
UCLA Policy 906: Undergraduate Researcher Laboratory Safety

Issuing Officer: Vice Chancellor for Research and Creative Activities

Responsible Dept: Research Policy & Compliance

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I. BACKGROUND & SCOPE

The University of California (“University”) is committed to providing a healthy and safe workplace for all members of the campus research community and to ensuring compliance with all applicable health, safety and environmental protection laws, regulations, and requirements. This Policy operates in conjunction with other applicable regulations and UCLA policies, including but not limited to UCLA Policies [905](#), [907](#), [992](#), [994](#) and [996](#).

This Policy applies to all Principal Investigators and lab staff working with Undergraduate Researchers in UCLA research laboratories. The safety requirements outlined in this Policy pertain to all research and teaching laboratories. This policy does not apply to students enrolled in regular laboratory courses for credit (e.g., Life Sciences 23L).

II. DEFINITIONS

For the purposes of this Policy:

Direct Supervision is when the Principal Investigator or other Supervisor, the assigned mentor (s), or another fully trained lab member who is at least a graduate student, postdoctoral scholar, or staff member, is directly watching the Undergraduate Researcher during experimentation.

Principal Investigator is defined in [UCLA Policy 900](#).

Supervision is when the Principal Investigator, Supervisor, assigned mentor, or other fully trained lab member who is at least a graduate student, postdoctoral scholar, or staff member is present in the room or in an adjacent room and is within hearing range of the Undergraduate Researcher.

Supervisor is the Principal Investigator, assigned mentor(s), or another fully trained lab member who is at least a graduate student, postdoctoral scholar, or staff member, who provides guidance and training to an Undergraduate Researcher, and may not be another Undergraduate Researcher.

Undergraduate Researcher is an undergraduate student, whether from UCLA or another institution, and any other individual who has not completed an undergraduate degree, including work study and other student employees. It includes others such as high school students (e.g., volunteers and minors) conducting research in a UCLA laboratory.

Working Alone is when an individual is working unaccompanied, such that assistance is not readily available should an injury, illness, or other emergency arise. Working Alone is interpreted as being out of

direct visual contact or hearing range of another lab worker for more than a few minutes, regardless of where the Undergraduate Researcher is working, or the time of day.

III. STATEMENT

Undergraduate students may not have the scientific background, technical knowledge, or practical experience to ensure that they can engage safely in all research activities. As a result, additional safety measures are necessary for some research activities. Further, some activities that involve highly hazardous materials and/or conditions are prohibited, as described below.

A. General Safety Requirements for All Researchers

A number of safety controls protocols and trainings have been established to ensure safety in research laboratories. The following apply to all researchers:

- Completion of the Laboratory Safety Fundamentals online training course
- Review of the Laboratory Safety Manual, including the following key programs
 - UCLA Chemical Hygiene Plan
 - Departmental Injury and Illness Prevention Program
- Completion of required research-specific safety training (such as ARC-mandated courses and occupational health program enrollment, Biosafety ABC's, IBC Compliance, Bloodborne Pathogen, Medical Waste Management, Radiation Safety, Laser Safety) as identified in the [UCLA Lab Safety Training Matrix](#)
- Completion of laboratory safety training mandated by the school or department hosting the Undergraduate Researcher
- Review of the research group's Laboratory Hazard Assessment Tool
- Completion of the laboratory safety orientation for the research group
- Completion of laboratory-specific safety training within the research group
- Inclusion of all appropriate researchers, including Undergraduate Researchers, on Institutional Biosafety Committee and Animal Research Committee protocols as required by laboratory research plans
- Adherence to the Personal Protective Equipment (PPE) standards established by [UCLA Policy 905](#)
- Use of additional PPE required by the research group's Laboratory Hazard Assessment Tool
- Use of additional PPE based on experiment hazard assessments
- Use of standard operating procedures (SOPs) on the safe use of equipment and chemicals
- Use of SOPs to guide safe execution of procedures

B. Additional Safety Requirements for Undergraduate Researchers

In addition to the general safety requirements outlined above, Undergraduate Researchers must also comply with the following requirements:

- Undergraduate Researchers under 18 years old (i.e., minors) must comply with the [UC Policy Minors in Laboratories and Shops](#) and submit a completed UC Release of Liability, Waiver of Claims, Express Assumption of Risks, and Hold Harmless Agreement to the Principal Investigator. See: https://www.ucop.edu/risk-services/_files/safety-resources/minors-in-labs-and-shops.pdf to the Principal Investigator. See the Information factsheet at: <https://ucla.app.box.com/v/ehs-uc-minors-labs-impacts>.

- Principal Investigators who wish to host Undergraduate Researchers who are under 18 years old (i.e., minors) must submit a Minors Research Proposal Registration Form to their Department Chair. The form is at <https://policy.ucop.edu/doc/3500602/MinorsLabsShops>.
- Undergraduate Researchers who are not enrolled at UCLA must submit proof of health insurance to the Principal Investigator.
- Undergraduate Researchers working in UCLA Health Schools (i.e., Medicine, Dentistry, Public Health, and Nursing) must register as “Volunteers” with UCLA Health Volunteer Services. Information is available at: <https://www.uclahealth.org/volunteer/>
- Undergraduate Researchers working in areas where radiation is being used are subject to [UCLA Procedure 994.2: Volunteers and Visitors in Non-Clinical Radiation Use Areas](#).
- Use of some materials or equipment may require additional training or direct supervision as determined by the Principal Investigator and/or Supervisor.
- The conduct of many laboratory procedures requires Direct Supervision until proficiency is demonstrated. The Principal Investigator and/or Supervisor will determine when the Undergraduate Researcher has demonstrated sufficient proficiency and may conduct these procedures independently.
- Performing operations that use an open flame require additional training and may not be done alone.
- Use of hydrogen peroxide at greater than 5% concentration or organic peroxides requires that a detailed protocol be developed by the Principal Investigator and/or Supervisor.
- Conducting a scale-up chemical procedure that is more than four times a prior experiment or uses more than 100 grams of substrate requires prior approval of the laboratory Principal Investigator and/or supervisor.
- Working with pyrophoric reagents requires additional training and can only be done under Supervision.
- Working with reactions under pressure, using glass or metal reactors, or that may become pressurized requires additional training and can only be done under Supervision.
- Performing radiosynthesis requires additional training and can only be done under Supervision.
- Working with radioactive compounds requires additional training and can only be done under Supervision.
- Performing flow cytometry requires additional training and can only be done under Supervision.
- Handling of BSL2 materials, including primary human cells/tissues/blood, but excluding established human cell lines, requires additional training and can only be done under supervision.
- Working in a BSL2+ facility requires additional training and can only be done under Supervision.
- Working in shops (e.g., electronic, machine or wood) requires additional training and may not be done when Working Alone.
- Performing any hot work (e.g., welding) that requires a permit may not be done when Working Alone.
- Working with open beam class IIIB or class IV lasers requires additional training and must be done under Supervision. See Attachment B, item 6 for definitions and examples.
- Working with ultrafast lasers requires additional training and must be done under Supervision. See Attachment B, item 6 for definitions and examples.

C. Prohibited Research Activities for Undergraduate Researchers

Some research activities present hazards of such severity, that exposing Undergraduate Researchers to these materials cannot be justified. Therefore, the following activities are prohibited:

- Working with any materials or equipment that the Principal Investigator has not authorized.
- Working with any materials or equipment that requires training before the training has been satisfactorily completed.
- Supervising another Undergraduate Researcher.
- Working with materials commercialized as, or under investigation as, explosives. Examples are listed in Attachment B, item 1.
- Working with materials understood to be potentially explosive under ambient conditions. Examples are listed in Attachment B, item 2.
- Working with potent oxidizing chemicals that when combined with common substances, which can act as potential fuels, are well understood to create explosive mixtures. Examples are listed in Attachment B, item 3.
- Working with Listed Carcinogens as identified in Attachment B, item 4.
- Working with neat (pure) chemicals, but not diluted solutions, having exceptionally potent health hazards as acute toxins, carcinogens, and reproductive toxins. (These are a subset of Particularly Hazardous Substances, see [UCLA Policy 907](#)). Examples are listed in Attachment B, item 5.
- Working with replication-competent pathogens that require BSL2+ facilities (e.g. HIV).
- Working in BSL3 facilities.
- Operating or repairing equipment that requires specialized user training or certification.

D. Exceptions

Principal Investigators may request exceptions to the requirements set forth herein by submitting a written request to the Office of the Vice Chancellor for Research Safety Oversight Committee ([OSOC](#)) (osoc@research.ucla.edu). The OSOC will evaluate the request and respond to the Principal Investigator in writing. The request should include:

- Names of the Principal Investigator, Undergraduate Researcher, and other supervisors or mentors (if applicable)
- Description of the research activity involving hazardous materials, as listed in Attachment B, that the Undergraduate Researcher will undertake
- Reasons that it is appropriate for the Undergraduate Researcher to conduct the research activity involving hazardous materials
- Enhancements to safety procedures that will be implemented to allow the Undergraduate Researcher to safely conduct the research activity involving hazardous materials

The OSOC will review all requests for exemptions and make a determination about whether to grant the request. The OSOC may consult with EH&S and others and may request additional information from the Principal Investigator before making its decision. OSOC may impose additional conditions or restrictions as part of the approval process. The Undergraduate Researcher may not begin the research activity involving hazardous materials unless and until the request is approved.

IV. RESPONSIBILITIES

All members of the campus community are responsible for taking appropriate measures to prevent laboratory injuries and illnesses. Specific responsibilities are assigned to designated campus authorities and

members of the research and teaching community in order to implement and ensure compliance with this Policy.

A. Principal Investigators

The Principal Investigator must:

- Ensure that every Undergraduate Researcher has completed all of the required General Safety training as outlined in Section III.A. Attachment A, “Safety for Undergraduate Researchers Checklist” is attached to assist in this process
- Consider assigning a specific graduate student, postdoctoral scholar, or staff member as the official mentor or Supervisor for each Undergraduate Researcher
- Identify Undergraduate Researcher(s) and location(s) where they are working in the appropriate forms and the Laboratory Hazard Assessment Tool
- Ensure that every Undergraduate Researcher adheres to:
 1. all safety requirements set by UCLA (see Section III.A)
 2. additional safety requirements set by the host school and department
 3. laboratory-specific safety requirements set by the Principal Investigator
 4. all additional safety requirements detailed herein (see Section III.B)
 5. all prohibited research activities detailed herein (see Section III.C)
- Determine when an Undergraduate Researcher must work under Supervision or under Direct Supervision and ensure that these requirements are met

B. UCLA Office of Environment, Health & Safety (EH&S)

EH&S is responsible for many aspects of laboratory safety (see UCLA Policy 811) and will:

- Advise Principal Investigators on all aspects of laboratory safety, including participation of Undergraduate Researchers
- Ensure that required documentation and protocols are in place in the laboratory
- Notify Principal Investigators of any safety deficiencies involving Undergraduate Researchers and advise on recommendations for resolutions and hazard abatements
- Communicate with campus safety committees on safety requirements for Undergraduate Researchers

V. NONCOMPLIANCE

Principal Investigators who fail to abide by the safety requirements described in this Policy will result in progressive disciplinary action in accordance with EH&S procedures for unauthorized hazardous work in the laboratory and may result in temporary suspension of laboratory activities until corrective action is implemented. The responsible PI may also be prohibited from working with Undergraduate Researchers in the future. Repeat violations by Principal Investigators may be interpreted as a violation of the faculty code of conduct and violations by students or staff may result in disciplinary action under University policies or, as applicable, collective bargaining agreements.

VI. REFERENCES

1. UCLA Policy 811, “Environment, Health, and Safety”
2. UCLA Policy 905, “Research Laboratory Personal Safety and Protective Equipment”
3. UCLA Policy 907, “Safe Handling of Particularly Hazardous Substances”
4. UCLA Policy 992, “Use of Biohazardous Materials and Recombinant or Synthetic Nucleic Acid Molecules in Research and Teaching Activities”
5. UCLA Policy 994, “Radiation Safety”

6. UCLA Policy 996, "Chemical and Physical Research Safety"
7. UC Policy on Minors in Laboratories and Shops, <https://policy.ucop.edu/doc/3500602/MinorsLabsShops>

VII. ATTACHMENTS

- A. Example: Undergraduate Researcher Safety Training Checklist
- B. Examples of Hazardous Materials

Issuing Officer

/s/Roger Wakimoto
Vice Chancellor for Research and Creative Activities

**Questions concerning this policy or procedure should be referred to the
Responsible Department listed at the top of this document**

EXAMPLE: Undergraduate Researcher Safety Training Checklist

The following checklist may be used by Principal Investigators to ensure that every Undergraduate Researcher working in their area of responsibility has completed all of the required General Safety training as outlined in UCLA Policy 906, Section IIIA. UCLA Policy 906 sets forth the safety requirements for Undergraduate Researchers and it is strongly recommended that PIs read the Policy prior to completing the checklist.

Use of this checklist is not required, though ensuring completion of all required training is mandatory. The list under “General Safety Requirements” may be modified as needed and may not be an exhaustive list of all required training.

Undergraduate Researcher name:

UID #:

Principal Investigator:

Direct Supervisor/Mentor:

Main laboratory room(s) where Undergraduate Researcher will work:

Date Undergraduate Researcher joined research group:

Was Undergraduate Researcher under 18 years old as of that date? _____ Yes _____ No

General Safety Requirements – UCLA Training:

Date	Initials	Topic
_____	_____	Laboratory Safety Fundamentals online training course
_____	_____	Inclusion on IBC, ARC, RSC protocols as required by research plan

Requirements for additional research-specific trainings beyond the General Safety requirements are identified in the [UCLA Lab Safety Training Matrix](#).

Completion of relevant biological safety courses:

Date	Initials	Topic
_____	_____	B Virus Exposure (online)
_____	_____	Biosafety ABC's - Biosafety Level 2 Training (in-person)
_____	_____	Biosafety Level 2 with Biosafety Level 3 Practices (in-person)
_____	_____	Bloodborne Pathogens (online)
_____	_____	Medical Waste Management (online)
_____	_____	NIH Guidelines for UCLA Researchers: IBC Compliance (online)
_____	_____	Safe Use of Biosafety Cabinets (online)
_____	_____	Shipping of Biological Materials (online)

Completion of relevant animal research courses:

Date	Initials	Topic
_____	_____	CITI Animal Research course (online)
_____	_____	Medical History Questionnaire (online)
_____	_____	Species-Specific training (online and wetlab)
_____	_____	Aseptic Techniques training (online and wetlab)

Completion of relevant radiation safety research courses:

Date	Initials	Topic
_____	_____	Radiation Safety Training for Users of Radioactive Materials (online)
_____	_____	Radiation Safety for Users of Radiation Producing Machines (online)

Laboratory-Specific Requirements

In addition to the General Safety requirements, the Principal Investigator will 1) develop safety enhancements applicable to the Undergraduate Researcher and 2) review the additional safety requirements and prohibitions with the Undergraduate Researcher as outlined in UCLA Policy 906, Section III B and C.

Date	Initials	Topic
_____	_____	Review of the Laboratory Safety Manual, including the following: <ul style="list-style-type: none"> ○ UCLA Chemical Hygiene Plan ○ Departmental Injury and Illness Prevention Program
_____	_____	Review of research group Laboratory Hazard Assessment Tool (LHAT)
_____	_____	Completion of lab safety orientation for the research group
_____	_____	Completion of laboratory specific safety training within the research group
_____	_____	Completion of laboratory safety training mandated by the department
_____	_____	Review of PPE standards established by UCLA Policy 905
_____	_____	Knowledge of PPE required by the research group LHAT
_____	_____	Knowledge of additional PPE based on experiment hazard assessments
_____	_____	Review of laboratory SOPs on the safe use of equipment and chemicals
_____	_____	Review of laboratory SOPs to guide safe execution of procedures

Examples of Hazardous Materials

The following list of hazardous materials are examples of materials that require additional training by Undergraduate Researchers before they can conduct the research or are materials that are prohibited for use by Undergraduate Researchers. For more information, see UCLA Policy 906.

1. Examples (not a complete list) of materials intended as explosives

- Cyclotrimethylenetrinitramine (RDX)
- Dynamite
- Nitroglycerin
- Pentaerythritol tetranitrate (PETN)
- Triacetone triperoxide (TATP)
- Trinitrotoluene (TNT)

2. Examples (not a complete list) of materials with known explosive properties

- Diazo compounds
- Diazonium salts
- Fulminate salts
- Perchlorate salts

3. Examples (not a complete list) of potent oxidizing chemicals

- Hydrogen peroxide or organic peroxides that are concentrated during the experiment
- Liquid oxygen
- Nitrogen tetroxide
- Perchlorate salts

4. Listed Carcinogens

The term “listed carcinogen” refers to a specific list of 13 chemicals regulated by Cal/OSHA. These chemicals have specific use and handling requirements that requires evaluation by EH&S and reporting to Cal/OSHA, even if work is contained within a laboratory fume hood.

- 2-Acetylaminofluorene
- 4-Aminodiphenyl
- Benzidine (and its salts)
- 3,3'-Dichlorobenzidine (and its salts)
- 4-Dimethylaminoazobenzene
- alpha-Naphthylamine
- beta-Naphthylamine
- 4-Nitrobiphenyl
- N-Nitrosodimethylamine
- beta-Propiolactone
- bis-Chloromethyl ether
- Methyl chloromethyl ether
- Ethyleneimine

5. Chemicals with extremely potent health hazards

Neat (pure), but not diluted solutions of, acute toxins with a LD₅₀ of less than 5 mg/kg (oral), 50 mg/kg (dermal), 100 ppm (gases), 0.5 mg/L (vapors), or 0.05 mg/L (dusts/mists).

Acetylenedicarboxylic acid monopotassium salt	Aconitine
Acrolein	Acryloyl chloride
Aflatoxin B1	Allyl chloroformate
Allylamine	Azide salts
bis(2-chloroethyl) sulfide	1,2-Bis(trimethoxysilyl)ethane
Blasticidine S hydrochloride	2-Chloroethanol
Cholera toxin	Colchicine
Crotonaldehyde	Cyanide salts
Cyanogen bromide	1,3-Dichloroacetone
Diethyl chlorophosphate	1 α ,25-Dihydroxyvitamin D3
1,6-Diisocyanatohexane	Dimethylmercury
Diphtheria Toxin	Divinyl sulfone
Eserine hemisulfate salt	Ethidium bromide
Ethyl chloroformate	Fluorine
Hydrofluoric acid	Hygromycin B
Iron(0) pentacarbonyl	Mechlorethamine
Methacryloyl chloride	Methanesulfonyl chloride
Methanesulfonyl fluoride	Methyl chloroformate
N,N-Diethylaniline	N,N-Dimethyl-p-phenylenediamine
1,4-Naphthoquinone	Nitric oxide
Nitrogen dioxide	Osmium Tetroxide
Paraquat dichloride	Phenyl Isocyanate
Phenyl Thiourea	Phorbol esters
Phosgene	Putrescine
Strychnine	Tetramethyl orthosilicate
2,4-Toluene diisocyanate (TDI)	(+)-Valinomycin
Warfarin	Wortmannin

6. Examples of laser hazards

An open beam laser is defined as a system where any part of the laser path is exposed.

A class IIIB visible laser is defined as any visible laser with 5 to 499 mW of power.

A class IV laser is any visible laser with greater than 500 mW of power.

Ultrafast lasers are considered herein as the same as class IV lasers for safety enhancements.

Any ultrafast laser, defined as having pulse durations < 1 ns, has the potential for severe eye damage regardless of power.