



Promoting safety culture: Chemical safety information initiatives

Carmen Nitsche, Pistoia Alliance

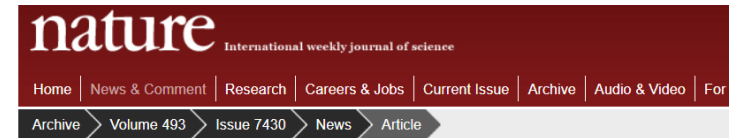
*Presented at the 256th ACS National Meeting and Exposition, August 19, 2018 PRES
Symposium: "Moving the Safety Values of the ACS Forward"*

Safety culture is
a critical component
of good science

.....“any injuries they sustained
were just part of the job”

In a lab safety survey by *Nature Publishing Group* and *Bioraft*

- ~2400 scientists responded
- Major finding: **Big gap** between **how people felt** about the safety of their work environment vs **how safe it actually was**
 - **86%** said they believed their lab is a **safe place to work**
 - **46%** had experienced some sort of **injury**, of which **21%** said **more than once**.
 - **>25%** had had an injury they **did not report**
 - **30%** had **witnessed** at least one **major incident** that required **medical attention**.



NATURE | NEWS

عربي

Safety survey reveals lab risks

Questionnaire suggests researchers not as safe as they feel.

[Richard Van Noorden](#)

02 January 2013

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Richard Van Noorden, “Safety survey reveals lab risks: Questionnaire suggests researchers not as safe as they feel.” **Nature** V 492, Iss 7430, Jan 2, 2013 <https://www.nature.com/news/safety-survey-reveals-lab-risks-1.12121>

.....“over a third [of respondents] have never included safety information in research publications and less than a quarter consistently provide the information.”

Finding from the 2017 CINF/CHAS baseline survey of academic chemical safety information practices.

Survey results published in Journal of Chemical health and safety

<https://doi.org/10.1016/j.jchas.2017.10.009>



Journal of Chemical Health and Safety

Volume 25, Issue 3, May–June 2018, Pages 6–10

Research article

Baseline survey of academic chemical safety information



Home > Volume 94 Issue 48 > ACS journals enact new safety policy

Advertisement



Volume 94 Issue 48 | p. 7 | News of The Week
Issue Date: December 5, 2016 | Web Date: December 1, 2016

ACS journals enact new safety policy

Authors to be required to address novel or significant hazards

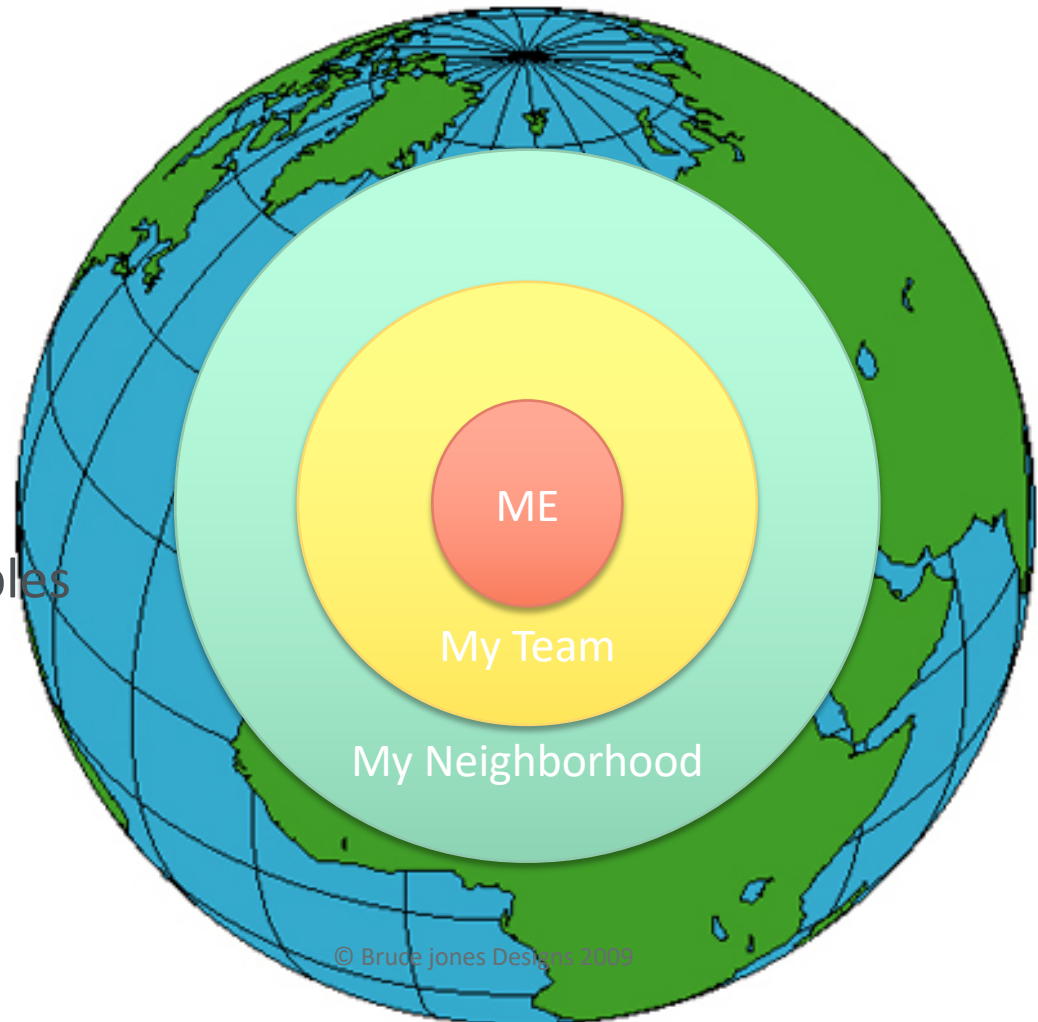
By Jyllian Kemsley

American Chemical Society journals will have a new safety reporting requirement starting in 2017: Authors must “address and emphasize any unexpected, new, and/or significant hazards associated with the reported work,” says an *ACS Central Science* editorial describing the change (2016, DOI: [10.1021/acscentsci.6b00341](https://doi.org/10.1021/acscentsci.6b00341)).



Holistic approach to safety

- Expanding realm
 - Individual
 - Colleagues
 - Community
 - Planet
- Cradle-to-grave
 - Green chemistry principles
- Situational aspects
 - Beyond toxicity
 - Protect → Avoid
 - Compliance → Culture



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Elements to cultivate a positive safety culture

- Focus on **prevention**
 - risk assessment
 - **R**ecognize the hazard
 - **A**ssess the risk
 - **M**inimize the risk
 - **P**repare for emergencies
- Examine **systems** and processes
 - Systemic issues overlooked
 - No accident ≠ safety
- Understand **everyone** is responsible for safety
 - Need both top-down and bottom-up efforts
- Promote institutional **knowledge retention**
- Reward **sharing**

Sharing & collaboration
have to be a part of
our safety culture



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UNIVERSITIES

Projects & Initiatives

Guide for Implementing a
Safety Culture in Our
Universities

About the Task Force on
Laboratory Safety

Actions that Support a
Culture of Safety

Core Institutional Values

What's New?

Recommendations:
Institution-Wide Dynamics &
Resources

A guide to implementing a
SAFETY CULTURE
in our universities

ASSOCIATION OF
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APLU Council on Research
Task Force on Laboratory Safety

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Meetings & Events Library



search universities with
force, which APLU created in
on Governmental Relations (COGR), is
tory representatives.

severely injured a graduate student,
ise to this national need, the Task

ory culture of safety from over 20

<http://www.aplu.org/projects-a>

Download guide here: <http://www.aplu.org/library/safety-culture/file>

t-lab-safety-tf.html

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Benchmarking

[BENCHMARKING](#)[CAREER CENTER](#)[LIBRARY](#)

CSHEMA provides survey and research services that help you improve environmental health and safety on campus.

[Salary Survey](#)[Benchmarking Survey](#)[Campus Climate Survey](#)[Safety Advancement Program](#)

<https://www.cshema.org/resources/benchmarking>

- **The Campus Safety, Health, and Environmental Management Association** offers self assessment tools and benchmarking data to measure and track ones institution's safety culture journey



Skills: Developing skills for safe research

Application: Making safety improvements in the laboratory

Foundation: Using safe practices as a foundation for professional success

Engagement: Encouraging active participation in improving safety awareness and practice

2017

SAFE Initiative

Strive for Continuous

Application: Great Chemistry Lab Clean-Out - held July 11-15, 2016


 UNIVERSITY OF MINNESOTA
Driven to Discover

JST
Chemistry and

Home ▾

The Joint Safety Team is focused on improving the culture of safety at the University of Minnesota. The Laboratory Safety and Chemical Engineering and other interested groups are interested in supporting your leadership through a monthly meeting.

• [Learn more](#)

 UNIVERSITY OF MINNESOTA
Driven to DiscoverSM

JST
Chemistry and CEMS Joint Safety Team

Learning Experience Reports

[LAH Fire](#)
May 27, 2016

[External LER - Lucky to be alive](#)
May 23, 2016

[Fire while cleaning glassware](#)
April 8, 2016



Reports

Safety Team
232 likes

Safety Team
with ago

to remember

ier



11

Not Voodoo X.4



Pyrophoric Reagents

Add Your Own

Many lab fires and explosions are caused by the same few common reagents. The list below is provided to emphasize the dangers associated with working with these reagents. **However, even if your reagent is not on this list, It could still cause a fire or explosion.**

NEW: [UCSD Instructional Videos - Working with Pyrophoric Reagents](#)

Check out this [pyrophorics bulletin](#).

To keep accurate data, please come back and record each fire/explosion you witness.

| Name | Fires | | Explosions | |
|---|-------|-----|------------|-----|
| Sodium metal | | 366 | | 107 |
| Lithium aluminum hydride (LAH, LiAlH ₄) | | 360 | | 75 |
| Palladium on carbon (Pd/C) | | 367 | | 39 |
| tert-Butyllithium (t-BuLi) | | 286 | | 6 |
| Sodium hydride (NaH) | | 259 | | 19 |
| Diethyl ether (Et ₂ O) | | 162 | | 23 |
| n-Butyllithium | | 159 | | 7 |
| Potassium Metal | | 121 | | 26 |
| Sodium Hydride (NaH; dry, oil free) | | 121 | | 4 |
| Raney nickel (dry) | | 117 | | 7 |
| Potassium hydride (KH) | | 93 | | 7 |


Chem Safety Search Tool

<http://chemistrygateway.com/chemsafety/desktop/en/search.html?pane=simple>

Advanced Search About Sign In

See Abe Lederman's, Founder and CEO of Deep Web Technologies, presentation to the American Chemical Society National Meeting

Quick Search



Full Record

Title

sodium azide

Author

Date Range

From Pick Year To Pick Year

Match

All

Clear Search

+ All Categories

+ Databases

+ eBooks & eJournals

+ MSDS

+ Regulatory

+ Safety Data

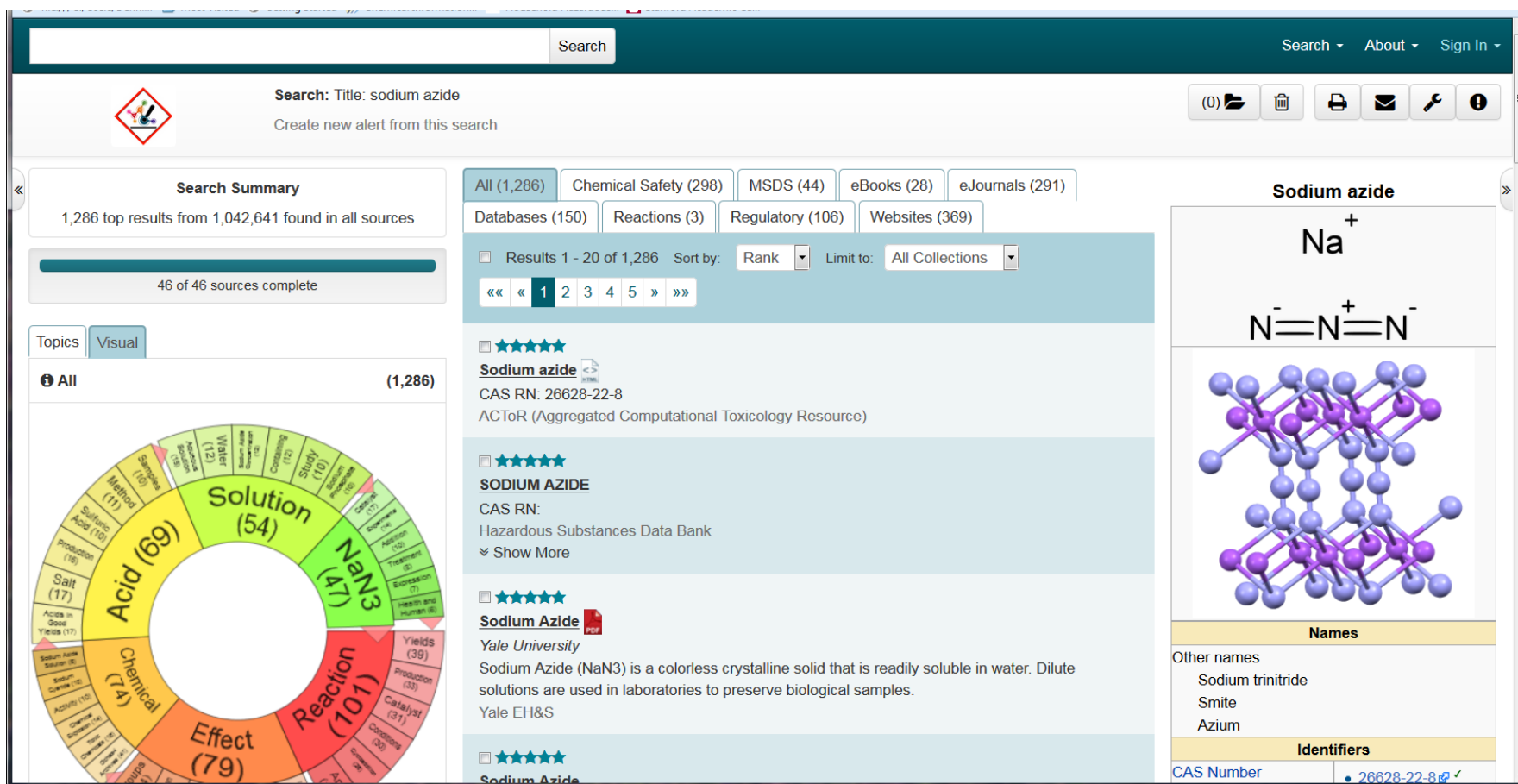
+ Syntheses & Reactions

+ Websites

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Slide provided by Grace Baysinger –Stanford University
Tool developed in collaboration w Deep State technologies

ChemSafety Search Results



Slide provided by Grace Baysinger –
Stanford University

Academic/industrial Partnerships – Dow

<https://www.dow.com/en-us/science-and-sustainability/safety/safety-courses/sustainable-safety-culture>

United States



Markets & Solutions Investors **Science & Sustainability** News & Media Events Careers

LAB SAFETY MODULES

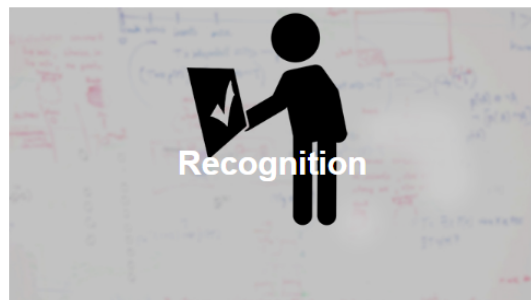
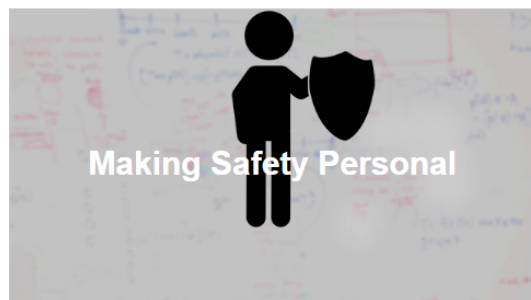
RESOURCES

Dow Global > Science & Sustainability > Safety > Safety Courses > Sustainable Safety Culture

Sustainable Safety Culture

The following modules include information on methods for building and sustaining a strong safe culture in the laboratory.

Each of the videos will address a given topic to provide guidance and recommendations. The videos are not meant to be all inclusive, but instead targeted at behaviors which will help enhance a student to be more productive, efficient and safer in the laboratory.



Academic/industrial Partnerships - ExxonMobil



School of Engineering & Applied Science

TEXAS



The University of Texas at Austin
Department of Chemistry
College of Natural Sciences

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College of Sciences

Home About Academics Research Safety People Alumni & Friends

Q SEARCH

ExxonMobil PALS - safety network meeting

[Important Contact Info](#)

[Emergencies](#)

[Safety Training](#)

[Safety Procedures](#)

Partnership in Academic Lab Safety: Exxon Mobil Partners will join us at our Fall safety network meeting

Deborah Davis and Tim Afford from ExxonMobil will be joining our Safety Network Meeting on October 4th. They will be offering an overview of the safety culture at ExxonMobil and information about the PALS initiative, the upcoming opportunities and workshops.

Lautenberg Chemical Safety Act

Protecting Americans' health and our environment while supporting U.S. economic growth and manufacturing.

LEARN MORE



American Chemistry Council:

- All members must participate in Responsible Care
- For continual improvement, started information/practice sharing forums

.....[the monthly Beacon]
“is dependent upon the
input of users like you. By
sharing these messages,
based upon actual
incidents from
companies, the content is
more meaningful to
operation personnel.”

From Background on AIChE Center for
Chemical Process Safety Process Safety
Beacon – targeted at manufacturing
personnel.

All incidents are anonymized

AIChE
The Global Home of Chemical Engineers

CPS Center for Chemical Process Safety An AIChE Technological Community

Topics Events & Resources People & Community

Process Safety Beacon

Process Safety Moments | CCPS Permissions

Process Safety Beacon

Share LinkedIn Share Like 29 G+ Tweet WhatsApp Email +

Process Safety Beacon

Process Safety Messages for Manufacturing Personnel

[What is the Beacon](#) »

[Subscribe to the Beacon](#) » <https://www.aiche.org/ccps/resources/process-safety-beacon#Accessing%20Archived%20Beacon>

[How to Use the Beacon](#) »

Find Healthier Substances

Compare hazards, avoid restricted substances, and find safer alternatives.

Register for Free

Take the tour

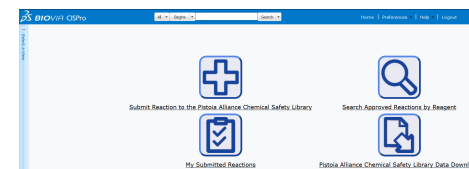
The Data Commons provides comprehensive hazard data for over 85,000 chemicals.

<https://commons.healthymaterials.net/>

- Offer independent hazard database Healthy Building Network's [Pharos Chemical and Material Library](#) (APIs access to the data)
- Created a community where building hazards can be discussed

The Chemical Safety Library – the history

- Who
 - **Pistoia Alliance**, a life sciences industry not-for-profit dedicated to **improving life sciences R&D** innovation and effectiveness through **pre-competitive collaborative projects and other activities**
- What
 - **Community sharing** of laboratory chemical **reaction incidents** to promote safety across companies. Experiment begun April 2017
<http://www.pistoiaalliance.org/projects/chemical-safety-library/>
- How
 - **Crowdsourced** submissions
 - **Curation** from project team
 - Resulting database made **freely** available for use and reuse



Status update



- Collection has **grown 4-fold** since launch, to **138 reactions**.
 - Working with three more pharma to capture their contributions
- Over **1000 individuals** have requested access to the CSL
 - A .csv file of the full database is [available on request](#).
- All collected data now **deposited into PubChem**
 - Section 12.8.3.1 of the compound summaries
- New **simplified submission** process –
 - simply fill out [google form](#) (curation team does data entry)
- Pistoia Alliance **experiment** runs through **end of 2018**
 - Seeking a strategic partner to further develop the CSL
- Demonstrating the value of the data
 - Pistoia Alliance 2018 **Hackathon winners** from Southampton University exploited CSL with ALEXA and notebook
 - **Datathon planned** at University College London Sept 21

Lessons learned from CSL experiment

PROS

- Universally welcomed as a needed resource
- Continued interest in accessing the database

CONS

- Data entry system difficult to use
 - Mitigation: Curation team now handles all data entry
- Getting new submissions remains a challenge!

One of the challenges

.....“incidents
continue to
happen. What
are we missing?”

Tom Connelly,
ACS CEO

Thomas Connelly, The ACS's role in Safety,
C&ENews vol 94, iss 26, p. 35
https://cen.acs.org/articles/94/26/ACSs_Role_in_Safety.html

Tremendous amounts of
good chemical safety
information out there

But much of it is “useless”

- Hard to find
- Scattered all over
- Unknown to many
- Not represented in standard way
- Not usable in meaningful ways (e.g. programmatic access)

ACS resources alone are daunting (a sampling)



How to live the ACS core value of safety?

- Where are we well positioned to contribute?
- Whom can we partner with to amplify the impact?



Carving out a role for ACS

ACS Strengths

- Serves the largest number of chemists in the world
- Represented across domains: academia to industry, to government
- Strong educational focus
- Strong presence in academic research
- Strong technical know-how thru CAS
- Safety articulated as a core value

Areas for ACS involvement?

- **Train students** on laboratory safety practices so industry does not bear the full safety training burden
- **Aggregate safety resources** to make them more known and accessible.
- Offer a **social platform** for members to **share, collaborate, and learn** from one another.

Acknowledgements

- Pistoia Alliance
 - Gabrielle Whittick (Project Manager)
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- Grace Baysinger (Stanford University)
- Sue Cardinal (University of Rochester)
- Dawn Mason (Eastman Chemical)
- Mark Jones (Dow)



Thank you

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www.pistoiaalliance.org