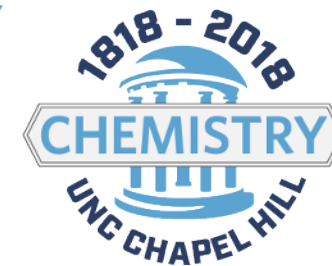


# CHEMISTRY

AT THE UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL



## Nurturing A Safety Culture Through Student Engagement

SERMACS 2019

Teaching, Creating & Sustaining a Safety Culture

Ralph L. House, Alexander Miller, David Lawrence, Jeffrey Johnson

10/22/2019





# Research Faculty

## Analytical Chemistry



Jeffrey  
Dick



Gary  
Glish



Leslie  
Hicks



Matthew  
Lockett



Michael  
Ramsey



Mark  
Schoenfisch

## Biological Chemistry



Dorothy  
Erie



Bo Li



Gary  
Pielak



Matt  
Redinbo



Nancy  
Thompson



Kevin  
Weeks

## Inorganic Chemistry



Jillian  
Dempsey



Mike  
Gagné



Jerry  
Meyer



Alex  
Miller



Cindy  
Schauer



Joe  
Templeton

## Polymer/Materials Chemistry



Joe  
DeSimone



Frank  
Leibfarth



Sergei  
Sheiko



Scott  
Warren



Wei You



Alex  
Zhukhovitskiy

## Organic Chemistry



Erik  
Alexanian



Jeff Aubé  
(joint)



Mike  
Crimmins



Abigail  
Knight



Jeff  
Johnson



David  
Lawrence  
(joint)



Simon  
Meek



Dave  
Nicewicz



Marcey  
Waters



Sidney  
Wilkerson-  
Hill

## Physical Chemistry



Joanna  
Atkin



Max  
Berkowitz



Jim  
Cahoon



Yosuke  
Kanai



Andy  
Moran



Zhiyue  
Lu



John  
Papanikolas

41 Research Faculty  
~36 Postdoctoral Fellows  
~250 Graduate Students





# Teaching Faculty



**Todd Austell**

- Analytical
- General
- Organic



**Josh Beaver**

- General
- Organic



**Carribeth Bliem**

- General
- Physical



**Anna Curtis**

- General
- Physical



**Nita Eskew**

- General
- Physical

- High structure classrooms
- Interactive learning
- Peer mentors
- Technology in the classroom
- Evidence-based methods
- CURES labs (course-based research)
- Safety (David Lawrence)

## Undergraduate Lab Supervisors:



**Kathleen Nevins**



**Calvin Grant**



**Thomas Freeman**

- General
- Biochemistry



**Brian Hogan**

- General
- Biochemistry



**Domenic Tiani**

- Analytical
- General



**Danielle Zurcher**

- General
- Organic



**Maribel Borger**



**Tyler Motley**



# Awareness Leads to Healthy Safety Culture



**H**ubris: “That will never happen to me”; “I’d never do that”

**A**daption: Adopting group culture; specialization

**R**ushing: Process takes too long or is inconvenient

**M**anagement: Cultural variation between groups

## Overcoming H.A.R.M.

Propagate strong safety culture in the next generation chemistry professional through active student *engagement, empowerment, and ownership*



# Engagement: Student Safety Committee

## Department Safety Committee:



David Lawrence  
(Chair)



Alex  
Miller



Cindy  
Schauer



Jim  
Cahoon



Mike  
Crimmins



Randy  
Simmons



Kathleen  
Nevins



Cathy  
Brennan



Ralph  
House



Olivia  
Williams

## Student Safety Committee:



Olivia Williams  
(Chair)



Ralph House

Brendon Sargent

Debanjan Dhar

Hannah Starr

J.C. Wong

Jon Patteson

Alex White

Bill Walton

Patrick Irving

Yuli Wang

Rui Zhang

Paul Soma

Erin Day

Diane Wallace

Sarah Sutton

Andrew Keith

Jeromy Rech

Xiao You

Matt Glasscott

Tessa Bartges

Joshua Welfare

Justin Marcum

Candice Crilly

Jessica Coleman

James Custer

Corban Murphey

Michael Turlington

Adam Zahara

Sally Lewis

Ninghao Zhou

Olivia Sanchez-Felix

Kyla Stingley

Quinton Bruch

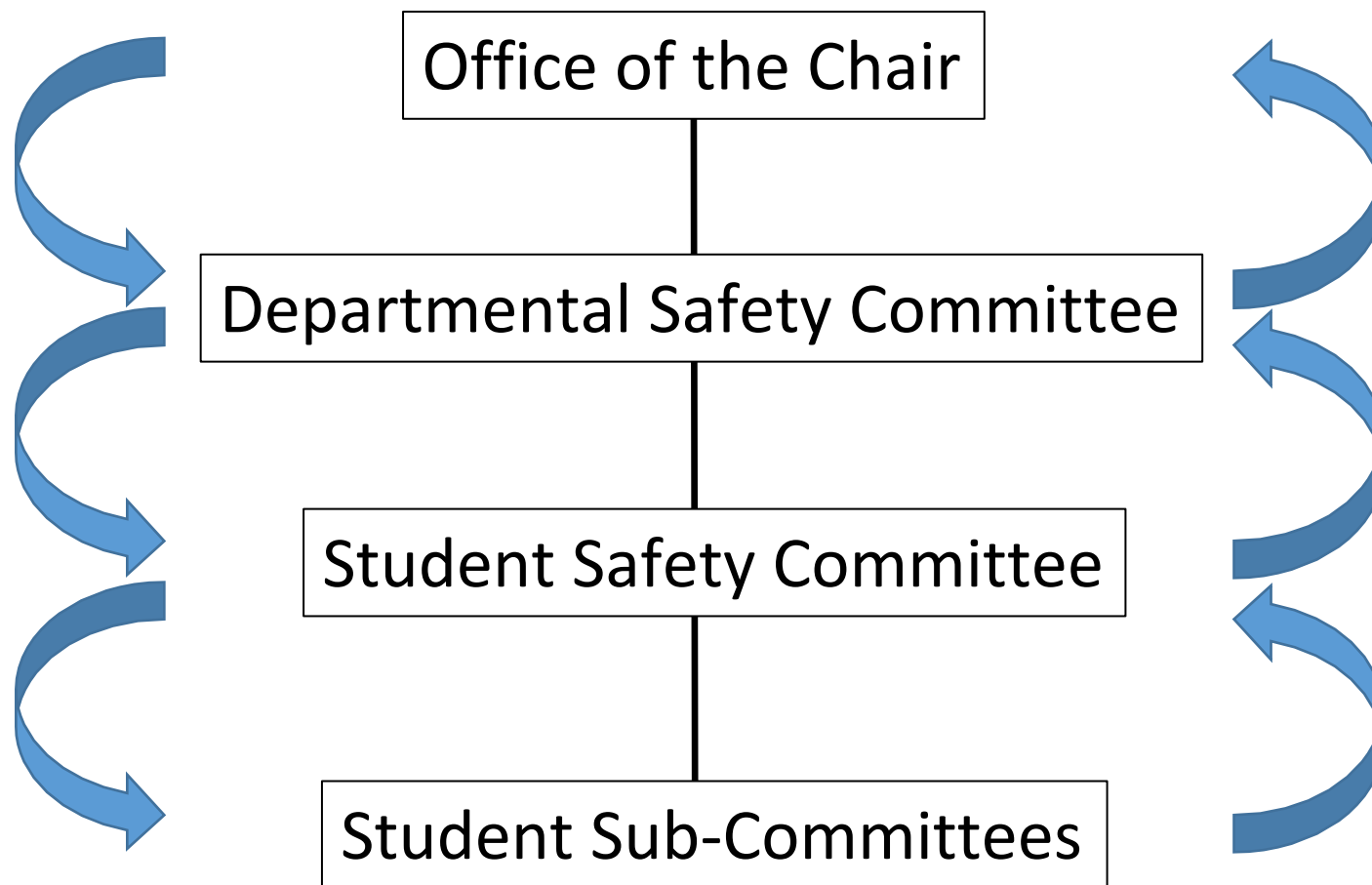


Kathleen Nevins



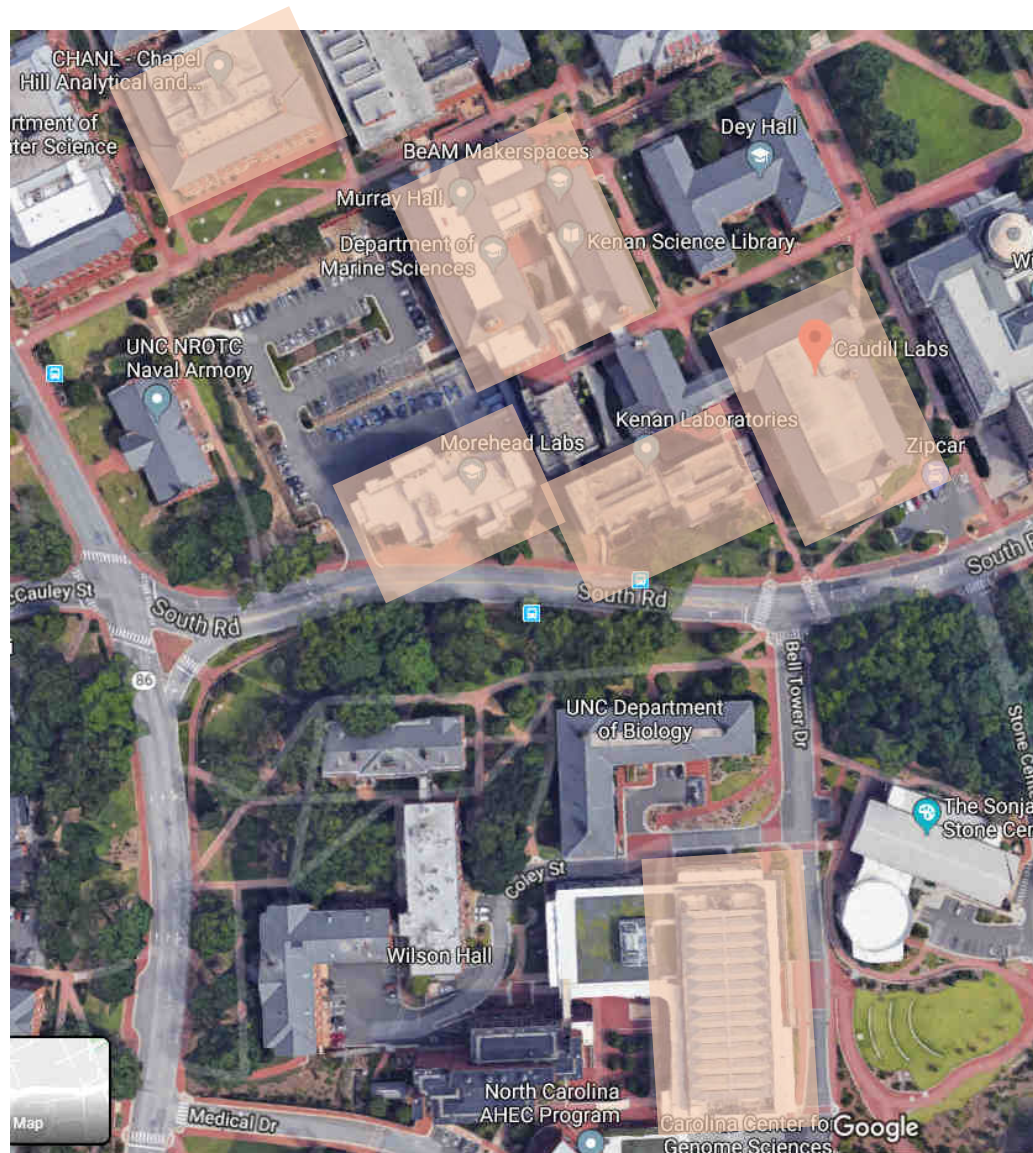
Cathy Brennan

# Engagement: Student Safety Committee





# Empowerment: Emergency Action Plan



- Evacuation routes undefined
- Have to cross road
- No accountability
- Expectations poorly communicated
- EAPs vary greatly across groups

# Empowerment: Emergency Action Plan

## *Assignment:*

Develop department-wide emergency action procedures and make recommendations to the safety committee

### Student Safety Committee:



Olivia Williams  
(Chair)



Ralph House



Kathleen Nevins



Cathy Brennan

Brendon Sarg

Debanjan Dha

Hannah Starr

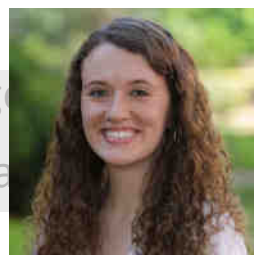
J.C. Wong

Jon Patten

Alex White

Bill Walton

Patrick Irving



Wang

Chang

Soma

Erin Day

Diane Walla

Sarah Sutton

Andrew Keit

Jeromy Rech

Xiao You

Matt Gla

Tessa Bartges

Joshua Welfare

Justin Marcum

Indice Crilly

Jessica Coleman

James Custer



Corban Murphey

Michael Turlington

Adam Zahara

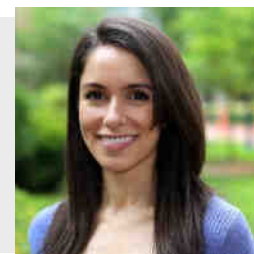
Sally Lewis

Ninghao Zhou

Olivia Sanchez-Felix

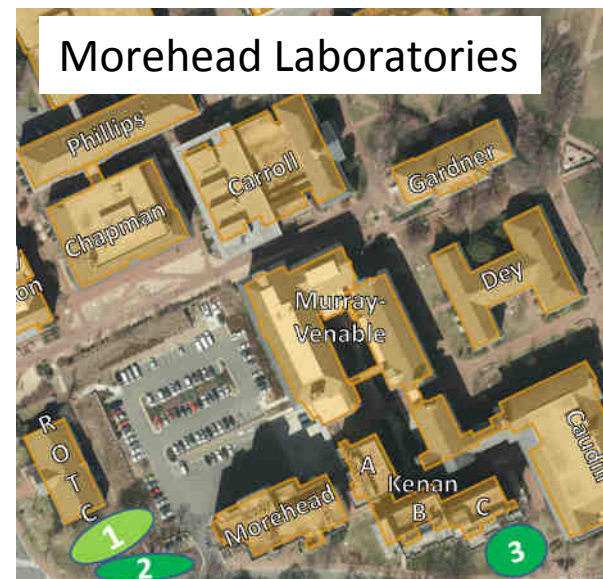
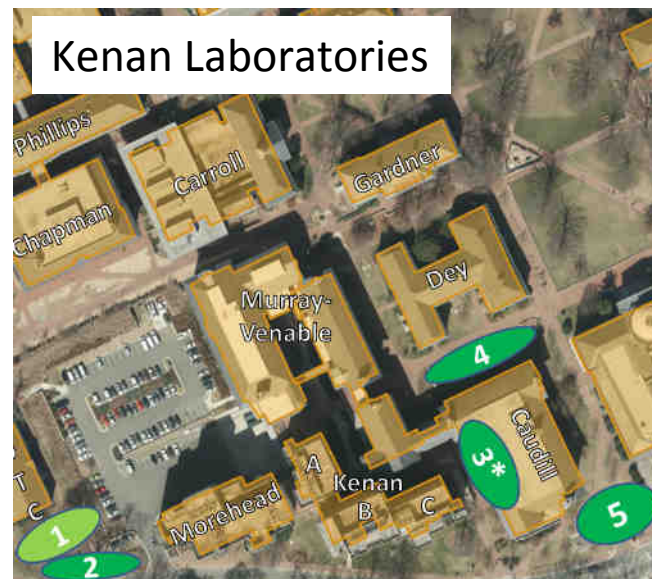
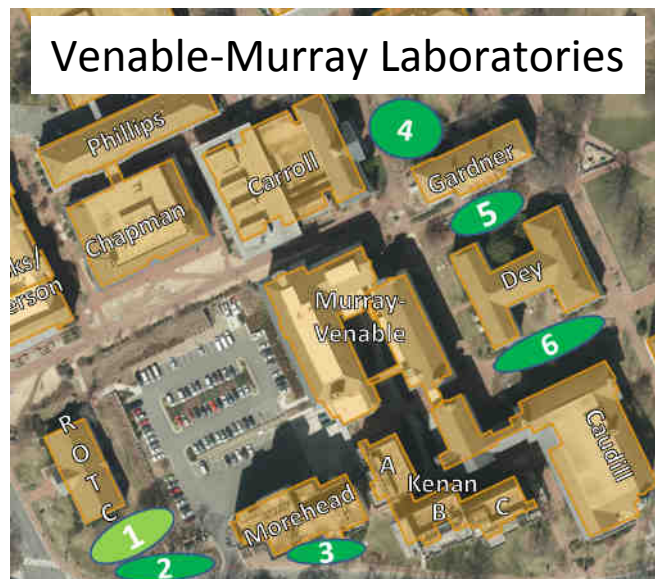
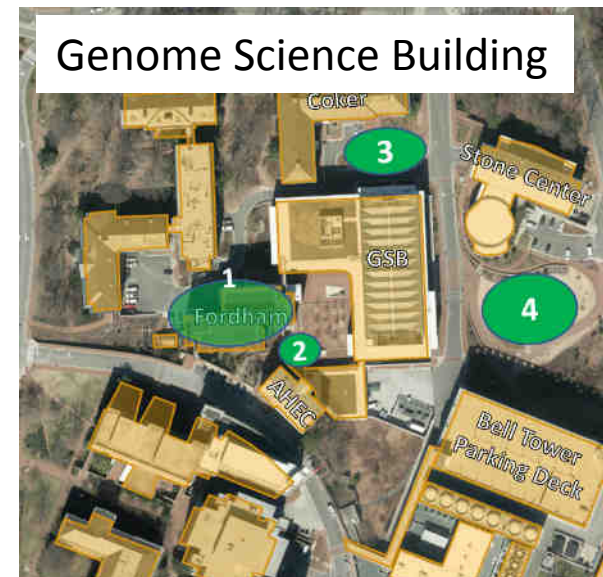
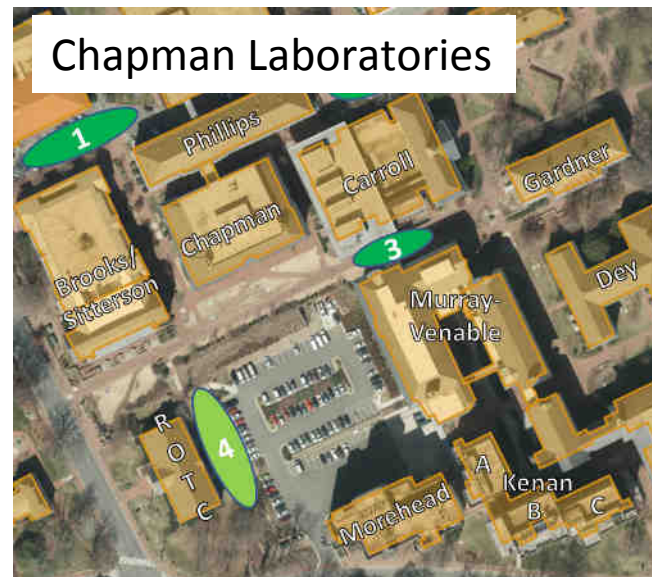
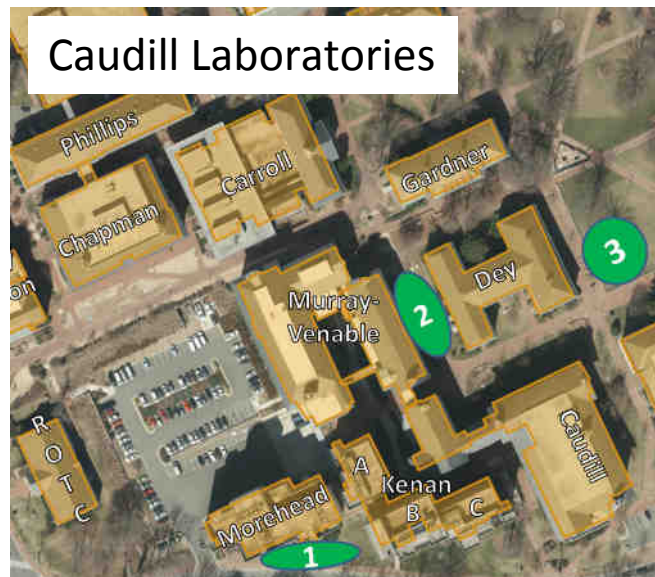
Kyla Stingley

Quinton Bruch





# Ownership: Emergency Action Plan





# Ownership: Emergency Action Plan

## 1) Evacuate

- When a fire alarm sounds, exit the building immediately via the closest available exit

## 2) Assemble

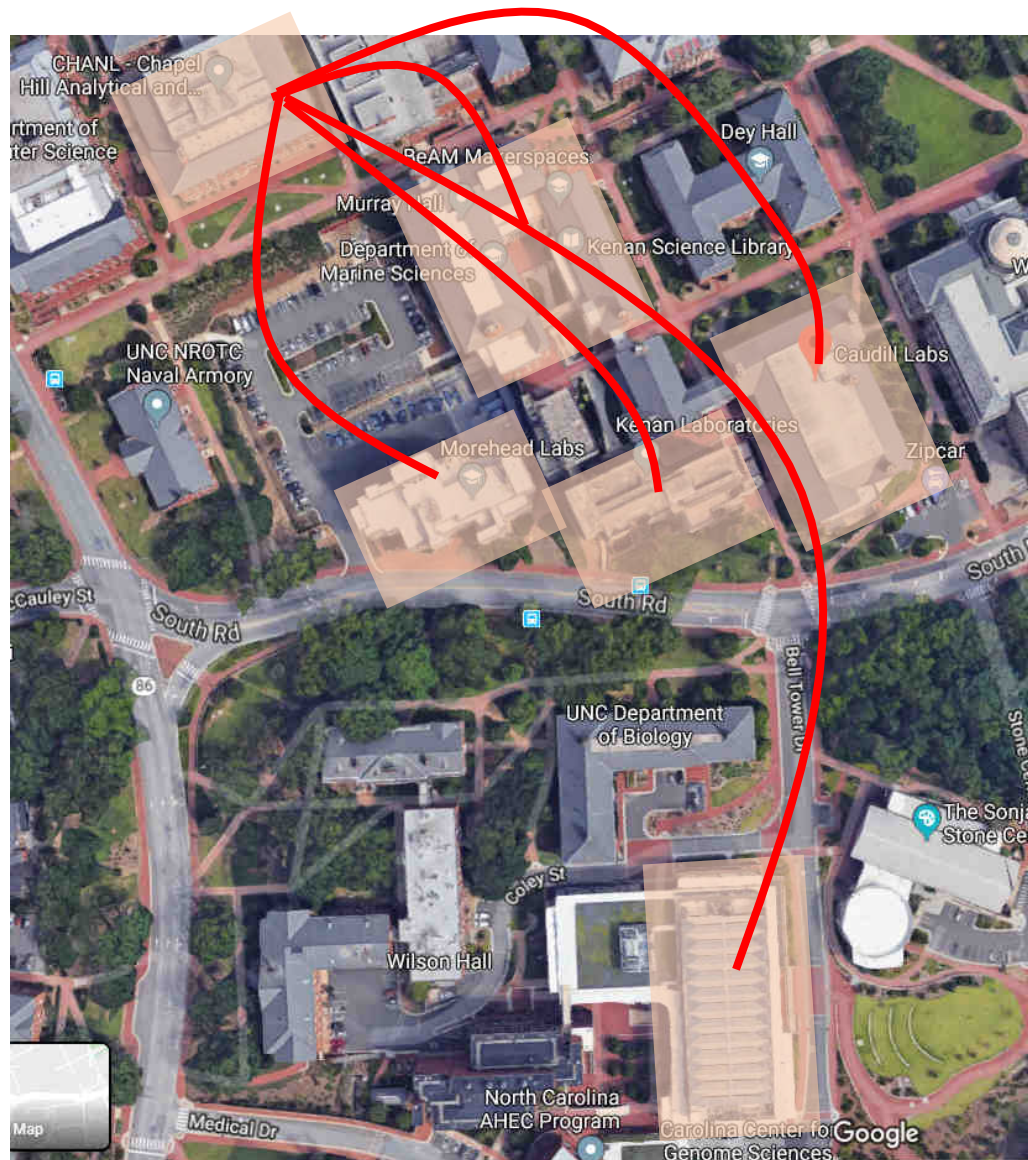
- Report to the nearest Safe Zone as described in evacuation protocol

## 3) Communicate

- Check-in with Emergency Coordinator either in person, via phone or text
- Emergency responders will be notified if someone's location is unknown



# Empowerment: Chernalert





# Empowerment: Chemalert

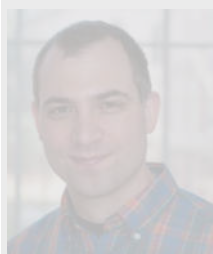
## *Assignment:*

Develop a method to rapidly communicate safety-related events to the entire department

### Student Safety Committee:



Olivia Williams  
(Chair)



Ralph House

Brendon Sargent

Debanjan Dhar

Hannah Starr

J.C. Wong

Jon Patteson

Alex White

Bill Walton

Patrick Irving

Yuli Wang

Rui Zhang

Paul Soma

Erin Day

Diane Wallace

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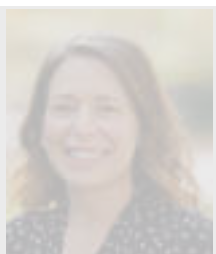
Sally Lewis

Ninghao Zhou

Olivia Sanchez-Felix

Kyla Stingley

Quinton Bruch



Kathleen Nevins



Cathy Brennan

# Ownership: Chemalert



## Safety Group Listserv Registration

E-mail

Your Email Address

---

Cell Phone Number

Your Cell Phone Number

---

Cell Phone Carrier

Your Cell Phone Carrier

---

SUBMIT

# Ownership: Chemalert

## [chemalert] Chemical odor Kenan 5th floor



Miller, Alexander James Minden <ajmm@email.unc.edu>

Mon 9/30/2019 9:18 AM

[ChemAlert] <chemalert@listserv.unc.edu> ✓

Good morning -

A strong chemical solvent odor has been noted on the 5th floor of Kenan. We are contacting EHS, but please be advised.

Alex



## [chemalert] Chemical odor Kenan 5th floor



Getting too much email? [Unsubscribe](#)



Simmons, Randy L <rlsimmon@email.unc.edu>

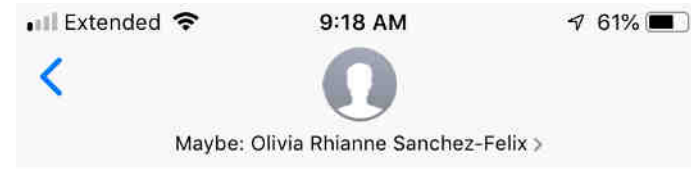
Mon 9/30/2019 9:26 AM

[ChemAlert] <chemalert@listserv.unc.edu>; [ChemAlert] <chemalert@listserv.unc.edu> ✓

Construction using paint on roof, they are finished now

Randy

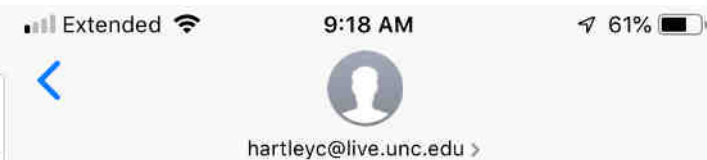
Sent from my iPhone



Subject: [chemalert] Fire alarm  
Chapman

Kind regards,

Olivia Sanchez-Felix (she/her/  
hers)  
Graduate Student  
Analytical Chemistry



Subject: [chemalert]  
Suspicious Person in Kenan..  
UNC Police received report 30  
minutes ago of suspicious male  
in first floor Kenan women



# Next Steps: Joint Safety Teams



## Dow Chemical Teams Up With Universities On Laboratory Safety

Partnership brings practices from industry to academia

By Jyllian Kemsley

- University formed safety teams of students and postdocs
- Dow tours schools and meets with safety team to understand current safety culture
- Safety teams visit Dow for two days of workshops and facility tours, all expenses paid
- Teams set priority and plans to improve lab safety culture

Industrial researchers run their labs with much more attention to safety than do academic researchers, or so holds conventional wisdom. **Dow Chemical** is now tackling that disparity head-on in a pilot safety collaboration with chemistry, chemical engineering, and materials science departments at the **University of Minnesota (UMN)**, **Pennsylvania State University**, and the **University of California, Santa Barbara (UCSB)**.

<https://cen.acs.org/articles/90/i44/Dow-Chemical-Teams-Universities-Laboratory.html>

# Next Steps: Joint Safety Teams



## Participating Institutions

- University of Minnesota, <http://www.jst.umn.edu>, [jst@umn.edu](mailto:jst@umn.edu)
- Yale University, <https://jst.chem.yale.edu>, [chemjst@elilists.yale.edu](mailto:chemjst@elilists.yale.edu)
- The Ohio State University, [chemistry.osu.edu/safety/jst](http://chemistry.osu.edu/safety/jst), [cbc-jst@lists.osu.edu](mailto:cbc-jst@lists.osu.edu)
- University of Illinois at Urbana-Champaign, <https://publish.illinois.edu/chemistryjointsafetyteam/>, [chemsafety@illinois.edu](mailto:chemsafety@illinois.edu)
- University of Chicago, @UChicago\_JRSI, [jr.si.uchicago.edu](http://jr.si.uchicago.edu)
- Northwestern University, [northwesternrssi.wixsite.com/rssi](http://northwesternrssi.wixsite.com/rssi), [rssi@northwestern.edu](mailto:rssi@northwestern.edu)
- Penn State, Safety Leadership Team, <http://chem.psu.edu/about/safety-resources>
- University of Nevada, Reno, Chemistry Department Student Safety Program, <https://www.unr.edu/chemistry/degrees/undergraduate-students/lab-safety/student-safety-program>
- University of Connecticut, <https://chemistry.uconn.edu/research/safety/joint-safety-team/>

# Next Steps: Joint Safety Teams



- Stall Street Journal
- Safety minutes during colloquia and seminars
- Student-led safety minute during mandatory class
- Safety tip at the beginning of weekly newsletter
- Industry safety tours (advisory board/alumni engagement)
- Collaboration with peer institutions



# Acknowledgments



**Jeff Johnson**



**David Lawrence**



**Alex Miller**



**Nita Eskew**



**Kathleen Nevins**



**Cathy Brennan**



**Mary Beth Koza**



**Oilvia Williams**



**Hannah Starr**



**Joshua Welfare**



**Michael  
Turlington**



**Olivia Sanchez  
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**James Custer**