What is Expected of a Ph.D. Student or Postdoctoral Fellow in the Sanders Lab?

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Training in the Sanders lab at the Ph.D. or postdoctoral levels is designed to prepare the trainee for a successful career at the cutting edge of research and/or teaching. Getting a good job at the Ph.D. level is very competitive and will require that you have established a strong track record of scholarship, as reflected both by your letters of reference and your publications. It also usually requires a high degree of professional motivation and a good track record of laboratory citizenship. This document is an attempt to outline the qualities which CS thinks are the key ingredients for maximizing one’s potential as a scientist-in-training at the Ph.D.-student and postdoctoral levels.

- Aspire to be a scholar, not only a highly skilled technician. Being a scholar includes both mastering the research literature related to your own project and also being broadly interested in other areas of science that may not be directly related to your own work. Scholarship also means being relentless in the pursuit of scientific truth, clarity, and thoroughness in terms of the conclusions being drawn from your research. So much of what you are looking for in your career will fall naturally into place if you are a scholar.

- I don’t know of anyone who is having a successful career in academic research who is at the Ph.D. student-or-higher level who is not working at least 50 hours a week at the lab, plus additional time spent working or reading at home. To a degree, what you do with your time beyond the classical 40 hours of work per week is what will define you as a scientist. It is typically this extra time that you will use to develop a broad scientific perspective and to make sure that your work is always of the highest quality.

- I respect the fact that some people prefer to come in late and then work late. However, you need to be in the lab by 10 AM, M-F. If you cannot do this, it is a big problem. If you are going to be absent or late on more than an occasional basis and have a good reason for it, let me know.

- When you are in the lab, be efficient with your time, although this does not mean the lab should not be a fun place.

- Follow the literature specifically related to your project area and also keep up with general scientific trends. Flipping through Science/Nature on a weekly basis is a good idea. I usually do regular Medline searches on areas/topics of interest. Proficiency in the use of Medline or some other literature retrieval system is essential. Following the literature goes hand-in-hand with the development of your ability to come up with viable ideas for topics for your own research program in the (hopefully) not-too-distant future.

- Attend useful journal clubs and seminars. It requires some effort to keep up with who is coming to town and when they are speaking. Often, extremely interesting people are visiting departments with which you may ordinarily have little contact. However, don’t go to so many talks that you cannot maintain momentum in the lab.

- Take advantage of the opportunity to attend 1 or 2 relevant scientific conferences a year and do your homework to find out which conferences will be most beneficial to you. Make sure you apply early enough to submit an abstract to present your work at the meeting. If the conference sponsors travel fellowships for which you are eligible, please apply. If you would like to attend an overseas conference, the general policy is that the lab can cover half of your
expenses. Students and postdocs are encouraged to apply for travel scholarships, when available, and to take advantage of the fact that Vanderbilt is also sometimes willing to cover the partial cost of conference attendance.

- The above point about attending conferences is really important. There are things about both the science and culture of your chosen sub-field that can only be learned at conferences and similar events. Failing to learn those things by neglecting to make an effort to travel and participate in meetings may limit career aspirations.

- Don’t be afraid to ask for help. In some cases, neither you nor anyone else in the lab will have expertise in a technique which may be “just what is needed” to address some question related to your research—don’t be afraid or shy about politely approaching those who may be able to help out. Just be sure to say “thanks” afterwards and to acknowledge those who help out when you publish. Indeed, in many cases, including helpful folks as authors on your paper is appropriate and represents a “win-win” outcome for everyone involved.

- Keep in mind that there is always the possibility to travel to a different lab for training or assistance in conducting an experiment that cannot be carried out locally.

- Develop efficient organizational skills including:
  - Keep a neat and detailed laboratory notebook. Future members of the lab should be able to follow your notebook and be able to figure exactly what experiments you carried out and what the details of those experiments were.
  - Computer files must also be organized and saved so that they can be identified and retrieved by others, even years after they are first prepared.
  - Maintain your own well-delineated folders on lab computers—don’t leave your files scattered throughout system folders.
  - Clean your dirty glassware promptly and maintain a well-organized bench space.
  - Order needed reagents and equipment far enough in advance so that you never have to delay experiments due to the need to wait for ordered supplies to arrive.
  - Label all samples and reagents clearly and store them appropriately.
  - Discard obsolete reagents and samples. Every few months you should make an effort to review what you have in the refrigerators and freezers and get rid of outdated or no-longer-needed samples.
  - Dispose of chemicals in an appropriate manner.

- The development of good writing skills during the course of Ph.D. and postdoctoral training is essential. Your advisor is happy to work with you to hone your writing skills. Many of your peers are also happy to do so. When drafting a new manuscript, a good strategy for a trainee in the lab is to work on the first few drafts with the help of other students or postdocs (you can pay them back later by helping them!). Once you have a draft that is in reasonably good shape, this is the optimal point to give it to your advisor, with whom subsequent rounds of editing will be carried out.

- The development of good public speaking skills during the course of Ph.D. and postdoctoral training is essential. Resolve always to give a good talk.

- When preparing your talks for group meeting keep in mind that our lab is very diverse, so that you can't assume that everyone already knows the background for your project. Just as you would do for any seminar you will be giving for a broad audience, you should include an
introduction to your project and to the techniques you will be referring to. A reasonable "rule of thumb" is that the first 1/3 of your presentation should be introduction.

- In addition to providing a good intro, it is also critical to project yourself into the minds of those in your audience so that you can present your data in a manner that they will be able to digest. For example, if you are giving a talk with a lot of biophysical data in it to a group of biologists you will need to adjust how you present your data in comparison to how you would present the same data to a group of biophysicists. Empathize with your audience.

- When invited to give a presentation, know how much time is allotted for your talk and don’t shoot yourself in the foot by exceeding this time limit.

- When answering questions after giving a presentation, try to avoid giving a 5 minute answer to a 1 minute question.

- Always provide me with the PowerPoint file for your group meeting presentation afterwards. This is an excellent way that CS can keep a record of your progress. Moreover, if the figures are of high quality, they often can later be used for publications without the need for extensive reformatting. Key details (such as sample pH and temperature) should be included in the figures so that people don’t have to interrupt your presentation to ask and also so that when someone looks at your file in the future (perhaps years in the future) they will have access to this important information.

- You should be aware of the importance of preparing high quality figures for all presentations, both written and oral. Not only is this important so that you can present your science clearly, but the quality of figures are often used as the basis for making a first impression. When an editor receives a paper you have submitted s/he will usually glance at the figures. If they are of low quality that editor is likely to immediately view the quality of your paper with suspicion. Always prepare high quality figures for any public presentation or paper.

- For an oral presentation, part of having high quality slides is to make sure that they are labeled clearly so that the audience can easily grasp what the slide is conveying.

- Maintain a spirit of helpfulness when working with your colleagues.
  - Be a good host to visitors when called upon to do so.
  - Make new members of the lab feel welcome.
  - If you make a mess, clean it up. Failure to do so is a serious infraction.
  - Help keep common areas of lab clean, even if you are not the one who made a mess.
  - Everyone occasionally breaks things, sometimes by carelessness and sometimes completely by accident. This is completely understandable. What is critical is that when you break something you report this immediately to the appropriate person (usually our lab manager) so that a repair/replacement can be promptly arranged. Failure to report is a serious infraction.
  - It is NOT OK to swipe a colleague’s buffer, recently cleaned NMR tubes, cell culture medium, etc.
  - Help instruct colleagues regarding lab practice and techniques when there is a need.
  - Help out with lab chores, even if they don’t directly benefit your project. Do not suppose you are too high in seniority to be called on to occasionally do menial task. CS has always done his own dishes.
- Watch out for the safety of your colleagues- don’t let them do things which are unsafe. Safety is everybody’s problem!
- Help to identify common reagents which are getting low and need to be ordered.
- Realize that Sanders lab projects are never set up so that members of the lab are in competition with each other (although there are many times when members of the lab work together towards a common goal). Therefore, always think about your lab mates in a cooperative manner.
- Understand that almost no labs are completely self-contained: at all stages of your career you are going to be called upon to share equipment, space, etc. with members of other labs. It is critical that you treat members of other labs with courtesy and respect.

• To a significant degree, science is based on the willingness of scientists to SERVE the community, without necessarily getting anything in return. The quality and integrity of scientific journals is based on the peer review (volunteer) system. So is the grant review system. You would be surprised at how devoted some of our most prominent scientists are to serving the scientific discipline and associated community in a most selfless way. So, while you will always need to avoid becoming overcommitted, make an effort to do your part when called upon to serve.

• Lab staff, especially the lab manager, should be regarded with particular respect.

• Resolve lab conflicts in a polite manner.

• Don’t let a one day crisis turn into a two day crisis. Deal promptly and decisively with problems, whether they are of your own making or whether they are visiting you uninvited.

• Use of profanity in the lab is discouraged. It sets a bad tone.

• Don’t gossip or talk about other lab members in a demeaning manner.

• Don’t be petty. Celebrate the accomplishments of your peers.

• Respect the value of your colleague’s time and don’t imagine that your time is more valuable than theirs.

• When teaching another person a laboratory technique, realize that they are much more likely to learn the technique if the student is the one who does the hands-on experiment. This is as opposed to you (the teacher) doing it while they merely look on. This is true both in the wet lab and when running instrumentation, include the NMR spectrometers. Yes, it may seem to take a little longer to teach this way, but in the end it saves time because the student learns faster and is less likely to need to be shown repeatedly.

• Be careful when communicating by e-mail as it is easy to rashly put something into writing that may not convey exactly what you mean, that you will regret later, and/or may be forwarded to people for whom your message was not intended. Serious matters are often best dealt with by face-to-face conversation.

• Factor cost when deciding on whether, when, and what to order. However, cost should hardly ever be a reason for not getting a critical piece of equipment or reagent. Remember that rush orders cost extra- try to project what you need in 2 weeks from today.
• Don’t leave dangling ends dangling. When a project is near completion, complete it! When a paper is almost done, finish it! It is usually best to finish a major endeavor before moving on to something new.

• Creativity and innovation in the lab is encouraged. However, if you wish to develop independent projects in the lab or to take an existing project in a completely new direction you must first consult with and obtain my permission.

• The establishments of collaborations with other labs can be highly beneficial for all involved. But not always. Please consult first with me before approaching someone from another lab about collaborating or if you yourself are approached by another lab. Please copy CS on e-mails between collaborators and yourself.

• The papers you publish represent a major form of currency for your future career advancement. You should always have a strategy (and I also think checklists are a good idea) for what your next paper is going to be and what needs to be accomplished to attain that publication goal. An unfortunate phenotype found among scientists are those who are smart, work hard, and generate lots of data, but have trouble completing work in publishable units.

• Never submit a paper that you know to be a weak paper or a grant application that you know is a weak effort. Reviewers remember who consistently submits only high quality work and those who do not, so your reputation is at stake (not to mention that you never want to waste the valuable time of your colleagues).

• I do not believe in publishing “minimal publishable units” (MPUs) just to publish as many papers as possible. This does not mean that we do not sometimes publish communications, short papers, or methods papers. However, every paper should tell a significant story, not just deposit data.

• I am committed to having my trainees work on projects that can be completed during the projected duration your time in this lab. Plan on working with me to write and submit your papers on your research before you leave the lab and move on to another position. I am completely committed to publishing completed work, but it is very very difficult to write and submit a paper on a student’s or postdoc’s work once s/he has moved on to another position. Factor this imperative into planning the timing of your work, job searches, and moving dates. It is a tragedy if a student or postdoc’s work cannot be written up for publication because s/he did not take the time to organize his/her results in publishable form before leaving the lab. If you leave it to someone else to finish your project then in all likelihood the person who finishes the project will be first author of the resulting paper.

• Avoid losing focus on your primary project. Focus, focus, focus. Some people are naturally good multi-taskers and can efficiently do two things (or sometimes more) at once, some people are not. However, everyone has to avoid losing focus on priorities.

• For senior postdocs in the lab who are planning on embarking on a career in academic research, there is the good possibility that I will give you permission to go ahead and try to generate some critical preliminary data for projects that you would like to pursue once you are out on your own. Speak with me about this first to make sure the time is right and that there are no problems. There is no, I repeat, no higher honor in science than for your students/trainees to
go on to establish successful independent research careers. It is definitely to your advantage if you can get a start on future projects at the tail end of your postdoctoral studies.

- Develop the ability to be fully aware of the “big picture” while at the same time being focused enough on your own work to bring it to full and prompt fruition.

- As part of being aware of the big picture, keep an eye out for areas that are distinct from what you are doing now, but that may represent avenues of future opportunities either at the postdoctoral level or when you develop your own research program.

- Think far down the road: What are your long term professional objectives? What steps will you need to take over month and even years to attain those objectives? What lab would you like to postdoc in some day?

- Develop the ability to discern what is likely to be “hot science” 5 years from now, even though today such an area may be undeveloped or neglected today.

- To an ever-increasing degree, the ability to “reinvent yourself” scientifically so that you can, repeatedly over a period years, adopt emerging approaches and/or shift emphasis to emerging problems seems to be an important survival trait for an independent research career. I am not sure how one develops this trait (especially without losing focus on one’s current projects), but I do think there is truth in this observation.

- When conducting experiments, an analyze-as-you-go approach is often the most powerful. For example, if you are doing a titration, it is good to plot the progress of the titration as you go along, rather than waiting until after completing the experiment to seriously look at the data. This approach allows you to either to make on-the-fly adjustments in the experimental procedure in response to the data turning out to be different than expected (for example, maybe you need to go to higher ligand concentrations to achieve saturation than you expect) or to terminate experiments that aren’t working at all at an early stage.

- When designing an experiment, always think hard about what the appropriate positive and negative control experiments are and make sure you include such controls. If you are having trouble seeing what the appropriate control experiments would be please see CS for advice.

- When developing or applying a new method for the first time it is almost always best to find a simple “model” system to test it on before moving on to the real application you have in mind. For example, if you want to test out a new method for phosphorylating purified proteins it is best to try this first with a small water soluble protein before attempting to phosphorylate a complex membrane protein.

- Your best analytical tool is your own common sense.

- Be very wary of automated software that is used for data analysis. Don’t assume, a priori, that the automated software will necessarily analyze things properly. When embarking on a lengthy analysis it is usually best to analyze at least some data manually and confirm that the automated routine gives you the results that you know to be correct.

- Do not “cherry pick” data. For example if you run an experiment 3 times and you get only one set of results that make sense, you need to know what went wrong the other 2 times before you can conclude that the “good” data reflects the correct (not just desirable) result.
• Always save your old data and do so in a form that will accessible far into the future. You never know which data you will need access to at a future date and so you need to save it all. *This is not a suggestion or request, it is a requirement.*

• Generally, there are two possible strategies for how one can establish a successful career as an independent scientist following postdoctoral work. You can continue to work directly in the area of your postdoctoral training. In this case, you start out as an expert in your field, but do run the risk of competing with your former mentor or of growing stale. Alternately, you can take the best of your training with you, but set out into completely fresh territory. The dangers here are (1) that you want to make sure that you don’t “bite off more than you can chew” in terms of adjusting to a new area (2) it is harder to develop a reputation when you don’t stay in the same circle of science for many years. Either choice can be a good choice, but be aware of the pitfalls to be avoided.

• When you have opportunities to seek your own funding (fellowships, scholarships paying your way to meetings, etc.) do so. It is important to get some experience in seeking funding (writing grants) under your belt and it looks good on your CV—obtaining a competitive fellowship is akin to securing your first grant.

• When applying for a grant, fellowship, or job, it is important to know what the application deadline is and make sure that you contact everyone who will need to contribute to that application far in advance of the deadline: reference letter writers, grants administrators who will need to process application forms, collaborators who need to supply a letter, CV etc. People are really really busy, so they will appreciate being given as much advance notice as possible regarding their contributions.

• Deadlines are your friends. They help you to focus and they terminate endless fine-tuning that is a temptation to perfectionists.

• Your mentor/preceptor always eager help a student or postdoc prepare a high quality paper, dissertation, or application. However, it may not be your best option to present him (or her, in some other labs) with a 1st draft document that is poorly organized or written in broken English. A better strategy may be to have one of your peers (or sometimes even a non-scientific friend) help you with getting that first draft into respectable shape before turning it over to your preceptor. You can return the favor when your proof-reader/editor has a document of their own they need help with.

• For those of you who are in the US on some sort of visa, please stay on top of your visa/immigration status to make sure that you reapply for your visa or switch visa types at the appropriate time (before your visa runs out!). Don’t assume that someone else is keeping track of this for you. Also, keep in mind that for some visa types we save a lot of money if we apply far in advance of the projected activation date.

• Requesting letters of reference: Throughout your career you will need to get letters of reference from other scientists who know your work. It is very important that you request letters as far in advance of deadlines as possible. Don’t assume your letter writers can drop everything to write and submit a letter for you today that is due tomorrow.

• When scheduling meetings via the internet (such a thesis committee meetings), try to do this as efficiently as possible. I generally suggest first finding two days that will work (within a 2 or
Sanders Lab Expectations

three week window) for all participants and then finding a time on one of those days that will work. Requests that are hopelessly vague such as "Let me know your schedule in the month of September" will not be warmly received by most faculty.

- Vacation: Vacation is very important and members of the lab are encouraged to take 2-3 weeks of vacation (up to 15 working days) a year. Except in the case where you skip some vacation in the prior year so that you can take an extra week the following year (to travel overseas, for example), it is not a good idea to exceed 3 weeks per year. It is also a very bad idea for you to take any significant vacation during your first 6 months in a new position (be it in this lab or anywhere else) unless you made clear arrangements regarding this with your employer as part of the offer/acceptance negotiations. Accepting a new job and soon after announcing plans to take an immediate vacation is a bad way to start a professional relationship.

- Before any paper on research from our lab is submitted, it is my policy to send it to the entire group for final review before submission. If you have any concerns regarding authorship (who’s an author or not; and/or order of authors) this is the time to have a frank discussion about this with your preceptor, not after the paper is submitted.

- When the time nears for you to move on to bigger and better things, CS will work with you to prepare a “exit task list” of things you should complete before departing (things like organizing samples/plasmids you will be leaving behind, providing records such as lab notebooks, locations of key computer files, etc.). Completing the items on this checklist is very important.

- We should conduct all our on-line activities with the assumption in mind that all such activities could soon be a matter of public record.

- Plagiarism, academic misconduct, criminal activity, and various forms of harassment are not tolerated and, if encountered, are dealt with "by the book," which include promptly turning the matter over to the appropriate academic officer or legal authority.

- You should know that no matter how much I like you personally (almost certainly a lot!) or how much I wants to see you to succeed professionally (definitely a lot!), that when I am asked to write a letter of reference for you, I will do so as honestly and objectively as possible. This means highlighting not only what I perceive to be your professional strong points, but also pointing out what I perceive to be any major professional weaknesses, especially as may be related to the specific job for which you have applied. A strong letter carries weight precisely because of this objectivity. There may be professional instances where “who you know” is the key criterion for getting a job and where preceptors provide strong letters of reference for loyal trainees no matter what. I do not think that this is generally the case within the scientific culture of the USA. What matters in this culture is talent, knowledge of specific technical skills, motivation, professional productivity, reliability, interpersonal skills, the ability to write and speak well, and scientific knowledge/interests. These are the qualities which must be addressed in a letter of reference. Seriously.

- The following is stated with kindness: keep in mind that your advisor is not your parent and your lab is not your family. This doesn’t mean that you won’t build deep and lasting friendships in the course of your time in a lab. However, to imagine that the personal commitments being made to you by your advisor and professional peers are akin to those made in a well-functioning family may lead to serious disappointments.
• When considering these “expectations” know that CS sometimes also must struggle to live up to his own expectations. Sometimes really struggle.

• The motto of the Sanders lab is a line from a Patti Smith song¹: “For beauty and the naked truth, it will cost you.”¹ http://www.youtube.com/watch?v=iK9aPaZgNhQ

• Don’t be daunted by the seeming height of the challenge of pursuing a career in scientific research. There is a song from an old and very bad holiday TV special² that has some useful advice in it regarding the challenge of attaining long term goals: “Just put one foot in front of the other and soon you’ll be walking ‘cross the floor…” Pursue your career one step at a time.² http://www.youtube.com/watch?v=OORsz2d1H7s

• Finally, a scientific career can and should be fun. Very fun. Moreover the relationships you build should last well beyond your years in this lab. It is sincerely hoped that your time in this lab will be fun and will lead to many new friends for life.
Sanders Lab: General Guidelines

When you join the lab you will be provided with a “Newcomer's Guide” that will provide addition info on getting keys, a computer account etc. Remind CS to give that to you. Our lab manager will also give you additional guides and help you find your way around.

Safety issues:
- The emergency phone number at Vanderbilt is 911 or 1-1911
- The police and security number is 2-2745
- Know where the fire extinguishers, safety shower, and eye wash stations are.
- Wear glasses in the lab (either prescription or safety glasses).
- Compressed gas tanks should always be anchored to walls or benches.
- Be careful with flammable solvents. Remember that ethanol is flammable.
- Chemical waste should be disposed of properly and not just rinsed down the sink.
- Bottles for centrifuges should always be properly balanced.
- Always turn off the gas burner immediately after use.
- Don’t take chances. If you aren’t sure it is safe get expert advice before trying it.

Lab Hygiene:
- Equipment such as spectrophotometers should be turned off at end of day. If you are the last one out please look around to make sure nothing is left on that should be turned off.
- All public areas (balances, pH meters, spectrophotometers, etc.) should always be cleaned after use.
- Put things like pipettors back in appropriate drawer or storage area after use.
- Dirty glassware should be rinsed with soap and water and placed on the “megalab dish cart” to be washed. Glassware contaminated with bacterial cultures should first be cleaned as instructed by the lab manager.
- Dirty glassware should be washed with soap, then rinsed with distilled water and possibly ethanol.
- When glassware is dry put it away.
- Do not allow outdated and worthless samples to accumulate in the refrigerator, freezer, or in the lab. Dispose of such samples.
- Use appropriate storage boxes to help with space efficiency in refrigerator and freezer. Mark the boxes clearly and in english so that others will know the general nature of the contents.
- All samples which are stored in public areas, in refrigerator, or freezer should be clearly marked with your initials, with a description of what they are, and with your lab notebook identification code.
- Each member of the lab is assigned their own area of -80 freezer space.
- Petri dishes with bacterial cultures are only good in the refrigerator for about 2 weeks. After that they should be disposed of by placement in autoclavable waste can. Other non-cleanable bacteria-exposed items (pipette tips, etc.) should be disposed of in the same manner.
- Lab glass should be disposed of only in lab glass waste box.
- Needles should be disposed only in special sharps waste containers.
- Each person in the lab is assigned their own desk and lab bench areas. Respect the space of others and maintain the neatness of your own area.
- If there is a mess in the lab and it is yours, clean it up. If it cannot be determined who made the mess, take your turn being a good citizen and clean up the mess even though you had nothing to do with it. “Always leave the camping area cleaner when you depart than it was when you arrived.”
- If you are the last one out, please lock the doors to the lab when you leave.
Lab Notebooks and Labeling:

- **It is required that you keep a “hardcopy” notebook.** We use hardbound “essay book” for this. When you have electronic data you can refer to it (with filenames and computer locations) in this.
- Lab notebooks are the property of the lab.
- Number your notebooks using Roman numerals: I, II, III ...
- Label your samples with the following notation:
your initials, the notebook number, the notebook page number on which the sample is described, and a letter A, B, C… for when there is more than one sample described on a certain page. For example, CSIII27A would be for the 1st sample described on page 27 of Chuck Sanders’ notebook III.
- It is generally preferable that you paste data printouts (spectra, elution profiles etc. in your notebook, rather than storing them separately).

Reports and Data Tabulation

- MS-Word is preferred for tables and reports. DO NOT use MS-Excel without first consulting CS.

Figures

When you present me with plotted data it will be very helpful for you to:

1. Give me full details of what the data represents. Label figures with temperature, pH, concentrations of protein, lipid, and detergent etc. This should be in the figure itself, not just in the text of the e-mail to which the figure is attached. I should be able to look at your data 5 years from now and know what it is.
2. Try to plot the data at publication quality. This means using font size and boldness that is clearly legible and using pen sizes for axes that are not spiderweb-like. And so forth. I would like to be impressed not only with your beautiful data, but how beautifully you present the data. It helps your reputation. Fill the page with the plot (don’t give me a 2” X 2” plot on a 8.5” X 11” piece of paper).
3. I particularly do not like to get Figures in PNG or Excel format. What I prefer is that you copy your figure into a Powerpoint file and send it to me in that format (to copy into PPT, the best results can often be obtained by copying it into PPT as a Metafile). If the data does not copy cleanly into PPT, then I am also happy to look at pdf files.
4. When you are sending me multiple figures for a paper or grant that we are writing, I usually prefer that they be part of one file (with multiple pages) rather than a separate file for each figure.
5. When it comes time to publish, I’ll ask you send me the figures in the format that works best for the journal—I’ll let you know what is preferred then when that (happy) time comes.

Group Meetings:

- Attendance by all members of the lab is required.
- When you present your work, use PowerPoint to prepare your presentation. Always send a copy of your presentation (group meeting, for example) to CS via e-mail or disk. This provides an excellent record of your progress that can be easily accessed at a later date. When publication-quality data is being presented, publication-quality figures should be prepared. This saves time later (you won’t have to do separate figures for papers and for oral presentations). Make sure you include all key experimental details (pH, temperature, incubation times, which mutant, etc.)
**NMR Time Guidelines:**

- Take the required training courses
- Read the *Preview of Practical Solution NMR, Up Through 2-D HSQC AND TROSY, Including a TROSY Gallery* by CS, which is posted at the lab website Resources page.
- Never bring guests into the NMR facility without first making sure they do NOT have a pacemaker.
- Guests to the NMR facility should UNDER NO CIRCUMSTANCES be permitted to enter the 5 Gauss zone around each magnet. At Vanderbilt, this done is denoted by a blue circle on the floor around each magnet.
- Remove watches, credit cards, and anything metallic before entering the 5 Gauss zone.
- Know and follow rules set by the NMR facility staff.
- Do not sign up for time you probably will not need. This is critical both to avoid waste of valuable NMR time and because we pay for the time whether we use it or not (and time typically costs in the range of $250/day).
- When you request time, provide enough information so that the NMR staff can tell what experiment you are planning to run and also what protein is involved. If there is an alternate instrument that would work just as well, indicate that as well in case the machine your request is made for is not available.
- If you cannot use time you have signed up for, notify the NMR facility staff immediately by voice and by e-mail.
- We use either 3 or 5 mm tubes. For somewhat salty detergent-containing samples such as we work with, these tend to yield very similar signal to noise from identical samples. 5 mm tubes are much easier to use if a titration is planned (although the new short 3 mm tubes work just as well for titrations). Standard volumes are 550 microliters for a 5 mm tube or 180 microliters for a 3 mm tube. (Do NOT use the low grade 3 mm tube from Wilmad: WG-3000-7-50. Instead use the Bruker 3 mm tube, which is inexpensive and reliable, even for 800/900 MHz use: Bruker order number is Z116388. (Or use the new short 3 mm tubes from Bruker).
- Respect the other users and the NMR staff.
- Report all problems promptly to the NMR facility staff.
- Data should be downloaded from NMR computers to our lab computers ASAP after acquisition. Once downloaded, follow NMR staff guidelines regarding the deletion of data sets from the NMR facility computers.
- When the NMR staff assists you with setting up new experiments always make sure they know how much you appreciate their help. Also, make sure that you let them know whether the new experiment worked or not.
- Submit your request for NMR time well in advance of when you actually want the time (consult with the NMR staff regarding how far in advance is just right and how far is too far)
- If you are assigned a specific service task such as doing a nitrogen fill, carrying out that task should be regarded as a VERY serious responsibility.
- When acquiring data, always aim for excellent signal-to-noise!
- It matters a lot which version of the TROSY sequence you use. You should use a version that efficiently filters out all buffer detergent peaks in a single scan (rather than relying on phase cycling to do this). Use of the wrong version of TROSY is something that really upsets CS, because it means someone is failing to communicate properly in the lab.

**Bacterial Strains:**

- Each person should have their own set of glycerol stocks which are stored at -80 °C for all strains which will be commonly used by that investigator. Do not use other people’s sets of strains without their permission.
• There is a “master set” of strains which should only be used to generate glycerol stocks for use by individual investigators.

Expression Plasmids:
• Know the sequence of your gene and expression construct
• Have the DNA sequence in an electronic format
• Keep a record of every new construct and mutant you make
• Label your tubes well. In English.
• For all plasmids generated, store one set together in a single box for you to turn over to CS and the manager when you eventually depart from the lab. Also provide a set of records of what each of these plasmids actually is (including DNA sequence).

Documenting New Plasmids and Other Constructs
• Keep detailed records for every DNA construct and mutant you make. Each person that has ever made a DNA construct or mutants should periodically send our lab manager an updated Excel document listing all their plasmids. Provide as many details as possible. (see suggested format below)
• Also, Email the sequencing ab1. files to our lab manager for lab records. These files should describe your final clones with confirmed DNA sequences.
• Optional: keep full DNA sequences and plasmid maps as SnapGene files.
• Talk to the lab manager if you have any questions.
• Example Excel table:

<table>
<thead>
<tr>
<th>Plasmid name</th>
<th>Vector background</th>
<th>Gene of interest (include domain or amino acid range)</th>
<th>Mutations?</th>
<th>Source</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>pcDNA3.1-V100-R233</td>
<td>pcDNA3.1</td>
<td>KCNQ1, as V100-R233</td>
<td>yes (GP)</td>
<td>made by Dumbledore</td>
<td>Aug 2012</td>
</tr>
<tr>
<td>pcDNA3.1-V100-R233/F160R</td>
<td>pcDNA3.1</td>
<td>KCNQ1, as V100-R233</td>
<td>yes (GP)</td>
<td>made by Dumbledore</td>
<td>Aug 2012</td>
</tr>
</tbody>
</table>

* Email sequencing ab1. files to Arina. These should be your final, confirmed clones.

Ordering and Receiving:
• Ordering items outside of the university is handled by our lab manager. For most on-campus stores, each person in the lab can do their own purchasing in consultation with the lab manager.
• When you see that we are getting low on an important supply or reagent, list it immediately on the “To Order” list on the white board in the lab.

Your Desk:
• If you want a private storage area at your desk (a drawer, for example), please mark it as such. Otherwise, desk areas are not to be regarded as private because of the need for people to find various things which you may have in or around your desk (keys to equipment rooms, lab notebook, etc.) However, things labeled “Private” must be absolutely respected as such.
Music in the Lab:
- If you want to listen to music using headphones this is OK. However, playing music through speakers is not allowed in the lab except at the following times: after 6 PM during the week and any time on Sat/Sun. This is not because we don’t like music, but reflects mutual respect among folks in the lab who may have VERY different musical tastes.

Dealing With Problems:
- If there is a problem in the lab, don’t let it fester. Go see CS or our lab manager about it. If the problem is of a confidential nature, this will be absolutely respected.
NMR Data Documentation: Standard Sanders Lab Protocol

- Data should be downloaded to Sanders lab computers immediately after acquisition. Delete data (but not parameters or pulse sequences) from the NMR Center computers as soon as you verify that data transfer went smoothly (but only after verification!).

- There is information at the SB web site on how to configure your LINUX account so that you can get access to the programs required to process data. Talk to the NMR manager or to someone in the lab if you need help.

- Both 1-D and 2-D Data sets should always be processed and spectra should be printed out in hardcopy form.

- When 1-D data are plotted/printed, always plot the full spectrum with all peaks (except for maybe water and the alkyl peak from detergent) on scale. Also plot the sub-spectra of particular interest. If you have an internal reference (TSP or DSS, use its peak as the 0 PPM reference). If not, use the water peak as the 4.67 PPM reference.

- For TROSY, always print the same spectral region and to the same scale. This allows spectra to be overlaid and directly compared on the light board.

- PPM should be labeled in both dimensions

- Print out two versions of each spectrum. One with no noise and one which is getting into the noise a little bit.

- pdf/ps files should be saved for possible later use—the allows you to avoid having to re-process each time).

- Each spectrum should be clearly labeled with the following information:
  - Date of acquisition
  - Notebook identifier
  - Protein name and concentration
  - Sample labeling
  - pH
  - buffer and detergent composition
  - %D2O
  - temperature
  - instrument field and identifier (e.g., 601 or 602)
  - name of pulse sequence
  - number of scans per t1 point
  - number of experimental increments
  - enzyme activity (if measured)
  - details of polyacrylamide gel, if used:
    - % cross-linking
    - bis:acrylamide ratio
    - original and final gel diameters

- Always provide a copy to CS