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

Chuck Sanders, Vanderbilt University (updated 8/2022)

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 goingto 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 are 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.

- Remember that "A couple of months in the laboratory can frequently save a couple of hours in the library." *(Quote attributed to Frank Westheimer)* Master the literature related to your project *before* diving into your project.

- 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 at least half of your plane ticket and your lodging and conference fees (for the conference part of your trip). See me about this when you have a trip in mind. 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.

- There are generally two types of conferences—*big* conferences that are typically sponsored by foundations or professional organizations like the American Heart Association, the Biophysical Society, the Protein Society, the two ACS (American Chemical Society and American Cancer Society, and *small* conferences such as the Gordon Research Conferences, Keystone Symposia, and FASEB Summer Conferences. I like both. It is not too early in your career to start looking for a regularly-running big conference and a regularly-running small conference that you like and will attend regularly. While attending a wide variety of conferences definitely has its merits, regular attendance of one or two particular conferences is a great way to start building long term relationships with national and international communities of investigators in your field.

- Consider joining one or two professional societies (probably the one who sponsors a regular conference that you seem to like—see above point) and consider opportunities to serve in such societies. Again, this helps you build professional relationships and get exposed to the culture of science at a different scale than you experience in your day-to-day work in your home lab.

- 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.

- I am a big fan of carefully prepared “lab protocols” that document important and commonly used lab methods in high detail. Such protocols should be written such that a new person in the lab can carry out the method successfully even if the person who originally developed the protocol is not present. ALL RELEVANT details should be included. If you think that a prayer to the Moon Goddess is essential for the success of an experimental protocol, state this clearly and include the exact phrasing of the invocation. When I ask you to prepare a detailed protocol, I ask that you take this very seriously and to try to project yourself into the mind of a novice who may need to carry out your procedure without the benefit of your being there to show him/her how to do it.

- 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. Many of your peers are also happy to do so. When drafting a new manuscript a good strategy 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 scientifically 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 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.

- Clear and complete slides really help presentations. If members of the audience keep interrupting you in group meeting to ask about the molecular weights of gel markers, what the pH of the experiment was, or what NMR field you were working at then your slides are not providing enough detail.

- When you prepare a new talk for an important venue, ALWAYS give a practice talk in advance of your scheduled presentation. Your advisor and fellow students and postdocs are usually very happy to help.

- 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, gel marker MWs, and temperature) should be presented, not only to avoid audience interruptions, but 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 on to share equipment, space, etc. with members of other

labs. It is critical that you treat members of other labs with courtesy and respect.

- The Sanders lab is 110% committed to providing an equal opportunity environment where diversity is celebrated, gender equity is a bedrock principle, cultural sensitivity is expected, and a safe working environment is regarded as imperative.

- 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.

- When I send you an e-mail with a question or request, I do expect a timely answer, even if it is "I am busy now, but will reply as soon as I can".

- Resolve lab conflicts in a polite manner.

- Don't let a one-day crisis turn into a two-day crisis. Deal promptly and decisively withproblems, whether they are of your own making or whether they are visiting you uninvited. "All big problems start as small problems." (quote by Dr. David Black, Nashville entrepreneur)

- 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. Exorcise that demon, Jealousy, from your heart.

- Respect the value of your colleague's time and don't imagine that yours is more valuable than theirs.

- While it is natural that certain members of the lab will gravitate toward each other to form friendships and alliances, try to avoid tribalism and cliquishness. For example, if members of the lab are going to partake in an after work social event, please give thought to being as inclusive as possible in terms of who gets invited.

- 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, including 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.

- Creativity and innovation in the lab is encouraged. However, if you wish to develop independent projects or to take an existing project in a completely new direction you must first consult with and obtain my permission. The research (and most often stipend) of members of the lab is usually being provided by research grants. These grants have aims. It is essential (indeed, it is often legally requisite) that if you are supported by a grant then your research needs to fall within the scope of the aims of said grant. Usually, CS gives prospective members of the lab copies of the grant proposals that describe the aims and approaches of possible projects. So, anyone serious about joining the lab should read the proposal(s) carefully and make sure that they buy into the science of the project that they will end up working on.

- 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 think “to do” 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 isa 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.

- Completing the final 20% of a project often requires 80% of the effort. So don’t be surprised at how difficult it is to bring a well-advanced project to the finish line. Indeed, when making future plans and estimating completion dates, this general principle should be factored in.

- Be a finisher. 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.

- I am committed to having my trainees work on projects that can be completed during their projected duration of 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. Everyone loses if a student or postdoc's work cannot be written up for publication becauses/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 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 advantageif 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.

- Some of us don't like to be professionally labeled. For example, CS is sometimes labeled as "an NMR guy", which makes him cringe both because half of the people in the lab will neverrun an NMR experiment during their training and also because CS does not perceive himself tobe particularly good at NMR spectroscopy. Having said this, I do think that for trainees there can be advantages to being labeled, particularly when you go out on the job market. Employees are often looking for someone whose label matches their labeled position. Consider the case of Hello Kitty. Hello Kitty is a well-known and appealing kitten. But what exactly is it that Hello Kitty does for a living? No one knows. This fact may ultimately limit Hello Kitty's professional aspirations. There are advantages to developing notable expertise in one or a few specific areas (techniques and/or specific areas of biological focus), so that by the time you move on to the next phase of your career you can, when it serves your interests, justifiably wear "expert" labels in these areas.

- To an ever-increasing degree, the ability to "reinvent yourself" scientifically so that you can,

repeatedly, over a period of 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 notsure how one develops this trait (especially without losing focus on one's current projects), but I do think this is now the way it is.

- 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 examine the data. This approach allows you 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.

- For some of the work in our lab, *attention to detail* seems to be especially important. I have found, for example, that some members of the lab are much better at getting reproducible NMR spectra of membrane proteins than others. This may reflect the degree of attention that folks pay to the gory details of sample preparation and careful consideration of the variables that go into membrane protein sample prep. In addition to all of the things one would worry about for a soluble protein (protein concentration, buffer pH and composition, temperature) there are the additional variables of total detergent concentration, free detergent concentration, micelle concentration, and the protein:micelle concentration ratio (not to mention lipids if you are working with bicelles, mixed micelles, vesicles or nanodiscs). If sample reproducibility from sample-to-sample matters, there are more variables that need to be reproduced for membrane protein samples! So careful attention to and appreciation of details is absolutely critical.

- Your best analytical tool is your own common sense.

- Be 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 a 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.

- You may want to develop a systematic approach for keeping up with the relevant literature in your area of interest. Just to note one option, I have a file saved with a Boolean query that I simply copy into the PubMed search line every couple of months. Here is an old version of a query I have used:

GPR3 OR Aph-1 OR Aph1 OR GSAP OR (APP AND amyloid) OR C99 OR beta-CTF OR APP-CTF OR B-CTF OR CTF-B OR CTF-beta OR (APP AND cholesterol) OR PMP22 OR "peripheral myelin protein 22" ORKCNE1 OR KCNE3 OR KCNE4 OR KCNQ1 OR KvLQT1 OR (integrin AND NMR) OR (integrins AND NMR) OR caveolin-3 OR bicelles OR (APP and rafts) OR (nanodiscs AND NMR) OR (caveolin AND NMR) OR ("membrane protein" AND NMR) OR ("membrane proteins" AND NMR) OR ("membrane proteins" AND folding) OR ("membrane protein" AND folding) OR "ribonuclease kappa" OR ("N-acetyltransferase 8" OR NAT8) OR (coli AND "diacylglycerol kinase") OR (MAM OR MAMs) OR (BACE or "beta secretase OR "beta-secretase") OR ("gamma secretase" OR "gamma-secretase") OR ("alpha secretase OR "alpha-secretase")OR TREM2 OR DAP12 NOT MRI

  In one fell swoop this query allows me to keep an eye on the literature related to our lab project plus other subjects that I like to keep up with.

- 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 is 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 with a 1st draft document that is poorly organized or written with poor grammar. 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 itover to your preceptor. You can return the favor when your proof-reader/editor has a document of their own they need help with.

- As the corresponding author for the papers generated by our lab, I do the final editing on papers. It will be *much appreciated* and in your best interest if when, you turn a manuscript over to me, I don't have to spend a lot of time doing *writing chores* such as: reformatting the manuscript for the intended journal, looking up the middle initials and addresses of co-authors, making sure the reference format used matches the requirements of the intended journal, checking the references to make sure there are no missing dates etc., making sure all abbreviations are properly defined as per journal-specific guidelines, and making sure any required database depositions (BioMagResBank, PDB, etc) have been carried out.

- 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 sometimes 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 ofreference 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. And remember, you want your letter writers to be in a good mood when they compose your letter!

- 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 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.

- When our lab receives requests for reagents or protocols from other labs, it is our policy to promptly provide these to the requestor and to do so with full documentation of what we send. It is our wish to be as helpful as possible to other scientists, even those who possibly could be viewed as our competitors. There are, of course, government and university laws and regulations about material and IP transfers and we (obviously) stay within legal boundaries.

- 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 is an author and/or order of authors) this is the time to have a frank discussion with your preceptor, not after the paper is submitted.

- 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 am immediate vacation is a bad way to start a professional relationship. Having stated this, let me add that if you have not traveled across the country to visit some of the great western US national parks, you really should consider doing this this during your stay in the lab. The northern route (Grand Tetons/Yellowstone) and the southern route (Zion/Bryce/Grand Canyon) are both extraordinary (but it is not advised to try both one trip!).

- Keep in mind that students and the postdocs in my lab are here to be trained. For each trainee the day will come where it will become clear to the trainee, to CS, or to both that the training period is coming to an end and it is time for the student or postdoc to wrap up their Sanders lab work and move on to bigger and better things. This is perfectly normal, although (especially for postdocs) the initial realization that this time has come can sometimes hurt just a little. Consider, it must be a little hard both for Mother Bird and Baby Bird when the time comes for Baby Bird to finally leave the nest. When this time comes then we need to have a frank and open conversation, which will include planning the wrap-up phase of Sanders lab work and a discussion of the strategy to pursue (by both CS and the trainee) to set up the next phase of the trainee's career.

- When the time comes to depart move on from the lab, CS will work with you to prepare a "exit task list" of things you should complete before leaving (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. There will also likely be some things that you will need to complete related to your work in this lab that you will have to do after moving on to another position—such as addressing reviewer comments or fixing figures related to your final manuscripts. While this can be a real pain and a distraction from the new phase in your career, it is very much in your best interest to save a little gas in the tank to complete these final Sanders lab tasks promptly and with attention to quality and detail. I hate it when people dog it—it is a bad way to end the professional phase of a relationship.

- Leadership is not about privilege. It is about service. A leader will clean the disgusting analytical balance from time to time even when it is not her or his turn, just because it needs to be cleaned.

- It is folly to burn bridges in terms of professional relationships that do not need to be burned.

- Conduct all on-line activities based on the assumption that all such activities may soon be a matter of public record. They may well be. Every little click you make…

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

- Some people like to give and receive hugs. Some people do not. If you are in the former group you should be very careful about assuming that someone wants to be hugged. If in doubt, go with a handshake, slight bow, or head nod. But do ask me about the time that a superstar scientist unexpectedly hugged me.

- One of CS' father's favorite sayings was "leave the campground cleaner when you depart than it was when you showed up". Broadly applicable to life in the lab.

- Attend to your health and personal relationships. Exercise on a regular basis.

- You should know that no matter how much I like you personally (almost certainly a lot!) or how much I want 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. Employers know an honest letter when they see one. There may be professional instances where "who you know" is the key criterion for getting a job or 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 thisculture is talent, knowledge of specific technical skills, motivation, professional productivity, reliability, integrity, diligence in record keeping, 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.

- There is a wonderful New York Times opinion piece published in June 2018 by David Brooks in which he comments on the polarization of society. I think this quote can be extrapolated to apply to the way scientists interact with each other. "...the core divide in our politics is no longer the conventional left-right divide. The core issue in our politics is over how we establish relationship. You can either organize relationship at a high level — based on friendship, shared values, loyalty and affection — or you can organize relationship at a low level, based on mutual selfish interest and a brutal, ends-justify-the-means mentality." Let us aspire to always take the high road in our scientific relationships, even with our competitors and people we may find annoying.

- 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 song[1]: "For beauty and the naked truth, it will cost you." [1]http://www.youtube.com/watch?v=iK9aPaZgNhQ

- Everyone, even CS, needs mentors. Allow yourself to be mentored at every stage in your career. It is one of the ways we learn, and having people you can look to for mentorship is one of the ways we weather the storms and trials of life, both professionally and personally.

- If you pursue a career at the cutting edge of science, then you are probably going to make mistakes. CS certainly has—plenty! When you make a mistake and you realize it, own up to it. Then get up, dust yourself off, and move on.

- Note that "back in the day', that when CS applied for postdoctoral positions he was rejected without interviews by the first 6 labs he applied to. Here are three examples: http://csb.vanderbilt.edu/sanders/postdoc_rejections_CS_1988.pdf Nevertheless, things worked out wonderfully (see: https://link.springer.com/article/10.1007%2Fs00232-019-00090-5) There is no tinge of regret about those 5 rejections! Make the best of the cards you can play and don't worry about the ones you can't. It only takes one good opportunity!

- 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 special[2] 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!