FROM GRAD STUDENT TO SAFETY PROFESSIONAL

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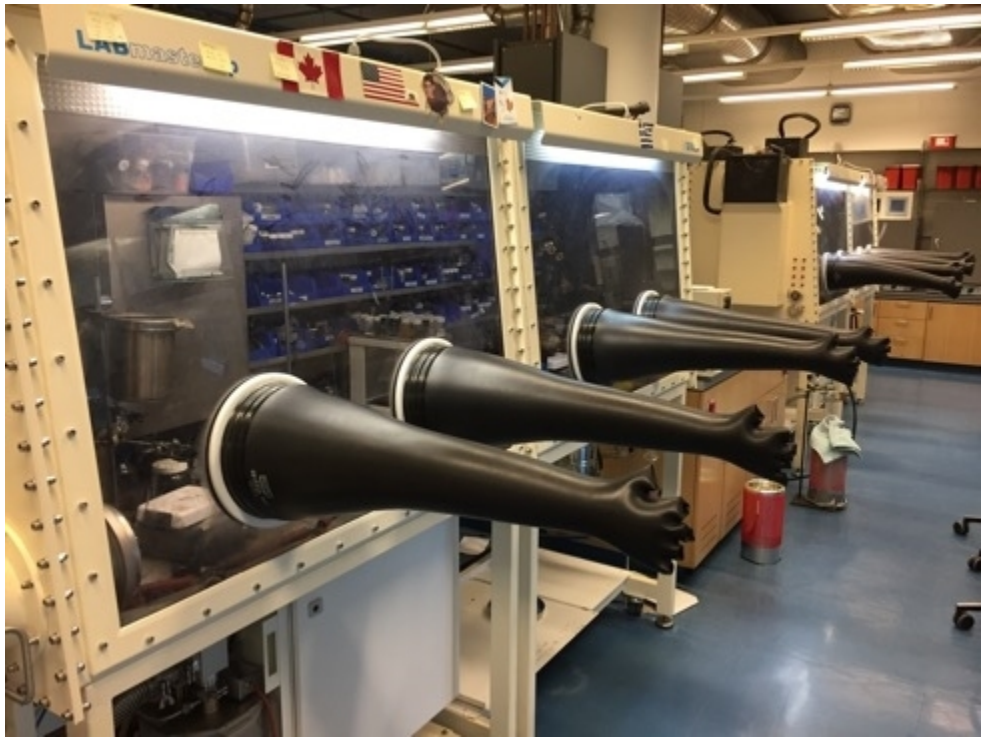
PRINCETON UNIVERSITY
EHS
ENVIRONMENTAL HEALTH & SAFETY

SAFETY AS A CAREER CHOICE

- Generation of UC graduate students who were affected by the death of Sheri Sangji and subsequent UC Settlement Agreement
  - Could this happen in our lab?
  - How to comply with settlement agreement?

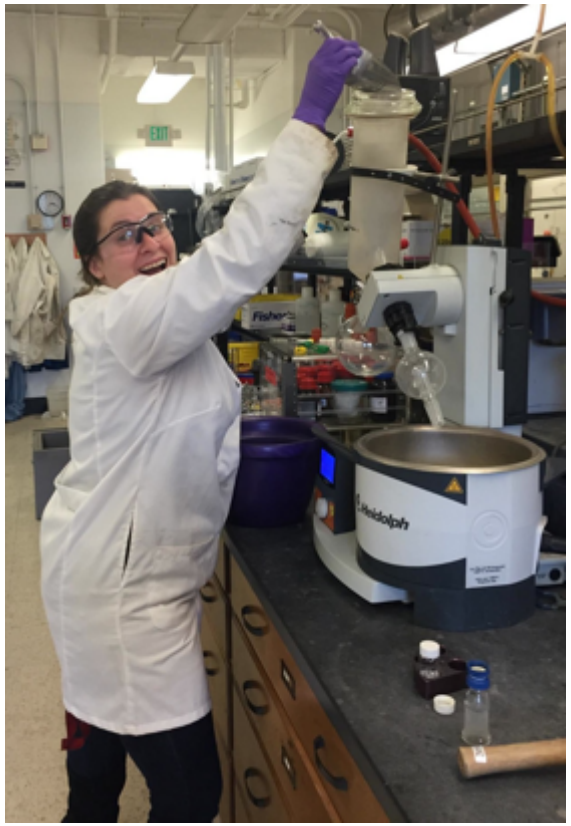
- Graduate students looking for non-traditional careers

- Personal experience in lab with near misses or incidents
  - Can experience from graduate research help improve safety culture?



SAFETY AS A CAREER CHOICE

- Started graduate school in 2012 in wake of settlement agreement
  - New SOPs, lab safety plans
  - Became safety officer in my lab in my 3rd year
- Need for accessible, useful SOP templates
  - SOP Task Force
- Departmental Safety Committee
- Chemical hygiene intern with UC Davis CHO
  - Pyrophoric material best practices document
  - Campus wide SOP requirements document
- **Encouraging graduate student participation in safety**
- **PI who is supportive of safety**



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SAFETY AS A CAREER CHOICE

- Conducted safety culture survey of graduate students in Department of Chemistry at UC Davis
- Presented my findings at ACS San Francisco meeting in 2016
- Started working at Princeton University in January 2018
  - First task: survey electrical engineering department

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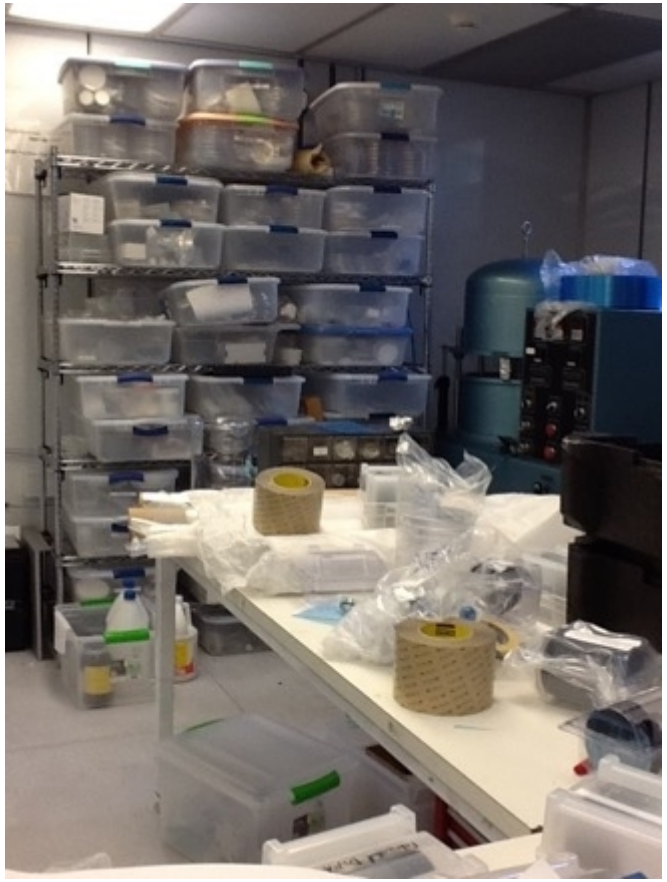
LAB SURVEYS AND OWNERSHIP



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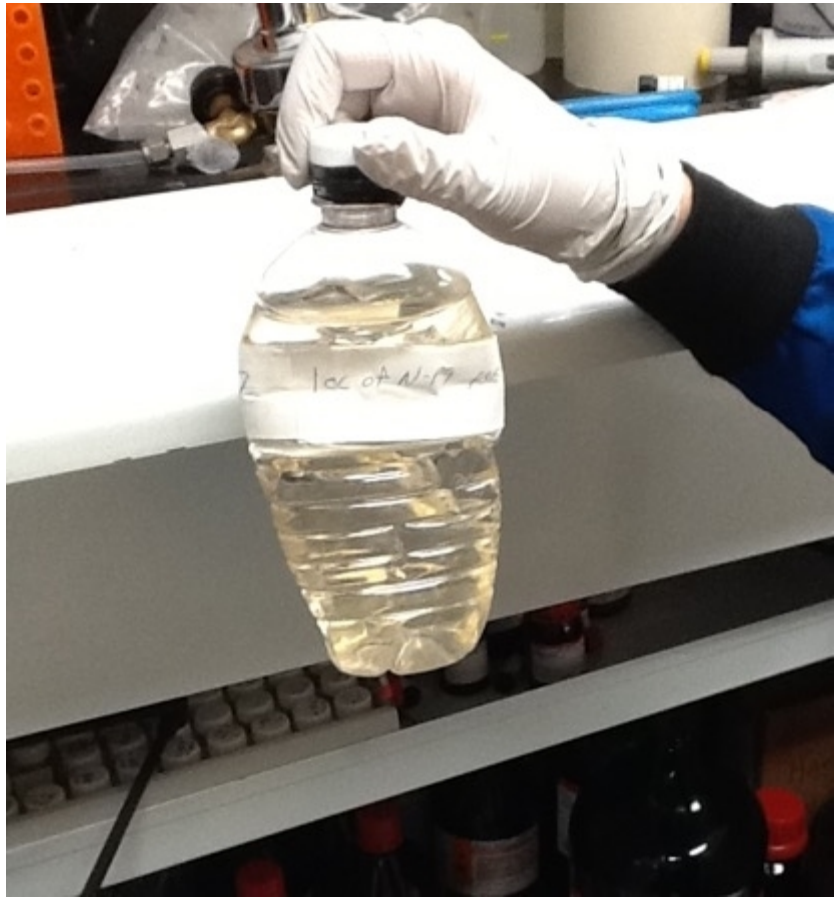
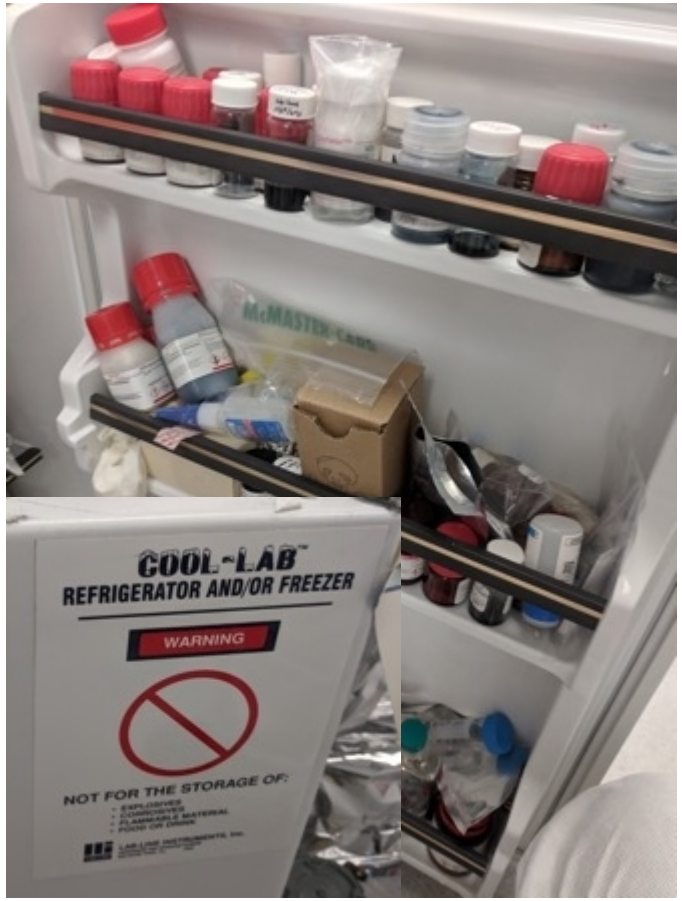
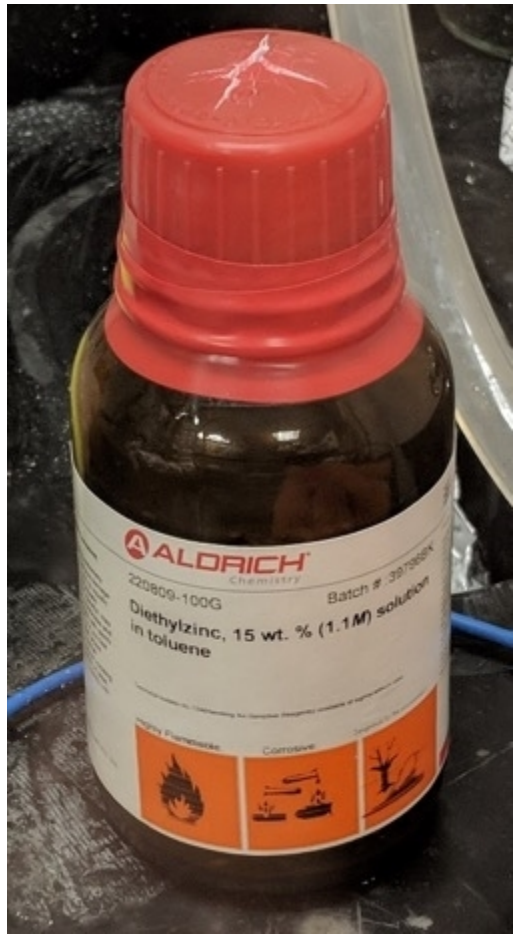




LAB SURVEYS AND OWNERSHIP

- Discussed findings with the lab, mentioned seriousness of situation
- Brought report to Department Manager and Departmental Chemical Hygiene Officer
- All agreed to submit report to School of Engineering and Applied Sciences (SEAS) administration
    - Building manager was already aware of some issues – facilities had refused to service lab space and adjacent service areas
    - Chair of Electrical Engineering, Dean of SEAS, Dean for Research were included on report
- Gave lab members 1 month to address issues identified in survey
- When this was not accomplished, the decision was made to close the lab until all corrective actions were implemented
    - Semi-annual surveys of lab after re-opening

COMMON SURVEY FINDINGS: MISMANAGED REACTIVES



- Pyrophorics stored in non-flammable materials storage freezers
- Bottles of reactive materials not dated with date received/date opened
- Expired reactive materials (dry picric acid!!)
- Bottles containing reactive materials in poor condition

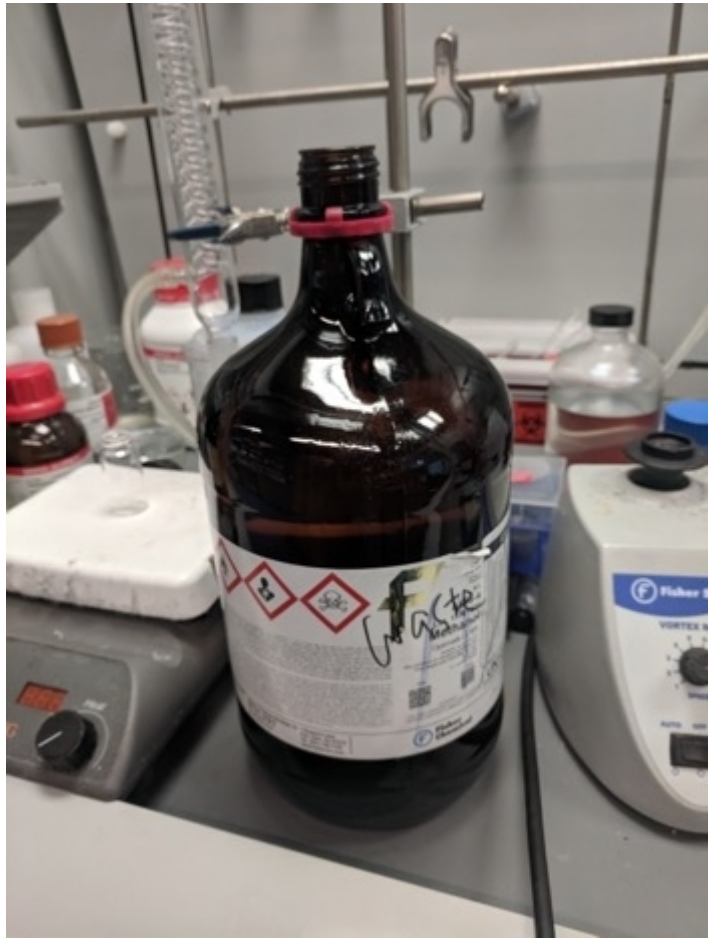
COMMON SURVEY FINDINGS: CHEMICAL CONTAINERS

- Illegible labels on old bottles
- Contaminated containers
- ???????

COMMON SURVEY FINDINGS: CHEMICAL STORAGE

- Segregation of incompatible chemicals
  - Acids and bases
  - Oxidizers and flammables
    - Acetic acid and nitric acid
- Dirty, rusted, or contaminated storage cabinets
- Common in all departments

COMMON SURVEY FINDINGS: WASTE MANAGEMENT



- Open waste containers
  - Instrument waste
- Unlabeled/improperly labeled waste
- Waste in improper containers
- Ongoing issue

HAZARDOUS WASTE

Federal & New Jersey Laws Prohibit Improper Disposal

Lab Group _____ Phone _____

Responsible Individual _____

Contents	Approximate %
Use Only Proper Chemical Names	
No Abbreviations	
No Formulas	
No Structures	

All Hazardous Waste containers must be labeled and closed after adding waste!

Select Hazard

Toxic Flammable Reactive (air/water) Oxidizer Corrosive

2017

HAZARDOUS WASTE

Contents	Approximate %	**Responsible Individual:**
Diethyl Ether	20%	Edward Hyde: 8-6753
Petroleum Ether	15%	Jekyll Lab Rooms 104-106
Ethyl Acetate	10%	
Hexanes	15%	
Dichloromethane	5%	
Acetone	35%	**Flammable Liquid**

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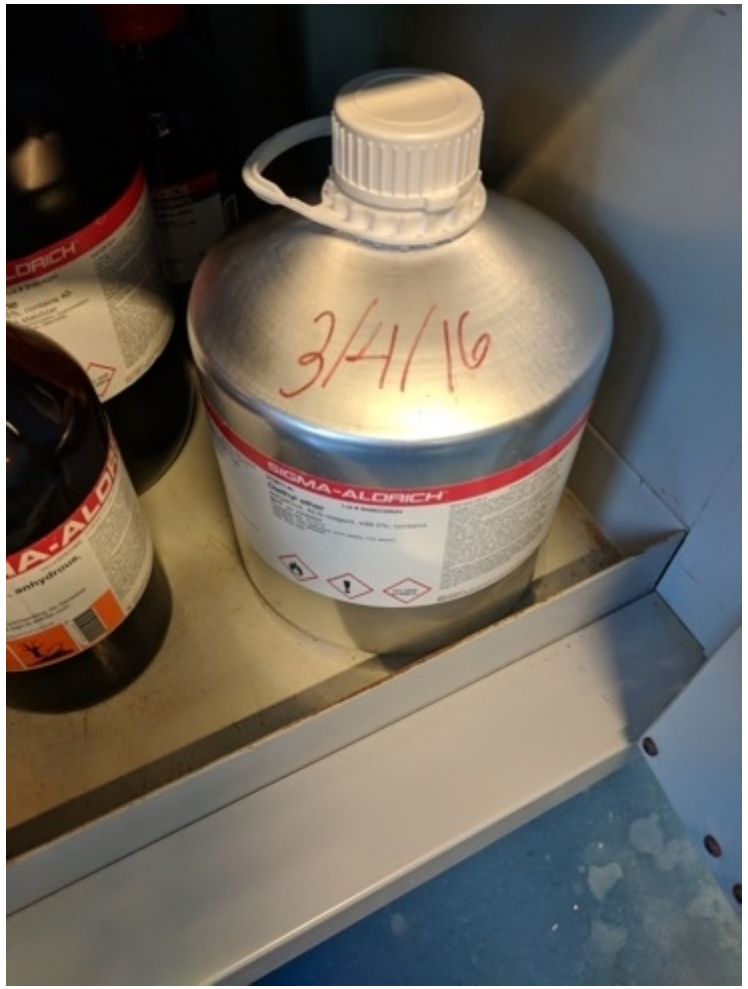
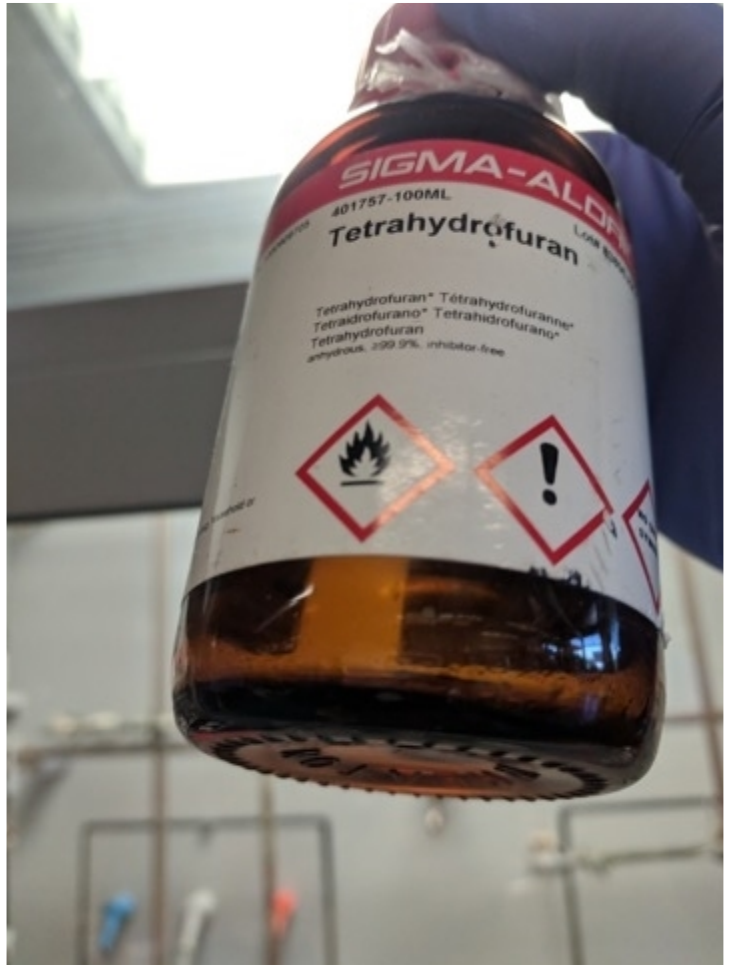
PEROXIDE FORMER AMNESTY PROGRAM





- Common theme of peroxide former mismanagement
- Focused on identifying mismanaged peroxide formers during laboratory surveys
- Used this initial list as a starting point for an amnesty event

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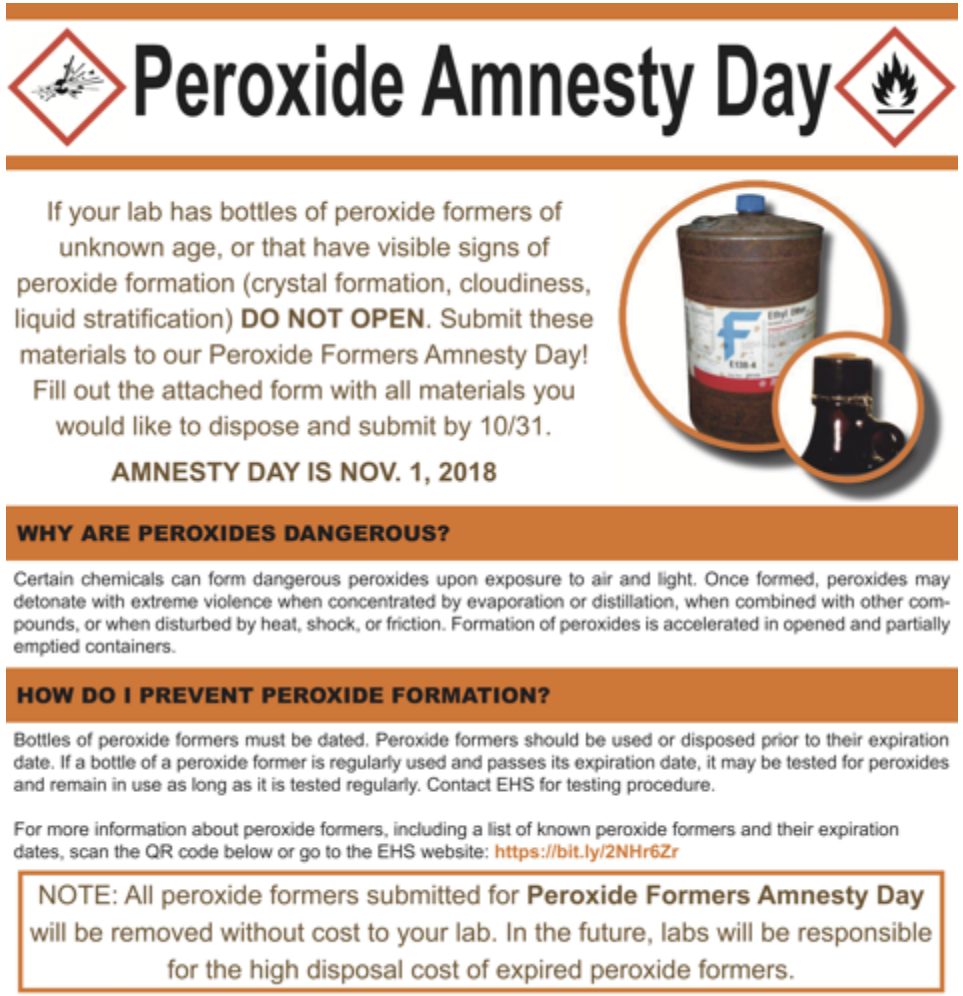

Peroxide Amnesty Day

If your lab has bottles of peroxide formers of unknown age, or that have visible signs of peroxide formation (crystal formation, cloudiness, liquid stratification) **DO NOT OPEN**. Submit these materials to our Peroxide Formers Amnesty Day! Fill out the attached form with all materials you would like to dispose and submit by 10/31.

AMNESTY DAY IS NOV. 1, 2018

WHY ARE PEROXIDES DANGEROUS?

Certain chemicals can form dangerous peroxides upon exposure to air and light. Once formed, peroxides may detonate with extreme violence when concentrated by evaporation or distillation, when combined with other compounds, or when disturbed by heat, shock, or friction. Formation of peroxides is accelerated in opened and partially emptied containers.

HOW DO I PREVENT PEROXIDE FORMATION?

Bottles of peroxide formers must be dated. Peroxide formers should be used or disposed prior to their expiration date. If a bottle of a peroxide former is regularly used and passes its expiration date, it may be tested for peroxides and remain in use as long as it is tested regularly. Contact EHS for testing procedure.

For more information about peroxide formers, including a list of known peroxide formers and their expiration dates, scan the QR code below or go to the EHS website: https://bit.ly/2NHr6Zr

NOTE: All peroxide formers submitted for **Peroxide Formers Amnesty Day** will be removed without cost to your lab. In the future, labs will be responsible for the high disposal cost of expired peroxide formers.

- Distributed announcement via email to department managers, individual lab safety liaisons, and posted flyers in science buildings throughout campus
- Included spreadsheet for researchers to complete with information on the bottles they wanted to remove
- Worked with high haz team over two 2-day sessions to remove, test, and quench peroxide formers
- Removed 126 bottles of mismanaged peroxide formers
- Spread awareness about how to properly manage these materials

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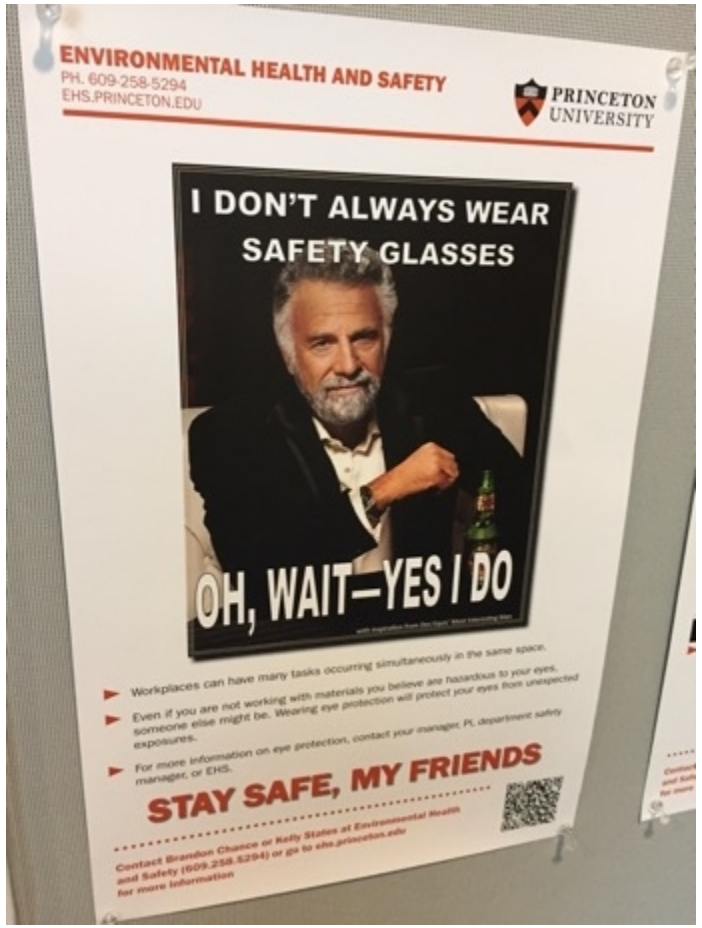
NEW LABORATORY SAFETY TRAINING

- How to better use training to give researchers tools to integrate safety into their daily operations?
- Previous training: 3 hour in-person training covered basics of lab safety and Princeton-specific safety procedures
  - More interactive training
  - Information overload
- **Design new safety training that is just as comprehensive, but also emphasizes safety resources and helps develop safety skills**

NEW LABORATORY SAFETY TRAINING



New training has two parts:

Part One: Fundamentals of Laboratory Safety

- Developed by Safety Training Consortium
- Online training with five modules and a final test
- Must score at least 80% on each section to progress
- Covers basics of laboratory safety

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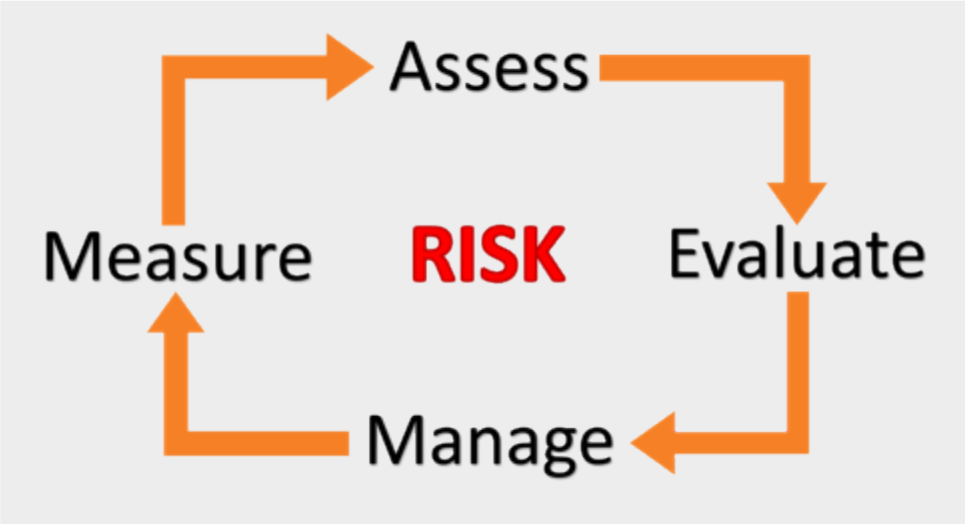
NEW LABORATORY SAFETY TRAINING

Part Two: Laboratory Safety at Princeton University

- Princeton-specific safety procedures
  - Focuses on resources available to researchers
- Documented risk assessment exercise
  - Have researchers break into groups of 3-4
  - Perform a risk assessment on a procedure from literature
- Safety soft skills
  - Have researchers discuss scenarios that address "soft skills" in safety and discuss how they can help improve safety culture



PRINCETON SOP TASK FORCE

- Started SOP Task Force at Princeton modeled after UC Davis SOP Task Force
- Comprised of graduate students, lab managers, and post docs in the Chemistry Department
- Templates for pyrophoric materials, working alone, carcinogens, acutely toxic materials, and reproductive toxins

IN SUMMARY

- Important to keep interactions between researchers and EHS positive
  - Emphasizing resources available
  - Frame lab surveys as a group effort

- Researcher involvement in safety is key
  - SOP Task Force
  - Interactive safety training

- Continue to think of ways to engage PIs in lab safety

Questions?

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