Gray Lab Mentoring Expectations for Graduate Students

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Welcome to the Gray lab! You are joining a group of researchers committed to the advancement of their science and scientific careers by contributing to a common research program studying the molecular biology of how bacteria sense and respond to stresses in their environments, and how those stress responses may be important in host-microbe interactions. As the principle investigator, it is my job to define the broad themes of our lab's research, write grant proposals to fund our work, promote our science to both the scientific and broader public communities, and help you to grow and succeed as a scientific professional. Correspondingly, there are certain responsibilities that you as a graduate student have to ensure both your own and our lab's success, and reciprocal responsibilities that I have towards you. The purpose of this document is to list these responsibilities, agreed to by both you as mentee and by me as mentor, such that they govern the conduct of our relationship during your program. Please discuss these expectations with me at the start of your degree program.

Responsibilities of the graduate student mentee:

Your Degree:

• *The completion and success of your degree is primarily your own responsibility.* This includes both your classroom and laboratory work, which must be conducted at all times with professionalism, self-motivation, engagement, scientific curiosity, and high ethical standards.

• *Be knowledgeable of the policies, deadlines, and requirements of the graduate program, the graduate school, and the university.* Comply with all institutional policies, including academic program milestones, laboratory practices, and rules related to chemical safety, biosafety, and fieldwork.

• *Work with me to develop a thesis project for your degree.* Your degree requires that you produce a coherent body of research representing a contribution to your scientific field. Ensure that your research is ultimately proceeding towards this goal.

• *Be responsive to advice and constructive criticism.* The feedback you get from me, your colleagues, your committee members, and your course instructors is intended to help you improve. Respect the wisdom of those who have gone before you.

Your Career Development:

• *Conduct research at the world-class standards of this institution.* I expect that you will learn how to plan, design, and conduct high quality scientific research.

• *Actively cultivate your professional development in non-research contexts.* Becoming a successful scientist requires more than just academic research. You are expected to continually develop as a teacher, as a scientific ambassador to the general public, and to build your scientific network. This may include taking advantage of professional programs offered through the university, active participation in external seminars, conferences, and workshops, and membership in one or more professional societies (*e.g.*, the American Society for Microbiology), as examples.

• *Routinely read the scientific literature.* Your research does not happen in a vacuum; reading papers provides knowledge of your field and prevents you from wasting time on questions that have already been answered. A broad reading of the literature allows you to identify theory and applications relevant to your research (and to prepare you for your qualifying exam), and keeps you abreast of news and trends in the scientific community (*e.g.*, as published in the journals Nature and Science). I ultimately expect you to have more expertise in your specific study topic than I do by the completion of your degree, and to read significantly before starting experiments and (especially) before writing.

• *Actively participate in department seminars.* Departmental seminars are another way to remain current with others' research, which often has unexpected connections to your own. I also expect you to take advantage of opportunities to interact with relevant visiting speakers; developing your scientific network is a part of your scientific development and often the means to the next step in your career. Remember that interesting seminars happen across the entire campus.

• *Present your data to the scientific community early and often.* You will begin presenting your work in department seminars and external meetings as soon as you begin generating data (*i.e.*, quickly after you begin your program). You will engage fully in the scientific program of the conferences that you attend; these should not be viewed as vacations. You will also publish your work in peer-reviewed journals. I expect that the bulk of your research be written up BEFORE your graduation; early publication enhances your success in obtaining scholarships and in finding your next position. The 'currency' of science is published papers, and because our lab is supported by taxpayer dollars we have an obligation to complete and disseminate our findings.

• *Mentor and train other students and help them with their projects.* I expect that senior students will mentor junior ones, and that people with unique and specialized skills will share them with the rest of the lab as teachers and/or collaborators. Mentoring junior students (*e.g.*, undergraduate researchers) is a particularly valuable skill that is important for your career development.

<u>Your Relationship with the Lab:</u>

• *Actively participate in laboratory meetings.* Lab meetings are times when, as a lab, we constructively critique each other's work, brainstorm new directions, and collaborate to strengthen each other's research. Beyond punctual attendance, you are expected to offer well thought out and constructive suggestions and criticisms and respect those given to you. Our lab is the first and safest crucible for forming research; it is better if deficiencies are identified here than in public.

• *Be a good lab citizen.* Recognize that our laboratory is a shared environment with shared resources. If you use the last of a common reagent, it is your responsibility to order more. Likewise, if you break something it is your responsibility to fix or replace it. Ensure that the laboratory remains clean and organized so as to not compromise the work efficiency of your colleagues. Protect samples and data that are shared with others, especially where confidentiality is protected. Be respectful, tolerant, and work collegially with all your co-workers; especially respect individual differences in values, personalities, work styles, and theoretical perspectives.

• *Be a good collaborator.* Collaborate both within and beyond our lab group, ensuring effective and frequent communication, mutual respect, trust, shared goals, and consistent acknowledgement of your collaborators' efforts.

• *Rigorously document all of your methods and results.* Every experiment (including computational ones) MUST be documented in its entirety, including EVERY result. To do otherwise is unethical

and grounds for dismissal. Lab notebooks (both paper and electronic) are lab property, and therefore must be maintained to a standard where they can be interpreted by someone other than yourself. (You are welcome to a copy when you leave the lab.)

• *Any computer code that you generate must be properly documented and reproducible.* Expect that all of your code will be published alongside manuscripts. Broken code constitutes an irreproducible experiment, and as such is grounds for retraction of published work. Employ good programming practice to the best of your ability, especially commenting your code and using some form of version control.

• *Collect all necessary metadata for each of your experiments and document it properly in the lab database.* Most scientific resources that you generate (samples, cultures, DNA sequence, phenotypic data) have the potential to be used by others in the lab at some point, even after you leave. Such meta-analyses (acknowledging your original work) are impossible without complete documentation.

• *Discuss data publication plans (papers, conferences, public database deposition) with me BEFORE the data is released into the public domain.* This is primarily for two reasons: (1) so that I can ensure that credit is allocated appropriately and ensure that omissions are rectified; and (2) so that intellectual property can be adequately protected, either from competition or for commercial application as warranted.

<u>Your Relationship with me:</u>

• *Meet with me regularly to update me on your research progress and plans.* Regular one-on-one meetings (at least every 2 weeks) enable me to help you to develop your research ideas and keep you from straying too far down unproductive side roads.

• *Set and strive to meet deadlines.* Deadlines are a means to keep yourself accountable for your progress, and will be set in conjunction with myself and your committee. While obviously there is flexibility for changes in plans and life circumstances, I expect that you will maintain these timelines to the best of your ability.

• *Be mindful of the constraints on my time.* As a professor, I bear responsibility not only for the progress of my lab and everyone in it, but also the students of the classes that I teach, my commitments to the university and the broader community, and my commitments to my family and other relationships outside of work. It is therefore necessary that you allow me to organize my time efficiently, setting and keeping meetings with me for in-depth conversations and letting me know your needs from me (*e.g.*, comments on drafts or letters of recommendation) at least one week before their due date, preferably 2 for more involved projects.

• *Provide feedback on my mentoring to you.* Not everyone has the same mentoring needs and personalities, so there will inevitably be places where my efforts do not line up with your preferences. I am not infallible, but can only make adjustments when I know that they are needed.

• *Show good time management.* Frankly, people with poor time management are not typically successful in upper-level science. Use work time efficiently so as to not distract yourself or your co-workers. Save recreational internet usage for at home. Be prompt when attending meetings and in responding to email.

• *Discuss policies on work hours, sick leave, and vacation with me directly.* Graduate school is a commitment greater than an average job; working beyond a typical 40 hour work week is not unusual. On the other hand, one of the great benefits of academic life is its flexibility. I require that you be productive in your research and the other elements of your graduate program (teaching, *etc.*). How you achieve this is ultimately up to you and should be customized to fit your working style. However, if you are not progressing adequately I will require you (after we discuss it) to construct a more concrete working schedule and stick to it. Vacations and work-life balance are important for creative thinking and good health. However, please consult with me before making plans, and understand that some activities are time-sensitive (*e.g.*, preparing for grants, manuscripts, exams, or conferences). As a general rule, you should not plan for more than ~2 weeks of personal vacation time per year, as is standard for most entry-level jobs. I am also certainly willing to accommodate sick and/or parental leave as required, and will determine this on a case-by-case basis.

Responsibilities of the graduate student mentor:

Your Degree:

• *I will help you navigate your graduate program of study.* As stated above, you are responsible for keeping up with deadlines and being knowledgeable about requirements for your specific program. However, I am available to help interpret these requirements, select appropriate coursework, and select committee members for your oral exams.

• *I will be committed to your research project.* I will help you design an independent project within the scope of my lab's research for your thesis. I will be intellectually committed to your research, including when you extend the research interests of my lab. This includes helping you to generate experimental and theoretical ideas, interpreting and constructively criticizing your data and contextualizing it within a broader context, and supporting you in presenting your ideas and results to the scientific community. I will help you set reasonable goals and keep you accountable for reaching them.

• *I will be committed to providing financial resources to you as appropriate and/or according to my institution's guidelines to allow you to conduct your thesis research.* To the best of my ability, I will provide the resources that you need to conduct your experiments. Depending on funding, I will also attempt to provide you with some teaching relief, especially later in your degree program and as your progress warrants. I will support you in trying to obtain external funding for your degree program.

Your Career Development:

• *I will ensure that you receive world-class training.* I will provide resources and mentorship from both myself and senior lab members so that you have the technical skills that you need to accomplish your research.

• *I will lead by example and facilitate your training in complementary skills needed to be a successful scientist, such as oral and written communication, applying for grants, lab management, mentoring, and scientific ethics and professionalism.* I will encourage you to seek teaching opportunities, even if not required for your degree, include you where appropriate in grant writing and manuscript reviews,

and provide opportunities for you to mentor junior researchers. I will enforce high standards of scientific ethics and professionalism.

• *I will help you build your professional social networks, including presenting at scientific meetings.* I will attempt, as funding allows, to send you to a major conference every year when you have material to present. I will also help you to identify and apply for travel fellowships to help pay for attending these conferences.

• *I will provide career advice and assist you in finding a position following your graduation.* I will give advice and feedback on your career goals, and encourage you to explore opportunities both outside and within academia as suits your interests and progress. I will promptly provide honest letters of recommendation whenever they are requested of me.

Your Relationship with the Lab:

• *I will work tirelessly for the good of the lab group.* The success of every member of our group is my top priority, no matter their personal strengths, weaknesses, or career goals.

• *I will provide everyone under my supervision an environment that is intellectually stimulating, emotionally supportive, safe, and free of harassment.* I will enforce a culture governed by collegiality that values differences in personalities and opinions.

• *I will enforce expected behavioral standards for communal behavior in our lab group.* You can expect me to ensure that you are not disadvantaged by others' poor stewardship of lab supplies, samples, and data, *e.g.*, care of lab equipment and archival and maintenance of samples, metadata, and computer code.

• *I will discuss issues relating to authorship and intellectual property with you and ensure that credit is allocated fairly.* This includes mediating a consensus between collaborators inside and outside the lab, and making clear any expectations of confidentiality.

Your Relationship with me:

• *I will be available for both regular one-on-one meetings and informal conversations.* Despite my busy schedule, meeting with you is always a priority. As noted above, please schedule longer meetings and understand that other obligations may mean that I am running off for things like meetings and classes.

• *I am committed to mentoring you, even after you leave my lab.* My ultimate goal is for your success, and will advise you and guide your career development as long as you wish.

• *To the best of my abilities, I will be supportive, fair, accessible, encouraging, and respectful.* I will work hard to understand your unique situation and learning style and mentor you accordingly. Everyone comes from different backgrounds and has different goals and constraints, and I will work hard to help you balance your unique situation with the high expectations of your graduate program. If there are ways that you think I can better strengthen your confidence, critical thinking, skepticism, and creativity, please discuss them with me. Your success is my ultimate goal.

Signatures

Michael Gray	Date	Graduate Student Mentee	Date

Acknowledgements:

Association of American Medical Colleges Compact Between Biomedical Graduate Students 2008
Trina McMahon Mentor-Mentee Contract 2013
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