

Microelectronics and Robotics Lab Safety Guidelines

1. **EMERGENCY TELEPHONE NUMBERS:** Our location is Room 111 in the Boyd Graduate Studies Building.

Emergency: (9) 911

UGA Police: 542-2200

Environmental Safety Services: 542-5801

2. **NO HORSEPLAY.** No intentional electric shocks, explosions, or ignition. No intentional abuse of any materials or intentional creation of any hazardous situation. No other acts of carelessness.
3. **WORK ON DE-ENERGIZED CIRCUITS.** As far as possible, remove power before handling a circuit in any way. This may mean turning the power supply on and off 20 or 30 times during an experiment. That's normal practice. Be sure to double check wiring and soldering before applying power to the circuit and components.
4. **RINGS, WATCHES, AND NECKLACES** made of metal can be hazardous when they touch energized circuits. Use care and prevent accidents. Also, tie back medium length and long hair when working near flames or entangling equipment.
5. **HIGH-VOLTAGE SAFETY.** Our **work** does not normally involve high voltages. If you must work with voltages higher than 35 V, always work with a partner, and clear your experiment with a faculty member in advance.

Do not repair or internally adjust computer monitors without expert supervision; they can hold their charge of 25,000 V for hours after being turned off. PC power supplies can hold a charge of 400 V for hours.
6. **HIGH-CURRENT SAFETY.** Even at **low** voltage, some of our power supplies can output enough current to generate appreciable heat, cause burns, and start fires. Know what you're doing. If you don't know approximately how much current will flow in a circuit, don't apply power until a more experienced person has checked it.
7. **LEAD HAZARD.** Many electronic components are pre-coated with solder that contains lead. **DO NOT EAT, DRINK, OR SMOKE** after handling electronic components until you have washed your hands. *This is doubly important when you have been soldering.* Make it a practice to wash your hands before and after working in the labs.
8. **NO FOOD OR DRINKS.** Food and drinks are prohibited in the labs.
9. **BASIC EYE PROTECTION** (eyeglasses or goggles) is required for **SOLDERING**, use of **WIRE CUTTERS** (which can result in flying fragments), and all use of **POWER TOOLS** other than the power screwdriver.
10. **GOGGLES** (over your glasses if you wear glasses) are required when working with the Dremel Moto-Tool, especially with the wire brush bit. *Particles will be thrown at your eyes.* Everyone within 2 meters of the rotating brush must wear goggles.
11. **THE SOLDERING IRON** must be kept in its holder when not actually in use (not laid down on the table) and should be turned off when not needed, even if you expect to need it again in half an hour. It warms up very quickly.
12. **CHEMICAL HAZARDS.** Follow the precautions on each bottle or container of every chemical we use. Some of them are dangerous.
13. **PROPER HANDLING OF COMPONENTS:** Integrated circuits are easily damaged by static electricity. To protect them from damage, avoid touching the pins any more than necessary; touch the frame of a piece of equipment before touching anything inside it; and in dry weather, make sure anti-static spray is applied to the carpet and chairs at least once a month. Also, turn off power before inserting components into a circuit.

14. **SAFE USE OF TOOLS:** Use pliers, wrenches, and screwdrivers that fit. It's much easier to get hurt, and to damage the equipment you're working on, when you use the wrong size. The right size Phillips (+) screwdriver is often surprisingly large; always use the largest one that fits.
15. **THE LADDER** is to be used only with a second person (a spotter) standing at the bottom to hold it.
16. **KEEP IT CLEAN:** A clean work environment can help you avoid many unnecessary accidents. Keep your work area clean and well organized. Pick up any trash that finds its way to the floor.
17. **EXITS.** Know the location of lab and building exits.
18. **PREGNANT WOMEN.** If you are pregnant, all these precautions are doubly important for you, especially about avoiding electric shock, lead, and other chemicals and hazards.
19. **FIRE EXTINGUISHER:** (1) In the inner hall just outside the microelectronics lab. (2) Just inside the door (one the left) in the inner conference room. It is recommended that you NOT use water on an electrical fire.

ELECTRICAL EMERGENCY RESPONSE:

1. **Electric Shock:** When someone suffers serious electrical shock, he or she may be knocked unconscious. If the victim is still in contact with the electrical current, immediately turn off the electrical power source. If you cannot do this, try to separate the victim from the power source with a nonconductive object, such as a wooden broom.

IMPORTANT: Do not touch a victim that is still in contact with a power source; you could electrocute yourself. Have someone call for emergency medical assistance immediately. Administer first-aid, as appropriate.
2. **Electric Fire:** If an electrical fire occurs, try to disconnect the electrical power source, but only if you can do it without endangering yourself. If the fire is small, you are not in immediate danger, and you have been trained in fighting fires, use any type of fire extinguisher except water to extinguish the fire.

IMPORTANT: Do not use water on an electrical fire.
3. **Power Lines:** Stay away from live power lines and downed power lines. Be particularly careful if a live power line is touching a body of water. The water could conduct electricity. If a power line falls on your car while you are inside, remain in the vehicle until help arrives.

NOTES:

There is a safe way to do all jobs. Ask yourself these questions:

- What are the worst possible things that could go wrong?
- How will I deal with them?

DO NOT perform the job until you have answers to these questions. The practice of safety in the laboratory requires:

- The desire on the part of the individual to protect themselves and their associates, and
- The need to follow the set guidelines as listed above.

Be a good neighbor: the lab joins an EITS office where other folks work. Keep the noise down so they aren't disturbed.

MICROELECTRONICS AND ROBOTICS LABORATORY SAFETY GUIDELINES

I Have Read, Understood, And Will Follow These Guidelines

Print Name: _____ UGA Student ID: _____

Signature: _____ Date: _____