

II. Guidelines for Good Lab Citizenship

Group citizenship is taken seriously. Only with *everyone* working as a research team can we all maximize our research productivity and learning while a part of this group.

A. Office Etiquette

First and foremost, under no circumstances should laboratory samples be brought into the office.

Use of the group office is a privilege that all group members are entitled to during their stay in the Joy Lab. Each member is responsible for his/her personal and work-related items stored in the office. Personal items should be stored within the space of the member's individual desk/shelf space whenever possible. The group office is a shared space, and all members are responsible for general cleanliness and maintenance of the office space (don't make a mess, and if you do clean it up as soon as possible).

The refrigerator, microwave, toaster oven, and coffee maker are all shared items of the group. Courteous use and upkeep is expected of all group members. All appliances should be restored to a clean, working order after your personal use. Space in the refrigerator is limited, therefore group members must be sure to not monopolize space by "forgetting" to remove items. In the case of spoiled, moldy, smelly random items being found in the group fridge the item in question will be disposed of without question.

Appropriate conduct is expected from all members of the group. Harassment, of any type, will not be permitted or allowed. Computer use should be limited to work related activities. The downloading or viewing of explicit material on group computers, or while in group or department facilities on any computer or device, is strictly forbidden and will not be tolerated.

B. Replace what you use

If you use the last of something, properly dispose of the empty container and buy a new one. Some common examples are emptying reagent chemicals, bottles of solvent, vials, syringes, pipettes, printer paper, or toner. Laboratory chemicals and supplies should be replaced for the side of the lab that the bottle originated from. Taking supplies from the other side of the lab is an acceptable temporary solution for running out of something, however the item should be replaced from the stockroom, or ordered for your side of the lab as soon as possible.

C. Glass and Equipment Repair

If you break something, make arrangements to fix or replace it in a timely manner with Jack Gillespie (the DPS Lab Glassblower on the 2nd floor of GDYR). If a particular piece of equipment or an instrument is not working properly, promptly notify the person in charge. There is an electronically signed glassware order/repair form in the group DropBox folder.

D. Balance Etiquette

Any materials spilled on the balance must be thoroughly cleaned/removed. While most chemicals can be removed by simply sweeping off the balance with the provided brushes, sticky polymers, liquids, or corrosive materials pose a far greater hazard to the balance housing, weighing mechanism, and group members. Corrosive or liquid chemicals may require solvent to clean. Try water first, followed by a mild organic solvent such as acetone. ***Never*** use corrosives such as acids or bases to clean off the balances. In the case of excessive or uncommon reagents being spilled on a common balance, the group member in charge of the balances should be consulted.

E. Glassware Drawers

Laboratory drawers should be clearly labeled indicating the glassware or other lab materials that they contain. Upon reorganization the drawer should be immediately re-labeled to reflect the changes by the person responsible. Only properly cleaned glassware that is fit for safe use should ever be stored in drawers (free from vacuum grease, chemical residue and permanent marker labeling). Glassware should never be hoarded on drying racks or ovens, unless it is intended for specific use.

F. Fume Hoods

Fume hoods must be kept in a safe and orderly state in accordance with the chemical hygiene plan. Regular inspections will be conducted by the Group's safety officers and violations must be addressed immediately. Keep the sash fully closed as much as possible, and at all times when the hood is unattended.

G. Oil Baths

Unless otherwise labeled all of the oil baths in the lab contain either mineral or silicone oil and are appropriate for heating reactions under 200 °C. A different type of oil, that won't catch on fire is required for higher temperature reactions; high temperature oil baths should be prepared and used only as needed by the specific group member when needed to avoid confusion.

H. Storing Samples

Synthetic products must be stored in an appropriately sealed vial or jar, labeled with a synthesis date, researcher's initials, and the appropriate laboratory notebook page. For example, a product made by Bob Ross from his 3rd notebook, page 33 on February 24th, 2015 would be labelled "BR 33C 2/24/15" Plastic trays should be used to organize synthetic products that are being stored in common areas (ex. Bench tops) and must be labeled with the group member's name (ex. 'Bob's Synthetic Products'). *Samples are never allowed to be stored in round bottom flasks. Unlabeled samples will be thrown away on a daily basis.*

I. Lab Cleanup

Keeping the lab clean is important from both a productivity and safety point of view. While we try to keep a clean lab, inevitably a good thorough cleaning is needed once per semester (or as needed). Lab members will be assigned to clean the following areas:

- 1. Hoods and Benchtops** : There are 10 hoods in the lab. In addition to throwing away rubbish, make sure to clean the cabinets below the hoods and sinks next to them. You are also responsible for the bench tops and cabinets directly behind your hood. This includes physical cleaning as well as finding appropriate places for miscellaneous items that may be left on your hood, randomly tossed onto the shelves above them, or into the cabinets and drawers below them. Remember to check the area under the front ledge in the fume hoods -- pipette bulbs, rubber septa, and stir bars like to vacation there. Make up some new labels if needed. This will likely be the most significant part of the cleanup effort.
 - Centrifuge Work Bench
 - Sonicator Work Bench
- 2. Glassware Clean-up:** Make sure to clean all glassware in your area. Unlabeled glassware should be cleaned with extreme prejudice -- acetone, soap wash, and then base bath. Graduated cylinders may be rinsed with acetone and placed on a drying rack. Labeled RBFs and flasks containing samples should be moved to properly labeled 20 mL scintillation vials or centrifuge tubes. Unlabelled vials should be washed with acetone and cleaned for the base bath -- this includes pre-made TLC solvent vials whose labeling has worn off. Store TLC solvent vials in the labeled container. Dispose of unlabeled 1 mL glass vials.
- 3. Solvent cabinets:** Check for empty bottles, etc.
- 4. Chemical cabinets:** Make sure everything is organized, no chemicals outside the cabinets.
- 5. Solvent waste area:** General cleaning.
- 6. GPC area:** General cleaning.
- 7. Re-label difficult to understand solvent wash bottles**
- 8. Recharge desiccators with new desiccant if needed**
- 9. Clean microbalances**
- 10. Check stock of common items (gloves, centrifuge tubes, TLC plates, needles, glass pipets, sand, NaCl, NaHCO₃, Kimwipes, rubber stoppers, labels, syringes...):** Let someone know if you think we need to order any of these items soon.
- 11. Clean spatulas/scoopulas:** Clean them well!
- 12. Collect rubber septa to be cleaned:** Just throw them in a blue bucket.
- 13. Drain and clean rotovap and sonicator baths. Re-fill with DI water:** DI water prevents mineral buildup in the baths. Also, check the coolant levels and fill them if needed. I believe the coolant is a 50:50 mix of ethylene glycol:water.
- 14. Organize extra common items into shelves**
- 15. Vacuum oven block:** General cleaning.
- 16. UV/IR Room:** General cleaning.
- 17. Irradiation lab:** General cleaning.
- 18. Chemical Fridge:** Chipping away at ice buildup. Everyone is responsible for his or her samples in the fridges. Please throw away unused samples. Transfer your samples from RBFs/flasks to appropriate containers. Any samples left in RBFs/flasks will be thrown away by the end of the day.
- 19. Collecting broken glassware for repair**

J. Data Recording and Notebooks

Maintaining a clear, well organized, and up-to-date lab notebook is critical for (a) keeping track of your experiments for your thesis, (b) any publications/ patents that you will write and (c) enabling future generations of students to reproduce your work.

An example of a typical notebook page is shown below, however, the following must be included. **Notebooks belong to the Joy Lab and can be obtained from Dr. Joy as needed.** Do not remove them from lab; they must be accessible at all times. Do not remove any pages from notebooks.

Date – Each notebook page must be dated.

Use every page – skipping pages waste money (notebooks are expensive), wastes space (blank pages = more notebooks = more required storage space in the lab). Blank pages also present problems with regard to intellectual property (IP) protection. If you need more than one page to properly record an experiment, use more than one. Make sure to mark down where the notes continue; write “Continued on page XX” or “Continued from page XX” on the bottom or top of each page – as appropriate – to ensure you can find your notes. If you inadvertently leave a blank page in your notebook, make a large “X” across the page, and sign and date it. If you leave half a page blank, cross it out so no further additions can be made. While desirable, contiguous pages are not necessary. If you need to add something and the next page in the notebook is used, go to the next empty page.

Reaction Scheme – include a scheme on each page that shows the reaction(s) you are trying to perform. List all variables in the scheme. This should include equivalents of reagents, temperature, time, etc. A table of reagents is required for every reaction. This should include: compound name, molecular weight, source or supplier for each chemical (if it was prepared in the group or is otherwise not commercial, include a notebook page; if a chemical was purified before use, state how); mass added, equivalents of each reagent, volume and density (if liquid). **All reagents, chemicals, catalyst, solvents, etc must be included.**

Detailed experimental notes must be recorded. Write in your notebook with non-erasable ink. If you make an error, cross through the mistake with a single line, write the correction in the closest blank portion of the page, and initial beside the line. The notes are critical and should include details such as where the experiment was setup, what size flask, if the flask was dry (if so, how was it dried?), if a stirbar was used, if the reaction was sealed, if the reaction was run under inert-atmosphere (if so, how?), what reagents were added and in what order, how reagents were added (was the solid weighed in, was it added via syringe, etc?), how long the reaction was stirred and at what temperature, how the reaction was worked up, how the product was assayed and purified, what the yield or result of the reaction was, any additional notes, conclusions or observations - this can be the color of the reaction, did it exotherm, did it stop stirring, does the experiment need to be changed, did something go wrong such that it should not be repeated, were there precipitates, did we learn anything in particular from the experiment? Any observations that you note about the reaction should be recorded. **You never know what seemingly unimportant details might prove crucial later. Include the yield.**

If you purify by flash column or other method, record the type of chromatography used, the eluant system, the column or prep plate size, and the quantity of silica gel or other solid phase. Comment on the outcome of spectroscopic data obtained and include TLC examples helpful to rerunning the experiment in your notebook.

For repeat experiments you may list only the reagent/substrate data and pertinent procedural changes. Cross-reference this notebook page to the most recent full experimental that you are following. When changing conditions note the changes and your reasons for making the changes.

When an experiment or page is complete, sign your name and note the date at the bottom of the page. Such information can be useful when applying for patents or for proving priority in publications. For new reactions or potential inventions, have another person who is capable of understanding the work sign as a witness. The witness cannot be someone who is a co-inventor or co-author on the potential invention/publication.

Page numbers and notebook numbers will be used to uniquely ID each reaction. The first experiment on the page should be numbered "A". **Our convention will be [Initials][Notebook Letter][Page number][Reaction letter]**. For example AJ B095A corresponds to reaction A in Dr. Joy's second notebook (B), experiment page 095.

Notebook Index. An index of reactions is required. Our notebooks provide space for this at the beginning of each book. Please keep your index up to date.

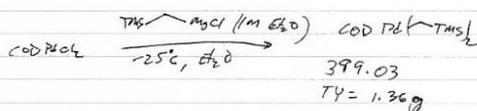
References. If a literature procedure (or modification thereof) was used to prepare a compound, list it below your table of reagents. If you are repeating on of your own procedures, reference that as well.

Archiving Data. Please keep a copy of all data (NMR, GPC, UV, IR, etc) that you collect in binders. Collect data from each experiment or page of experiments in a single protector sheet (use multiple if needed) and organize them by notebook and experiment number in the binders. **KEEP THIS UP TO DATE.** Be sure to copy your electronic data to a CD or DVD when finishing a notebook. This disc should be affixed to the inside cover of your completed notebook if possible or kept at your desk until graduation.

Be critical of each other's notebooks and keep each other accountable.

Example notebook entry:

10/21/02



COD Pbl	285.51	1g	3.50 mmol	1	g-mol
TMS-MgCl	(in A/N, Et ₂ O)		44.0 mmol	22.3	g-mol
Et ₂ O			8 mmol		40 ml
acetone	58.05		8 mmol	0.6	g
			4.0 mmol	4	0.711 g

In a flame dried 100 mL 14/20 round flask equipped w/ a septa & large stirbar, a suspension of Pbl in 70 mL Et₂O was cooled to -25°C (in a cryocool) w/ rapid stirring. A soln of 0.5 mL of dry, degassed acetone was added. After 15 mins, giving a grey/green suspension which darkened slightly as it was stirred at -25°C for 1 hr. 0.5 mL dry, degassed acetone was added, which caused color to lighten slightly. After 5 mins, solvent removed to dryness on vac line at -25°C. Back filled w/ N₂. Degassed pentane 70 mL added slowly to the resultant dark grey solid at -25°C. After stirred

Con't from DAW05016

for 5 min at -25°C. Solution transferred via filter-cannula to pre-chilled 200 mL Schlenk flask at 0°C. Solids washed w/ additional 5 mL pentane. Combined pentane soln ~~added~~ concentrated on vac-line to give light yellow solid which was dried at 0°C for 30 mins, then at rt for 5 mins (Vac gauge pressure < 50 mTorr). The solid was placed in glove box & the solid was moved to a vial for storage. Yield = 780 mg 57% (Product DAW05016A1)

K. Meetings

Group meetings will be held each week in order to discuss group research, a recent literature paper, relevant literature collection, and common business. Group members assigned to literature collection duty must update the "Literature Collection" Excel file in the Joy Lab Dropbox folder with the journals, issues, and volumes covered. A schedule will be distributed several weeks in advance of any meeting, in order to give participants time to prepare.

Each group member is expected to submit a bi-weekly Research Update to me on the Monday after payday. The reports should detail the work that has been performed, along with any issues and possible solutions, and appropriate spectral data as needed.

L. Joy Lab Dropbox Folder

Our lab uses Dropbox in order to sync important files between the computers of lab members. Dropbox cloud storage backup service and is free to download for Windows, Mac, and Linux (as well as iOS, Android, Blackberry, and Windows mobile operating systems) at <https://db.tt/OAHu8yu> Each account is given 2 GB of storage space.

The Dropbox folder contains a number of important files and folders:

- Group meeting presentations
- Literature collections
- The chemical inventory
- Chemical and supply request forms
- Group contact info and lab responsibilities
- MSDS sheets

- Relevant textbooks and instrument manuals
- Instrument logbooks and GPC sign-up sheets
- PowerPoint and ChemDraw templates
- Logos and group pictures

Email a current group member in order to be added to the group Dropbox folder.

M. Joy Lab Quartzy Account

Our lab uses Quartzy.com to manage inventory, order requests, and certain procedures/documents. Email a current group member to be added to the Joy Lab Quartzy page.

N. Literature Readings

An enormous number of journals now exist that are related to our work in this group, which makes keeping track of everything challenging. At minimum, all students and post-docs in this group are expected read the relevant publications:

- [ACS Macro Letters](#)
- [Macromolecules](#)
- [Biomacromolecules](#)
- [Journal of the American Chemical Society \(JACS\)](#)
- [Angewandte Chemie International Edition](#)
- [Advanced Materials](#)
- [Polymer Chemistry](#)
- [Chemical Communications](#)
- [Journal of Polymer Science Part A: Polymer Chemistry](#)
- [Bioconjugate Chemistry](#)
- [Biomaterials](#)

A schedule will be distributed to assign other journals to individuals to keep tabs on and relevant and interesting papers will be flagged for the group at large. Importing the [RSS feeds](#) for these journals into a feed reader such as [Feedly](#) can make keeping up with literature a much simpler task.

General tips for reading the chemical literature

- You cannot expect to read everything.
- Try to read papers that are (i) the most interesting to you and (ii) the most relevant to your and the group's research projects.
- No one has time to read the entire text of every article. Read the abstract and introduction and then try to discern the major point of the paper from the Figures and Schemes. If you find something especially interesting or unclear consult the text for further details. Keep in mind when writing your own papers that these are the sections that are usually the most read.
- Whenever possible, discuss with others what you have read! This will solidify your general knowledge as well as improve your understanding of what you have read.

O. Vacations & Holidays

I don't monitor vacation days, and I don't expect that it should be necessary. Please discuss your plans prior to your departure, describing the days you will be gone, and providing an emergency contact phone number where you can be reached just in case something happens in your area of the lab that requires us to contact you.

Personal emergencies and illness are understandable and a completely different matter. Please let me know what is going on when you are able; when you have an illness or crisis I may be able to help you get back on your feet faster, or I may know of someone who can help you, such as the university's counseling center. While research and publications are important to me, your health and well-being are the most important. I will always offer all the help I can provide – just ask.