



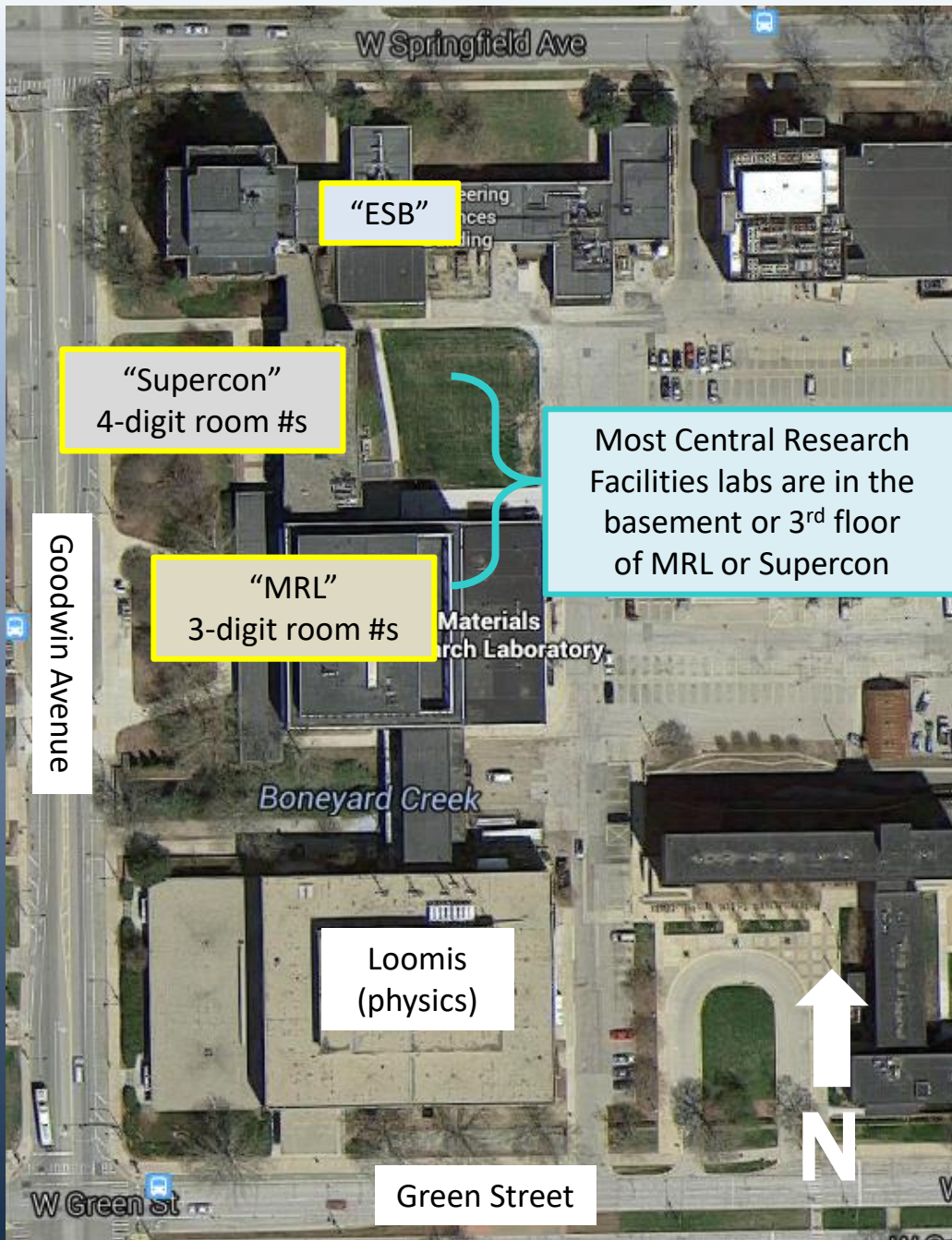
I Welcome!

to the

**Materials Research Laboratory
Central Research Facilities**

Orientation for New Researchers

Where are the MRL Central Research Facilities?



At MRL You Can:

- Characterize materials from the nanoscale to the centimeter scale.
- Fabricate micro/nanomaterials and devices.

CMM

Center for Microanalysis of Materials: characterization by microscopy, x-rays and surface analysis

Microfab

Also called the Cleanroom, the Fab and 3rd floor

LSF

Laser and Spectroscopy Facility: Characterization by optical techniques

MRL is one of several user facilities (shared labs) on campus.

Use any or all facilities which best suit each part of your research.



MRL

Materials
Research Lab



MNTL

Micro and
Nanotechnology Lab



**Beckman
Institute**



IGB

Institute for
Genomic Biology

Storerooms on Campus

Physics/MRL Shipping-Storeroom

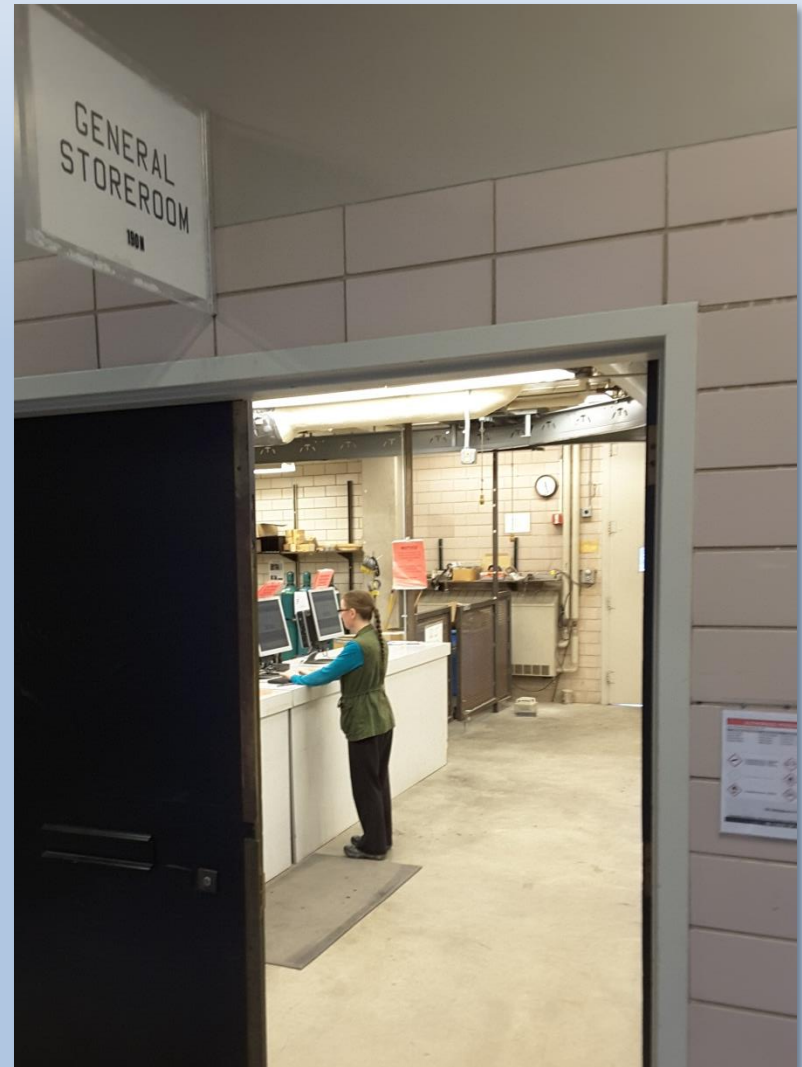
- 1st floor, between MRL and Loomis
- Net ID, AD password and CFOP
Self check-out (record ALL items using computers at the counter)
- Pick up or mail packages or borrow carts

SCS Storeroom

- Roger Adams Lab, ground floor

ECE Storeroom

- New ECE building (near Beckman)





I Safety

at the

**Materials Research Laboratory
Central Research Facilities**

Orientation for New Researchers

Building Emergency Action Plan the “BEAP”



BEAP is the campus-wide initiative to provide annual training on what to do and where to go in case of an emergency.

- Training is on Compass: Training > BEAP > MRL
- BEAP Instructions: <http://mrl.illinois.edu/BEAP>
- You must be up to date on your BEAP training to log in to the scheduling calendar to request instrument training or to receive key access to the MRL.

Emergencies



In case of a serious injury or other emergency, get help *immediately*.

- Call 911 from a cell phone.
- Get medical attention!

Even if you are otherwise okay (err on the side of caution)

In case of fire or hazardous chemical release:

- Pull the fire alarm.
- Call 911 from a cell phone.
- **If a fire alarm is sounded, you must leave the building immediately. Meet at Grainger Library.**

Other Accidents

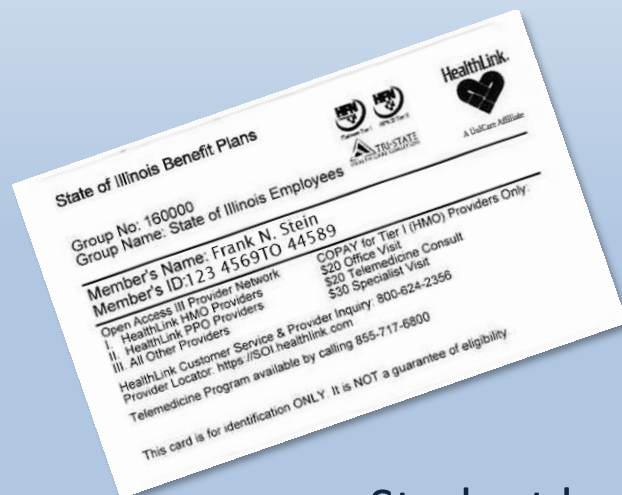
If your injury is not serious (no bleeding, not unconscious, nothing's broken), go to your nearest health care provider.

- McKinley for undergrads
- Wherever you have health insurance (Carle, Christie, etc.)

Notify Susan Logan (sklogan@illinois.edu) within 24hrs. Fill out Injury/Incident Report forms so:

- MRL administration can address safety issues
- Insurance will be able to cover your medical costs

Health Insurance



If you are working at MRL during the summer, make sure your health insurance continues.

Student health insurance doesn't automatically continue when you are not enrolled.

Opt in from the Office of Student Health Insurance:
<http://si.illinois.edu/>

Working Late or on the Weekend?

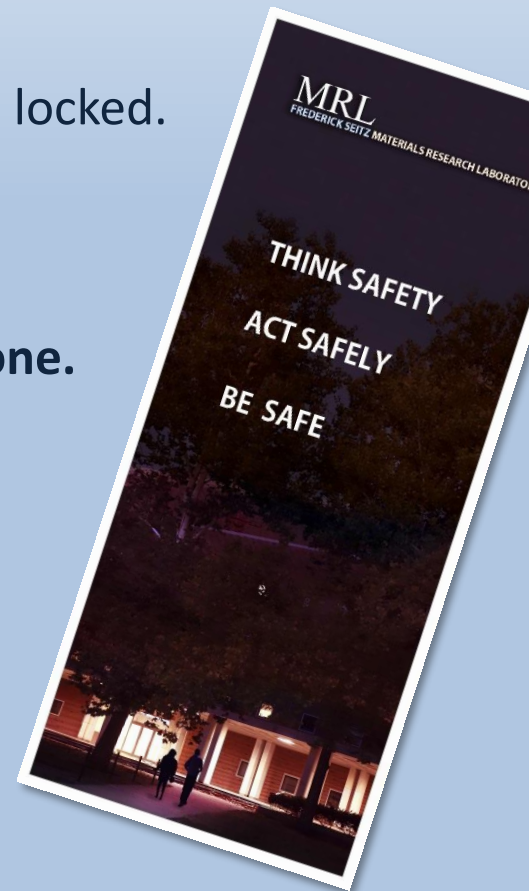
Buddy system

- Bring your outside door key, as the building will be locked.
- Have someone within shouting distance who can help you in case of an emergency.
- If you're doing anything hazardous, **don't work alone.**
(a buddy must be present for hazardous tasks)

Don't let strangers into the building.

SafeWalks and SafeRides

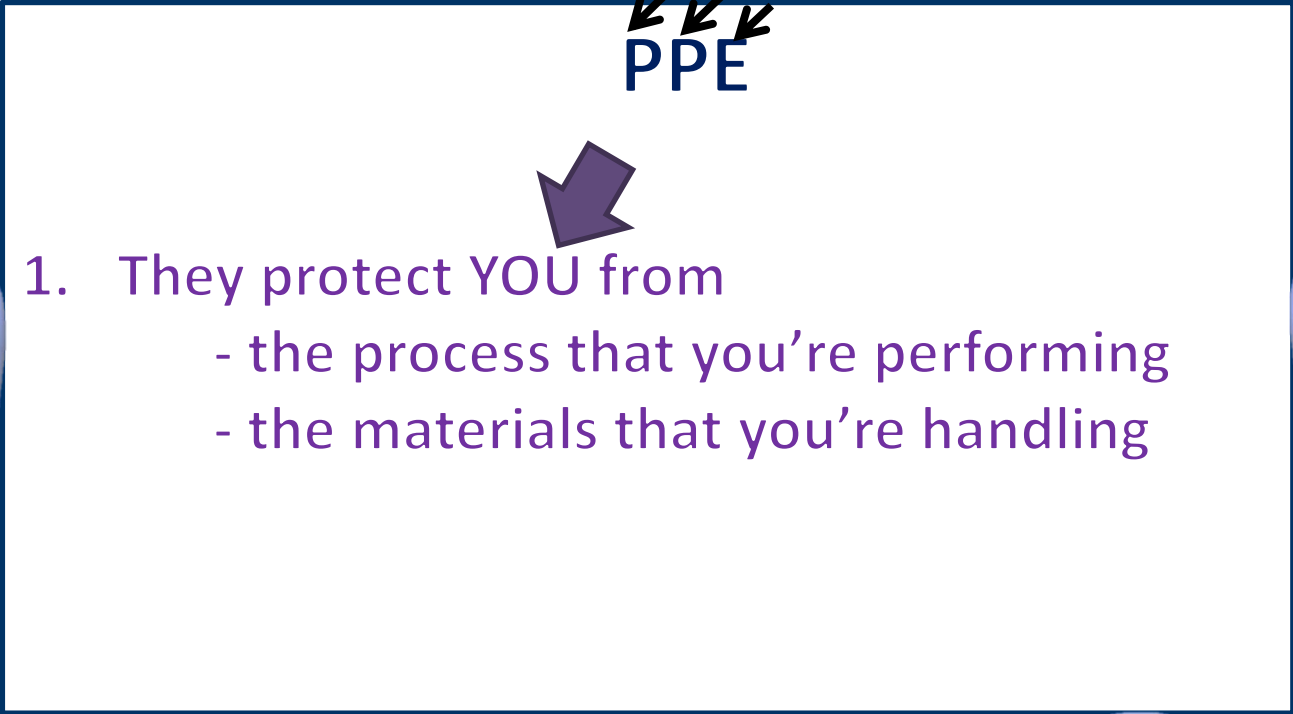

phone numbers are on the back of your i-card.



PPE

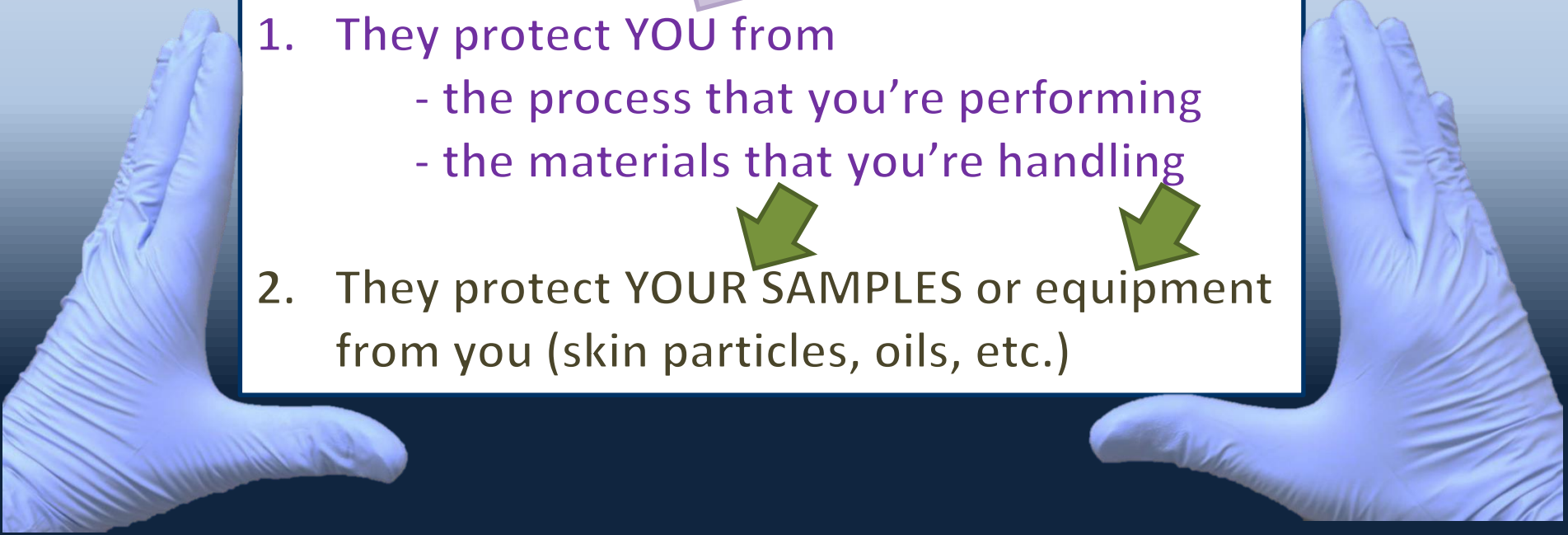





Personal
Protective
Equipment
PPE

- 
- 
1. They protect YOU from
 - the process that you're performing
 - the materials that you're handling

Personal
Protective
Equipment

PPE

- 
- 
- 
- 
1. They protect **YOU** from
 - the process that you're performing
 - the materials that you're handling
 2. They protect **YOUR SAMPLES** or equipment from you (skin particles, oils, etc.)

The Right Glove for the Right Job

Gloves may or may not be needed.

- Different types for different instruments or samples
- Ask during training



PPE is for LAB WORK only...



Do not touch personal items or “common fixtures” with gloves.

Throw out gloves after you’ve used them once.



Protect yourself!

In MRL labs you are expected to wear:

- Long pants
- Close-toed shoes
- Clothing that will not get caught on things
- Eye protection when needed
- And if you have hair that can get in the way, please tie it back out of the way.



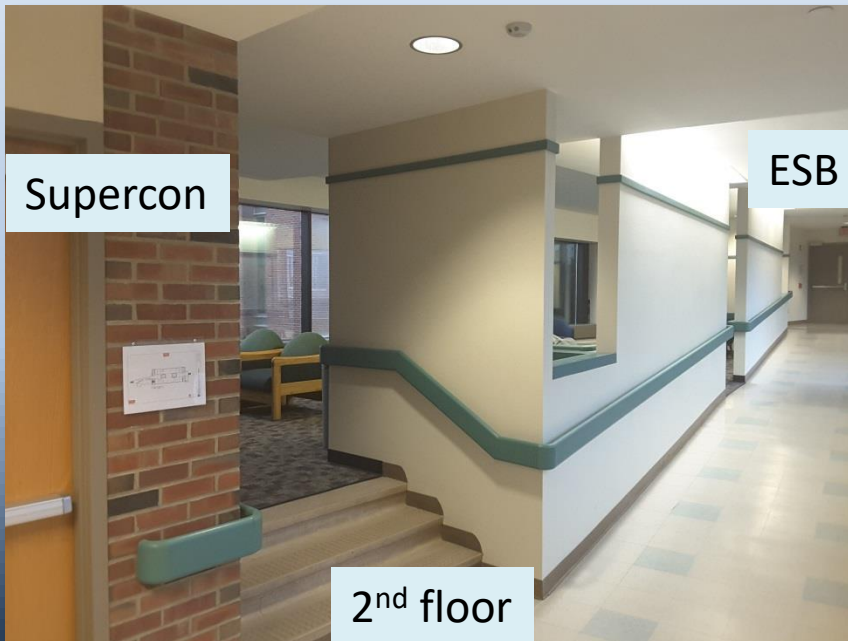
No Food or Drinks Allowed in Any of the Labs



**Your food may contaminate your work
or damage equipment!**

Your chemistry may contaminate your food!

You May Eat Here



You are welcome to eat or drink
in the lounges on the 2nd and 3rd floor of
Supercon and in the break room in the
center of the basement of MRL.



Transport of Material

Use freight elevator
for:

- Compressed gas cylinders
- Cryogenic dewars
- Chemicals
- Carts and heavy objects
- Equipment

**Do not travel with
hazardous materials.**



Transport of Material

Secondary containment is required for liquids > 500 mL (use a bottle carrier).



Transport materials through public areas in a way that doesn't require gloves.



Safety Data Sheets

SIGMA-ALDRICH


SAFETY DATA SHEET

Version 5.2
Revision Date 07/01/2014
Print Date 08/19/2014

1. PRODUCT AND COMPANY IDENTIFICATION

- 1.1 Product identifiers**
Product name : Bismuth(III) selenide
- Product Number : 401080
Brand : Aldrich
Index-No. : 034-002-00-8
CAS-No. : 12068-89-8
- 1.2 Relevant identified uses of the substance or mixture and uses advised against**
Identified uses : Laboratory chemicals, Manufacture of substances
- 1.3 Details of the supplier of the safety data sheet**
Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA
Telephone : +1 800-325-5832
Fax : +1 800-325-5052
- 1.4 Emergency telephone number**
Emergency Phone # : (314) 776-8555

2. HAZARDS IDENTIFICATION


- 2.1 Classification of the substance or mixture**
GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Inhalation (Category 3), H331
Specific target organ toxicity - repeated exposure (Category 2), H373
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410
For the full text of the H-Statements mentioned in this Section, see Section 16.
- 2.2 GHS Label elements, including precautionary statements**
Pictogram 
- Signal word : Danger
- Hazard statement(s)
H301 + H331 : Toxic if swallowed or if inhaled
H373 : May cause damage to organs through prolonged or repeated exposure.
H410 : Very toxic to aquatic life with long lasting effects.
- Precautionary statement(s)
P260 : Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264 : Wash skin thoroughly after handling.
P270 : Do not eat, drink or smoke when using this product.
P271 : Use only outdoors or in a well-ventilated area.
P273 : Avoid release to the environment.

Aldrich - 401080

Page 1 of 8

Read SDS to understand hazards associated with each material you use.

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P270 : Do not eat, drink or smoke when using this product.
P271 : Use only outdoors or in a well-ventilated area.
P273 : Avoid release to the environment.

Questions? Email Maisie Kingren: mlswans2@illinois.edu

Door Signs

in front of every lab

AUTHORIZED PERSONNEL ONLY - HAZARDS PRESENT

Seitz Materials Research Lab, 67

Name	Title	Room number	Phone
Stephan Burdin	Principal Investigator	217-244-0298	217-355-4464
Timothy Spila	Principal Investigator	217-355-4965	
Kathy Walsh	Principal Investigator	217-300-6662	217-417-3259

SAFETY NOTES

- in case of instrument problem
- contact *right after* an emergency

Potential safety hazards in the room

- Compressed Gases - INERT
- Low/No Corrosives
- Cryogenics
- Low/No Explosive Materials
- Low/No Flammable
- Low/No Health Hazard
- Low/No Oxidizers
- Low/No Toxics
- Low/No Water Reactive

No biological or radioactive hazards present.

University of Illinois - Division of Research Safety 217-333-2755 Last Updated: 5/14/2015

IN CASE OF EMERGENCY CALL 911

Labeling Containers

Chemical containers *must* have labels!

No “mystery materials”! Please write clearly!

Secondary containers must have:

- Full chemical name
- Warning statement
- Solution or mix concentrations
- Preparation date
- Name, net ID and MRL user number

Avery labels (transparent sticky sheets) can be bought in the MRL-Loomis storeroom.

Waste containers must also be labeled “WASTE”.

The Basic Parts of A GHS-Compliant Label

1 → **n-Propyl Alcohol**
UN No. 1274
CAS No. 71-23-8

2 → **DANGER**

3 → Highly flammable liquid and vapor. Causes serious eye damage. May cause drowsiness and dizziness.

4 → Keep away from heat/sparks/open flames/hot surfaces. No smoking. Avoid breathing fumes/mist/vapours/spray. Wear protective gloves/protective clothing/eye protection/face protection. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present. Continue rinsing.

5 → Fill Weight: 18.65 lbs. Lot Number: B56754434
Gross Weight: 20 lbs. Fill Date: 6/21/2013
Expiration Date: 6/21/2020
Acme Chemical Company • 711 Roadrunner St. • Chicago, IL 60601 USA • www.acmechem.com • 123-444-5567

6 →

See SDS for further information.

Sample label courtesy of Weber Packaging Solutions • www.weberpackaging.com

1. **Product Identifier** - Should match the product identifier on the Safety Data Sheet.
2. **Signal Word** - Either use "Danger" (severe) or "Warning" (less severe)
3. **Hazard Statements** - A phrase assigned to a hazard class that describes the nature of the product's hazards
4. **Precautionary Statements** - Describes recommended measures to minimize or prevent adverse effects resulting from exposure.
5. **Supplier Identification** - The name, address and telephone number of the manufacturer or supplier.
6. **Pictograms** - Graphical symbols intended to convey specific hazard information visually.

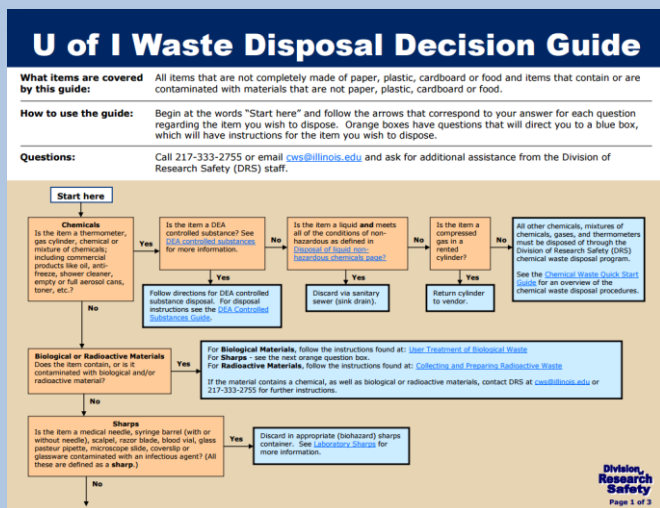
<http://blog.weberpackaging.com/?p=1626>

n-Propyl Alcohol, Water
Danger - Flammable
Mix - 50% n-Propyl Alcohol
50% Water
Date - 8.17.2015
Matt Bresin (mbresin, 88)

What Do I Do with Waste?

If you generate waste at MRL, bring it back to your own lab or dispose of it in specified containers.

Follow the DRS waste disposal guide:



<http://www.drs.illinois.edu/site-documents/WasteDisposalGuide.pdf>



MRL is a Biosafety Level 1 Facility

All biological materials must be approved by MRL's biosafety officer, *before* they are brought to MRL.

- Biological: anything that is, or was, alive and derivatives of those things (proteins, plants, cells, etc.).
- Biological materials must be disclosed on your proposal.
- **BE SPECIFIC IN YOUR DESCRIPTION OF MATERIALS**
Don't just say "cells", "proteins", "drugs" or "polymers".

Fixative is available for free (contact mrl-facilities).

Beckman Institute, MNTL BioNanotechnology Labs, or IGB are alternative facilities for biological work.



Materials Safety at MRL

Prior approval and staff permission are required *before* bringing new or hazardous materials into MRL.

Submit a **Change of Scope proposal** to your project if your materials change.

Discuss materials with MRL staff
for *each* instrument.
Have the SDS available for review.



Getting things done

at the

**Materials Research Laboratory
Central Research Facilities**

Orientation for New Researchers

Miscellaneous things to know

Your account (University CFOP-A*) submitted with the proposal is how your MRL Central Research Facilities use is billed each month.

To change your account contact mrl-facilities@illinois.edu or stop by the MRL office.

More than one project? A new PI or different fund source requires submitting a new proposal. Each MRL ID is tied to one CFOP-A.

Adding a technique to your existing project? Submit a “change-of-scope” (instead of a “new”) proposal.

To purchase from a storeroom, use the correct account/CFOPA for buying things. This may not be the same used for facilities use billing.

** A stands for activity code. Not all accounts have one of these.*

Procedure

- Submit (a) proposal(s) online.
- Have your proposals approved.
- Request trainings
- Be trained by MRL staff.
- Request room access online.
- ALWAYS carry your I-Card.
- Submit a change-of-scope proposal, if project changes, or need to add techniques or materials.



Additional safety trainings

**You may need additional safety trainings
after MRL orientation before you can work in MRL
facilities:**

cleanroom, HF trainings - Microfab Facility

Laser safety training - Laser and Spectroscopy Facility

Analytical X-ray safety training - X-Ray Diffraction Facility

Instrument Trainings

1. PRE-TRAINING

- Discuss with staff about your experiment plans.
- Some instruments require background reading or a seminar before the first training session. This makes the in-person training go faster.

2. IN-PERSON TRAINING

- Group training, individual training
- Supervised Sessions: some instruments require several sessions.
- Testing: Demonstrate safe and effective operation of the instrument.

3. ADVANCED / REFRESH TRAINING

- Advanced or special modes require additional training.
- Refresher training may be required if you haven't use the instrument for 6 months.

Request Training and Schedule Instrument Time



- The instrument scheduling system

<https://cmmserv.mrl.illinois.edu/>

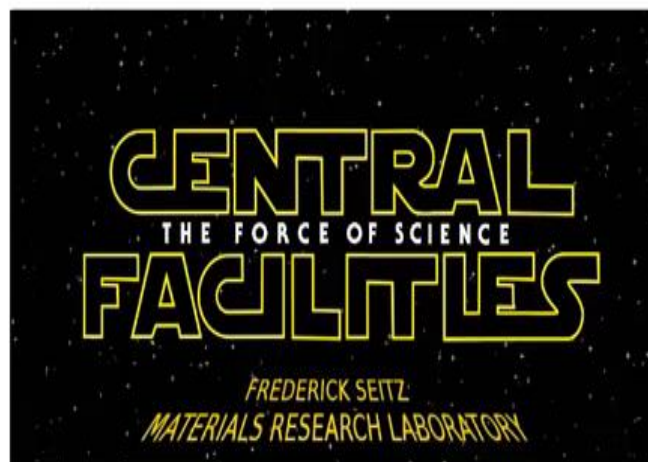
- Walkthrough video

<https://www.youtube.com/watch?v=kElGtjcGi-E&t=44s>

Instrument Reservation and Logging System

MRL Facilities Number or NetID: MRL Password
(not your AD password):

(Illinois.edu domain only)



Materials Research Laboratory

Central Research Facilities

University of Illinois at Urbana-Champaign
104 South Goodwin Ave
Urbana, IL 61801, USA

P: (217) 333-1370 | F: (217) 244-2278 | MRL-Facilities@illinois.edu

[Report a Bug in the Schedule System](#)

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Prepare for Your Training

The well-equipped trainee...

- **Be ON TIME!**
- Leaves texting and messaging for later.
- Make notes. Brings a pen or pencil, notebook and/or instrument instructions to the training session.
- Has an alert and inquisitive mind.
ask questions

*Your PI is supporting your work
by paying for you to learn!*



Always inform the staff

If you need to be late or absent

- Email the staff as far in advance as possible
- Other trainees may have to wait
- Other researchers may be able to use the time

After 15 minutes, no notification, no show

- You will be charged for ½ hour of training time.
- Your PI will be notified.
- You will be moved to the bottom of the training queue. Sometime it can be months away.

Logbook Recording

- Accurately report your instrument usage
 - Failure to report this accurately is considered theft of instrument time – **your access to the instrument and lab could be deactivated.**
 - Record the amount of consumables used with the instrument (example: thickness of gold sputtered).
- Accurately record instrument status parameters, if being asked.

Important to
staff and
other users.



Time In	Time Out	Date	Code	Hours Used	User Number	Name	Adv							
								Sample	Scanner	Transducer	Probe Used (S/N)	Probe Left On	Comments	
8:33	4:14p	1/23	A1	8	1138	H. Solo	I. Jo	1	cement	S	S	MS01121007	MS01121007	OK

When done using an instrument

Fill the logbook. Legible writing please!

Take your data with you

- MRL instrument computers are not long-term data storage (data can get lost).
- How you transfer data depends on the instrument.
 - USB vs. internet, shared folders
 - Virus-scan your USB drive before bringing it to MRL

If you finish early

- delete the remaining time and notify the next user.

Scheduling Etiquette for the Responsible MRL Researcher



- Most instruments are used by many researchers—be considerate!
- Be patient when trying to get time/training on heavily-used equipment.
- Until you're good at the instrument, schedule time during workday hours when staff are around.
- If you can't use your scheduled time, cancel as soon as possible. Check sign-up rules to see restrictions on late cancellations
- Don't reserve time you don't expect to use.

Signs up for extra-long sessions and cancels lots of time

The user booked an extra-long session...

07:30AM		
08:00AM		T. DEMO
08:30AM		
09:00AM		
09:30AM		
10:00AM		
10:30AM		
11:00AM		
11:30AM		
12:00PM		
12:30PM		
01:00PM		
01:30PM		
02:00PM		
02:30PM		
03:00PM		
03:30PM		
04:00PM		
04:30PM		
05:00PM		
05:30PM		
06:00PM		
06:30PM		
07:00PM		K. WALSH
07:30PM		
08:00PM		
08:30PM		
09:00PM		
09:30PM		
10:00PM		
10:30PM		
11:00PM		
11:30PM		

Later, the user deleted part of his session hours.

	Fri
	25
	T. DEMO
	K. WALSH

This user could use the instrument earlier.

Be a Responsible Researcher

Do:

Keep equipment and the instrument area in a usable and clean condition for the next researcher.

- Take your samples with you
- Put trash in appropriate waste containers
- Return all accessories to their proper storage location

Contact the staff if something is wrong with the equipment

- That's what we're here for.
- It's a much more efficient use of your research time.
- The staff have experience fixing similar problems.

Be a Responsible Researcher

Do Not:

Take tools/parts!

- MRL equipment and consumables are for use in the MRL Central Research Facilities *only*.
- If you need to borrow something, talk to MRL staff *first*.
 - Even if your professor tells you to do it
 - Even if it's just a little bit of consumable
 - Even if you plan to bring it right back

Try to solve instrument problems yourself

Install any software on MRL computers.

Use the internet on MRL computers for anything except:

- Data transfer
- Scheduling instrument time
- Research activities like looking up papers

Getting Lab Room Access

After you have been trained on an instrument, you may request access to the lab room. All key and I-card access requests are made via the MRL web:

- Log in to <https://my.mrl.illinois.edu/>
- Hover over the menu: Facilities
- Click the sub-menu: Keys
- Input key information
- Submit

Note: some rooms have limited terms for access. For example, you may be limited to daytime hours when staff are present.

Code of Conduct

As part of the MRL research community, I will...

Be Safe

- Operate the equipment as instructed by MRL staff.
- Follow safe work practices and report any accidents.
- Properly dispose of my materials and clean up after myself.
- Notify MRL staff if I notice problems with the equipment or observe unsafe or improper behavior.

Be Courteous

- Respect other researchers' rights to use facility resources.
- Respect their samples and processes.
- Read all communications from MRL facilities (safety posters, instrument status or procedure updates, etc.).
- Ask staff for clarification if you don't understand the communications.

Suspension Policy

The MRL Suspension Policy ensures that research is done safely and courteously.

- Suspension: Case-dependent. You may **lose access** to an instrument or **to all MRL facilities for a week or a month.**
- If you are a mentor to undergraduate students, be a responsible mentor. **Suspension of an undergrad means the postdoc/grad supervisor will also be suspended.**

When Your Work is Published

All publications that incorporate results obtained through the MRL Central Research Facilities must include the following acknowledgement:

“...was carried out in part in the Materials Research Laboratory Central Research Facilities, University of Illinois.”

Please also send a copy of your publication to:
mrl-facilities@illinois.edu

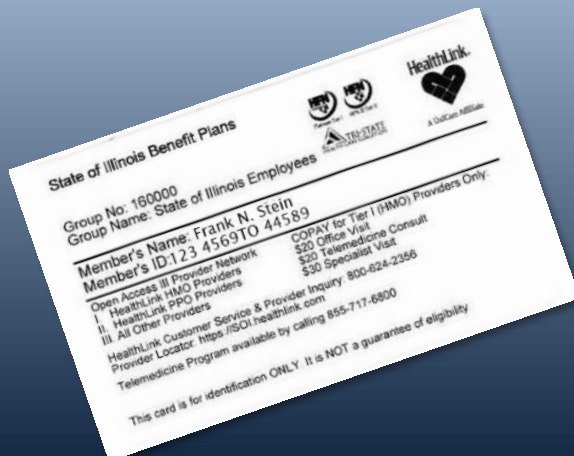
MRL After Graduation

Congratulations!

Turn in your keys to the MRL office and have your MRL User ID deactivated.

Are off-campus users permitted?

YES! You may apply to use MRL as an affiliate of any academic institution or business.



You need to have an active appointment on campus and proof of health insurance to do any work in the MRL after graduation.



I Resources

For working at the

**Materials Research Laboratory
Central Research Facilities**

Orientation for New Researchers

MRL on the Web

mrl.Illinois.edu

Staff directory, instruments, proposal portal, upcoming seminars and workshops

mrl.Illinois.edu/resources

Links to many useful documents for MRL users, including this presentation!



<https://www.facebook.com/mrlfacilities/>
<https://www.facebook.com/MaterialsResearchLab/>



<https://MaterialsResearchLab@MRLatIllinois>

MRL Workshops

Advanced Materials Characterization (AMC)

2-day workshop held early June each year introducing techniques and instruments available at MRL.

Specialized Instrument Workshops/Seminars

Throughout the year with information and registration links posted on the MRL web.



Science and Technology of Materials, Interfaces and Processing Student Chapter at UIUC



Applied Vacuum Society Student Chapter

Free student membership for 1 year
No experience required

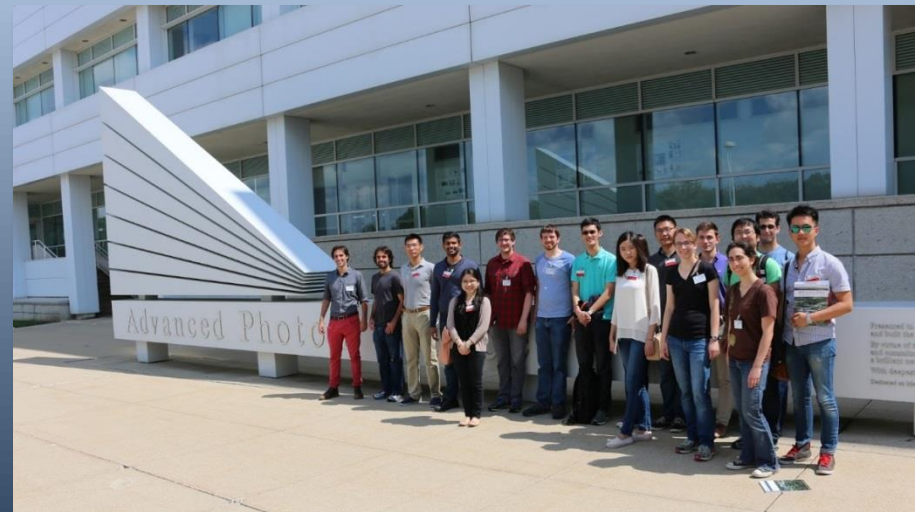
Outreach

- Vacuum demonstrations
- Engineering Open House
- Leadership opportunities
- Exploding PEEPS



Career development

- “How to give a presentation” faculty talk
- Learn about grad school
- Learn what research groups are doing



AVS and MRS trip to Argonne National Lab

Safety Contact



MRL Safety specialist

Maisie Kingren

295 B Engineering Sciences Building

mlswans2@illinois.edu

- Chemical waste questions and issues
- Lab safety questions

safety@mrl.illinois.edu

Engineering IT

264 MRL Computer Lab

- Open ~ 9am to 5pm
- Computers
 - 7 Windows, 1 Linux, and 1 Mac
 - Not an EWS lab
 - Log in with your NetID
- Printers
 - Available to people in MRL or Physics research groups
 - 208 MRL contains 1 printer and is always unlocked
- Poster Printing
 - go.illinois.edu/mrlposter
 - Research posters only

For help using the computer lab email Engineering IT:
engrit-help@illinois.edu

Don't have your MRL ID yet?

We welcome your participation in MRL Orientation before your project has been approved (and before your MRL User ID has been issued).

Be advised that updating your record about Orientation completion once your user ID is issued is **NOT AUTOMATIC**.

We update every week, however you may email us if you would like to bring it to our attention sooner.

mrl-orientation@Illinois.edu



I Thank you for coming!

**Materials Research Laboratory
Central Research Facilities**

Orientation Team

Note: Orientation updates to your user record will be made by the end of day following the session you attended. If you have issues logging in, please email mrl-orientation@Illinois.edu