240503 Meeting Minutes

Attendees: Kate Malecek, Vijaya Kumar, Genevieve Gandara, Cathryn Holmes, Alexis Cho, James Linton, Stephanie Connon, Tatiana Solovieva, Annie Lam, Ben Ben, Tasha Cammidge, Giada Spigolon, Henry P, Ping Dong

This month, we are ordering food from group favourite (and #1 choice from last month's vote!) Tender Greens for this Friday's meeting! In your RSVP, please type in the meal of your choice (including all the fixin's) (limit of $20 per person)! **The deadline for submitting your order is Thursday 9am.** I will also bring a kettle so we can boil hot water and I will bring some yummy hot chocolate packets and tea bags for folks to enjoy! If you prefer, BYOT.

Will update Restaurant Guide (released in October) and our Coffee, Breakfast, and Dessert Guide (posted in December!)

Introductions …

Million Advocates for Sustainable Science Petition

- International Institute for Sustainable Laboratories (I2SL) along with My Green Lab are petitioning to change funding granting agency policy to promote sustainable research
- By signing the letter you can help transform how science funding organizations set expectations for efficiency, resiliency, and sustainability in the way scientific research is conducted
- Reached 1000+ signatures!

Green Labs Monthly Tip: Energy Efficiency

- Renovo1 developed a Whitepaper that covers:
    1. Establish Collaborative Equipment-Sharing Practices
    2. Adopt Green Chemistry Principles
    3. Optimize Lighting with LED Task Lights
    4. Automate Equipment Power with Outlet Timers
    5. Enhance Safety & Efficiency by Closing Fume Hood Sashes
    6. Improve Cold Storage Efficiency
    7. Upgrade HVAC (Heating, Ventilation, & AC Systems)
    8. Run Autoclaves Efficiently
    9. Implement Smart Sensors for Equipment Monitoring
    10. Choose ENERGY STAR Appliances
- We also suggest using outlet timers to turn off equipment at the end of the day and turn them on again before folks arrive the next day (for example: water baths)
- Consider utilizing smart sensors to monitor equipment temperature, humidity, energy consumption, and usage
    1. This will allow you to understand how the equipment is used and identify opportunities to optimize your energy consumption
- Can utilize other energy-saving measures such as turning off computers and monitors at the end of the day, turning off equipment after use or over holidays/weekends
- Getting Green Labs Certified to take advantage of our energy efficiency stickers!

Justice, Equity, Diversity, and Inclusivity (JEDI) Presentation – James Linton

- See slides that were uploaded to the Drive
- Additional notes supplementing the slides are *italicized*:
- Sustainable Science: balancing action and knowledge
    - *We are getting some pushback from researchers who don't want to set their -80C freezers to -70, so we started a program to collect samples of various types and keep them at -20, -70, and -80 to demonstrate statistically that -70C is a safe temperature AND it could save 522 kWh/year (which is HUGE)*
    - *We often use -80 as a stopgap before putting a sample in LN2, so also showing that -70 is safe for this purpose as well*
        - Sample types include: archival HEK cells, glycerol stocks of bacteria, protein PMP4 (signalling molecule) and more
- Premise: we can better defent our practices when we have a comprehensive understanding of their life cycle impact and cost-benefit
- Balancing action and knowledge
    - Sustainability – paradoxes and trade-offs
    - LCA (Life Cycle Assessment) is a tool for informed decision making
    - Applications of LCA
- Jumping back to 1987
    - *There was an emerging sense that a global community could be realized and this lasted until the mid-1990s, when the world began to change and not see that as much of a possibility any more*
- Defining sustainability: the Brundtland Commission
    - The Brundtland Commission defined sustainability as: "Meeting the needs of the present without compromising the ability of future generations to meet their own needs."
    - *This commission was established to increase the standard of living for all humans on Earth*
    - Reference: *Report of the World Commission on Environment and Development: Our Common Future* World Commission on Environment and Development. 1987
- Encouraging sustainability: actions with information
    - Prescriptive Actions: Clear guidelines and regulations to promote a behavior.
    - Information: Data and methods to understand the impact of our actions.
    - *Encourages awareness, then actions*
    - *If we get pushback, then we need data to support the change*
- Why information matters
    - It provides evidence demonstrating the effectiveness of actions in achieving defined sustainability goals.
    - It provides the pros and cons of the "best" action required to achieve objectives grounded in the framework of sustainability
- The biofuel paradox: means vs ends
    - Ethanol production from corn can be more energy-intensive than gasoline.
    - Large-scale corn production for ethanol can lead to deforestation for new farmland, negating some of the environmental benefits.
        - Reference: J. Lark et al., Environmental outcomes of the US Renewable Fuel Standard. *Proc. Natl. Acad. Sci. U.S.A.*, WWF Position on Biofuels in the EU July 2007
- Trade-offs in sustainability

    - Example: managing consumable plastics in the lab
        - Single-use plastics: generate waste across their life cycle
        - Recyclable plastics: reduce end of life waste and energy consumption.
        - Reusables: reduce waste and energy across their life cycle
    - Example: managing consumable plastics in the lab
        - Balancing factors:
            - Frequency of use
            - Type of plastic
            - Waste management practices
            - Evidence for health impacts from micro-plastics
            - Societal impact
- Life Cycle Assessment (LCA): a method for assessing the environmental impact of a product, process, or service
    - LCA analyzes all stages of product/resource life:
        - Raw material extraction
        - Manufacturing
        - Distribution
        - Use
        - Disposal or recycling
    - *Quantitatively assessing*
    - Criticism:
        - No standards
        - Inconsistent application
        - No assessment of social impacts
        - Reference: Matthews, H. Scott, Chris T. Hendrickson, and Deanna H. Matthews (2014). Life Cycle Assessment: Quantitative Approaches for Decisions That Matter. pp. 83–95.
- LCA: a mathematical framework
    - Energy use= Mass of plastic recycled × Energy use per unit mass
    - Simple framework
    - $$\int_{t_0}^{t_1} \left(M(t) \times \mathrm{CO2e}(t)\right)\, dt$$
    - Complicated framework:
    - $$\int_{t_0}^{t_1} \left(\left(M(t) \times \mathrm{CO2e}(t)\right) \times \alpha(t) \times \beta(t) \times \gamma(t) \times \mathrm{EoL}(t) \right) dt$$

      $\alpha(t)$: Efficiency factor over time

      $\beta(t)$: Weighting factor over time

      $\gamma(t)$: Feedback adjustments over time

      $\mathrm{EoL}(t)$: End-of-life considerations over time

        - *a is efficiency, could be extraction of goods, transportation, transport of waste*
        - *B is demand (for example, the rate of plastic use over time)*
        - *Y is quota of plastic usafe*
        - *EoL is any recycling or reuse*
- LCA examples, where we have no EoL (no reuse or recycle), run this model through with slight variations (based on normally distributed data), we can get an average
    - *Note that during the summer months, things expend more energy because of heat needing to be dispersed, there is a higher demand in the fall because folks start work then, and a decrease in spring time, model reflects those changes*
- LCA examples, with EoL, see a significant decrease (almost 50% reduction in CO2 emissions!)
- LCA examples, with adding in changing demand, but less of an effect on CO2 emissions
    - *Some virgin plastics still even with recycling, only about 70% reuse/recycle calculated, not 100%*
    - *Some more work needed to suss out differences, but a powerful tool showing how small changes affect great changes*
    - *Want to generate separate documents for this*
- Questions:
    - KM: what behaviour should we focus on to change a the most?
        - JL: so a reflects extraction and manufacture
        - KM: what is the difference if people spend 30 mins, say, a week, to change behaviour and reduce CO2, what is the best use of their time? For example, could we rerack tips vs unwrapping them?
            - JL: reracking tips is a good example, there are some CO2 emissions from washing, more hours, someone has to rerack the tips and they may have a commute, so if you choose someone to take that work on that is already coming in or that has a shorter commute, or can donate some time to it, that improves the a
            - JL: since you are running a core facility, YOU have the power to set standards for that research that benefit a
        - KM: this is potentially very useful for grants, but would need costs incorporated
            - JL: yes, it would be very useful to incorporate things like fragility (for example the pipette tip shortage during the pandemic) into the model, so the model is definitely not complete yet
        - JL: math gives appearance of understanding without being actually understanding, so it is a tricky thing, and I acknowledge that this is just a simple model and these are just simple examples
        - JL: want to write a grant to use this tool, simulate it to better understand and run simulations that better understand CO2 impact etc, would need a few thousand dollars probably
            - KM: would be useful to use this model on one type of plastic, say Styrofoam
                - JL: yes, Styrofoam would be a convenient model to build a database on, then build up from that model for other types of

plastics (additive benefits)… Many are using machine learning for this but would need huge amounts of data

- KM: would the costs be for behavioural changes or financial changes, (or the cost to make the changes)
    - JL: behavioural changes are hard to model, so we would need to determine what we NEED to know, so it would be a group effort to gather all those data

- JL: LCA has a weakness, including my model, in that we did not incorporate societal impacts
    - JL: should think about where plastics are actually recycled? Are the plants in Malibu? NO, they are in primarily lower middle class areas
- TS: powerful tool, are there already models available? Could we make one?
    - JL: yes we can make one, and I did not look and see if one exists but brief searches didn't look like it, and it would require a lot of time and perhaps some funds
    - TC: well, we have an intern this summer..!
- GS: carbon footprint of the product calculated in?
    - JL: the carbon footprint of making new vs reuse is readily available

Updates!

- **20 Certified labs!! WHOOOOO**
    - Please get CERTIFIED TODAY! To get certified, finish the easy, 30-minute Green Labs Certification and submit it to sustainability@caltech.edu.
    - Certified Labs-exclusive event planned for April!
- Lots of media lately
    - California Tech Article "Caltech Orange Needs a Hint of Green"
    - Caltech Weekly Article "Caltech on Path to Decarbonize)
- We should use this energy from the campus to encourage sustainable practices!!

Updates – Pilot Programs

- Lomi Composter Update
    - GSA update…! Composting in the Catalina's
    - BI: Bronner Lab/Imaging Core added
    - 161 kg of dirt (806 kg (or 1777 lbs!) food waste)
- Pipette Tip Box Recycling
    - 2538 gallons of plastic waste (1121 lbs!) diverted
- -70˚C/-80˚C Comparison Pilot
    - 5 labs involved, collaborating with NIH
- Styrofoam Recycling
    - **VOLUNTEERS>!>!>!>!**
    - Waiting to hear about space for bins!
    - Made some progress this month….

        - We now have space in the Holliston yard, and have confirmed costs for the program, TC will do a proper writeup and present it next time!
        - KM: could have a roaming bin rather than multiple bins, would reduce cost and require fewer volunteers
    - Sign the petition!
    - Technical bulletin from I2SL
    - LCA of Styrofoam
    - How to do LCAs
- Resources
    - Updated Green Labs Guide for 2024, and updated Action Plan (will post very soon!)
    - Sustainable Restaurant Guide available online
    - Sustainable Coffee, Breakfast, and Dessert Restaurant Guide!

- Spring Clean Event ongoing
    - Spring Clean Event – 6 labs submitted photos, updated on website
        - Beacon Instrument Lab
        - Bjorkman Lab
        - Mazmanian Lab
        - Pierce Lab
        - Prober Lab
        - Wang Lab
    - Some folks did some cool things
        - Beacon Lab provided slides
        - Bjorkman lab did a equipment share program
        - Mazmanian lab included during photos
    - Leading to a collaboration with I2SL!
        - We were asked to talk about our pilot and to help design a program with them (in collaboration with UC Boulder's Lab Space program)
        - We are giving a presentation on this in the next year to the I2SL community
    - Freezer defrost kit!! - updated with magnets, signage etc!
    - Tote bags?
        - 

- BBE Spring Event
    - Thanks to Kate for presenting!!
- Certification Event
    - 20 labs certified
    - Event in early June?
- 2024 Freezer Challenge
    - January 1 – July 1, 2024
    - Labs compete to improve freezer efficiency, sample accessibility, reduced risks, cost-savings, and energy-savings for their lab's cold storage!

    - Fun, free program
    - Scored on different categories (like defrosting freezers or inventorying)
    - Awards given at I2SL for the winners!
    - Could provide internal prizes also?

- 2024 International Freezer Challenge! January 1 – July 1, 2024
    - Our lab did the scoresheet in under an hour
    - Opportunity for us to get funding to go to I2SL conference for free…..!!! if we do well in the competition, so please sign up and do the challenge, most of us are already doing this work so it would be great to get credit for it!
    - Labs compete to improve freezer efficiency, sample accessibility, reduced risks, cost-savings, and energy-savings for their lab's cold storage!
    - Fun, free program
    - Scored on different categories (like defrosting freezers or inventorying)
    - Awards given at I2SL for the winners!
    - Could provide internal prizes also?

Social Media Campaign – Jaasiel Alvarez

- Follow us on social media
- Do you have time to film a short video or write a blog post I2SL is asking for videos or blogs, and there is a $500 stipend available!
- Letters to the editor California Tech (https://tech.caltech.edu/about/)
- JA presented her slides (see Drive for details) and made a case for social media at Caltech
- TC will create a folder in the Drive for this so we can collaborate and make sure we are covering interesting topics
- **Organizing May 17 working session!!**

GROUP WORKED ON ENGAGEMENT PROGRAM AS DIRECTED BY KATE MALECEK – wait until next month!

- STICKERS!!
- Update on Survey!
- Walkthrough and feedback of existing Fact Sheet(s)
- Work on Fact Sheets resource collection (remaining time)
    - Talk through topics and if these need to be for slides, fact sheet etc
    - We will also book a room for 2h to work on these resources on May 17? (details to follow) and also to post our next social media post!
-

For next time

- Certification
    - Takes ½ hour
    - Very simple!
    - See https://greenlabs.caltech.edu for the form
    - Get a plaque!

    - Green Labs will give you bins and signage for your lab!
    - Only for Green Labs Certified labs
        - Stickers
            - Can order stickers through us and we will print them and drop them off!
            - Three sizes (but fully customizable) and three colours/messages (1", 1.5", 2")
        - Help encourage behavioural changes
        - Recycling bins
            - "slim jim" style
    -

- Photos!
- Work on Action Plan
- Anything Else?

Working meeting May 17 – working on social media posts and fact sheets!!
Next Meeting June 14 12pm-1:30pm Chen 240
Bring a friend and get a RocketBook!

(NOTES FROM LAST MEETING BELOW)
Reengagement Project – Kate Malecek (slides and resources posted to the Drive under Certified Green Labs Engagement and Fact Sheet Coordination)

- Update the Certification form
- Efforts to reengage labs that are already Certified and improve their score, check in, see if they are keeping up with sustainable changes, what are they working on now etc
- Made docs we can collaborate on to create fact sheets
- Made some mock-ups of fact sheets
    - Can have a lot of fun with them!

From KM's slides:

- KM: the current Green Labs Certification program is managed by MC, under sustainability office, we have done a lot to promote it, some labs have had them for a year, moving forward we want to think about it more, we want to think of it in a new way, want to engage labs that have participate previously, want to survey and engage them and build them up for the future, want this plaque to mean something moving forward and to support them and mobilize them for things we and they need, provide more examples of real world real lab solutions

Survey
Check in about ongoing practices
Provide support and learn about obstacles
Use a survey to identify areas for progress that labs are motivated to pursue

- KM: survey of GL Certified labs as a way to increase engagement of those labs, also see which modules they can grow into or specific areas where we can give them a badge that they work towards a particular goal in 2024, then the plaque becomes a living document to these green practices, can continue to add notches to their belt to promote sustainable lab practices
- KM: with the survey we want to check in about their practices, how is their lab doing, who is working with them, who is an obstacle, can we provide additional support, also want to use the survey they want to move forward into working naturally with the modules
- KM: I went through the scorecards and looked at areas that labs were doing well and areas are doing not so well, common areas that we have developed resources for like green procurement (tip refills, bio gloves), cold storage (difficult to take on because of huge institutional memory and PI s have strong opinions on this), so we can add those to the survey and see how we can help labs do better
- KM: on second page of the survey want to add "what did GL do?" Gets folks thinking of what we did and what they have done last year. All of these things will be highlighted
    - 12 monthly meetings
    - Sustainable Dining guide
    - Sustainable Coffee and Tea guide
    - Lomi composting in BBE kitchens - yield
    - Pipette tip box recycling with vendors - yield
    - Lightning Talks event for Pilot Program Proposal
    - Event with WiBBE
    - Visit to a diagnostic lab with a pipet tip washer
    - New certified Green Labs! - count
        -

Modules
Direct the resources that we have developed in the past year to individuals who are poised to use them effectively
Generate ongoing attention to the certified status plaques
Generate real lab accounts of approaching and working through different sustainability issues

- PURCHASING may include
    - using tip refill inserts in reused tip boxes
    - choosing items with low waste packaging
    - using biodegradable gloves
    - consolidating orders to reduce shipments
- COLD STORAGE may include
    - maintaining fridge and freezer inventories
    - using high density storage boxes and racks
    - consolidating into fewer freezer racks when possible with regular clean out of unneeded samples or expired reagents
    - performing preventative maintenance (de-icing, brushing, and filter cleaning)
- RECYCLING & WASTE may include
    - efforts to divert landfill waste to recycling or reuse

    - engaging vendors about their packaging, including taking back Styrofoam or cold packs
    - donating lab supplies that are no longer needed to others
- ENERGY CONSERVATION may include
    - efforts to estimate energy use
    - promoting powering off unnecessary equipment
    - investing in Energy Star appliances
    - closing fume hood sashes when not in use
    - switching ULT freezers from -80C to -70C
- EDUCATION OF LAB may include
    - incorporating sustainability information and guidelines into lab training
    - promoting compliance with your lab's existing sustainable practices with signage and announcements
    - engaging with sustainable programming at Caltech, or Green Labs Group programs!
- OTHER may include
    - Describe another way in which your lab has addressed sustainability
-

Future initiatives
Create awareness about issues that may require broader mobilization to address - such as recycling transparency or Styrofoam recovery

<u>Conversation re modules:</u>

- WW: want to talk to PIs, have them talk about sustainability as a goal, if we as grad students, our targets are research, concerns of taking time away from research, should not be primary focus, if they can get the idea and push from up to downwards would be easy
    - KM: what do you mean?
    - reply to KM: gloves and purchasing decisions come from PIs and education and how to use instrument and preserve energy, changing from -70 to -80, PIS have more say those decisions
    - KM: true that the PIs are responsible for the people in their labs, but most labs PIs don't care where you buy tips or if you organize freezer, lab managers do, PIs don't have time don't care,
    - WW reply: in some labs PIs are responsible
    - KM: some PIs are responsible but can still mobilize staff and students, it is their immediate space and they care
    - WW: need better incentive is that we say we are saying to be more energy savings, increasing productivity, if you can convince them of increased productivity energy and costs are not important, but productivity is important)
    - KM: you can find samples faster in a cleaner freezer, can build that in, people may answer that on the survey, being wasteful is making us more productive, lab meeting slides that show that and will target the PIs, but hesitate that they are the major pull, have to have them convinced and supportive,
    - WW: if the PIS don't care the culture nothing will change

    - KM: lab managers make purchases and maintain the spaces etc, grad students are busy but still believe that things can be better but PIs don't, PIs should be part of it but no PIs submitted a certification, trainees and staff did),
    - TC: when we talk to the PIs we will be sure to change the language to make it more convincing to them, the work we do and the resources we make are mostly targeted to lab managers, grad students etc, but when we do talk to PIs I agree the messaging is different, perhaps WW can provide feedback on what they think their PI will take more seriously? We can go over slides together?
    - TC: also, note that labs do NOT have to adopt sustainable practices like tip washing – if labs don't want to no one is forcing them! We want to make it easy for labs to participate and for it to not impact their workflows at all, so for example, the tip box recycling program adds no time to anyone's day (except the person who brings it down to the recycling bins, which takes less than 5 mins a month for me), you are either throwing the boxes in the recycling bin in your lab or into a garbage bin in your lab, so this action does not impact productivity
    - JA: (directed to WW) from a grad students perspective, what would incentivise more PIs to care?
        - WW: from a GS standpoint is how you can conveniently act green, how does that help, for example tip washing, if you switch from using brand new boxed tips to washed tips, but have to fill in the tips manually that will take time in that case you have to do that work
        - JA: could present a built-in process, manual tip stuff is a pain, we can say we want to change the behaviour, idea of using the tips and re-racking by hand, the current idea is that the machine will do that (re-rack the tips for you, so no extra labor burden on labs)
        - WW: going to be friction because you are changing the protocol, not good if you are introducing something new, unless there is a good reason to change it, challenging
        - HT: another GS perspective, a lot of people do care about sustainability and won't go out of their way, but if given the choice between a sustainable option and not most will choose sustainable choices, we in our lab have a great lab manager, and we are given that option, and also for composting a lot of people aren't aware but I can remind people, you can make a choice to compost they do
            - Yvette: My PI is very indifferent to these options
        - KM: tip washer is biggest ask, time to do something about the waste that does not cause such upheaval in your lab, can still do smaller actions that have a big impact if they are not convinced by the data from the tip washers
- KM: getting back to the module program and they survey, we want to gather more information on the ground like how are their initiatives going, currently GL is providing a lot of resources and don't know what their impact is, need to reengage them,
    - WW: education ground is hardest, I am the GL rep in our lab, TBH don't have that much time to educate everyone in the lab, need to find 5 min video that could educate them
    - TC: we can work on that, making it more accessible for folks

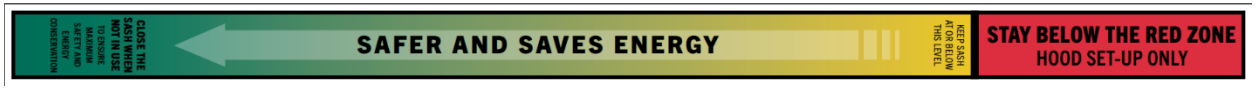
    - KM: want help drafting slides, fact sheets, emails, we can put resources into templates to start the conversations and that will help with education,
- KM: first idea is to send out the survey, then break up the work, maybe there will need to be fewer modules, subgroups responsible for all the modules are ready to go, take on a little bit at a time, links, pictures etc to make the module, the goal is to be done at end of spring, push for Earth month (could be later)
- KM: want to talk about the stickers, they have to look good to be motivated, might be an area where we engage Sami who did the logo, the plaque does not have the logo, so our stickers have the logo so it is associated with the group
    - TS: make it a game, have an additional plaque with punches in the scorecard
    - KM: very open to that design, makes it more interactive,
- JA: punch card starts clean slate that lasts a longer period of time, stickers have the year that you achieved the goal
    - KM: aligns with tickers on the plaque, at Huntington you get stickers when you sign the updated the policies, signal that they have signed the handbook etc, durability, very strong visual impression,
- KM: how do we prove that they have done it? write-up with a paragraph what did you do, how did you decide to do it, what difference did it make, plans to maintain etc
    - WW: add photos if they want
    - KM: documentation, first person account, adds weight to the accomplishment
        - CR: incentivise people to be involved
        - KM: right, give a number of that gives people accountability

- TC: Do we want to divvy up the work a little and choose a focus for next time? Could make it a working meeting?
    - TC: I am interested in the vampire energy fact sheet, found some cute resources, could customize it to be for labs, found cute ones other groups did with vampires and their capes
        - HT: could we make them fold?
        - TC: YES super cute, could have them on tables etc around BBE
    - WW and JA: interested in writing for newspaper
    - JA : interested in incorporating videos to the fact sheets, for example we could do one for green purchasing, could have a 30 second video, or how to make sure your products are sustainable, what that looks like on TechMart, in addition to the fact sheet, link the QR code on the sheet
    - KM: want to graduate the fact sheets to training for Green practices, tied to the flip book
    - KM: green purchasing is easiest to achieve
        - WW: but education is hardest
    - YGF: Cold storage management is hardest, facilities have cold storage management, she even has templates to minimize the opening of freezers, she thaws the -20s every year, those are the things we need to target, are feasible, should do it anyway for organization, align with research goals, when it is breaking down you can pull out the highest priority ,

        - KM: could write a lab manager testimonial about preventative maintenance, put together the things that Yvette manages she has templates and
    - KM: recycling and waste management have the most resources already, not a lot we can do to change the system,
        - JA could do some public shaming, put data on the blue bins
        - TS: we don't want it to be confrontational or discouraging, hard to commit later on if policies change
        - YGF: not had success being publicly shameful, want it to be non-confrontational and collaborative, won't get anything done otherwise,
        - TC: we have established trust so we should use that, make it more collaborative and supportive (like this is how it is now, but in the future we can change it to this! Or highlighting the work GL has already done to divert etc)
        - KM: styrofoam or plastics recycling programs are good but can't change how we interact with vendors, this is something to work on for future
    - Electricity conservation
        - TC: this year we want to get going on shut the sash initiatives
        - KM: ordering power meters that labs can borrow for their lab to estimate their kWh and costs, make an instruction fact sheet
        - KM: if James was here he could talk about the -70/-80 project, could focus on that also
    - Education of lab members
        - WW: Group meeting announcement slides, fact sheets easy to print out
        - KM: Would 1 on 1 meetings be effective?
        - Can develop fact sheets, signage, slides etc, and work to graduate the fact sheets to training for GL practitioners

<u>Fume Hoods</u>

- Consume 3.5x as much energy as a house
- Many examples of things like 6 foot long fume hood in a tiny room!
- Sash intelligence **reduces energy use by 75%** and is safer for users
    - Automatic closures and alarms
    - Sticker indicators


CLOSE THE SASH WHEN NOT IN USE TO ENSURE MAXIMUM SAFETY AND ENERGY CONSERVATION
SAFER AND SAVES ENERGY
KEEP SASH AT OR BELOW THIS LEVEL
STAY BELOW THE RED ZONE
HOOD SET-UP ONLY

Caltech green labs

FALL 2023

GREEN LABS COMPOSTING CHALLENGE

Date: SEPTEMBER – DECEMBER

Who: CALTECH LABS

Each floor in Chen and the third floor in Broad will compete to turn the most food waste into compost dirt during Fall 2023.

Green Labs will provide a lunch party for the floor that makes the most compost dirt! Second and third prizes will also be provided!

Add your food waste or coffee grounds to compete and start composting today!

Download the 30-minute Green Labs Certification Form today an and submit it to sustainability@caltech.edu to get Certified today!

Or check our website for more information about the Lomi, or find Green Labs tips to make your lab more sustainable!

Sustainably printed on 100% recycled paper!

Caltech green labs

SPRING 2023

LAB SPRING CLEAN COMPETITION

Competition: JANUARY – APRIL

Lunch Party: MAY 1

Who: CALTECH LABS

Participants will compete to clean their labs top to bottom by cleaning out freezers, organizing storage spaces, and taking inventory of lab supplies!

Each participating lab will provide pictures of their cleanup by midnight APRIL 31ST. Prizes will be given for the biggest before and after difference, and for the "weirdest thing found".

The day after the competition ends, Green Labs is inviting all participating labs to have a sustainable lunch on us!

RSVP your lab by Sept. 15! All Labs are welcome!

Or check our website for more information about this event or find Green Labs tips to make your lab more sustainable!

Download the Certification Form today!

Sustainably printed on 100% recycled paper!

Caltech green labs

NOV. 30TH

GREEN LABS CERTIFICATION CHALLENGE

Date: FRIDAY, NOVEMBER 30TH

Who: CALTECH LABS

Certified labs will be rewarded with a Certified Green Labs Plaque, and access to exclusive events and swag (including free recycling bins and efficiency signage and stickers).

If your lab is Green Labs Certified by FRIDAY, NOVEMBER 30TH, Green Labs is inviting your lab to have a tasty treat and enter a fun raffle at a top-secret location only given to those most excellent and certified green labs.

Start your Green Labs Certification today!

Download the Certification Form today!
Event Date: Top-secret
Event Location: Top-secret
All Certified Labs are welcome!

Or check our website for more information about this event or find Green Labs tips to make your lab more sustainable!

Sustainably printed on 100% recycled paper!

Caltech green labs

CALL FOR SAMPLES

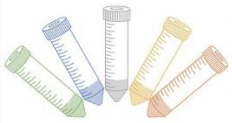
TO COMPARE -70°C AND -80°C FREEZERS

Dates: August 1 – December 31 (and beyond!)

Who: ANY CALTECH LABS

Green Labs is calling for samples for a student-led study comparing samples held at -20°C, -70°C and -80°C in the Chen Freezer Farm. Samples from various labs will be tested and compared at intervals over a period of up to 5 years.

We hope that by conducting a controlled study at Caltech, we can provide evidence for labs to change their -80 °C freezers to -70 °C, ensuring an energy savings of up to 30%! Below are some additional resources suggesting that -70 °C is a safe storage temperature for many kinds of samples. Use the QR code below to sign up to contribute a sample!



Sign up to contribute samples here. All labs are welcome to contribute samples for our long-term study!

Want to make your lab sustainable? Check out our website or download the Green Labs Certification Form!

Here are some resources suggesting that -70 °C is a safe storage temperature for many kinds of samples!

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