

## **Lab Research 101: Introduction to the Biopolymer Labs (Dr. Brazel, Chemical & Biological Engineering)**

### *Introduction*

There are three primary labs that are used in the Brazel group- A15, A10 and A04. Equipment is shared between the labs, and may be occasionally shared with other faculty on campus. Our group does work that is interdisciplinary in nature, so we interface with biology, chemistry, materials/metallurgical engineering and various centers on campus as well as at UAB. This gives us access to analytical chemistry equipment, mechanical testing devices, advanced microscopy techniques, and thermal analysis equipment. Most faculty and research groups are willing to share equipment to a certain extent, but be conscientious of keeping equipment in good working order.

The labs are laid out to have space set aside for working areas, especially in the hoods, and common areas where chemicals are stored (acids, volatile chemicals, salts, non-hazardous chemicals, and those that need refrigeration/freezing). The labs are fairly well organized, so if you are looking for something, try the drawer labels first.

The graduate students are working on long-term projects towards an M.S. or Ph.D. in chemical engineering, and usually have priority as far as doing their experiments, but they are also good sources of information and advice in the experiments of undergraduate researchers and new graduate students.

The areas of research represented typically fall into one of the following categories: drug delivery, polymer synthesis, biomaterials, microencapsulation, material characterization, or environmentally-responsive materials.

This is meant to serve as a guide to offer a 'standard' introduction to the labs.

### *Broken Glass*

It is inevitable that glass will break. Be careful when working with especially expensive glassware (like the permeation cells, the dissolution cells or the quartz cuvettes), but any glass that must be disposed of (even if it didn't break) needs to go into the broken glass box, so that it doesn't cut someone when the trash is removed. When the box gets full, the easiest way to remove the glass is simply to dump out the contents into the dumpster and return the empty box to the lab. James Hill has extra boxes if a new one is needed. The main thing if anything breaks is to let me or others in the lab know so that we can replace it.

### *Unwanted and Spent Chemicals*

In a few instances, dilute solutions of non-hazardous materials can be washed down the sink and polymers, because they are inert, can be thrown in the trash, but most chemicals need to be saved for eventual clean-up by the environmental health and safety (EHS) department on campus. Used and empty chemical bottles can be used to store unwanted chemicals. Rinse the bottle three times with water, and remove the original label(s) (or deface them so that the original contents can no longer be read). There are spent chemical forms in both labs at the entrance that should be filled out and attached to the bottles.

On these forms:

1. List each chemical's full name (the safety office won't know HEMA, DOP, and AMPS)
2. Give an approximate content or composition (within 10-20 % is reasonable)
3. Fill out the bottom section with my name, the lab room number, & my phone number 8-9738)

Keep track of the chemicals added to these bottles, and when full, fill out an on-line request at <http://www.ua.cems.sr.unh.edu/CEMS/Info> to have the chemicals removed from the lab.

NOTES: Do not label spent chemical bottles as "WASTE", & do not wash polymers down the sink! (they clog)

### *Ordering Chemicals*

Chemicals and supplies are readily found in catalogs such as Fisher and Aldrich. When you want to order something, find the approximate cost, and let the advisor approve the spending (mainly to select the appropriate research account). The business office staff (currently Inge Archer) can assign the departmental credit card, and in most cases the order can be placed on-line.

Be sure to store the chemical in the appropriate place when it arrives, and add it to the chemical inventory list.

### *Inventory*

The University keeps a computer-based chemical inventory for all labs on campus. Each chemical in our lab should be bar coded as it is received, and must be entered into the web-based chemical inventory system. Whenever a chemical is exhausted (used up), it should be removed from the inventory list (unless the bottle will be refilled with the same chemical). All graduate students in the Biopolymer lab are trained on the inventory system and can help any undergraduate student enter or delete chemicals as needed.

### *Safety*

A few ground rules: when working with chemicals, wear safety glasses. Lab coats and gloves are available and should be used to protect clothing and hands when working with chemicals. A chemical spill kit is located in a box on the floor in each lab, designed to absorb liquid spills. Eyewash stations and safety showers are available within at most one closed door of each lab.

UV-protective safety glasses should be worn when working with ultraviolet light, for example, when running photopolymerizations.

No food or drink is allowed in the lab.

### *Biological Hazards*

Both Labs (A004 and A015) are designated at bio-safety level 1 (the lowest level) for work with living organisms. Our lab works with microorganisms occasionally, primarily to follow cell growth patterns, demonstrate extraction techniques for cellular proteins, or study the cytotoxic effects of chemicals and materials on living cell cultures. Two living strains are used in our labs: *saccharomyces cerevisiae* (or brewer's yeast) and *Drosophila* S2 cells (fruit fly cells). These organisms are stored frozen, and when they are used, sterile areas must be created. Unless your research involves biologicals, you should not contact the cell cultures. When working with the cells, all material and lab supplies that contact the cells must be sterilized (by autoclave or passivation using ethanol solutions) before being returned to normal lab circulation. Biological waste generated should be stored in a biohazard container, and either autoclaved prior to disposal, or removed by a staff member from UA's Environmental Health and Safety (EHS) office.

### *Lab Notebooks*

All experimental data should be recorded in PEN. Pencil marks are not allowable in the case that your work becomes the data to support a patent application. Lab books are provided in Lab A15, and should be kept in the laboratory at all times. If you generate graphs or computerized data, it is acceptable to staple the data into the lab book. Experimental records should state the experiment being done, the goals of the particular work, and list experimental conditions that are controlled. Once listed in the book, subsequent experimental procedures can refer back to the original entry, noting any changes.

If an error is made, mark through the words/data with a single line and initial the error.

### *Resources*

Please read through the chemical hygiene plan when you first start working (located just inside the door of each lab). Also, make a note of safety equipment location, and find the MSDS notebook in the lab.

A chemical inventory list is posted in the lab, and should be updated when a new chemical arrives by whoever ordered it. Also, phone numbers of each of the researchers are kept so that they can be contacted if there are questions about on-going experiments, or samples.

Other resources, such as library and chemical information web sites, can be found through [www.bama.ua.edu/~cbrazel](http://www.bama.ua.edu/~cbrazel).

### *Training*

General Lab Safety Training – anyone needing General Lab Training should send an email to [mwhitney@bama.ua.edu](mailto:mwhitney@bama.ua.edu) – Marcy Whitney will send a link for training. All login information will be included in the training email. Marcy will send out certificates of completion to everyone who completes the training and passes with test with a grade of 80% or better.

Chemical Hygiene/Safety - anyone needing Chemical Hygiene Training should send an email to [mwhitney@bama.ua.edu](mailto:mwhitney@bama.ua.edu) – Marcy will send a link for training. All login information will be included in the training email. Marcy will send out certificates of completion to everyone who completes the training and passes with test with a grade of 80% or better.

Laser Safety – anyone needing Laser Safety Training should send an email to [mwhitney@bama.ua.edu](mailto:mwhitney@bama.ua.edu) and Marcy will email a file. This file will include the training information as well as the proficiency test. Instructions for opening the file will be included in the email, instructions for submitting the test will be included in the training packet.

Biological Safety - anyone needing Biological Safety Training should send an email to [mwhitney@bama.ua.edu](mailto:mwhitney@bama.ua.edu) and Marcy will email a file. This file will include the training information as well as the proficiency test. Instructions for opening the file will be included in the email, instructions for submitting the test will be included in the training packet.

Read and understood by:

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Name

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Date