University of Georgia

College of Engineering

Bio-Sensing and Instrumentation Laboratory Handbook

Fall 2018

Contents

A Letter to New Lab Members

Dear students, postdocs, visiting scholars, and coworkers,

Welcome to the Bio-Sensing and Instrumentation Lab at the University of Georgia!

You are joining an excellent institution with a proud history. The University of Georgia is the oldest public University in the United States and has been consistently ranked among the top 20 public research Universities in the U.S. The Bio-Sensing and Instrumentation Lab has not only become one of the most productive labs in the College of Engineering, but also been recognized nationally and internationally for the high quality and innovative research we conduct. In the past 11 years, the students and trainees from our lab have received over twenty significant awards including some prestigious national awards such as the ASABE Rain Bird Engineering Concept of the Year Award, ASABE Superior Paper Award, Boyd-Scott Graduate Student Research Awards (4 times) and ITSC Conference Paper Awards (3 times), to just name a few. We have made great strides towards our goal: to be one of the most successful and respected research groups in the area of sensing and robotics in agriculture and biological systems. We work on an interdisciplinary interface and collaborate closely with biologists, but identify ourselves as engineers specialized in sensing, robotics, and artificial intelligence to solve problems in food, agricultural, and biological systems. We believe our work will help advance the efficiency and sustainability of global food, fiber, feed, and fuel production systems, which is critical to the wellbeing of human population in the 21st century.

You made your decision to join our lab, because we all share the same core values which are: integrity, excellence, accountability, and respect. I cherish the opportunity to work with all of you (undergraduates, graduate students, postdoctoral research associates, and visiting scholars) and treat you as my colleagues. I believe that working with you is one of the most rewarding aspects of being a professor. Providing good mentoring to you is one of the best investments I can make in my own professional life and perhaps in my trainees' lives. My mentoring goals are: 1) to provide educational opportunities for my trainees, to make them grow and learn, and to advance their career and professional development in the long term; 2) to advance science by conducting high quality and innovative research and scholarly work, and to advance the mission of our Lab. I will provide the best resources for you to maximize your intellectual potential. I hope you can make the most out of your experiences in this lab.

This manual was designed to provide a guideline for all lab members in dealing with various issues related to your study in the lab. We should strive to comply with those general principles that we all agree upon. I hope you have a rewarding experience and have fun in this lab!

Sincerely,

Changying "Charlie" Li, Ph.D.
Professor and Director
Phenomics and Plant Robotics Center
Bio-Sensing and Instrumentation Laboratory
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1 The Mission, Values, and Guidelines of the Bio-Sensing and Instrumentation Laboratory

Lab mission: We develop innovative sensing and robotics technologies for food, agricultural and biological systems. Our long term goal is to enhance the efficiency and sustainability of the biological systems and eventually improve the quality of our lives. We strive to be among the most successful and respected labs in our area of endeavor.

Our Core Values: Integrity, Excellence, Accountability, and Respect.

1. Be honest. Science is all about the truth.
2. Do quality work. Research is not worth doing if it's not worth publishing.
3. Success in research requires motivation, focus, hard work, and persistence.
4. Communicate regularly with your advisor(s). Maintain a good relationship with your advisor: mutual-respect and mutual-benefit is the key.
5. Take the initiative – you are the owner of your project and ultimately responsible for your success. Learn from your peers.
6. Good time management practices:
   (a) Set deadlines and strive to keep them.
   (b) Keep a to-do list, arrange them in priority order, and then do the best to get the important ones done ASAP.
   (c) There is always enough time for the important things.
   (d) Keep long-term goals in mind even while doing the smallest task.
7. Treat your colleagues with dignity and respect, and maintain a good lab working environment.

2 Statement of Core Values

We work together in the Bio-Sensing and Instrumentation Lab because we have common goals and share the same values. Every member of the Bio-Sensing and Instrumentation Laboratory is expected to adhere to our core values: Integrity, Excellence, Accountability, and Respect.

Integrity Everyone in the lab should be honest. This is the most important character that we value. Be honest with your research data and be honest when you interact with your advisor and co-workers. Dishonesty is the first order misconduct. There is no space in our lab for the person who is not honest.

Excellence We will conduct our research and perform our duties with excellence and high quality.

Accountability Everyone in the lab should be trustworthy and accountable. Everyone should conduct research and duties by keeping deadlines. Everyone should cherish and protect lab resources. Be a responsible stakeholder.

Respect Everyone in the lab should treat each other with dignity, fairness, compassion, and decency.

3 Orientation for New Members

3.1 Check List

- Social Security Number (SSN)
- UGA ID
- Housing
- Bank
- Paperwork for Payroll/Benefits
- Email Account and Computer Log On / User Name
- Key to the lab and UGA card: Firstly ask Dr. Li to help you and go to the secretary of Boyd 7th floor to get the key and the application of UGA card. Then go to the UGA card center located at Tate center to get the card.
- Notebooks and Office Supplies
- Library - Journal Routing
- Tour of Work Area - Library, Computer Area
- Online Orientation

3.2 Safety Training

- UGA Right to Know Online Training (Mandatory for our lab) - `https://esd.uga.edu/right-know`
- UGA Environmental Health and Safety - `http://esd.uga.edu/`
- UGA Hazmat Online Training - `http://esd.uga.edu/hazmat/training/`
- UGA Radiation Safety - `https://research.uga.edu/compliance-training/research-safety/radiation-safety-training/`

3.3 Useful Websites

- Bio-Sensing and Instrumentation Lab - https://sensinglab.engr.uga.edu/
- UGA Engineering Department - http://www.engr.uga.edu/
- UGA Graduate School - http://www.grad.uga.edu/
- UGA Health Center - http://www.uhs.uga.edu/
- UGA Libraries - http://www.libs.uga.edu/
- UGA Engineering IT Department - http://www.engineering.uga.edu/uploads/main/ITLabGuide.pdf
- UGA Graduate School Deadlines and Forms - http://www.engineering.uga.edu/uploads/resources/CENGR-Graduate-Handbook-rev-2012.pdf
- UGA Police Department - http://www.police.uga.edu/
- The Red & Black (student newspaper) - http://www.redandblack.com/
- Athens Banner Herald (local newspaper) - http://www.onlineathens.com/

3.4 Travel Guidelines

Rationale

1. I encourage students and my trainees to go to conferences and believe they will benefit from this experience. I will try my best to provide financial support for students to attend meetings if they can submit their accepted papers on time and the work can be later published in journals.

2. Going to meetings is becoming more expensive and getting travel funding is more difficult these days. In order to support more students/trainees with limited funding resources, I encourage students to be conservative in budgeting for the conference by sharing rooms with other students and volunteering during the meeting to save registration fees. In addition, I encourage students to apply for travel funds from other sources, such as the CENGR, Graduate School, and ASABE GA Section.

Note:

1. If you get additional funding support from other sources, I will provide 10% of that funding support for you as incentive, to supplement your travel.

2. Fill travel authority (TA) form at least one month before your travel. Send your travel cost estimate to PI for review before receiving the account number. The TA form filling guide is at file share "Z:Public\LabDocuments\LabGuidelines".

3. After you return from a conference and get reimbursed, please send your reimbursement form to PI for review.

Table 1: Typical expenses in ASABE conference (or other typical conferences) for a graduate student

Item & Cost & Comments		
Hotel	$210.00	$70/night for 3 nights; (the cost could be lower if you share the room with three or four fellows)
Registration	$300.00	this could be saved by volunteering (refund $200)
Meals	$140	$35 per day for 4 days including travel day
Flight (may vary)	$350	$250 flight + $100 bus/shuttle. This could be lower if driving
Total	$800.00	This is the total amount that I can provide to support a student to attend a conference.

4. If you do not have a paper and have a strong desire to go, the maximum amount I can provide is $300 (if you do not have the college support).

5. If you do not get the conference paper and presentation ready in a satisfactory form before the deadline (at least 2 weeks before the official paper deadline and 1 week before you leave for presentation rehearsal, respectively), I will not support your travel and you have to self-support.

6. If the meeting location is within driving distance (within 10 h), I encourage students to consider driving and sharing the ride with other fellows to save costs.

3.5 Two deadlines for conference preparation

If you plan on presenting at a conference, you must provide me with an electronic copy of your poster and paper at least **two weeks** prior to the meeting deadline. This will provide adequate time to review them and make any changes that are needed.

At least **One week** prior to the conference, you will give a rehearsal presentation at the lab meeting. This will give you a chance to receive feedback and polish your presentation before the conference.

3.6 Publication authorship

- If a student conducts an experiment and is the primary author (i.e., write the draft) of the subsequent paper, he/she should get first authorship. If a student leaves the lab before the paper is written, he/she can still receive first authorship so long as the student finishes writing and revising the paper. Otherwise, he/she will not receive the first authorship.

- We can only offer some collaborators co-authorship unless he/she made significant intellectual contributions to the project. Our lab has developed a good scoring system for the co-authorship as shown in the following table.
- Other related documents are at "Z:\Public\LabDocuments\Authorship"

Table 2: Authorship Criteria

Phases	Credits & Notes	
Idea	15-20%	Students proposing future research direction get up to 20% of Idea credits; External advice: gets up to 10-20% of Idea credits
Experiment design and research planning	5-10%	
Implementation	10-20%	
Conducting experiments	5-15%	
Data analysis	5-10%	
Writing	25%	committee members comments on manuscripts: editorial: up to 10% of writing points; more insights in ms: up to 20% of writing;
PI credit (facility, equipment, financial support)	10%	
Committee credit	2%	

3.7 Laboratory notebooks

To assure the proper documentation of a study either for regulatory purposes or simply for future publication of the data, care must be taken. The following points should be considered when using a laboratory notebook and collecting data.

1. Use a separate, properly labeled notebook for each study. Sequentially number your own notebooks with your initials in the number.
2. Always be truthful with your data. Science is all about integrity.
3. Make entries in black or blue ink, not pencil.
4. Date each unambiguously: June 1, 2002 or 01 June 2002, not 6/1/02 or 1/6/02. Initial or sign the page.

5. Record data and calculations so that the experiment could be repeated from your notes by someone unfamiliar with the work. You may reference a protocol that is kept in a separate file. If data are recorded in an electronic file, enter the file name and location. Be sure your electronic files are backed up. The electric files (data, programs, and figures) organization guidelines is at "Z:\Public\LabDocuments\LabGuidelines\Data organization expectations.docx"

6. Record all calculations, including units.

7. Record raw data in the notebook. Do not transcribe data into the notebook.

8. Mark through errors with a single line. Correct the value(s), initial it, date it, indicate the reason for the change using a code system and circle the code number to separate it from your data: 1) misspelling or carelessness, 2) instrument was misread, 3) misunderstood or heard incorrectly, 4) miscount, 5) recorded in wrong place, 6) transposed or out of proper sequence, 7) illegible, 8) wrong word or phrase for meaning, 9) previous error(s), 10) other unlisted reason, identify reason for meaning.

9. Use the log sheet to assemble a table of contents for your notebook.

10. The original data files and records must remain with Dr. Li.

3.8 Research Integrity

It is the policy of the University of Georgia to maintain the highest standards of integrity in research without regard to the type of research or the source of its funding. It is, therefore, the responsibility of the administration, faculty, staff, and students of the University of Georgia to maintain the highest ethical standards in conducting and reporting research. This responsibility is owed not only to the University of Georgia, but also to the worldwide academic community, to private and public institutions that sponsor research, and to the public at large. The administration, faculty, staff, and students of the University of Georgia also share the responsibility to assure that misconduct in research, which includes fabrication, falsification, and plagiarism, is reported timely and accurately. At the same time, the University must assure that allegations of research misconduct are handled fairly and effectively, while preserving the reputation of the University, as well as the reputation of those individuals who in good faith file allegations of misconduct and, to the extent possible, those charged falsely. The purpose of the University of Georgia Policy on Responsible Conduct in Research and Scholarship is to provide the University of Georgia community guidelines for reporting and investigating allegations of research misconduct. The Research integrity Office can be reached at (706-542-5939).

3.9 Civil Rights Compliance

As director of the lab and a faculty member at the University of Georgia, I am committed to ensuring equal employment opportunity and protecting the civil rights of all employees, stakeholders, and applicants for employment regardless of race, color, national origin,

religion, gender, age, disability, political belief, sexual orientation, or marital status. Furthermore, I am committed to ensuring a work environment that is free of discrimination, reprisal and harassment. I will take immediate corrective action if such behavior is observed or made known. I recognize that retaliation against employees who engage in whistleblower activities is prohibited by law. As an employee at the University of Georgia, you also agree to abide by all applicable federal, state, and University laws and rules pertaining to protecting the civil rights of all employees. Every employee has a right to be treated with dignity and respect, and to receive fair treatment in all aspects of employment. All reports of a violation of the University's nondiscrimination and anti harassment policy should be reported to the Equal Opportunity Office for investigation (706 542-7912).

3.10 Ethics

In 2008, the Georgia Board of Regents adopted the USG Ethics Policy, a unified set of ethic rules to govern the actions of the entire University System of Georgia. To ensure that all faculty and staff are familiar with the fundamental tenets of the new policy, the Board of Regents has designed an online training and certification process. All faculty and staff (but not student workers) are required to complete the online training module available at https://hr.uga.edu/employees/training/e-learning-opportunities/bor-ethics-training/. In addition, the Board of Regents also developed a compliance reporting hotline (877-516-3467). The hotline is independently operated and available 24 hours a day. Callers may remain anonymous when reporting apparent incidents of wrongdoing on campus that need to be addressed.

4 General Lab Issues

4.1 Annual and sick leave

Graduate Students:

- If you are sick, notify your supervisor by email about your condition and plans to take sick leave; include number of days needed for your recovery.
- If you plan to take a vacation or a long trip in summer or winter (for instance, to visit your home country), you need to get your supervisor's approval before you book your tickets. For international travel, it could be several months in advance. Your supervisor is the primary person responsible for your safety. Provide your supervisor with the following details: your intended destination, time of departure/return, means of transportation you plan to use.

Technicians and Postdocs:

- If you plan to take medical leave due to sickness or for other personal matter, you have to fill out a sick leave form or annual leave form. Immediately contact your supervisor and notify him of your intentions, your work has to be properly arranged to accommodate your leave. If sickness condition lasts for more than one week, medical certification of the illness must be provided.

- More information on sick leave and annual leave can be found at: `https://hr.uga.edu/employees/leave/paid-days-off/`. The sick leave form can be accessed at `http://www.busfin.uga.edu/forms/leave.pdf`.

Compensation Hours for Research Technicians

- It is acceptable to use comp hours based on mutual understanding so the work will not be affected. The person should faithfully record hours of when and where the comp hours were accumulated.

4.2 Computer Use

- University computing resources (machines, software, and networks) are to be used only by persons authorized by the University, and only for University purposes. University purposes include educational programs, research, administrative, and outreach activities. Any use of computing resources for other purposes requires prior authorization.

- No one shall copy, install, or use computing resources in a way that violates applicable copyrights, or license agreements. A much more comprehensive listing of UGA Computer Use Policies is available online at: `https://eits.uga.edu/access_and_security/infosec/pols_regs/policies/aup/`.

- Installation of software must be authorized by the College of Engineering IT personnel, and Dr. Li.

- Chatting, tweeting, and social networking software are not allowed on lab computers.

- There is no assumption of privacy when using computing resources.

- A history of all web viewing and email is always maintained on the server by the University for evidence in criminal investigations.

- E-mail is intended for communication between individuals and clearly identified groups only. No one shall use the University's facilities to distribute bulk messages (spam) or to forward chain letters.

- Peer file sharing is not permitted (e.g. Limewire, Napster, Kazaa).

- Personal computers and mobile devices can be used on campus, but, for internet access, they need to login to PAWS-Secure wireless network using personal credentials. All the traffic over PAWS-Secure is monitored and recorded for safety and security purposes.

- No personal devices can be connected to Ethernet ports in the lab. Ethernet ports are open only to desktop computers in the lab. When additional Ethernet ports are needed a request has to be placed with the College of Engineering IT.

- If repairs or software installation is necessary, place a work order with IT group by sending a message to support@engr.uga.edu.

- Use of University computing resources for any non-university business is not permitted.
- Bio-Sensing and Instrumentation Lab utilizes two types of data storage shared among lab members:
  - A storage space at the College of Engineering Fileserver provides a personal folder for each lab member accessible by the said member and his/her supervisor as well as "public" folder shared among all lab members. The fileserver can be mapped to your computer as an additional drive using the path: "fileserver2.engr.uga.edu/sensinglab/".
  - We use Google Docs and Sheets to share lab activity schedule and some other information online. Google Drive contains a number of documents accessed and edited by lab members at any time. In order to participate in document review and editing, you need to create a Google account and ask your supervisor or other lab members to share Google documents with you. After being shared, the documents can be accessed through Google Drive.
- Further questions about the appropriate use of University computing resources can referred to the College of Engineering IT group at support@engr.uga.edu.

4.3 File sharing

4.3.1 External Portable Hard Drive

Graduate students, postdoctoral researchers, and visiting scholars will get an external portable hard drive with RAID configuration. The RAID function shall be enabled in the mode of RAID10 (mirror and double throughput). All research materials (e.g. data, program codes, and manuscripts) shall be saved on this hard drive, and the drive needs to be returned to the lab PI (Dr. Li) when members leave the lab.

4.3.2 UGA Network Drive

Network drive provided by the UGA and College of Engineering is another approach used for data backup and sharing. In addition to your own M drive provided by the UGA, our lab has a specific file share **sensinglab**. Following is the instruction regarding how to connect to the file share on your computer.

1. Make sure that you have been granted permission to the UGA Internet network. Otherwise, please send a request to support@engr.uga.edu.
2. Once you have normal internet access, make a VPN connection via `http://remote.uga.edu`. Instruction of VPN access can be found at `https://eits.uga.edu/access_and_security/infosec/tools/vpn/`.
3. Once a VPN connection has started, you can map the drive.
   - Click Start orb/button; right-click "Computer" and select "Map network drive".

- Choose a Drive letter.
- In Folder, type \\fileserver2.engr.uga.edu\sensinglab
- Check "Connect using different credentials", and press Finish.
- The next box asks for credentials.They must be in the following format (without quotes)
  User Name: "myid\myid_username"
  Password: your MyID password
- Click OK, and after a short delay, the user should see the share.

4. From off-campus (or PAWS), You must ALWAYS make a VPN connection before attempting to map/access the share.

Note: If you will work on high throughput phenotyping (HTP) projects, please contact IT support with Dr. Li's approval to gain the access of the HTP folder.

4.3.3 Lab Filing, Naming, and Data Backup Rules

Naming Rules

- Avoid nonsense naming
- Use underscores instead of period or space
- Include a version number, or equivalent term
- Be consistent
- Include all necessary information independent of where it is stored

Naming Guidance

- Include all necessary information in files name independent of where it it stored (Owner name, Date, Purpose, Project information, Instrument info, replica #, Sample No, Treatment, etc)
- Make a good trade off between information and brevity (up to 25 characters)

Data Backup Guidance

- Backup your data the first time after you collect/create it
- Raw data must be files and backed up
- Backup regularly
- Don't backup everything

4.3.4 Literature organization protocol

1. Naming rules for downloaded PDF full text papers:
   first author + publication year + 2-3 key words + (journal name abbreviation: optional)
   e.g.: "Fortier2011_trash_FTIR";
   or "Xu1999_TRJ_cluster_cotton_trash" (TRJ stands for Textile Research Journal)

2. Organization of PDF full text papers:

   (a) Save all PDF files in one folder.

   (b) You can setup sub-folders to categorize your papers into different groups. But it is not recommended to setup too many sub-folders which make them look like a labyrinth and it would be extremely difficult to find the paper you want.

3. Use EndNote to organize your full text PDF papers:
   Use "attachment" function in each paper record to attach the corresponding full text PDF file. EndNote will automatically duplicate this PDF file into a separate folder. This step does not substitute step 2.

4. Some issues in EndNote:

   (a) Keep only one library, not multiple small libraries.

   (b) Use "My Groups" function in EndNote X9 to categorize your literature into different groups based on their topics.

   (c) Delete duplicates in your EndNote library.

   (d) Authors names: make sure you differentiate first name and last name; only capitalize the first letter of each name, not all letters.

   (e) Paper title: only capitalize the first letter of the title, keep other letters lower case.

   (f) Journal title: first letter of each word should be in upper case.

   (g) It's better to include both Volume and Issue numbers (some journals do not ask for Issue No.)

   (h) We may need to explore how to better use EndNote Web function to share library online.

5. Please update your EndNote library (with PDF attachment folders) regularly.

6. Please close the EndNote library if you do not use it. Other members can gain the access to the library.

7. As we are working on several new research fields, specific folders have been created for those fields.

   (a) Z:\PublicPaper\Sharing\Phenotraits for papers shared by the Wechat account PhenoTrait.

(b) Z:\PublicPaper\Sharing\DeepLearning for papers relevant to deep learning techniques.

(c) Z:\PublicPaper\Sharing\agRobot for papers relevant to agricultural robotics.

4.4 Good programming practices

Programs and codes are very important part of lab life. Good practices would be helpful for yourself and others to use the programs. Related documents are at
"Z:\Public\LabDocuments\CodeSharing"

1. Comments

2. Variable naming
   Variable name should include information:
   nCount //integration type, used to counter;
   Arr_Path //Array to store path

3. Flowchart

4. Function:
   Some comments about input, output, who, when it was writen or modified must be clear (Beneficial to the entire group).
   // getCurrentSelect is used to get the name of current selection
   // Haihua Wang 05-06-2011
   // nID - current selection ID handler
   // return CString type
   CString getCurrentSelect(int nID, ..)

   CString strName;
   ...
   return strName;

5. Readability

   (a) Indent
   Different layer should be clear by using indent
   Smart indent in Matlab
   Alt + F8 in Visual C++
   CTRL + SHIFT + F in IDL

   (b) Space
   Using space between variable and calculate sign.

   (c) Space line
   Use space line to separate different paragraph that work for independent object.

6. Program robustness

7. Documentation: flowchart; how to use it

8. Optimization

4.5 Lab organization

- All cabinets and drawers in the lab are individually numbered to locate items more easily. A Google Drive spreadsheet (Cabinet_Drawer-201604) contains the cabinet/drawer location of all the lab items. Please, request your supervisor or other lab members to share this document with you so you can access it using your Google account.

- If you bring a new item to the lab or make a purchase, identify the appropriate drawer/cabinet to store the item and record its location in the corresponding Google spreadsheet. Purchased items also have to be recorded in the Lab Purchase spreadsheet shared with you via Google documents (LabPurchaseRecord2013.).

- If you remove tools or equipment from the lab, please use the sign-out sheet to record the name of the borrower as well as the date borrowed and returned.

- If you remove any item for use in the lab, please return it to its original place when not in use.

- If other lab borrow the tools, please make the borrower use the sign-out sheet to record the name and the room number of the borrower as well as the date borrowed and returned.

4.6 Lab cleaning

- All lab members are responsible for lab maintenance and cleanliness.

- Lab members clean the lab every other week following the Journal Club meeting.

- Cleaning duties include cleaning the counter surfaces, book shelves, dusting equipment, and taking out the trash/recyclables.

- Please clean up after yourself as you work and keep your work area tidy. Remember, you share the lab with others.

- Try to maintain a pleasant working environment for yourself and your colleagues.

- If your work involves bringing pathogens into the lab, be sure to sterilize your work area and equipment with Ethanol, located in the flammable cabinet.

- Dispose pathogen-infected samples by autoclaving them first. Make sure disposed samples produce no smell or other adverse effects. Pack them tightly into plastic bags.

- Dispose syringes and needles into the "Biohazard" container.

- Sweeping and floor mopping are generally done by janitors. If a spill or garbage is disposed on the floor as the result of your work, use the tools available in the lab to clean up by yourself.

- Failure to comply with the rules in the Lab Organization or Lab Cleaning sections may result in additional assignment of cleaning duties. Remember, our work area reflects our approach to research - a messy lab suggests sloppy research!

4.7 Lab Meetings

In order to get feedback from the advisor and other lab members, each lab member needs to present his/her work to the lab every week. In order to control the overall meeting time, each lab member should finish his/her presentation within 15 minutes. Besides the weekly meeting, we have a learning club every week, the format could be journal club meeting and special topic meeting. The journal club meeting is intended to discuss journal papers among the lab members, and the special topic meeting is intended to introduce a technology topic which is closely related to our research projects.

4.7.1 Weekly Lab Meeting

Meeting Schedule Meetings are scheduled on the same day of each week. On what day depends on the time schedule of the lab members. Usually, our lab meeting is held on every Monday from 1:00 to 3:00 pm. The presenters need to send the report to PI (Dr. Li) by Sunday evening.

Meeting Organization Before each weekly meeting, the coordinator needs to prepare the meeting equipment (projector, computer, TV, etc) and provide some refreshments for the meeting. During the meeting, each presenter has 15 minutes to present and answer questions from other lab members.

4.7.2 Journal Club

The purpose of the JC:

1. Learn how to do research by reading what others did and how they did it.

2. Learn how to write a good paper.

3. Reinforce the idea that reading literature is very critical to the success of a graduate students or a postdoc.

Paper selection guidance:

1. The paper should be not excessively long. The total length (without supplementary materials) should typically be no more than 10 pages.

2. A good paper should be well written and organization.

3. The topic is related to lab's research, or is very innovative, or may produce great impact on other research, or introduces a new method that can potentially be used in our field.

4. Select papers that can be generally understood by lab members with moderate efforts. Don't select papers from very specific journals. If you really want to select such kind of papers, you should have a good understanding of the papers and give other members an introduction at the beginning of the meeting. The introduction should cover basic principles, explanation of obreviations, materials and methods, and others things that is not very easy to understand. Control the introduction to 20–30 minutes and the entire period of time for journal club is 1 hour.

5. Typically select recently published papers (within last 5 years).

Presentation organization:
A. Beginning: give the background and motivation needed to appreciate the paper.

1. Build up slowly in the introduction. For example, describe the general topic, relevant definitions, the specific topic and its importance, and the precise question at hand. You could also state the answer to the question and the message of the paper at this point, although this is a matter of preference.

2. Edit the introduction ruthlessly. Give only the necessary details regarding methods (unless, of course, your talk is on methods). Narrow the focus rather than try to cover a large, complex topic with generalities in a short period.

3. Even when the program specifically calls for an overview, pull out one or two points to discuss in as much detail as time permits (probably about 10 min).

B. Middle: describe the study and its importance.
For each experiment discussed, make these four points clear:

1. Question - why they did the experiment

2. Experiment - what they did

3. Results - what they found

4. Answer to question and its implications - the message of what the results mean. Link the experiments to each other and to the message, for example, tissue level, molecular level, in vitro- in vivo, steps in genetic pathway. Link each experiment to the message of the paper.

C. Note:

1. Data = numbers

2. Results = what the numbers mean (5-10 points)

3. Answer = answer to the question or what the results mean (usually 1-2 points)

4. Implications = extrapolations or going beyond the data.

D. End: wrap up

1. Final statement of the message.

2. Critique of the experiments.

3. Future directions.

Review Criteria:

The following review questions may be useful when you read a journal paper. In our group discussion, please cite examples from the paper and be specific when you make comments on one particular aspect shown below.

A. Overall evaluation:

1. Is the paper innovative? Does the paper contribute to the new knowledge?

2. What are strengths and weaknesses of this paper?

3. If you were the editor or reviewer, would you recommend this paper for publication?

B. Paper Writing:

1. Is the paper clearly written?

2. Is the writing concise? Are irrelevant aspects eliminated?

3. Is the presentation complete?

C. Front matter, introduction and literature:

1. Is the title appropriate?

2. Is the abstract complete and concise?

3. Does the introduction provide adequate background?

4. Is the literature review thorough and in depth?

5. Are the objectives well stated?

6. Do the authors cite the best references (relevant and original)?

D. Materials & Methods:

1. What new materials, methods, or new techniques have author(s) used that the reader can use elsewhere?

2. Is the approach original or innovative?

3. Does the M & M provide all the information so you can repeat the experiment?

E. Results and Discussion/Conclusions:

1. Are results presented concisely, without simply repeating results in tables and figures?
2. Is there any real discussion of the result? Did authors explain WHY?
3. In discussion, did authors relate their results with other existing literature?
4. What, precisely and in detail, is author(s) new result?
5. Do the conclusions answer objectives? Are they warranted?
6. Why should the reader believe author(s) result?

F. Data presentation (Graphs and tables):

1. Are all figures well designed, self-explanatory, and with clear titles?
2. Is every table and graph necessary?
3. Do the tables have been well formatted and contain more digits than are actually significant?

4.7.3 Special Topic Meeting

The purpose of the Special topic:

1. Create a learning environment in our lab and help all lab members learn core and advanced technologies in our research area.
2. Reinforce the idea that learning new knowledge is very important to a researcher.

Topic selection guidance:

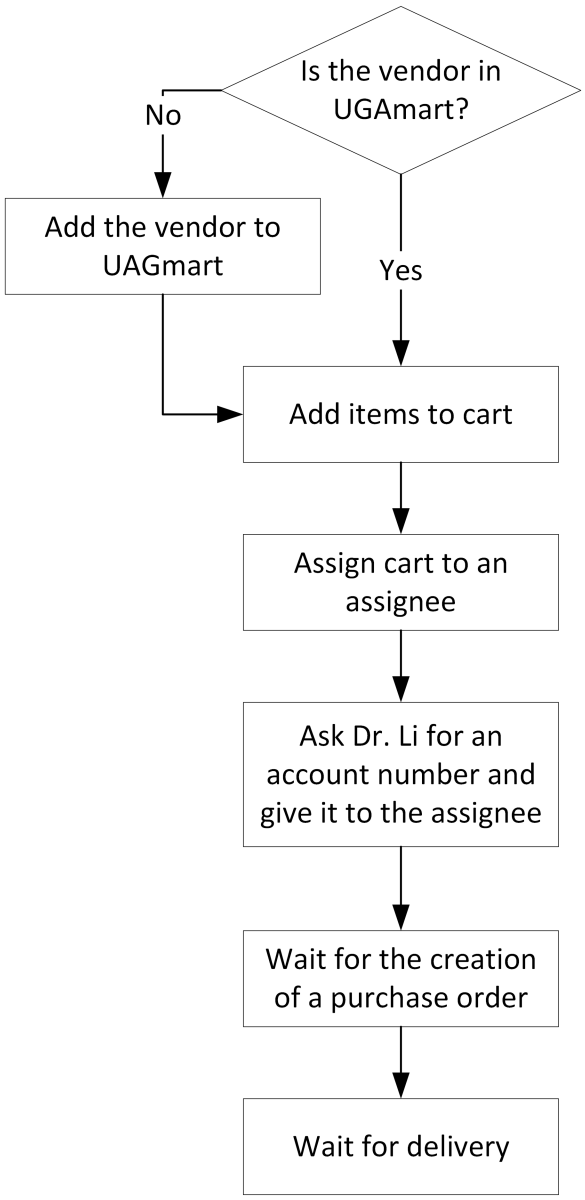
1. The topics should be closely related to what we are doing in our onging projects.
2. The potential topics can be discussed and determined in a lab meeting by all lab members. Each topic should be assigned in advance so that the presenter can have enough time to prepare it.

Other issues of special topic can refer to journal club meeting.

4.8 Lab Purchases

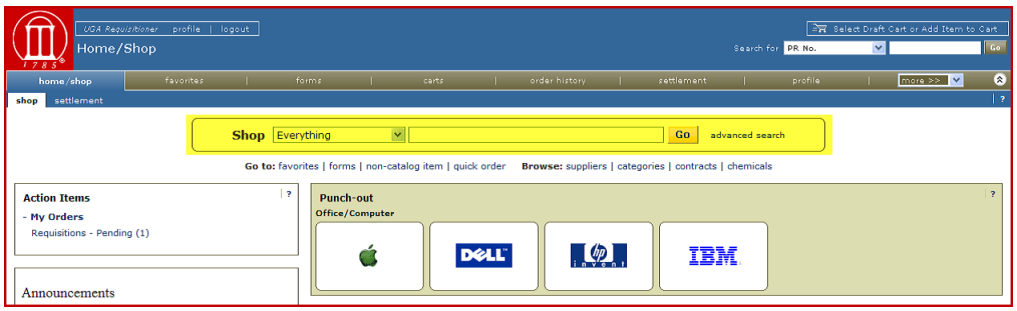
4.8.1 UGAmart

Most of the lab supply/equipment can be purchased from UGAmart. For other tips and questions, please read UGAmart FAQs. The following figure shows the flowchart to purchase from the UGAmart.



How to order an item

1. Always Search for the item you want to buy first. Remember: Punchout items are not returned in the search results. To view these items click on the vendor name to go directly to UGA's contract website. Only contracted items are available at a vendor's punchout.



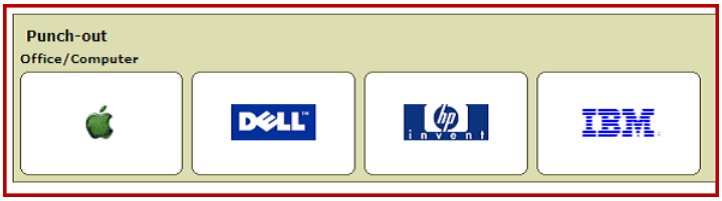
2. Next, if anything in the search results meets your needs, then select the items based on the following order:

   (a) Mandatory Statewide Contract

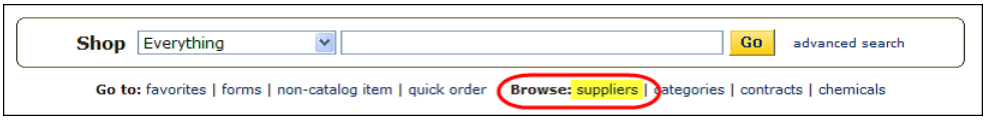
   (b) UGA Contract

   (c) If items in the search results have no icon, or if no search results are generated, then you are free to use the 'non-catalog form' to request the items you need (See step 3).

3. The 'non-catalog form' can only be used if the vendor has been loaded into UGAmart. Check for vendors this way: Click 'Browse Suppliers' Then,



use a portion of the vendor's name to be sure you don't exclude the vendor from your

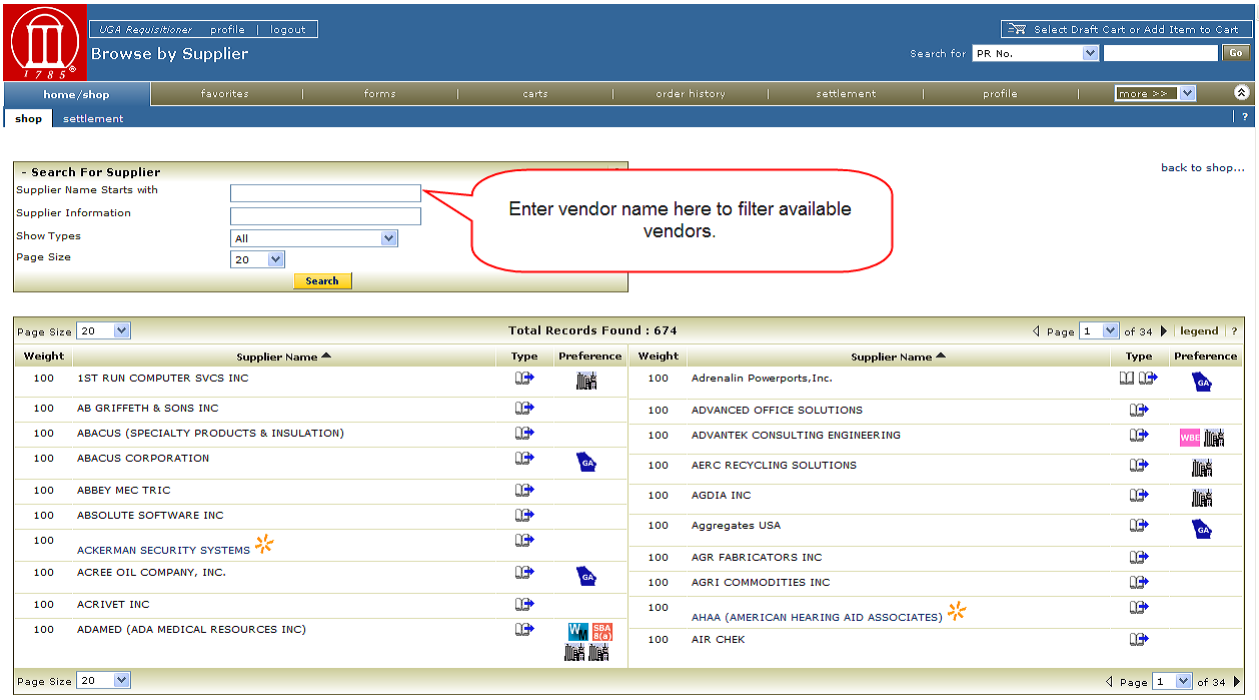


search. If the vendor exists in UGAmart, then you can complete the 'non-catalog form' for your requested items.

If the vendor is not found in UGAmart, you need to add the vendor into the UGAmart (see 14.2).

How to add a vendor To add a vendor into UGAmart, you need to request the vendor complete the vendor profile form located at https://webapps.ais.uga.edu/UVDB-VP/home.seam. If this order is urgent, please have them notify the manager as soon as they have completed the form so the manager can expedite the process. Once their vendor record has been approved you will be able to select them in UGAMart as a Supplier.

Purchases from local stores/online websites For some supply/equipment not available in UGAmart, you can either buy them from local stores or online websites. If the total



amount is less than $ 50, can get approval from the lab manager. If the total amount is larger than $ 50, you need to get approval from Dr. Li first. Then you can use your own credit card to pay and get reimbursement afterwards.

Purchase record After getting the lab supply/equipment, provide receipts, save them on fileshare, and record them into LabPurchaseRecord2013.

4.9 Copier and Fax Machine Use

- University copy machines and the fax machine are intended for legal reproduction of materials required for research purpose. There is no provision for personal use of these resources.
- If you need to send or receive a personal fax, go to Staples or other appropriate facility.
- University copiers are located in the printing room of the 7th floor, and Scientific Library.
- The burden of proof for legal photocopying rests on the user, not the University.
- The unit on the 7th floor of Boyd building can be used only for photo-copying and scanning. Each copy is charged to the department.
- Printing guideline is at "Z:\Public\LabDocuments\LabGuidelines".

4.10 Lab website

The lab website (`http://sensinglab.engr.uga.edu`) is a platform dedicated to publicize our lab mission, organize lab activities, and advocate our research programs. The website is

built upon Word Press and all lab members shall contribute to the content of the website. To maximize the website security and compatibility, one lab member will be assigned as website editor updating website.

4.10.1 Access

The lab website includes two parts:

- Public site: `http://sensinglab.engr.uga.edu`
- Management login page: `http://sensinglab.engr.uga.edu/wp-admin`

4.10.2 Password

The website editor account was manually set up by the administrator of the website. New website editor shall contact Dr. Li to obtain the account for editing the content of the website. Please DO NOT store the website account on any cloud services for security purposes.

4.11 Work Atmosphere

- Be courteous to other lab members and visitors (core value: respect). Because the lab is a shared workspace, be mindful not to create an atmosphere unpleasant or disruptive to others.
- Don't play loud music in the lab if coworkers are present since the music may distract you and others, and reduce the work efficiency. If you listen to the music while you work please use headphones. Listening to music is acceptable as long as it does not become a distraction from your work.
- Remember, excessive talking in the lab may be distracting to others as well. Keep chatter to a minimum, and take discussions elsewhere when possible.

4.12 Lab Safety

- All lab members must complete resident and online safety training on an annual basis. This training is administered by the UGA Environmental Safety Division (ESD) located on the web at `https://www.usg.edu/facilities/rtk-ghs`.
- It is important a paper trail be maintained for any safety training you receive, whether on-line or in the field. Anytime you take a safety class/training, please, make a copy of the completion certificate for your supervisor.
- In addition to general safety training and University required courses, you must be specifically trained on any chemical you use that is corrosive, toxic, flammable, or reactive. This is called Chemical Specific Right-to-Know training and can be accessed at Chemical and Laboratory Safety Manual. At minimum you need to know the common name of the substance, appropriate hazard warnings (what the numbers on

the NFPA Fire Diamond mean), proper handling, storage, and emergency response should a spill occur.

- The Material Safety Data Sheets (MSDS) for our lab are located in the MSDS binder located on a bookshelf.

- In order to prevent fire and equipment damage, be sure to power down or unplug any equipment (except for computers) at the end of the day, including the battery charging station.

4.13 Security

- The Bio-Sensing and Instrumentation Lab is stocked with very expensive equipment, so security is an issue of utmost importance.

- If you are the last person leaving the lab, lock the door when you leave for lunch and when you go home in the afternoon.

- If you work after-hours or on weekends, you should have a security chip enabled in your UGA Card. This allows you to enter the Boyd building and use elevator to access floors above the 5th one. The stair walk also has a security lock on the floors above the 5th. This lock can be accessed with the approved UGA card. Ask Ms. Angie Malone for instructions on how to get your UGA Card enabled.

4.14 Vehicle Use

- For business travels (e.g. attending conferences and long-distance field trips), you may chose to rent a vehicle, if transportation is the cheapest and most convenient upon approved by PI. In this case, please follow the link for choosing the best vehicle rentee. ReadMe.

- For field trips (within 50 miles from the campus), it is recommended to drive the lab truck. Please follow the guideline (Z:\Public\LabDocuments\Lab Truck\Guideline for Truck Use.docx) for proper use and maintenance of the lab truck. In addition, a quick instruction is attached on the glove box in the lab truck, please read it before you drive out the truck.

- Lab truck key is stored in the Cabinet #56. Please return the key to the cabinet, so the truck can be used by other lab members.

4.15 Emergency

- This section of the lab manual provides the information needed to handle emergency situations.

- The most important attribute during an emergency is to stay calm and rational. Your reaction can make a significant difference in the outcome of the situation.

Medical Emergencies

- The First Aid kit for minor cuts and abrasions is located next to the sink.
- More serious incidents that require a trip to the doctor, but not an ambulance trip, should be referred through UGA Workers' Compensation. After the incident has been reported to your supervisor, you may proceed to Emergency Room or UGA Health Center. Information on Worker's Compensation for injuries can be found at `https://hr.uga.edu/employees/workplace-injuries-workers-comp/`.
- Obviously, any accident that requires immediate medical intervention or life threatening injuries should be referred through the 911 emergency response systems.

Crime, Bomb Threat, or Workplace Violence

- The UGA Police Department provides campus security to the UGA campus. UGA Police Department can be reached at (706)-542-2200. More information about UGA campus police can be found at `http://www.police.uga.edu/`.

Fire

- There are fire extinguishers on the hallway ways outside the lab.
- Unless the fire is small, do not attempt to put out a fire by yourself without first calling 911 for professional help. It is important to close the door to any room with a fire and immediately notify your supervisor and the office representative.
- Ms. Angie Malone is the current office representative on the 7th floor. Her phone number and email are 706-542-8902 and tamalone@uga.edu.

Utility Disasters

- During business hours you need to call UGA Facilities Management at (706)-542-7456. You can request immediate help (electricians, plumbers, etc.) or place a work order.
- UGA Facilities Management ((706)-542-7456) should be notified if there is an imminent threat to the public such as a natural gas leak or gasoline spill.
- For after hours, weekends, and holidays, please contact (706)-542-0090 for help from UGA Facilities Management.

Tornado

- Tornados are not typical and extremely rare events in the Athens area.
- Tornado warning sirens are located throughout the campus and are audible from a distance. In the event you hear the siren, go to the 1st floor of Boyd building and remain in the area with no open access to windows until the siren stops.

4.16 Food and Drink in the Lab

- Drink may be consumed at your personal workstation, but food consumption is not allowed based on University policies.
- Please be aware there are chemicals and sometimes pathogens stored in the lab that are serious health hazards. It is important to be aware of your surroundings and recognize there may be times when it is a bad idea to have exposed drink present.
- Please wash your hands before and after eating to avoid getting grease or condiments on computers or other lab equipment.
- The refrigerator in the lab is for research materials only. Food and drink should not be stored in the lab refrigerator. If you have food items that need to be refrigerated, please store them in the refrigerator in the kitchen.
- There are soda machines located on the 2nd floor of Boyd building, and a drinking fountain at the end of the hallway on the 7th floor.

4.17 Telephone Use

- Personal cell and lab telephones remain a critical communication tool in our program. In the event someone calls the lab to speak with a lab member who is not available, please take a complete message and leave the message in the person's workspace.
- Please return calls promptly when someone leaves you a message.
- Personal cell phones may be carried in the course of executing your job, but personal calls and texting should be avoided while on the clock.
- A list of lab members' phone numbers is available through Google documents. These numbers could be used for emergency contacts. They cannot be shared with other parties.

4.18 Time Management

1. Philosophy
    - Be productive to advance our careers.
    - Eight hours is not enough for a productive researcher.
    - "It does not matter how many hours you spend; it matters how you spend".
    - Get the job done.
2. Make the most of your times
3. Planning for your work
    - Short term (daily, weekly)

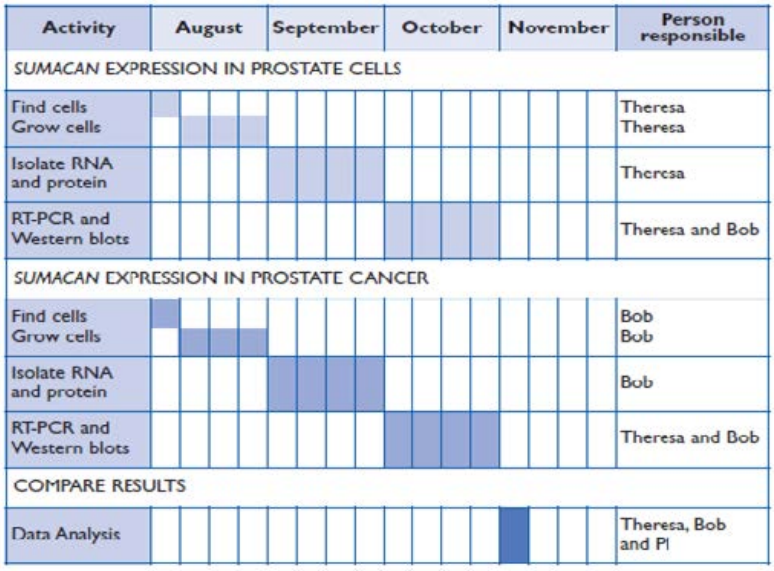
	Not Important	Important
Not Urgent	• Most e-mail • Weekend plans of lab members • The Super Bowl pool	• Ongoing experiments • Preparing for a committee meeting • Next month's grant deadline
Urgent	• "You've got mail" alert • Ringing telephone • Inquiring colleague	• A lab fire • Tomorrow's grant deadline

Source: Sandra L. Schmid, The Scripps Research Institute, adapted from Stephen R. Covey's time management matrix in *The Seven Habits of Highly Effective People: Powerful Lessons in Personal Change.*

- Mid term (months)
- Long term (years)

4. Prioritize your daily work: A,B,C

5. Gantt Chart



6. Techniques

- I give myself enough time to concentrate on high priority items.
- I do first thing first.
- Get your email under control. Do not check emails in the morning.
- I work alone creatively in the morning and use the afternoons for meetings or experiments.
- I keep small talk to a minimum during work hours.
- I put signs in my office reminding me of my goals.
- I remind myself : "there is always enough time for the important things."

7. Don't become the slave of the technology!

8. References

- Stephen Covey: The seven habits of highly effective people.
- Alan Lakein: How to get control of our time and your life.

5 Living in Athens

5.1 Housing

A comprehensive list of local real estate listings can be found on:
`https://athensga.craigslist.org/search/apa`
`https://www.rentathens.com/vacancies/`
`https://www.rent.com/georgia/athens-houses`
`https://www.bulldogrent.com/`
`https://www.apartmentfinder.com/Georgia/Athens-Apartments`

5.2 Banking

- Bank of America
  196 Alps Rd, Athens, GA
  110 E Clayton St, Athens, GA
  1890 Epps Bridge Pky, Athens, GA
  1070 Gaines School Rd, Athens, GA

- Wells Fargo Bank
  202 College Ave, Athens, GA
  1200 Mitchell Bridge Rd
  1059 Gaines School Rd, Athens, GA

- First American Bank & Trust
  300 College Ave, Athens, GA
  2241 W Broad St, Athens, GA

- SunTrust Bank
  101 N Lumpkin St, Athens, GA
  185 Alps Rd, Athens, GA
  180 Gaines School Rd, Athens, GA
  3445 Atlanta Hwy, Athens, GA

5.3 Benefits, Human Resources

Detailed information regarding employment issues, benefits, health insurance can be found on the UGA Human Resources website.

5.4 Social Security Number

1. If applicable, remove flag in your international records at `http://international.uga.edu/`.

2. After 10 days following the flag removal, you can request the Office of International Education (OIE) to provide you with the Social Security Application Form, please check the instruction at `https://isl.uga.edu/uploads/docs/Social_Security.pdf`.

3. If you get your application letter, you can go to Business Office of College of Engineering, located in 203 Driftmier, and then ask Mr. Andrew Hale to fill out the blanks in the application letter.

4. Go to the Social Security Administration Office with your documents including Passport, Application Letter, UGA Card and I94. To find more information, go to `https://secure.ssa.gov/ICON/ic001.do#officeResults`. Do not forget to get receipt of your SSN application.

5.5 Driver's License

To get detailed information about driver's licenses, go to https://www.dmv.org/ga-georgia/, and select Georgia in the State option. In order to get the driver's license, it's necessary to get the permit and the SSN card beforehand.

5.6 Tag Office

For detailed information on car registration, go to the Tag Office Website.

5.7 Food

5.7.1 On Campus

There are several dining halls on campus. Optionally, you can purchase an academic year meal plan. The dining hall are buffet and provide different food. If you don't want to eat in a dining hall, you can eat at Tate Center or Georgia Center. Tate Center has fast food (burger, chicken, pizza, etc) and Georgia Center provides traditional American food (sandwich, salad, sides, etc).

5.7.2 Off Campus

1. Cali N Tito's
   1427 S Lumpkin St, Athens, GA

2. Hibachi Grill
   2020 S Barnett Shoals Rd, Athens, GA

3. Siri Thai Cuisine
   367 Prince Ave, Athens, GA
   6335, 1040 Gaines School Rd, Athens, GA

4. Just Pho...and more
   1063 Baxter St, Athens, GA 30606

5. New Red Bowl
   1935 S Barnett Shoals Rd, Athens

5.8 Facility Use

UGA has a number of useful facilities for students to use. Here are some facilities you can take advantage of:

- Science Library
  Address: 210 D. W. Brooks Dr, Athens, GA 30602
  Website: http://www.libs.uga.edu/science/

- Main Library
  Address: 320 S. Jackson St., Athens, GA 30602
  Website: http://www.libs.uga.edu/

- Engineering My Lab
  My lab is a virtual computer system provide by The College of Engineering. It provides some useful softwares (Matlab, AutoCAD, etc) you can use for study.
  Website: http://mylab.engr.uga.edu/

- Tate Student Center
  UGA Card Office, Copy & Print, Passport Office, Food Services, Business Office, Events
  Address: Baxter St Athens, GA 30602
  Website: http://tate.uga.edu/

- Ramsey Student Center
  Recreational Sports
  Address: 330 River Road, Athens, GA 30602-6502
  Website: http://www.recsports.uga.edu/

- Health Center
  Address: 55 Carlton Street, Athens, GA 30602
  Website: http://www.uhs.uga.edu/

5.9 Transportation

5.9.1 School Bus

There are 13 bus lines operated by the UGA. You can find the bus route and schedule on the UGA campus transit website. On holidays and special events (game days), bus routes and schedule may change. Check the latest notice on the campus transit website before you take the bus on those days. You can also download a mobile device app from the website to get the live bus routes.

5.9.2 City Bus

There are 28 bus lines operating in Athens. You can find the bus route and schedule on the Athens transit website. On holidays and special events (game days), the bus route and schedule may change. Check the latest news on the Athens transit website before you take the bus on those days.

6 Bio-Sensing and Instrumentation Lab Contact List for 2018

Name	Cell Phone	Work Phone
Li, Changying	(814) 777-7564	(706) 542-4696
Jiang, Yu	(706) 248-7695	(706) 542-9113
Xu, Rui	(706) 255-8860	(706) 542-9113
Sun, Shangpeng	(678) 575-0030	(706) 542-9113
Pandey, Piyush	(510) 281-3726	(706) 542-9113
Han, Tsunghan	(614) 390-7909	(706) 542-9113
Ni, Xueping	(706) 254-0903	(706) 542-9113
Zhang, Mengyun	(706) 296-7366	(706) 542-9113

7 Other Important Documents

To help lab members quickly adapt to the lab life and use the shared properties, many other important documents are put at file share "Z:\Public\LabDocuments\LabGuidelines" and appendix of this file.

1. Lab property management guideline.docx: Very important guidelines of using lab tools, equipments, and instruments.

2. DataOrganizationStructure.docx: The guidelines of organizing your personal folders (under your name) which is only shared with Dr. Li at the file share.

3. Data organization expectations.docx: The guidelines of organizing your experimental data.

4. Steps to write a manuscript in lab.docx: The golden rules for drafting a paper.

5. Travel authority and reimbursement.docx: The guidelines for filling your travel authority before you leave and having your reimbursement after you com back from the travel using UGA system.

6. Computing Resources.docx: The computing resources you can use at the University system.

7. Guidelines of use and maintenance for valuable equipment and instruments-r1-YJ.docx: The rules for using valuable equipment and instruments.

8. Roles of Laboratory Manager_v3-YJ.docx: Duties of the lab manager.

9. Printer Mapping Instructions.pdf: How to use the printer on 7th floor at Boyd building.

8 Acknowledgments

Contributions

- Version 2013
  Changying Li (Ch.1,2,3), Svyatoslav Chugunov (Ch.3,4), Rui Xu (Ch.3,4,5), Weilin Wang (Ch.4), Yu Jiang (Ch.5), and Adnan Mustafic (Ch.3,5,6).

- Version 2018
  Changying Li (Ch.1,2,3), Rui Xu (Ch.3,4,5), Yu Jiang (Ch.4,5), Shangpeng Sun (Ch.4), Liujun Li (Ch.4), Piyush Pandey (Ch.3), and Mengyun Zhang (Ch.3,5).

9 Appendix

9.1 Lab property management guideline

9.1.1 Purchase

As of another rapid growing era, our lab will invest many new properties such as instruments, devices, tools, computers, licensed software, and experimental materials. To efficiently and effectively manage all these investments, it is crucial to reinforce our purchase procedure which provides a track point for all properties. Based on the previous purchase practice, the new procedure is listed as below. Please check this before your purchase.

1. Initiate discussion with the lab PI (Dr. Li) for potential purchase exceeding $100 or with the lab manager for purchase less than $100.

2. Determine payment methods (UGA Mart, Purchase through reimbursement, P-card order, etc.)

3. Submit order and initiate purchase record (in personal file)

4. Receive item (s) and complete purchase record (in google spread sheet, https://docs.google.com/sprea Sj6OshY/edit#gid=1427155922) (Please comment on the items listed in the spread sheet)

9.1.2 Inventory

Although purchase record will directly keep inventory of all items, it would be necessary to duplicate the inventory information in the spread sheet (https://docs.google.com/spreadsheets/d/1-QGo_6nYXshv3HhoRiVj8eOLixPElGDz2n4TpMdEG1o/edit#gid=1706251913), as members usually wonder the location of items.

9.1.3 Daily use and maintenance

Property missing or loss is an unresolved problem in our lab. In particular, lab tools keep missing or lost due to various reasons. This would waste our lab investment, and more importantly, reduce research efficiency and productivity. I proposed the following solution to solve this issue.

1. Purchase a lab toolbox with lock, re-organize all tools, and re-purchase missing but important tools.

2. Assign one lab member as tool specialist to manage all the lab tools, and this person takes the key for the toolbox. In addition, lab PI and manager also take the key for special situations.

3. For in-lab work, lab members freely grab tools for their work during working hours, and return all tools to the toolbox before 5:30 pm. Lab specialist will check all benches to ensure all tools are returned.

(a) Each member has a responsible working area, and they need to make sure all tools in their areas are returned before leaving.

(b) Unreturned tools and responsible member will be reported during the lab meeting. Fines would be considered if a member keeps violating the tool return rule.

(c) A member can coordinate with lab specialist if he/she needs to use tools after working hour. If so, he/she takes responsibility for organizing all tools.

(d) If a tool is missing, please report to tool specialist for tracking.

4. For out-lab work, lab members need to coordinate with tool specialist and make a checklist for all checking-out tools. After finishing our-lab work, the member needs to return all tools to tool specialist.

   (a) A member can coordinate with lab specialist if he/she needs to use tools after working hour. If so, he/she takes responsibility for organizing all tools.

   (b) Fine would be applied if checking-out tools are missing.

5. For other labs, lab manager will coordinate the checking-out process to ensure the track of lab tools.

9.1.4 Annual check and maintenance

Two annual checking points would be considered: 1) UGA lab annual inventory and 2) the end of each academic year. In the annual check and maintenance, lab manager will work with tool specialist to check loss and damages of tools, and give a report in the last lab meeting in December.

9.2 Data organization structure

9.2.1 What data should be archived

1. Projects

   (a) Data:

      i. raw data;

      ii. processed data;

      iii. Figures (Sigmaplot, Matlab, SAS, InkScape, Gimp, Visio,

      iv. Pictures, videos

      v. ReadMe.txt

   (b) Programs and codes: ReadMe.txt

   (c) Data sheet

   (d) Manuscript:

      i. Conference papers

      ii. Ms1

A. Outline, experiment plan,

2. Presentations (PPT, posters, monthly report)
3. Progress Reports (weekly meeting reports, monthly report, 4-month report, Gantt chart)
4. Purchases: part number + price + vender
5. Literature: EndNote; full text papers (naming rule);

9.2.2 File share public drive

1. Individual's folder
2. Lab meetings (monthly meeting, journal club, special topics)
3. Lab documents (pics, logos, handbook, phone directory, ,
4. Projects/research: literature? Manuscripts review; special topics (GPU, microscope manual, ...),
5. Software (drivers,)

9.3 Data organization expectation

1. Raw data:
   (a) Example: hyperspectral images without any correction; after flat field correction.
   (b) ReadMe document: where are the data stored? What special software is needed to open these data files (e.g., SEQ file)? Metadata of your data: when (when the experiments were done), where (where the experiments were done), what (brief experiment design, sample numbers, replicates, treatments), who did it and how.
   (c) You will be given two hard drives (2TB for each) to archive your raw data.
2. Processed data: extracted spectra; images;
   (a) Metadata: the tree structure of all your files and organization; the structure and format of your data/matrix: e.g.: the training data are in Matlab data format (.mat) and are in m x n matrices (sample number x frequency component) (this information should also be in the comments of program codes.
   (b) What software is needed to run and process the data? (e.g., Matlab, Labview, SAS, Python, IDL, ...)
   (c) Archive your processed data on your lab fileshare and local hard drives.
3. Programs: please add comments and good documentation (check details of our guideline).

4. Figures in editable form and related data, programs: put in each folder related to the figure. Recommendation: generate all figures (if possible) using Matlab script (so the figures can be easily reproduced and modified by others).

9.4 Travel authority and reimbursement

If you plan to get reimbursed for any type of expense and want Ellen, Pam, Kendra or Angie to process it for you then you will need to click on this link and assign them as a delegate. They cannot get you reimbursed until you go through the delegation process. It takes a maximum of 5 minutes.

The first link has the instructions on how to set this up.
https://training.onesource.uga.edu/UPK_Training/OneSourceOL/Publishing%20Content/PlayerPackage/5942-466e-8a8f-de6aa63b1c05
Click the "Try It" button and follow the directions from there.

The 2^{nd} link is where you will go into the system and actually enter the delegates. Click on "Log in" to get started and be sure to click "save" when you are done.
https://onesource.uga.edu/
The myids of each person you can select as a delegate is eking pp04180 kendrag tamalone

If you would like to remit reimbursements yourself then clicking the link is not necessary.

A delegate is someone you authorize to create reimbursement documents on your behalf like we used to do in the e-check request system. You can have as many delegates as you prefer but I would highly recommend setting these four as your delegates so that if someone is out of the office for an extended period of time, someone else can get you reimbursed. You will only have to set this up once. While these four can remit reimbursements on your behalf once they have completed the reimbursement process you will still need to sign in electronically and signoff/submit saying the expenses are accurate and are legitimate expenses instead of signing a piece of paper as in the past doing the same thing. You should receive an automated email once the reimbursement is at your level to signoff/submit. Reimbursements will have to be approved by the supervisor if it is for travel, then it will come to Andrew for state funds, Teresa for grant funds or I as their backup for financial approval. Reimbursement for supplies, etc will only need financial approval. Print screens are below to illustrate how setting up delegates work.

When requesting reimbursement or placing a purchase order please provide the person initiating the request for you:
Your department number (which is similar to what an account number was under the old system). Most FY19 account spreadsheets are on the share drive and accessible by the person over those funds. Each faculty member has their own 8-digit department number which is on their spreadsheet on the "Z" drive. If you cannot view your spreadsheet please let me know. Forrest confirmed this morning that they are now accessible. If any faculty member is unsure what their department number is please ask myself, Andrew, Teresa,

Ellen, Kendra, Pam or Angie. Funds are controlled at the "Department Number" part of the chartstring so that is why I am not providing the entire college everyone's department number in this email.
Type of funds you are utilizing: (State and the purpose of the expenditure is **Instructional, Research, Administration or Public Service**). There are more purposes but those are the four we use the most in the college. The department number will not change for something that is instructional or research but the chart string will, which the financial people will be able to identify once we know the purpose of the purchase. Other types of funds you may utilize are faculty startup, IDC, Grant, RIAS, Lab & Supply Fee, etc. If you provide us the old account number we can probably work with that, generate the chart string but not in all cases so please get used to using the new terminology "department number" and type of funds you want to spend.

Payroll through December 2018 will still use old account numbers and payroll systems. Travel, operating, reimbursements and equipment will use chart strings & department numbers and new accounting software. The FY19 account spreadsheets will have the old "account number" and new "chart string and department number" since we are utilizing both financial systems for fiscal year 2019. The entire university is new to this system so please be as patient as possible while all of us get acclimated. The beginning of a fiscal year is as difficult as finishing one which entails retrieving funds across campus to fund special initiatives, putting people into payroll for the new fiscal year and processing purchase orders and check request that was held during the fiscal year-end closeout. Let me know if you have any questions/concerns regarding the new system since I am the OneSource Coordinator for the College of Engineering. Email is preferred so that I can research the answer if necessary and reply back to you.

9.5 Computing resources

1. Computing resources in GACRC (https://gacrc.uga.edu/)
   You should send email to GACRC (cc to Dr. Li) and get training
   (https://gacrc.uga.edu/training/).

2. The node for Deep Learning in GACRC
   Job submission script to the lab computing node
   #PBS -S /bin/bash
   #PBS -q patterli_q
   #PBS -N testTfModels
   #PBS -l nodes=1:ppn=4:gpus=1
   #PBS -l walltime=72:00:00
   #PBS -l mem=40g
   cd $PBS_O_WORKDIR
   module load tensorflow/1.8.0-gpu

9.6 Guidelines of use and maintenance for valuable equipment and instruments

Our lab is making extreme efforts on seeking resources that financially support all research projects and students. Considerable amounts of funds are invested in purchasing advanced and cutting-edge technologies to achieve our research goals each year. It is important for us to have a standard protocol to use and maintain such investments, because those equipment and instruments are the core of a successful and sustainable laboratory. It is difficult to guarantee no accident during every study (especially in new research projects), but we need to make enough endeavor to minimize the possibility of any potential risks such as equipment damage. To this end, this guideline is prepared to provide a protocol for use and maintenance of valuable equipment and instruments in the Bio-Sensing and Instrumentation Laboratory. Valuable equipment refers to any investment **exceeding $500** in the lab. Generally, lab PI and manager take responsibility of managing all valuable equipment. For convenience, a valuable equipment can be assigned to a lab member who needs to intensively use it for research projects. In such cases, assigned lab member becomes the primary responsible person who needs to regularly report the equipment status and periodically maintain it.

1. Valuable equipment purchase
    (a) Follow the purchase procedure in the lab
    (b) Inventory valuable equipment in the lab equip-list
    (c) Wait for the equipment assignment
2. Training of using valuable equipment
    (a) Lab PI assign valuable equipment to a lab member who intensively uses in his/her experiments
    (b) Assigned lab member becomes responsible person
    (c) Responsible person needs to thoroughly read instruction, watch training video, or take training workshop
    (d) Responsible person needs to archive all necessary documents for valuable equipment
    (e) Responsible person may give a training workshop as a special topic in journal club
3. Use and maintenance of valuable equipment
    (a) Responsible person needs to prepare an online or physical notebook for valuable equipment, recording the equipment status and use date.
    (b) Responsible person should provide a written report to Lab PI and manager, if valuable equipment has abnormal status during each use.
    (c) Responsible person needs to maintain valuable equipment based on manufacturer's recommendation. If necessary, Lab PI may purchase additional maintenance service for certain valuable equipment.

(d) Valuable sensors should be detached from mobile platforms after each use, and placed in rugged cases for storage and transportation. If valuable sensors are required to attach on a platform, please email lab PI and manager for approval.

(e) Responsible person should present in person, if valuable equipment will be used with collaborators. It is recommended that the responsible person always operates valuable equipment for collaborators, avoiding potential damages due to improper operations.

(f) Responsible person has the privilege to prevent any use requests without lab PI's approval.

4. Special requirements for aerial systems

   (a) Programs for controlling aerial systems should be validated through a three-stage checking: 1) test the program using a simulator, 2) share source codes and documents with the team for checking, and 3) perform at least three trial flights with "simulated" sensors (objects with the same shape and weight of valuable sensors).

9.7 Roles of Laboratory Manager

9.7.1 Description of Position

Lab manager is an official position within the Bio-sensing and Instrumentation Lab, which serves two purposes: First, the lab manager helps the lab director (Dr. Changying Li) run the lab safely and efficiently. He/she takes responsibility for all aspects of daily lab activities, including lab resource management, experiment safety and coordination, and event planning and scheduling. Second, regarding soft skills training, the lab manager takes the leadership role for lab activities and serves as a representative for the lab or lab director under certain situations (e.g. when the Lab Director is not present on campus). The term of lab manager is one year, and a lab member can serve for a maximum of two terms under normal circumstances.

9.7.2 Duties

1. Representing the lab
   The lab manager will represent the Lab Director and manage the lab (including various research projects) when the Lab Director is not on campus. The lab manager will represent the lab director (Dr. Changying Li) in safety and property inspections, as well as other activities (guest visits, lab tours, meetings), when the lab director is not available or not on campus.

2. Management of lab resources
   "Lab resources" refers to all things purchased for lab use, including equipment, instruments, sensors, computers, software, and other raw materials (metal frames and lumber). The lab manager monitors and organizes these resources and makes record of them in the lab inventory spreadsheet on Google Drive. In addition, the lab manager

coordinates with UGA property control for annual property checks and inspections on behalf of the lab director (Dr. Changying Li).

3. Management of lab activities
   Currently, there are four regular lab activities, including lab meetings and cleanings (bi-weekly), journal clubs (weekly), lab lunches (lab members' birthdays), and lab retreats (spring semester). The lab manager plans and manages these activities. In particular, for lab meetings and journal clubs, the lab manager coordinates with lab members to create a schedule which minimizes conflicts and maximizes attendance.

4. Safety training and checks
   The lab manager conducts safety training for lab members who plan to perform any task or use any items listed in the safety training programs of the college and university. In addition, the lab manager coordinates with UGA safety control for annual safety inspections on behalf of the lab director (Dr. Changying Li).

5. Experiment coordination
   The lab manager needs to coordinate the lab resources if 1) there is a conflict of lab resources for different experiments, 2) experiments require resources from other labs, or 3) lab resources will be used for other labs.

6. Management of a small account (under discussion)
   The lab manager may need to manage an account ($1000-2000) for purchases that are under a certain limit (e.g. less than $100). The lab manager will issue monthly reports on the status of the account to the lab director (Dr. Changying Li). This is still under discussion.

7. Lab media
   The lab manager checks the website periodically (monthly) and reminds lab members to update their important progress (e.g. presentations, publications, and awards).

9.7.3 Privileges

1. Leadership in lab management
   The lab manager has the right to assign tasks to lab members for lab activities and management, and to require progress updates on these tasks, both periodically as they are carried out and upon completion. Deadlines will be determined by mutual agreement of the lab manager and member.

2. Representing the lab
   The lab manager will represent the Lab Director and manage the lab (including various research projects) when the Lab Director is not on campus. The lab manager will represent the lab director (Dr. Changying Li) in safety and property inspections, as well as other activities (guest visits, lab tours, meetings), when the lab director is not available or not on campus.

3. Permission to purchase (under discussion)

(a) The lab manager can give permission for lab purchases under $100.

(b) The lab manager could manage a separate account (under discussion)

(c) Monthly report to lab director (Dr. Changying Li)