

# **Yale's Safety Advisor Model for Supporting and Integrating Safety into Research**

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Department of Environmental Health & Safety

# What EHS Does at Research Universities

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About 70% of the work involves supporting research laboratories and the hazardous materials they use (e.g., biologicals, chemicals, radioactive materials)

Managing hazardous waste (much of it generated by laboratories) and other environmental compliance activities

Other safety programs: investigating accidents, fall protection, electrical safety, hazard communication, industrial hygiene, bloodborne pathogens, etc.







# EHS Service Models at Research Universities

## Typical Specialty Groups

- Radiation safety staff do wipe tests, calibrate meters, exposure monitoring, etc.
- Biosafety staff register rDNA research, validate BSLs, work practice observations, investigate needlesticks, biosafety PPE, etc.
- Chemical safety staff review chemical storage, inventory, labeling, signage, chemical PPE, etc.
- Fire safety staff inspect flammable loads, separations, etc.
- Occupational health staff do ergonomic assessments, investigate accidents, etc.

## Yale Safety Advisor Program

Safety Advisors are generalists.  
Each Safety Advisor performs all of the above tasks.

# Many Benefits to Safety Advisor Model

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**Efficiency:** One inspection and one meeting versus many.

**Customer service:** EHS is not seen as “the safety police.” Helping relationships are developed from the opening welcome.

**SA job satisfaction:** Variety, responsibilities, intellectually challenging, interacting with people, always something new.

**No more “not my job:”** SAs are responsible for all EHS issues in their assigned department or building.

**EHS Agility:** EHS can change priorities and reallocate resources on a dime. Time allocated to safety issues naturally adjust to their demands.

# We BIRG

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**B**asking

**I**n

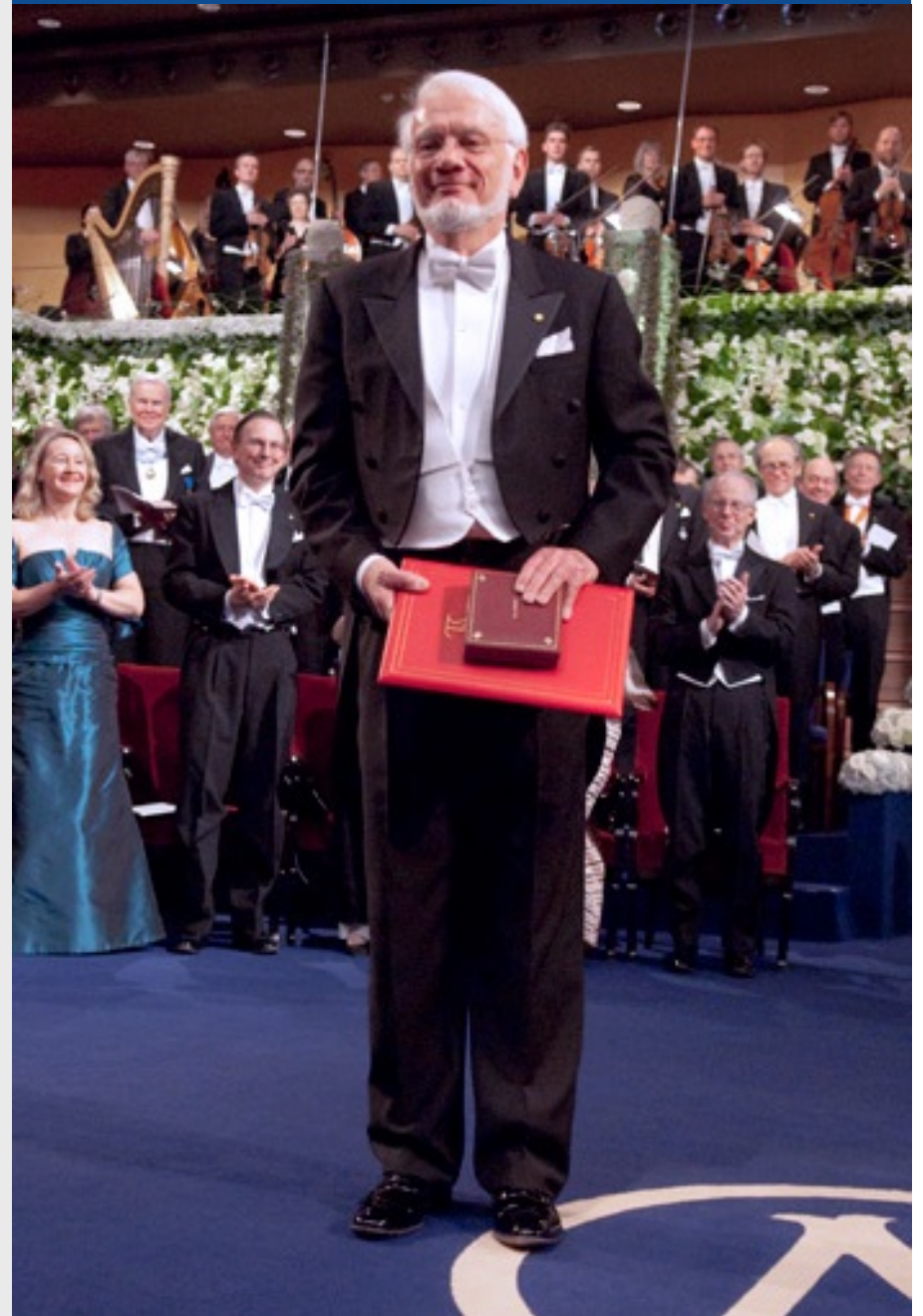
**R**elected

**G**lory

To paraphrase BASF:

We don't make scientific  
discoveries.

We make scientific discovery  
safer.



# The Key to All Relationships: Understanding

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The researcher's career at Yale

Understanding their “world” as a research scientists

Learning about their research goals, accomplishments,  
future plans...

Listening to the PI and their staff

Attending groups meetings

Attending departmental seminars



**Genetic loss of *Tmprss6* uncouples hepcidin expression from erythroferrone signaling**  
Xiuqi UI<sup>1</sup>, Rebecca L. Whittlessey<sup>2</sup>, and Karin E. Finberg<sup>1,2</sup>  
<sup>1</sup>Department of Pathology, Yale School of Medicine, New Haven, CT  
<sup>2</sup>Department of Pharmacology and Cancer Biology, Duke University Medical Center, Durham, NC

### Introduction

Although iron is essential for many biological processes including oxygen transport, excess iron induces cellular toxicity. Consequently, organisms have evolved complex mechanisms to regulate iron absorption in response to body iron stores and erythroid demands. Hepcidin, a peptide hormone secreted by the liver in response to rising iron stores, acts on duodenal enterocytes to limit iron release into circulation<sup>1</sup>. Recent evidence suggests that erythroferrone (Erfe), a protein secreted by erythroblasts, may link erythropoietic activity to iron absorption. Erfe expression in erythroblasts is induced by phorbolmy or erythropoietin (Epo) treatment in mice. Additional *in vitro* studies suggest that Erfe may act directly on the liver to suppress hepcidin.

**The role of Erfe in iron deficiency anemia remains undefined. In this study, we evaluated Erfe expression in *Tmprss6*<sup>-/-</sup> mice.**

### Materials and Methods

All experimental mice were on a C57BL/6J background. They were bred and housed in the Yale University Animal Facility under Institutional Animal Care & Use Committee approval. Genotype blood counts were performed on a Coulter (D50) analyzer. Serum iron levels were measured on previously validated<sup>2</sup> serum iron determined by routine clinical chemistry (Roche/Hitachi). The liver was isolated from fresh-frozen liver, snap-frozen in liquid nitrogen, and stored at -80°C until analyzed. RNA was extracted using RNeasy spin columns (Qiagen) and quantified by real-time quantitative PCR (RT-qPCR) using primers and conditions as previously described.

### Results

**Genetic disruption of *Tmprss6* in mice induces severe iron deficiency anemia.**

Table 1. Hematological, serum, and tissue parameters of 8-week-old mice.

Genotype	Blood hemoglobin, g/dL	Erythrocyte mean corpuscular volume, fL	Serum iron, $\mu$ g/dL	Liver hepcidin mRNA normalized to $\beta$ -actin
<i>Tmprss6</i> <sup>+/+</sup>	14.0 $\pm$ 0.2	47.2 $\pm$ 0.3	136.0 $\pm$ 10.0	1.00 $\pm$ 0.09
<i>Tmprss6</i> <sup>-/-</sup>	14.1 $\pm$ 0.1	45.9 $\pm$ 0.3	130.7 $\pm$ 13.2	1.09 $\pm$ 0.37
<i>Tmprss6</i> <sup>-/-</sup>	10.0 $\pm$ 0.3*	26.6 $\pm$ 0.7*	47.5 $\pm$ 3.6*	5.78 $\pm$ 1.02

Samples from 8-8 week mice per genotype were analyzed. Data are presented as mean  $\pm$  SEM. \*P < 0.001 compared with *Tmprss6*<sup>+/+</sup> mice.

***Tmprss6*<sup>-/-</sup> mice show significantly elevated serum erythropoietin (Epo) levels.**

Figure 1. Serum Epo in *Tmprss6*<sup>+/+</sup>, *Tmprss6*<sup>-/-</sup>, and *Tmprss6*<sup>-/-</sup> mice. N=6 to 8 per genotype. Error bars represent SEM. \*P < .05 compared with *Tmprss6*<sup>+/+</sup> mice.

***Tmprss6*<sup>-/-</sup> mice exhibit a marked increase in Erfe expression in the bone marrow and spleen.**

Figure 2. Spleen (A, C) and bone marrow (B, D) Erfe (*Erfe* mRNA) expression relative to either  $\beta$ -actin (A, C) or alpha globin (*Hbb*) mRNA expression. Expression levels normalized to WT animals. N=6-8. Error bars represent SEM. \*P < 0.001 compared with *Tmprss6*<sup>+/+</sup> mice.

**Despite this marked increase in Erfe expression, *Tmprss6*<sup>-/-</sup> mice fail to suppress hepatic hepcidin production (Table 1).**

### Discussion

*Tmprss6* acts locally in the liver to suppress hepcidin<sup>3</sup>. The uncoupling of hepcidin expression from Erfe signaling in *Tmprss6*<sup>-/-</sup> mice raises these intriguing possibilities:

- Tmprss6* may be required for Erfe signaling in the liver to suppress hepcidin.
- Upregulation of hepcidin by the loss of *Tmprss6* may override Erfe's suppressive signal.

Figure 3. Model of systemic iron regulation. Fpn denotes ferroportin, the only known cellular exporter of iron. Adapted from Camaschella<sup>4</sup>.

Our results suggest that *Tmprss6*<sup>-/-</sup> mice may be useful in elucidating the molecular pathways of Erfe action, and that ERFE-based therapies may fail to lower hepcidin in patients with iron deficiency due to germline *TMPRSS6* mutations.

### References

- Ganz, T. & Nemeth, E. Hepcidin and iron homeostasis. *Biochimica et biophysica acta* **1823**, 1434-1443 (2012).
- Kautz, L. et al. Identification of erythroferrone as an erythroid regulator of iron metabolism. *Nature genetics* **46**, 678-684 (2014).
- Finberg, K. E., Whittlessey, R. L., Fleming, M. D. & Andrews, N. C. Down-regulation of Bmp/Smad signaling by *Tmprss6* is required for maintenance of systemic iron homeostasis. *Blood* **115**, 3817-3826 (2010).
- Camaschella, C. Iron-deficiency anemia. *The New England Journal of medicine* **372**, 1852-1843 (2015).

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# Not Just the PI



# Getting Off to a Great Start

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- **Making it personal:** “I’m your Safety Advisor. I’m here to help you.” Lab staff have a single point of contact.
- **Cutting red tape.** We are all on the same team.
- **Making it easy** to get help, easy to comply, easy to get things done.

# EHS' Welcome to New Investigators

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- **Explaining EHS Services:** waste disposal; fume hoods; biosafety cabinets; shipping; emergency water; spill response
- **Registrations:** Radioactive material; rDNA; human pathogens; restricted chemicals; lasers; controlled substances
- **Training assessment**
- **Needs assessment:** For research? Appropriate space? Safety infrastructure?



## RESEARCH ARTICLES

S. Premi, *et al.*, *Science*, **347**, 842-847 (2015)

## PHOTOCHEMISTRY

# Chemiexcitation of melanin derivatives induces DNA photoproducts long after UV exposure

Sanjay Premi,<sup>1</sup> Silvia Wallisch,<sup>1</sup> Camila M. Mano,<sup>1,2</sup> Adam B. Weiner,<sup>1\*</sup>  
Antonella Bacchiocchi,<sup>3</sup> Kazumasa Wakamatsu,<sup>4</sup> Etelvino J. H. Bechara,<sup>2,5†</sup>  
Ruth Halaban,<sup>3,6</sup> Thierry Douki,<sup>7†</sup> Douglas E. Brash<sup>1,6‡</sup>

Mutations in sunlight-induced melanoma arise from cyclobutane pyrimidine dimers (CPDs), DNA photoproducts that are typically created picoseconds after an ultraviolet (UV) photon is absorbed at thymine or cytosine. We found that in melanocytes, CPDs are generated for >3 hours after exposure to UVA, a major component of the radiation in sunlight and in tanning beds. These “dark CPDs” constitute the majority of CPDs and include the cytosine-containing CPDs that initiate UV-signature C→T mutations. Dark CPDs arise when UV-induced reactive oxygen and nitrogen species combine to excite an

## **ACKNOWLEDGMENTS**

We thank M. Bosenberg and V. Muthusamy for UVA-irradiated mouse skin; the Yale Office of Environmental Health and Safety for the single-photon liquid scintillation counter; A. Bommakanti for photography; and D. Mitchell and A. Mennone for helpful discussions. Supported by Department of Defense CDMRP grants CA093473P1 and CA093473 (D.E.B. and R.H.); NIH grant 2 P50

# RAMP Process

	Radmat	Biologicals	Chemicals
Scope	All	<ul style="list-style-type: none"><li>• rDNA</li><li>• Human Pathogens</li></ul>	<ul style="list-style-type: none"><li>• Restricted chemicals</li><li>• Certain operations</li></ul>
<b>R</b> ecognize the hazard	PI submits protocol; EHS reviews preliminarily; RSC reviews and approves	PI submits protocol; EHS reviews preliminarily; IBC reviews and approves	PI submits Chemical Hazard Risk Assessment Form; EHS reviews and approves
<b>A</b> ssess the risks			
<b>M</b> inimize the risks			
<b>P</b> repare for emergencies	General Radiation Safety Training	General Biosafety Training	General Laboratory Safety Training



## Yale *Environmental Health & Safety*

2-Methoxyethylacetate
5-Nitrobenzotriazol
Acetone cyanohydrin, stabilized
Acrolein
Aluminum phosphide
Ammonia
Arsenic
Arsenic trichloride
Arsenic trioxide
Arsine
Beryllium
Bis(2-chloroethylthio)methane
Bis(2-chloroethylthiomethyl)ether
Boron tribromide
Boron trichloride
Boron trifluoride
Bromine
Bromine chloride
Bromine pentafluoride
Bromine pentafluoride

## Yale Restricted Chemicals

Chlorosulfonic acid
Chromium (VI)
Cyanogen
Cyanogen chloride
DF
Diborane
Dichlorosilane
Diethyl methylphosphonite
Diethyleneglycol dinitrate
Dimethyl sulfate
Dimethylmercury
Dingu
Dinitrogen tetroxide
Dinitroresorcinol
Dipicryl sulfide
Ethyl phosphonyl difluoride
Ethylene dibromide
Ethylene oxide
Ethyleneimine
Ethylphosphonothioic dichloride
Fluorine

# Ongoing Safety Advisor Research Support

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- **Providing great customer service:** high quality, prompt, helpful and personal
- **Fixing problems** to support their research and improve safety
- **Acting strategically**—finding and pursuing common goals

# EHS-Initiated Reviews

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- **New hazards**
- **Renovations**
- **Accident investigations**
- **Supplemental Safety Plans**

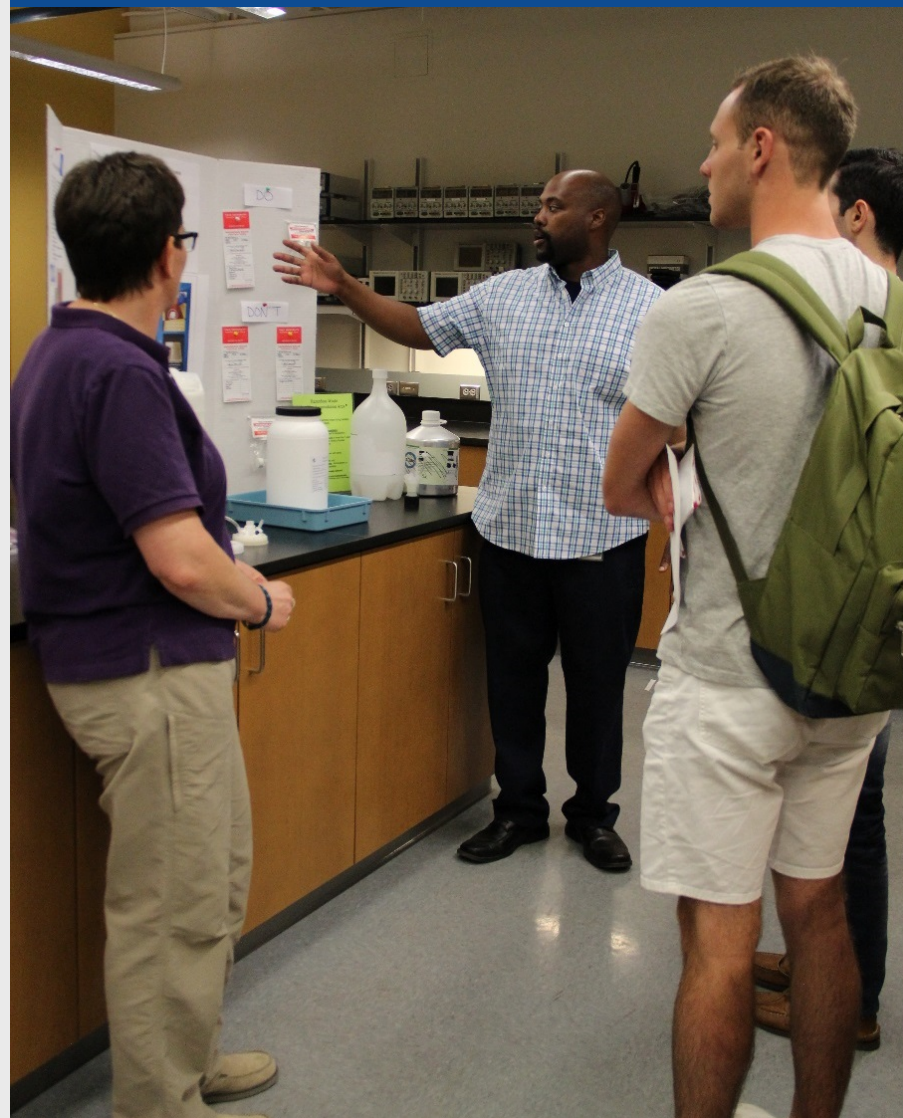




# PI-Initiated Reviews

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- **Reviews of lab inspection results**—how to make improvements
- **Training:** Asking EHS to provide (or arrange) refresher or specialized safety training



# Other Ways That Safety Advisors Help Researchers

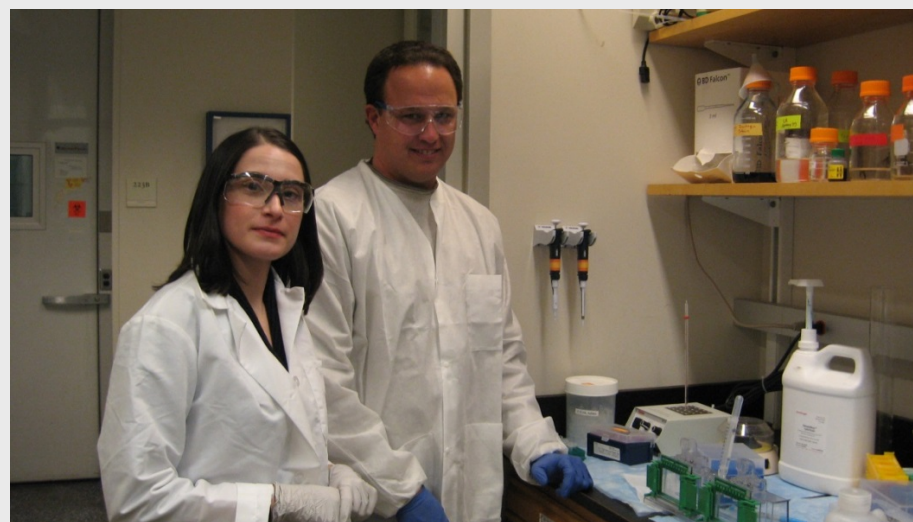
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Decommissioning  
(equipment, facilities)

Laboratory clearances  
prior to renovation or  
new occupancies

Compressed gas safety  
assessments

Pre-inspections prior to  
USDA and CT DPH  
inspections



# Other Faculty Support and Engagement

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Advocating on behalf of our researchers to regulatory agencies; expediting licensing; etc.

EHS information system


Enterprise-wide chemical inventory system

Safety Committees (mostly faculty)

- Radiation Safety Committee
- Institutional Biosafety Committee
- Laboratory Safety Committee
- University Safety Committee

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torHomePrincipal ProfileRegistrationSurveyInventoryWaste



EHSIntegrator is an Environmental, Health and Safety web portal designed for use by EHS's partners in promoting safety across the institution.

Please use the menu at the top of the page to navigate. If you are unable to find an item related to your needs, please contact your lab manager or Principal Investigator to request access. For further assistance please contact Yale Environmental Health & Safety directly.

⌵ Your Pending Items ⓘ

Please review the pending items below. These are items associated with you, which typically require an action on your part. However, there are cases where others may be responsible for a pending item that you have access to. Click on a pending item to be brought to the associated area. Hover over the ⓘ to view more information about the item.

⌵ Registration ⓘ

1 Registrations Requiring Your Approval ⓘ  
2 Registrations Expiring/Renewing ⓘ  
1 Lab Safety (Minors/Visitors) In Progress ⓘ

⌵ Surveys & Decommissions ⓘ

2 Surveys Requiring a Response or Resolution ⓘ

⌵ Principal Profile Training ⓘ


20 Training Compliance Issues

⌵ Inventory ⓘ

1 Incomplete Radiation Inventories ⓘ  
1 Incomplete Clean Air Device Chargebacks ⓘ

⌵ Waste ⓘ


1 Unsubmitted Biomedical Waste Requests

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EHSIntegrator - Registrat

← → ↻ ⌂ ⚠ Not secure | https://localhost/EHSIntegrator/Registration

 Home Principal Profile Registration Survey Inventory Waste

Home > Registration

Welcome to EHS Registration

Principal Principal Search Category All Lab Safety Radiation Other Filters

To create a new registration, a Principal must be selected.

1 Registrations Requiring Your Approval

Registrations requiring your approval as a condition of Authorization.

Type	Version	Appl. Type	Name	Status	
Radiation Isotope	3	Renewal	Anderson, Karen\Rad Iso\C-14\3	Pending	Review & Approve

2 Registrations Expiring/Renewing

Registrations expiring soon or EHS has explicitly indicated as requiring renewal.

Type	Version	Appl. Type	Name	Status	Expiration	
Radiation General	1	New	EHS, Test\Rad Gen\1	Authorized	8/21/2018	View Renew Close
Radiation Isotope	1	New	EHS, Test\Rad Iso\Ac-225 (SS)\1	Authorized	8/21/2018	View Renew Close

1 Lab Safety (Minors/Visitors) In Progress

Submitted Lab Safety Registrations with outstanding items to be completed.

Type	Version	Appl. Type	Name	Status	
Lab Minor	1	New	EHS, Test\Minor\TEST\DIubac Minor, James\2019-08-24\1	Pending	View

2 Authorized Registrations

The Principal's 'working' registrations that have been approved.

2 EHS Approval or Close Pending

Submitted registrations that are awaiting EHS approval or closing.

Type	Version	Appl. Type	Name	Status	
Radiation Isotope	3	Renewal	Anderson, Karen\Rad Iso\C-14\3	Pending	Review & Approve
Lab Minor	1	New	EHS, Test\Minor\TEST\DIubac Minor, James\2019-08-24\1	Pending	View

Receive | Tools | Help | Home | Logout

Search For Materials:  
CAS No  Begins  7664-39-3

Materials With Containers

Hydrofluoric acid

Identity	Hazards	Physical	Structure	Docs	Properties	Containers
Filter: <input type="text"/> Site Inventory <input type="button" value="Other Sites"/>						<a href="#">Create Conta</a>
BARCODE	DESCRIPTION	PRODUCTNO	QUANTITY	EXPIRES	OWNER	LOCATION
<a href="#">017455</a>	for analysis,48-51% soln in H2O	AC22333	500.000 mL container		Newhouse	CRB,215,Bench 4
<a href="#">017732</a>	ACS, 48-51% soln in H2O	AC42380	500.000 GM container		Hazari	KCL,211,Bench 8
<a href="#">021855</a>	48 wt.% in H2O, >99.99% trace metals basis	339261	100.000 mL container		Herzon	CRB,203,Bench 3
<a href="#">046601</a>	48%	2640	1.000 LB container		Crabtree	CRB,225,Bench 4,Cab 2,Shelf 2
<a href="#">075205</a>	for analysis,48-51% soln in H2O	AC22333	500.000 mL container		Butts	ESC,254B
<a href="#">075206</a>	for analysis,48-51% soln in H2O	AC22333	500.000 mL container		Butts	ESC,254B
<a href="#">075207</a>	for analysis,48-51% soln in H2O	AC22333	500.000 mL container		Butts	ESC,254B
<a href="#">076188</a>	49%, Cleanroom® MB	428-064003	2.000 GAL standing inventory		Power	BCT,528 StorageCab
<a href="#">076890</a>	48% in water	HX0621	500.000 mL container		Solar	W-ESC,124,Bench1
<a href="#">078238</a>	48% in water	HX0621	500.000 mL container		WangH	W-ESCII,E106 Wang
<a href="#">080777</a>	ACS reagent,>48%	30107	500.000 mL container		Ganim	KCL,121,roomD Chemistry
<a href="#">081305</a>	ACS reagent, 48%	695068	25.000 mL container		Aksoy	MS-LEPH,607
<a href="#">086390</a>	OmniTrace®,47-51% in water	HX0627	500.000 mL container		Raymond	ESC,078B
<a href="#">086391</a>	OmniTrace®,47-51% in water	HX0627	500.000 mL container		Raymond	ESC,078B
<a href="#">090619</a>	ACS reagent,>48%	30107	1.000 L container		Kim	HLH17,511 Kim,Acid/Misc Cab
<a href="#">094725</a>	TraceMetal™ grade	A513	500.000 mL container		Planavsky	KGL,332
<a href="#">095774</a>	48 wt.% in H2O, >99.99% trace metals basis	339261	100.000 mL container		Herzon	CRB,201,Bench 1
<a href="#">096355</a>	48 wt.% in H2O, >99.99% trace metals basis	339261	100.000 mL container		Jacobswagner	W-ABC,269
<a href="#">100515</a>	TraceMetal™ grade	A513	500.000 mL container		Bezur	W-CSC,C134
<a href="#">109233</a>	48-51% ACS	BDH3040	500.000 mL container		Zhong	HLH17,425,Acid Cab
<a href="#">112141</a>	TraceMetal™ grade	A513	500.000 mL container		Planavsky	KGL,332
<a href="#">114874</a>	TraceMetal™ grade	A513	500.000 mL container		Planavsky	KGL,332
<a href="#">114875</a>	TraceMetal™ grade	A513	500.000 mL container		Planavsky	KGL,332

Researchers can find their valuable chemicals.  
Labs can share chemical stocks.  
Encourages safe chemical management.

## Also...

- Because we develop close relationships with laboratory staff, the lab's Safety Advisor is often the first to hear of a pregnancy. We refer the people to Employee Health for counseling and accommodation.
- The Chemistry Department's Safety Advisor supports and closely partners with their Joint Safety Team.
- Several EHS Safety Advisors participate in the annual Chemistry Department "Safety Day."



Yale University

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## Chemistry Joint Safety Team

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## People

## Alumni

## Bio



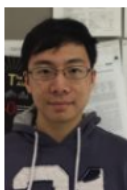
Benjamin Rudshiteyn  
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[Website](#)

Ben was a graduate student in the Batista Lab studying computational chemistry. Specifically, he applied it to problems in alternative energy, specifically carbon dioxide mitigation and water splitting using the tools of DFT, EHT, and simulated vibrational spectroscopy. Despite not doing experiments, he was passionate about lab safety, especially ergonomic safety. He acted as both the liaison for SCL as well as the webmaster. He received his B.S. in chemistry from Brooklyn College/CUNY/Macaulay Honors College in 2013 and graduated in 2018 with a PhD. He acknowledged the financial support of the NSFGRFP program. Ben served as webmaster from 2015-2018 and served as SCL Liaison from 2015-2017.



Ana Newton, Ph.D.  
President Emeritus  
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[Website](#)

Ana S. Newton, Ph.D. is a postdoctoral researcher at the Jorgensen Lab in the Department of Chemistry at Yale University. Dr. Newton helps develop small inhibitors to treat cancer and HIV using both computational and synthetic skills. She is currently leading two collaborative research projects to design potent small molecule inhibitors of DNMT3B, a protein whose inhibition has been shown to reduce or eliminate cancer growth, and CXCR4, a G-protein-coupled receptor associated with HIV. Dr. Newton holds a Ph.D. in Medicinal Chemistry and a B.S. in Chemistry from the University of Lisbon.



Xiaoshen Ma  
Safety Officer Liaison for CRB  
Emeritus  
[xiaoshen.ma@yale.edu](mailto:xiaoshen.ma@yale.edu)

Born and raised in Beijing, China, Xiaoshen received his undergraduate education at Peking University where he studied transition metal carbene chemistry under the mentorship of Professpr Jianbo Wang. After graduating, Xiaoshen decided to pursue his PhD in chemistry at Yale. Xiaoshen currently serves as an LSO liaison for the CRB building in the JST team. Aside from chemistry, Xiaoshen enjoys cooking, reading, and classical music.



Herman Nikolayevskiy  
[herman.nikolayevskiy@yale.edu](mailto:herman.nikolayevskiy@yale.edu)

BE, 2011, The Cooper Union for the Advancement of Science and Art

Herman was born in Tashkent, Uzbekistan during the collapse of the Soviet regime. Escaping with his family to America allowed him to pursue his passion for science and math at the Bronx High School of Science. At the Cooper Union for the Advancement of Science and Art, Herman studied chemical engineering. As an escape from the mathematics of his degree, Herman took interest in Organic Chemistry, working under Professor Ruben Savitzky on benzyl guanidine analogs as inhibitors of the Tat-TAR interaction in HIV-1. Upon graduation, Herman decided to pursue total synthesis under Professor Seth B. Herzon at Yale University. Besides chemistry, Herman enjoys traveling, foreign foods and soccer. He is currently a postdoctoral fellow at NIDDK/NIH.



## Chemistry Joint Safety Team

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[Home](#) » [News](#) » 4th Annual Safety Day

### 4th Annual Safety Day

August 9, 2018

The 4th Annual Safety Day will be held in the 3rd Floor Lounge of SCL **Tuesday August 28th 9AM - 1PM**. All first-year students and safety officers are required to attend and visit all stations. Slots for training in the morning are reserved for attendees who work at West Campus. Trainings and demonstrations include:

- **Pyrophoric Materials** (JST demonstration)
- **Bench and hood maintenance** (JST demonstration)
- **Emergency Response** (JST demonstration)
- **Chemical Hygiene** (JST demonstration)
- **Fire Extinguisher Training with Yale Fire Marshals**
- **Chemical Inventory System**
- **Near Miss Reporting**
- **Hazardous Waste**
- **Safety Glasses Fitting**
- **Lab Coat Fitting**
- **Gas Cylinders with TechAir**
- **PPE**
- **E-Ship Global**

There will be a light breakfast at 9AM as well as a lunch at noon. To receive a lunch voucher, attendees must visit and get stamped at the Waste Management Station, Near Miss Report Station, and at least 1 JST demonstration. Go to all of the stations and trainings for a chance to win \$80 in Amazon gift cards!

The JST and EHS would also like to remind everyone to complete the required online safety training for Laboratory Chemical Safety (<https://ehs.yale.edu/node/269>) and Fire Extinguishers ([https://bmsweb.med.yale.edu/tms/tms\\_enrollments.offerings?p\\_crs\\_id=2074&p\\_std\\_id=](https://bmsweb.med.yale.edu/tms/tms_enrollments.offerings?p_crs_id=2074&p_std_id=)) **by August 27th. Please sign up for the interactive fire extinguisher training using the attached spreadsheet to get the opportunity to put out a real fire!**

**\*The online trainings are required for everyone in Chemistry whether you attend the Safety Day or not.**



# Safety Advisor Career Progression

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- **Safety Advisor Technician:** support activities for Safety Advisor Program—radmat package deliveries, fume hood testing, environmental sampling, etc.
- **Safety Advisor-1:** True generalist—assigned departments and buildings. (All Safety Advisors have responsibilities for laboratory and non-laboratory space.)
- **Safety Advisor:** In addition to SA-1 duties, we add responsibilities in an area of specialty (e.g., laser safety, research material exports, clinical safety, etc.)

“The collateral damage of unsafe research is all research”

—James M. Welch

Ex-Executive Director, Elizabeth R Griffin Research Foundation