical Engineering (TCBE) located at TBSI, it should be noted that all Schools and Disciplines are required to adhere to the requirements outlined in the TBSI Building Safety Statement as well as their own site-specific Safety Statements which includes contact details, information on the management of the induction and consultation process within the discipline and risk assessments for their area.

0.1 Trinity College, Occupational Health and Safety Policy

Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

OCCUPATIONAL HEALTH AND SAFETY POLICY

We of **Trinity College Dublin, the University of Dublin** ("Trinity") value, above all else, the safety and health of our undergraduate and postgraduate students, staff, visitors, contractors and all others affected by our activities and we are committed to working in accordance with the provisions of the Safety, Health and Welfare at Work Act 2005 ("the Act") and associated legislation in order to provide a safe and healthy educational, recreational and residential environment for all. To comply with Section 20 of the Act, we have prepared a Framework (Parent) Safety Statement which sets out the safety management programme in place at Trinity and specifies how safety, health and welfare is secured.

The framework Safety Statement and local Safety Statements for each functional Unit, School or Area are maintained and updated. Trinity is committed to fulfilling our statutory obligations to manage and co-ordinate workplace safety, health and welfare, and to ensure that, so as far as is reasonably practicable, work activities are managed to safeguard the safety, health and welfare of our staff, students, visitors, contractors and others. We will achieve this by carrying out local risk assessments and bringing them to the attention of all staff and students at least annually. Within the risk assessments, protective and preventative measures have been identified, which will be implemented and maintained.

We will provide a safe place of work, including welfare facilities, which are adequately designed, maintained, and have a safe means of access and egress. Trinity will also provide safe plant and equipment and ensure that safe systems of work are in place.

We will ensure, as far as is reasonably practicable, that any improper conduct likely to put staff, students, visitors or contractors' safety and health at risk, is prevented. All staff and students will be provided with the appropriate information, instruction, training, and supervision as required to stay safe and healthy. We will, as far as is reasonably practicable, prevent risks to health from articles or substances such as chemicals, nanotechnology, and radiological and biological agents.

Where hazards cannot be eliminated, adequate arrangements in accordance with the General Principles of Prevention, including where required the provision of suitable protective clothing and equipment, will be put in place to reduce the risk of injury. Trinity have plans and procedures to be followed in the event of an emergency or serious or imminent danger.

The College has competent personnel to advise and assist in securing the safety, health and welfare of staff, students, visitors, and contractors. The safety message is communicated to the college community through the College website, the University Safety Committee and its sub committees, local safety officers and safety representatives.

Our policy is subject to annual review, and we appreciate any feedback in relation to this policy that allows us to continually improve our health and safety standards.

Signed: Linda Doyle *Date:* 14 June 2024

Dr Linda Doyle, President & Provost, Trinity College Dublin, the University of Dublin

0.2 General Statement of Department Safety Policy

It is the Department's policy to ensure, in so far as possible, the health, safety and welfare of all its staff and students in accordance with the College Safety Policy, the Safety, Health and Welfare at Work Act of 2005 and relevant, later, subsidiary legislation and statutory instruments. All reasonable steps will be taken to ensure that no persons – be it staff, students, or others – health, safety and welfare is put at risk by, or as a result of the activities of the Department.

In so far as reasonably possible, adequate resources in relation to health, safety and welfare matters will be made available. All affected will receive the necessary, and up to date information, instruction and training and adequate levels of supervision for them to undertake activities in a safe manner. Both proactive and reactive approaches towards health, safety and welfare will be taken.

By achieving all the above, the Department will ensure that it meets its objectives for health, safety, and welfare by:

- establishing a safe environment for all
- establishing and maintaining safe working procedures for staff and students
- encouraging health and safety as an integral part of work by all staff and students
- developing and maintaining a safety consciousness and a safety culture in all within the Department & Biomedical Engineering Centre
- conforming to the requirements laid down in the Safety, Health and Welfare at Work Act 2005, any further provisions made under the Act, other applicable legislation and the College Safety Statement, College Policies and Codes of Practice documents.

Signed:  (Stephen Spence, Head of Discipline)

Date: 8th August 2025

Section 1 – Health and Safety Management Structures

The purpose of this document is to provide essential health and safety information for all staff and students in the School, particularly in relation to work carried out in laboratories, offices, and during field trips. The health, safety, and welfare of all staff, students, and visitors is a core priority of the School and the wider University.

Legal Responsibilities

In accordance with the Safety, Health and Welfare at Work Act 2005, all individuals are legally required to:

1. Take every reasonably practicable precaution to protect their own safety and the safety of others.
2. Ensure that their actions or omissions do not endanger themselves or others in the workplace.

Departmental Safety Statement and Codes of Practice

This Departmental Safety Statement sets out the safety management structure, responsibilities, and practices specific to the School of Mechanical, Manufacturing and Biomedical Engineering (MMBE). It is designed to supplement:

- The University Safety Statement
- All relevant University policies and procedures available via the Safety Office website.

The document includes:

- Codes of Practice
- Risk Management Procedures
- Roles and Responsibilities
- Induction and Training Requirements

Mandatory Compliance

All staff and students are required to:

1. Read, understand, and comply with the Departmental Safety Statement and associated Codes of Practice.
2. Complete the relevant Acknowledgement Form confirming their understanding and agreement to abide by safety requirements.

Important: Access to laboratories and workshops will be denied until the completed Acknowledgement Form is received.

Scope of this statement

This safety statement applies to all individuals working in the following areas:

- Parsons Building
- MMBE-designated areas of the Watts Building
- MMBE-designated areas of the Trinity Biomedical Sciences Institute (TBSI)
- MMBE-designated areas of SNIAM
- MMBE-designated areas of Trinity East
- MMBE office space in Stack B

All members of the MMBE Department - including academic staff, technical officers, researchers, postgraduate and undergraduate students, and administrative personnel - are required to read and sign this document, regardless of their primary work location.
In addition, MMBE members based in buildings outside the Parsons Building — such as E3 — must also read, sign, and comply with the E3 Safety Statement and adhere to any relevant local work practices specific to those facilities.

Safety responsibilities and duties

All personnel – including staff, students, and visitors – have a personal responsibility to ensure the health and safety of themselves and of others who may be affected by their activities within the Department.

Executive Safety Roles and Responsibilities

The Head of Department, Professor Stephen Spence, holds overall responsibility for safety within the Department. In his absence, he will appoint a member of staff to act on his behalf. A record of the appointed Acting Head of Department will be maintained in the Departmental Office.
The Department Safety Officer, Mr. Gordon O'Brien, has executive responsibility for safety matters and reports directly to the Head of Department. He is supported by the MMBE Chief Technical Officer, Mr. Mark Jordan. In the absence of the Department Safety Officer or the Chief Technical Officer, the other will assume the full set of safety responsibilities.

Statutory Employer Duties

The Head of Department acknowledges and accepts the legal obligations placed upon employers under Section 8 of the Safety, Health and Welfare at Work Act 2005, and must ensure, *so far as is reasonably practicable*, that:

(a) That work activities are managed and conducted in a way that ensures the safety, health, and welfare of all employees.

(b) That improper conduct or behaviour likely to endanger staff is prevented.

(c) Regarding the place of work:

(i) It is designed, provided, and maintained in a safe condition.

(ii) There are safe means of access and egress.

(iii) All machinery and equipment are safe and without risk to health.

(d) That the use of any article, substance, or exposure to noise, radiation, vibration, or other physical agents does not endanger health.

(e) That systems of work are planned, organised, performed, maintained, and revised for safety.

(f) That facilities and welfare arrangements are provided and maintained.

(g) That adequate information, instruction, training, and supervision are provided.

(h) That health and safety measures are determined and implemented during risk assessments and safety statement preparation, accounting for changing circumstances.

(i) That where risks remain, suitable personal protective equipment (PPE) is provided and maintained.

(j) That emergency plans and procedures are prepared and revised as needed.

(k) That all accidents and dangerous occurrences are reported as prescribed.

(l) That competent persons are consulted or employed where required to fulfil safety responsibilities.

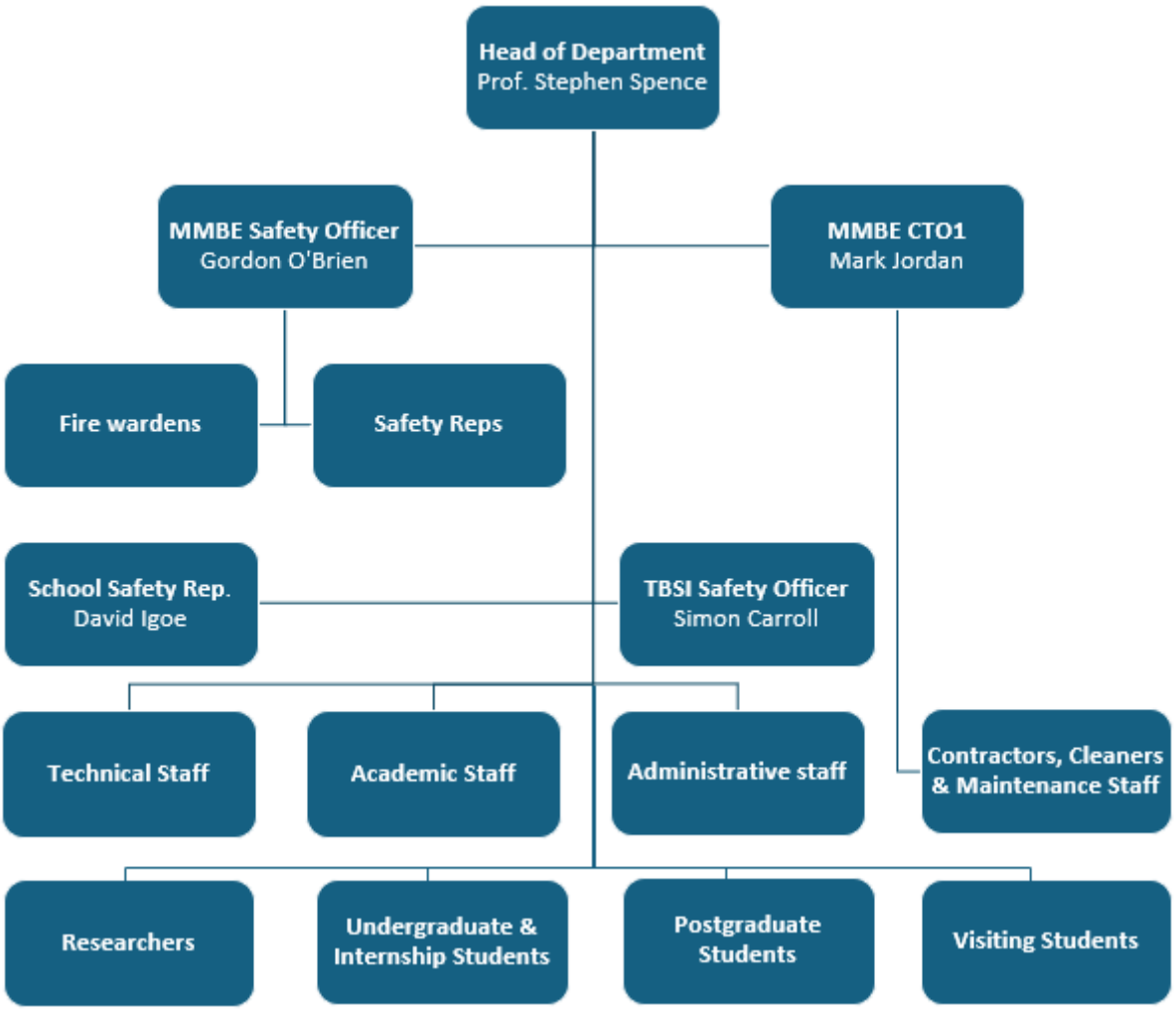
Specific Duties of the Head of Department

To meet these legal obligations, the Head of Department will:

- Ensure that the Departmental Safety Statement is prepared, reviewed regularly, and updated as necessary.
- Sign and display the Statement of Intent within the Department.
- Appoint a Safety Officer to manage day-to-day health and safety compliance.
- Appoint Fire Wardens to assist in fire prevention and evacuation procedures.
- Lead by example by demonstrating a personal commitment to the highest safety standards.
- Facilitate regular safety inspections within MMBE.
- Attend legal briefings to stay informed of their responsibilities under health and safety legislation.
- Monitor the implementation and compliance with the Departmental Safety Statement.
- Support the distribution of health and safety documentation and updates.
- Ensure that all incidents, accidents, and dangerous occurrences are reported per College procedures.
- Provide or organise safety training for staff and students or ensure attendance at College training sessions.
- Oversee the identification and provision of required PPE and safety equipment prior to the commencement of work.
- Collaborate with College personnel on health and safety matters affecting MMBE.
- Ensure that new members receive a proper safety induction, including being informed of the Department Safety Statement.
- Communicate and enforce building rules, including:
    - Avoiding the covering of window panels in doors,
    - Displaying appropriate signage for biological and chemical hazards in labs.

MMBE Health and Safety Structure

1.1.1 Organisational Chart



1.4.2 Personnel

Health and Safety responsibilities have been allocated to those shown in the table below.

Health and Safety Responsibility	Name	Title
Head of Department	Prof. Stephen Spence	Professor and Head of Department
MMBE Chief Technical Officer	Mark Jordan	MMBE Chief Technical Officer 1
Local Safety Officers	Gordon O' Brien (MMBE) Simon Carroll (TCBE)	Chief Technical Officer 1 Chief Technical Officer Specialist
School Safety Representative	David Igoe	Assistant Professor

Health and Safety Responsibility	Name	Title
Occupational First Aiders	<u>Parsons Building</u> Gordon O'Brien Alex Kearns <u>Watts Building</u> To Be Confirmed <u>TBSI</u> Front desk	 Chief Technical Officer Chief Technical Officer Specialist
Occupational First Aiders		
Manual Handling	Manual handling training is arranged through the Safety Office	
Fire Wardens	<u>Parsons Building</u> Tania Pañero Patrick Lynch Séamus O'Shaughnessy Gerry Byrne Alex Kearns Robert Dunbar Gordon O' Brien <u>Watts Building</u> Daniel Trimble <u>TBSI</u> Simon Carroll	 Administrative Officer Senior Technical Officer Associate Professor Senior Experimental Officer Chief Technical Officer Specialist Chief Technical Officer Specialist Chief Technical Officer Associate Professor Chief Technical Officer Specialist
MMBE Specialist Safety Areas *VDU Safety* *Laser Safety* *Radiation Safety* *Chemical Safety* *Biohazards Safety* *Electrical Safety* *Compressed Gas Safety* *Mechanical Safety* *Thermo Lab Safety* *STAM Lab Safety*	 Safety Office Tim Persoons Robert Dunbar Robert Dunbar Simon Carroll Patrick Lynch Gordon O'Brien Brian O'Dwyer Gerry Byrne Garret O'Donnell	 Associate Professor Senior Technical Officer Senior Technical Officer Chief Technical Officer Specialist Senior Technical Officer Chief Technical Officer Senior Technical Officer Senior Experimental Officer Associate Professor

Health and Safety Responsibilities within MMBE

All personnel within the Department share a collective responsibility to support the continuous monitoring and improvement of safety performance. This includes, on a day-to-day basis, the prompt reporting of any safety-related comments, queries, or concerns to the Departmental Safety Officer or the MMBE Chief Technical Officer.

Any identified deficiencies in equipment or procedures must be addressed without delay. Equipment deemed unsafe must not be used under any circumstances until the appropriate corrective actions have been completed.

Specific roles and responsibilities are set out further below:

1.5.1 MMBE Chief Technical Officer Responsibilities

The MMBE Chief Technical Officer (MMBE CTO1) will

- Be familiar with the Department of MMBE Safety Statement and its content.
- Eliminate or report unsafe conditions and hazards.
- Ensure that an effective staff safety training programme exists to meet identified needs.
- Ensure all staff under their control are aware of the Safety Statement, Risk Assessments, and the procedures in place for reporting incidents and accidents in a timely manner.
- Ensure that the University's controls of contractors policy is implemented.
- Be aware of procedures to be followed in the event of an emergency.
- Demonstrate through personal behaviour that only the highest standards of safety are acceptable this includes compliance with the Safety Statement and other company policies and procedures such as the clean desk policy and the promotion of good housekeeping throughout the premises.
- Follow established safe working procedures.
- Assist in accident and incident investigations.
- Provide feedback to the Departmental Safety Officer and Head of Department.
- Ensure that work activities are managed and conducted in such a way as to ensure so far as is reasonably practicable the safety, health, and welfare at work of their employees.
- Ensure that work activities are managed and conducted in such a way as to prevent so far as is reasonably practicable any improper conduct or behaviour likely to put the safety, health, or welfare at work of their employees at risk.
- Where risks cannot be eliminated, provide, and maintain suitable protective clothing and equipment as is necessary to ensure, so far as is reasonably practicable the safety, health, and welfare at work of their employees.

1.5.2 Departmental Safety Officer

The Departmental Safety Officer will:

- Take a direct interest in the health and safety policy and positively support any person whose function it is to carry it out.

- Demonstrate commitment by taking active steps to be aware of the safety record of the premises and shall issue any necessary reasonable directives in the interest of the health, safety and welfare of all employees and others.
- Ensure that responsibility is properly assigned, understood, and accepted at all levels.
- Procure advice and assistance whenever necessary and take heed of any health and safety matters brought to their attention.
- Ensure that all staff under their control are held accountable for their performance in relation to occupational health and safety.
- Ensure that a disciplinary procedure exists for wilful breaches of safety standards contained in the Safety Statement and that all staff are aware of this.
- Demonstrate through personal behaviour that only the highest standards of safety are acceptable.
- Ensure that up to date Safety Data Sheets are maintained for all chemicals on site.
- Commend people who, by action or initiative, eliminate hazards. Suggest ways of minimising hazards and improving safety performance.
- Ensure that the Department Safety Statement including risk assessments is periodically evaluated and revised.
- Ensure that employees have access to the Safety Statement have read and understood it.
- Ensure regular inspections of the areas / activities are carried out and remedial action taken where necessary.
- Ensure that induction and safety training of all employees is carried out.
- Ensure that sufficient numbers of staff are aware of action to be taken in the event of an emergency.
- Ensure that an accident report form is completed for all accidents and that all accidents are investigated.
- Record all relevant accidents and dangerous occurrences on iProtectU.

1.5.3 Academic Staff, Principal Investigators and Researchers

Academic Staff Responsibilities

Academic staff have a key role in assessing risks and implementing appropriate control measures to prevent or reduce harm arising from both teaching and research activities. Safety legislation applies to all aspects of research, and academic staff are expected to uphold these standards. Their responsibilities include:

- Undertaking suitable and sufficient risk assessments.
- Applying the principle of risk avoidance wherever possible, in preference to risk reduction.
- Identifying and implementing appropriate control measures and safe working procedures.
- Ensuring that health and safety are adequately considered in the planning and development of course programmes, research projects, and any related activities.
- Liaising with technical staff to ensure that appropriate health and safety instructions, training, and supervision are provided for all teaching and research activities.

Principal Investigators (PIs) and Supervisors

Principal Investigators are responsible for the health and safety management of all research work under their direction. This includes ensuring compliance with legal obligations and departmental procedures. Specific responsibilities include:

- Identifying hazardous substances present in the workplace.
- Assessing risks to employees, students, and others arising from these substances.
- Preventing or adequately controlling exposure to hazardous substances, so far as is reasonably practicable.
- Establishing arrangements to deal with accidents, incidents, and emergencies, including chemical spillages.
- Providing appropriate information, training, and consultation to employees and students.
- Facilitating access to health surveillance where applicable.
- Ensuring the prompt and proper disposal of hazardous waste.
- Preventing overstocking and avoiding the retention of expired chemicals.

Researchers' Responsibilities

Researchers must actively support the safe conduct of research by:

- Cooperating with the Principal Investigator and/or Supervisor, including adhering to procedures, Standard Operating Procedures (SOPs), policies, and safety protocols.
- Making full and correct use of control measures (e.g., local exhaust ventilation) and promptly reporting any defects.
- Immediately reporting any faults with equipment or infrastructure to the PI or Supervisor.
- Reporting any accident, incident, or near-miss that may have resulted in the release of hazardous chemicals or substances into the workplace.

1.5.4 Employees

All employees—including part-time staff—have specific legal responsibilities under Sections 13 and 14 of the *Safety, Health and Welfare at Work Act 2005*. These duties include the following:

General Duties

- Take reasonable care for their own health, safety, and welfare, as well as that of others who may be affected by their actions or omissions.
- Ensure they are not under the influence of an intoxicant to such an extent that they may endanger themselves or others.
- Submit, if reasonably required by their employer, to any appropriate test for intoxicants carried out by or under the supervision of a competent person.
- Co-operate with their employer and any other relevant persons to ensure compliance with health and safety requirements.
- Refrain from improper conduct or behaviour that could endanger others, including bullying or harassment.
- Attend all necessary and required training related to health and safety.

- Correctly use any safety equipment, clothing, or devices provided for their protection.
- Immediately clean up any spillages or leakages to prevent hazards.
- Operate machinery and equipment safely and in accordance with training and instructions.
- Never place hands or limbs into machinery or equipment while it is in operation or not safely isolated.

Reporting Obligations

Employees must report to their Supervisor, Manager, or the Department's Health and Safety Coordinator as soon as practicable:

- Any work activity that may pose a danger to themselves or others.
- Any defects in the workplace, systems of work, machinery, equipment, or substances that could pose a risk.
- Any known breach of health and safety legislation or regulations.

Prohibited Actions

Employees must not:

- Interfere with, misuse, or damage any equipment or item provided for health, safety, and welfare at work.
- Undertake actions that place themselves or others at risk during work activities.
- Intentionally or recklessly interfere with or misuse any appliance, equipment, or safety device provided to ensure workplace safety.

1.5.5 Students

The University has a duty to ensure, so far as is reasonably practicable, the health, safety, and welfare of its students. In turn, students are expected to actively co-operate in maintaining a safe environment by:

- Taking reasonable care of their own health and safety, as well as that of others who may be affected by their actions or omissions.
- Following all instructions, procedures, and guidelines related to safe practices.
- Refraining from intentionally or recklessly interfering with or misusing any equipment, materials, or systems provided in the interest of health, safety, and welfare.

Failure to comply with these responsibilities or with any established safety procedures may result in disciplinary action by the College.

1.5.6 Visitors

Departmental staff who host visitors are responsible for ensuring that:

- Visitors are made aware of all relevant safety rules and local fire evacuation procedures.
- Visitors are informed of any specific risks associated with the area they are visiting.
- No visitor who is not technically qualified is left unattended in any laboratory.

All visitors, including contractors and maintenance personnel, must comply fully with the Department and Laboratory Safety Regulations.

Risk Assessment

All members of the College are required to carry out a risk assessment when their work has the potential to cause harm to themselves or others.

General Requirement

All experimental work must be supported by a documented risk assessment that:

- Identifies and addresses all potential hazards, including lone working.
- Is updated in response to significant changes in experimental procedures or equipment.
- Is reviewed and revised annually to remain current and accurate.
- Is signed by the responsible Principal Investigator (PI) or Supervisor.

The Four Basic Steps of Risk Assessment

- **Identify Hazards** - Hazards are anything with the potential to cause harm (e.g., chemicals, equipment, procedures, environmental factors).
- **Assess the Risks** - Evaluate the likelihood of the hazard occurring and the severity of potential harm.
- **Determine and Implement Control Measures** - Define and implement appropriate safety measures to eliminate or minimize the identified risks. These control measures are the core of the risk assessment and must be followed rigorously.
- **Assess Residual Risk** - Evaluate any remaining (residual) risk after control measures have been applied. If necessary, refine the controls further to reduce risk to an acceptable level.

Project Safety Statement

Where applicable, risk assessments should be compiled within a Project Safety Statement, which includes, but is not limited to:

- Title Block
- Student and Laboratory Information
- Emergency Contact Details
- Project Overview
- Activity Descriptions
- Relevant Standard Operating Procedures (SOPs)
- Safety Data Sheets (SDSs)
- Risk Assessments (in 5×5 format)

Note: Some projects may require multiple individual risk assessments.

Completed Project Safety Statements must be uploaded to the Projects SharePoint. Previous examples are available on SharePoint for reference.

Available Risk Assessment Templates

Templates and guidance for completing risk assessments are available in Appendix A. Depending on the nature of the work, the following risk assessments may be required:

- Equipment Risk Assessment

- Chemical Risk Assessment
- Project Safety Statement & Risk Assessment
- Biological Agents Project Risk Assessment
- Lone Working Risk Assessment
- Pregnant Employees Risk Assessment

New Hazard Safety Document

A New Hazard Safety Document is required for the introduction of any high-risk hazard in the workplace. This includes, but is not limited to:

- Hazardous Chemicals
- Compressed Gases
- Cryogenics
- Other substances, equipment, or activities deemed high-risk by the Departmental Safety Officer or Supervisor

Purpose

The New Hazard Safety Document serves to:

- Provide a comprehensive overview of the new hazard, including:
    - Purpose of use
    - Specific location(s) where the hazard will be present
    - Duration the hazard will be active or in use
- Ensure all relevant safety controls and procedures are identified and in place prior to the hazard being introduced

Content Requirements

The document must include the following:

- A clear description of the hazard, its purpose, and context of use
- Location and duration of exposure or activity involving the hazard
- Applicable Material Safety Data Sheets (MSDS) or Safety Data Sheets (SDS)
- Any additional safety documentation, such as manufacturer instructions, guidance from regulatory authorities, or internal safety protocols
- Risk Assessment(s) specific to the hazard
- Clearly defined control measures and emergency procedures

Approval Process

All new high-risk hazards must:

- Be fully documented through the New Hazard Safety Document
- Include all required risk assessments
- Receive formal approval from the Departmental Safety Officer and/or Principal Investigator prior to implementation or use

Identified Hazards

1.8.1 MMBE Hazards

Several general hazards have been identified within the Department of Mechanical, Manufacturing and Biomedical Engineering (MMBE). These hazards are common across departmental areas and activities:

- Fire Hazards
- Workshop Hazards
- Rotating Machinery and Power Tools Hazards
- Electric Shock Hazards
- Arson and Bomb Threats
- Slips, Trips and Falls Hazards
- Work Environment Hazards
- Plant, Equipment and Machinery Hazards
- Chemical Hazards
- Late Night Working
- Overcrowding

Details and guidance on how to manage these risks can be found in the safety section of the MMBE website. For specific machinery and equipment, Standard Operating Procedures (SOPs) and Risk Assessments (RAs) are developed and must be followed at all times.

1.8.2 TBCE Hazards

Within the Trinity Centre for Biomedical Engineering (TCBE), located in the Trinity Biomedical Sciences Institute (TBSI), a wide range of hazards specific to biomedical research have been identified and documented. To manage these, TCBE has developed 215 Standard Operating Procedures (SOPs) and Risk Assessments (RAs), covering the following areas:

- 3D Bioprinting SOPs and RAs (Sept 21) – *15 No.*
- Biochemical SOPs and RAs (Sept 21) – *17 No.*
- Biomaterials SOPs and RAs (Sept 21*) – 47 No.*
- Cell Culture Cleaning SOP (June 19)
- Cell SOPs and RAs – *31 No.*
- Coverslipper SOP and RA
- David Hoey SOPs and RAs – *41 No.*
- Deliveries SOP
- General SOPs and RAs – *41 No.*
- Histology SOPs and RAs – 28 No.
- Liquid Nitrogen SOP and RA – 1 No.
- Sensitive Sample Shipping SOP
- Software SOPs – *4 No.*
- Waste Disposal SOP – *1 No.*

Note: All SOPs and RAs are reviewed annually and updated as required to ensure ongoing compliance and safety. Note: All SOPs and RAs are reviewed annually and updated as required to ensure ongoing compliance and safety.

Safety Consultation

Trinity College Dublin is committed to promoting a culture of co-operation and consultation between management and staff on all matters related to health and safety. The College will give due consideration to any safety-related representations made by staff and will review the effectiveness of consultation arrangements at regular intervals.

MMBE Commitment to Consultation

The MMBE (Mechanical, Manufacturing & Biomedical Engineering) Department fully supports and complies with Section 26 of the *Safety, Health and Welfare at Work Act 2005*, which outlines the employer's duty to consult with employees on safety matters.

- Safety Noticeboards are maintained throughout MMBE buildings to provide up-to-date health and safety information to staff, students, and visitors.
- The School of Engineering holds quarterly Safety Committee meetings, attended by the School of Engineering Safety Representative, Dr. David Igoe, where health and safety concerns may be raised and discussed.
- Health and safety issues may also be raised through local team meetings or directly through the School of Engineering Safety Representative.

TBSI (Trinity Biomedical Sciences Institute) Consultation

For staff and students based in TBSI, departmental consultation is maintained through participation in the TBSI Management Group meetings. These meetings are:

- Attended by Simon Carroll, representing TCBE (Trinity Centre for Bioengineering)
- Inclusive of the Academic Director, Technical Officers, Safety Officers, and other key stakeholders from Schools and Disciplines based in the TBSI
- Minutes, ensuring accountability and follow-up on safety issues raised

Safety Representatives

In accordance with Section 25 of the Safety, Health and Welfare at Work Act 2005, employees are entitled to select and appoint a Safety Representative. Individuals fulfilling this role shall not be placed at a disadvantage in their employment.

Rights and Responsibilities of Safety Representatives

A Safety Representative may:

- Make representations to their employer on any safety, health, or welfare matter at the workplace.
- Inspect the workplace with reasonable notice, following a schedule agreed in advance with the employer.
- Carry out inspections in the event of an accident, dangerous occurrence, or a situation of imminent risk.

- Investigate accidents and dangerous occurrences, provided they do not obstruct legal or safety procedures.
- Investigate complaints from employees they represent, with reasonable notice to the employer.
- Accompany a Health and Safety Authority (H.S.A.) Inspector during routine inspections or investigations (as permitted).
- Make oral or written submissions to H.S.A. Inspectors.
- Receive advice and information from H.S.A. Inspectors on safety, health, and welfare matters.
- Consult and liaise with other Safety Representatives in the organisation.

Notification of Inspections

- Safety Representatives must be informed when an H.S.A. Inspector visits the site for inspection purposes.

1.11 Auditing & Inspections

The Departmental Safety Officer will implement and maintain a Safety Inspection Programme.

- Formal safety inspections will be conducted at least annually.
- Inspection findings will be reviewed and communicated to Departmental management.
- All staff, students, and researchers are encouraged to report safety concerns to their supervisor or directly to the Departmental Safety Officer.

1.12 Disciplinary Action

Where informal methods such as advice and persuasion do not resolve non-compliance, the Department reserves the right to take disciplinary action. This includes, but is not limited to:

- Failure to adhere to Departmental safety and health procedures.
- Presence in MMBE labs outside permitted access hours without proper authorisation.

1.13 Bullying and Harassment

Trinity College Dublin is committed to providing a work and learning environment that is free from bullying and harassment.

- Management at all levels is expected to uphold this policy and will take prompt action to address violations.
- Any incidents of bullying or harassment should be reported to a supervisor, line manager, or via the University's Dignity & Respect Policy framework.

1.14 Stress

In line with the Safety, Health and Welfare at Work Act 2005, the University recognises work-related stress as a health and safety issue.

- Stress occurs when job demands exceed an individual's ability to cope.
- The University is committed to identifying, assessing, and addressing risks associated with stress in the workplace.
- Staff are encouraged to make use of the Staff Wellbeing resources available via the University website.

Section 2 – General Safety Rules

2.1 Emergency

Trinity College Dublin (Main Campus)

In the event of an incident requiring emergency assistance, the fire/emergency services or medical assistance:

- **Emergency** (24/7):
    - Security: Ext. 1999 / 01 896 1999 (from a mobile)

When calling:

- State the type of assistance required (e.g., ambulance, fire brigade).
- Describe the nature of the emergency (e.g., fire, injury).
- Give your name, extension number, exact location, and mobile number if possible.

Stay by the phone if it's safe, in case further information is needed.

- **Non-Emergencies:**
    - Security Centre: Ext. 1317 / 01 896 1317
    - Front Gate: Ext. 3978 / 01 896 3978
- MMBE Safety Contact Numbers: Available on the MMBE Safety Contacts page.

TBSI Emergency Contacts

- TBSI Attendant Desk: Ext. 3999 / 01 896 3999
- Executive & Technical Director – Tony Byrne: Ext. 3964 / 087 973 1446
- Premises Manager – Patricia Ryan: Ext. 4339 / 087 251 2362
- Trinity Central Security Desk: 086 045 3299
- Michael Flanagan (Colliers): 087 254 1442

2.2 Cardiac Emergency

- AED Location: Outside Reception, Parsons Building. University Security vans are also equipped with AEDs.
- In the event of cardiac arrest:
    - Contact the nearest staff member.
    - Call College Security: 01 896 1999
    - Request a cardiac ambulance.

AEDs are for emergency use only. Tampering is strictly prohibited and will result in disciplinary action.

2.3 General Safety Action

When entering any University or MMBE building:

- Locate emergency exits and assembly points.
- Identify fire safety equipment and alarm call points.
- Read all hazard signage (chemical, biological, laser, radiation, etc.).

2.4 Fire Action

If You Discover a Fire:

- Activate nearest break glass unit.
- Evacuate the building immediately—do not use lifts.
- Close doors behind you.
- Call Security: Ext. 1999 / 01 896 1999 (or Ext. 3999 in TBSI).
- Notify a Fire Warden outside if available.
- Proceed directly to your designated assembly point.

If the Fire Alarm Sounds:

- Follow instructions from Fire Wardens or Safety Officers.
- Evacuate calmly via nearest exit.
- Do not re-enter the building until the all-clear is given.

MMBE Fire Assembly Points:

- Parsons Building & SNIAM: Point D – *Flat Iron triangle, College Park*
- WATTS Building: Point E – *Between Lloyd & O'Reilly Buildings*
- TBSI: Points F & G – *Cumberland Street South & Sandwich Street*
- Stack B: *Tree* Garden*, North Side*

2.5 Evacuation Marshal

Role Definition

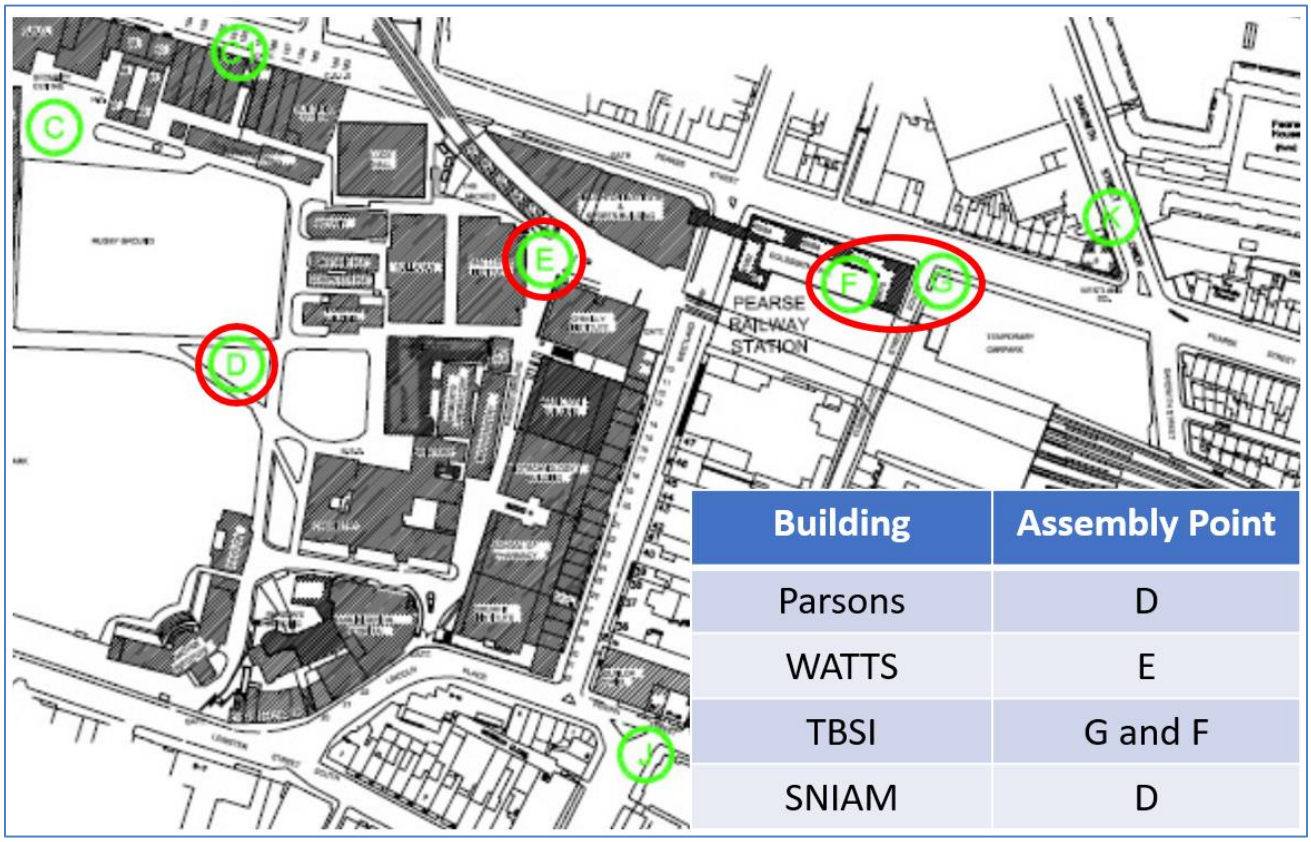
- An Evacuation Marshal is a senior person present when the fire alarm sounds—e.g., a lecturer in a theatre, a post-doc in a lab—only acts in the absence of a Fire Warden.
- Responsibilities are distinct from those of Fire Wardens: no audits or equipment checks.

Key Responsibilities

- Ensure safe and orderly evacuation of all individuals within their designated area.
- Do not engage with fire hazards or firefighting equipment.
- Must be familiar with exit routes, refuge areas, and assembly points, and inform others accordingly.
- Report any individuals unable or refusing to evacuate to Fire Wardens or emergency personnel — without putting themselves at risk.
- Must participate in emergency drills to maintain familiarity with procedures.

Training & Support

- No specialized training required—only the necessary awareness of evacuation protocols.
- Implementation is overseen by the Head of School or Unit, who ensures Marshals are notified and briefed on their role. Evacuation Marshal Policy (TCD)



Building	Assembly Point
Parsons	D
WATTS	E
TBSI	G and F
SNIAM	D

MMBE Fire Assembly Points

2.6 Fire Drills

- Conducted annually, without prior notice.
- Supervised by College Fire Safety Officer and Security.
- All occupants must participate fully.
- Records include evacuation time, occupant count, and date.

2.7 Disabled Persons in Emergencies

- No fire lifts are available in the Mechanical Engineering Dept.
- A Buddy System must be in place.
- Use Progressive Horizontal Evacuation (move horizontally to a safe location).
- Staff members must notify fire services of the disabled person's exact location.

2.8 Fire Wardens

Parsons Building:

- Tania Pañero – Ext. 1383
- Patrick Lynch – Ext. 1332
- Seamus O'Shaughnessy – Ext. 1778
- Alex Kearns – Ext. 1463
- Gerry Byrne – Ext. 3523
- Robert Dunbar – Ext. 1854
- Gordon O'Brien – Ext. 2396

TBSI Labs:

- Simon Carroll – 087 923 3004

WATTS Building:

- Daniel Trimble – Ext. 4856

2.9 First Aid

- Minor injuries: Seek a First Aid qualified person in your area.
- Serious injuries: Contact University Health Services (Ext. 1556) or call Ext. 1999 (Main Campus) / Ext. 3999 (TBSI).
- First Aid Boxes are maintained by the Chief Technical Officer.
- Locations are marked throughout the Department.

2.10 First Aid Training

The Department supports First Aid training for permanent staff and postgraduates. Volunteers are encouraged to participate.

2.11 Reporting Accidents and Incidents

- Report all accidents/near misses immediately to your supervisor and local safety officer.
- Complete an incident report on iProtectU.
- Contacts:
    - MMBE Safety Officer: Gordon O'Brien – gordon.obrien@tcd.ie
    - TBSI Safety Officer: Simon Carroll – simon.carroll@tcd.ie

2.12 Reporting Hazards

- All staff and students must report observed hazards to:
    - MMBE Safety Officer
    - Chief Technical Officer
- Undergraduate students may report to their class representatives.

2.13 Lone Working

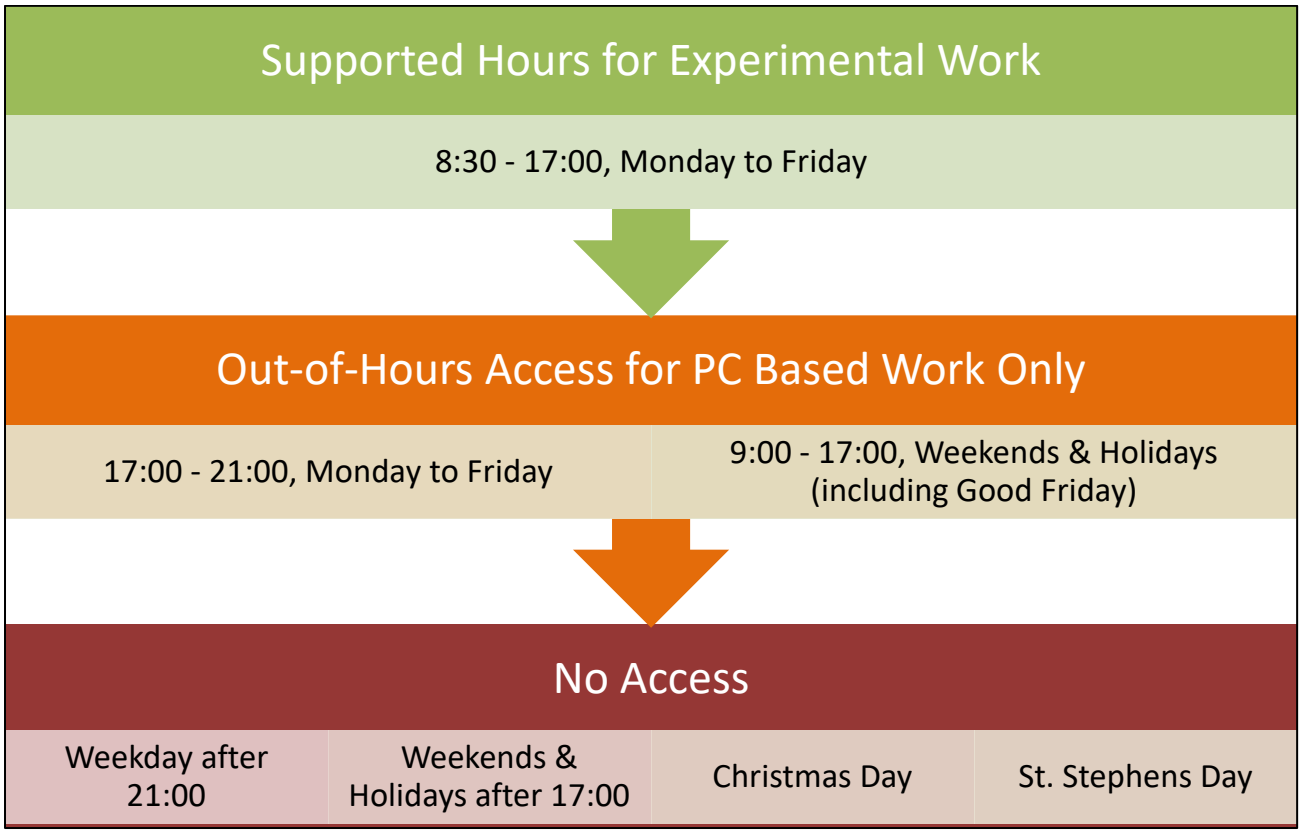
- Defined as working without supervision or isolated without contact.
- Approval from the Safety Officer is required.
- Undergraduates are not permitted to work unsupervised after hours.
- SafeZone app use is mandatory during out-of-hours access.

Complete the MMBE Lone Working Application and refer to Appendix D of the Department Protocol.

2.14 Department Access Hours

- Normal Hours:8:30am – 5:00pm (Mon–Fri)
- Extended Hours:
- 5:00pm – 9:00pm (Mon–Fri)
- 10:00am – 6:00pm (Weekends/Holidays)
- No access is permitted outside these hours without prior approval.

Non-MMBE members are not permitted out-of-hours.



Parsons Access Times

2.15 Out-of-Hours Event Management

All events outside regular hours require a completed Event Management Plan, including:

- Venue capacity
- Expected attendance
- Crowd control
- Fire safety measures
- Responsible persons/stewards

Templates and guidance available from the University Safety Office.

2.16 Hazardous Areas

- Clearly marked with appropriate signage.
- Access is restricted to authorised personnel.
- Familiarise yourself with posted hazards and PPE requirements before entry.

2.17 Clearways

- All corridors, exits, and stairways must be kept clear.
- Temporary obstructions must be reported to the Safety Officer.

2.18 Electrical/Plant Rooms

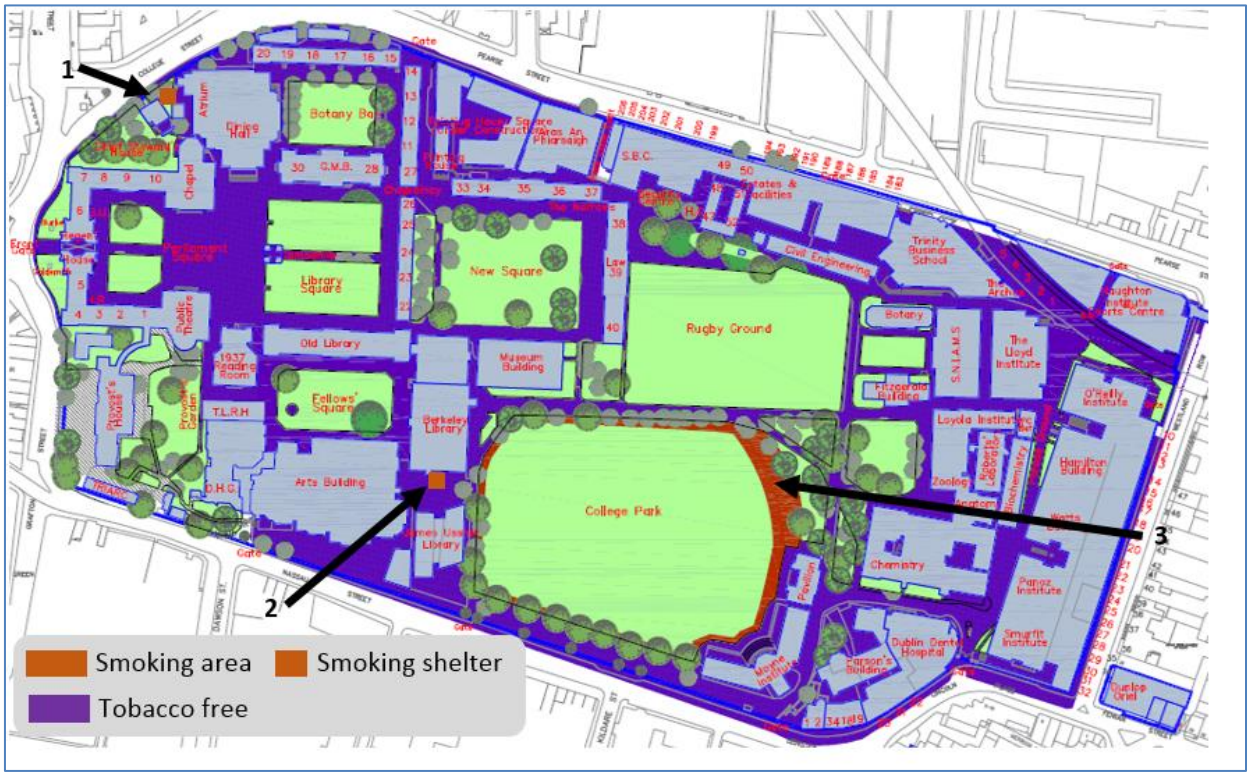
- Must remain unobstructed at all times.
- Access restricted to authorised personnel only.

2.19 Smoking and Vaping

Trinity is a tobacco-free campus, with limited designated areas.
Smoking, vaping, and use of e-cigarettes is prohibited within Department buildings and within 4 metres of entrances or windows.

2.20 Work Travel Safety

- Travel Insurance is required for work-related travel and must be:
    - Approved by the Head of Department
    - Submitted via the Estates & Facilities portal
    - Alternatively, submit a printed form.



Campus Smoking Areas

Section 3 – Safety rules for Teaching Labs & Lecture Theatres

The general safety rules outlined in Section 2 apply to all personnel (staff, students, and visitors) within the Department. The following rules are specifically for staff, demonstrators, and undergraduate students who are authorised to enter or work in teaching laboratories and lecture theatres within the Department of Mechanical, Manufacturing and Biomedical Engineering (MMBE).

3.1 Training

- The Department strongly encourages participation in safety training courses provided by the College Safety Office throughout the academic year.
- Fire Safety Training is mandatory for:
    - Demonstrators
    - Technical Officers working in undergraduate teaching labs.
- Additional mandatory training may apply to personnel working in special hazard areas (see Section 5).
- For a list of available training courses, refer to the Health & Safety Training section on the University Safety Office website.

3.2 General Laboratory Rules

All individuals working in teaching labs or lecture theatres must adhere to the following rules:

- Read and follow the Department Safety Statement, which outlines safety policies and responsibilities.
- Smoking, vaping, and the use of e-cigarettes is strictly prohibited in all college buildings.
- Eating and drinking is not permitted in laboratories or lecture theatres.
- Hazardous materials, equipment, and procedures (e.g. lasers, chemicals, electrical systems) must be handled according to the guidance provided in Section 5 – Designated Safety Areas.
- Coats, bags, and personal items must not be placed on benches or in walkways, as they may create obstructions or hazards.
- Unsupervised work is prohibited unless explicit permission is granted by the lab supervisor.
- Avoid gathering or blocking entrances to laboratories, lecture theatres, or building access points.
- The lab or lecture theatre supervisor is responsible for ensuring all students and demonstrators are aware of these rules.
- A Risk Assessment must be completed for each process or activity carried out in the lab (see Appendices for the form template).

Section 4 – Safety rules for Offices, Research Labs & Workshops

In addition to the general safety rules outlined in Section 2, the following procedures and responsibilities apply specifically to personnel (including staff, postgraduate researchers, visiting researchers, and undergraduate project students) authorised to work in research laboratories and workshops within the Department of Mechanical, Manufacturing and Biomedical Engineering (MMBE).

Personnel working in MMBE labs located within TBSI must also comply with the additional requirements outlined in Section 5.

4.1 Responsibility

- The Head of Department has overall responsibility for Health and Safety within the Department.
- The research supervisor or person in charge of a laboratory is directly responsible for:
    - Ensuring a safe working environment,
    - Overseeing safe working practices,
    - Determining appropriate levels of supervision based on risk assessment outcomes.
- All MMBE personnel (staff, students, and visitors) are responsible for ensuring their actions (or omissions) do not endanger themselves or others.

Note: New or untrained individuals, or those working in high-risk or unfamiliar settings, must be supervised until competent.

4.2 Specialist Safety Consultants

Designated Specialist Safety Consultants are available for areas involving identified hazards (e.g. lasers, chemicals, biological materials, etc.). Consult these experts before beginning any work in such areas. Designated Safety Areas are listed in Section 5.

4.3 Authorised Access to Research Laboratories

- Access to any laboratory is limited to individuals authorised by the research supervisor or person in charge.
- Visiting researchers and new staff must receive relevant safety training before access is permitted.
- Laboratories containing specific hazards must:
    - Display clear hazard warning signs,
    - Restrict access to trained and authorised personnel only,
    - Require supervisor permission before admitting visitors or unauthorised individuals.

4.4 General Laboratory Practice

All laboratory personnel are expected to:

- Maintain a clean, organised, and safe environment, ensuring access to services (e.g. electrical boxes, water valves) remains unobstructed.
- Design fail-safe experimental systems.

- Complete detailed risk assessments in consultation with supervisors, using the following steps:
    - Identify hazards to health/safety.
        - Identify who may be harmed and how.
        - Evaluate risks and determine if precautions are sufficient.
        - Record findings.
    - Review and revise as necessary.
- Submit copies of all risk assessments to the Departmental Safety Officer.
- Use all personal protective equipment (PPE) and clothing provided.
- Seek training before attempting new procedures.
- Ensure changes in procedures or equipment are communicated clearly, and that any resulting risks are signposted with visible warnings.
- Be aware of fire safety procedures, including the nearest fire exits, fire blankets, and extinguishers (only trained personnel may use extinguishers).
- If an oxygen monitor alarm sounds: DO NOT ENTER the lab. Notify staff immediately. Report any alarms found switched off.

4.5 Protective Clothing and Personal Protective Equipment (PPE)

It is departmental policy to provide PPE where required. Research supervisors are responsible for ensuring lab coats, aprons, gloves, etc., are available and used appropriately.

4.6 Unattended Experiments / Apparatus

- Do not leave systems running unattended without prior supervisor approval.
- For unattended equipment, complete and clearly display an Unattended Apparatus IV Form (Appendix E) beside the apparatus. Remove this form when it no longer applies.
- Risk assessments must specifically consider the impact of service failures (power, water, etc.).

4.7 Shared Offices

Those using shared or co-working spaces must ensure:

- Spaces and equipment are safe and well-maintained.
- No personal electrical appliances such as toasters, blow heaters, or 3D printers are used.
- Walkways are kept clear at all times.

4.8 Charging Restrictions

The charging of electric bikes and scooters is strictly prohibited on campus due to the associated fire risk.

Section 5 – Safety Designated Safety Areas

Certain areas within the Department are classified as Designated Safety Areas due to either:

- The statutory requirements that govern work conducted there, or
- The inherent hazards associated with specific activities (e.g. high voltage, radiation, cryogenics, compressed gases, biological samples, lasers, etc.)

Key Features of Designated Safety Areas:

- Specialist Safety Training
    - All researchers working in these areas must complete explicit, area-specific safety training prior to conducting any experimental work.
- Safety Consultants
    - Each area has a designated Safety Consultant, who is responsible for:
        - Providing specialist advice tailored to the activities and materials used in that area
        - Conducting risk evaluations
        - Identifying potential hazards
- Area-Specific Rules and Procedures
    - Detailed safety protocols and procedures apply to each Designated Area. These are developed in line with:
        - Relevant legislation (e.g. Chemical Acts, Biological Agents Regulations)
        - University policies
        - Industry standards (e.g. BS5304, ISO laser classifications, etc.)

Designated Safety Areas in the School:

- TBSI (Consult: Dr. Simon Carroll)
- Laser Laboratories (Consult: Dr. Tim Persoons)
- Radiation Zones (Consult: Mr. Robert Dunbar)
- Cryogenics Storage and Transfer Areas
- Compressed Gas Handling Zones (Consult: Gordon O'Brien)
- Biological Sample Laboratories (Consult: Dr. Simon Carroll)
- Mechanical Workshop (Consult: Mr. Brian O'Dwyer)

For each area, relevant documentation (e.g. safety guidelines, risk assessments, and training records) must be maintained and available for inspection upon request.

5.1 TBSI Safety

Safety Officer for MMBE/TCBE Labs and Offices in TBSI:
Simon Carroll, Extension: 8503

All new members of the Trinity Centre for Biomedical Engineering (TCBE) are required to:

1. Access the TCBE SharePoint site
    - Review the TCBE Welcome Document (Appendix F)

- This document includes essential information regarding:
    - Induction procedures
    - Health & Safety policies
    - Lab access protocols
    - Standard Operating Procedures (SOPs)
    - Training requirements

2. Complete the TCBE Induction Checklist
    - The checklist summarizes all the mandatory documentation and training
    - These must be completed before engaging in any lab-based activities within TCBE spaces
3. Access Requests and Support
    - For SharePoint access or questions regarding training and documentation, please contact:
        - Simon – simon.carroll@tcd.ie

This ensures consistent integration with the overall safety manual and emphasizes the required procedural steps.

5.2 Mechanical Safety

Mechanical Safety Contact:
Brian O'Dwyer, Extension: 1463

The guarding of dangerous parts on machinery and machine tools is a legal requirement under British Standard BS 5304 – Safety of Machinery, which provides the primary guidance for ensuring machinery safety. All equipment within the Department's Engineering Workshop adheres to this standard.

Please note: Machine tools are among the most hazardous equipment in the Department. While trained technical staff operate them as part of their normal duties, strict rules apply to research workers and students entering or working in the Mechanical Workshop.

Workshop Access and Conduct Rules for Students and Researchers

- Eye Protection:
    - Safety glasses must be worn by anyone entering the workshop while machining is in progress.
- Do Not Disturb Machine Operators:
    - Visitors should not directly approach anyone operating machinery. Wait at a safe distance until the operator is free.
- Authorized Use Only:
    - Only suitably qualified staff are permitted to operate main workshop machinery.
- Limited Access Permission:
    - Undergraduate and postgraduate users may be granted permission to use specific equipment.
    - This is granted solely by the MMBE Chief Technical Officer

    - Permission is based on demonstrated competence and sufficient prior experience
- Behavioural Conduct:
    - Movements in the workshop should be calm and deliberate—no rushing or horseplay.
- Personal Safety:
    - Long hair must be tied up
    - Loose clothing and jewellery must be secured before operating or going near machinery
- Obey Technical Staff:
    - All reasonable instructions issued by Technical Staff must be followed without delay or argument
- Machine Safety Features:
    - All machines must be equipped with appropriate safety guards and interlocks
    - Regular inspections must be conducted by qualified staff only
- Welding Operations:
    - Only trained technical staff may perform welding
    - Eye protection and gloves are mandatory
    - A hot works permit must be obtained from the College Safety Officer before performing any welding outside the Mechanical Workshop

Additional Reference

Further safety information is available in the HSE publication:
"Health and Safety in Engineering Workshops"

- Location: **Berkeley Library**, Official Publications Section
- Shelf marks: OPUB GB HEAC 14E:6 or OPUB GB HEAC 14J:1

5.3 Compressed Gas Safety

Compressed Gas Safety Contact
Gordon O'Brien, Extension: 4908

Compressed gases present significant health and safety hazards in the laboratory environment. In line with College safety policy, the following requirements must be adhered to when working with compressed gases in the Department of Mechanical, Manufacturing and Biomedical Engineering (MMBE):

General Safety Policy

- Wherever reasonably practicable, piped gas systems should be used instead of storing gas cylinders within laboratories.
- Gas cylinders in laboratories should only be used as a last resort and must be accompanied by a temporary gas permit that is approved and clearly displayed.

Compressed Gas Permits

- All gas cylinders must have a valid Compressed Gas Permit.
- Permits must be:

- Updated every 6 months, or
- Renewed whenever a new cylinder is ordered.

New Compressed Gas Requests

1. New requests must be accompanied by a New Hazard Safety Document (see Section 1.7 of the Department Safety Statement).
2. A risk assessment specific to compressed gas must be completed and:
    - Updated annually, using guidance from TIS49: Risk Assessment Considerations for Compressed Gas Cylinders.

Training Requirements

i. All users of compressed gas must complete the Compressed Gas Safety Passport Training.
    - Note: First-year postgraduate students are not permitted to undertake this training.
    - Users who are not fully confident after training must continue to request technical staff assistance for gas cylinder connection/disconnection.

ii. All staff and students working in areas where gas cylinders are present must complete the Gas Safety Awareness Online Course.
    - This course does not authorise the user to carry out duties requiring full Compressed Gas Safety Passport certification.

Cylinder Use and Maintenance

- Cylinders must be secured with restraints or chains at all times.
- Valves must be protected, and labels must never be damaged or removed.
- Gas regulators and connecting hoses:
    - Must be dated, and
    - Replaced every 5 years from their manufacturing or service date.

Ordering Gas

- Only Gordon O'Brien is authorised to order compressed gases for the MMBE Department.
- Compressed gas can only be ordered using the official form:
    - MMBE Compressed Gas Request

5.4 Chemical Safety

Chemical Safety Contact:
Robert Dunbar, Extension: 1854

The Chemicals Act 2008 and the Chemicals (Amendment) Act 2010 govern the use of hazardous chemicals in the workplace in compliance with EU regulations. Accordingly, principal investigators (PIs) and supervisors are responsible for ensuring the safe use and management of hazardous substances in the School.

Principal Investigator and Supervisor Responsibilities

- Risk Assessment: Identify risks arising from hazardous substances and implement effective control measures.
- Control Maintenance: Ensure control systems are functional, used correctly, and maintained.
- Training & Information: Provide comprehensive safety training and chemical hazard information.
- Monitoring & Health Surveillance: Monitor exposure levels and implement health checks when required.
- Chemical Inventory: Submit a list of flammable chemicals (approximate quantity and location) to the Department Safety Officer and Chemical Safety Rep.
    - A sign must be displayed on the lab door indicating the presence of flammable chemicals.

General Laboratory User Responsibilities

All researchers and lab users must observe safe chemical handling and storage practices.

Regulatory Documents

A. Chemicals Act 2008 (No. 13 of 2008)
B. Chemicals (Amendment) Act 2010 (No. 32 of 2010)

5.4.1. Rules and Protocols for Chemical Use

Chemical Inventory and Ordering

- All chemicals must be logged in LabCup, including precise storage locations.
- Chemical orders must be:
    - Risk assessed.
    - Reviewed by the PI.
    - Approved using the Research Supervisor and Safety form.
- Chemicals may only be ordered by a PI or the MMBE Chief Technical Officer, based on a signed requisition from a research supervisor.
- Upon arrival, chemicals must be barcoded and entered into LabCup by the ordering researcher.
- Safety Data Sheets (SDS) for all chemicals must be reviewed and retained.

Training and Documentation

- Chemical Safety Training is mandatory before working with hazardous substances.

- A copy of risk assessments must be retained by both the PI and the Department Safety Officer.
- Only individuals who have completed an approved College safety course may handle hazardous chemicals.

Safe Handling and Storage

- Always wear appropriate PPE: gloves, lab coat, and safety goggles.
- Use fume hoods for volatile or hazardous substances and ensure fair usage rotation.
- Store chemicals correctly:
- Do not store acids and bases together.
- Use fire-safe cabinets where required.
- Relabel all transferred chemicals, include hazard symbols and LabCup barcodes.

Spill Response and Disposal

- Spill kits are available on each floor. Use immediately and notify staff to arrange replacement and proper disposal.
- Dispose of chemicals using the correct waste stream:
    - Chlorinated and Non-Chlorinated solvents: Use marked containers; send to the Hazardous Materials Facility (HMF) in the TBSI basement when two-thirds full.
    - Acid Waste: Use designated acid containers.
    - Cytotoxic Waste: Dispose of in yellow-based, purple-lid bins.
    - Broken Glass and Sharps: Use designated 'Sharps' bins.

Transport and Tracking

- Use bottle carriers when transporting large chemical containers (e.g., Winchester bottles).
- Inform technicians or lab attendants when a chemical is fully used so it can be removed from LabCup.

Further Resources and Contacts

- Chemical Safety Guidelines: TCD Chemical Safety
- Hazardous Materials Facility: Contact for waste disposal times, costs, and procedures.
- E.U. Chemical Regulations: Refer to the REACH website

Chemical Waste

Chlorinated/Non-Chlorinated Solvent Waste

Chemically Contaminated Waste

Hazardous Liquid Disposal (e.g., Acids)

Clinical Waste bin

Chemical Spill Kit

Cytotoxic Clinical waste bin

5.5 Electrical Safety

Electrical Safety Contact:

Patrick Lynch, Extension: 1332

In Ireland, single-phase mains electricity operates at 230V rms with a 3-wire system: Live (L), Neutral (N), and Protective Earth (E). Three-phase 400V supply is used for larger equipment such as fans and pumps.

While electrical systems are generally safe when used properly, electricity poses significant hazards including fire, severe injury, and even death. Therefore, research supervisors and those in charge of research laboratories must ensure:

- All staff, especially new or visiting researchers, receive electrical safety training before being granted access.
- Safe working practices are promoted and enforced.

Key Safety Devices

- Fuses: Provide over-current protection only.
- Residual Current Devices (RCDs): Detect small leakage currents (in milliamperes) and disconnect power rapidly to prevent electrocution.

General Safety Guidelines

- Always switch off and unplug equipment when not in use.
- Inspect plugs and cables regularly for signs of damage.
- Never use damaged plugs or cords – report them immediately.
- Have technical staff inspect unfamiliar or newly delivered equipment before plugging in.
- Extension sockets should be raised off the ground to avoid contact with spills or leaks.
- Do not leave extension cables or reels plugged in unattended.
- Keep mains isolation switches unobstructed at all times for quick emergency shutdown.
- All custom-built electrical equipment must:
    - Be correctly fused.
    - Have securely earthed metal enclosures.
    - Prevent user access to live components without tools.
- Batteries can deliver high short-circuit currents — handle with caution.

- Do not use autotransformers (Variacs) for isolation purposes — they do not provide electrical isolation.
- High-voltage systems (kV range) require special precautions and supervision.
- Unattended overnight experiments must:
    - Be designed to be fail-safe,
    - Allow for safe manual shutdown via the mains isolation switch.

Remote Access & Unattended Apparatus

If an experiment is operated remotely or unattended:

- A completed "Unattended Apparatus Form" is required.
- A copy of the form must be posted visibly at the equipment.

Electrical Emergency Procedures

Disconnect power immediately by either:

- Pulling the plug, or
- Activating the mains isolation switch.

5.6 Laser Safety

Laser Safety Consultation

Tim Persoons, Extension: 1936
University Laser Safety Officer: Mr. Christopher Smith (Ext: 3649)

Principal Investigator and Supervisor Responsibilities

Supervisors and persons responsible for laser operations must ensure that:

- All lasers under their control are registered in the University Laser Register, maintained by the University Laser Safety Officer.
- All new or visiting researchers:
    - Are registered as designated laser workers.
    - Receive appropriate laser safety training before being granted access to laser-controlled areas.
- All laser safety precautions and protocols are fully implemented and adhered to.
- Suitable laser eye protection is provided to each user, tailored to the specific wavelength and power class of the laser.
- Each laser user must attend the annual Laser Safety Training Day.
- For scheduling and attendance, contact the University Laser Safety Officer (Ext: 3649).

Training Requirements for Laser Users

- Postgraduate researchers must demonstrate to their supervisor that they:
    - Have completed formal laser safety training,
    - Are competent to use the specific laser equipment,
    - Have submitted proof of training attendance to the Departmental Safety Officer.
- If an in-person laser safety course is unavailable:
    - Users may complete the online laser safety module hosted on Blackboard:

        - Self-enrol on the Laser Safety module.
        - Study the course materials and complete the assessment.
    - This provides preliminary registration as a laser user.
- Preliminary users may only work under supervision by a registered expert user until fully trained.

Further Guidance

For full safety protocols, policy documents, and additional information, please visit the [Laser Safety] portal (link to be inserted if available).

5.7 Radiological Safety

Radiological Safety Consultation
Robert Dunbar, Extension: 1854

Preliminary Considerations

Before commencing any work involving ionising radiation, researchers must critically evaluate the necessity and justification of its use by addressing the following questions:

- Is the use of ionising radiation essential for this work?
    - Can safer, non-radiological alternatives be employed?
- Is the use of ionising radiation justified?
    - Do the benefits of its use outweigh the potential health and safety risks?
- Are the quantities and activities of radiation being used minimised?
    - Are they absolutely necessary for the objectives of the work?
    - Usage must comply with the ALARA principle (As Low As Reasonably Achievable).
- Will dose rates remain within legal safety limits throughout the work?

If you cannot answer “Yes” to all four of the above questions, authorisation to work with ionising radiation will not be granted. These are legal requirements under national radiation safety regulations.

Permit to Work System

- The use of radioactive materials (RAM) — whether sealed or unsealed — or irradiating apparatus, is strictly regulated.
- Only authorised personnel are permitted to handle or work with such materials or equipment.
- All individuals intending to use ionising radiation must register in advance with the Departmental Radiological Protection Supervisor (DRPS):
    - Contact: Robert Dunbar dunbarro@tcd.ie

Further Information

Detailed policies, safety procedures, legal limits, and guidance documents can be found in the Radiological Safety section of the University Safety Office website.

5.8 Biological safety

Biological Safety Consultation
Simon Carroll, Extension: 1854

Regulatory Compliance

All work involving biological agents or samples must comply with the following:

- Safety, Health and Welfare at Work (Biological Agents) Regulations 2013
- College Biological Hazards Policy

These regulations are legally binding and aim to protect all individuals who may be exposed to biological hazards in the workplace, including laboratory personnel, students, and visitors.

Project Approval Process

If a proposed project involves biological samples, either:

- Conducted within the MMBE Department, or
- Conducted by MMBE personnel at external facilities,

you must:

1. Consult with the College Biological Safety Officer at the earliest possible stage of planning.
2. Complete and submit the following documentation:
    - Biohazards Project Registration Form
    - Biohazards Personnel Registration Form

These documents are mandatory and help ensure the risk assessment, containment measures, and procedures are aligned with national and institutional biosafety standards.

Further Guidance

Additional information, including:

- Risk group classifications
- Containment level requirements
- Waste disposal procedures
- Training requirements can be found www.tcd.ie/safetyoffice/lab-safety/biological -safety/

For all biosafety-related inquiries or assistance with project registration, please contact Simon Carroll simon.carroll@tcd.ie

5.9 Cryogenic Liquid Safety

Overview

The most common cryogenic hazard in our laboratories is liquid nitrogen, which has a boiling point of -196˚C. This extremely low temperature poses significant risks including cold burns, asphyxiation, and explosion hazards due to rapid vaporization.

Training Requirement

All personnel intending to handle cryogenic liquids must complete the 'Safe Use of Cryogenics' course provided by the University Safety Office prior to use.

Safety Rules and Guidelines

To ensure the safe handling and use of cryogenic liquids, the following precautions must be observed:

- Personal Protective Equipment (PPE)
    - Wear a cryogenic apron, eye protection (face shield or goggles), and thermal cryogenic gloves when transferring or handling liquids.
- Risk Assessment
    - A risk assessment must be completed and approved by your Principal Investigator (PI) before conducting any work involving cryogenic liquids.
- Ventilation
    - Ensure the laboratory is well ventilated. Cryogenic liquids can displace oxygen, creating a serious asphyxiation hazard, especially in enclosed or poorly ventilated spaces.
- Spills and Alarms
    - In the event of a liquid nitrogen spill or if an oxygen monitor alarm is triggered:
- Evacuate the laboratory immediately.
    - Inform a staff member to assess the situation and initiate the appropriate response.
- Transport Restrictions
    - Do not travel in lifts with dewars containing liquid nitrogen under any circumstances. This is a life-threatening asphyxiation risk in the event of a leak.

Further Information

For comprehensive guidance, please consult the University Cryogenic Safety Guidelines available on the College Safety Office website.

For questions related to cryogenics or to schedule training, please contact the University Safety Office.

5.10 Visual Display Unit (VDU) Safety Assessment

VDU Safety consultation – Safety Office

Under the *Safety, Health and Welfare at Work (General Application) Regulations 2007*, all individuals who regularly work with Visual Display Units (VDUs), such as desktop computer monitors, are entitled to a VDU workstation assessment. This assessment is designed to identify and resolve potential hazards related to:

- Poor ergonomic setup
- Inadequate seating arrangements
- Improper lighting or glare
- Screen positioning or posture-related risks

Who Needs an Assessment?

The University VDU Policy primarily applies to employees who habitually use display screen equipment for a significant portion of their work—typically more than one continuous hour per day, on a daily basis.

For occasional or short-term users and non-employees, the guidelines should be applied in a common-sense, proportionate manner.

Use of Laptops

- Laptops are not automatically covered under these regulations.
- Users who choose to work primarily on laptops must:
- Use appropriate ergonomic accessories such as a docking station and a separate keyboard/mouse.
- Sign off on a form acknowledging their choice to use a laptop as their main device, accepting the ergonomic limitations.

For further details or to request a workstation assessment, please contact the University Safety Office or visit the University's Health and Safety website.

5.11 Dignity and Respect Policy

The Department of Mechanical, Manufacturing and Biomedical Engineering is fully committed to fostering a positive, inclusive, and respectful working and learning environment. Every employee and student has the right to be treated with dignity and respect at all times.

The University promotes a collegiate and supportive environment, free from:

- Discrimination
- Bullying
- Sexual harassment
- Harassment in any form
- Excessive or undue stress

If you experience or are affected by any of these issues, you are encouraged to raise concerns promptly and respectfully. Please contact:

- Your class representative
- Your research supervisor
- Your line manager

For comprehensive information on procedures, support resources, and reporting mechanisms, please refer to the University Dignity and Respect Policy.

5.12 General Information

If you have any queries, updates, or recommendations regarding this Health and Safety Policy, please contact the Department Safety Officer, Mr. Gordon O'Brien (Ext. 4908).
For broader University health and safety guidance and resources, please refer to:

- University Safety Office: Visit the University Safety Office
- National Health and Safety Authority (HSA): Visit the Health and Safety Authority

These sources provide up-to-date legislation, best practices, and support for maintaining a safe working environment.

5.13 Storage of Training Records and Risk Assessments

Risk Assessments and Standard Operating Procedures (SOPs)

- All Risk Assessment Forms and Standard Operating Procedures (SOPs) must be:
    - Available in the laboratory for reference by staff and students at all times.
    - Reviewed annually to ensure they remain current and accurate.
    - Stored centrally with the Department Safety Officer for formal record-keeping, auditing, and review.

Training Records

- Training records must be maintained for all:
    - Academic staff
    - Technical staff
    - Administrative staff
    - Research staff and students
- These records should include evidence of:
    - Initial induction training
    - Safety courses completed (e.g., chemical, gas, cryogenics, laser, radiation)
    - Refresher or role-specific training
- Training records must be:
    - Updated at least annually
    - Stored securely with the School Administrator
    - Made available for review by the Head of Department as required

This structure ensures transparency, regulatory compliance, and a robust audit trail for both internal and external safety inspections.

Section 6 – Important Safety Contacts

Title/Function	Present Holder	Email	Phone
Emergency	**University Security**		**1999**
First Aid Personnel	Gordon O'Brien	gordon.obrien@tcd.ie	4908
	Alex Kearns	kearnsal@tcd.ie	1463
Head of Department	Prof. Stephen Spence	csimms@tcd.ie	1129
MMBE Chief Technical Officer	Mark Jordan	jordanm7@tccd.ie	1557
Department Safety Officer	Gordon O'Brien	gordon.obrien@tcd.ie	4908
School Safety Officer	David Igoe	igoed@tcd.ie	3805
MMBE Specialist Safety Areas			
VDU Safety	Safety Office	iProtectU (for staff)	
Laser Safety	Tim Persoons	Tim.persoons@tcd.ie	1936
Chemical Safety Radiation Safety	Robert Dunbar	dunbarro@tcd.ie	1854
Biohazards Safety	Simon Carroll	Scarrol6@tcd.ie	8503
Electrical Safety	Patrick Lynch	patrick.lynch@tcd.ie	1332
Compressed Gas Safety	Gordon O'Brien	gordon.obrien@tcd.ie	4908
Mechanical Safety	Brian O'Dywer	odwyerb5@tcd.ie	1463
Thermo Lab Safety	Gerry Byrne	gerbyrne@tcd.ie	3523
STAM Labs Safety	Garret O'Donnell	odonnege@tcd.ie	1184
Fire Wardens	Tania Pañero	panerogt@tcd.ie	1383
	Daniel Trimble	dtrimble@tcd.ie	4856
	Seamus O'Shaughnessy	oshaugse@tcd.ie	1778
	Gerry Byrne	gerbyrne@tcd.ie	3523
	Alex Kearns	kearnsal@tcd.ie	1463
	Robert Dunbar	dunbarro@tcd.ie	1854
	Partick Lynch	patrick.lynch@tcd.ie	1332
	Gordon O'Brien	gordon.obrien@tcd.ie	4908
University Safety Officers		https://www.tcd.ie/safetyoffice/	
Head of Safety	Katherine Murray	murrayk7@tcd.ie	1914
Biological Hazards	Mary McDonnell	mmcdonn8@tcd.ie	3965
Radiation Protection		safetyoffice@tcd.ie	4000
Fire Safety	Cathal Ryan	cathal.ryan@tcd.ie	3545
Safety Training	Safety Office	safetyoffice@tcd.ie	4000
Additional University Contacts			
University Security	Non-emergency	01 896 1317	
	Emergency	**01 896 1999**	
University Health Service	https://www.tcd.ie/collegehealth/		1591 1556

Section 7 Acknowledgement Forms

To ensure compliance with departmental safety policies and confirm awareness of responsibilities, all students and staff must complete the relevant Acknowledgement Form.

Submission Process

- Acknowledgement Forms are to be completed via Microsoft Forms (MS Forms).
- Links to the forms are distributed during induction, training sessions, or can be obtained from the Department Safety Officer.
- Digital submission is preferred. Paper-based forms will only be accepted in exceptional cases.

Data Handling and Confidentiality

- A restricted-access spreadsheet will be maintained by the Department to track acknowledgements.
- Access to this data is strictly limited to:
    - Head of Department
    - Department Safety Officer
    - MMBE Chief Technical Officer

Forms to Complete

A. MMBE STUDENT ACKNOWLEDGEMENT FORM

- All students (undergraduate and postgraduate) must complete this form during induction or prior to engaging in any laboratory or research activities.

B. MMBE STAFF ACKNOWLEDGEMENT FORM

- All academic, technical, administrative, and research staff must complete this form upon joining the Department or upon renewal of safety training.

For access to the forms or assistance with completion, please contact the Department Safety Officer or the Chief Technical Officer.

Appendices

The Appendix files for this document are located on the MMBE website Safety Section.

- RISK ASSESSMENTS
- MMBE IDENTIFIED HAZARDS
- INCIDENT/ACCIDENT REPORT (STAFF)
- LONE WORKING
- UNATTENDED APPARATUS FORM
- TBSI WELCOME DOCUMENT
- COMPRESSED GAS SAFETY AN FORMS