
UCLA Policy 906: Undergraduate Researcher Laboratory Safety
Draft for Review

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I. BACKGROUND & SCOPE
II. DEFINITIONS
III. STATEMENT
IV. RESPONSIBILITIES
V. ADDITIONAL INFORMATION
VI. REFERENCES
VII. ATTACHMENTS

I. BACKGROUND & SCOPE

The University of California (“University”) is committed to providing a healthy and safe environment and workplace for all members of the campus community. It is University policy to comply 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 Undergraduate Researchers, including work study and other student employees, working in research laboratories. Undergraduate Researchers doing clinical research involving humans are subject to additional requirements, including those of UCLA Health and Health Sciences.

II. DEFINITIONS

For the purposes of this Policy:

Direct Supervision is when the individual is being directly watched during experimentation by the Principal Investigator, Supervisor, the assigned mentor, or another fully trained lab member who is at least a graduate student, postdoctoral scholar, or staff member.

Principal Investigator is a faculty or staff member who is responsible for the research laboratory. A full administrative definition of a UCLA Principle Investigator can be found at [UCLA Policy 900: Principal Investigator Eligibility](#).

Supervision is when the individual is not working alone due to the presence within the room or adjacent room within hearing range of the Principal Investigator, Supervisor, the assigned mentor, or other fully trained lab member who is at least a graduate student, postdoctoral scholar, or staff member.

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

Undergraduate Researcher is an individual who is an undergraduate student, whether from UCLA or another institution, and any other individual without an undergraduate degree such as a high school student (e.g. volunteer and minor), conducting research in a laboratory setting. This Policy applies to students working in laboratories and not those students enrolled in regular laboratory courses for credit

(e.g., Life Sciences 23L). This Policy also does not apply to those individuals doing clinical work where there are additional requirements, including those of UCLA Health and Health Sciences.

Working Alone is when an individual is working unaccompanied, such that assistance is not readily available should an injury, illness, or emergency arise. Alone is interpreted as being out of direct visual contact or hearing range with another lab worker for more than a few minutes. It can occur during normal working hours as well as during evening, night or weekend hours and even in the same general area as others.

III. STATEMENT

UCLA recognizes that undergraduate students participating in research projects may not have the scientific background, technical knowledge, or practical experience to engage safely in all research activities. As a result, additional safety requirements are necessary for some research activities and other activities that involve highly hazardous materials and/or conditions are prohibited.

The safety requirements as outlined in this Policy pertain to all research and teaching laboratory environments.

A. General Safety Requirements for all Researchers

As outlined in various University and campus policies, UCLA has established a number of safety controls, protocols and trainings to ensure safety in research laboratories. The following apply to all researchers:

- Completion of 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 research
- Review of the research group 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 BUA and ARC protocols as required by laboratory research plans
- Adherence to the Personal Protective Equipment (PPE) standards established by [UCLA Policy 905](#)
- Use of added PPE required by the research group 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

Some research activities require additional training by Undergraduate Researchers before they can conduct the research and some require added restrictions that aim to provide added safety protection.

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

- Undergraduate Researchers under 18 years old (minors) must comply with the [UC Policy Minors in Laboratories and Shops](#) and submit to their Principal Investigator a completed UC Release of Liability, Waiver of Claims, Express Assumption of Risks, and Hold Harmless Agreement https://www.ucop.edu/risk-services/_files/safety-resources/minors-in-labs-and-shops.pdf. Information factsheet is at: <https://ucla.app.box.com/v/ehs-uc-minors-labs-impacts>.
- Principal Investigators of Undergraduate Researchers under 18 years old (minors) must submit a Minors Research Proposal Registration Form to the chair of their department. Form is at https://www.ucop.edu/risk-services/_files/safety-resources/minors-in-labs-and-shops.pdf.
- Undergraduate Researchers must submit proof of health insurance to their Principal Investigator if not enrolled at UCLA.
- Undergraduate Researchers working in the UCLA Health and Health Sciences must register as “Volunteers”. Information at: <https://www.uclahealth.org/volunteer/>
- Undergraduate Researchers working in radiation use areas are subject to [UCLA Procedure 994.2: Volunteers and Visitors in Non-Clinical Radiation Use Areas](#).
- Working with some materials or equipment may require additional training or direct supervision as determined by the Principal Investigator and/or Supervisor.
- Conducting many laboratory procedures requires Direct Supervision until proficiency is demonstrated. Only then can the procedures be conducted independently and this is set by the laboratory Principal Investigator and/or Supervisor.
- Performing operations which use an open flame require additional training and may not be done alone.
- Conducting any procedure involving hydrogen peroxide or organic peroxides must have a detailed protocol and must be approved 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 which 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. machine or wood) requires additional training and may not be done alone.
- Performing any hot work (e.g. welding) which requires a permit may not be done 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 not authorized for the Undergraduate Researcher by the Principal Investigator.
- Working with any materials or equipment which requires training where the Undergraduate Researcher has not yet been trained.
- Acting as the Supervisor for another Undergraduate Researcher for any of the safety requirements described in this Policy.
- 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, with 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. Exemptions

Principal Investigators may request exemptions 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). OSOC will evaluate the request and provide a written response back to the Principal Investigator. The request should include:

- Names of the Principal Investigator, Undergraduate Researcher, and mentor (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

OSOC will review all requests for exemptions and make a determination whether to grant the request under the authority of the Vice Chancellor for Research. 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 will not begin the research activity involving hazardous materials unless and until the request is approved.

IV. RESPONSIBILITIES

Preventing laboratory injuries and illnesses is the responsibility of every member of the campus community. 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 laboratory where Undergraduate Researchers are conducting research must have a responsible person who is a Principal Investigator (See: [UCLA Policy 900: Principal Investigator Eligibility](#)). 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
- Ensure that every Undergraduate Researcher adheres to:
 1. all safety requirements set by UCLA (see Section III.A)
 2. all safety requirements set by the host school and department
 3. all safety requirements set by the research laboratory
 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)

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

- Advise Principal Investigators on all aspects of laboratory safety, including participation of Undergraduate Researchers
- Identify laboratories that have minors and Undergraduate Researchers working in them and ensure that required documentation and protocols are in place
- 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. ADDITIONAL INFORMATION

Questions can be sent to the Office of the Vice Chancellor for Research Safety Oversight Committee ([OSOC](#)) at osoc@research.ucla.edu.

VI. REFERENCES

1. UCLA Policies 811, 905, 907, 992, 994, 996;
2. UC Policy Minors in Laboratories and Shops.

VII. ATTACHMENTS

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

Issuing Officer

/s/Roger Wakimoto
Vice Chancellor for Research

**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 in their area of responsibility has completed all of the required General Safety training as outlined in UCLA Policy 906, Section III.A. UCLA Policy 906 sets forth the safety requirements for Undergraduate Researchers and it is strongly recommended that you 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 Section II of this checklist may be modified as needed and this may not be an exhaustive list of all required training.

I. Identities

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

II. 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
_____	_____	Completion of relevant biological safety courses:
_____	_____	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:
_____	_____	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:
_____	_____	Radiation Safety Training for Users of Radioactive Materials (online)
_____	_____	Radiation Safety for Users of Radiation Producing Machines (online)

Beyond the General Safety requirements are additional research-specific required trainings (such as Biosafety ABC’s, IBC Compliance, Bloodborne Pathogen, Medical Waste Management, Radiation Safety, and Laser Safety) as identified in the [UCLA Lab Safety Training Matrix](#).

III. 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&C.

Date	Initials	Topic
_____	_____	Review of the Laboratory Safety Manual, including the following: <ul style="list-style-type: none"> o UCLA Chemical Hygiene Plan o 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

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.