

# *Entering Research: Research Mentee Training to Support Undergraduate and Graduate Trainees*

The activities you have chosen for your customized curriculum are drawn from *Entering Research* (2nd edition; Branchaw, Butz, & Smith, 2019; Macmillan). The *Entering Research* materials were developed, reviewed, and tested by many partners across the country. Activity developers are acknowledged in the footer of each page. A full listing of partners and funders can be found at [CIMERProject.org](http://CIMERProject.org) and in the *Entering Research* book.

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## Graduate Research Trainee Expectations

1. Why do you want to do research?
2. What are your career goals? How can this research experience and the mentor–trainee relationship help you achieve them?
3. What would success in this research experience look like to you? What would you like to achieve:
  - a. By the end of your 1st year?
  - b. By the end of your 3rd year?
  - c. By the time you complete your degree?
4. How many hours per week and at what times/days do you expect to work on your mentor's research?
5. What other commitments or obligations will you have during graduate school (group meetings, teaching, family, religious, community, etc.)? How many hours will these take? How will you schedule around these commitments?
6. Assuming a good fit, how long do you expect to work with this research group?
7. What, if any, specific technical or communication skills do you expect to learn as part of the research experience?
8. How do you learn best (written procedure, verbal instructions, watch and repeat, etc.). What can your mentor do to help you learn the techniques and skills in a timely manner that you need to be successful in your research lab? What can you do before you start in the lab to allow you to be successful in this research group?
9. Once you are trained in basic techniques, the goal should be to gain independence. What can you do to gain independence in your research? How long do you expect this transition to take?
10. What role do you want your mentor to take throughout your graduate career? For example, would you prefer that your mentor is hands-on throughout your graduate work? Or do you prefer a more hands-off approach to being supervised?
11. How will you document your research results? Is there a specific protocol for keeping a laboratory notebook in your research

group?

12. To whom do you expect to go to if you have questions about your research project? Does your mentor expect you to come solely (or first) to them, or should you feel free to ask others in the research group? If others, can your mentor identify those in the group who would be good resource people for your project?
13. Are you comfortable with the methodology used in the lab? Does it involve the use of animals, for example? Does it involve lengthy field trips where you might be isolated with other researchers for weeks at a time? How do you feel about that?
14. Is the research that you will be involved in confidential? Are you allowed to discuss your project with other individuals outside of your laboratory?
15. What role will your mentor play in the development of your writing skills? Will they provide feedback and guidance on numerous drafts or will they only want to provide feedback on the final draft? If your mentor only wishes to read final drafts of writing, are there others in the lab who are willing to provide feedback on earlier drafts?
16. Do you know all the institutional safety or ethics training that is required to work in your research project? Discuss the required training with your mentor and establish a deadline by which you should complete it.
17. If you have previous research experience, what skills do you expect to bring to your new research group?

## Research Mentor Expectations

1. Why do you want to mentor a graduate researcher?
2. What are your research goals? How can this research experience and the mentor–trainee relationship help you achieve them?
3. What would success for you trainee look like to you? What would you like your trainee to achieve:  
By the end of his/her  
1st year? By the end  
of his/her 3rd year?  
By the time he/she completes his/her degree?
4. How many hours per week and at what times/days do you expect your trainee to work on your research?
5. Assuming a good fit, how long would you like your trainee to remain with the group?
6. What, if any, specific technical or communication skills do you expect your trainee to learn as part of the research experience?
7. What level of independence do you expect your trainee to achieve, once basic techniques are learned? What can your trainee do to gain independence in research? How long do you expect this transition to take?
8. What is your mentoring approach? Once your trainee has learned the techniques and procedures used in your lab do you prefer to watch your trainee closely, walking him/her through all the steps or do you prefer a more hands off approach?
9. How will your trainee document research results? Is there a specific protocol for keeping a laboratory notebook in your research group?
10. To whom should your trainee go if they have questions about your research project? Do you expect them to come to you solely (or first), or should they feel free to ask others in the research group? If others, who would be good resource people for your project?
11. What are your expectations for your trainee's level of comfort with the methodology used in the lab. For example does your research involve working with animals, lengthy field trips, or working in isolation with other researchers, and is your trainee comfortable with this?
12. Will the research that your trainee will be involved in be confidential? Are they allowed to discuss your project with other individuals outside of your laboratory? What are your expectations?

13. What role will you play in the development of your trainee's writing skills? Will you provide feedback and guidance on numerous drafts or do you only want to provide feedback on the final draft? If you are only willing to read final drafts of writing, are there others in the lab who are willing to provide feedback on earlier drafts?
14. Discuss the institutional safety or ethics training that is required for your trainee to work on your research project and establish a deadline by which they should complete it.
15. If a student has previous research experience, is there anything that you need to share about this research group that is unique and that the student should be aware of?

## Mentor - Graduate Trainee Expectations Agreement

Trainee (print) \_\_\_\_\_ Mentor (print) \_\_\_\_\_

This agreement outlines the parameters of our work together on this research project.

1. Our major goals are:
  - A. proposed research project goals –
  
  - B. trainee’s personal and/or professional goals -
  
  - C. mentor’s personal and/or professional goals –
2. Our shared vision of success in this research project is:
3. We agree to work together on this project for at least \_\_\_\_ years
4. The trainee will work at least \_\_\_\_ hours per week on the project during the academic year, and \_\_\_\_ hours per week in the summer. In addition, the trainee is expected to \_\_\_\_\_
5. The trainee will propose their weekly schedule to the mentor by the \_\_\_\_ week of the semester.

If the trainee must deviate from this schedule (e.g. to study for an upcoming exam), they will communicate this to the mentor at least (weeks/days/hours) before the change occurs.

6. On a daily basis, our primary means of communication will be through (circle all that apply):  
face to face/phone/email/instant messaging/ \_\_\_\_\_
7. We will meet one-on-one to discuss our progress on the project and to reaffirm or revise our goals for at least \_\_\_\_\_ minutes\_time(s) per month
  - a. (Circle one): It will be the (trainee’s/mentor’s) responsibility to schedule these meetings.
  - b. In preparation for these meetings, the trainee will:
  - c. In preparation for these meetings, the mentor will:

8. At these meetings, the mentor will provide feedback on the trainee's performance and specific suggestions for how to improve or progress to the next level of responsibility through a
  - a. written evaluation
  - b. a verbal evaluation
  - c. other \_\_\_\_\_
9. The trainee is expected to participate in the following (e.g. journal club, teaching commitments, etc.)
10. When learning new techniques and procedures, the mentor will train the trainee using the following procedure(s) (e.g. write out directions, hands-on demonstration, verbally direct as trainee does procedure, etc.):
11. The proper procedure for documenting research results (laboratory notebook) in our research group is:

The notebook will be checked \_\_\_\_\_(e.g., weekly/monthly).
12. If the trainee gets stuck while working on the project (e.g. has questions or needs help with a technique or data analysis) the procedure to follow will be:
13. The standard operating procedures for working in our research group, which all group members must follow and the trainee agrees to follow, include: (e.g. require institutional training wash your own glassware, attend weekly lab meetings, reorder supplies when you use the last of something, etc.)
14. The mentor and trainee have agreed on a mentoring approach which consists of
15. The mentor and trainee have discussed the methodology used in the lab in detail and trainee understands what is expected of him/her.
16. The mentor agrees to read and revise the trainees research writing according to the following procedure:
17. The trainee agrees to not present any of the research findings from this laboratory in any shape or form without the explicit consent and approval of the mentor.
18. Other issues not addressed above that are important to our work together:

By signing below, we agree to these goals, expectations, and working parameters for this research project

Trainee's signature _____	Date: _____	Mentor's	signature
_____	Date: _____	Professor's	
signature _____	Date: _____		

## **Example Mentor - Graduate Trainee Agreement** **Dr. Trina McMahon, University of Wisconsin-Madison**

### **The broad goals of my research program**

As part of my job as a professor, I am expected to write grants and initiate research that will make tangible contributions to science, the academic community, and to society. You will be helping me carry out this research. It is imperative that we carry out good scientific method and conduct ourselves in an ethical way. We must always keep in mind that the ultimate goal of our research is publication in scientific journals. Dissemination of the knowledge we gain is critical to the advancement of our field. I also value outreach and informal science education, both in the classroom and while engaging with the public. I expect you to participate in this component of our lab mission while you are part of the lab group.

### **What I expect from you**

Another part of my job as a professor is to train and advise students. I must contribute to your professional development and progress in your degree. I will help you set goals and hopefully achieve them. However, I cannot do the work for you. In general, I expect you to:

- Learn how to plan, design, and conduct high quality scientific research
- Learn how to present and document your scientific findings
- Be honest, ethical, and enthusiastic
- Be engaged within the research group and at least two programs on campus
- Treat your lab mates, lab funds, equipment, and microbes with respect
- Take advantage of professional development opportunities
- Obtain your degree
- Work hard – don't give up!

### **► You will take ownership over your educational experience**

**Acknowledge that you have the primary responsibility for the successful completion of your degree.** This includes commitment to your work in classrooms and the laboratory. You should maintain a high level of professionalism, self-motivation, engagement, scientific curiosity, and ethical standards.

**Ensure that you meet regularly with me and provide me with updates on the progress and results of your activities and experiments.** Make sure that you also use this time to communicate new ideas that you have about your work and challenges that you are facing. Remember: I cannot address or advise about issues that you do not bring to my attention.

**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.

**Actively cultivate your professional development.** UW-Madison has outstanding resources in place to support professional development for students. I expect you to take full advantage of these resources, since part of becoming a successful engineer or scientist involves more than just doing academic research. You are expected to make continued progress in your development as a teacher, as an ambassador to the general public representing the University and your discipline, with respect to your networking skills, and as an engaged member of broader professional organizations. The Graduate School has a regular seminar series related to professional development. Adapted by E. Frazier, C. Pfund, and A. R. Butz from Branchaw, Pfund & Rediske (2010). *Entering Research: A Facilitator's Manual*. New York: WH Freeman & Company, and from Pfund, Wassarman & Skarlupka (2014). *Establishing your Mentoring Relationships for CMB, Biophysics and Nutritional Sciences*. Branchaw, J. L., Butz, A. R., & Smith A. (2018). *Entering Research* (2nd ed.). New York: Macmillan.

development. The Delta Program offers formalized training in the integration of research, teaching, and learning. All graduate degree programs require attendance at a weekly seminar. Various organizations on campus engage in science outreach and informal education activities. Attendance at conferences and workshops will also provide professional development opportunities. When you attend a conference, I expect you to seek out these opportunities to make the most of your attendance. You should become a member of one or more professional societies such as the Water Environment Federation, the American Society for Microbiology, or the American Society for Limnology and Oceanography.

► *You will be a team player*

**Attend and actively participate in all group meetings, as well as seminars that are part of your educational program.** Participation in group meetings does not mean only presenting your own work, but providing support to others in the lab through shared insight. You should refrain from using your computer, Blackberry, or iPhone during research meetings. Even if you are using the device to augment the discussion, it is disrespectful to the larger group to have your attention distracted by the device. Do your part to create a climate of engagement and mutual respect.

**Strive to be the very best lab citizen.** Take part in shared laboratory responsibilities and use laboratory resources carefully and frugally. Maintain a safe and clean laboratory space where data and research participants confidentiality are protected. Be respectful, tolerant of, and work collegially with all laboratory colleagues: respect individual differences in values, personalities, work styles, and theoretical perspectives.

**Be a good collaborator.** Engage in collaborations within and beyond our lab group. Collaborations are more than just publishing papers together. They demand effective and frequent communication, mutual respect, trust, and shared goals. Effective collaboration is an extremely important component of the mission of our lab.

**Leave no trace.** As part of our collaborations with the Center for Limnology and other research groups, you will often be using equipment that does not belong to our lab. I ask that you respect this equipment and treat it even more carefully than our own equipment. Always return it as soon as possible in the same condition you found it. If something breaks, tell me right away so that we can arrange to fix or replace it. Don't panic over broken equipment. Mistakes happen. But it is not acceptable to return something broken or damaged without taking the steps necessary to fix it.

**Acknowledge the efforts of collaborators.** This includes other members of the lab as well as those outside the lab. Don't forget important individuals like Dave Harring at the CFL and Jackie Cooper at CEE.

► *You will develop strong research skills*

**Take advantage of your opportunity to work at a world-class university by developing and refining stellar research skills.** I expect that you will learn how to plan, design, and conduct high quality scientific research.

**Challenge yourself by presenting your work at meetings and seminars as early as you can and by preparing scientific articles that effectively present your work to others in the field.** The 'currency' in science is published papers, they drive a lot of what we do and because our lab is supported by taxpayer dollars we have an obligation to complete and disseminate our findings. I will push you to publish your research as you move through your training program, not only at the end. Students pursuing a Masters degree will be expected to author or make major contributions

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to at least one journal paper submission. Students pursuing a doctoral degree will be expected to be lead author on at least two journal papers submissions, preferably three or four.

**Keep up with the literature so that you can have a hand in guiding your own research.** Block at least one hour per week to peruse current tables of contents for journals or do literature searches. Participate in journal clubs. Better yet, organize one!

**Maintain detailed, organized, and accurate laboratory records.** Be aware that your notes, records and all tangible research data are my property as the lab director. When you leave the lab, I encourage you to take copies of your data with you. But one full set of all data must stay in the lab, with appropriate and accessible documentation. Regularly backup your computer data to the Bacteriology Elizabeth McCoy server (see the wiki for more instructions).

**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 improve your scientific work.

► *You will work to meet deadlines*

**Strive to meet deadlines: this is the only way to manage your progress.** Deadlines can be managed in a number of ways, but I expect you to work your best to maintain these goals. We will establish mutually agreed upon deadlines for each phase of your work during one-on-one meetings at the beginning of each term. For graduate students, there is to be a balance between time spent in class and time spent on research and perhaps on outreach or teaching. As long as you are meeting expectations, you can largely set your own schedule. It is your responsibility to talk with me if you are having difficulty completing your work and I will consider your progress unsatisfactory if I need to follow-up with you about completion of your lab or coursework.

**Be mindful of the constraints on my time.** When we set a deadline, I will block off time to read and respond to your work. If I do not receive your materials, I will move your project to the end of my queue. Allow a minimum of one week prior to submission deadlines for me to read and respond to short materials such as conference abstracts and three weeks for me to work on manuscripts or grant proposals. Please do not assume I can read materials within a day or two, especially when I am traveling.

► *You will communicate clearly*

**Remember that all of us are “new” at various points in our careers.** If you feel uncertain, overwhelmed, or want additional support, please overtly ask for it. I welcome these conversations and view them as necessary.

**Let me know the style of communication or schedule of meetings that you prefer.** If there is something about my mentoring style that is proving difficult for you, please tell me so that you give me an opportunity to find an approach that works for you. No single style works for everyone; no one style is expected to work all the time. Do not cancel meetings with me if you feel that you have not made adequate progress on your research; these might be the most critical times to meet with a mentor.

**Be prompt.** Respond promptly (in most cases, within 48 hours) to emails from anyone in our lab group and show up on time and prepared for meetings. If you need time to gather information in response to an email, please acknowledge receipt of the message and indicate when you will be able to provide the requested information.

**Discuss policies on work hours, sick leave and vacation with me directly.** Consult with me and

notify fellow lab members in advance of any planned absences. Graduate students can expect to work an average of 50 hours per week in the lab; post-docs and staff at least 40 hours per week. I expect that most lab members will not exceed two weeks of personal travel away from the lab in any given year. Most research participants are available during University holidays, so all travel plans, even at the major holidays, must be approved by me before any firm plans are made. I believe that work-life balance and vacation time are essential for creative thinking and good health and encourage you to take regular vacations. Be aware, however, that there will necessarily be epochs – especially early in your training—when more effort will need to be devoted to work and it may not be ideal to schedule time away. This includes the field season, for students/post-docs working on the lakes.

**Discuss policies on authorship and attendance at professional meetings with me before beginning any projects to ensure that we are in agreement.** I expect you to submit relevant research results in a timely manner. Barring unusual circumstances, it is my policy that students are first-author on all work for which they took the lead on data collection and preparation of the initial draft of the manuscript.

**Help other students with their projects and mentor/train other students.** This is a valuable experience! Undergraduates working in the lab should be encouraged to contribute to the writing of manuscripts. If you wish to add other individuals as authors to your papers, please discuss this with me early on and before discussing the situation with the potential co-authors.

### **What you should expect from me**

**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 and weaknesses, or career goals.

**I will be available for regular meeting and informal conversations.** My busy schedule requires that we plan in advance for meetings to discuss your research and any professional or personal concerns you have. Although I will try to be available as much as possible for “drop in business”, keep in mind that I am often running to teach a class or to a faculty meeting and will have limited time.

**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 discuss data ownership and authorship policies regarding papers with you.** These can create unnecessary conflict within the lab and among collaborators. It is important that we communicate openly and regularly about them. Do not hesitate to voice concerns when you have them.

**I will be your advocate.** If you have a problem, come and see me. I will my best to help you solve it.

**I am committed to mentoring you, even after you leave my lab.** I am committed to your education and training while you are in my lab, and to advising and guiding your career development – to the degree you wish – long after you leave. I will provide honest letters of evaluation for you when you request them.

**I will lead by example and facilitate your training in complementary skills needed to be a successful scientist, such as oral and written communication skills, grant writing, lab**

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**management, mentoring, and scientific professionalism.** I will encourage you to seek opportunities in teaching, even if not required for your degree program. I will also strongly encourage you to gain practice in mentoring undergraduate and/or high school students, and to seek formal training in this activity through the Delta program.

**I will encourage you to attend scientific/professional meetings and will make an effort to fund such activities.** I will not be able to cover all requests but you can generally expect to attend at least one major conference per year, when you have material to present. Please use conferences as an opportunity to further your education, and not as a vacation. If you register for a conference, I expect you to attend the scientific sessions and participate in conference activities during the time you are there. Travel fellowships are available through the Environmental Engineering program, the Bacteriology Department, and the University if grant money is not available. I will help you identify and apply for these opportunities.

**I will strive to be supportive, equitable, accessible, encouraging, and respectful. I will try my best to understand your unique situation, and mentor you accordingly.** I am mindful that each student comes from a different background and has different professional goals. It will help if you keep me informed about your experiences and remember that graduate school is a job with very high expectations. I view my role as fostering your professional confidence and encouraging your critical thinking, skepticism, and creativity. If my attempts to do this are not effective for you, I am open to talking with you about other ways to achieve these goals.

### **Yearly evaluation**

Each year we will sit down to discuss progress and goals. At that time, you should remember to tell me if you are unhappy with any aspect of your experience as a graduate student here. Remember that I am your advocate, as well as your advisor. I will be able to help you with any problems you might have with other students, professors, or staff. Similarly, we should discuss any concerns that you have with respect to my role as your advisor. If you feel that you need more guidance, tell me. If you feel that I am interfering too much with your work, tell me. If you would like to meet with me more often, tell me. At the same time, I will tell you if I am satisfied with your progress, and if I think you are on track to graduate by your target date. It will be my responsibility to explain to you any deficiencies, so that you can take steps to fix them. This will be a good time for us to take care of any issues before they become major problems.