

Agronomy Shared Labs Handbook

Department of Agronomy, Iowa State University

Lab Manager

Dani Clark

Agronomy Shared Labs Handbook

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Introduction

This handbook serves to provide information for all users of the Agronomy Shared Labs. Research efficiencies are critical in times of budget shortfalls and limited laboratory space.

Though still evolving, our goals are as follows:

- Maintain a high level of laboratory safety
- Increase space use efficiency
- Increase equipment use efficiency
- Establish long term laboratory goals (protocols and capabilities to add)
- Increase interactions among faculty, graduate students, and professional staff.

The shared laboratory concept has provided for many of the efficiencies we envisioned. While we are still learning how to function under this model, the faculty have been very supportive and our processes continue to evolve. We hope this approach will serve as a model for other research groups/programs.

This information as well as other information about the Agronomy Shared Labs can be found online at <https://www.agron.iastate.edu/shared-labs/> Please be familiar with this online tool with a list of equipment, spaces, equipment scheduling (<https://www.agron.iastate.edu/shared-labs/reserve-equipment-agronomy-shared-lab/>), and much more.

Information in this handbook serves to cover the topics most pertinent to this group of researchers. Some topics will be obvious “common sense” items. Others are in this book because they were not so obvious and have become stumbling blocks and issues that have needed to be dealt with in the past.

Please use this handbook to make yourself aware that there are procedures that need to be followed with specific examples to model. If information you need isn't covered, please contact research staff or faculty for the answer and we will update this document as necessary.

New User and Continuing Requirements

Laboratory access/beginning a new project

You will not be permitted to work in the labs without the permission of your PI and the lab manager. Once approval has been obtained the person will need to ensure the appropriate paperwork has been completed. This includes completed safety training records to your PI or direct supervisor, approved Standard Operating Procedures (SOPs) for all work to be conducted in the Agronomy Shared labs, and a signed Laboratory User Agreement. The

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person will also need to be properly trained to operate relevant equipment. After following these steps, the lab manager will then allow access to the laboratories and equipment by issuing a key to faculty, staff, post-docs, visiting scientists, and graduate students. Undergraduates are not issued keys.

Before beginning a new project in the lab that will require the use of chemicals, equipment, space or any other supplies, it is the responsibility of the student/Post Doc/visiting scientist to arrange a meeting with the lab manager to integrate the project into the ongoing life and safety provisions of the lab. This includes:

- Overview of laboratories (location of work areas, available supplies, emergency equipment, etc.)
- Submission of EH&S training records indicating successful completion of University required safety training modules (ISU & OSHA requirements) to YOUR SUPERVISOR not the Lab Manager!
- Review of laboratory safety rules and procedures
- Reading and signing the Laboratory User Agreement
- Submission of a written Standard Operating Procedure (SOP) (ISU & OSHA requirements). In order to ensure a safe working environment and a thorough understanding of the research at hand, SOPs need to be written by the individual leading the research for every procedure conducted in the lab. **SOPs must be approved** by one's major professor and the lab manager **prior to implementation**. It is also the responsibility of the researcher to ensure that anyone assisting with the project be sufficiently trained and aware of all safety hazards. See lab manager for electronic SOP template or assistance with obtaining new SDSs.
- Inventory of the supplies needed
- Review of procedure for introducing new chemicals into the laboratory
- Instruction on proper use of equipment and instruments

Laboratory Practices

Dani Clark is the manager of our lab. She has great experience with all kinds of analyses and is a source of wisdom on getting things done effectively and efficiently. Please let her know what you hope to do in the lab and get her advice about how and where to do it. Her advice and instructions will be exceptionally useful for you. Talk with Dani before you begin any new project or analysis.

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Required Safety Trainings – Information for Supervisors

- **Who needs to complete trainings?** All faculty, staff, post-docs, graduate students, undergraduates, visiting scientists, etc who work in a laboratory setting – wet or dry labs and the field. (<http://www.ehs.iastate.edu/>).
- **Who is responsible for ensuring personnel are properly trained?** Safety trainings are the responsibility of the PI/Faculty and supervisors. Supervisors can include faculty, staff, post-docs, graduate students.
 - **Trainings have moved to WorkDay Learning!** As your training expire in Learn@ISU, complete new trainings in Workday. Any new employees should go straight to WorkDay Learning to complete all trainings.
 - **Does my employee supervisor someone?** Make sure that all employees are aware of their supervisor status and training responsibilities.
 - **Shared facilities or other labs on campus besides those in your name?** If your employee works in another lab in the building, on campus or in a shared lab facility (aka – Agronomy Shared Lab) – it is YOUR responsibility as their supervisor to ensure they are up to date on all trainings.

LAB/BUILDING Required trainings:

- Laboratory Safety: Core Concepts – required every **3 years** (waste & recycling was included in this training and individual training was retired in 2019)
- Emergency Response Guide Video – required every **3 years**
- Fire Safety and Extinguisher Training – required **Annually**
- **What additional trainings are needed?? – complete this form!**
 - [Safety Training Curriculum for Laboratory Personnel](#)

FIELD/GREENHOUSE/GROWTH CHAMBERS Required trainings:

- Hazard Communication Training (Worker-Right-to-Know) – required every **3 years**
- Worker Protection Standard (WPS) Training: Agricultural **Worker** Pesticide Safety Training – required **Annually**
 - **Offered 1x/month Workday Learning**
 - **Offered 2x/month by Dani: Registration on Shared Labs website under WPS.**
 - Those who perform tasks related to growing & harvesting plants on farm or in greenhouses, nurseries, or forests.
 - Workers include anyone doing tasks such as:
 - Carrying nursery stock
 - Repotting plants
 - Watering
 - Other tasks directly related to the production of agricultural plants on an Ag establishment

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- Worker Protection Standard (WPS) Training: Agricultural **Handler** Pesticide Safety Training – required **Annually**
 - **Offered 1x/month Workday Learning**
 - **Offered 2x/month by Dani: Registration on Shared Labs website under WPS.**
 - Those who:
 - Mix, load or apply agricultural pesticides;
 - Clean or repair pesticide application equipment; or
 - Assist with the application of pesticides.
- If you have taken the Pesticide Applicators License training you do not need the Worker or Handler training – required every **2 years**.
- **Others to consider based on your research needs:**
 - BioCentury Research Farm Safety Training
 - Forklift Driving
 - Golf cart and utility vehicle training
 - Research Farms Safety Training
 - Scaffold Safety Training
 - Tractor Safety Training
 - There may be more that are required for your research needs!

Please reach out to the Agronomy Department Lab Safety Contact: Dani Clark (dwilson@iastate.edu) with any questions!!

Safety in the lab or in the field is everyone's responsibility. Please do everything that you can to work safely and encourage others to do the same. This means that we take very seriously all the lab safety procedures in the EH&S training. Some examples: **No food or drink in the lab or disposing of food waste in lab trash**. No sandals in the lab. Wear eye protection whenever working with fluids or dusty materials (which means essentially all the time in our lab). (Please get used to these expectations.)

Keys to labs

Keys will be issued to those who have completed the above items including EH&S safety trainings, signed the Laboratory User Agreement, written SOP's for all lab related tasks.

Lab group personnel

A current, updated list of personnel working in the labs is needed to ensure everyone is properly trained and up to date on information. Staff or post-docs associated with a research group should provide that information at least every semester (fall, spring, and summer).

Cleanliness and organization in the lab

Each student is responsible for keeping clean and orderly the lab's workbenches as well as lab spaces used for instrumentation and storage of samples, reagents, or equipment.

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These responsibilities include washing and storing glassware and other containers promptly. We want our lab spaces to be used, but they must be kept clean and organized. For each procedure that you undertake, please build in enough time for prompt cleaning of your space and the lab supplies that you use. Please ask Dani about how to clean glassware or plastic supplies. There are bottles of Windex available in all spaces to clean lab benches.

Hazardous waste

Each student must be responsible for both temporary storage and final disposal of any hazardous waste generated by his / her analytical work. As a general rule, almost all chemical waste should be collected as hazardous waste and not poured down a drain. If you are not sure how to handle the waste, please talk to Dani. Have a plan for your waste before you begin any procedure. All waste needed to be submitted within 90 days from the time they are generated. Please use the orange waste tag to label all waste generated. The orange waste tag should be placed on your waste container as soon as you fill it with material!! Waste should be stored in the Satellite Accumulation Area (1514 and 1528). When you are done collecting waste, the waste container is full or you will not be collecting more waste in the next 1-2 months, submit it to Dani Clark for disposal.

Solid waste/trash

Please take a turn moving the trash to the dumpster located on the ground floor and back of the building. Should you generate enough waste that can overflow the can, please move it to dumpster. Shipping boxes need to be folded before they are placed in the recycling section of the building (also located at the loading dock on the ground floor). Trash bags are located under most sinks in lab spaces. If they supplies are low, please notify Dani Clark.

Equipment and supplies

Take time to become familiar with the equipment and supply inventories in our labs. We should have lots of supplies on hand. **When you are done with an item, please return it to its designated storage place promptly.** If you need it for an extended amount of time, please inform Dani.

Please do not move laboratory instruments or major equipment items without checking with Dani. In general, it is preferable to prepare your samples at your lab bench to the extent possible and then move the samples to the instrument for the analysis. If we don't have something that you require, it may be possible to borrow it from another lab in the building. Borrowing from other labs requires tact and responsibility. It's best if you sign out an item (even if it is just glassware), give the owner a projected period of use, label it to indicate ownership and normal location, and then return it to its owner promptly when you are done.

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Equipment training

Site specific training will be provided for all equipment to ensure proper use.

Please schedule time with Dani when you would like to use equipment.

Scheduling equipment usage

Everyone should be using the online scheduling for equipment usage (<https://www.agron.iastate.edu/shared-labs/reserve-equipment-agronomy-shared-lab/>). If the specific equipment you are using is not listed, please notify Dani so that she can add to the list. In addition, please use the user sign-in sheets by equipment to also aid in tracking your usage of equipment. This is critical on sheets like the dryers.

Lab security

The security of our labs is a responsibility that we all share. Please remember to lock each lab whenever it is not in use. Each lab needs to be locked in the evenings, and the last person out of a lab must take responsibility for locking the door. If you notice someone in our labs who is not familiar to you, please ask that person what their business is – and notify Dani or the Department of Public Safety immediately of anything suspicious.

Laboratory common sense

- Return items borrowed from another bench space to its proper area at your earliest possible convenience (leaving a note as to the temporary relocation is helpful). Please refrain from moving equipment unless absolutely necessary.
- Equipment should not be removed from their assigned location without first notifying the lab manager.
- Accidents do happen and things in the laboratory will break. If you break or damage an item, please notify the laboratory manager immediately so it can either be repaired or replaced. **This is especially critical in regards to equipment failure.** Should there be a charge associated with the repair/replacement of the damaged item, your major professor may be asked to provide an account number to cover the cost, depending on the circumstances.
- User sign-up sheets (such as the ones on the 1426 ovens) need to be completely filled out each time the equipment is used. Not only does this make it easier to correct the settings should an alarm be triggered but it also lets other users know when the equipment will next be available for use.
- When the supply for an item in the lab is running low, notify the lab manager so an additional supply can be ordered prior to it being needed.

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- Remove gloves before opening doors, answering the phone, using keyboards, etc.
- Use odiferous chemicals in one of the lab's fume hoods with the vent on and sash at or below indicated level of operation.
- Avoid allowing liquids to enter the vacuum system. All vacuum systems, especially siphons, must be properly trapped and/or filtered.
- Clean all labware promptly after use, and store properly when dry. Please do not leave dirty dishes piled in the sink as this makes it awkward for others to access it. If you are unable to wash your labware immediately, place the dishes in a wash tub and set to the side.
- Do not leave stir bars in the sink as they will go down the drain.
- Clean up counter space after use, including balances and surrounding area and change lab paper after spills. Chemical residue will eat the counter tops and balance plates.
- Refill paper towel dispensers as they become empty (OSHA regulation). Extra paper towels are located in room 1522.
- When the trash bag is full, tie up the bag, take it to the dumpster and place a new bag in the trash can (garbage bags below sinks).
- If a project involves work with fresh plant tissue (germinated seedlings, for example), remove the waste materials from the lab and place in the teaching greenhouse headhouse compost bin (off loading dock) each day.
- When in doubt, label it!
- If you are the last one out of the lab, turn the lights off and lock all of the doors. EH&S safety regulations require labs to be locked if unattended for a period of greater than five minutes.
- Please leave the lab as one would expect others to leave it — if not better.

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Labeling

Samples

Working samples

Samples collected from the field, greenhouse, or growth chambers should be labeled immediately. All samples whether in paper bags, cloth bags, plastic bags, or any other form should be properly labeled for use in the labs. Most research groups have their own method for identifying samples with these typical pieces of information. All samples in the lab should at least have Names (graduate student & major professor) along with the date. An email and phone number would also be appreciated for emergencies.

Sample storage – awaiting processing (short term storage)

Samples that are dry and awaiting further processing may be stored in large trash bags but those trash bags should bear a tag with a label identifying the contents of the bag and the owner of the samples to prevent discarding the of those materials. Unidentified samples stored in trash bags run the risk of being mistakenly identified as trash and discarded.

Sample storage – small samples in plastic bags, specimen cups, glass jars (long term storage)

Samples that are being stored in the lab following any lab work should be properly labeled with all identifying pieces of information on the example above.

Chemicals

Reagent labeling is very important. Each chemical reagent that you prepare should be stored in a container that is labeled correctly. This includes (1) the name of the reagent (in words, not just chemical symbols), (2) the date it was prepared, and (3) the name of the preparer. Some reagents will require storage in a secondary container. Some will require storage in the hood. Please make these decisions carefully and ask Dani if you have any questions.

All secondary chemical containers (flask, beakers, test tubes, etc.) should be labeled with the following information:

- ✓ Chemical name – Spell out the name completely and correctly. Avoid using abbreviations or chemical formulas.
- ✓ Concentration – If the chemical is in solution, indicate the solution's molarity or strength.
- ✓ Hazard catch word – List in clear terms the potential hazards of the chemical and what target organs would be affected. This information can easily be found on original container label or SDS. Avoid numerical or alphabetical codes. Use signal words (i.e.,

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danger, warning, caution, etc.) and/or associated hazards (i.e., eye irritant, non-toxic, corrosive, flammable, etc.)

- ✓ Date prepared – Knowing the date the chemical was prepared is very important, especially for those chemicals that either have a limited shelf life or become more hazardous with age.
- ✓ Name of preparer!

Note: even beakers and bottles containing substance ‘only for a few minutes’ must be labeled – including water!!

Glassware tape is provided in all labs

Other items

All other items, including supplies, chemicals purchased by your group or those you are currently using should be properly labeled with graduate student name, professor name, emails, and phone numbers.

Violation of Laboratory Policies and Procedures

Should there be a violation of laboratory policies and procedures, the laboratory manager will first verbally notify the offender as to the problem at hand and how to properly resolve the situation. Upon second offense, the laboratory manager will provide the offending lab personnel with a written notice, and a copy will be sent to the PI or advisor. Should policy/procedure continue to be violated, the laboratory manager will revoke said personnel’s laboratory privileges and keys until a meeting with the aforementioned offender, their advisor, and the lab manager is held. Laboratory privileges may or may not be reinstated, depending on the outcome of the meeting.

Upon completion of research

Research in the laboratory will not be considered complete until:

- All laboratory space and equipment has been cleaned and restored to their original condition (minus, of course, normal wear and tear)
- All hazardous chemical waste has been properly labeled and placed in an appropriate satellite accumulation area.
- All research materials (including plant and seed samples) have been properly disposed of or placed in storage (labeled correctly)
- Any keys to the laboratory facilities have been returned to the key desk at the General Services Bldg.