# *Safety considerations for Bioelectricity labs*

In general, our labs are quite safe. However, there are some common-sense precautions to follow. Note that while this list is meant to hit the high points, it is not and cannot be exhaustive.

*Electricity, water and grounding*:

- Electricity and water do not mix well. You should not keep spillable liquids (e.g., a cup of coffee) near the lab equipment. When you work with the equipment, make sure your hands are dry. If for any reason you work outside of the lab room, then keep away from all other sources of water (e.g., sink or bathtub)
- Our labs involve connecting roughly 3 probes to your body. The preamplifiers that are connected to the electrodes on your skin run on 3.3V and further use resistors to reduce current to a very low level. However, you should not not connect the electrodes to any equipment other than the preamps that we specifically supply to you. And while it is unlikely that this amount of power can seriously harm you, all safety provisions should still be obeyed rigorously.
- Current, not voltage, is what typically determines how lethal a shock is. However, current and voltage are roughly related by Ohm's Law. The lower the resistance from your body to ground, the more current a given voltage can drive. Thus the rule: do not ground your body. Some examples of being grounded in your home are being in a bathtub and/or standing (especially barefoot) on a cement basement floor. In our lab, the equipment grounds (e.g., the black alligator clips attached to the oscilloscope probes) are grounded – do not attach them to your body!
- Your laptop charger most likely uses a 120V supply. The cord from the charger carries enough voltage and power to shock and/or kill you. Do not, under any circumstances, use your laptop charger while your body is effectively grounded (and see above for when that is).

*General lab safety*

- You should use only the equipment that has been provided to you. While you may use your laptop while in the lab, you must obey the grounding rules noted above. Also, you should not be using your laptop as a display device for equipment connected to electrodes on your body. As a general rule, while it is unlikely that your laptop will drive power into the lab equipment or into your body, it is even safer not to tempt fate.
- Each lab assignment has a written set of instructions. You should follow the instructions, especially as regards to using lab equipment.
- We intend that you work in the Electrical Engineering lab space. However, if for some reason you work in a different space, then pick a good work space. It should be well ventilated and have adequate lighting. While the risk of sparking in our work is low, there should not be flammable liquids nearby. Furthermore, if you work in a cold room on a hot humid day, condensation can create water (and see the notes above about mixing electricity and water).
- For general safety, rings, metallic jewelry and metal watchbands should not be worn.
- Lab equipment should be returned to the EE department at the end of the semester. Non-reusable items (the stick-on pads and any wires you have used) can be disposed of in

ordinary trash. Batteries should be disposed of responsibly (e.g., in a marked battery-disposal box).

- Soldering is not needed for any of our labs, nor is it allowed.

*Handling unusual circumstances*

- As noted above, water and electricity do not mix. If you do spill water or any other liquid on lab equipment, you should turn off the power immediately and not reuse the equipment until it has fully dried.

If you have any questions about lab safety, please contact either your instructor or the Electrical-Engineering department safety manager (John Chivers).