Safety in Chemistry at KU

Based on Materials Developed by:

Safety Committee for the Department of Chemistry and Gray-Little Hall (*aka* ISB)

KU DEPARTMENT OF CHEMISTRY
College of Liberal Arts & Sciences

August 8, 2025

Agenda

- Introduction
- Working Safely in ISB
  - Hazard Classes present in ISB
  - Safety Equipment in ISB
  - Personal Protective Equipment
  - Brief Review of Building Emergency Plan
  - Tornado Information
- Communicating about Safety
  - Who Can You Talk To?
  - Reporting Safety Concerns
- Handout
- Adjournment

Safety Committee Leadership

Prof. James Blakemore
(Chemistry Department)

blakemore@ku.edu

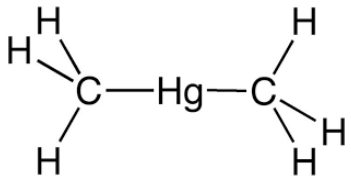
Laurie White
Facility/Building Manager
Gray-Little Hall (ISB)

lauriewhite@ku.edu

Examples of Cases Where Things Went "Wrong"

Mercury Poisoning Kills Lab Chemist

By Science News Staff | Jun. 11, 1997 , 12:00 AM



LD_{50} = 50 μg/kg

Prof. Karen Wetterhahn

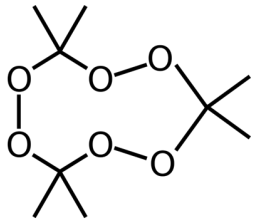
Learning From UCLA

Details of the experiment that led to a researcher's death prompt evaluations of academic safety practices

By *Jyllian N. Kemsley*

Bristol University PhD student accidentally makes explosive chemical used in terror attacks

share Save



Spark from pressure gauge caused University of Hawaii explosion, fire department says

Email Print

Postdoc Thea Ekins-Coward, who lost an arm in the incident, was using a gauge not specified for work with flammable gases

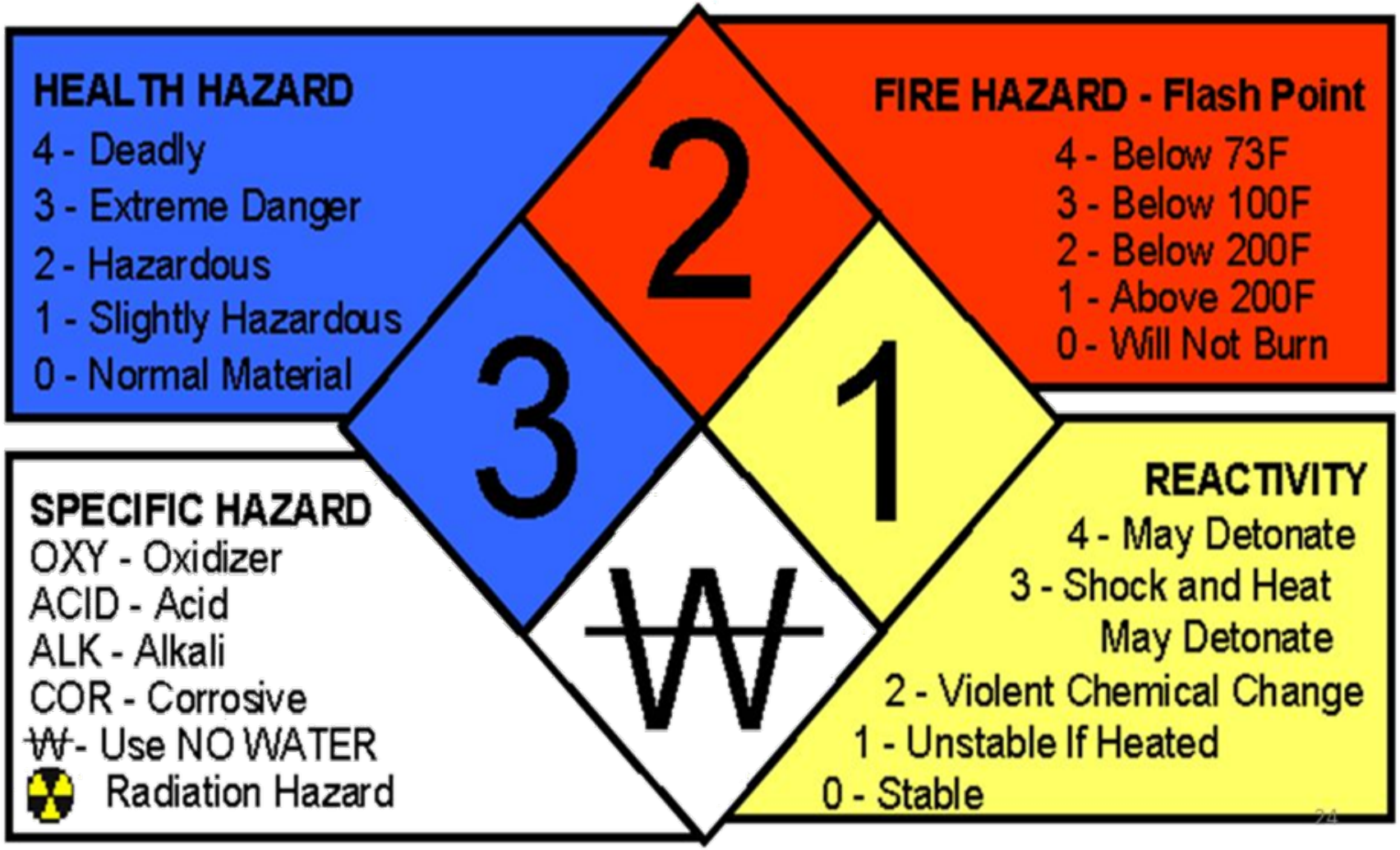
By *Jyllian Kemsley*

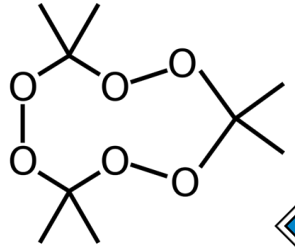
[+]Enlarge

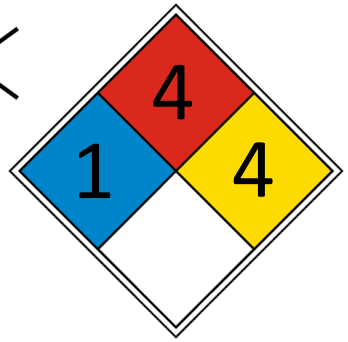
- ***In each instance, the chemicals involved behaved exactly as expected!***

NFPA Fire Diamond

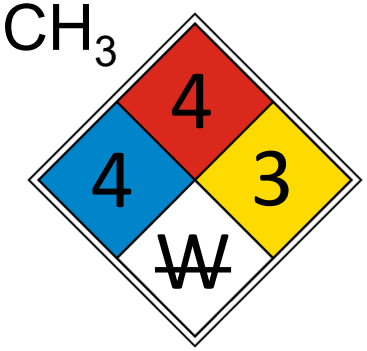
- National Fire Protection Association







$H_3C\text{-}Hg\text{-}CH_3$



tert-BuLi


KU DEPARTMENT OF CHEMISTRY
College of Liberal Arts & Sciences
Chemistry
Blakemore Lab
3105
EHS Hazard Classification: 3
1-Low 2-Moderate 3-Substantial 4-High
Reference: CRC Handbook of Laboratory Safety, Chapter 3
NFPA Hazard Identification
3
Fire
3
1
Reactive
Chemical Hazard Information
Flammables/Self-Reactives
Organic Peroxides
Skin Corrosive / Burns
Carcinogen/Mutagen/Teratogen
Gasses Under Pressure
Irritant (skin and eye)
Target Organ Toxicity
Reference: OSHA Hazard Communications Standard
EYE PROTECTION REQUIRED
EATING AND DRINKING PROHIBITED
Emergency Contact Information
Primary Contact:
Alternate Contact:
Responsible Party: James Blakemore 785-864-3019
Building / Room: Integrated Science Building (ISB), 3105
Department: Chemistry 785-864-4670
2/26/2019
EMERGENCY - 911
KU Public Safety Office
785-864-5900
KU-EHS Dept. M-F 8am-5pm 785-864-4089
KU-EHS 24 Hour Emergency Pager 785-838-7421
For Pager: After three beeps, punch in your phone number. EHS will call back right away. Try again if necessary.

Range of Hazards in ISB and Science Buildings

Toxic

Example: Thallium hexafluorophosphate ($TlPF_6$)

Group: ***James Blakemore***

Biologically Active Agents

Example: Lysyl oxidases

Group: ***Minae Mure***

Inhalation Hazards

Example: Chemical powders (e.g., silica gel)

Group: ***Kristin Bowman-James***

Poisonous/Compressed Gases

Example: Carbon Monoxide

Group: ***Misha Barybin***
James Blakemore
Manar Shoshani

Range of Hazards in ISB and Science Buildings

Mercury

Example: Na/Hg amalgam

Group: ***James Blakemore***

Peroxides

Example: Hydrogen peroxide

Group: ***Tim Jackson***

Corrosive strong acids/bases

Example: Piranha Acid

Group: ***Clean Room***

Halogens & Other Oxidizers

Example: Bromine

Group: ***Paul Hanson***

Range of Hazards in ISB and Science Buildings

Water Reactive

Example: Sodium metal

Group: ***Misha Barybin***
Manar Shoshani

Pyrophorics

Example: *tert*-Butyllithium

Group: ***Jon Tunge***

Cryogenics

Example: Liquid Nitrogen

Group: ***Tim Jackson,***
NMR Laboratory

Shock/Friction Sensitive

Example: Organic azides

Group: ***Paul Hanson***

Range of Hazards in ISB and Science Buildings

Lasers

Example: Invisible or Visible Light

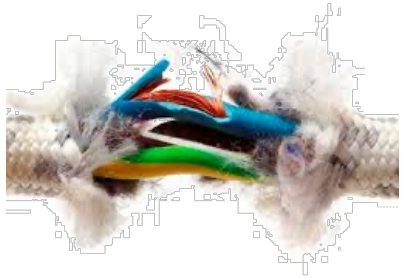
Group: ***Chris Elles***
Rebecca Whelan

Radiation

Example: X-ray radiation

Group: ***X-ray Lab, Scott Lovell***

Electrical



Example: Frayed electrical cords

Group: ***Ward Thompson, Brian Laird***,
Marco Caricato, Building Offices

Open Flame

Example: Glassblowing

Group: ***Misha Barybin***

Range of Hazards in ISB and Science Buildings

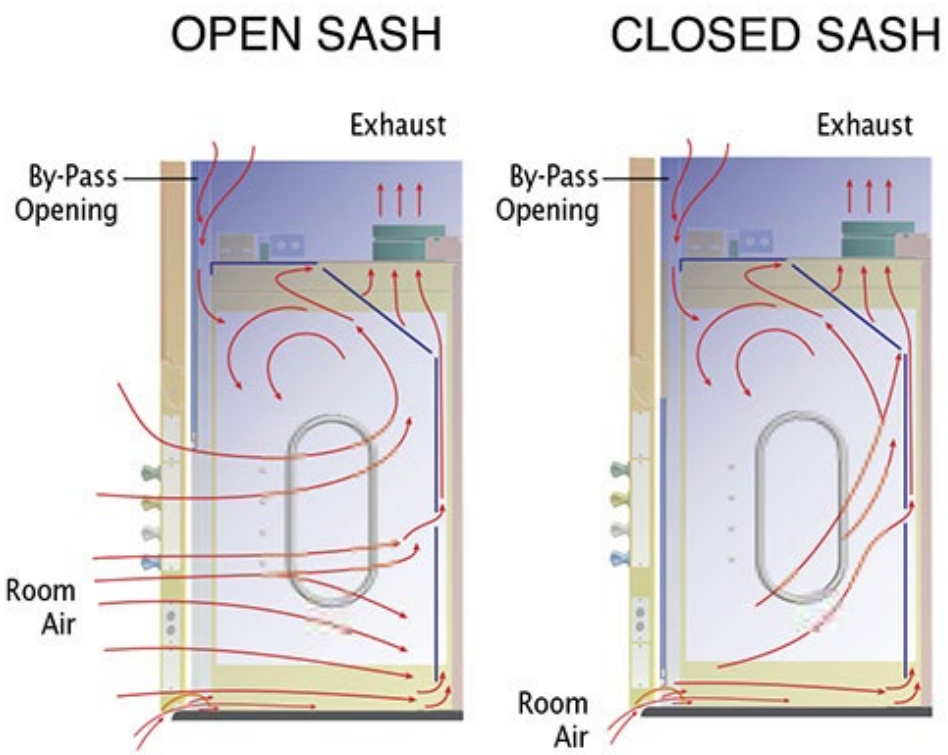
Flammables

Example: Organic Solvents

Group: ***all synthetic groups***

Fume Hoods

- Designed for trapping and venting of harmful chemical vapors
- Vapors transported through ducts and directed outside by blowers

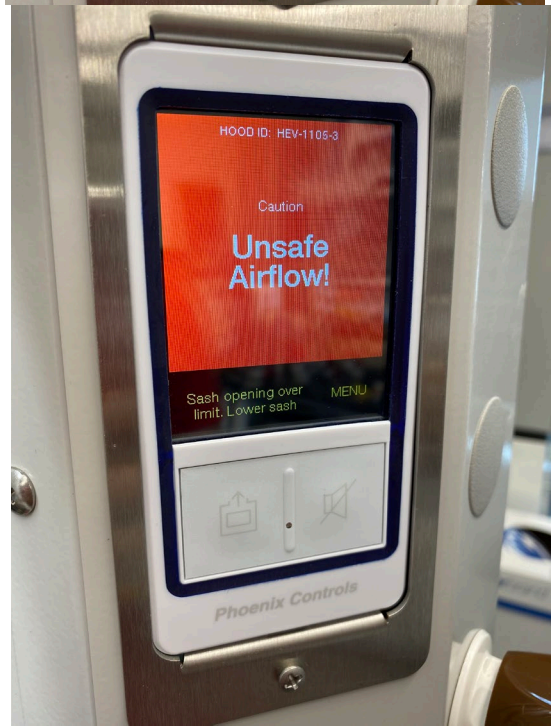


https://www.labconco.com/product/protector-xstream-laboratory-hoods/24

https://www.labconco.com/articles/fume-hood-basics-5-best-practices

When the machine is working…

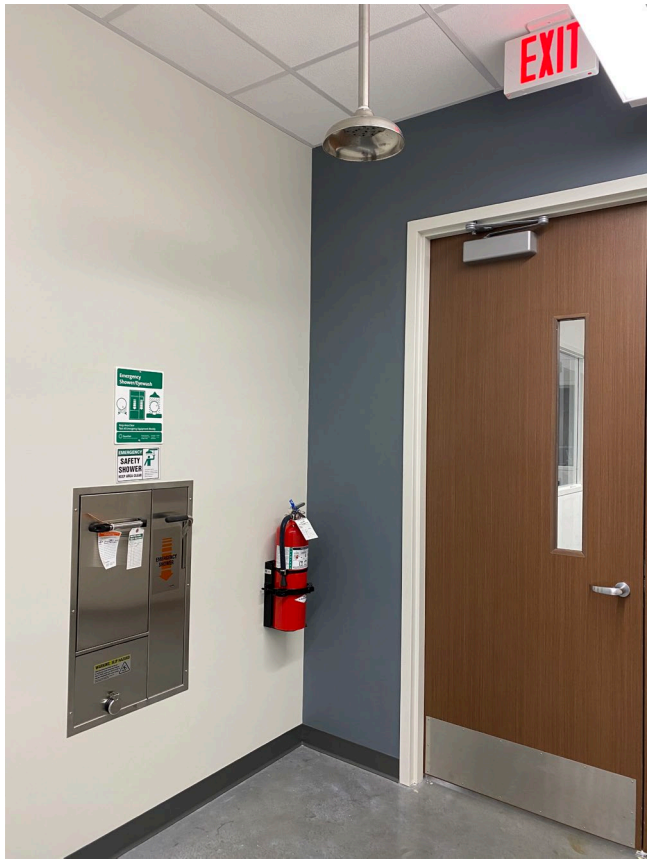
When the machine doesn't work…

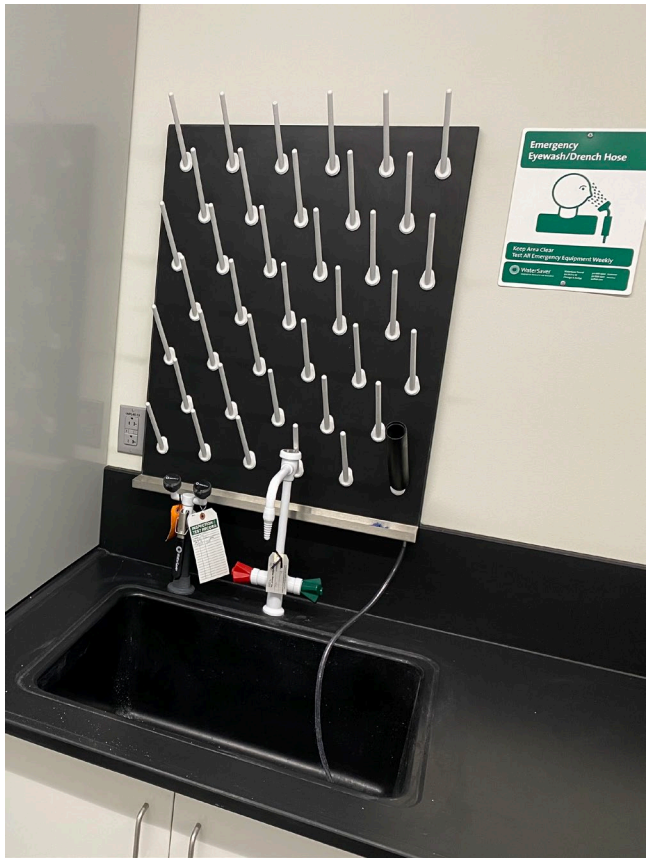


Fire in a Fume Hood with the Sash Down

Emergency Satety Equipment

- Safety showers and eyewash stations are located in all research and teaching labs
- At least 20 GPM flow rate for the safety showers (30 psi pressure)





Special Thanks:

Shrikant Londhe (Tunge Group)
Wade Henke (Blakemore Group)
Larry Cattoor and Sean Hadley (EHS)

Fill out Your Version of This Form Today !

KU Chemistry Laboratory Safety
Emergency Contact Information

EMERGENCY?
Any kind – Any time – DIAL 9-1-1

From a campus phone, this will connect you to KU Public Safety Dispatch.
From your mobile phone, this will connect you to Douglas County Dispatch or KU Dispatch; either dispatch will guide responders to your location.

Our Lab Location: Room _____
Address:

Our Lab Phone Number: _____

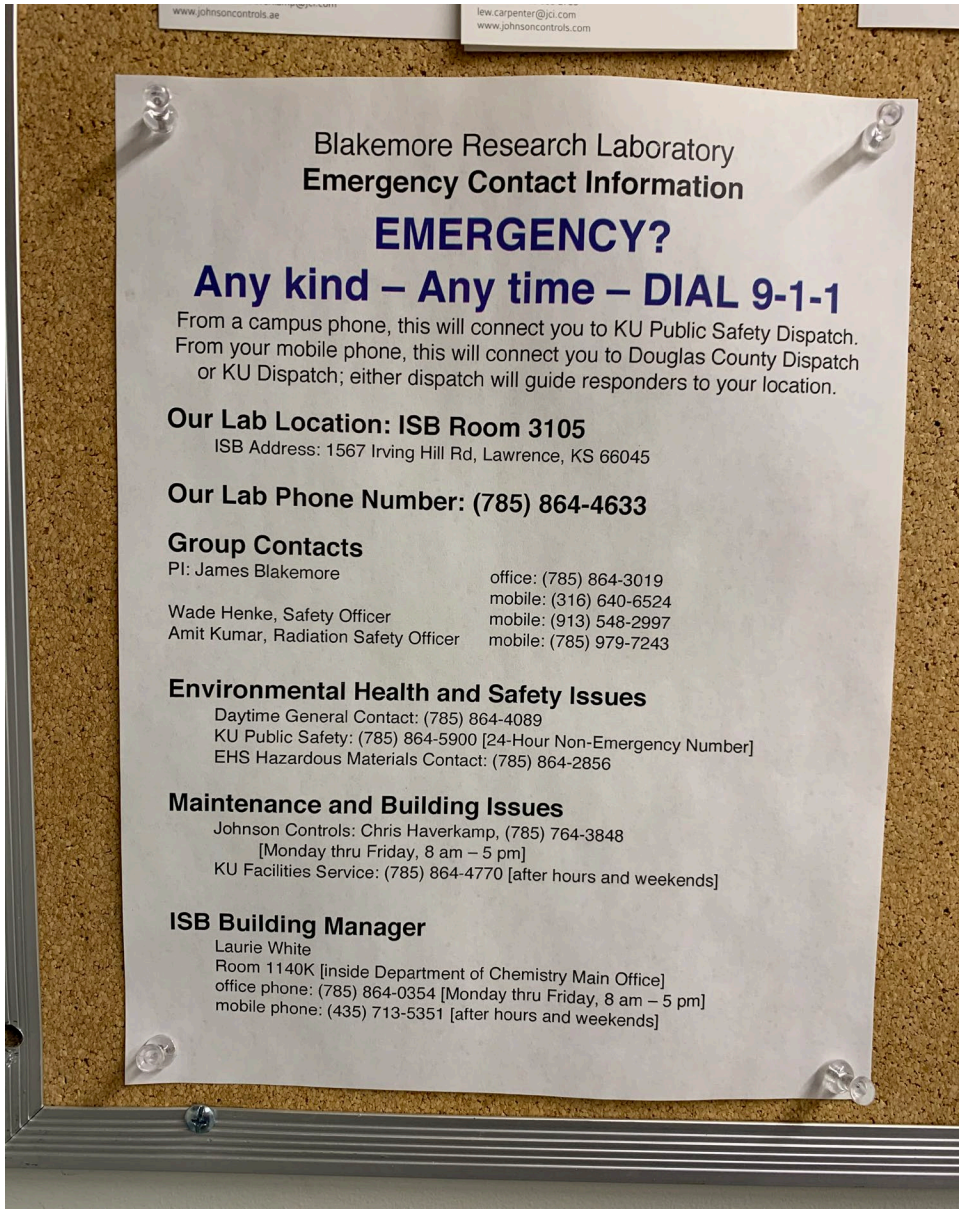
Group Contacts with Phone Numbers
Principal Investigator:
Safety Officer:
REU In-Lab Co-Mentor:

Environmental Health and Safety Issues
Daytime General Contact: (785) 864-4089
KU Public Safety: (785) 864-5900 [24-Hour Non-Emergency Number]
EHS Hazardous Materials Contact: (785) 864-2856

Maintenance and Building Issues
Johnson Controls: Chris Haverkamp, (785) 764-3848
[Monday thru Friday, 8 am – 5 pm]
KU Facilities Service: (785) 864-4770 [after hours and weekends]

ISB Building Manager
Laurie White
Room 1140K [inside Department of Chemistry Main Office]
office phone: (785) 864-0354 [Monday thru Friday, 8 am – 5 pm]
mobile phone: (435) 713-5351 [after hours and weekends]

Department of Chemistry Safety
Prof. James Blakemore
Room 3116
office phone: (785) 864-3019; e-mail: blakemore@ku.edu



Lab Phones

- All labs should be equipped with phones for use in emergencies
- Emergency Contact Information Sheet should be located nearby for use in emergency situations
- What happens if you dial 911 from a campus phone?

  - Refer to Emergency Contact Information Sheet

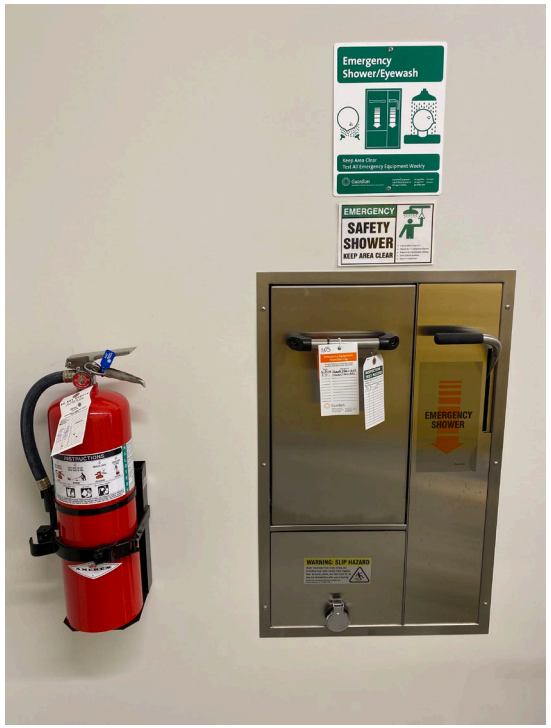
- Campus phones are Microsoft Teams phones

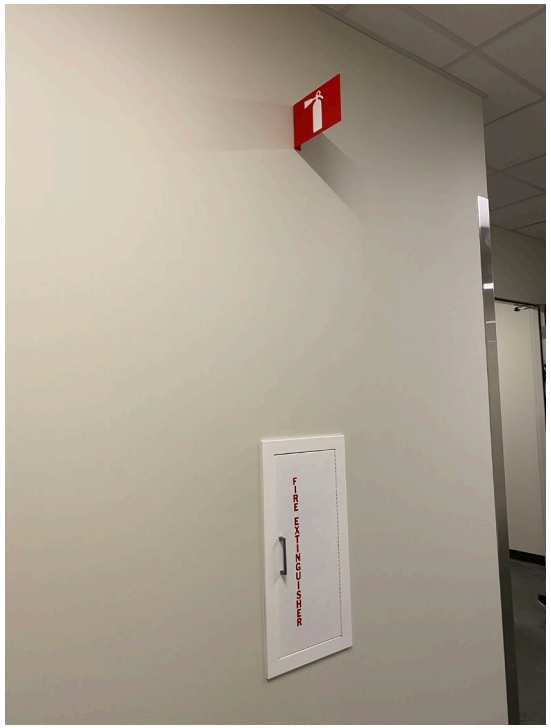
- Concerned about your lab phone (or lack thereof)?

  Speak with Laurie White or James Blakemore

Fire Extinguishers and Fire Alarms

- Fire extinguishers can be found inside labs and at various locations in the building hallways
- Fire alarms are located next to all major exits and in some other locations





Fire Extinguisher Types

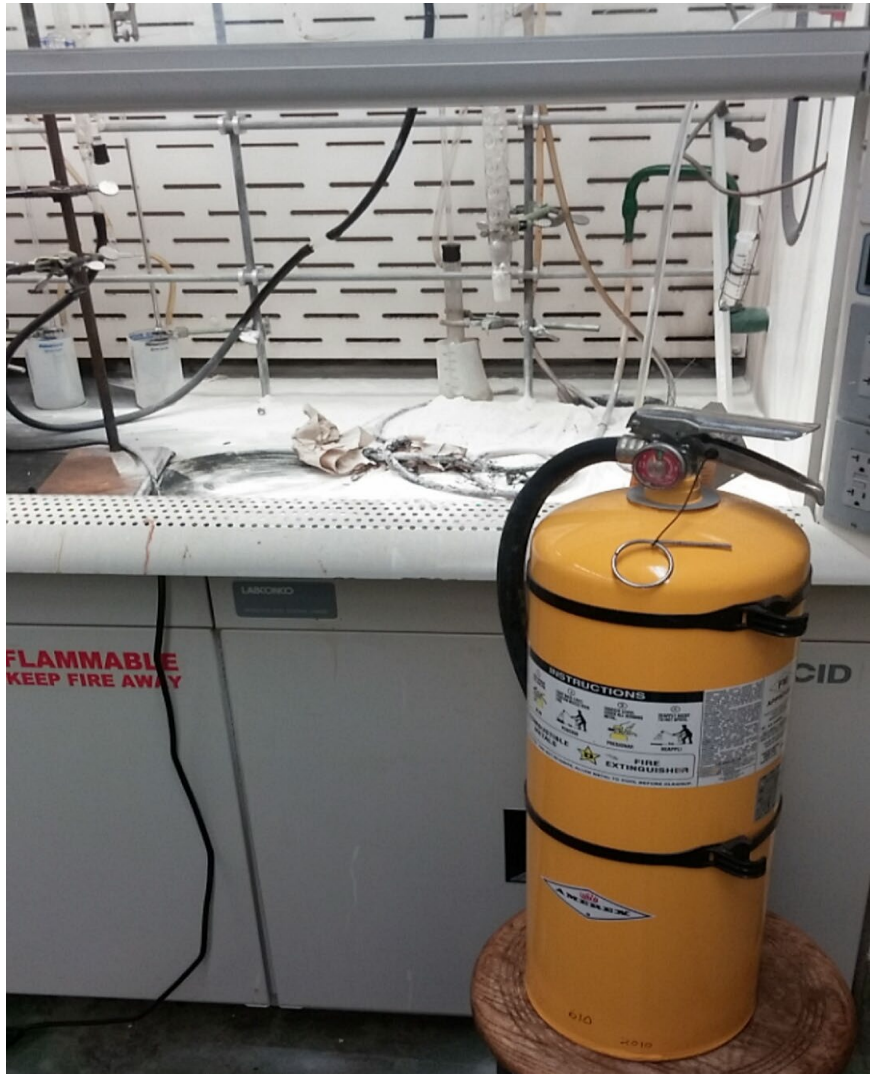
ABC Type

D Type

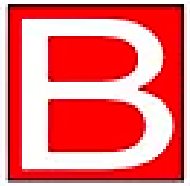
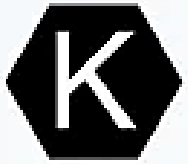
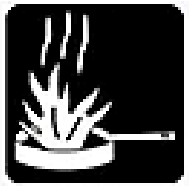
Student for comparison

Class D Fire Extinguisher

- Composition: NaCl & sand (SiO_2)
- Very heavy (57 lbs)
- NaCl melts at the surface of burning metal (e. g., Na) to make a shell that prevents oxygen access to the metal surface



Fire Extinguisher Types

Fire class	Geometric symbol	Pictogram	Intended use	Mnemonic
A			Ordinary solid combustibles	A for "Ash"
B			Flammable liquids and gases	B for "Barrel"
C			Energized electrical equipment	C for "Current"
D			Combustible metals	D for "Dynamite"
K			Oils and fats	K for "Kitchen"

Examples

wood, fabric, paper, plastic, rubber

methane, propane, solvents, oils, alcohols

electrical appliances, computer equipment

solium, lithium, potassium, cesium, magnesium, titanium

cooking appliances, oils, Animal and vegetable fats

http://readyfortakeoffpodcast.com/rft-217-fire-extinguisher-symbols

http://hsearticles.blogspot.com/2017/01/classes-of-fire.html

How to Use a Fire Extinguisher

P – PULL

Hold the extinguisher upright and pull the pin to break the tamper seal

A – AIM

Point the nozzle or hose at the base of the fire

S – SQUEEZE

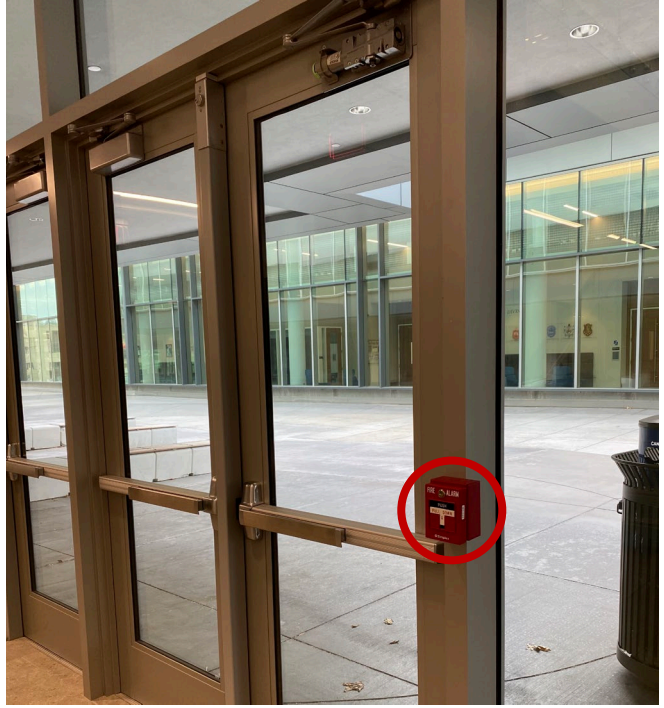
Squeeze the handle to release the extinguishing agent

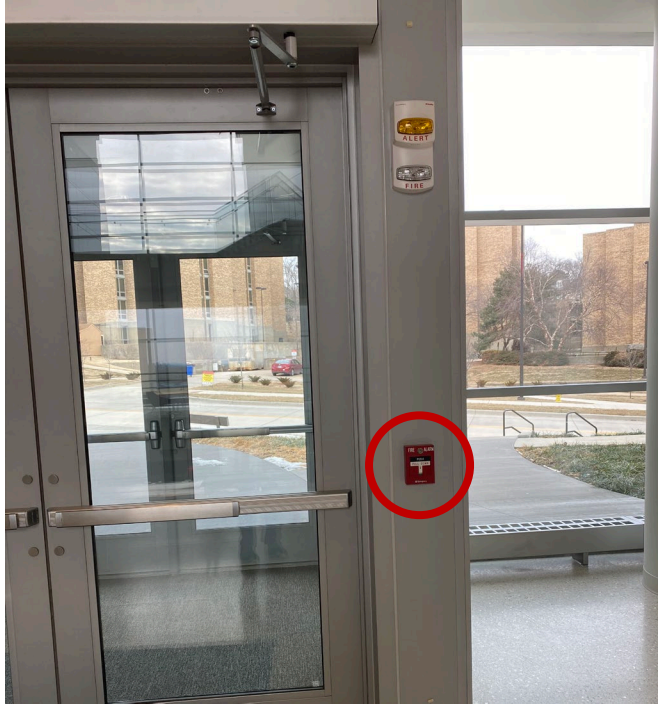
S – SWEEP

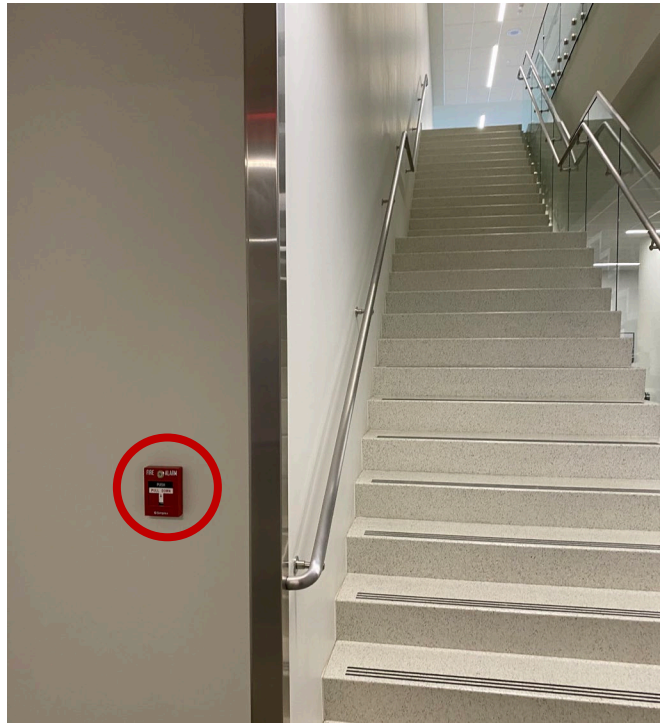
Sweep the nozzle side to side at the base of the fire until it appears to be out

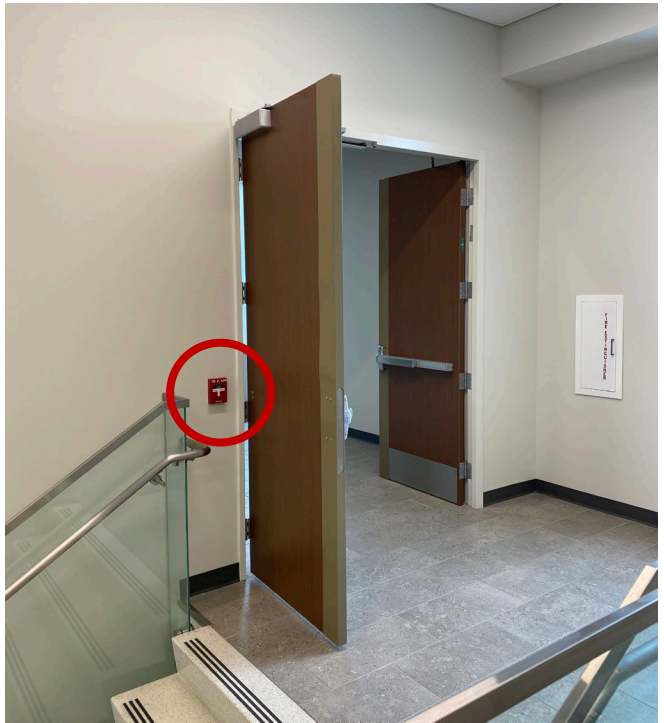
- Always keep a clear escape behind you
- If the fire cannot be controlled within seconds, evacuate immediately, pull a fire alarm, and call **911**

Fire Alarm Locations









Automated External Defibrillator (AED)

- Device used to restore the heart rhythm in a cardiac arrest
- Located close to the dual elevators in the atrium on the 2nd floor
- American Red Cross classes for AED Certification (also First Aid and CPR training)
  - https://www.redcross.org/

American Heart Association 2023©


AED
AED
Severe Weather Procedures
DEFIBRILLATOR
PHILIPS
FIRE EXTINGUISHER

Personal Protective Equipment (PPE)

latex

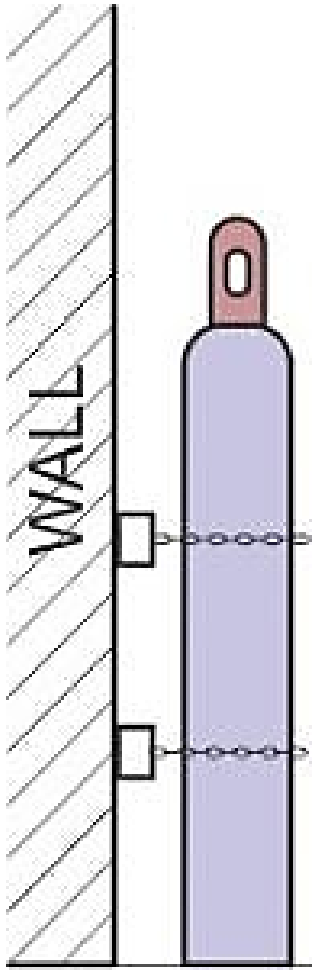
nitrile

neoprene

"Silver shield" laminated gloves containing ethylene vinyl alcohol copolymer (EVOH)

Personal Protective Equipment (PPE)

Gas Cylinders

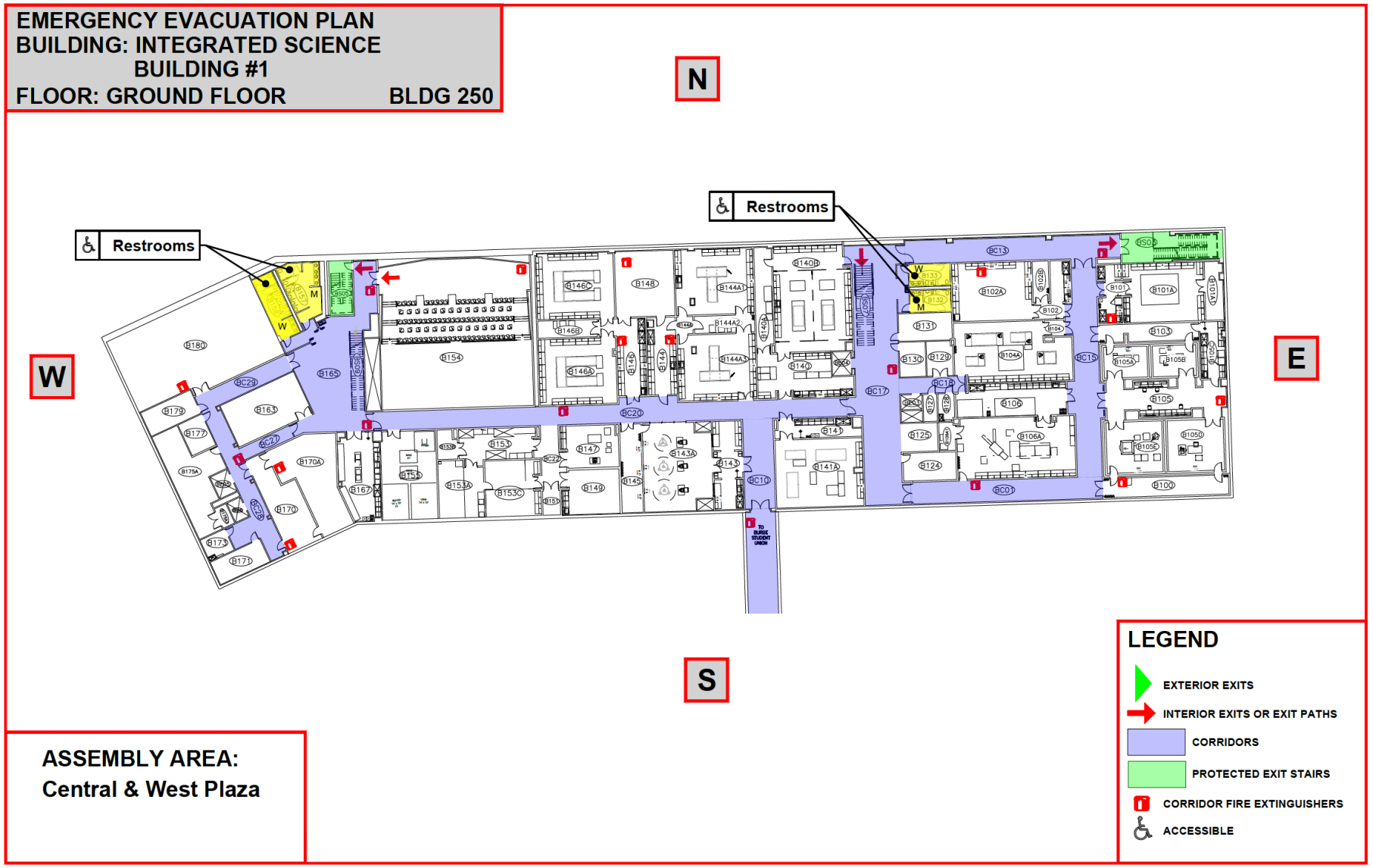


hopkinssafety.edu

- Never move a gas cylinder without its cap/bonnet firmly screwed on!
- If you see an unsecured tank without a cap, contact Laurie immediately!

www.earlbeck.com/welding-101-blog/ensuring-cylinder-safety-10-essential-tips

Building Floor Maps



ISB Building Emergency Evacuation Plan (BEEP)

- **A comprehensive document outlining guidelines for evacuations and emergencies**

❑ Fire/Smoke or Hazardous Material Release:

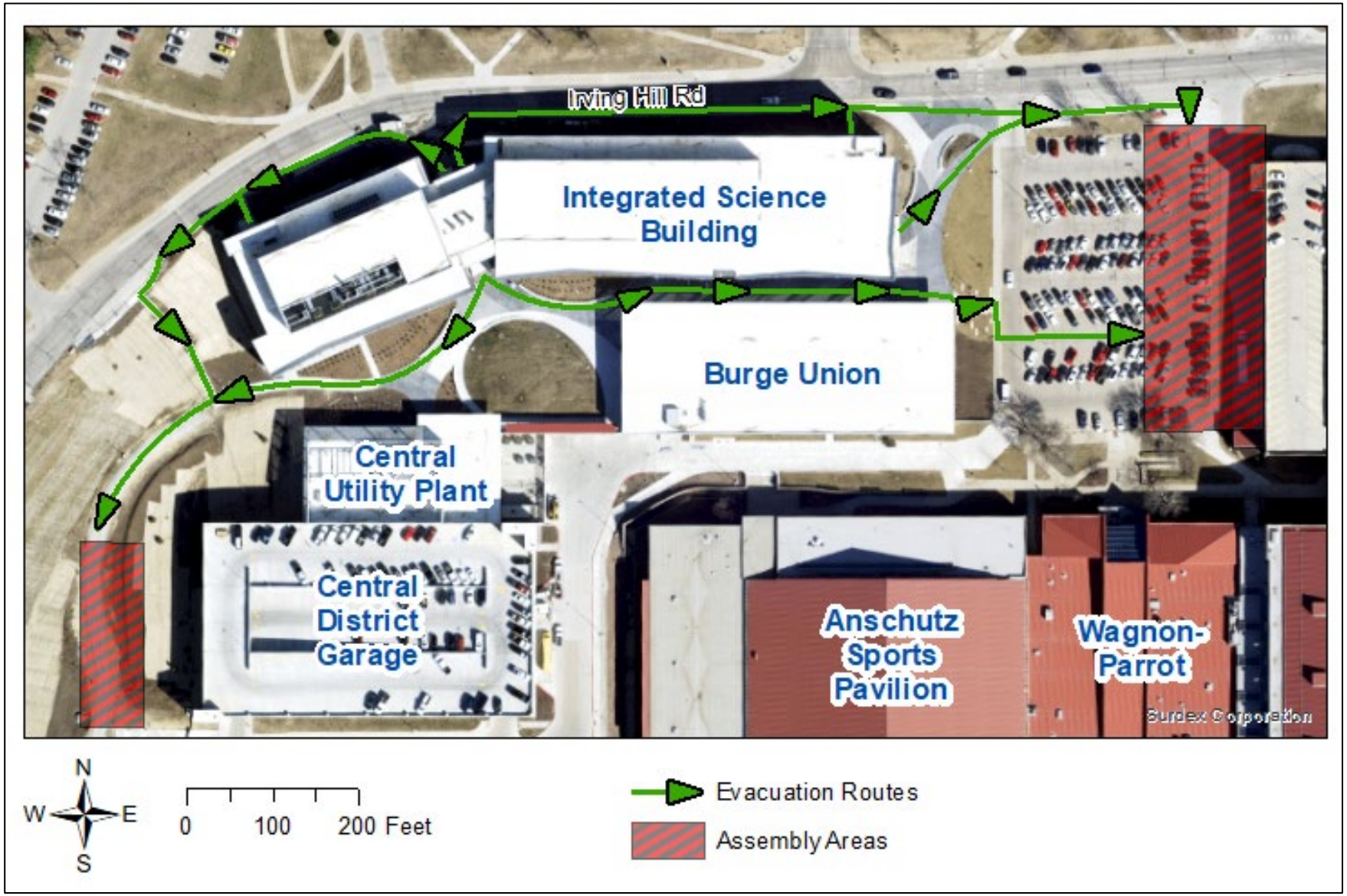
- If the need for evacuation is discovered,
  - *Pull fire alarm and exit the building*
  - *Call 911 and provide details*

- General procedure for evacuation
  - *Shut down potentially hazardous operations or equipment*
  - *Evacuate following the route designated in the floor map*
  - *Account for your group members, report if anyone is missing*

❑ Medical Emergency:

- *Stay with the patient, call 911*
- *Arrange for someone to meet with and direct first responders to the patient's location*
- *Provide first aid ONLY if you are trained and sure about it*

Evacuation Map



Tornado Facts

- Tornado winds can reach up to 300 mph
- Damage paths can be in excess of one mile wide and 50 miles long
- Funnel clouds usually last less than 10 minutes, but on rare occasions they can last for over an hour
- Tornados are most likely to occur between 3 pm and 9 pm, but can occur at any time

In Case of Tornado Warning, Take Refuge in Basement

If the Tornado Sirens go off…

- secure your experiments;
- go to the basement as quickly as possible;
- do not use the elevator;
- know your nearest exits before any weather occurs and plan your route.

- The safest refuge location is through the solid double doors near the NMR Core Laboratory, in the tunnel hallway leading to the Chemistry Stockroom

In Case of Tornado Warning, Take Refuge in Basement

Avoid Glass Stairs!

Reporting Safety Concerns

- **Four Options**

1. Safety Concerns Form
   Developed by the Chemistry Graduate Student Organization

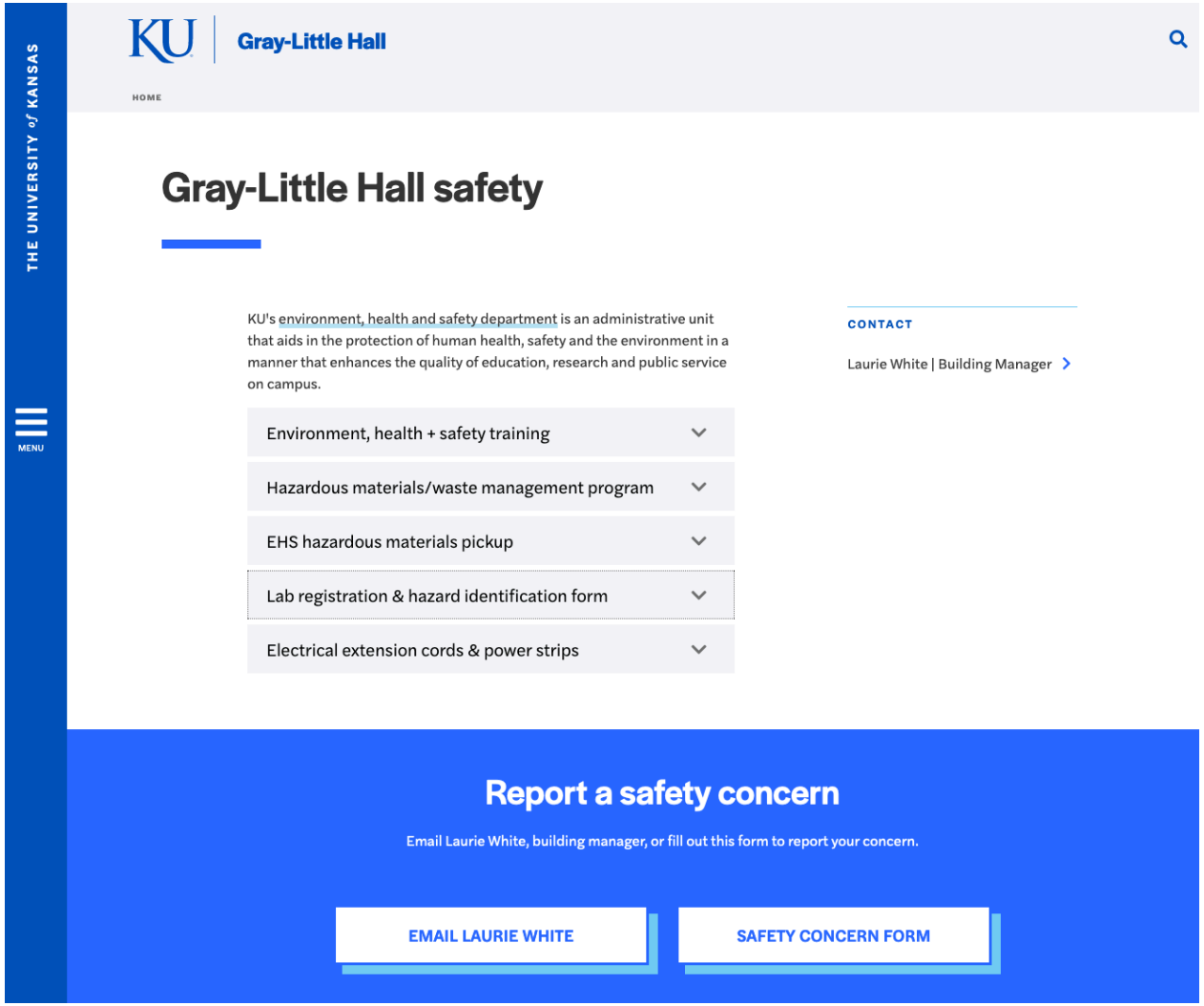
2. Contact your supervisor (and/or in-lab co-mentor)

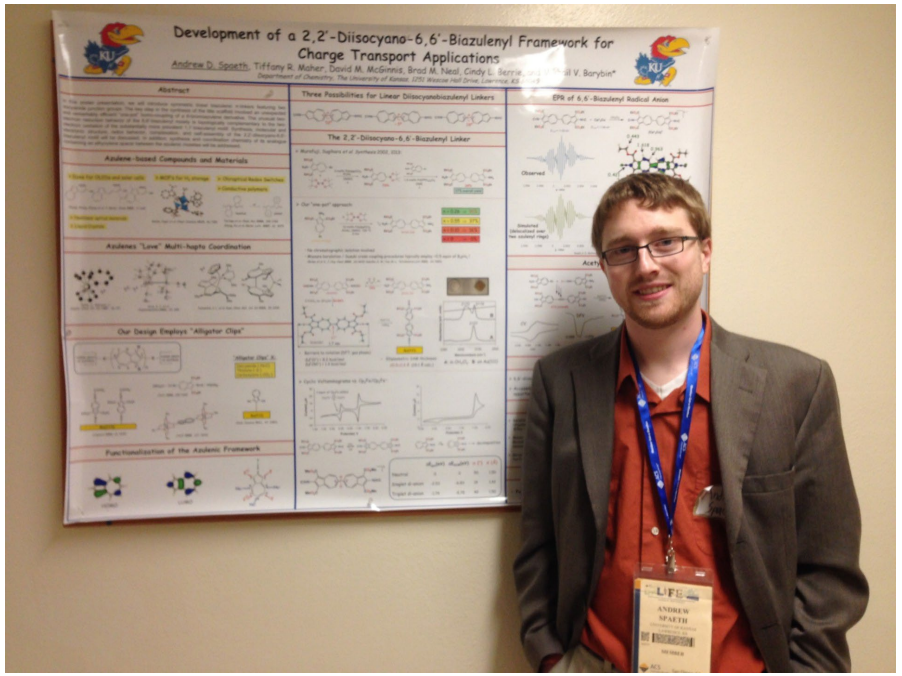
3. Contact Laurie White

4. Contact Prof. James Blakemore
   Chair of Chemistry Dept Safety Committee

Safety Concerns Form

- Access at https://gray-little.ku.edu/safety-gray-little-hall





Dr. Andrew Spaeth, KU Chemistry Ph.D. ‘14

Principal Engineer at RTX

Rock Chalk!