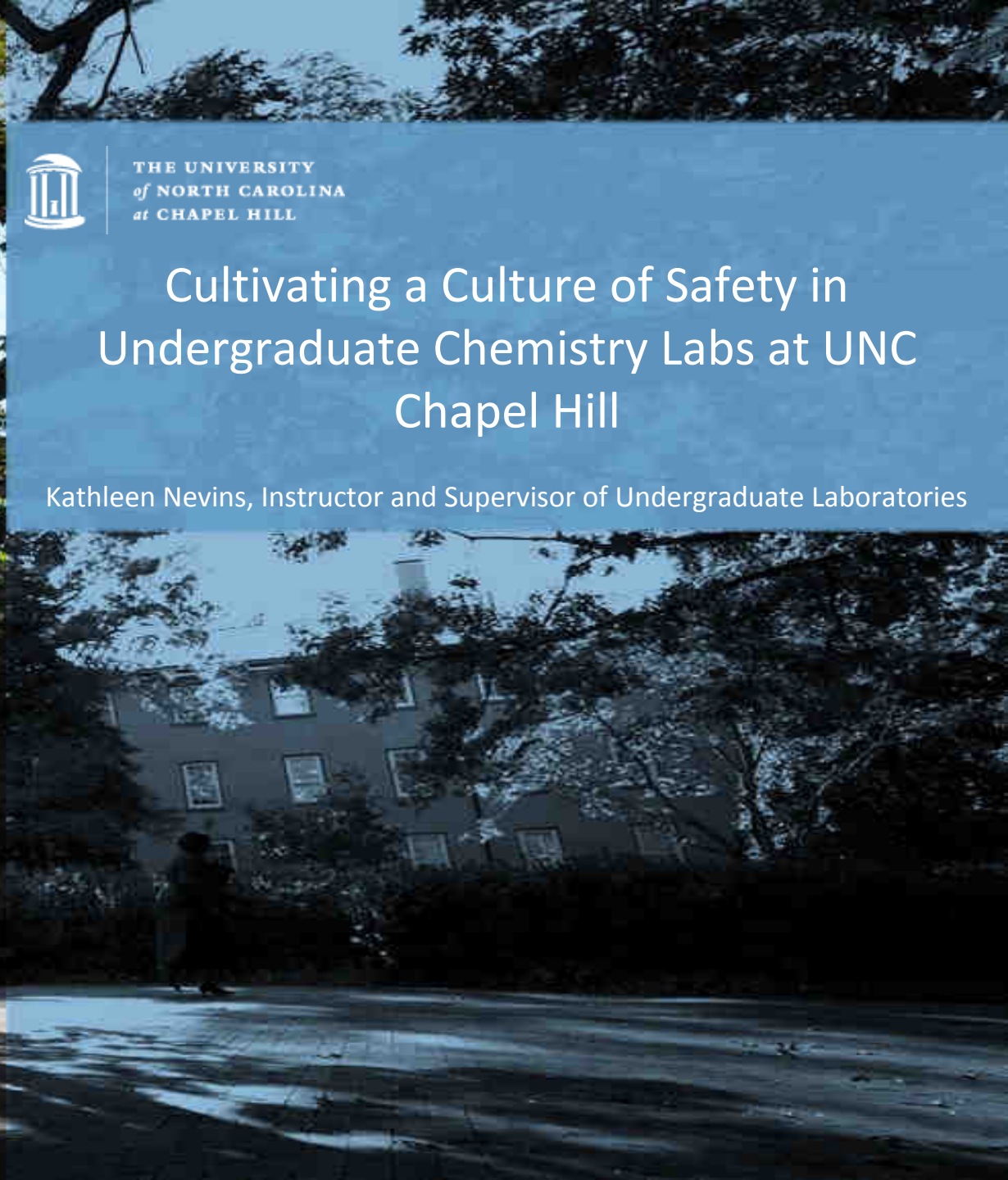




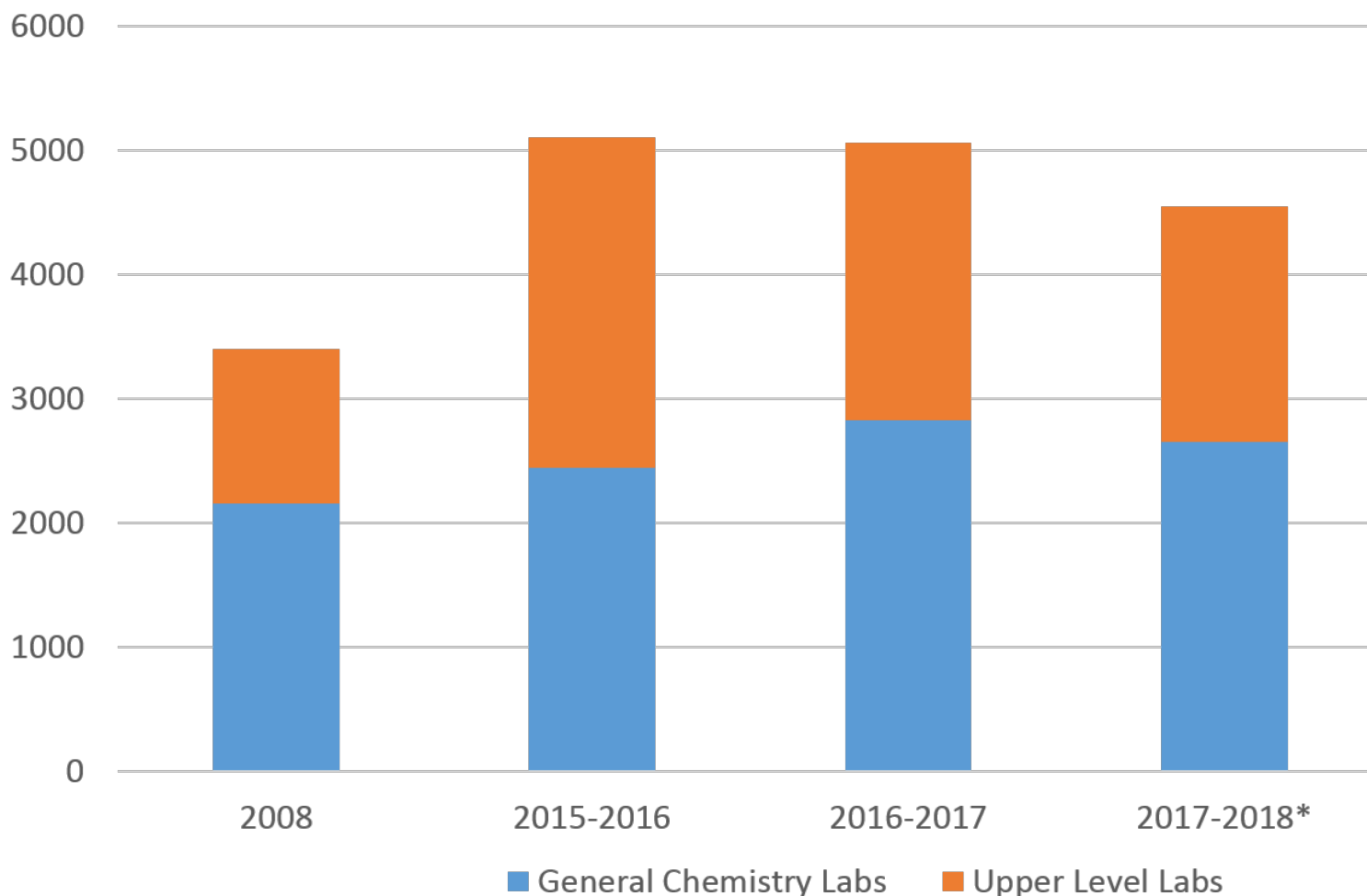
THE UNIVERSITY  
of NORTH CAROLINA  
at CHAPEL HILL

# Cultivating a Culture of Safety in Undergraduate Chemistry Labs at UNC Chapel Hill

Kathleen Nevins, Instructor and Supervisor of Undergraduate Laboratories



# Annual Student Lab Enrollment at UNC Chapel Hill



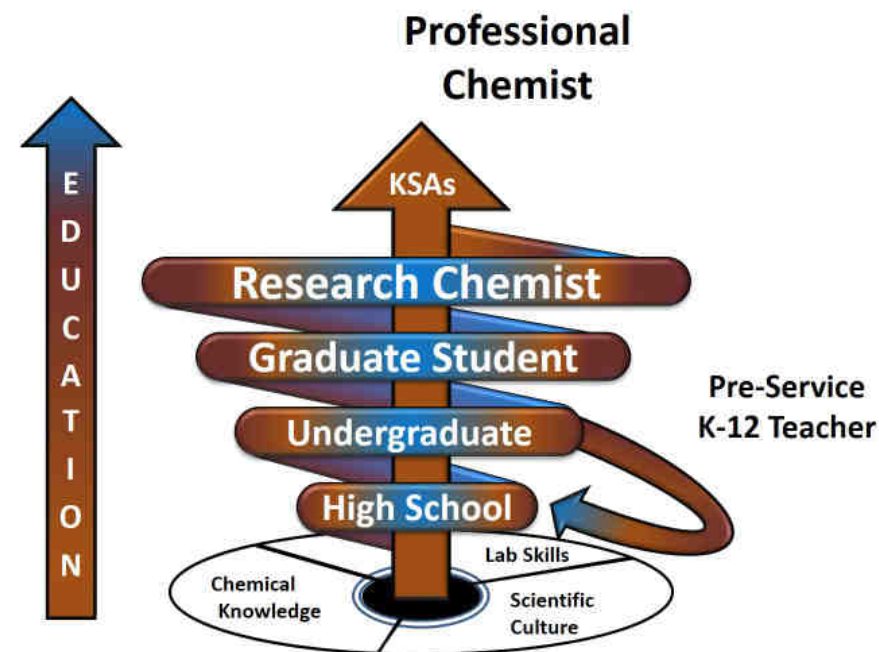
- At UNC: ~30,000 students
- Enrolled in Undergraduate Labs: ~5,000 students/year
- 26 course offerings/year with 263 sections





# Why Create a Culture of Safety with Undergraduate Students

- *The University of North Carolina at Chapel Hill Chemistry Department is committed to teaching and fostering a Culture of Safety.*
- This starts with the first undergraduate course in Chemistry and continues throughout the entire educational process to PhD.



Graphic Ref: S. Sigmann, (2018) Chemical Safety for the 21<sup>st</sup> Century – Fostering Safety Information Competency in Chemists, *J. Chem. Health Safety*, 25 (3), pp. 17-29.



# How Do We Create a Culture of Safety

- Lab faculty and staff
- Chemistry teaching assistants (TA)
- Chemistry Lab Students



<https://www.genesisproject1.com/training/>



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# Who are we?



Nita Eskew, PhD  
Director of  
Undergraduate Labs



Maribel Borger, PhD  
Instructor/Supervisor of  
Undergraduate Labs



Kathleen Nevins, PhD  
Instructor/Supervisor of  
Undergraduate Labs



Tyler Motley, PhD  
Instructor/Supervisor of  
Undergraduate Labs



Calvin Grant, PhD  
Instructor/Supervisor of  
Undergraduate Labs



# TA Training

Approximately 70 TA's per semester

## Typical TA Training Agenda:

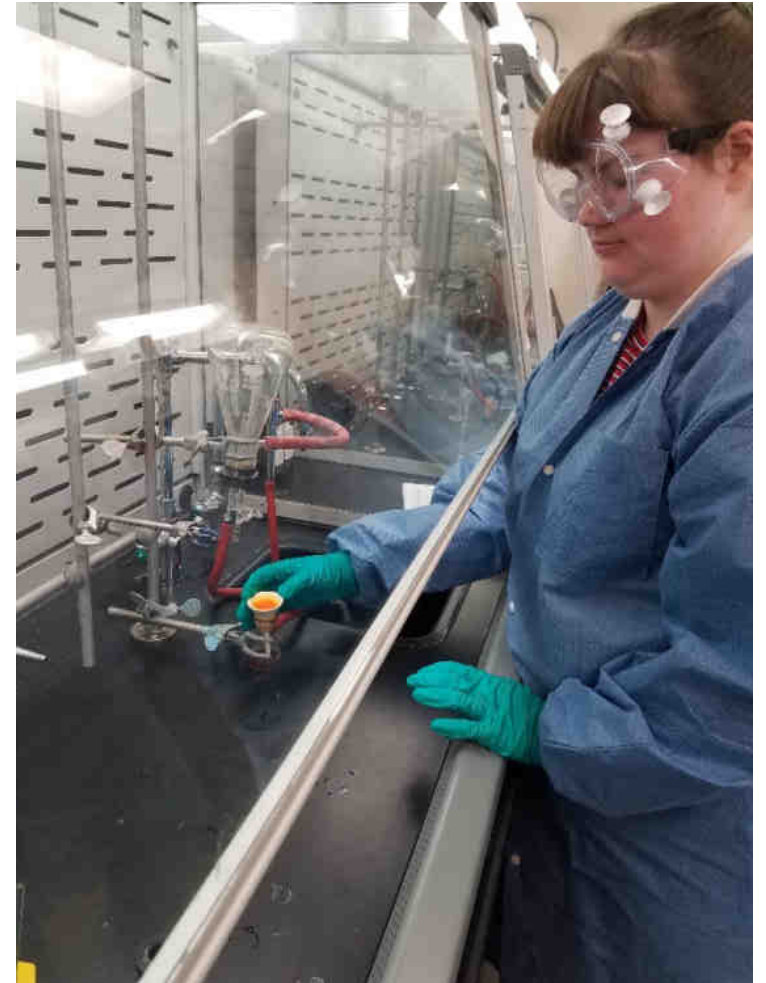
- EHS in house training
  - Fire extinguisher
  - Chemical hygiene and safety
- Counseling and Psychological Services
- Active shooter
- TA guidelines and contract
- Course specific training
- Hands-on experimental training





# Student Training

- Lab Safety
  - <https://mnv-media.s3.amazonaws.com/hm-media/ESKEW90047W17/videos/safetyvideos.mp4>
- Safety quiz
- Lab manual
- Lab Safety Contract
- Regular reinforcement



# PPE and Waste Handling



EYE PROTECTION



Safety goggles



Safety glasses

**WASTE DISPOSAL**

All *organic* waste should be placed in the designated waste container in the hood.





# Student Lab Manual

- Use of highlighted safety boxes throughout manual
- Identification of required safety equipment and how to obtain SDS information

**SAFETY** NEVER point the separatory funnel toward you or anyone else when venting; always vent immediately.

**SAFETY** When transporting chemicals from one container to another, use secondary containment. Your samples must be in a rubber carrier before moving from your lab. No student is permitted to carry chemical containers.

**SAFETY** All containers are volatile. Do not wipe the needles used in the lab. If properly you must

**SAFETY**

**ferrocene:** flammable solid; harmful if swallowed or if inhaled; suspected of damaging fertility or the unborn child; may cause damage to organs (liver) through prolonged or repeated exposure if inhaled; very toxic to aquatic life with long-lasting effects

**acetic anhydride:** flammable liquid and vapor; harmful if swallowed; causes severe skin burns and eye damage; toxic if inhaled

**phosphoric acid:** causes severe skin burns and eye damage; may be corrosive to metals

**sodium hydroxide:** causes severe skin burns and eye damage; harmful to aquatic life with long lasting effects

**acetylferrocene:** fatal if swallowed; IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician; wash skin thoroughly after handling

**alumina:** irritant

**acetone:** highly flammable; causes serious eye irritation; may cause drowsiness or dizziness

**ethyl acetate:** highly flammable liquid and vapor; causes serious eye irritation; may cause drowsiness or dizziness

**hexanes:** highly flammable liquid and vapor; may be fatal if swallowed and enters airways; causes skin irritation; may cause drowsiness or dizziness; suspected of damaging fertility or the unborn child; may cause damage to organs (nervous system) through prolonged or repeated exposure if swallowed; toxic to aquatic life with long-lasting effects



# Tracking and Minimizing Accidents

- Internal accident forms completed by TA and submitted to Supervisor.
- Forms are posted on Sakai so all TAs and EHS can review and be aware of incident.
- Modifications are made as necessary to prevent future safety incidents
- EHS performs further investigation if warranted.



# Summary

- Work closely with EHS to train everyone who is involved in lab courses
- Start during freshman year and continue to reinforce safety throughout their education.
- Creating and maintaining a safety culture in the undergraduate labs allows for students to develop good safety practices early that they can carry with them in their careers.

