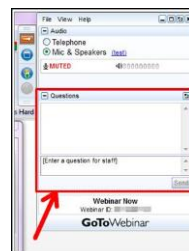


Have Questions?



Type them into questions box!

“Why am I muted?”

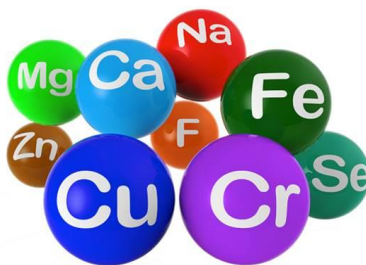
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Assistant Professor of Chemistry and Chemical Hygiene Officer, Eastern Mennonite University
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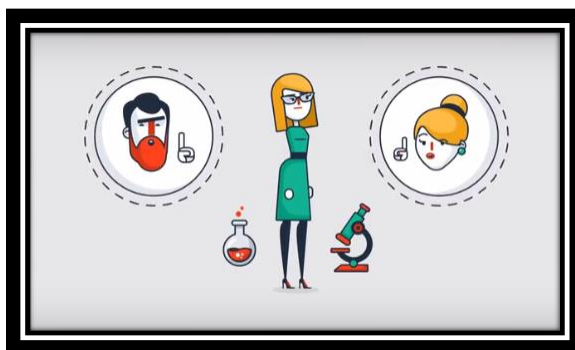
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- Know your career options
- Develop strategies to strengthen your skills
- Map a plan to achieve your career goals

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Global Chemists' Code of Ethics (GCCE)



Global Chemists' Code of Ethics Workshop, Kuala Lumpur, Malaysia – April 2016



General ethical guidelines for practicing chemists, chemical engineers, and other professionals, meant to increase safety and security in the global chemical enterprise.

- Created for adoption or to influence ethical codes for scientific societies, universities, or companies.
- Key provisions: Environment, Research, Safety, Security, and Publishing & Writing.
- Preambles for: Policy Makers, Academia, and Industry.

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Thursday, October 26, 2017



Psoriasis: Treatment and Novel Approaches

Session 9 of the 2017 Drug Design and Delivery Series

Frank Narjes, Principal Scientist, AstraZeneca

John Morrison, Senior Research Investigator Bristol-Myers Squibb and Chair-Elect of the Drug Discovery and Development Interface Section, American Association of Pharmaceutical Scientists

Thursday, November 2, 2017



How to Create Sustainable Product Design that Satisfies Production Demand and Eco-Awareness

Session 10 of the Industrial Science Series

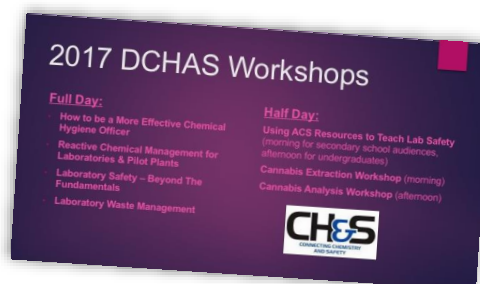
Eric Beckman, Entrepreneur and Bevier Professor of Engineering in the Chemical Engineering Department at the University of Pittsburgh

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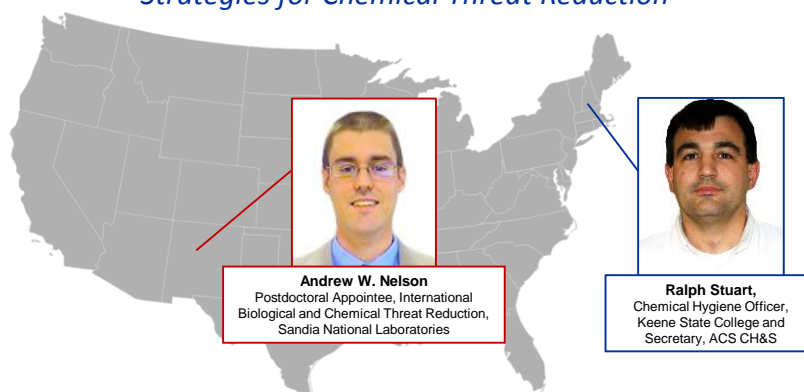
The division is dedicated to supporting the efforts of chemical manufacturers, industrial and academic researchers, and science teachers at all levels to work for a safe and healthful work environment. Through our technical symposia, the Division's Journal, the *Journal of Chemical Health and Safety*, our **workshops** and our **DCHAS-L listserv**, we provide a forum for scholarly health and safety research, advice and counsel from an experienced group, and support for health and safety efforts in industry and academia.

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Avoiding the Next Chemical Catastrophe: Strategies for Chemical Threat Reduction



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Avoiding the Next Chemical Catastrophe: Strategies for Chemical Threat Reduction

Andrew W. Nelson, PhD MPH

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Daesh/ISIL/ISIS and the Capture of Mosul

Mosul University Before Daesh



Mosul University After Daesh



Mosul captured in June 2014





What Does this Have to Do with Chemistry?

labs at Mosul University



chemical weapons



airport security testing equipment



technical experts



15

Audience Challenge Question

ANSWER THE QUESTION ON BLUE SCREEN IN ONE MOMENT



How prepared is your laboratory against threats?

(select from the possible answers on the blue screen in one moment)

- What is a chemical threat?
- We are not as prepared as we would like to be but want to learn more
- We are somewhat prepared and would like to learn more
- We are very prepared and have a security risk management system in place

16

Sandia National Laboratories Albuquerque, New Mexico, USA



Bill Tondreau



International Biological and Chemical Threat Reduction: Core Capabilities



Human Capacity Development

Risk Management

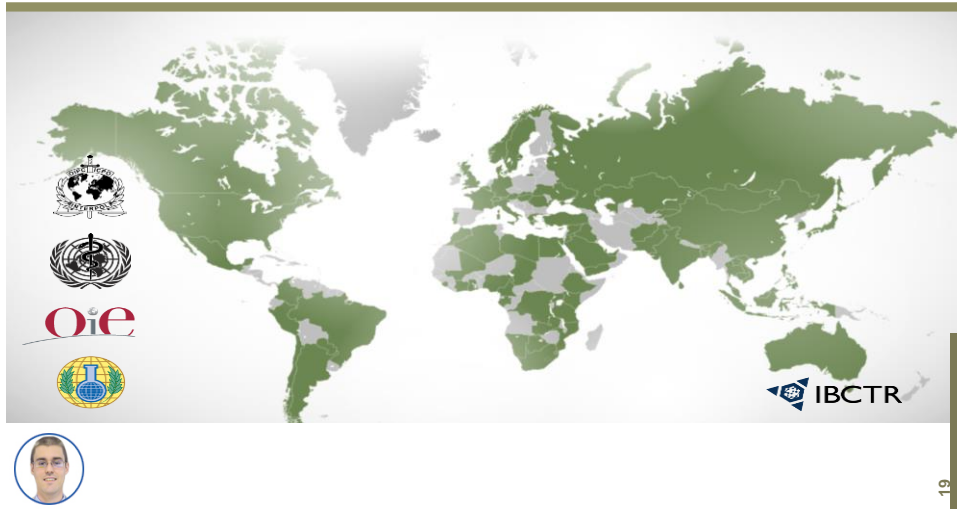
Analysis

Health Security





IBCTR's Global Experience in Risk Management



Which Chemicals Need to Be Secured?

WEAPONS AND EXPLOSIVES



ILLICIT DRUGS





Chemical Weapons—An Ancient Problem



1000 B.C.—China: Arsenical Smoke



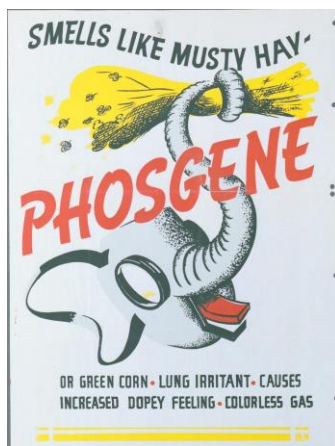
600 B.C.—Greece: Helleborus



21



Chemical Weapons—Dual-Use Chemicals



WWI – Europe: Chlorine, Phosgene, Mustard

22



Chemical Weapons—Designed to Kill



1937-present— Germany, Iraq, Japan

Iraq-Iran War: Iraq was first nation to use nerve agent (Tabun) in warfare 1984 against Iran



23



Chemical Weapons—Non-State Actors



Aum Shinrikyo: nerve gas attacks in Matsumoto (1994) and Tokyo Subway System (1995)



24



International Efforts—Chemical Weapons Convention (CWC)



OPCW

1997-**2017**
OPCW
YEARS

- CWC entered into force in April 1997
- Headed by the Organization for the Prohibition of Chemical Weapons (OPCW)
- Goal is to end the development, production, stockpiling, transfer and use of chemical weapons
- US signed in 1993 and ratified in 1997
- Egypt, North Korea, and South Sudan have not signed or acceded to the CWC
- <https://www.opcw.org>



25



Chemical Weapons—Still A Threat Today



2013

“The United States Government assesses with high confidence that the Syrian government carried out a chemical weapons attack in the Damascus suburbs on August 21, 2013.”



2017

OPCW Fact-Finding Mission Confirms Use of Chemical Weapons in Khan Shaykhun on 4 April 2017

26

Audience Challenge Question

ANSWER THE QUESTION ON BLUE SCREEN IN ONE MOMENT



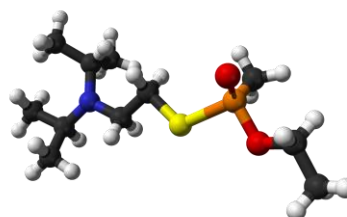
Which V-series nerve gas was alleged used to assassinate Kim Jong-nam of DPRK? (select from the possible answers on the blue screen in one moment)

- VE
- VG
- VM
- VR
- VX

27



Chemical Weapons—Still A Threat Today: DPRK



Kim Jong-nam, February 13, 2017
alleged assassinated with VX

28



Explosives—Made from Chemicals



Oklahoma City Bombing, April 19, 1995

29



Explosives—Dual-Use Chemicals



Boston Marathon Bombing, 2013

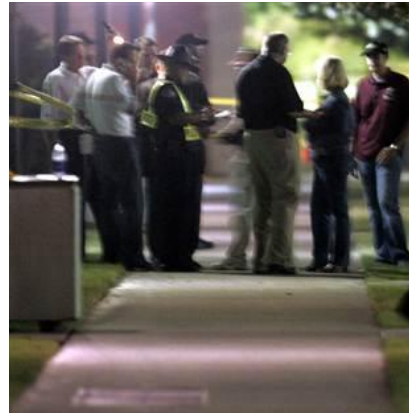
30



Explosives—A Threat to Universities



3 Arrested, March 16, 2017, George Mason University, bomb materials



Bombing near packed football stadium at the University of Oklahoma, Oct 2005



31



Illicit Drug Production—Not just a Hollywood Drama



Breaking Bad, Albuquerque, NM



32

Audience Challenge Question

ANSWER THE QUESTION ON BLUE SCREEN IN ONE MOMENT



Which of the following chemicals could cause a dual risk for your lab? (multiple correct answers may be possible)

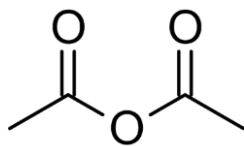
- Acetic anhydride
- Pseudoephedrine
- Methamphetamine
- Naloxone
- Ethanol

33

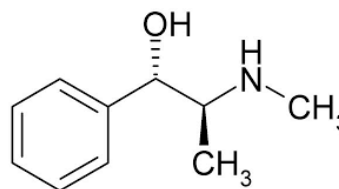


Illicit Drug Production—Dual-Use Lab Reagents

- Opioids and acetic anhydride
- Pseudoephedrine and methamphetamine
- Ethanol
- Etc.



acetic anhydride



pseudoephedrine



34



Illicit Drug Production—Methamphetamines



Image of a methamphetamine lab

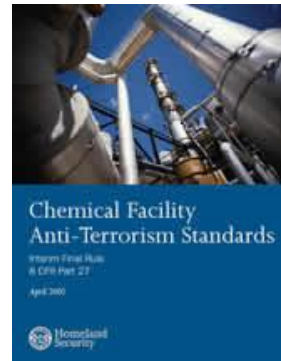
2008, UC Merced, Student Stole ~\$10k in chemicals to make meth



35



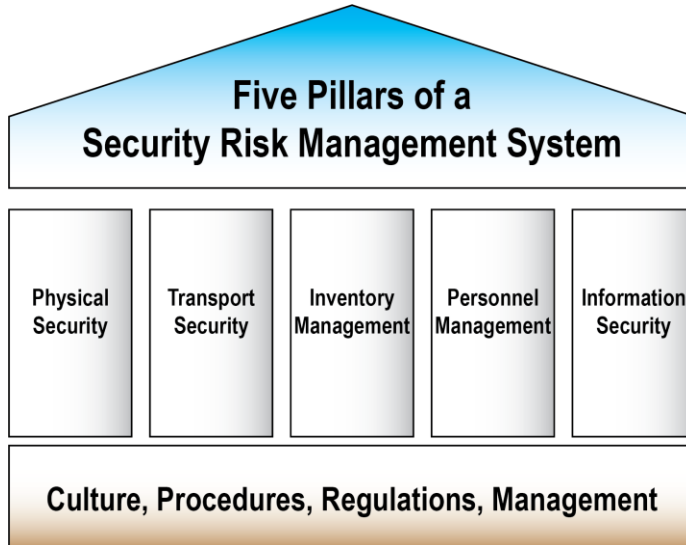
How Do We Stop Illicit Usage of Chemicals?



36



Regulations Are Just One Piece of the Solution



37



Physical Security



38

Transport Security



39

Inventory Management



40



Personnel Management



41



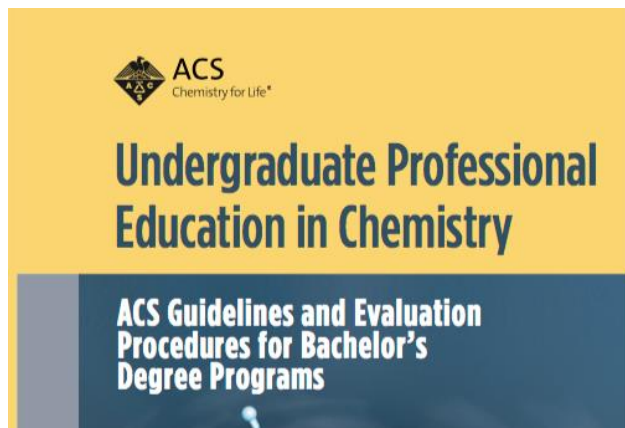
Information Security



42



Change Culture through Education



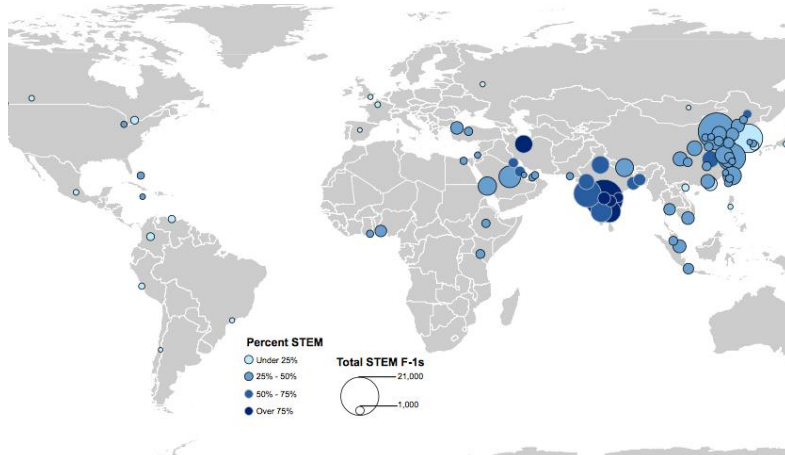
Word “Safe” (and its derivatives) mentioned 40 times,
no mention of “Secure” (and its derivatives)

43



Our Education System Has Global Reach

Global Hometowns of STEM Foreign Students, 2008-2012



426,505 F1 Visas for STEM students (2008-2012)

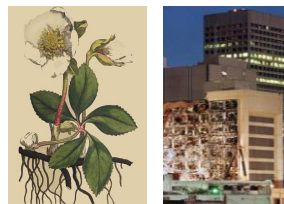
44



Key Messages

Chemical Security is:

- Ancient AND **current** problem
- Important for developing and **developed countries**
- Prevents weapons, illicit drugs, and explosives
- **A teachable skill!**

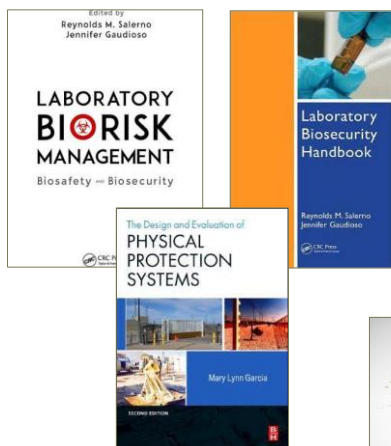


45

How can we work together?



BOOKS



SOFTWARE



CMS©



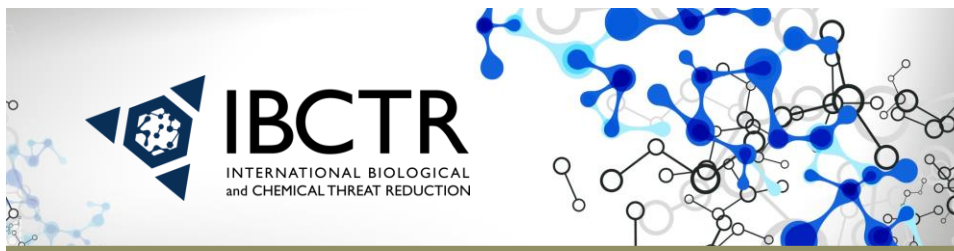
Chem-SAM

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INTERNATIONAL NETWORKS



46

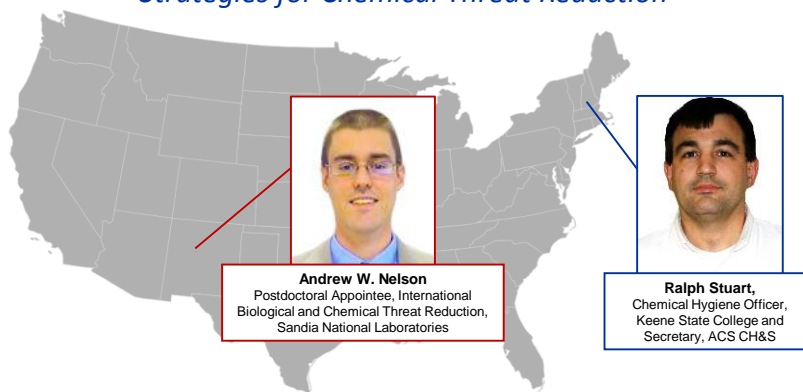


**Thank you for your time!
Let's continue to discuss:**

Email: awnelso@sandia.gov



***Avoiding the Next Chemical Catastrophe:
Strategies for Chemical Threat Reduction***



Andrew W. Nelson
Postdoctoral Appointee, International
Biological and Chemical Threat Reduction,
Sandia National Laboratories

Ralph Stuart,
Chemical Hygiene Officer,
Keene State College and
Secretary, ACS CH&S

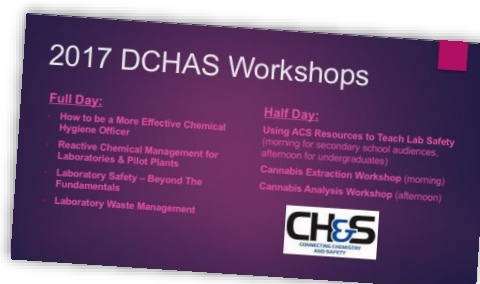
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Session 9 of the 2017 Drug Design and Delivery Series

Frank Narjes, Principal Scientist, AstraZeneca

John Morrison, Senior Research Investigator Bristol-Myers Squibb and Chair-Elect of the Drug Discovery and Development Interface Section, American Association of Pharmaceutical Scientists

Thursday, November 2, 2017



How to Create Sustainable Product Design that Satisfies Production Demand and Eco-Awareness

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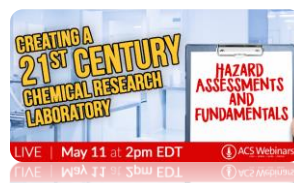
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Assistant Professor of Chemistry and Chemical Hygiene Officer, Eastern Mennonite University
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