



Safety Culture in the Chemistry Department

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What is “*Safety Culture*”?

Creating Safety Cultures in Academic Institutions

A Report of the Safety Culture Task Force of the ACS Committee on Chemical Safety

1st Edition 2012 http://portal.acs.org/portal/PublicWebSite/about/governance/committees/chemicalsafety/CNBP_029720

Elements of a Strong Safety Culture:

- Leadership and Management of Safety in the Academic Institution
- Teaching Basic Laboratory & Chemical Safety through Continuous Learning and Spiral Education
- Safety Attitudes, Safety Awareness, Safety Ethics
- Learning from Incidents
- Collaborative Interactions that Help Build Strong Safety Cultures
- Promoting and Communicating Safety
- Encouraging Institutions Support of Safety by Funding Safety Programs and Supplies

Safety First

- Safety Culture is an organization's collective commitment, by leaders and individuals, to emphasize safety as an overriding priority to competing goals and other considerations to ensure protection of people and the environment.

A strong safety and health culture is the result of:

- Positive workplace attitudes – from the president to the newest hire.
- Involvement and buy-in of all members of the workforce.
- Mutual, meaningful, and measurable safety and health improvement goals.
- Policies and procedures that serve as reference tools, rather than obscure rules.
- Personnel training at all levels within the organization.
- Responsibility and accountability throughout the organization.

What are the basic elements of a safety and health culture?

- All individuals within the organization believe they have a right to a safe and healthy workplace.
- Each person accepts personal responsibility for ensuring his or her own safety and health.
- Everyone believes he or she has a duty to protect the safety and health of others.

Education

- A crucial component of chemical education for all personnel is to nurture basic attitudes and habits of prudent behavior so that safety is a valued and inseparable part of all laboratory activities throughout their career.

New ACS Accreditation Guidelines

Proposed

- *Programs must train students in the aspects of modern chemical safety appropriate to their educational level and scientific needs. Approved programs must promote a safety-conscious culture in which students understand the concepts of safe laboratory practices and apply them.*
- *Programs must train students in the aspects of modern chemical safety appropriate to their educational and scientific needs.*
- *The promotion of safety awareness and skills must begin during the first laboratory experience and be incorporated into each lab experience thereafter. Classroom and laboratory discussions must stress safe practices. Students should be actively engaged in the evaluation and assessment of safety risks associated with laboratory experiences.*
- *Safety understanding and skills should build throughout the curriculum and be assessed.*
- *Students should:*
 - *understand responsible disposal techniques*
 - *understand and comply with safety regulations*
 - *understand and use material safety data sheets (MSDS)*
 - *recognize and minimize potential chemical and physical hazards in the laboratory and know how to effectively handle laboratory emergencies.*
- *Students must undergo general safety training as well as lab-specific training before beginning undergraduate research.*
- *Approved programs must have an active departmental safety committee.*

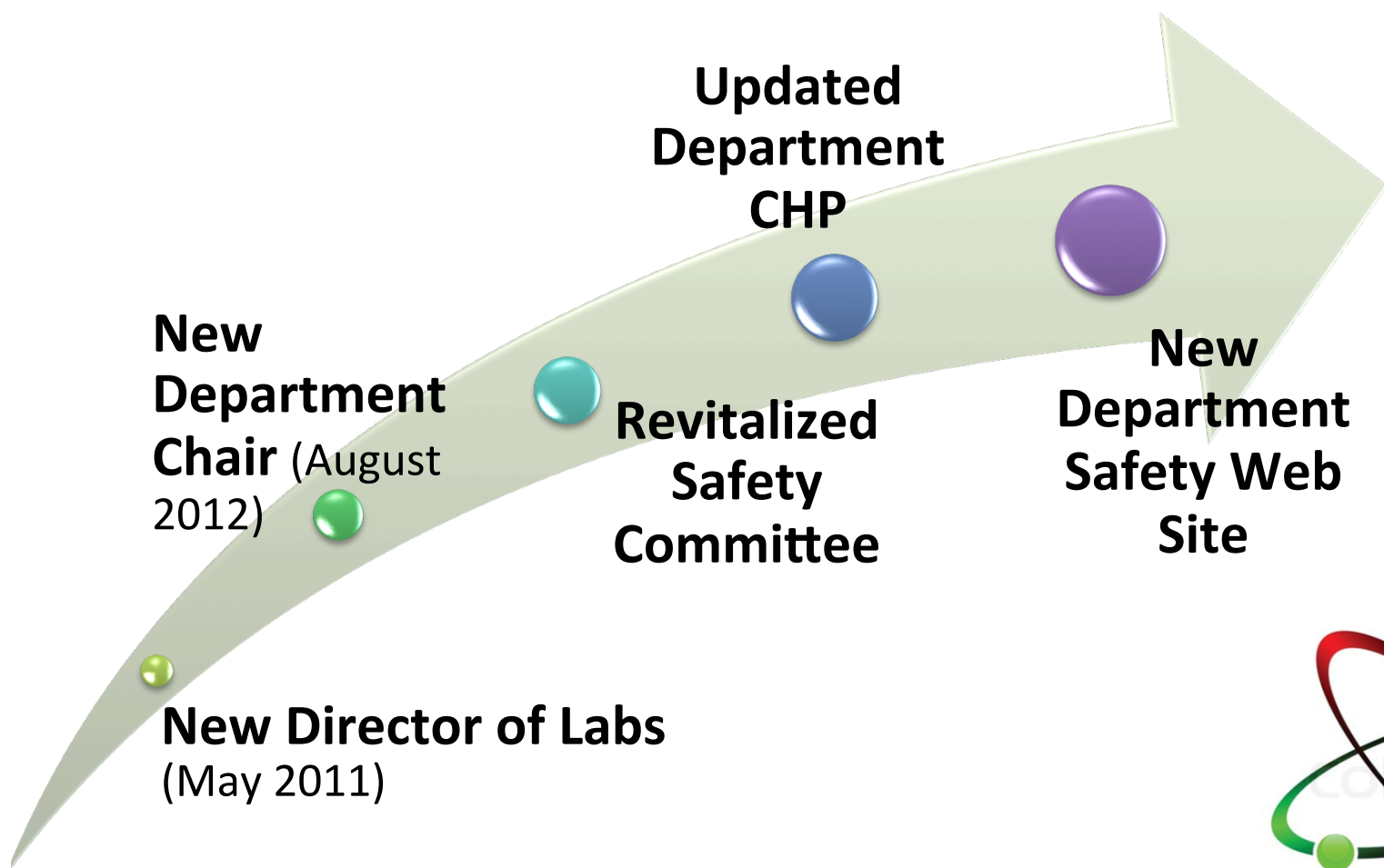
ACS Advancing Graduate Education

Safety

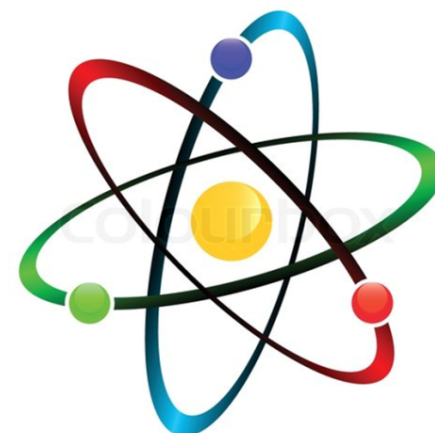
- *Academic chemical laboratories must adopt best safety practices. Such practices have led to a remarkably good record of safety in the chemical industry and should be leveraged.*
- Progress would afford better protection to students and other workers at all academic levels and would better prepare students to meet the natural expectations of their future colleagues and employers. Specifically, the Commission urges that safety as a culture must be consistently led by example in all graduate programs in the chemical sciences. Faculty members in the chemical sciences can and should take the lead toward best practices, and should advocate for support at the highest institutional levels. In the end, leadership from the top of an institution is essential for a sound safety culture to take root and thrive. The hazards and issues in the chemical sciences also exist in departments and programs outside the chemical sciences all across college and university campuses. A strong safety culture must not vary across institutions, and mechanisms for managing the associated costs cannot be left to individual departments or research groups.
- Today's companies demand safety performance from their employees that far exceeds what students are accustomed to in academic settings. There are many safety skills that are easily taught, such as doing hazard analyses, but the core issue is that students must be "grown" to value safety in a manner that is "bone deep" and can drive the highest level of performance, known as interdependent behavior. **This culture of safety is often a surprise to newly hired students. It should not be.**

Everyone does “compliance”

- EH&S has a continuing lab safety program for inspections, training, etc.
- EH&S invited by Chemistry Department for lab safety/chemical, hazardous waste, biological & fire safety training for new Graduate students in September.
- Chemistry Department has a Safety Committee, departmental CHP, Chemistry Research Day



***Increased
Attention
to Safety***



A horizontal scroll with a light brown, parchment-like texture. It is held open by four wooden rollers, two at the top and two at the bottom. The scroll is slightly curved, and the text is centered on it. The background is a dark blue, textured surface.

Chemistry Research Day 2012

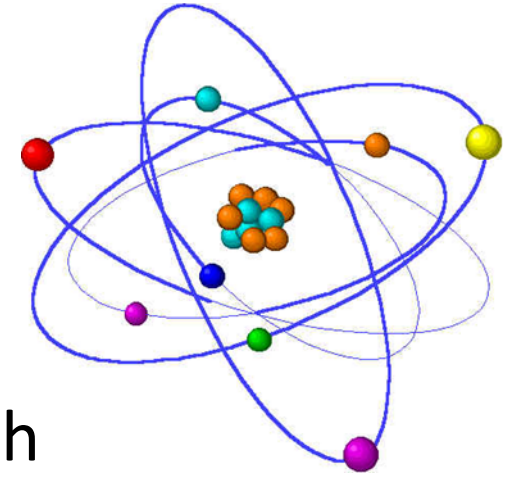
**A Celebration of Chemical Research
performed by graduate,
undergraduate and high-school
students, as well as postdoctoral
fellows and staff scientists
affiliated with Stony Brook
University and Brookhaven National
Laboratory.**



Winds of Change

- **Hurricane Sandy hits Long Island days before Chemistry Research Day**
- **Quick reschedule & change venue**
- **Change theme**
 - **Chemistry Research AND Safety Day**
 - **Idea came from Chemistry Safety Committee**

Everyone's Involved



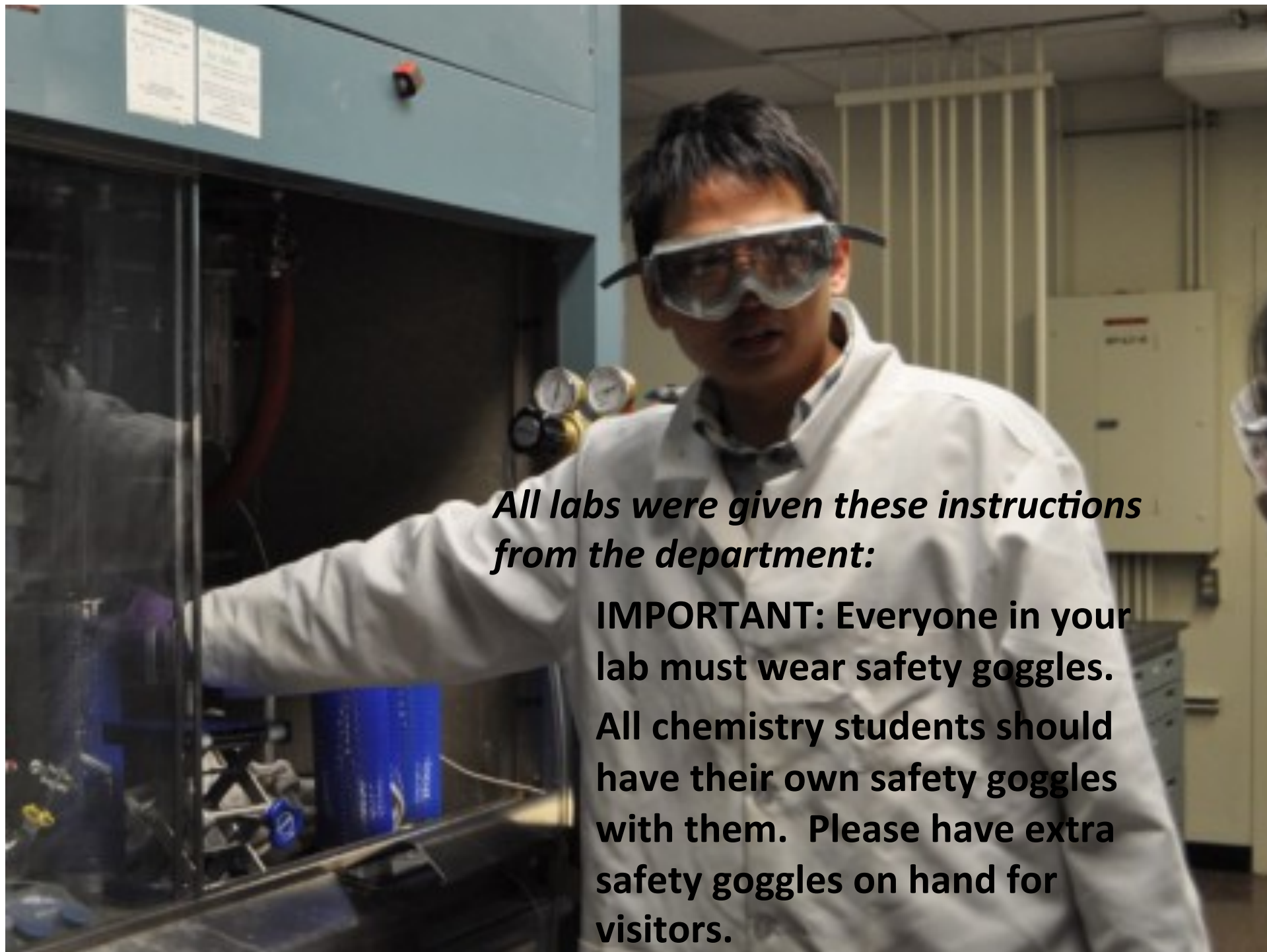
Poster & Lab Demo Sessions

- 106 posters describing ongoing research
- 28 lab demos

Lunch & Safety Expo

- EH&S safety information table
- Several companies with information tables and donated prizes





All labs were given these instructions from the department:

IMPORTANT: Everyone in your lab must wear safety goggles. All chemistry students should have their own safety goggles with them. Please have extra safety goggles on hand for visitors.

EH&S Pre Demo Guidance

- **If it involves a piece of equipment:** make sure you have a copy of the manufacturer's manual. Read it thoroughly! Pay special attention to any safety requirements. Have the manual available during the demo.
- **If it involves a chemical:** make sure you have a copy of the Safety Data Sheet (aka MSDS). Read it thoroughly! Pay special attention to Section 8 - PPE. Have the SDS available during the demo.
- Check the **EH&S web page** for additional information, handouts & policies. <http://www.stonybrook.edu/ehs/lab>. Read the appropriate information for your demo thoroughly! Have the page, handout and policies available during the demo.
- Conduct a **Hazard Review & write a Safety Protocol** for the procedure. Read the EH&S web page for information: <http://www.stonybrook.edu/ehs/lab/general-lab-safety/hazard-reviews.shtml>. Use the templates available on that page. Have the safety protocol reviewed & approved/signed by the PI. Have the safety protocol available during the demo.

SESSION I LABORATORY DEMONSTRATIONS

RM	RESEARCH GROUP	PRESENTERS	DESCRIPTION
454	Bhatia	Wendy Hom and Xiao Liu	Steps Towards a Successful Light-Scattering Experiment
422	Chu/Hsiao	Edward Lu	Fabrication of Polyacrylonitrile Nanofibers by Electrospinning
448	Khalifah	Diane Colabello	Compressed Gas Safety
634	Sampson	Li Tan, Rui Lu and Matthew Wiperman	Centrifuge Operation (Both Ultra Centrifuge and High-Speed Centrifuge)
606	Schärer	Burak Derkunt and Shivam Mukherjee	Safe Handling of Acrylamide & Ethidium Bromide in Casting a Gel
672	Takeuchi	Roberta DiLeo	Proper PPE and Glove Compatibility
474	Wong	Jonathan Patete, Megan Scofield and Amandia Tiano	How to Use a Tube Furnace in Conjunction with a Gas Tank
632	Tonge	Lauren Spagnuolo	Mimicking Reverse-Phase Silica Conditions Using Normal\ -Phase TLC Plates

SESSION II LABORATORY DEMONSTRATIONS

RM	RESEARCH GROUP	PRESENTERS	DESCRIPTION
572	Boon	Dhruv Arora, Kate Higgins and Takahiro Ueno	Hot Box
748	Drueckhammer	Xiaofei Liang and James Liao	Solvent Recycling System
532	Carrico	Lisa Shah	Determining the Thermal Decomposition Temperature of Novel Azido Compounds
754	Grubbs	Zhe Sun	Schlenk Line and Trap
464	Jia/Lacey	Damian Reynolds	Cybersecurity
706	Rudick	Xiaoli Liang	AtmosBag Use Instructions
546/ 562	Sears/White	Matthew Cich	Compressed Gas Safety

SESSION III LABORATORY DEMONSTRATIONS

RM	RESEARCH GROUP	PRESENTERS	DESCRIPTION
452	Bhatia	Wendy Hom and Xiao Liu	All-Around Experiment Hazard Awareness
424	Chu/Hsiao	Zhe Wang	Oil Adsorption with Modified Luffa Sponge
446	Khalifah	Diane Colabello	Pellet Press
612	Koch	Soumya Bhattacharya and Su'aad Zaman	Safe Transfer of Large Amounts of Pyrophoric Organic Compounds (n-BuLi)
644	Sampson	Siyeon Lee and Wei Wang	Solvent Still System Operation
672	Takeuchi	Jessica Durham	Proper Fume Hood Use
474	Wong	Christopher Koenigsmann and Crystal Lewis	How to Use an Acid Digestion Bomb

SESSION IV LABORATORY DEMONSTRATIONS

RM	RESEARCH GROUP	PRESENTERS	DESCRIPTION
544	Boon	Dhruv Arora, Kate Higgins, Sandhya Muralidharan and Takahiro Ueno	Spot the Violation
530	Carrico	Yoon Hyeun Oum and Lakshmi Rajaram	Proper Processing of Adenoviral Samples in a Laminar Flow Hood
754	Grubbs	Zhe Sun	Cryogen Safety with Liquid Nitrogen
774	Goroff	Hongjian Jin	Glove Permeability
724	Ojima	Krupa Haranahalli and Simon Tong	Acid / Base Safety
706	Rudick	Xiaoli Liang	Quenching Lithium Aluminum Hydride



EH&S

What's Wrong with this Lab?

Contest

Display board with 25 pictures of lab safety violations from Chemistry Department labs taken over many years. No lab identifiers.

What's Wrong with this Picture?

Identify 10 problems correctly to be eligible for a prize!

Please make sure your handwriting is legible if you want to be eligible for a prize!

Use the back if more space is needed.

Name _____ SBU ID _____ Group _____

And the winners are....



Best Safety Demonstration

1. Boon Group – “Hot Box”
2. Goroff Group – “Glove Permeability”

EH&S Award “Spot the Violation”

Christopher K. - Wong Lab



Cleanest Lab

1. Boon Group
2. Takeuchi Groups

Chemistry Research & Laboratory Safety Day

Stony Brook University's [Department of Chemistry](#) included laboratory safety demonstrations for the first time in its annual Chemistry Research Day, which was held on January 18. The celebration showcases the department's research, what students study and learn, and how it is all done in a safe environment. This emphasis on safety is a conscious step in ensuring the laboratory culture continues to value safety as well as data.

Graduate students and postdoctoral fellows presented the safety procedures used in their own laboratories as self-contained educational modules. The presentations included live demonstrations, narratives, question-and-answer sessions, handouts, videos and pictures, which were very well received by fellow students, faculty and visitors. The demonstrations have been developed into written standard operating procedures that will be revised by incorporating useful feedback from the university-wide [Environmental Health and Safety](#) community.

Sponsors provided prizes that were awarded to the labs voted best demo, cleanest lab and best able to spot safety violations by their peers. Provost [Dennis Assanis](#) and Chemistry Chair [Nicole Sampson](#) presented the awards to the students at the end of the day. Following a reception in the Wang Center Theater lobby, Professor Stephen Koch gave the keynote address, "Dr. Frankenstein, the Lye of Blood and the Bioinorganic Chemistry of Hydrogen."

University Press Release

Post Event Activity

Hazard Assessment & SOP training

- 2 classes
- trained 60 people, including PIs

Additional training to be scheduled

- PPE
- Spills

Chemistry CHP now requires EH&S Lab Safety/Chemical Hazards and Hazardous Waste training ANNUALLY

Safety Day will continue separately from ***Research Day*** next year

Big Bang! Publicity!



April 17th, 2013 • 02:04

Stony Brook chemistry incorporates lab safety into Research Day celebration

By Jyllian Kemsley • Posted in Academia, Safety resources, Training • Comments Off

A note from Jyllian: I get a lot of questions from people asking how to be positive and proactive about safety rather than punitive and reactive. If your group or department is doing something that others could find useful, please [get in touch!](#)

<http://cenblog.org/the-safety-zone/2013/04/stony-brook-chemistry-incorporates-lab-safety-into-research-day-celebration/>

Does this have a lasting effect?

- ***Department's idea for LS day organized by department, not EH&S***

Leadership and Management of Safety in the Academic Institution



- ***Post event training***
- ***Annual required EH&S courses***

Teaching Basic Laboratory & Chemical Safety through Continuous Learning



- ***EH&S "What's Wrong with this Lab" photos***

Learning from Incidents



- ***Each lab group now has LS Group Coordinator***

Collaborative Interactions that Help Build Strong Safety Cultures



- ***Event included in SBU Happenings***
- ***C&EN Safety Zone blog***

Promoting and Communicating Safety



- ***Hiring new departmental position with safety duties***

Encouraging Institutions Support of Safety by Funding Safety Programs and Supplies



Academic Leadership

Provosts, Deans, Chairs

- Carry out steps to accomplish the vision of the top leader for safety
- Ensure that responsibilities and accountability for safety are incorporated in all employees performance plans and annual evaluations
- Establish institutional safety councils and committees
- Work with faculty and staff to implement a plan to incorporate laboratory safety education into the undergraduate curriculum
- Arrange for minimum safety training for all faculty and other laboratory employees
- Establish and implement a health and safety program that includes EHS personnel
- Establish an institutional system for incident investigation, reports, and data management
- Prepare annual safety budgets for presidential approval
- Implement a safety promotional plan for the institution

Academic Leadership

Faculty & Teaching Assistants

- Teach safety in a continuous manner with increasing complexity as students' knowledge of the science builds throughout the entire chemistry undergraduate curriculum
- Set a personal example for safety and be an active promoter of safety – talk with students frequently about safety and its importance and encourage fellow faculty in safety measures
- Start all laboratory sessions with a lesson in safety and begin all research group meetings with safety topics
- Accept responsibility and accountability for safety – and hold your students and staff responsible and accountable for safety
- Discuss laboratory incidents or near misses (incidents that could have resulted in injuries but just narrowly missed) with students and emphasize the lessons that can be learned from these incidents
- Assign students responsibilities for papers, seminars, or presentations about safety or with significant safety components
- Recognize students for following safe practices
- Ensure that TAs receive the necessary safety instruction to provide guidance and direction for safety to students working in their laboratories (teaching a safety topic at the beginning of each lab session will also educate the TAs)

Lab Group

Graduate Students & Postdoctoral Associates

- Student led team to assess safety issues, learn best practices from Dow, and propose solutions to be implemented at UM.
- Each lab must have LSO. Additional training provided to clarify duties and available resources.
- Toured Dow labs to observe workplace research laboratories.
- Surveyed UM labs to determine baseline compliance and attitudes toward safety.
- Group developed posters and weekly departmental safety updates.
- “Safety Moments” presented at group meetings developed by students.
- Compliance, Awareness, Resources and Education (CARE).

Questions?

“A strong safety culture develops superior safety skills and strong safety ethics by building year after year, beginning with the first year undergraduate curricula and continuing throughout the entire undergraduate experience and into graduate studies and postdoctoral training. These safety skills, safety education, and safety ethics will serve students well into their future careers.”

- Creating Safety Cultures in Academic Institutions



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<https://cls.ucla.edu//>

The UC Center for Laboratory Safety (Center) has been created to improve the practice of laboratory safety through the performance of scientific research and implementation of best safety practices in the laboratory. The Center operates under the oversight of the UC Center for Laboratory Safety Advisory Board with technical support from the UCLA Office of Environment, Health and Safety and the UCLA School of Public Health – Department of Environmental Health Sciences.

Dow Lab Safety Academy

<http://safety.dow.com/>

Welcome to the Dow Lab Safety Academy!

At Dow, our safety culture is part of everything we do and every decision we make. The Dow safety mindset is based on driving behavior toward incident prevention, sustained by renewed employee engagement and the responsibility to provide a safe work environment for our employees.

Our goal with the Dow Lab Safety Academy is to enhance awareness of safety practices in academic research laboratories and to promote a safety mindset in the future workforce of the chemical community.

Orientation & Training

Specialized Topics

Plan, Evaluate, Execute

Sustainable Safety Culture



The Joint Safety Team (JST) is a researcher-led organization focused on improving the culture of safety in chemical laboratories at the University of Minnesota. The JST consists of all graduate student or postdoc Laboratory Safety Officers (LSOs) within the Departments of CHEM and CEMS. We also welcome any other interested graduate students or postdocs to participate. If you are interested in supporting our objective, meeting new people, or improving your leadership skills, then please email jst@umn.edu or attend the next monthly meeting to get involved!

JST Home

LSO Resources

Safety Training

Safety Moments

Labeling Resources

Safety Resources

SOP Resources

Hazardous Waste

Incident Reporting

Incident reporting

Reporting lab accidents and near-accidents can allow others to learn what measures need to be taken when running an experiment. This page is dedicated to outlining the appropriate forms to fill out in case of an incident and how to report these learning experiences for other University researchers

Learning Experience Reports (LERs)

A Learning Experience Report is a document for recording incidents or situations that could have lead to incidents (near-misses) that happen in a laboratory setting in a format that can allow others to learn from the experience. These files will be anonymous with a brief description of the incident and the measures that were taken to solve the problem.

[Learning Experience Report Form](#) (Secure)

Forms for reporting lab Incidents

Reporting safety concerns

Maintaining a safe work environment is the responsibility of all researchers. If you have a safety concern, you can report this to the Office of Occupational Health and Safety at the University of Minnesota campuses.

- [Safety concern report form](#)

Lab incident investigation

Incidents that lead to a chemical spill, fire, or other safety hazard should be reported and investigated as soon as possible after the incident as possible.

- [Accident Investigation form](#)

Safety Moments

Safety moments are 2 - 5 minute topics regarding an aspect of safety in lab or everyday life that can be used to start off any meeting or seminar with a consideration for safety.

Safety moment collection and templates

Need an idea or content for a safety moment? The JST has provided a list of topics, template powerpoint slides, and a collection of moments that are ready to go. Just download the slides and present them at the start of group meetings and departmental seminars.

Feel free to adapt the safety moments to meet the specific needs and time constraints for an audience or occasion; this may mean using only a portion of the prepared slides for a topic or including additional resources for an in-depth discussion.

The collection is divided into categories, and the content for each is accessible by clicking on the subheadings in the list of topics (below).

Help build the collection by sending your safety moments to jst@umn.edu with "safety moment- topic" in the subject line. Please put content in the provided [template](#) and cite reliable, credited sources.

<http://www.jst.umn.edu/>

National Research Council: Safety Culture in Academic Laboratories

1st Committee Mtg: Washington, DC - 05/15/13, 2nd: San Francisco, CA - 06/26/13, 3rd: Boston, MA - 08/28/13

4th: Irvine, CA - 11/20/13

<http://dels.nas.edu/Study-In-Progress/Safety-Culture-Academic-Laboratories/DELS-BCST-11-04?bname=bcst>

Statement of Task

The National Research Council, through its Board on Chemical Science and Technology and Board on Human Systems Integration, will examine laboratory safety in chemical research in non-industrial settings. It will compare practices and attitudes in these settings with knowledge about promoting safe practices from the behavioral science literature. It will make recommendations for systems and practices that would improve the safety of chemistry research laboratories specifically and other non-industrial research laboratories more generally. It will:

- Describe the current hierarchy of actors responsible for laboratory safety in US education and in national laboratories. Identify the strengths and shortcomings of these hierarchies and how it impacts the development of a culture of safety in academic research laboratories.
- Examine knowledge from the behavioral sciences, and experience with safety systems from other sectors (such as industrial research facilities, nuclear energy, aviation and medical) for key attributes of successful safety systems and cultures. Use this to draw lessons that could be applied non-industrial laboratory research.
- Provide guidance on systems (such as training and reporting) that might be established, maintained, and utilized to raise the overall safety performance of US chemistry research laboratories.
- Determine key actors required to achieve broad implementation of improved safety performance in research laboratories, especially in the US higher educational system, and provide guidance on their roles and how they might be effectively engaged in improving safe laboratory practice.

The resulting findings and conclusions will be disseminated broadly to key actors in academic laboratory safety.



American Chemical Society
Division of Chemical Health & Safety

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<http://www.dchas.org/>

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<http://www.acs.org/content/acs/en/about/governance/committees/chemicalsafety.html>

Committee on Chemical Safety

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Robert H. Hill, Chair

Welcome to the Committee on Chemical Safety (CCS)! CCS promotes and facilitates safe practices in chemical activities. We provide advice and counsel to ensure safety by calling attention to potential hazards and stimulating education in safe chemical practices. CCS also serves as a resource to other ACS units on matters related to chemical safety and health.

Here you will find publications, tips, and other information to improve safety in schools, the workplace, and beyond.