Safe & Sustainable Labs (S2L)

Collaborating Across MIT

MIT EHS
ENVIRONMENT · HEALTH · SAFETY

Mission Statement

Ensuring every laboratory and shop at MIT has the **knowledge, resources and support** to enable a sustainable approach to world class scientific research, this team utilizes the EHS-MS to strengthen and introduce **sustainable initiatives** to campus, communicate updates on sustainable projects and opportunities, as well as identify new areas of improvement, to help reach the Institute’s goals in MIT's Climate Action Plan.

S2L Partners

MIT EHS
ENVIRONMENT · HEALTH · SAFETY

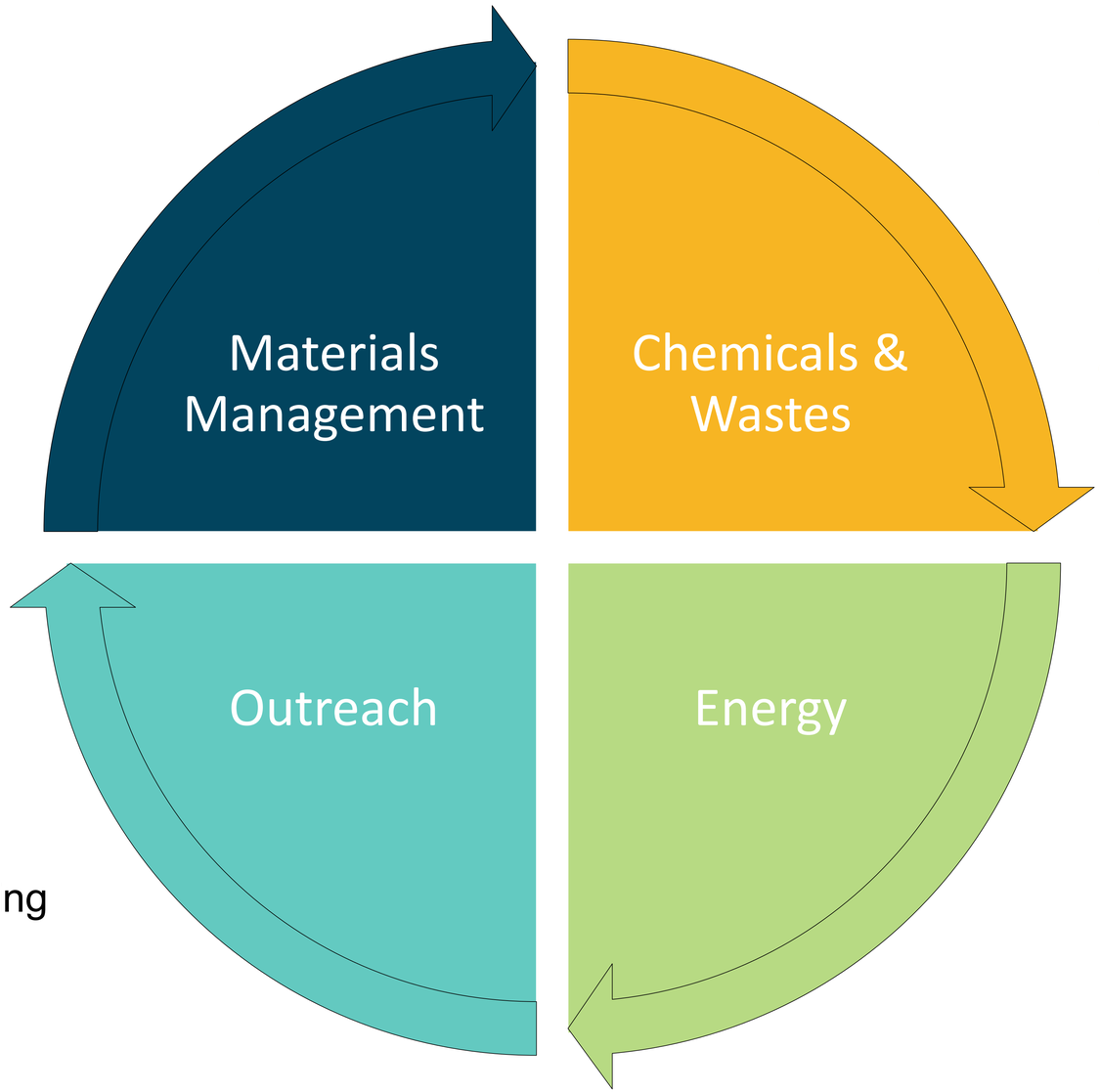
MIT Office of Sustainability

MIT Office of the Vice President for Finance

MIT Department of Facilities

Safe & Sustainable Labs (S2L) Program Overview

- Purchasing
- Rheaply
- Lab Recycling



- Chemical Inventory
- Chemical Sharing/Exchange
- Green Chemistry
- Hazardous Waste Management
- Pollution Prevention

- Communication
- Training
- Assessment & Reporting

- Plug Load
- Cold Storage
- Ventilation
- Lab Design

Why focus on labs?

Labs are energy and resource intensive spaces

- 50x the plastic than office spaces
- 10x more energy than office spaces
- 4x more water than office spaces
- 12 billion pounds of plastic waste each year

Buildings with a high density of laboratories tend to be the largest consumers of energy on campus. The manufacture, sourcing, and disposal of specialized laboratory consumables and instruments also has a significant environmental impact.

Case Study: Lab Plastics Recycling

- EHS Office offers recycling program for plastic pipette tip boxes and conical tube racks.
- Any lab which uses these materials can participate.
- Information and pickup request form at https://ehs.mit.edu/regulated-waste-program/recycling-waste-reduction/

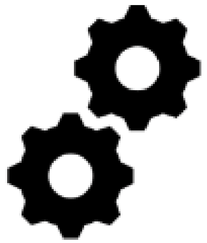
Pipette Tip Box Recycling FY24

- 116 labs
- 895 pick-ups
- 16,314 pounds of lab plastic (≈ 65,250 pipette tip boxes).

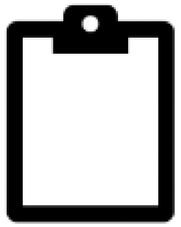
2025 Freezer Challenge

Implement sustainable and energy efficient best practices regarding:

Preventative Maintenance



Inventory Management



Upgrades & Retirements

Temperature Tuning

Cutting-Edge Actions

Learn more & register: www.freezerchallenge.org

freezer challenge

The International Laboratory Freezer Challenge is a partnership of:

my green lab.

I2SL International Institute for Sustainable Laboratories

LOOKING AHEAD

- **Expanded Lab Plastics Recycling**
  - Media bottle pilot in Building 68
- **Outreach to DLCIs as part of MITOS's Climate Action Workshops**
  - Follow-up meetings with DLCI EHS Coordinators & EHS Reps
- **Training Development & Deployment**
  - Introduction to Lab Sustainability
  - Green Chemistry
  - Sustainable Lab Purchasing
  - Energy Savings for Lab Equipment
  - Lab Recycling
  - Fume Hood/Lab Ventilation

Contact Info

Scott McNey

617-258-8107
smcney@mit.edu

Wei Lee Leong, PHD, CIH, CSP

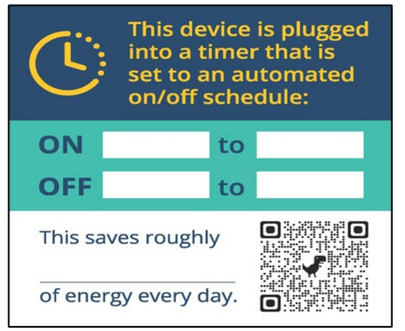
617-258-8105
wlleong@mit.edu

Mitch Galanek, CSP

617-258-9457
galanek@mit.edu

Stickers & Signage

ENVIRONMENT@MIT.EDU



beyondbenign
green chemistry education

Greener Solvent Guide

For more resources for Green Chemistry in chemistry education: http://bit.ly/gc-resources

Key: Hazardous | Problematic | Preferred

* Indicates Highly Hazardous

Undesirable Solvents	Alternative
Pentane, Hexane(s)	Heptane
DMF, DMAc, NMP, DMSO	Acetonitrile, Cyrene[c], Cyclopentyl methyl ether (CPME)[a], dimethyl carbonate[c]
Tetrahydrofuran, Methyl tert-butyl ether (MTBE)	2-Methyltetrahydrofuran (2-MeTHF), CPME
Di-isopropyl ether or diethyl ether*	2-MeTHF or tert-butyl methyl ether, CPME
Dioxane or dimethoxyethane	2-MeTHF or tert-butyl methyl ether, CPME
Chloroform*, dichloroethane* or CCl_4*	Dichloromethane
Pyridine (as a base)	Triethylamine (Et_3N)
Dichloromethane (in extractions)	Ethyl acetate (EtOAc), MTBE, toluene, 2-MeTHF
Dichloromethane (in chromatography)	EtOAc/heptane[b], 3:1 EtOAc/EtOH[b]
Benzene*	Toluene
Acetone	Ethyl lactate[a]

For a review of organic reactions in water: http://bit.ly/org-rx-water
For a review of solvent-free organic reactions: http://bit.ly/solvent-free-org-rx

References:
Prat, D., *et al*, *Green Chemistry*, **2016**, *18*, 288–296; Dunn, P. J., *et al*, *Green Chemistry*, **2008**, *10*, 31–36.
a. MilliporeSigma Greener Solvent Alternatives [https://www.sigmaaldrich.com/technical-documents/articles/analytical/solvents-and-reagents/greener-solvent-alternatives.html].
b. Taygerly, J.P., *et al*., *Green Chemistry*, **2012**, *14*, 3020–3025.
c. Byrne, F.P., *et al*., *Sustain Chem Process*, **2016** *4*, 7 1–24.

V.1 March 2020