

CNSI Microfluidics Lab and Innovation Workshop

New User Orientation & Safety Guidelines

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Welcome!

Welcome to the CNSI Microfluidics Lab and the Innovation Workshop. These are facilities where you can build, assemble and test components for scientific instruments for your research, and to prototype parts to test new ideas. Ensuring that the labs are safe places to work is our first priority, so only use tools for which you have completed training, and let the lab staff know about any problems. General guidelines for working in the labs:

1. Work safely – read the manuals first, follow the operating procedures, ask for training and assistance when you're learning new tools.
2. Be considerate of others – clean up after yourself.
3. Don't take tools, instruments or supplies from the lab.
4. Safety glasses, closed-toe shoes and long pants are required at all times.

Location & Phone Numbers

Innovation Workshop – 2448 Elings Hall, 805-893-7186 (phone on central bench towards the door)

Microfluidics Lab – 3430 Elings Hall, 805-893-7186 (phone on front bench next to the microscope)

Contact information

- Dave Bothman, Lab Manager, bothman@ucsb.edu, 3227 Elings Hall, 805-893-4125 (O), 805-680-2821 (C)
- Bob Hanson, CNSI Building Manager, bhanson@cnsi.ucsb.edu, 3233 Elings Hall 805-893-4631
- Teddy Thomas, Financial Analyst (Recharge and Billing), tthomas@cnsi.ucsb.edu, 3241 Elings Hall, 805-893-6095

Emergencies

All emergencies and accidents must be reported by phone, text or e-mail as soon as possible.

Emergency phone numbers and resources

5. Contact information: In case of emergency call 9-911 (from the lab phone) or 893-3446 (cell phones)
6. Refer to the flip chart by the front door for information about emergency procedures.

Fire

7. If the fire alarm sounds put any equipment that you are using in a safe mode (turn off hot plates, lasers, drills & saws, etc.) and leave the lab. Take the stairs at the south (ocean) end of the building to the first floor. The primary assembly area is in the courtyard between Elings and Kohn Halls. If it is not safe to exit at the south end of the building use the north exit and assemble in the small parking lot on the mountain side of the building.
8. Let someone who is staying know if you are leaving the assembly area so that they can let first responders know that you made it out of the building safely.
9. If there is a small fire that you feel is safe to put out with a fire extinguisher or fire blanket do so and alert the lab manager and/or the building manager. In the Microfluidics Lab there is a Halon extinguisher next to the laser cutter and an ABC extinguisher by the door to the lab. In the Innovation Workshop an ABC extinguisher is by the door. Several more fire extinguishers are in the corridor outside the labs.

10. If it is not safe for you to extinguish leave the lab and pull the fire alarm pull station nearest the lab to activate the building's alarm. When you reach the assembly area let the building manager and the firefighters know what the situation is.
11. As soon as possible call or e-mail the lab manager with a complete description of the incident.

Medical Emergencies

12. First Aid kits are on the wire shelves by the entrances to the labs.
13. Provide immediate first aid to the injured wearing appropriate PPE.
14. Call the emergency numbers listed above to summon an ambulance.

Chemical accidents

15. Small spills can be cleaned up by the user (small amounts of solvent, paint, lubricant, 3D print resin).
 - a. Wear appropriate PPE
 - b. Use wipes or absorbent pads to collect spilled material
 - c. Place waste in a plastic bag, label the bag with a chemical waste label and place in the grey chemical waste bins (see the section on chemicals in the labs below for supply locations).
16. Safety showers and eyewash stations
 - a. Microfluidics Lab: there is an eyewash at the sink by the front door to the lab and a safety shower / eyewash station in the adjacent lab (through the glass door to the right)
 - b. Innovation Workshop: the safety shower / eyewash station is on the back (west) wall of the lab, and several others are in the corridor.

Accessing the labs

Obtaining card-key access

17. In general faculty, staff and graduate students receive 24/7 card-key access to the labs. Undergraduates receive M-F 8-5 access. This can be extended after they are familiar with the lab. These hours have been reduced during COVID.
18. Card key access to the Workshop may be requested at:
<http://access.cnsi.ucsb.edu/Forms/form.php> (the Workshop is in room 2448). All users must complete UCSB Environmental Health and Safety's *Fundamentals of Laboratory Safety* course.
19. Instructions for accessing Fundamentals of Laboratory Safety on-line:
 - a. Go to the Learning Center website <https://www.learningcenter.ucsb.edu/> and login
 - b. Search for LS60
 - c. On the select tab select start.

Note for undergraduates: if you are not able to log into the learning center e-mail the lab manager who can get the system to send you an invitation to enroll.

Swiping in AND out

20. Once your card has been activated swipe it on the black box outside of the lab to unlock the door. When you leave the lab swipe out to end the billing session.

Recharge rates and policies

Hourly charge

21. The hourly charge for using the labs for campus users is \$12/hr. and \$36/hr. for commercial users. This covers the cost of supplies, maintenance, and a portion of staff salaries. CNSI can often subsidize instructional and outreach use of the labs with non-Federal funds. Contact the lab manager for details.

3D printer cost recovery charges

22. In addition to the hourly recharge, users of the 3D printers are billed for the cost of consumables and prorated portion of the cost of maintaining the printer.

Visitors in the labs

23. Users may not lend their access cards to others.
24. Visitors who have not completed the lab safety orientation are not allowed to work in the lab.

Visitors are allowed into the lab in the following circumstances:

- a. Research group / team members who are visiting the lab to observe (not to work).
- b. When working with potentially dangerous tools after hours users should have a second person in the lab who can give assistance in case of emergency. They may not use any tools in the lab, but may use computers.
- c. Tour groups visiting CNSI may visit the labs and observe an authorized user demonstrating tools. Make sure that the visitors are wearing safety glasses.
- d. Off-campus visitors should complete a liability waiver and give it to the lab manager before visiting the lab:

<https://www.ehs.ucsb.edu/files/docs/rm/WaiverElecActivities.pdf>

Reservations

25. Lab reservations in FBS are required for all use of the Microfluidics Lab and the Innovation Workshop. Detailed information about FBS can be found on the lab [Wiki](#)

Lab computers and on-line resources

26. The CNSI Workshops Wiki has tool operating manuals, the list of approved chemicals, recommended vendors, MSDS sheets, SOPs and other important information:
<http://microfluidics.cnsi.ucsb.edu/wiki/doku.php>
27. The wireless password in the Microfluidics Lab is “smallparts”

Computer guidelines

28. UCSB Computer use guidelines apply to all lab computers:
<http://eci.ucsb.edu/eci/about/computer-use-policy/>
29. Do not install software on any lab computers without permission from lab staff
30. Labels on keyboards and/or monitors have login instructions.
31. Computers are not backed up – so don't store irreplaceable data on them

General lab information

32. The lab safety binder including SOPs are in a binder by the entrance to each lab, and also on-line.

33. Sharp waste (glass, razor blades, needles, etc.) MAY NOT be placed in the trash. Glass must be placed in a special container for broken glass. Needles and blades must be placed in approved red plastic sharps containers.
34. Don't eat or drink in the lab.
35. Understand the hazards associated with your work in the lab, and don't work until you have all of the necessary training and safety equipment.
36. Treat the equipment in the lab and the property of other lab users with respect.
37. Do not take tools, lab supplies or consumables from the lab.
38. Clean up after yourself.
39. Manuals and safety instructions are on-line. Review them if you are unsure about how to use a tool.
40. Problems or questions: e-mail microfluidics@cnsi.ucsb.edu
41. Please acknowledge the CNSI Microfluidics Lab in research posters and papers. *The authors acknowledge the use of the Microfluidics Laboratory within the California NanoSystems Institute, supported by the University of California, Santa Barbara and the University of California, Office of the President.*

Personal Protective Equipment

42. Safety glasses, long pants and closed-toe shoes are required at all times, and lab coats are REQUIRED when working with chemicals in the lab.
43. Safety glasses are available in a bin by the entrance door, on the shelf opposite the door, and on the wire rack to the left of the door.
44. Lab coats on the racks by the fume hoods are for general use. If you want to store a personal lab coat in the lab please use the bins on the wire rack to the left of the door.
45. Gloves are stored on the wire rack by the entrance door. In general Nitrile gloves are preferred, Latex gloves provide better protection against solvents, but some people are allergic to Latex. Read <https://www.ehs.ucsb.edu/labsafety-chp/sec2/selecting-proper-gloves> for more information. Contact lab staff if you have questions.

Standard Operating Procedures (SOPs)

46. Standard operating procedures describe the safe operation of tools and instruments in the lab, detail procedures for working with chemicals, and summarize techniques that other lab users have developed. Review them before working with a tool or instrument. They are in the safety binder and on-line as described above.

Chemicals in the labs

General information about working with chemicals

47. The lab's chemical hygiene plan is in the notebook bin by the entrance door, and on the lab web page.
48. Only chemicals on the list of approved chemicals may be used in the lab: see lists on line. Contact lab manager to add chemicals to the list.
49. Read appropriate SOPs before working with chemicals in the lab. New processes using chemicals must have an approved SOP before work can begin.
50. Solvents squirt bottles are stored in the hoods. Bottles to refill them are stored under the hoods.
51. Never dump waste chemicals in the drain – dispose in chemical waste with complete EH&S labels in the grey waste bin in the lab.
52. Never evaporate chemical waste – dispose of waste in labeled bottles (stored under the fume hood).
53. All chemicals and samples must be labeled with name and date. Never leave unmarked containers in the lab.
54. Do not to store incompatible chemicals together – the list of approved chemicals on the lab web page includes storage locations.
55. Chemicals must be stored in marked chemical storage areas (not in drawers or group storage bins)

Fume hoods

56. Most work with chemicals takes place in one of the lab fume hoods. Please observe the following fume hood guidelines
 - a. Lower the sash when the hood is not in use. This saves energy and reduces noise in the lab.
 - b. Work with the sash as low as practical, but never open the sash beyond the level where the two red arrows are aligned.
 - c. If the fume hood alarm is in alarm (beeping sound and red light illuminated) it means that the airflow is not sufficient to work safely. Close the sash and notify the lab manager or building manager. Do not use the hood until the alarm is off.
 - d. You may push the mute button to silence the alarm (the red light will still be on) so that the sound doesn't annoy everyone else, but don't use the hood until the ventilation is restored to a safe level.

Waste collection and disposal

57. While in use waste bottles are stored under the fume hood.
58. When full, note the date on the tag and put the full bottle in the waste pickup bin. In the Microfluidics Lab this is under the sink by the door. In the Innovation Workshop the waste bin is under the sink in room 2442 Elings – the 3D printer room.
59. Replace the full bottle with an empty one. In the Microfluidics Lab empty waste bottles are in the grey tub under the bench opposite the fume hoods. In the Innovation Workshop empty bottles are in the left-hand cabinet under the fume hood in 2442 Elings.
60. Chemical waste must be labeled with a UCSB hazardous waste label (stored in an envelope on the side of the fume hood in and in the office supplies drawer.

Spill cleanup supplies

61. Chemical spill cleanup supplies (absorbent pads, gloves, etc.) are stored in tan-colored cabinets. On the second floor the supply cabinets are opposite room 2440, and on the 3rd floor they are opposite door 3414.

LHAT

62. Most users get safety glasses, lab coats and other personal protective equipment, PPE, through their home laboratories, and are not registered on LHAT through the Microfluidics Lab. If you do not have PPE already, please let Microfluidics Lab staff know and we will sign you up.

Supplies and storage

63. Storage in the labs is color-coded
 - a. Yellow: tools (may be used in the lab, but must be cleaned and put away, and not taken outside of the lab)
 - b. Blue: general lab supplies
 - c. Red: supplies for sale
 - d. Green: user storage
64. General supplies such as gloves, wipes, swabs, foil, ear plugs, lens wipes, etc. are on the wire shelf by the door.
65. The labs have supplies for sale in drawers/bind with red labels. Make sure to sign out any supplies that you purchase.
66. A drawer marked 'Office Supplies' has tape, pens, scissors, chemical waste labels, etc. In the Innovation Workshop the drawer is by the sink near the front door, in the Microfluidics Lab it is on the back wall by the Objet printer.
67. Users may store their supplies (not chemicals which must be stored in marked chemical storage areas) in empty bins or drawers. Label the storage with a Green label.
68. Once a year during spring cleaning users will be required to clean their storage areas. Abandoned items will be discarded.

List of tools in the labs (training required before use)

Microfluidics Lab

3D printed water jet cleaning station
Silane vapor deposition setup
Ultrasonic cleaner
Laurel spin coater
Microfluidics fitting bonding tool
Pipette cutter
Height gauge
Hot plates
Vacuum chamber for degassing
Pressure casting chamber
Thinky mixer
Electronic scales
Ovens for curing polymers
Diamond saw
Objet printer
Laser welder
Trotec Speedy 100 laser cutter
Sherline/Flashcut CNC drill
Keyence microscope
Droplet microfluidics workstation
Optical alignment tool
Biopsy punch
Hot press
Vacuum oven
Novascan Ozone Cleaner
Sonoplot multimaterial writer
Spraybase electrospinning / spraying tool
Haas Super Mini Mill
Hand tools
Power tools

Innovation Workshop

3D scanner
Photobooth
Digital microscope
Bandsaw
Drill press
Small mill
Mini drill press
Arbor press
Hand tools
Power tools
Soldering station
Oscilloscope
Power supplies
DVM
Thermal camera
Borescope
Hot wire cutter
Miter saw
Panel saw
Jig saw
Sanders
Formlabs 3D printers
Ultimaker 3D printer
F270 FDM printer
MiiCraft 3D printer
Caustic 3D print support cleaning tank
Speedy 300 laser cutter
Small CNC router
CNC vinyl / paper cutter