

Garage Prototyping Space Garage: Phase 2

Safety Plan and Code of Conduct

Partners I, Suite 1650 on Centennial Campus

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General Information

Area Location:

Entrepreneurship Garage
1017 Main Campus Drive
Partners I, Suite 1650
Raleigh, NC 27606

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Eren Hebert

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Office Location: **102, Partners 1,
Suite 1650**

Campus Box Number: 1625 Department:
Entrepreneurship Initiative Executive Director: Dr.
Thomas K. Miller III

PERSONS AUTHORIZED TO WORK IN THE LAB AREA:

a) Faculty and Staff of the Entrepreneurship Initiative. b) Students enrolled in classes offered by the Entrepreneurship Initiative or its affiliates who have 1) filled out an application and been accepted and 2) completed the safety training.

TELEPHONE NUMBERS: Telephone numbers given below are to be dialed as given without the dash (-). The dialing procedure is applicable only for university telephones, not pay telephones located on campus.

Universal Emergency: **911** Campus Emergency: **919-515-3333**

NCSU EH&S: **919-515-6858** Rex Hospital: **919-784-3100** Wake

Medical Emergency: **919-350-8000** NCSU Safety Hotline:

919-515-5445 NCSU Hazardous Material Management:

919-515-6863 or 919-515-6864 Carolinas Poison Control Center:
7-1-800-848-6946

General Statement Concerning The Garage, Innovation Hall

The Garage is a teaching laboratory room accessed by a lobby area and an access door marked by 'The Garage' and 'Entrepreneurship Initiative.' The Garage is maintained under RF proximity key-card (student ID) access made available only to persons teaching in the Entrepreneurs Initiative (EI), students who have applied and been accepted in the teaching laboratory, and EI staff. This room may be used at any time, both during formal class time and at any other time, night or day. Students are free to use this space for study and the design and construction of projects and may or may not be supervised. No hazardous chemicals are mixed, stored or used in this laboratory. The small quantity of chemicals that may be stored or used in this laboratory (such as lubricants, adhesives and paints) are directly related to the project work conducted in the area.

Evacuation Plan

The evacuation route for the rooms associated with this lab is marked on Figure 1. In the event of an evacuation, personnel working in The Garage will exit any work suite and turn towards the back door (East) and exit 100 feet outside the exterior door. Alternatively, personnel can exit The Garage through its front door, the main entrance to the building and through the multipurpose room at the corner of the building. They are then to proceed to the parking lot area to the North of the building behind EB3. Occupants will be advised by Public Safety when it is safe to return. Whenever possible, turn off all electrical power. There are NO gas lines in The Garage. Avoid hindering any emergency operations in progress.

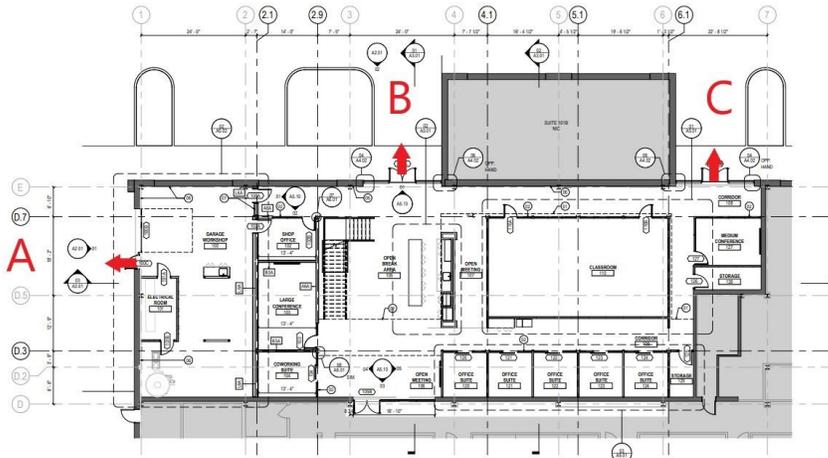


Figure 1:
Evacuation Plan

Safety Training

1. Process Description The assembly and testing of various student projects. (Note: The heavy metal fabrication functions of welding, cutting, brazing, bending, forming etc. will not be performed in The Garage). The student projects may be constructed of wood, metal, plastics or other materials or combination of materials.

2. Potential Hazards

a) Electrical Shocks associated with the use of power tools, b) Cuts that may result from drills, knives c) Dust from wood sanding.

3. Personal Protective Equipment The following equipment is available for authorized persons in the lab for use when necessary: Safety glasses, latex gloves, protective face-mask, filter mask, and ear plugs.

4. Engineering and Ventilation Controls Ventilation equipment is designated in specific areas for the purposes of evacuating fumes created by the operation of those equipment pieces. Ventilation controls area provided in the Woodworking room, to operate the overhead air filtration system and dust collection systems. There are windows that may be opened and the roll up door may be opened to allow for the circulation of fresh air when necessary.

The dispensing of spray paint is not allowed inside The Garage. All spray painting must be done outside the building. No aerosols or chemical substances are allowed in the Garage.

5. Shelter-In Place Procedures (ie..wolf alerts, tornados) All garage occupants should be directed to shelter in place in areas such as inside bathrooms with the door closed, the workshop room with the door closed, or on the floor in the long hallway (away from the multipurpose room) with all hallway/apartment doors closed, until given further instructions by University Police or emergency personnel or an “All-clear” alert is given by university personnel.

6. Special Handling and Storage Requirements No materials are to be brought into this laboratory unless it is directly related to the project of interest. No materials such as paints, adhesives or lubricants are to be discarded in the bathroom sinks or toilets located in the building.

7. Spill and Accident Procedures Before starting work, each worker is to make

certain the following items are available in the laboratory: absorbent materials such as vermiculite and paper towels, brush and dust pan, plastic bags of different sizes, gloves a sealable container (metal can or plastic lined box).

When handling chemicals, you must always wear a lab apron, safety glasses, filter-mask, and latex gloves. In case of minor spills, place the absorbent material over the spill and ventilate the area by opening the hall door or the roll up door. If the spill generates odor, open the door and step outside The Garage and ask other workers/students to accompany you. Make sure the exit door is closed to prevent the odor from entering the rest of the building. It may be necessary to place an additional fan near the hallway door and ventilate such that air is blowing from the room. Return to the spill area only after all odor is ventilated and gently brush the absorbent materials to a lift-pan and dispose of them into the designated container, and seal the container. In the case of minor spills, wash the spill area thoroughly with a wet paper towel and discard these towels with the adsorbent materials.

In case of a major (ODOROUS OR OTHERWISE) spill, immediately vacate the spill area and ask other occupants to accompany you. It may be necessary to alert occupant(s) of the adjoining rooms to vacate those rooms also. Call the EH&S (5-6858) immediately. Do not attempt to manage the spill yourself. If you feel that the spill is dangerous, also call the emergency number 5-3333 immediately.

General Safety Guidelines

1. General Statement

Carelessness is the major cause of many accidents in a fabrication shop. These accidents often result in pain, serious injury and the loss of time, money, productivity, and can result in damaged tools or equipment. With proper precautions, most accidents may be avoided. The first line of defense against an accident is the operator of the piece of equipment. Although every possible hazard cannot be anticipated, having a healthy respect for the unknown as well as the known hazards can significantly reduce the likelihood of injury or damage. The capabilities and limitations of the operator as well as the machine must be recognized and accommodated. This is true for the simplest shop equipment as well as the most the most complex machines .Proper training and experience is the key to accident prevention.

2. General Procedural and Housekeeping Rules

- A. **No one may use the Garage Prototyping space until they have completed a safety orientation with Garage Staff.** No piggybacking/granting access to non certified members.
- B. **No smoking or alcoholic beverages are allowed.**
- C. Food and beverages are not allowed near equipment or in the Woodworking room. Although limited eating and drinking is permitted in this laboratory, you should avoid situations and areas where there is a possibility of contaminating both your food and the equipment. ALWAYS clean up after eating.
- D. **You cannot work alone** when you are performing functions that involve power tools or potentially hazardous devices, use the **Buddy System**. There needs to be at least one other person within earshot who knows you are working in the lab and who can provide assistance in an emergency, or call for help if the need arises.
- E. **Durable and appropriate quality work clothing is required. NO OPEN TOE SHOES ARE PERMITTED WHEN WORKING WITH EQUIPMENT. Tie back long hair and roll up sleeves to avoid catching these in equipment.** It is also advisable to remove all jewelry such as watches, rings, and necklaces.
- F. **Horseplay is never permitted.** Equipment must be used for their intended purpose only. Horseplay can result in immediate ejection from the facility.
- G. **Bench and counter tops must be kept clear** of any devices or materials not directly related to the experiment in progress. All work surfaces must be brushed clean or wiped down with a damp paper towel immediately following use.
- H. **All tools must be cleaned and replaced** into their proper cabinet or drawer after use. Report missing tools promptly to the instructor or teaching assistant.
- I. **Outside tools are not allowed** in the space unless approved by Garage staff.
- J. **Do not remove tools from the Garage** prototyping space.
- K. A **First Aid Kit** is located in The Garage for the treatment of minor injuries. All injuries that occur in this laboratory, no matter how minor, are to be promptly reported to the Instructor or Teaching Assistant.
- L. An **Eye Wash Station** is located outside of the exterior door and to the left.
- M. **SAFETY GLASSES ARE REQUIRED (PPE Required).** Safety glasses, goggles or a face shield must be worn when you are engaged in or observing work that may

produce flying chips, dust or shavings. Each person working in this laboratory will be issued a pair of safety glasses for their personal use.

- N. **Gloves should be worn to handle materials with sharp edges and splinters.** Gloves should **NOT** be worn when operating power tools or equipment with moving parts.
- O. **Do not operate any machine which has guards or shields removed.** Be sure the equipment is in proper working order at all times. If you are unsure as to the condition of the equipment, ask your instructor before using.
- P. **Cut off power to all tools when not in use.** Never leave a machine running while not in use.
- Q. **Be sure others are a safe distance away from hazards.** Pay attention to other people in the shop - visitors or workers- they may not be aware of the hazards around them.
- R. **Pay attention to environmental hazards.** Noise, fumes, hot surfaces, ventilation, and lighting all contribute to the quality of the workplace environment.
- S. **Evaluate any operation for hazards.** Seek assistance for any procedure you are not comfortable with. Think through any operation or procedure; learn to anticipate potential exposure to hazards.
- T. **All work areas and passageways must be kept clean and orderly.** The floor must be maintained in a clean and dry condition. Passageways must be kept clear and appropriately marked.
- U. **Do not attempt to lift large, heavy, or long materials without assistance.**
- V. **No chemicals are allowed in the Garage.** Do not bring chemicals into the Garage, as these pose environmental hazards and health risks.
- W. Erase white boards when you are done using them.
- X. Reserve equipment in the Coworks system.
- Y. **You must meet NC State University's Academic and Conduct policies. You must be in good academic status and have no negative conduct record.**
- Z. **Failure to adhere to the rules can result in ejection from the facility. Generally, a three strike policy will be in place. First, an oral warning will be given. Then, a written warning. If a third warning is received, you will be permanently ejected from the facility. For severe infractions, the management can, in their opinion, eject you from the facility without any warnings.**

3. List of Safety Equipment Available in The Garage

- Dry chemical fire extinguisher for A, B, and C fires First-aid Kit
- Eye-Wash Station (located outside of exterior entrance)
- Impact protection safety glasses/goggles
- Face Shields
- Package of ear-plugs
- Voluntary N95 Dust Masks

4. Electrical Hazards

The effects of increasing current values on an adult human body have been described by the American Instrument Society as follows:

Current (Milliamperes) Effect 0-1 No sensation 1-3 Mild perception
3-10 Painful shock, muscular contraction Over 10 Paralysis, inability to move
Over 30 Asphyxiation, unconsciousness 80-240 Heart Fibrillations
4000 (4 Amps) Heart paralysis Over 5000 (5 Amps) Burning

NOTE: For more information, see the National Electrical Code, a part of the National Fire Codes (especially Article 500 on electrical equipment in hazardous atmospheres).

5. Additional Rules for Electrical Safety

- a. Do not touch a person in contact with a live electrical circuit. Disconnect the power first or you may be seriously injured.
- b. All laboratory personnel should know the location of circuit breakers and how to cut off all electrical service to the laboratory in case of fire or accident.
- c. All electrical outlets should carry a grounding connection requiring a three-pronged plug.
- d. All electrical equipment should be wired with an approved grounding plug. If equipment does not have a three-pronged plug, the equipment must be separately grounded. All electrical outlets should be periodically checked for proper grounding.

- e. Continuity of grounding connections, including leads to building ground itself, should be checked periodically by an authorized inspector.
- f. Follow the National Electrical Code in all installations. The installation of all wiring must only be done by appropriate university personnel. This includes proper grounding as well as installation of proper equipment service for laboratory areas. Grounding electrical outlets may not be enough protection in a laboratory where the floor might be wet or where there is much electrical equipment. In these cases, an approved ground- fault interrupter may be required.
- g. Do not use wiring that is frayed or worn. If possible, do not use drop cords or allow wiring to lie unprotected on the floor. Panel boards and electrical outlets should be properly labeled and never have missing cover plates or other parts.
- h. The condition of wiring, plugs, cords, and related equipment should be regularly inspected. Display warning signs on or near the main power switch of each electrical device.
- i. Refrigerators constitute a unique hazard because explosions may occur when they are used for storage of volatile or unstable chemicals. ONLY food is allowed to be stored in The Garage refrigerator.

Reporting Garage Accidents or Incidents All accidents which result in **injury**, however minor, result in excessive **exposure to hazardous materials** or are considered **near misses** are to be reported immediately to Ebony Hinton and Miguel Rufino and to Public Safety (515-3333) / NCSU Environmental Health and Safety Center (515-6858). Spills of hazardous materials or other situations that are potentially hazardous are also to be reported immediately.

A written accident report must be completed by the person(s) involved in the accident (see *Accident Report Form for Innovation Hall, Ground Floor*, below), if possible, within 24 hours of the occurrence of the accident. Copies of the report are to be filed with Ebony Hinton and Miguel Rufino who will promptly forward copies to the department head and to the NCSU Environmental Health and Safety Center. The accident form below should be used for this purpose. Copies of completed accidents forms and blank copies of this form will be maintained in the Lab Safety Manual.

Accidents involving students or others who are not employees do not require Worker's Compensation reporting.

Full-time Employees Only: Accident/Illness Worker's Compensation forms are available from NCSU Environmental Health and Safety Center. Completely fill out both forms and return **WITHIN FIVE (5) DAYS** following the accident.

Accident/Incident Report Form
Partners 1, Suite 1650, The Garage

Name(s) of accident victim(s): _____

Date of Accident: _____

Time: _____

Specific Location of Accident:

Detailed Description of Accident:

Description of Treatment:

Where was Treatment Performed?

Additional Information:

Safety Training Certification

On _____, I, _____ was
Date of Instruction Typed Full Name

instructed by _____ on the hazards
Typed Name(s) of Instructor(s)

Present in Partners I, Suite 1650, Room 100, The Garage, and on the proper safety procedures to follow when conducting rounds there as outlined in the Safety Plan for that area.

I understand these hazards and accept them as a necessary part of my housing responsibilities. I will follow the proper safety procedures in my work in this area at all times.

Signature Date

Attested by Principal Investigator:

Signature Date

Distribution: Three Signed Originals 1 - Person Trained , 1 - Principal Investigator, 1 - Department Head

Additional Information on Lab Safety

Laboratory Safety Institute:

<http://www.labsafetyinstitute.org/LabSafetyGuidelines.htm>

Safety Best Practices:

http://h2bestpractices.org/lab_safety

Power Tool Safety:

<http://www.udel.edu/ehs/sawacc.html>

General Prototyping Lab Rules

1. Woodworking Room General Safety Rules

1. All persons must wear safety glasses upon entering the Woodworking room. Please note that a face shield is not a substitute for safety glasses; it is only added protection.
2. Working with wood is dusty. Particle masks are available on a voluntary basis. Consult with Garage Staff for more information.
3. Appropriate attire must be worn to work in the wood shop. No jewelry or baggy clothes may be worn when working with power tools. Long hair must be tied back. No open toed shoes. Never wear gloves.
4. No member is allowed to work with power tools while alone in the shop. Use of the 'Buddy System' is required when using the Woodworking room.
5. No one is permitted to remove a safety guard from any tool.
6. Never speak to anyone using a power tool. Wait until they are done.
7. If you find any tool in need of repair, turn it off immediately and tell Garage Staff. Under no circumstances make repairs to the equipment yourself. Please note that broken tools will take up to two weeks to get back online.
8. Shop users are responsible for immediately cleaning up their work area and the tools when done. This must be done before another person uses the area. A Shop-Vac and an air hose are provided. Failure to clean up can result in suspension.
9. Wood and supplies must not be stored in the shop. Projects in process may only be left with permission of the Garage Manager.
10. If using lumber, only new and dry lumber may be used in the Woodworking room. All bark must be removed from wood and wood must be properly dry. Any recycled or found materials must be inspected by Garage Staff before being machined.
11. No food or drinks are allowed in the woodworking room.
12. No grinding of metal is allowed in the Woodworking room.
13. No open flame in the Woodworking room.
14. If you should get dust or debris in your eye, Do Not Rub your eye. Use the Eyewash station located outside and adjacent to the exterior door.
15. Immediately report any and all accidents or incidents to Garage Staff, no matter how small.

For your safety, if you are unsure of how to do something ask the Garage Staff. Any damage done to equipment due to negligence will be billed to the individual responsible.

Please notify the Garage Manager and/or the Garage Assistant if you have any disabilities that may require some modifications so that appropriate arrangements may be made.

The Garage Manager and the NC State Entrepreneurship Garage make the final decision on how this facility and equipment will be used.

2. Tools & Machinery

THE FOLLOWING TOOLS ARE NOT INCLUDED IN THE SAFETY ORIENTATION. DO NOT USE a tool if you are unsure how it operates, consult with Garage Staff for instruction. It is important to discuss your construction plans with the woodshop staff and consider how you will use the tools and the shop to best complete your project.

A. Tool Safety

1. Always wear safety glasses.
2. Use tools that are the PROPER SIZE and TYPE for the job.
3. Follow the correct procedure for using every tool.
4. Make sure your hands are FREE OF GREASE and OILS.
5. Handle sharp-edge and pointed tools with care.
6. Always carry pointed tools by your side with the POINTS and heavy ends DOWN.
7. SECURE all small work & short work with a VISE or CLAMP.
8. NEVER carry tools in your pockets.
9. DON'T use tools which are LOOSE or CRACKED.
10. KEEP your punches & chisels in good condition. Mushroomed heads can chip & cause injuries.
11. DON'T use a file without a HANDLE.
12. DON'T pry or hammer with a FILE. It may shatter.
13. DON'T use screwdrivers as chisels or pry bars.
14. AFTER USING A TOOL — clean it and return it to its proper storage place.
15. If anything breaks or malfunctions — report it to your supervisor AT ONCE.
16. Use the RIGHT TYPE of tool for the job.
17. NEVER place tools and materials where they hang on the edge of a bench.
18. Don't use tools for things they weren't meant for.
19. Cut away from yourself when you use chisels and other sharp or edged tools.
20. DON'T FORCE screws; make sure that the correct screw for the job is being used.
21. If you should get DUST or DEBRIS in your eye, DO NOT RUB your EYE. Use the Eyewash station located outside and adjacent to the exterior door.

B. Drill Press

1. **Always wear proper eye protection.** Ear protection is available. Wear a dust mask if desired (supplied by you).
2. Position the Guard properly, allowing clearance for your work piece, while still allowing protection from flying debris.
3. Always use the proper drill bit for the operation you are performing.
4. Use the chuck key to loosen the chuck. Insert your desired bit and securely tighten the chuck with the key.
5. NEVER leave the key in the chuck. Remove the key from the chuck IMMEDIATELY after securing the bit.
6. Never wear jewelry, gloves, ties, loose clothing or clothing with long sleeves. Keep long hair tucked under a hat. Jewelry, gloves, ties, clothing and hair could become entangled in the bit.
7. Adjust the depth stop (when available) to your desired depth.
8. Clamp the stock to the worktable.
9. Use only accessories and bits designed to be mounted in power drills.
10. **Never drill or bore metal or plastic freehand.** Always clamp it to the worktable and back-up stock.
11. Clean the tool and the work area when done.

C. Disk Sander

1. Start the dust extraction unit before using the sander.
2. **Always wear proper eye protection.** Ear protection is available. Wear a dust mask if desired (supplied by you). If you're doing a large amount of sanding, you should wear a respirator.
3. Turn on the sander, let the disc get up to speed, then feed the workpiece. Don't turn on the power with the stock laying on the worktable or already in contact with the disc.
4. Never reach over the disc or behind it while it's running.
5. **Always sand on the downward motion side of the disc.** The rotation helps to hold the workpiece against the table. If you sand on the upward motion side, the disc will lift the piece off the table and cause a kickback.
6. Maintain a 1/16" maximum clearance between the worktable and the disc.
7. Do not sand the end grain of 3/4" stock that is wider than 5-1/2". The rotation of the disc may lift wider boards off the table.
8. Always use the worktable; add the extension table if necessary.
9. Never sand without a table supporting the stock.
10. Use the rip fence to guide and support your material when feeding larger parts. Always clamp down the rip fence to ensure that it doesn't move during the process.
11. Use the ShopVac to Clean up the sander and area. Leave the machine and area in a safe, clean and tidy state.

C. Scroll Saw

1. **Always wear proper eye protection.** Ear protection is available. Wear a dust mask if desired (supplied by you).
2. Use this scroll saw to cut only wood, manufactured boards, plastics and nonferrous metals.
3. Do not hand hold pieces so small that your fingers will go under the blade guard. Use a jig to hold a small workpiece.
4. Ensure there are no nails or foreign objects in the part of the workpiece to be cut.
5. **Adjust the hold down foot so that it is pressing lightly on the work piece.**
6. Start the dust extraction unit before using the saw.
7. Before starting the cut, watch the saw while it runs. If it makes an unfamiliar noise or vibrates excessively, stop immediately. Turn the saw off and isolate the machine. Do not restart until finding and correcting the problem.
8. Allow the blade of the saw to reach full operating speed before starting the cut.
9. **Keep hands and fingers clear of the scroll saw point-of-operation.**
10. **Do not force the tool.** Firmly hold the workpiece with both hands and feed it at a moderate rate of speed into the blade.
11. Keep your face and body to one side of the blade and out of line with a possible thrown piece if the blade should break.
12. Turn off the machine and wait until it has completely stopped before removing scraps or making adjustments.
13. Switch off the saw and reset all guards to a fully closed position.
14. Use the ShopVac to Clean the area and saw. Leave the machine and area in a safe, clean and tidy state.

D. 4" Angle Grinder

1. Wear a face shield and safety glasses. A face shield is not a substitute for safety glasses.
2. When using the tool for sanding move the tool around the stock, do not leave it in one place.
3. Do not grind metal in the wood shop.
4. Never remove the guard. It can be rotated for optimum positioning.
5. Always use the auxiliary handle for maximum control over torque reaction and kickback.
6. Secure the work properly on the workbench. Adjust your work to a comfortable height. There is a portable step to stand on if you need to be higher. **IF YOU DON'T KNOW HOW TO SECURE YOUR WORK—ASK!**
7. When carving with the carving attachment for the angle grinder, be very careful!
8. Grip the tool with both hands at all times.

9. No loose clothing.
10. Be very aware of people around you, ask them to give you space if you need it.
11. Blow off the tool, put it away and sweep the work area.

E. Die Grinder

1. Always wear safety glasses.
2. Keep away from rotating spindle and accessories.
3. Do not wear jewelry or loose clothing. Keep hair away from tool.
4. Use accessories that are rated for the Die Grinder only.
5. Keep hands clear of spindle and tool end.
6. Use both hands to hold tool
7. Be aware of excess hose on the floor, tripping is a hazard.
8. Clean tool and work area when done.

F. Circular Saw

1. Wear safety glasses.
2. Cut down full sheets of plywood on the panel saw.
3. Check to see that blade guard is working properly.
4. Set blade depth 1/4" below material you are cutting.
5. Arrange the material so that the saw will not bind as you are cutting the material.
6. Unplug cord before changing the blade or working on the tool.
7. Clean tool and work area when done.