

Improving people's lives through the power of best chemical health and safety practices

The ACS Division of Chemical Health and Safety provides authoritative technical resources and mentorship in chemical health and safety for all.



**Professionalism, Safety,
and Ethics**



**Looking Forward: Fifty Years of
Chemical Safety Experience**

Looking Forward: Fifty Years of Chemical Safety Experience

NEAL LANGERMAN

Advanced Chemical Safety
San Diego, California, USA

**255 ACS National Meeting
Boston, MA August 2018**



Mentors & Role-Models

- Warren Kingsley
 - JT Baker Lab Safety Workshop
 - JT Baker “Saf-T-Data” Labeling System

JBaker **BAKER SAF-T-DATA* Guide**

An easy-to-understand hazard classification appears on JT Baker labels. It will help include your awareness of safe occupational health and safety practices. Using the BAKER SAF-T-DATA System as a guide you can quickly learn the hazards each substance presents to your health and safety. Personal laboratory practice equipment that should be used for handling, and the recommended storage of compatible products by color code.

A NUMERICAL HAZARD CODE
Substances are listed on a scale of 1 (not hazardous) to 4 (potentially hazardous) in each of four hazard categories:
 • **HEALTH** - the danger to toxic effect a substance presents if inhaled, ingested, or absorbed.
 • **FLAMMABILITY** - the tendency of the substance to burn.
 • **REACTIVITY** - the potential of a substance to explode or react violently with air, water or other substances.
 • **CONTACT** - the danger a substance presents when exposed to skin, eyes, and mucous membranes.

Rating Scale: 4 Extreme, 3 Severe, 2 Moderate, 1 Slight, 0 None*

HAZARD SYMBOL
A substance rated 3 or 4 in any hazard category will also display a hazard symbol. These easy-to-understand pictograms emphasize the serious hazards related to a substance:

HEALTH: CANCER, CORROSIVE, TOXIC, IRRITANT, HARMFUL, DANGEROUS
 FLAMMABILITY: FLAMMABLE, HIGHLY FLAMMABLE, EXTREMELY FLAMMABLE
 REACTIVITY: EXPLOSION, CORROSIVE, REACTIVE
 CONTACT: IRRITANT, CORROSIVE, DANGEROUS

B LABORATORY PROTECTIVE EQUIPMENT
This series of pictograms suggests the personal protective clothing and equipment recommended for use when handling the substance in a laboratory situation. The pictograms relate to the combination of hazards presented by the substance.

GOGGLES, GOGGLES & SHIELD, LAB COAT, LAB COAT & APRON, STOP, PROPER GLOVES, VENT HOOD, EXTINGUISHER, EXTINGUISHER, EXTINGUISHER

C STORAGE COLOR CODING
The SAF-T-DATA label suggests a unique method for setting up your chemical storage area. Compatible products are identified with the same color. Simply group these colors together and follow the recommendations for appropriate storage:

BLUE - health hazard, store in a secure glass area
 RED - extremely hazardous, store in a secure glass area
 YELLOW - readily reacts with water, store in a secure glass area
 WHITE - contact hazard, store in a secure glass area
 ORANGE - substances that are not readily miscible with water, store in a secure glass area

D SPILL CONTROL CODE
This statement indicates which JT Baker spill control kit is the solution for use with the substance.

E NFPA SYSTEM*
This system was adopted by the NFPA in 1970 to categorize the level of hazard. It is based on the hazards created by a substance in a laboratory situation. For the purpose of the hazard ratings in the Baker SAF-T-DATA System, which are based on substances in a laboratory situation, we have always conformed with the NFPA ratings.

4 L Acetone 9006-03
 'BAKER ANALYZED'® Reagent
 (CH₃)₂CO FW 58.08

ACTUAL ANALYSIS, LOT D08826
 Main A.C.S. Specifications: 99.6 %
 Assay (CH₃)₂CO by GC, corrected for water: 99.6 %
 Color (HPLC): 0.7500
 Density (g/mL at 25°C): 0.7850
 Refractive Index (n_D 20): 1.3582
 Boiling Point (mmHg): 56.0
 Flash Point (mmHg): < 0.0003
 Autoignition (mmHg): < 0.0003
 Incompatibility (CH₃)₂CO by GC: 0.02
 Incompatibility (CH₃)₂CO by GC: 0.02
 Substrate Reactivity: 0.02
 Water (H₂O) by Karl-Fischer: 0.3
 Heat of Vaporization: 0.3
 Copper (Cu): < 0.0003
 Heavy Metals (ppm): < 0.0003
 Nickel (Ni): < 0.0003

J.T. Baker Inc. Philadelphia, NJ 08108 USA 800 955 2151



Mentors & Role-Models

- Eileen Segal
- Myth 1. Contact Lenses Should Be Prohibited in Chemical-Use Areas
- Myth 2. Hydrofluoric Acid Needs Extended Flushing Time on Exposed Areas
- Myth 3. Flammable Storage Cabinets Should Be Vented

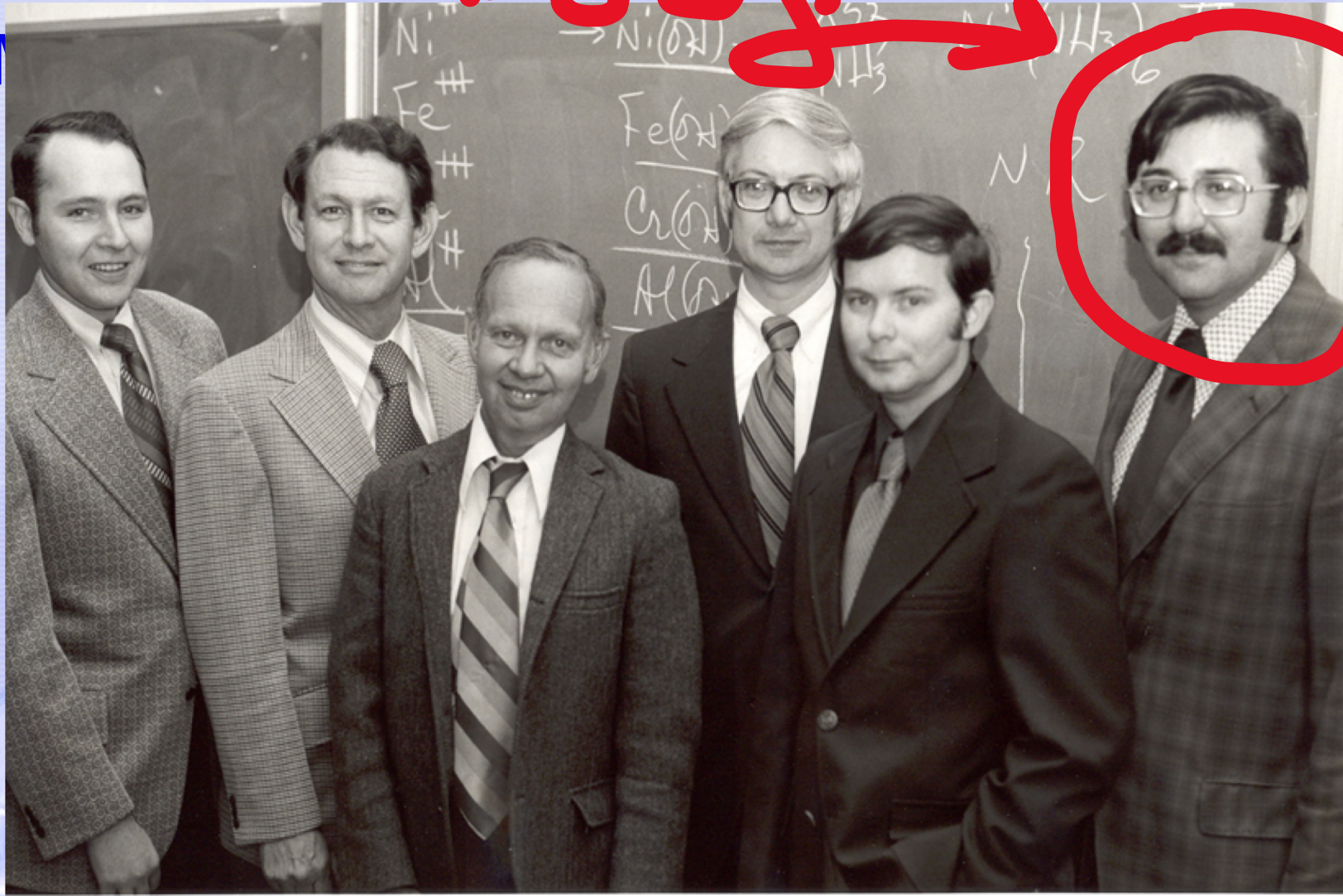


Mentors & Role-Models

- Jay Young
 - Author – 1st Edition SACL
 - Expert Witness
 - Professional Curmudgeon
 - First ELECTED CHAS
Chair



Doug

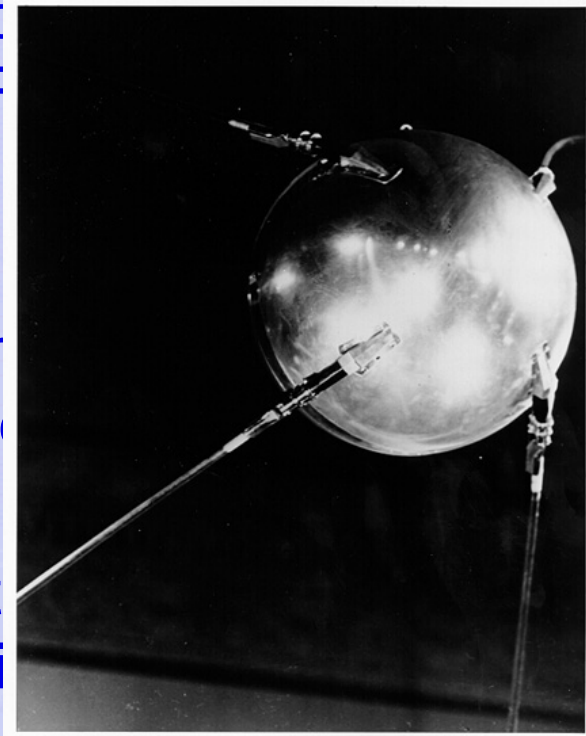


Victims



Milestones

- 4 October 1957 Sputnik 1 launched
- 1966 Explosive decomposition of hydrazine
injuries 4 people
- 1970 HN_3 Release
- 1973 Dilution of hydrazine
Tufts University
Medicine
- 1975 Establishing
committee
University
- 1978 SCUBA incident



Milestones

- 1980 RCRA enters into force
Warren & Eileen
- 1980 Chemical Safety Associates
formed
- 1985 Full-time career
“Make the world safe for ions, molecules and
free radicals”



Significant Projects

- Waste Nitric Acid
- Tetra-azido pentaerythritol Explosion
- UCLA
- Electronic component recycler
- AMOCO Oil Company



The Clouded Crystal Ball¹

- Chemistry students
 - Increased safety awareness
 - Enhanced skill set
 - Global networking
 - Social responsibility

¹ Klotz I.M. (1986) The Clouded Crystal Ball: Creases of the Mind. In: Diamond Dealers and Feather Merchants. Birkhäuser, Boston, MA doi.org/10.1007/978-1-4899-3529-8_2



The Clouded Crystal Ball

- Faculty and PI's
 - Recognition of safety responsibility
 - Enhanced safety knowledge & skills
 - Markedly increased need for technical safety information



The Clouded Crystal Ball

- Colleges & Universities
 - Risk managers increased authority
 - Administrators include safety performance in evaluations
 - Repeated litigation shaping performance



The Clouded Crystal Ball

- Public K-12 schools
 - Resource starved
 - Qualified science teachers scarce
 - Pressure to eliminate “risk” from science classrooms



The Clouded Crystal Ball

- Small manufacturing firms
 - Struggle for compliance
 - Need for practical, cost-effective guidance



The Clouded Crystal Ball

- ACS
 - Ethics will become a major issue
 - Safety programs will reach a maintenance status
 - Declining membership will dominate Board attention



Challenges

- CHAS & CCS
 - Guide ACS to remain relevant
 - Work with other professional groups within the broader safety community
 - AIChE
 - AIHA
 - CSHEMA
- Educators vs Practitioners
 - Overcome the schism
 - Rationalize the duality of language



Challenges

- Laboratory Safety Professional
 - Two Types
 - Happened into it (current model)
 - Career choice (outgrowth of JST model)
 - Must provide career development content
 - Certification/degree other than CHO?



Challenges

- Knowledge & Skill of the Lab EH&S Professional
 - Knowledge of chemistry equivalent to grad student
 - Informed on current & emerging methods and instrumentation
 - Capable of discussing research-level science with faculty

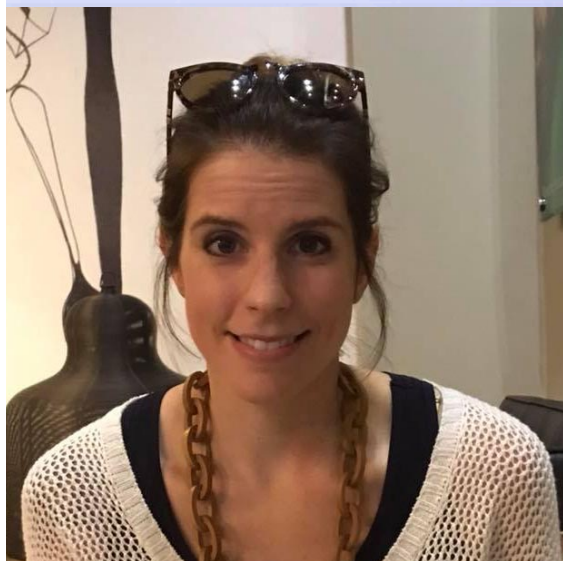


Challenges

- Design Basis of Safety
 - Risk and Risk-Perception based
 - Flexible
 - Innovative
- Work platforms we barely recognize today
 - Robots & automation
 - Easy access to zero-g
- Evolving today's tools



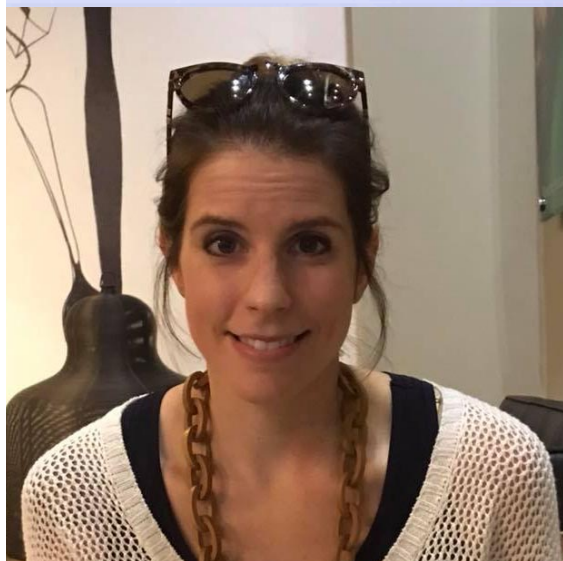
The Future



- You, the next generations
 - Rise to the challenges
- Passing the torch
- Kimi Bush Brown
 - Skilled in PPE
 - UPenn, Senior Lab Safety
 - Merck & Co., Chemist
 - CSP, CHO
 - M.S. Environmental Protection
Safety Management



The Future



- Kimi Bush Brown



- “The Future of Chemical Health and Safety through a Wide-Angle Lens”

