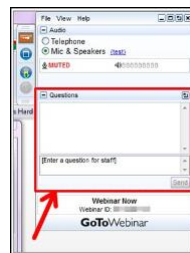


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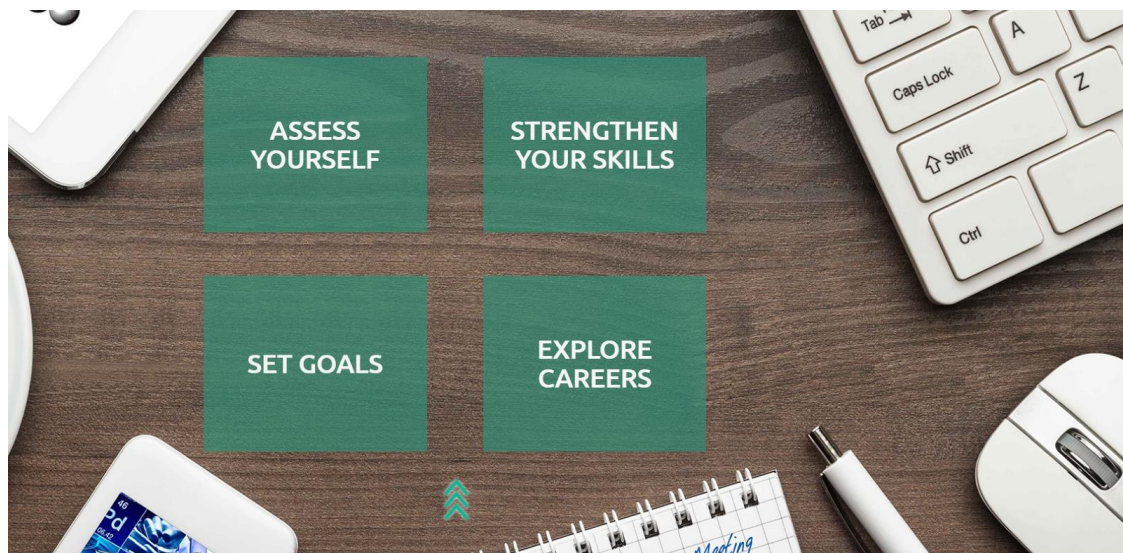
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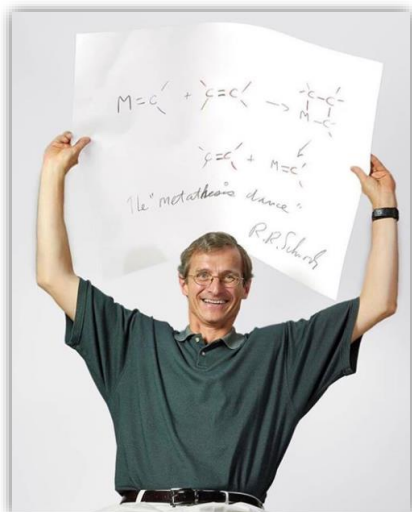


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Join Nobel Laureate Richard Schrock as he
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Ryan Fortenberry
University of
Mississippi

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Creating a Lab Safety Culture

for Industrial Chemists,
Educators, and Grad Students



THIS ACS WEBINAR WILL BEGIN SHORTLY...



Creating a Lab Safety Culture for Industrial Chemists, Educators, and Grad Students



Peter K. Dorhout
ACS President and Vice President for Research, Kansas State University



Dominick Casadonte
Minnie Stevens Piper Professor, Department of Chemistry and Biochemistry, Texas Tech University and Director, STEM CORE



Dawn Mason
External Innovation Manager, Eastman Chemical Company



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Opportunities in Chemical Safety for ACS

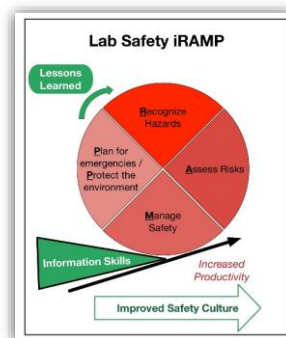


- **Provide information solutions:** Connect safety information resources into a flexibly structured ecosystem of ACS and external resources, led by a partnership of ACS and external stakeholders.
- **Empower members and member communities:** Empower members to become safety leaders as part of their professional and ethical skill set, which are core personal assets.
- **Support excellence in education:** Develop RAMP-based safety education resources with a focus on building risk assessment skills.
- **Communicate chemistry's value:** Model safety culture (risk assessment, leadership and empowerment) to the four ACS key audiences.



RAMP up Safety

- **R**ecognize hazards
- **A**ssess the risks
- **M**inimize the risks
- **P**repare for emergencies



"There are hazards associated with all experiments. By recognizing and minimizing the risks, we are able to do hazardous things. We do them safely; we just don't do dangerous things in the lab." - P&G CEO



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Audience Challenge Question

ANSWER THE QUESTION ON BLUE SCREEN IN ONE MOMENT



What changes have you seen in chemistry safety culture over the past 5 years?

- Great improvement
- Some improvement and some degradation
- No noticeable change
- General degradation

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Introduction to Laboratory Safety



- Ph.D. candidate and NSF Graduate Research Fellow at the University of Illinois at Urbana-Champaign
- Specialization in materials chemistry (polymer synthesis & surface modifications)
- Lab manager of my research group
- Representative of my research group to the chemistry department joint safety team (JST)



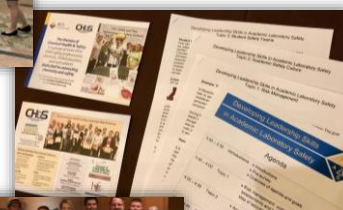
<https://publish.illinois.edu/chemistryjoinsafetyteam>

@kalialese

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Volunteering with ACS

- Selected to serve on the National ACS Committee on Chemical Safety
- Developed a workshop to train future leaders in chemical safety and develop plans for the creation of student safety programs
- Two successful workshops held in March and August 2018
- Attendance has been 15-20 graduate students, plus staff and faculty participants

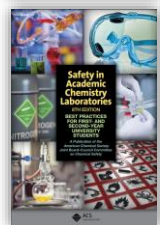
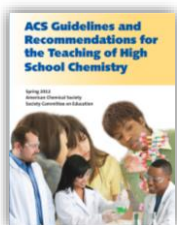
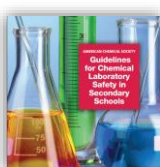


<http://dchas.org/jst-workshop>

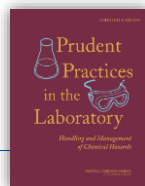
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ACS Chemical Safety Resources

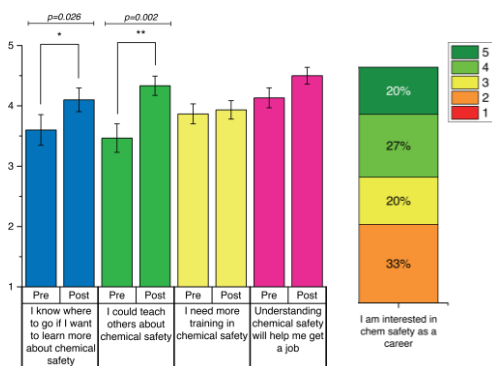


Audience	Technical Resources	Cultural Resources
High School and Undergraduate Teaching Labs	Guidelines for Chemical Laboratory Safety in Secondary Schools , ACS 2016	Guidelines and Recommendations for the Teaching of High School Chemistry , ACS 2012
Mentored Research Labs (REU, CURE, similar programs)	Safety in Academic Chemistry Laboratories (SACL) , 8 th edition ACS 2017	Risk Assessment Video ACS DCHAS, 2018
Supervised Research (graduate school)	Guidelines for Chemical Lab Safety in Academia , ACS 2016	A Guide to Implementing a Safety Culture in our Universities APLU, 2016
Research Leadership	Prudent Practices in the Laboratory National Academies Press 2011 Hazard Assessment in Research Laboratories ACS, 2016	Safety Guidelines for the Chemistry Professional ACS DCHAS / CCS, 2017



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Future Directions



- Participants gained valuable resources to take back to their institutions
- Discussed the impact of laboratory safety experiences on future employment
- Open communication between student leaders will help facilitate sharing of resources and program ideas
- Beginning preliminary work to offer an online version of the workshop



<https://dchas.org/journal-of-chemical-health-and-safety>

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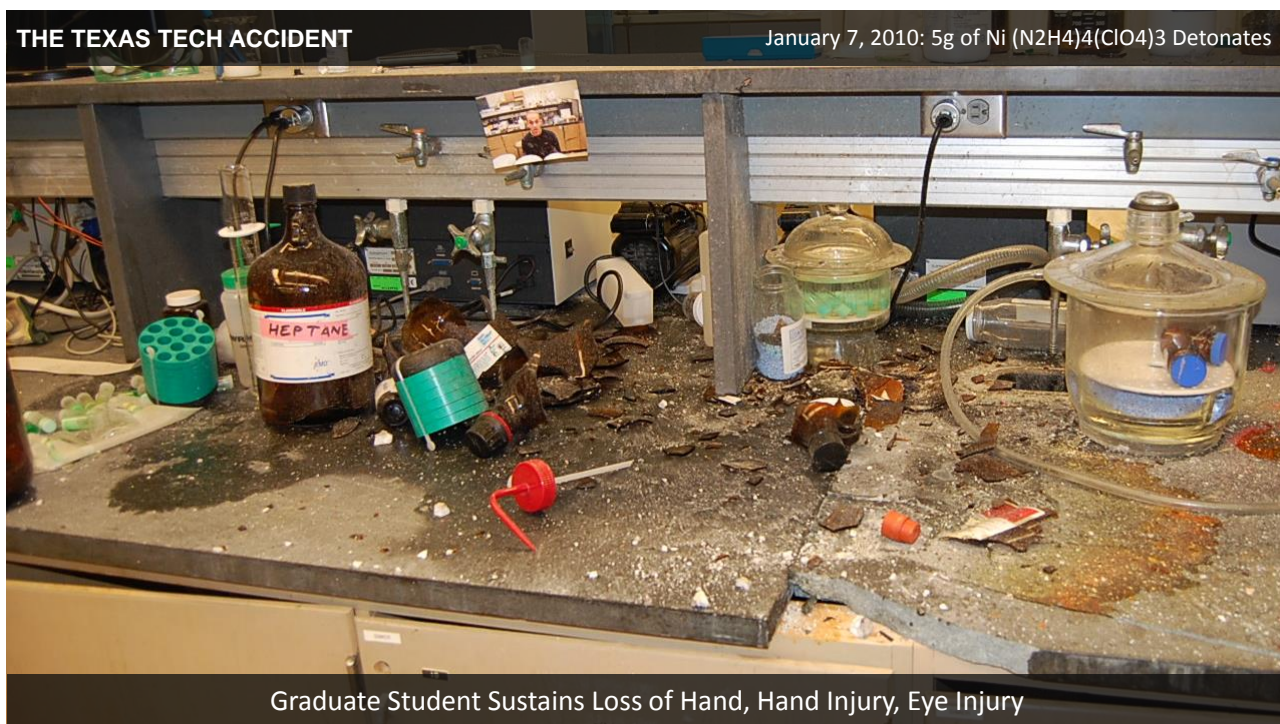
Audience Challenge Question

ANSWER THE QUESTION ON BLUE SCREEN IN ONE MOMENT

Where did you learn most of your chemical safety knowledge?

- Before higher education
- As an undergraduate
- In graduate school
- On the job
- Other (Tell us more in the chat)

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The Texas Tech Accident



- Investigated by National Chemical Safety Board
- Recommendations Made October 20, 2011: CSB Release of "**Experimenting with Danger**" <https://www.csb.gov/videos/experimenting-with-danger>
- <http://www.depts.ttu.edu/vpr/integrity/csb-response/index.php>



TTU Self-Imposed Recommendations

As a result of the accident Texas Tech President Guy Bailey is imposing a series of recommendations to compliment those being suggested by the CSB. These are as follows:

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NCSB Recommendations:



- Ensure that research-specific hazards are evaluated and then controlled by developing **specific written protocols** and **training**.
- Expand existing laboratory safety plans to address the **physical hazards** of chemicals.
- Ensure that safety personnel **report directly to a university official** who has the authority to oversee research laboratories and implement safety improvements.
- Document and communicate **all laboratory near-misses and incidents** to educate individuals and track safety at the university.



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Changing a Safety Culture



- At First, Compliance-Driven
- **Development of Institutional Laboratory Safety Committee (ILSC):** All Stakeholders Represented and Difficult Situations Vetted
- More Resources Provided to EH&S
- Change in Point of View of EH&S as Helpful Resource
- All Academic Labs Have Lab Safety Plans and SOPs
- Routine Safety Inspections
- Faculty Have Become Leaders in Developing Safety Culture Both on Campus and Nationally
- **Safety Awards:** Contribute to Sense of Continual Improvement



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Changing a Safety Culture



- All incoming graduate students in C&BC are required to take a for-credit course entitled “Chemical Safety and Responsible Conduct of Research”
- All students across campus who work in labs must take online or face-to-face safety modules through EH&S and score >70% each year
- Faculty/Staff must take at least one on-line intro to lab safety module every two years
- All labs in C&BC have safety captains
- Six month lab inspections by EH&S
- Lab safety training for all TA's, with study of its efficacy (BCCE, 2012)
- University-wide chemical inventory system; all new chemicals are bar coded before given to PI with safety classification and location

- Consequences for willful negligence of safety protocols, including lab closures
- Rewards for exemplary behavior underway
- Currently working with Ph.D. student to analyze a national survey on collegiate safety culture



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Lessons Learned



- Academic Chemistry Labs are Dynamic: **Academic Safety Culture Must Be Just as Dynamic**
- Not Everyone Has the Same Idea of What Constitutes Safety in a Pluralistic Society: **Dialogue Needed!**
- Safety is **EVERYONE'S** Responsibility
- Younger Researchers **Must Be Able to Trust** That Faculty and the Institution Are Interested in Safety: Faculty and EH&S Must Be Safety Mentors and Models
- A Database of Effective Safety Practices, Protocols, Procedures, Videos are Needed for **National Access**
- **Lessons Learned** and **Near Miss Databases** are Vital
- **We Need More Carrots!**

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Audience Challenge Question

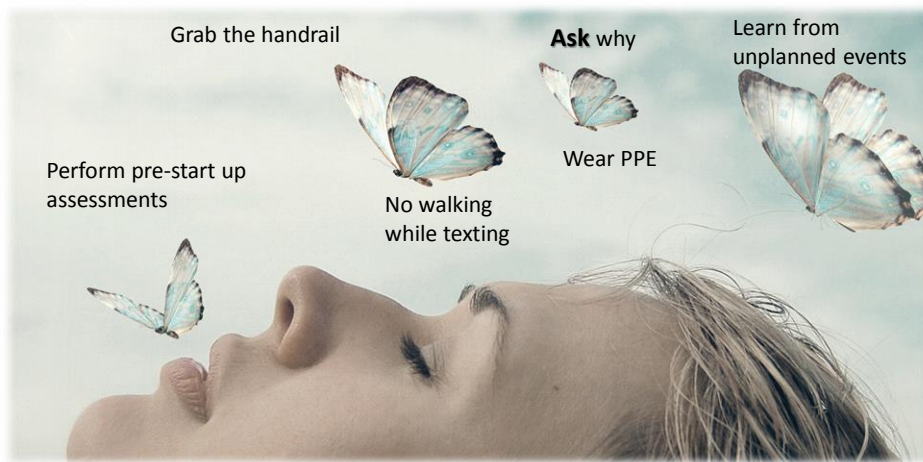
ANSWER THE QUESTION ON BLUE SCREEN IN ONE MOMENT

Who has been the most important influence on your safety attitudes?

- Mentors / Supervisors
- Peers / Coworkers
- Academic or industrial management
- General public and family expectations
- Other (Tell us more in the chat)

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Skills, Attitudes and Expectations



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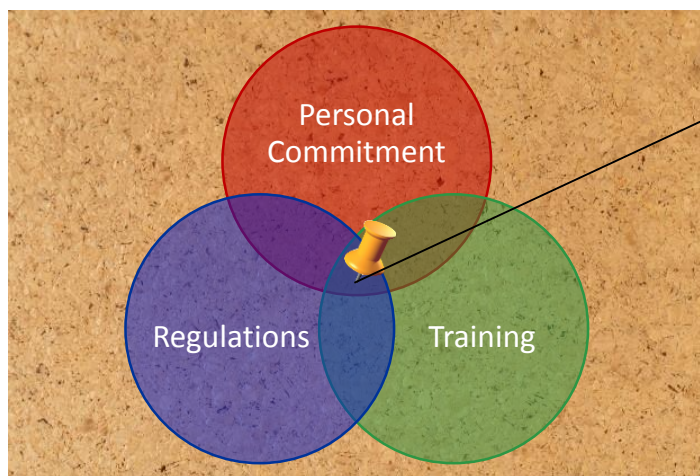
Safety Trends Over Time



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Safety Culture Map

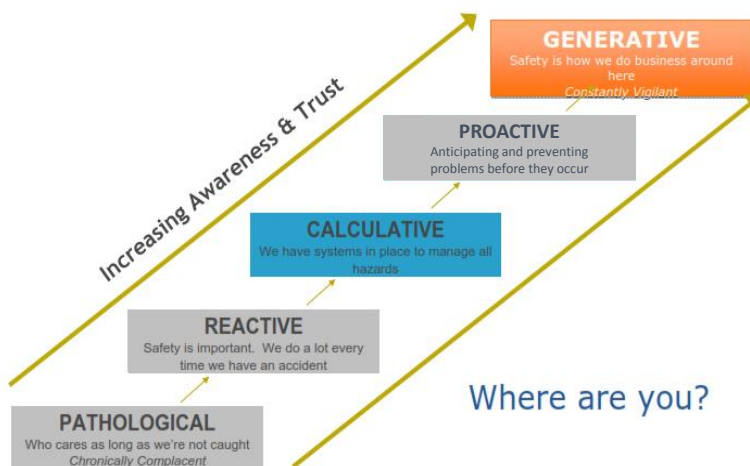


You are here



31

Evolution of Safety Culture



Where are you?



Courtesy of John Howarter

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Start today...

❑ Utilize your natural curiosity to learn

- Daily habits – ask questions!
- Learn about Root Cause Analysis and use it

❑ Seminars

- Ask questions
- Encourage students to ask questions

❑ Publications

- Integrate safety information as part of your discussion sections

❑ Teaching AND research labs

- Ask questions, test your knowledge
- Share information
- Pick up that tripping hazard!



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Good Science is Safe Science. Be a Leader!

✓ Create working conditions that minimize risk

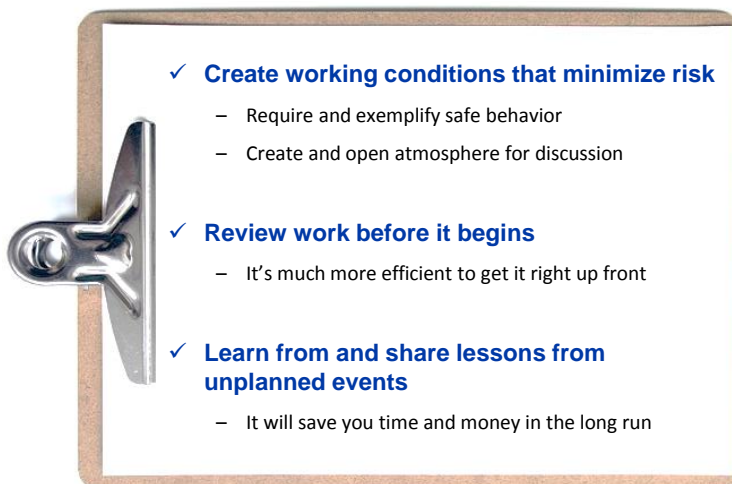
- Require and exemplify safe behavior
- Create and open atmosphere for discussion

✓ Review work before it begins

- It's much more efficient to get it right up front

✓ Learn from and share lessons from unplanned events

- It will save you time and money in the long run



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**YOU CREATE NEW STANDARDS EVERY
TIME YOU DON'T ADDRESS AN ISSUE.**



Are you up for
the leadership
challenge



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Audience Challenge Question

ANSWER THE QUESTION ON BLUE SCREEN IN ONE MOMENT



What do you consider your most valuable safety skill?

- Emergency response
- Process planning
- Situational awareness during a chemical process
- Reviewing the literature for potential hazards
- Other (Tell us more in the chat)

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Creating a Lab Safety Culture for Industrial Chemists, Educators, and Grad Students



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ACS President and Vice President for Research, Kansas State University



Dominick Casadonte
Minnie Stevens Piper Professor, Department of Chemistry and Biochemistry, Texas Tech University and Director, STEM CORE



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Assistant Director, Environmental Health and Safety, Virginia Tech

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