Postdoc Academic Chat #2

Managing Your Research Program as a New Professor: Guidelines on establishing effective faculty-Student research relationships.

Wednesday, October 9, 2019

We will discuss how set the right expectations for your students in terms of work ethics, sharing resources, participating in meetings and seminars, deciding on the appropriate attributions for authorship, and more.

Readings

Note: I know that these two readings, especially #2, are quite long but I think they contain very useful material. Look over what you can before the chat and save the rest for referral at another time. – Rick Reis

#1 What I ask of lab members and of myself.

#2 Making the Right Moves: A Practical Guide to Scientific Management for Postdocs and New Faculty

#1 What I ask of lab members and of myself.

(Draft)
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Preface.

This document is intended to lay out my expectations for people working in my research group or interested in such. In the spirit of good communication, it reflects discussions with individuals and in several group meetings held over the years since first implementation (2010) and it is constantly evolving – which is why it will

always be labeled "Draft". Please read it and if there is ANYTHING that doesn't make sense or that you think is in any way not the right expectation, then let me know – I am happy to discuss any aspect any time, individually or as a group. Nothing is unchangeable but I ask you to respect the process and abide by the expectations as written here unless we have had an explicit conversation that agrees to some change.

Finding a Project.
Two brains are better than one, especially when creativity is the task. My hope is that everyone will engage in a period of intense and collaborative thinking when they join the lab and periodically thereafter to conceive of a project that is:

-original
-important
-interesting
-complements other projects in the lab
-meshes with the overall direction of the group and its funding base

I will help shape the project to meet these goals but expect that each person in the lab provides the creative spark behind their respective projects.

Work Ethic.
I expect all to be self-motivated and for the number of hours worked to never be an issue. A flexible time schedule is one of the many perks of our lifestyle. I ask, however, that all be in the lab for at least a majority of the usual workday (9-6) so that interaction with your colleagues can occur for their and your benefit. In other words, I ask that people do not routinely spend the bulk of their workday outside those hours (e.g., come in at 1 and leave late in the evening).
Weekends are primarily for relaxing and recharging but keeping the momentum going at work is important and I expect many will stop by the lab and/or do some work at home to move projects forward.

Absences.
Please let me know if you will be out of the lab for more than one day and the duration of and general reason for that absence (e.g., vacation, conference (I know I *should* know but not easy to keep track of everyone's meeting plans), etc.). This is so that if someone is not here I/we know that it is not because of an accident and we can also plan conversations appropriately, know when you're back to dig out reagents, etc.
As a general rule of thumb, I expect people to take 3 weeks' vacation a year not counting the two weeks around Christmas and New Year. The lab does NOT shut during the University's "Winter Closure" and you are welcome to work for whatever portion of this period you choose but most take off all or a good portion of this time or at least shift into "sustain the momentum" or "weekend" mode (i.e., not necessarily be completely away but not working long hours each day).
Please leave contact information for emergencies (e.g., cell phone or email) whenever you take time off.

Notebooks.

As you will all know or will come to know, past members' notebooks are a crucial resource. I am required by NIH rules to keep these for several years and they must be usable for verifying data in any publication, should questions arise. You are welcome to make copies of your own notebooks to take with you when you leave but the original must remain here.

My general guidelines are:

1. Use a separate notebook for each project.
2. **Date** every experiment.
3. Indicate the overall **purpose** of the experiment.
4. Record full details of **materials and methods**.
5. Include "back of the envelope" **calculations** (I.e., don't use the back of an envelope, paper towel, etc.) so that these can be checked if there is a problem (ranging from how you made a 10 mM stock of some reagent to how you made a reaction mix).
6. Present the key **results** and/or refer to any electronic database with the results. Include all original data (e.g., gel photos, FACS plots, etc.).
7. Describe your **conclusions** – write this for your, my and future lab-workers' benefit. Talk to us! State **lessons learned**, even if negative. Put models in to help you and others think about the work. It is also helpful to note which experiment/figures are in your papers and provide clear descriptions of how new parasite strains were made, isolated, and which clone(s) were used for your published research.

I recommend that you use a three-ring binder so that you can include data in various forms. I like to use one side of the paper for the formal notes and one for the rough notes/calculations/etc.. Use a three-hole transparent holder for autoradiograms, etc. that can't easily be punched.

Shared Reagents.

We cannot afford for everyone to have his/her own tube of everything. Additionally, if everyone removes an aliquot that is, likely, more than actually needed ("just in case") then we will end up with lots of small tubes with small amounts that end up wasting materials. So, with very rare exceptions, please do not set up your own stash of samples of common reagents.

Maintaining stocks of shared reagents requires everyone to order a replacement WELL BEFORE the stock is gone, typically when the **penultimate** tube/bottle is nearly finished.

Unique Reagents.

Please store all unique reagents in a box that is clearly marked with your name.

Please date everything as YYMMDD format. This is enormously helpful in figuring out the value of what's in a tube, be it a purchased reagent or a home-grown one (it allows us to look up in your notebook more about it, differentiate between different versions of something and, in some instances, figure out who the tube might belong to).

Please place your name or initials on every tube of truly important/unique reagents (like plasmids, parasites, etc.) and every item placed in common space so that these don't become 'zombies' taking up needed space. We spend a lot of time trying to figure out who owns a given tube and I'm worried about throwing something precious out when a

nameless tube shows up somewhere. This also lets people know who to find if items are spilled, broken, etc. Obviously, this is not necessary for aliquoted tubes of ROUTINE reagents that are in YOUR box.

Talks.
Unless you have given essentially the same talk before, please plan to practice with whomever from the group can come. Likewise, please try to make time to attend a practice talk and give input. Since most of us don't like to be hypocritical, it is useful to criticize and then apply those criticisms of others to your own talk (I do, all the time). I also recommend inviting someone from outside the lab to the talk to catch the omission of things that we all take as "given" but others don't (e.g., use of lab-specific jargon, system-specific "insider" knowledge, etc.).
I have truly never been anything other than proud to listen to a presentation from someone in the lab. That doesn't mean we can't all improve our presentation skills and I will provide feedback for both the practice talk and the actual talk. I will try to apply the FAST feedback principle (Frequent, Accurate, Specific and Timely).
Please provide me with an electronic copy of your talk; these are invaluable summations of your work and a nice complement to the more detailed lab meeting presentations. I also draw on these talks to assemble my own talks since, shockingly, I don't generate data myself…

Papers.
Please refer to and review my PowerPoint presentation on how to write a paper as soon as you think a project is nearly ready for writing up. Note that the earlier you start, the better, just to be sure that we don't realize that a key experiment is required very late in the process with a consequent delay in submission.
Please be sure I receive a final copy of a manuscript when submitted to the journal and all submitted revisions.
Please post a copy on the lab server in the file "Papers In Process."

Posters.
LESS IS MORE. Many people, myself included, find posters hard to take in because the space for poster sessions is often dimly lit, extremely crowded and noisy and full of distractions. As a result, they should not be a paper that you reformat to a poster, with tons of words and details. Instead, they should be very light, generally in bullet format and with relatively few words. People passing by need to see a short summary to decide if this is something that they want to take the time to look at in detail. Conclusions are also essential.
I like to review posters to help provide input and to be sure that I know what we are saying/showing publicly.
I'll put some model posters up on our new server.
Please send me final copies of all posters electronically for archiving.

Congresses.
Meetings can be invaluable for the information gleaned and contacts formed. Attendance at sessions is clearly key and I strongly recommend taking good notes as the amount of

information flowing in can be overwhelming and impossible to retain. Using the abstract book as what you take notes in works well in many cases but sometimes, an old fashioned notebook is best.
Possibly the most important aspect of conferences is meeting new people. The resulting network will enormously facilitate your research both in terms of information learned and the ease of obtaining reagents when those occasions arise. To meet people you may need to GET OUT OF YOUR COMFORT ZONE!! I strongly recommend sitting at meals with people you don't know. Do this for at least one, preferably two meals a day. Meaning, don't hang out with folk you do know! Introduce yourself to those you sit next to and ask, "what do you work on" and be prepared to do likewise although I suggest answering with "I work on HOW or WHAT…" – pose it as a question you are answering so you don't just say "I'm trying to knock-out…" Another good conversation-starter at meetings is asking someone "What's the most interesting (coolest?) thing you've heard so far?"

Safety.

We work on an incurable, potentially fatal human pathogen. NEVER forget that. I expect all lab personnel to adhere to all safety guidelines, both for general lab and chemical safety and for the specific risks associated with handling *Toxoplasma gondii*. PPE must be worn whenever handling any chemical or biological hazard. This includes whenever passing *Toxoplasma* cultures in the hood. **NB: when working with *Toxoplasma* cultures you *must* wear a lab coat, gloves, and safety goggles.**

Animals.

Often, our need to understand something about the pathogenesis of Toxoplasma makes it necessary to do experiments in animals. I believe such experiments should only ever be done when there is no *in vitro* alternative. I also believe that the "bar" for whether an experiment is worth attempting is considerably higher when animals are involved. This is not a cost issue, it is about respecting the dignity of life. There must be a purpose higher than curiosity to motivate experiments in animals; there must be a real expectation that human and/or animals will benefit from the work through lives saved or disease ameliorated.

All animal work requires approval, in advance, from the relevant panels at Stanford. It is crucial that all aspects of the approved protocols be followed and that anyone working with animals has completed all the required training. Animal users are responsible for reading the protocols and knowing what is in them and what we are allowed to do.

Behavior in the lab.

I expect all to be supportive of one-another and professional in all interactions with everyone in the lab and in all professional encounters. Professionalism means treating everyone with respect, not shouting and not arguing. Disagreements will arise, of course, but I expect those to be resolved professionally and courteously. If you are tempted to raise your voice, don't – please explain your position calmly and if no resolution is forthcoming, walk away. When both parties are calm, then return to the conversation, possibly out of the lab. While it is not how I would prefer to spend my

time, I'd rather engage any dispute with the individuals concerned and help resolve it (individually or together) than to see the culture of the lab become one where arguing occurs.

Humor is a matter of taste and culture. Please be sensitive to others who may "laugh along" but underneath be very uncomfortable. Please be sensitive about swearing and "off-color" jokes, especially those that might be interpreted as sexist, racist, homophobic, etc. **It is crucial that the work environment be safe and free from all harassment or discrimination.**

Department Seminars.

I believe that communication within a department is invaluable in making the most of the community of scientists we are a part of. Selfishly, there is much to be learned from others, often unexpectedly. In addition, input to others is always useful. Hence, I attend all department seminars that I am in town for, be they internal or external speakers. I ask you do the same except in very unusual circumstances.

Department Retreats.

I expect all to attend all of the annual department retreat except in extraordinary circumstances (I have missed 4 in 35+ years due to sabbaticals or family weddings/funerals). I feel very strongly that the whole point of being in a department is to benefit from the collective wisdom and knowledge of others and the department retreat is a key time to share that. If you think you know more than others, then share your brilliance. If you realize you don't, then go to learn as well as help others.

Scheduled one-on-one meetings.

I set aside an hour to meet with everyone weekly. I will try to give as much notice of any change as possible but occasionally, I learn of a meeting or seminar that I need to attend on short notice and ask your understanding. I expect the same of you and will likewise understand if things unavoidably change. Sometimes I am coming from the other side of campus and will be a few minutes late but will always try to call if it will be more than a few minutes. Sometimes, a meeting in my office will be on the verge of some scientific epiphany and I may ask for another few minutes when you come to my door. I promise not to abuse your gift of a few more minutes to me and one of your colleagues. If my door is shut and you're not sure if I'm with someone, please knock – it is possible I'm working on something that needed concentration and am anxiously waiting for your arrival.

Biweekly written reports. Please:

1. Send a PowerPoint update that describes your progress since our last formal meeting by the night before (or, at the latest) 8:00 a.m. in the morning on the day of our scheduled one-on-one meeting. I use the time after breakfast to read these and actually THINK about the work. It is MUCH harder to do that when coming in cold to the conversation.
2. Name the report – YYMMDD-xxJBmtg where xx are your initials.

3. Please use a first slide that has the date prominently displayed. I then take that slide set and merge it to the end of a slide set that has all your slides. That way, we can easily scroll up to look at data from past weeks and the date slide serves as a rough time signature.
4. State the title and goal of each project on a separate slide. Obviously, this won't change most weeks but it is very helpful to me and probably not bad for you, to see what you are really trying to accomplish with the work. And it "costs" nothing to have those slides repeated in the cumulative slide deck.
5. Include any recent results in graphical format.
6. Describe short-term experimental plans.

Spontaneous conversations. The scheduled meetings are only the *minimum* of the interaction I expect to have with you. Always feel free to stop by. If my door is open, come on in. If it's closed then consider the bar raised in terms of how important the conversation needs to be but don't consider this an absolute "do not disturb"; I won't be shy about saying I'm in a meeting (in case it's not obvious when I open the door).

Lab Meetings.

Attendance. I expect all to attend all lab meetings they are in town for except in truly extraordinary circumstances. Doing otherwise is extremely disrespectful. We have a delightful tradition of having these with food which takes time to set out and serve. Please be prepared to listen/speak by 15 minutes past the hour.

Participation. I am forever impressed by the benefit of collective thinking. Please share your thoughts with the group. I have many times seen a "stupid" idea spark another idea that sparked another that turned out to be truly key to a person's project. Don't be shy about sharing "stupid" ideas – they may not be so insane and will help the creative process. Likewise, please be mindful that everyone in the room deserves an equal opportunity to talk. Some are more reticent to do so and need some "space" to offer an opinion. Please don't dominate the conversation and feel free to continue giving input after the meeting, one-on-one with the speaker. If you feel the speaker has not "heard" you, then just say, "Let's talk about this more after."

Presentations. Please send the final Powerpoint to me by 10 minutes before the presentation so I can take notes on them during the meeting. Also, I expect these presentations to be:

- **Professional**. Obviously, they can be informal but that does not mean unprofessional. Be proud of your work. Professionalism also means no "F-bombs" or other swearing. Treat all questions as worthy of a considered response, regardless of whether you feel the questioner should know the answer.
- **Clear**. Introduce the **question**, even if you're sure everyone must remember it from the last meeting. Odds are they don't and it can never hurt to remind them and you of the real point of the experiments. Remind us of any **key** aspects of Toxoplasma biology that underlie your work. The life cycle will sometimes be relevant but don't show such if it's not and don't go over well-known facts unless super-relevant; if you do include such material be sure to let us know why you are doing that. We may know the background information, but not your thinking, logic, or approaches that led to this project or question.

- **Rigorous**. It is crucial that you be the most critical of your own data. You will never hang for understating a conclusion; you may (metaphorically speaking) for overstating it. The word **identical** is the preserve of integers!
- **Time-aware.** Only you know what you hope to teach and learn from others. Be mindful of the time and don't hesitate to say, "that's very useful input but I'd like to continue this particular conversation off-line and now move on as I need your help with some work I've yet to describe, even more."
- **Food**. Our routine is that a speaker provides snacks for the NEXT lab meeting after the one they present at. If you can't do that, please arrange for a substitute. I realize you are not paid a lot of money. As of 10/1/16, I added $180 per year to all post-doc pay for any at the lab minimum and provide up to $60 cash to all grad students each week after the meeting that they bring food to and for which they provide receipts. You are responsible for clean-up on the day you bring the food. All chip in but you're the clean-up foreman that day!

Graduation (Ph.D. students only)

I expect all PhD students to graduate in about five years and, in worst case, no more than six years.

I hope that all PhD students will be able and want to attend the School of Medicine graduation each June. It is a privilege for me to attend and "hood" such individuals and unless essentially impossible for me to be there, I will be! Please let me know if you will attend. I am comfortable with you "walking" through graduation before all University requirements have been met but ONLY if the thesis committee agrees that you are ready to defend your thesis AND a date for the defense has been set.

Finishing in the lab.

Upon completion of your time in the lab, I ask the following:

- Leave lab notebooks in an organized and accessible form. That means labeling on the outside by project and indexing all notebooks with date/topic/page so that others don't have to leaf through every page to find something. As above, you are welcome to take a copy of your notebook but the original must remain with me. Please clearly note experiments that are in your paper(s).
- Leave a list of all reagents that might be useful to others, appropriately indexed and accessible to others. This is your "Where did they leave it" file. Please print a copy and give it to John/Lidia as well as send the electronic version to John. Leave very clear explanations of strains, genotypes, how they were derived, clones and their relationship to each other (same or different population?) and what were the clones used for your research and in publications. Often the name you initially call something and how you refer to it in your notebooks is different from what ends up being used in a paper. Please give us a key to "decode" that.
- Discard all materials that could truly be of no use to others and completely clean off your bench and empty your fridge and freezer spaces (with the exception, of course, of items described in your "Where did they leave it").
- Consolidate important items to be kept so they take up as little space as possible.
- Bequeath useful items (i.e. antibody stocks) to a specific person so they are not forgotten, lost and unused in a box!

- Help me think about the direction your project should take in the future.
- Write up any unpublished results in a timely way and take responsibility for doing such once away.
- "Check in" periodically through life. I care about all who have ever been in the lab and hope to maintain some level of contact forever. In addition, I am required to provide current status information to funders on a periodic basis (e.g., for training grants). And, lastly, it is fun (and a challenge) to keep the "Lab Alumni/ae" website up to date so that you all can keep in touch with each other and prospective applicants can see what kinds of careers people take as they move on. And, for the record, I am proud of every individual's chosen direction. Without exception.

What I expect of myself.
I will:

- provide you with scientific and professional guidance that furthers your progress toward **your** professional goals; it is your life, not mine.
- treat all equally.
- pay all equally using a transparent pay structure such that all with comparable credentials and experience receive the same pay, regardless of their personal situation. The only exception is if someone obtains outside funding that pays more than my pay schedule.
- be professional at all times and always err on the side of discretion in how I handle all situations and information.
- respect your time.
- give credit where credit is due, especially in public presentation of any work done in the lab.
- not be the "slow-step" in getting manuscripts submitted.
- be a life-long mentor to the extent you choose to engage me in that role.

#2 Making the Right Moves: A Practical Guide to Scientific Management for Postdocs and New Faculty

Burroughs Wellcome Fund
Howard Hughes Medical Institute
https://www.hhmi.org/sites/default/files/Educational%20Materials/Lab%20Management/Making%20the%20Right%20Moves/moves2.pdf

Chapter 3

LABORATORY LEADERSHIP IN SCIENCE

The day has finally come when you walk through the door of your own laboratory. You are the boss! What got you here is your creativity and scientific expertise. But you

quickly realize that the day-to-day operation of the laboratory also requires strong leadership and management skills.

This chapter describes the skills and competencies involved in leading and managing a group of people. It also offers some suggestions on how to achieve them. It is organized in four main sections. The first provides a definition of leadership in the context of directing a scientific laboratory. The second describes the process for developing a vision for your laboratory; your main role as a leader will be to organize and motivate the people in your lab to enact this vision. The third is about different leadership approaches and how you might proceed in developing your individual style. The fourth discusses the role of the laboratory leader in building and sustaining an effective team—that is, how to communicate with the people in your lab, how to motivate them, how to make decisions and resolve conflicts, and how to set and enforce expectations and rules of behavior. This chapter is largely based on material developed by Edward O'Neil, director of the Center for the Health Professions at the University of California–San Francisco, as well as interviews with scientists with years of experience running laboratory research programs.

"If I had one piece of advice to give it's that although you've been hired for your scientific skills and research potential, your eventual success will depend heavily on your ability to guide, lead, and empower others to do their best work." —Thomas Cech, HHMI

YOUR ROLE AS A LABORATORY LEADER

What Is Leadership?

Before getting into the details of your responsibilities as the head of a lab, or prin- cipal investigator (PI), you need to understand what leadership is. Leadership is get- ting a group of people to enact a vision of what needs to be accomplished. Thus, according to O'Neil, leadership starts with a vision, and requires relationships with others to accomplish tasks.

Leadership = Vision + Relationships + Tasks

Put into practice, this means that the leader has to perform a number of functions, from coming up with a scientific strategy, to motivating people, to managing budgets.

Vision. A leader has to create a vision and set the direction for the lab. (See "Creating Your Vision as a Leader," page 53.)

Relationships. A leader enables others in the lab to do the work in a unified manner. Thus, a leader has to

- Build and manage teams.
- Create an environment where people are able to give and receive feedback.

□□Motivate and support graduate students, postdocs, and technicians.

□□Delegate responsibility to others when possible.

□□Make fair decisions and manage conflicts.

□□Communicate and listen.

□□Be sensitive to diverse populations and needs (see chapter 5, "Mentoring and Being Mentored").

□□Be a mentor to others, as well as seeking his or her own mentors (see chapter 5, "Mentoring and Being Mentored").

Tasks. A leader also has to manage the activities of lab members. This requires that the PI understands the core activity that he or she is responsible for directing. Beyond a basic knowledge of the scientific tools and processes used in the lab, the PI must also be able to

□□Design projects and determine time frames (see chapter 7, "Project Management").

□□Create budgets (see chapter 9, "Getting Funded").
□□Write grants and papers (see chapter 9, "Getting Funded").

□□Teach courses (see chapter 13, "Teaching and Course Design"). □□Juggle many different demands at once (see chapter 6, "Time

Management").

Leaders and Managers: What Is the Difference?

Although leadership and management are often used interchangeably, they do not mean the same thing. A leader influences the opinions and attitudes of others to accomplish a shared goal. A manager, on the other hand, is primarily an administrator, who makes sure that people and processes are in place to achieve the desired goal. Managers need to be able to plan, budget, organize, and solve problems, to keep a complicated system of people and technology running smoothly. As head of a scientific laboratory, you will need to be a leader and a manager.

Developing Leadership Skills

Some of the leadership skills mentioned above, such as developing a vision statement, may come easily to you, whereas others, such as motivating people in your lab or delegating responsibility, may prove more difficult. "Leadership development" is the process of improving your leadership skills. It involves establishing one or several goals for becoming a better leader and making a plan for achieving them. Here are some tips on how to go about it.

Choose a behavior that you want to modify. Say that a conflict arises between two postdocs in the lab; their projects have converged and now they are competing against each other over who should take charge. You realize that you should be keeping closer tabs on the experiments being done by everyone in your lab, as well as on the interactions among people.

Choose a specific goal for changing your behavior. You should choose a goal that is as specific as possible and state it in clear, measurable terms. For example, a goal that states "I will be better at communicating with people in the lab" is neither clear nor easy to assess. You will be more likely to achieve a goal that states "I will meet weekly with the postdoc who is working on project x to discuss in a direct and open way progress on the project and any issues that might be affecting the work." This way you will be able to tell if you have or have not followed through.

Determine a timeline for completion. You need to have a realistic deadline for assessing your progress. For example, "In one month, I will know what everyone in the lab is working on and will have set up scheduled meetings with each person."

Assess your progress. From the beginning you should have clearly stated the expected outcomes of your goal, so that you will know if you have achieved them. The questions you want to be able to answer are

□ □How do I know I have been successful?
□ □Who are the other people who will notice and be affected? □ □What difference will they notice?

To know if your plan is effective, you will need to create open channels of feed- back. This involves asking people in your lab and your colleagues for feedback on how you measure up against your desired model (see "Giving and Receiving Feedback," page 60).

How to Improve Your Leadership Skills

Improving leadership skills is often a process of trial and error, but there are some more formal ways of going about it.

Find a mentor. To help you define and achieve a specific goal, identify someone who does what you would like to do. For example, if one of your limitations is making people feel valued for their work and accomplishments, you may want to observe how another PI recognizes and rewards the people in his or her lab and then attempt to model that behavior in your own lab. You will need to practice and probably modify your behavior to suit your own personality and situation. Similarly, you probably know colleagues who are good public speakers, cool under pressure, effective at managing time, or skilled at running lab meetings. Observe these people and identify specific positive behaviors that you see them use and then try to adopt these behaviors. You may also ask these colleagues for feedback and advice on your own behavior and progress. (See chapter 5, "Mentoring and Being Mentored," page 97.)

Read books and attend courses. You can aid your leadership development by reading books and taking courses offered at your university, especially if it has a school of management. Some of the scientific societies also offer seminars or short courses in laboratory management in conjunction with their annual meetings. You can also take advantage of the resources available through your institution's human resources department. A number of organizations, such as the Center for the Health Professions at the University of California–San Francisco (*http://www.futurehealth.ucsf.edu*) or the Leadership Learning Laboratory at the University of California–Davis (*http://sdps.ucdavis.edu/browse/hr/hrs021.htm*), can also bring tests and other resources to your institution.

Get to know your strengths and weaknesses. In most cases, you cannot change your personal qualities, but becoming aware of them can help you lead more effectively. You will be able, for example, to make the most of your assets and work around or improve on your liabilities. In addition, self-knowledge will make you more aware of the personalities of people in your lab and help you direct and sup- port them more effectively. You can take different tests to help you understand various aspects of your own personality and how you behave in certain situations; one of the best known is the Myers-Briggs Type Indicator (MBTI). Appendix 1 (page 73) offers a brief description of the MBTI personality types and how these may play out in a laboratory environment. More information on the MBTI can be found at *http://www.myersbriggs.org*.

A popular way to understand your on-the-job strengths and weaknesses is to complete a so-called 360-degree feedback questionnaire. One example, Skillscope, published by the Center for Creative Leadership, consists of a series of questions that you and others answer. Your supervisor, peers, and people you supervise rate you on what parts of your job (from communicating information and supporting the professional development of your staff, to administrative and organizational abilities and time management skills) you excel in and what parts could use improvement. The questionnaire also gives everyone a chance to say if they think that particular skill is important to your job. It is very enlightening (and an opportunity for discussion) to know what others consider your strengths and weaknesses compared with your ideas about them. Responses are anonymous, except for the supervisor's responses. More information on Skillscope can be found at *http://www.ccl.org*.

CREATING YOUR VISION AS A LEADER

Most people understand that the president of a university or the head of a large teaching hospital must have a vision for what he or she wants to accomplish, but how about someone running a lab? Even a six-person lab in which there is no clear vision is likely to have postdocs and graduate students heading off in their own directions, wasting time, and generating ill will. Developing a vision for everyone in the lab to share does not limit innovation. Instead, it provides a foundation for creativity from which new directions may be taken.

"My vision is that we are going to regenerate the heart after a heart attack. This is really what I would like to accomplish with my career. Initially, I was worried that I would sound "sappy" in some fashion when I told people that I had a vision. I found that at first people may think it's a little odd, but pretty soon when they hear it again and again, you start seeing people nodding their heads and agreeing with you. Having a clearly stated vision does help to inspire in people the mission behind what you are working on".

—Charles Murry, University of Washington School of Medicine

How to Create a Mission Statement

The cornerstone for implementing a vision for your lab is the mission statement. It describes the kind of research you want to do, the motivation for your research, and the kind of atmosphere in which you want to work. It should take into consideration the history and current challenges of your lab and what you want to accomplish in the short and long term, with an eye to the future work of your department and institution as a whole. As you develop your mission statement, you might present it verbally to colleagues and your department head in an informal setting. Following input and adjustment, the statement should be written in about one paragraph.

As you develop your mission statement, keep in mind the following points:

□□Decide what values you want for your lab (e.g., scientific excellence, disc pline, teamwork, competition).

□□Consider your social and financial goals, in addition to scientific ones.
□□Craft a statement that you feel comfortable communicating to your peers,

superiors, and lab members.

The following are two sample mission statements:

□□*The goal of our laboratory is to be among the most successful and respected in the area of cancer genetics. The ultimate goal is to help develop better therapies and cures for cancer. To this end, we will collaborate with other researchers in the area and share our results and reagents. We will be recognized for being fair and collegial.*

□□*Our lab aims to understand the mechanisms by which cells transport proteins. In particular, we will focus on technical challenges that others have not been able to overcome. A main focus of the lab is to train the next generation of scientists. We will create an environment that is conducive to learning and testing new skills.*

Keep in mind that mission statements are not operating plans or strategic maps for the lab, but they serve to shape these essential elements. In addition, they are not static; they evolve and change with time.

Developing Your Mission Statement

□□Paint with broad strokes, but also identify key measures of success.

- □□□Provide both reasoned and emotional justifica- tion for the vision.
- □□□Tie it to the values and culture of your depart- ment and school.
- □□□Be clear and honest.
- □□□Create a distinct future that distinguishes your research program from others, especially those of competitors.

Once you have a mission statement that you are comfortable with, start saying it over and over to the people in your lab. Mention it at lab meetings, when people first join the lab, when you sit down to write a paper. Every decision you make from now on—from hiring staff to choosing scientific projects for the people in the lab to establishing how communication flows—should be made with this statement in mind.

DEVELOPING YOUR LEADERSHIP STYLE

Your mission statement is what sets the course for your lab, but how do you go about directing and motivating people to accomplish this vision? The way in which you carry out your role as a leader is called your "leadership style." It will depend largely on your own personality and the types of mentors you have had up to now. For example, you may find you feel more comfortable making decisions on your own, without seeking the input of others in the lab or colleagues. Or you may find it difficult to give unsolicited feedback to your students and postdocs. After a few months of leading your own lab, you will most likely develop a style that you feel comfortable with. But management experts tell us that different styles are required for different situations and different individuals, and that you should practice using a variety of such styles.

Four Styles of Leadership

Ken Blanchard, best known for the "One Minute Manager" series, and Paul Hershey proposed one classic research model for so-called situational leadership. They visualized leadership styles in terms of a continuing spectrum of directive and supportive behavior. Directive behavior involves clearly telling people what to do, how to do it, and when to do it, and then closely monitoring the behavior. Supportive behavior involves listening to people, providing assistance and encouragement, and then facilitating their involvement in problem solving and decision making. According to this model (see figure 3.1), the degree to which you direct and support people who work for you is influenced by their level of competence and their commitment to completing a given task.

Supportive Behavior

The four styles of situational leadership are described below.

Directing. This style puts a high focus on task and a lower one on relationship. When the person you are supervising is not yet qualified or not sufficiently motivated to carry out a task independently, then you need to tell him or her precisely what to do at each step. For example, you may take this approach with a technician who has just started working in the lab and needs to learn an important technique that he or she will be doing routinely.

Coaching. This style puts a high focus on both task and relationship. As a PI, you would continue to direct the action of the person you are supervising, but also take the time to explain decisions, solicit suggestions, and support the individual's professional development. This leadership style is the most demanding. It requires a lot of time and emotional investment on the part of the leader. For example, soon after a graduate student joins the lab, you will probably have to show him or her different techniques and help him or her decide which experiments to do, but you would explain why and how they fit in with the lab's mission.

Supporting. This style puts a low focus on task and a higher one on relationship. As a PI, you would facilitate people's efforts toward accomplishing a given task and share responsibility for decision making with them. In a lab, the PI is likely to adopt this leadership style with most postdocs and experienced graduate students. For example, you would give the postdoc responsibility to choose what experiments to do but continue to discuss what these are and facilitate progress by, for example, helping the postdoc find someone to collaborate with so that he or she can get the next step of a project accomplished.

Delegating. This style puts a low focus on both task and relationship. As a PI, you would turn over responsibility for decision making and problem solving to an individual who has become more independent. For example, you would allow a post- doc who is ready to leave the lab to make decisions about what projects to pursue and collaborators to seek out without having to ask for your input first.

Delegating Tasks and Authority

Many PIs, especially starting PIs, are reluctant to delegate for fear of losing control or power. Delegating is important because it will relieve you of some of the day-to- day responsibilities. Assigning responsibility does not lessen your role in the lab. It merely gives you a capacity to handle greater responsibility. In addition, delegating serves to empower and motivate the people who work for you.

In deciding whether there is something you could delegate, ask yourself the following questions: What am I doing now that I'd like to see someone else do? Is there a person in the lab who is capable of handling and willing to take on a new responsibility? What could I do if I had more free time?

Once you have decided to delegate the responsibility for a given task, you need to □□Be sure you delegate the necessary authority with the responsibility.

□□Give clear directions and make sure they are understood; keep two-way communication channels open.

□□Clearly define the responsibilities assigned to each lab member, and make this information known to everyone in the lab.

□□Once you have delegated, follow up to make sure the job is being done without interfering with it.

□□When you delegate authority to someone, be sure to back up that person when his or her authority is called into question.

□□Distribute responsibilities fairly among members of the lab.

"Through the years I've learned that, on the one hand, there are a bunch of ways to treat people that generally work well; on the other hand, each individual case seems to bring up something new that you don't have experience with. So even though you think you've developed all of this experience, with the very next circumstance, you may have to fine-tune your approach, because every person is different"

—Thomas Cech, HHMI

BUILDING AND SUSTAINING AN EFFECTIVE TEAM

Today, more than any other time in history, science is a team sport—and the teams keep getting bigger. For many kinds of experiments, you need to integrate different kinds of technical expertise and backgrounds. Regardless of the size of your lab, there are some general guidelines for keeping the team members motivated and working effectively, from communicating and giving feedback to setting specific rules of behavior. They are discussed in the sections below. (For more information about how to collaborate with other labs, see chapter 12, "Setting Up Collaborations." For more information about how to select lab members, see chap- ter 4, "Staffing Your Laboratory.")

Communicating Within the Lab

You should communicate with laboratory members on a daily basis. If you are still doing experiments at the bench, you will be accessible to your lab members. But, if you spend most of your time in your office writing papers and grants, make an effort to walk around

the lab at least once a day, if possible, and informally chat with people. Unless you need to concentrate on a task without interruptions, keep the door to your office open.

In addition to these informal interactions, formal meetings are an organized way to ensure that everyone is kept informed of the group's activities and results and for you to reiterate your expectations and values. By all means, hold regular goal-setting and evaluation sessions: an annual lab retreat, periodic lab meetings involving the full staff, weekly or more frequent small-group meetings to discuss specific issues, and regularly scheduled one-on-one advisory meetings and performance evalua- tions. Group activities, held periodically, are also important for building morale and encouraging lab members to think of themselves as part of a team.

Research group meetings. Many research groups hold weekly meetings. One or more people in the lab take turns presenting what they've done since they gave their last presentations. They give an introduction, share their results and their interpretation, and then discuss what they plan to do next. Comments and sugges- tions from the research team usually follow. In some labs, especially larger ones, a research group meeting is a semiformal presentation with overheads or PowerPoint slides and can be a somewhat intimidating experience, especially for a graduate stu- dent. In smaller labs, these meetings may be more informal—for example, each person discusses what he or she did that week. These meetings are much more interactive. Yet, even in smaller labs, it's important to schedule occasional formal presentations so that students and postdocs can perfect their ability to speak about their research. Another good idea is to have joint research meetings with other labs. It is good experience for your lab members to give presentations to scientists out- side your lab. It can help to clarify presentations and garner new ideas from those who aren't so closely involved with the project. It also extends your network and that of your students, which is especially useful when they are looking for jobs or letters of reference.

One-on-one meetings. Regardless of the frequency of research group meetings, you should meet often with each lab member to keep current with progress and problems. Invite your students,

Guidelines for Effective Meetings

For most formal types of meetings you should have a predetermined plan for the meeting that states its goals and purpose:

□□Solicit agenda items and distribute an agenda before the meeting.

- □□□Have clear assigned roles for the meeting— that is, who will speak, who will take notes, who will lead the discussion.
- □□□For each action item on the agenda, go over discussion points, make a decision, and deter- mine postmeeting actions.
- □□□Discuss what should be on the next meeting agenda.
- □□□Follow up the meeting with a meeting sum- mary and a to-do list.

docs, and technicians to come into your office with their lab notebooks and show you what they've been working on. Many PIs meet with lab members for an hour each week. They may meet with them more frequently immediately after lab members have finished a series of experiments or when they notice that a lab member is struggling.

Performance reviews. The performance review meeting with lab members is an opportunity for you to clarify your expectations, review their recent accomplishments, and set performance goals. It is also a good time to talk about their career goals and how their work in your lab contributes to achieving those goals. Another important purpose of performance evaluations is to provide lab members an opportunity to give you feedback on your leadership style. Work with your institution's human resources department to make sure you conform to your institution's performance management process. Appendix 2 shows a sample performance review form, created by Tamara Doering. She gives the form to lab members a few days before the meeting. The form consists of two parts: a self- assessment section that is completed by the lab member before the meeting and a joint feedback section that is completed during the meeting. In addition to a focused discussion of short- and long-term goals, the twice-yearly meeting gives lab members an opportunity to give feedback on Doering's leadership style. The form offers some suggestions about what to evaluate and how to engage lab members in self-evaluation. Appendix 3 includes a checklist developed by HHMI's Department of Human Resources; it can also help you prepare for a performance feedback ses- sion with a lab member.

Small-group meetings. Some labs also have meetings attended by individuals working on specific projects or with specific techniques. This is where lab members deal with logistics and technical matters, and they hammer out experiments, trying to get different approaches to work.

Strategy sessions. Should you decide that your research needs to take a new direction, you may want to call an official strategy session. A strategy session helps the group identify the next most important questions and what experiments will answer these questions. Such a meeting also helps the group develop a shared understanding of the lab's direction and clarifies what needs to be done and who is interested in what aspects of the new research area. In addition, these meetings help you determine how potential conflicts and competing interests can be avoided.

"If a PI has 20 people in the lab and you ask the PI at any moment, "What is person number 17 doing?" he or she should be able to give you a two-hour talk on this without any preperation. The sine qua non for being a good lab director is having all of this in your head."

—Thomas Cech, HHMI

In my lab, there are five or six breakout groups that meet once a week or two, and that works really well. It gives them a team- building experience.

—B. Brett Finlay, University of British Columbia

Journal club meetings. These meetings are an integral part of training new scientists and can vary in frequency from weekly to monthly, or as desired. The discussion of a scientific report serves to illustrate how to and how not to construct and test a hypothesis, what constitutes effective analysis, and how to report scientific findings. In addition, a journal club meeting reinforces the idea that reading current papers is essential to keeping up with the field. These meetings also provide an opportunity to communicate your values about science when discussing other people's work.

"[At journal club meetings] we discuss papers and talk about their weaknesses, and it makes it clear that we don't want our papers to have those kinds of weaknesses. I think the scientific rigor issues come up as we go along."

—Tamara Doering, Washington University School of Medicine

Informal group activities. Organizing social occasions to celebrate a major accomplishment—publication of a paper, a job, a grant—is important for promoting your shared vision of the lab and building morale. In addition, most PIs agree that it is important that lab members occasionally socialize in a relaxed, nonwork environment. Such get-togethers can help promote team building and enhance communication among lab members. As you are establishing your lab, you might have to arrange these outings. After a while, they will occur more spontaneously. Don't feel that you always have to participate, and don't feel offended if you are not invited to all after-hours occasions.

Giving and Receiving Feedback

Giving and receiving feedback is a critical leadership skill. Receiving feedback from individuals in your lab will help you improve as a leader and help you steer people toward your vision. In turn, giving them feedback will help them develop as scientists and ensure that your expectations are met. Feedback should be given informally, on a daily basis, as well as during formal meetings. Giving feedback and communicating with your group on a regular basis help instill the culture of "feedback," and can also make it easier to approach lab members about specific situations or problems, since they are used to regular sessions with you. It also helps avoid unpleasant surprises from members of your lab.

Giving Feedback. When you give feedback to people in the lab, try to

□□Time it well. Feedback during stressful times (e.g., when a grant deadline is looming) is rarely helpful, especially when either party is angry, or when someone is not ready to receive feedback.

□□□Be specific and objective. Focus your comments on first-hand data, actions, and behavior and not on the person or speculation about his or her intentions. For example, instead of saying "You are not focused enough on your work" or "You don't seem to care about your experiments," think of a specific instance that you thought was a problem.

"We decided at our meeting that you would do these three experiments, but you only did one."

- □□□Reinforce expectations. Provide feedback in terms of previously outlined goals and decisions (e.g., "We decided at the last meeting...").
- □□□Avoid subjective statements. An example of such a statement is "I don't like the fact that you show up in the lab whenever you feel like it." Try instead to stick to objective arguments: "If you arrive at unpredictable times, it is difficult for other people in the lab to know when they can talk to you. Many people depend on your expertise and need to know when you are available."
- □□□Present it in a constructive way. Feedback should be seen as a method of improving rather than as a punitive step. To this end, ensure that the student or postdoc has a plan for dealing with any problems you have identified and arrange a way to monitor progress. Why does the postdoc come to the lab late in the day and have an erratic work schedule? Does she need to adjust her daily routine and go to sleep earlier? Does she have a problem with getting transportation to and from the lab? Suggest ways to overcome these problems and agree on a deadline for reevaluating the problem: "From now on I expect you to be in the lab at 10 a.m. and to attend all scheduled lab meetings. Talk to Dave or Jane about carpooling to the lab. We can talk again in a week to see how you are doing."
- □□□Make sure it registers. Feedback is often subject to distortion or misinterpretation. You may want to ask the student or postdoc to rephrase what you have said and talk about his or her assessment of the issues you raised.
- □□□Avoid giving too much. Select the highest-priority issues to start with, and remember that time and space are needed for integrating feedback.

  "Although I know it's important, it is hard for me to let people know when their behavior does not meet my expectations. When I first opened the lab, I was more uncomfortable with this than I am now. Basically, I'm quicker to call people on it now. If things are not working and the quality of their work is some- how slipping, or the effort that they are putting in is somewhat dropping, I have an easier time saying, "This isn't right, you have to change it now."

  —Charles Murry, University of Washington School of Medicine

Receiving feedback. Invite people in your lab to provide feedback on specific issues by asking questions during lab meetings or scheduled one-on-one meetings. Make it a point to meet with your department chair on a regular basis and have lunch with senior colleagues to get a sense of how they think your work is progressing and whether you are on track for getting tenure. (If they have not been paying attention to your work, this conversation will motivate them to start doing so). But remember, to get honest comments and suggestions, you must be receptive. If you respond angrily or defensively, those in your lab and other colleagues will be reluctant to give you their opinion. As you are listening to a comment, try to understand what the other person is saying. If

something is not clear, ask for clarification. If the feedback is negative, take time to think about what you heard, even if you don't agree. What behaviors might have caused these perceptions? What changes, if any, do you need to make?

Making Decisions

As a PI you will be making tens if not hundreds of decisions a day, from determining which e-mails to open and what type of answer to give each one, to choosing to hire a new postdoc. In each case, the first step in making a decision involves understanding the demands of the situation by answering the following questions:

□ □How important is the decision I have to make? For example, hiring a new technician is a serious commitment. You will have to interview the candidate and carefully research his or her background before you make a decision. On the other hand, whether or not you agree to referee a paper is unlikely to carry very serious consequences.

□ □When do I need to make the decision?
□ □Do I have enough information to make the decision?
□ □How critical are the consequences of this decision?
□ □Who needs to know or cares about the decision I am about to make?
□ □Will I need assistance or approval from others?
□ □If I have made that kind of decision before, can I use the same approach?

Answers to these questions will help you choose the most appropriate decision style—that is, the degree to which you go at it alone or include others.

Making a decision in complete isolation. This decision style works best when you are under severe time constraints, there is no need for buy-in from other people, you alone have the best insight, or you are dealing with highly confidential information. For example, if another scientist approaches you to collaborate on some experiments for a paper that he is in a rush to publish, you may quickly decide whether it is worthwhile for you to get involved. You can make this decision without consulting anyone else if the work can be done by yourself or a technician. Another example would be to decide whether to referee a paper or write a reference letter for a postdoc.

Making a decision after consulting with other individuals, but without necessarily telling them why. You would use this decision style when you need input from others and have sufficient time to gather information. In general, this approach improves the quality of the decision, but you run the risk of involving people who are not really participating in the decision-making process, which may lead to resentment or misunderstanding. For example, if approached by another researcher to collaborate on a project, you may ask your colleagues whether they know this person and what his or her reputation is. A PI considering taking on a new research direction may consult with the

department head and postdocs and students in the lab. But the decision ultimately rests on the shoulders of the PI.

Making a decision with the group. This decision style is helpful when you have few time constraints, need the buy-in or technical experience of the group, or need a creative response. It is more time-consuming than the two discussed above, but in some cases it improves the quality of the decision. For example, when deciding whether or not to invite a new postdoc to join the lab many PIs will decide jointly with existing lab members. Another example is when a PI has to decide whether or

Steps in Making a Decision

1. Determine the type of decision that you need to make.
2. Pick a style that is appropriate for the decision and situation. (Remember, different decision styles will fit different situations and you should be equally comfortable using any of the styles when appropriate.)
3. Make the decision.
4. Keep a log of all your decisions, giving a brief description of the issue at hand, the decision type, and what the decision and outcome were.
5. Go back to the log once a month to see how each decision is playing out.

not to buy a new piece of equipment that he or she has little experience with. There may be postdocs in the lab who are more knowledgeable and can make a better decision.

Passing the decision on to others. It may be appropriate to let other people in your lab make a decision in cases where the decision is more important to them, you have little competence in the particular issue, or you have other more pressing priorities to deal with. The most important thing to consider in this case is that you will have to live with the decision, whether you like it or not. The last thing you want to do is overturn a decision once it has been made. For example, you might let a senior postdoc decide on his or her own whether to collaborate with another scientist or where to submit a paper.

Depending on your personality, you probably prefer to make decisions in one particular way. For example, if you are an introvert, you may gravitate toward making decisions on your own, without too much group discussion. But people in your lab will appreciate being involved in some of the decisions. It is a good idea to try to experiment with different decision styles in different situations.

Setting and Communicating Rules of Behavior for Members of Your Laboratory

A key aspect of your role as a lab leader is to set and effectively convey expectations that reflect your vision for the lab. Some expectations may apply to a particular group of lab members (e.g., postdocs), and others will be unique to each individual. You may want to work with your lab members to set these expectations— this can increase the likelihood of buy-in and help increase motivation. The best way to communicate expectations is to convey them continually—at the first inter- view, on the first day on the job, at lunch

time, during lab meetings, and, most importantly, by setting an example. It's also a good idea to communicate your expectations in writing, especially for new lab members and when conducting staff reviews, and to periodically review them with your staff. As a general rule, you should live by the expectations you set for your lab members. Show your workers that you enjoy what you are doing. Especially in the early years, be present in the lab, working side by side with them. They will be able to see how you work and what is important to you.

"I give a "state of the lab" talk once a year. I start with review- ing the accomplishments, the things that have gone well over the last year. I try to point out things that everyone has done so that there is a sense that everyone has been recognized for their part. Then I go over the lab budget—what our "burn rate" is, where our money is coming from—and talk a little bit about money management issues and strategies".

—Charles Murry, University of Washington School of Medicine

"We have a package that we give people on arrival that tells them what their lab duties are and how the lab is run. The faster you can get new lab members to the bench and get them going, the better it will be".

—B. Brett Finlay, University of British Columbia

Below are some general areas that you will want to consider when setting expectations for people in your lab.

Work hours. Some PIs feel they should stipulate a specific number of hours per week that they expect graduate students or post- docs to work. But that strategy does not necessarily work well and can generate resentment. Focusing on productivity will prove more successful than focusing on the number of hours or on the specific hours an individual works. Nevertheless, you will probably want the members of your laboratory to be present during certain hours—to make sure that they can interact with you and the other lab members. Generally, your own work hours set the pace for your group. If you leave the lab at 6:00 p.m., don't expect people in your lab to be working late into the evening.

Question: How do I avoid potential misunder- standings among lab members regarding work hours and time off?

Answer: The best way to handle this is to convey your expectations about work hours and time off to applicants during the interview. For example, the amount of vacation leave varies from country to country (e.g., it is usually longer in Europe than in the

United States), so you should let applicants know about your institution's and your lab's policies.

Prolonged absences. Communicate your expectation that lab members should give you several weeks' notice about an upcoming vacation. Inform them of the vacation and personal leave limits at your institution. Your institution will also have guidelines about maternity and paternity leave. It is best to follow these guidelines rigorously.

" *Some labs get a bad reputation when PIs say, "We expect you to be here every Saturday and never take vacations," or some- thing similar. I think what you want to do is set an example and help your people find how to be most effective. It is possible to work regular hours, but one has to be very organized about it. I have had very efficient people who can be very pro- ductiv working nine to five and just use their time well. I have also had other people who don't use their time well, and so I try to work with each lab member to help them figure out what works best".*

—Suzanne Pfeffer, Stanford University School of Medicine

Authorship of papers. The inclusion and order of authors on a paper are often sources of discord in the lab. In deciding who should be an author on a paper, the PI has to consider who has contributed to particular aspects of the work. All lab members who are involved in a project should express their expectations concerning authorship and credits on the resulting paper, and provide their rationale for being considered as an author.

Here are some guidelines to consider:

□□The first author is normally the individual who is primarily responsible for the project.

- □□□Occasionally, two individuals may share that responsibility; most journals permit a statement that indicates that the first two or three authors listed have each contributed equally to the publication.
- □□□It is unwise to make upfront promises about authorship. You may choose to make it a policy in your lab to wait until you know how much each per- son has actually contributed before authorship is assigned.
- □□□In deciding whether to include someone as an author, ask "Could this project have been done without this person's conceptual or technical contribution?" "

Scientific ethics. The best way to communicate responsible conduct in research to your lab is to live by those values. As a leader, you should talk about important ethical issues (e.g., scientific rigor and reproducible and discrepant results) in a lab meeting or in a more informal setting. Most universities offer lectures or seminars in scientific ethics, and

you should encourage your staff to attend. An introduction to the ethical conduct of research is a report from the Institute of Medicine, *Integrity in Scientific Research: Creating an Environment That Promotes Responsible Conduct*, which is available from National Academies Press at *http://www.nap.edu*. You should also make it possible for your research staff to discuss and report concerns to you in a confidential manner.

Project ownership. The PI, with input from individual members, usually decides what projects people in the lab work on. Some labs have strategy discussions every three to four months during which everyone talks about what projects they would like to continue or initiate. Work in the lab is most effective and productive when members have clearly defined projects that are sufficiently distinct so that each per- son can carry out some independent work, and at the same time the projects are interrelated so that no one is working in a vacuum. This way, everyone in the lab can consult with and motivate each other.

‘‘ *I have included a student on a paper because he had a conceptual contribution without which the whole study could not have been done. There was no question, everybody wanted this person on the paper—so an author doesn't have to contribute an actual figure if they've contributed something that was essential for that project to go forward”.*

—Suzanne Pfeffer, Stanford University School of Medicine

Policy on letting projects leave the lab. You should develop a clear policy concerning whether or not you will allow postdocs to take their projects with them when they leave your lab. Communicate this policy to all prospective postdocs. Some PIs let their postdocs take whatever they had worked on during their stay in their labs, with no strings attached. Others will let postdocs take some aspects of their projects to serve as the focus for their new labs. In these cases, the PI makes sure that he or she does not compete directly with the former postdoc's project for a few years, until the postdoc's lab is well established. When you develop your policy, think about how you would want to handle a situation in which the research results are different from what you anticipated or a situation in which the results lead to interesting new avenues of research. If you have a small research group and a focused area of research, you may not be able to let departing postdocs take their projects with them. In this case, you might have to develop some alternatives to benefit them. One possibility is to give your postdocs six months of salary and resources to generate preliminary data for a new research question or direction. If this is not possible, you may encourage your postdocs to work on two projects: one that contributes directly to the mission of the lab and one that is related to what the lab does but is not a main focus. The postdocs are free to take the latter projects with them.

“I often encourage people to collaborate or help each other with techniques. So if someone has an idea, I'll say, “Why don't you go to so and so? She has been thinking about that or knows how to use that machine. Why don't you talk to her?” And I try to make it reciprocal as much as I ca”n.

—Tamara Doering, Washington University School of Medicine

I personally think it's unfair to say to someone who has slaved away in your lab for three years and goes looking for a job, "You can't continue what you've been working on," because then that person won't be able to get a grant.

—B. Brett Finlay, University of British Columbia

"The head of a lab needs to be generous, and that is hard for junior PIs because you feel like you are just starting and every- thing is crucial to the success of your research program. So it's hard to let postdocs take projects with them. But they need to, and the main thing is to communicate about it."

—Tamara Doering, Washington University School of Medicine

Keeping Lab Members Motivated

One of your key roles is to motivate people to work hard toward achieving your shared vision. While different people respond to different types of internal and external motivation, most people are motivated when their contributions to the lab- oratory are recognized and appreciated. According to Edward O'Neil, to feel motivated, most people require the following:

□□*Choice:* People want to make some decisions. As a PI, make sure you give people appropriate responsibilities, involve them in discussions about general scientific strategy, and listen to their ideas.

- □□□*Competence:* People need the skills to do the work that is expected of them. As a PI, check competences by asking someone to do an experiment with you or ask appropriate questions.
- □□□*Purpose:* People need to understand the importance of their role in the lab and in scientific enterprise. As a PI, it is important for you to set goals that define success for each person in the lab and make sure they match with what the person is doing. It is important to listen to what each person wants to do and understand what his or her goals are. If a postdoc has decided to pursue a career in industry, trying to motivate him or her to follow in your footsteps into academia will not work. As a lab leader, you need to address your lab members' individual goals while you work together to realize your shared vision.
- □□□*Recognition:* You need to provide continuous feedback to your lab members. Comments and suggestions should be provided in the context of the given expectations. Special accomplishments, such as publishing a paper or get- ting a difficult technique to work, require special recognition, such as a lab outing.
- □□□*Feeling comfortable:* To be able to focus on their work, people have to feel comfortable in their environment. One example is that some lab members like to play music in the lab, while others get distracted by it. The working environment

needs to be comfortable so that your lab members look for- ward to coming to work everyday and enjoy conducting research in your lab with their colleagues.

- *Progress:* Satisfaction in achieving goals should not be in the distant future. It is a good idea to schedule individual meetings as often as once a week to set deadlines, solve problems, and plan future experiments.

Enthusiasm: You undoubtedly love science for the thrill of discovery, of finding the answer to an important scientific question that has never been answered before—share your enthusiasm and soon others in the lab will follow your lead.

Barring personal problems, when these factors are in place people should feel motivated to work in your lab. A lack of motivation may manifest itself as a decrease in productivity; someone who was productive will stop producing results consistently week after week. You will first need to determine the cause for this decrease. Is it an interpersonal problem in the lab, an experimental obstacle, or a personal crisis? Discuss the problem with the lab member and see whether you can jointly develop a strategy to address the issue or minimize the impact of the lab member's actions.

"I think the mistake a lot of us make is to assume all too often that individuals don't have any contribution to make, just sim- ply because it might be a minor contribution. I think gaining an appreciation of what everyone brings to the table is extremely important."

—Gail Cassell, Eli Lilly and Company

"When people present a really good result at a lab meeting, I'll say, "That seems like a pizza result," and I'll buy pizza for the lab in their honor. Sometimes it's by way of appreciation rather than an important result. If someone—say a junior technician—gets stuck in a cloning project for a long time and then gets the construct he's been trying to make, that's a pizza result".

—Tamara Doering, Washington University School of Medicine

I do half-hour meetings with each person once a week. If they come in and say, "Nothing worked," I say, "OK," and change the subject because I realize that probably 90 percent of the experiments as a scientist don't work. I've found that this approach is a very subtle but effective motivator. Most people don't want to come into my office week after week and say, "Nothing worked."

—B. Brett Finlay, University of British Columbia

Managing Conflict in the Lab

Conflict is any situation where one person's concerns or desires differ from those of another person. In the lab, conflicts often arise over "turf wars," when two individuals are interested in the same project. By staying on top of what each member of your lab is doing, you can often spot potential problems and deal with them before they become too serious.

Most people tend to avoid conflict. But we should think of conflict as a creative part of our lives. Conflict has the potential of both positive and negative effects. Depending on how it is managed, conflict can be constructive or destructive, be stimulating or unnerving, produce higher-quality results or stifle a project, lead to original thinking or cause destructive power struggles.

Kenneth W. Thomas and Ralph H. Kilmann provide a useful model for evaluating an individual's behavior in conflict situations. The Thomas-Kilmann Conflict Model describes a person's behavior in a conflict situation along two basic dimensions: assertiveness—that is, the extent to which an individual attempts to satisfy his or her own concerns—and cooperativeness—that is, the extent to which an individual attempts to satisfy the concerns of the other person.

These two basic dimensions of behavior can be used to define five specific modes of dealing with conflict that everyone is capable of using.

Competing. This conflict-handling mode is assertive and uncooperative. competitors pursue their own concerns at the other person's expense. They use whatever powers seem appropriate to win their position, including their ability to argue or their rank. This conflict mode works when you are dealing with a vital issue, an unpopular decision, or a decision that needs quick action. However, although it sometimes seems justified, the mistake many scientists make is to stay in individualistic, competitive mode all the time. For example, if the head of another lab asks you for a reagent that you have not yet cited in a publication and that one of your postdocs is using for his or her project, you may refuse to share the reagent until your postdoc has published a paper referring to it. The decision will probably make you unpopular with the other PI, but you are safeguarding the inter- ests of your postdoc.

Accommodating. This mode is unassertive and cooperative—in other words, the opposite of competing. Accommodators often neglect their own concerns in order to satisfy the concerns of others. Times when the accommodating mode is appropriate are when you want to build political capital or create good will, and for issues of low importance. However, keep in mind that the accommodating mode can be a problem if you keep a tally and expect that the other person will be accommodating next time. For example, you and your collaborator are sharing a piece of equipment that just broke down. He insists that you pay for the repairs since your lab uses it more. You don't agree, but you give in on this one because you know that his lab uses all the other shared equipment more so it will be his turn next time a piece of equipment needs repair.

Avoiding. Avoiders are unassertive and uncooperative. They do not immediately pursue their own concerns or those of others. The conflict is never addressed by avoiders. Many times people will avoid conflicts out of fear of engaging in a conflict or because they don't have confidence in their conflict management skills. But, avoiding can be a good strategy in cases where the person you are in conflict with has much more power than you do or when issues are not that important. It is also a good strategy when you need to buy time. An example of how to do this is to say "These are serious changes. I will need some time to think about it."

Collaborating. This conflict-handling mode is both assertive and cooperative—the opposite of avoiding. Collaborators attempt to work with the other person to find some solution that fully satisfies the concerns of both persons. They dig into an issue to identify the underlying concerns of the two conflicting individuals and try to find an alternative that meets both sets of concerns. With such a positive out- come, some people will profess that the collaboration mode is always the best con- flict mode to use. However, collaboration takes a great deal of time and energy; thus, it should be used only when the conflict warrants time and energy. For exam- ple, if two postdocs are arguing over "territory," you might want to spend the necessary time to carefully carve out different projects in a way that will satisfy both postdocs. On the other hand, if your postdocs are in conflict about which day to hold a lab meeting, the time and energy necessary to collaboratively resolve the conflict is probably not beneficial.

Compromising. On the negotiating continuum, this mode lies somewhere between assertiveness and cooperativeness. The goal of the compromiser is to find an expedient, mutually acceptable solution that partially satisfies both parties. The compromiser gives up more than the competitors, but less than the accommodator. He or she addresses an issue more directly than the avoider, but does not explore it in as much depth or detail as the collaborator. This mode of conflict resolution is useful for decisions of moderate importance, when you have equal power status, or when you are faced with an issue that needs to be resolved quickly. In general, academics tend to underutilize this mode of handling conflict. For example, say your department chair goes back on her agreement to give you a semester free of teaching responsibilities. She tells you that she is desperate and needs you to teach *Introduction to Biology* for 200 students, including labs during your first semester. You point out that it is stipulated in your contract that your first semester would be free of teaching responsibilities; however, you are willing to teach a smaller, graduate-level course. You of course would rather not teach anything and are not contractually bound to teach your first semester, but you also know that it is in your best interest to accommodate your chair's wishes as much as possible.

Steps for Dealing with Conflict

When faced with conflict:
□ □Assess the problem.
□ □Assess the other person's interests. □ □Acknowledge the constraints.

□ □Select a strategy that balances the importance of the problem, time constraints, power differ- ences, and the relationships of the people involved.

Each of the conflict-handling modes has value; none is intended to be good, bad, or preferable in all situations. A worthwhile goal for you as a PI is to increase your repertoire of responses to conflict, with the flexibility to use various modes in different situations and in appropriate ways.

The people who work for you in your lab will also tend to adopt one style of handling a conflict over another. You will have a mix of competitors accommodators, and avoiders. Show them by example that there are differ- ent ways of handling conflict depending on the situation.

Resolving a conflict between lab members. When conflict occurs between two or more members of the lab, determine whether it is necessary for you to step in and facilitate a resolution. Usually, most people will be able to resolve their own conflicts, but make sure that a conflict does not fester to the point where it affects morale and the atmosphere in the lab.

Here are a few tips for how to help resolve conflict in the lab:

□ □Foster an environment that accepts conflict, as long as the difficulties are faced openly and honestly by the people involved. The PI can actively reinforce openness by lab members, especially

Help the individuals involved in a conflict synchronize the timing, focus, and extent of their overtures and responses. The PI may, for example, invite the people involved in a conflict to the office at a designated time to discuss the problems openly and honestly, and come to a resolution.

□ Make sure that each person understands the other's point of view. The PI can do this by summarizing, clarifying, focusing questions, and encouraging listening by each person.

Resolving conflicts between you and others in the lab. Conflicts between the PI and the lab members also occur. Such conflicts are important and influential in developing the future course of the lab, particularly during the early stages. It is important that the leader demonstrates interest in receiving and understanding negative feedback and shows a willingness to learn from it, when appropriate. It also is important for the leader to avoid the trap of dropping his or her leadership responsibilities and responding to the challenge by becoming "just another lab member." In other words, as a PI, you never have just your interests at hand but those of the lab as a whole.

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