Improving Research Mentoring Relationships

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We are proud to offer *Entering Mentoring* on behalf of the American Association of Physical Anthropologists (AAPA), in collaboration with the Center for the Improvement of Mentored Experiences in Research (CIMER).

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Workshop Description

Researchers often are not trained for their crucial role of mentoring trainees. Acknowledging this gap, researchers and curriculum developers at the University of Wisconsin-Madison developed an evidence-based research mentor training program called *Entering Mentoring*, an interactive mentor training curricular series designed for research mentors across career stages and disciplines. The training is designed to help mentors develop skills for engaging in productive, culturally responsive, research mentoring relationships -- relationships that optimize the success of both mentors and mentees. This interactive experience is aimed at promoting discovery and understanding.

During this training, you will experience the *Entering Mentoring* curricula. These curricula address important topics and concepts in research mentoring by creating learning communities and engaging mentors in activities, assignments, case studies, and facilitated discussions to solve mentoring dilemmas and share successful mentorship strategies. Themes include: aligning expectations, addressing equity and inclusion, articulating your mentoring philosophy and plan, assessing understanding, cultivating ethical behavior, enhancing work-life integration, fostering independence, maintaining effective communication, promoting mentee research self-efficacy, and promoting professional development.

Agenda

Time	**Activity**
8:00 - 8:30	Registration and Networking
8:30 - 9:15	Introduction to Research Mentor Training and Workshop Goals
9:15 - 10:00	Competency 1: Maintaining Effective Communication
10:00 - 10:45	Competency 2: Aligning Expectations
10:45 - 11:00	BREAK
11:00 - 11:45	Competency 3: Cultivating Ethical Behavior
11:45 - 12:30	Competency 4: Addressing Equity and Inclusion
12:30 - 1:00	Mentoring Reflection and Next Steps
1:00	Lunch

CIMER Trainer Biographies

Kelly Diggs-Andrews, PhD (Diggs-Andrews Consulting, LLC)

Kelly Diggs-Andrews, PhD is the founder and CEO of Diggs-Andrews Consulting, LLC, a consulting and media company whose goal is to broaden accessibility to science careers through science outreach, diversity training, and professional development.

She is also a Master Facilitator with the National Research Mentoring Network (NRMN) and a Certified Trainer with the Center for the Improvement of Mentored Experiences in Research (CIMER), where she leads both in-person and virtual workshops for research mentors across career stages and disciplines nationwide. She has led trainings at national scientific conferences for the American Society for Microbiology, the Society for Neuroscience, the Annual Biomedical Research Conference for Minority Students, and others as well as numerous colleges, universities, and medical institutes. Her curricular expertise includes *Entering Mentoring*, *Facilitator Training for Entering Mentoring*, and *Culturally Aware Mentoring*.

Dr. Diggs-Andrews earned her BS in Biology from Alabama State University (2005) and her PhD in Biology and Biomedical Sciences from Washington University in St. Louis (2010). She was also the recipient of the NIH-Ruth L. Kirschstein National Research Service Award, Chancellor's Diversity Graduate Fellowship, and a National Cancer Institute Postdoctoral Supplement. In her previous role, she served as the Education and Mentoring Fellow with the American Society for Microbiology (ASM) and spearheaded an NSF-funded program to develop ASM's mentoring capacity, to advance investigator-educator collaborations and interdisciplinary research, and to broaden participation of underrepresented individuals in science, technology, engineering, and math (STEM) fields.

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Preface for *Entering Mentoring* Series

Mentoring: Learned, Not Taught

Mentoring principles, not practices, are universal

Effective mentoring can be learned, but not taught. Most faculty learn to mentor by experimenting and analyzing success and failure, and many say that the process of developing an effective method of mentoring takes years, which is a reflection of the unique qualities, needs, and challenges presented by each mentee. A skilled mentor is guided by a reflective philosophy that directs examination of the mentee's changing needs and how best to address them, creating fluidity in the relationship. No book can prescribe a single 'right' approach, but systematic analysis and discussion of mentoring generates a method for tackling the knotty challenges inherent in the job.

The goal of the curriculum outlined in this book is to accelerate the process of becoming an effective research mentor. The approach described provides mentors with an intellectual framework, an opportunity to experiment with various methods, and a forum in which to solve mentoring dilemmas with the help of their peers. The mentor training process expands each mentor's knowledge through secondhand exposure to the experiences of the entire group, enabling participants to engage with as many mentoring experiences as each of them would typically handle in a decade. This process in turn enhances their readiness to work with diverse mentees and anticipate new situations. At the completion of the training, mentors will have articulated their own approach to mentoring and have a toolbox of strategies to draw upon when confronted with mentoring challenges.

Although no one can provide formulas, practices, or behaviors that will work in every mentoring situation, certain principles guide good mentoring. The principles that shape this curriculum are founded on research that has revealed how people learn and has identified the essential elements of environments shown to be most conducive to learning, productivity, and creativity.

Mentoring diversity, not sameness, is essential

An individual's performance in any endeavor is the product of a complex interaction involving innate ability, experience, confidence, education, and the nature of the performance environment.

Professional mentors can directly influence their mentees' performance by creating an environment that is conducive to achieving excellence and that fosters confidence, even in stressful situations. Setbacks are a source of stress that everyone experiences, and the mentee's response can be modulated by a mentor's intervention. A mentor's goal is to promote a mentee's growth and achievement. People build resilience and self-reliance through positive reinforcement coupled with the expectation of excellence. The most important message a mentor can send is faith in the mentee, a willingness to embrace diversity, and an eagerness to continually improve as a mentor. A theme implicit in this book's curriculum is that mentors may facilitate growth best when they work collaboratively with their mentees to continually re-examine and adjust to their individual needs. This process, followed by the mentee

producing high-quality research, will generate self-sustaining confidence for both.

Another aspect of creating an environment that is conducive to learning is being open to other ways of doing research and seeing the world, including the world of academia. The next generation of researchers will be more diverse than the last. Working with people who are different from ourselves can at times be frustrating and baffling, though also enlightening and deeply rewarding as we learn from one another. When given the opportunity to work with mentees from different backgrounds and with distinct perspectives, who may not share the characteristics we value most in ourselves, we may struggle to imagine them fitting the academic mold. We are often surprised by the success of those who don't immediately fit in, and find that they may be the very people that bring a key new perspective or insight. Being a good mentor requires accommodating styles that differ from our own, thereby enhancing the diversity and the vibrancy of the scientific community.

Christine Pfund
Series Editor
University of Wisconsin-Madison

Jo Handelsman
Series Editor
Yale University

Theoretical Framework for *Entering Mentoring*

Christine Pfund, University of Wisconsin-Madison
December 2018

The original seminar, known as the Wisconsin Mentoring Seminar, was developed at the University of Wisconsin-Madison using an iterative approach involving design, testing, evaluation, and revision. The materials for the original mentor training seminar were developed in collaboration with a group of faculty, staff, graduate students, and postdoctoral researchers in the biological sciences. Drawing on the literature on mentoring and business management, their own writing about mentoring, the collective experience of the group, and discussions over the course of one semester, this group of 12 identified many of the core elements in mentoring. They also provided ideas for the cases and discussion topics that shaped early versions of the seminar. In 2005, after a 2-year period of implementation, evaluation, and revision, the research mentor training curriculum was published as *Entering Mentoring*[1]. Although the *Entering Mentoring* curriculum is now a well-established research mentor training program, it was not initially designed with an explicit theoretical base in mind. Specifically, it did not capitalize on the extensive literature on the psychology of career development, and thus did not focus on important personal (e.g., race, gender) and cognitive factors.

One of the better researched cognitive factors in academic and career development literature is self-efficacy, which is confidence in one's ability to successfully perform a given task. Self-efficacy is a central construct in social cognitive career theory (SCCT)[2] and is highly correlated with choice of and persistence in a science or engineering major. [3,4] Bakken et al.[5] has illustrated how SCCT provides a valuable theoretical base for understanding and promoting biomedical and clinical research careers because it incorporates the reciprocal interactions between person, cognitive, and environmental elements in shaping career outcomes. In recent years, Drs. Byars-Winston, Branchaw, and Pfund, at the University of Wisconsin-Madison, have been studying mentoring relationships and using SCCT to delineate factors relevant to effective mentoring. These factors can be incorporated into interventions to guide mentors and mentees into highly productive and purposeful relationships.

Moving forward, new research mentor training modules will be built upon a strong theoretical base and focused on training hypothesized to impact, in particular, the persistence of underrepresented minorities (URM) in science, technology, engineering, math, and medical (STEMM) fields. We recognize that these mentoring relationships and the development of career intentions do not happen in random fashion or in a vacuum. Rather, "persistence" is constantly shaped by social and psychological influences that are described by several social science theories and models.[6-8] These theories and models reveal the "mechanisms" by which individuals persist, or not, along the pathways toward becoming a scientist, and apply those skills to potential careers. Two selected theories, social cognitive career theory[1] and science identity development [7,9] are guiding the development of new research mentor training modules.

Finally, mentoring URM trainees toward successful research careers occurs within numerous cultural contexts that are shaped by society, academic institutions, and even scientific disciplines. Therefore, to build the capacity of research mentors to effectively mentor and respond to the needs of URM mentees, we must foster the development of their cultural competence. Building upon the extensive scholarship

of multicultural training in the field of teacher education, specifically the effective practices of culturally responsive teaching, [10-12] we adopted the term "culturally responsive mentoring" (CRM).[13] We strive to achieve culturally responsive mentoring across the mentoring relationships that our National Research Mentoring Network (NRMN) will help form and support.

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Constructive and Destructive Group Behaviors[1]

Constructive Group Behaviors

Cooperating: Is interested in the views and perspectives of other group members and willing to adapt for the good of the group.

Clarifying: Makes issues clear for the group by listening, summarizing, and focusing discussions.

Inspiring: Enlivens the group, encourages participation and progress.

Harmonizing: Encourages group cohesion and collaboration. For example, uses humor as relief after a particularly difficult discussion.

Risk Taking: Is willing to risk possible personal loss or embarrassment for the success of the overall group or project.

Process Checking: Questions the group on process issues, such as agenda, time frames, discussion topics, decision methods, and use of information.

Destructive Group Behaviors

Dominating: Uses most of the meeting time to express personal views and opinions. Tries to take control by use of power, time, and so on.

Rushing: Encourages the group to move on before the task is complete. Gets tired of listening to others and working with the group.

Withdrawing: Removes self from discussions or decision making. Refuses to participate.

Discounting: Disregards or minimizes group or individual ideas or suggestions. Severe discounting behavior includes insults, which are often in the form of jokes.

Digressing: Rambles, tells stories, and takes group away from primary purpose.

Blocking: Impedes group progress by obstructing all ideas and suggestions. "That will never work because..."

[1] Adapted from Brunt (1993). "Facilitation Skills for Quality Improvement." *Quality Enhancement Strategies*. 1008 Fish Hatchery Road, Madison, WI 53715

Maintaining Effective Communication

Introduction

Good communication is a key element of any relationship and a mentoring relationship is no exception. As research mentors, it is not enough to say that we know good communication when we see it. Rather, it is critical that mentors reflect upon and identify characteristics of effective communication and take time to practice communication skills in the session and with their mentees.

Learning Objectives

Mentors will have the knowledge and skills to:

1. Provide constructive feedback
2. Communicate effectively across diverse dimensions including various backgrounds, disciplines, generations, ethnicities, positions of power, etc.
3. Identify different communication styles
4. Engage in active listening
5. Use multiple strategies for improving communication (in person, at a distance, across multiple mentors, and within proper personal boundaries)

Case Study: "The Slob" (EM)[2]

A post-doc mentor was frustrated because her graduate student mentee was not running successful experiments. While the graduate student had great enthusiasm for the project, each experiment failed because of some sloppy error: forgetting to pH the gel buffer, forgetting to add a reagent to a reaction, or forgetting to turn down the voltage on a gel box.

After a month of discussions, and careful attempts to teach the graduate student habits that would compensate for forgetfulness, the post-doc mentor was ready to give up. She spoke with her faculty adviser (the PI in the lab) and asked for advice, hoping that she could fix the problem. The adviser offered to work with the graduate student mentee. When the graduate student walked into his office the next day, the faculty adviser said, "I hear you're a slob in the lab. You gotta clean up your act if we're going to get any data out of you." Seeing the crushed and humiliated look on the student's face, he quickly added, "I'm a slob too - that's why I'm in here pushing papers around and not in the lab doing the hard stuff like you guys!"

Guiding Questions for Discussion:

1. If you were the mentee, how would you feel? Post-doc mentor?

2. What is the most effective way to communicate when problems arise between a mentor and mentee?

3. If you were the faculty adviser, how would you have handled the situation?

4. How does this situation affect the research environment?

[2] Pfund, C., Branchaw, J., and Handelsman, J. (2014). *Entering Mentoring*. New York, NY: W.H. Freeman & Company.

Activity: Active Listening

Role	Step 1: Share/Listen (2 min)	Step 2: Discuss (3 min)	Step 3: Debrief (5 min)
Speaker	Share a current mentoring relationship challenge.	Develop a plan to resolve the situation.	Listen to feedback from observer, ask questions, provide reflections on experience.
Listener	Practice active listening skills.	Ask clarifying questions and help the speaker develop a plan.	Listen to feedback from observer, ask questions, provide reflections on experience.
Observer	Observe and note tone, body language, facial expression, etc.	Observe and note tone, body language, facial expression, etc.	Report on observations. Did the listener actually understand the problem the speaker described?

Building a Relationship with a Mentee

Adapted from the I-TECH Clinical Mentoring Toolkit, produced by the International Training and Education Center for Health (I-TECH)/University of Washington with funding from the US Health Resources and Services Administration. For more information, visit www.go2itech.org.

Building an effective relationship of mutual understanding and trust with the mentee is a critical component of effective mentoring. Mentors can establish rapport with their mentees by using effective interpersonal communication skills, actively building trust, and maintaining confidentiality. This document contains information and advice to help mentors build rapport and create positive relationships with mentees so both parties can achieve the greatest benefit from the mentoring experience.

Interpersonal Communication

Interpersonal communication is a person-to-person, two-way, verbal and nonverbal sharing of information between two or more persons. Good communication helps to develop a positive working relationship between the mentor and mentee by helping the mentee to better understand directions and feedback from the mentor, feel respected and understood, and be motivated to learn from the mentor. Mentees learn best from mentors who are sincere, approachable, and nonjudgmental. These qualities are communicated primarily by facial expressions, and, to a limited extent, by words. People often remember more about how a subject is communicated than the speaker's knowledge of the subject.

There are two types of communication: verbal and nonverbal. Verbal communication is communication that occurs through spoken words. Nonverbal communication is communication that occurs through unspoken mediums, such as gestures, posture, facial expressions, silence, and eye contact. It is important for mentors to remember they are communicating to mentees both when they are speaking and when they are not speaking. Up to 93% of human communication is nonverbal.[1] Body language tells those with whom we are communicating a great deal about what we are thinking and feeling. Examples of positive or open body language include:

- Eye contact (depending on the culture)
- Open or relaxed posture
- Nodding or other affirmation
- Pleasant facial expressions

Examples of negative or closed body language include crossed arms, averted eyes, and pointing fingers. The mentor needs to be aware of what he or she is communicating nonverbally as well as what the mentee is communicating nonverbally.

When mentoring, effective communication involves more than providing information or giving advice; it requires asking questions, listening carefully, trying to understand a mentee's concerns or needs, demonstrating a caring attitude, remaining open-minded, and helping solve problems. There are many communication skills that mentors can utilize to effectively communicate with mentees, including the following:

- Active listening: Be sure to really listen to what a mentee is saying. Often, instead of truly listening to the mentee, the mentor is thinking about his or her response, what to say next, or something else entirely. It is important to quiet these thoughts and remain fully engaged in the task of listening.

- Attending: Listen while observing, and communicate attentiveness. This can include verbal follow-up (saying "yes" or "I see") or nonverbal cues (making eye contact and nodding the head).

- Reflective listening: Verbally reflect back what the mentee has just said. This helps the mentor to check whether or not he or she understands the mentee, and helps the mentee feel understood. Examples:
  - "So it seems that you're overwhelmed with your workload."
  - "It seems that you are concerned about that experiment."

- Paraphrasing: Determine the basic message of the mentee's previous statement and rephrase it in your own words to check for understanding. Examples:
  - "You're interested in developing a system for improving that."
  - "It sounds like you're concerned about the design of the experiment."

- Summarizing: Select main points from a conversation and bring them together in a complete statement. This helps ensure the message is received correctly. For example, "Let me tell you what I heard, so I can be sure that I understand you. You said that the main challenge right now is balancing your clinical load and writing the research proposal."

- Asking open-ended questions: Ask mentees questions that cannot be answered with a simple yes or no. Open-ended questions encourage a full, meaningful answer using the mentee's own knowledge and feelings, whereas closed-ended questions encourage a short or single-word answer. Examples:

Close-ended question: "You didn't think the experiment would work?"
Open-ended question: "What factors led you to your decision to change the protocol?"

Close-ended question: "Did you understand what we discussed today?"
Open-ended question: "Can you summarize what we discussed today?"

- Probing: Identify a subject or topic that needs further discussion or clarification and use open-ended questions to examine the situation in greater depth. For example, "I heard you say you are overwhelmed; please tell me more about that."

- Self-disclosure: Share appropriate personal feelings, attitudes, opinions, and experiences to increase the intimacy of communication. For example, "I can relate to your difficult situation, I have experienced something similar and recall being very frustrated. Hopefully I can assist you to figure out how to move forward."

- Interpreting: Add to the mentee's ideas to present alternate ways of looking at circumstances. When using this technique, it is important to check back in with the mentee and be sure you are interpreting correctly before assigning additional meaning to their words. For example, "So you are saying that the reason the interpretation is flawed is because of the statistical test used to analyze the data? That is likely one reason, but have you also considered that the design may be wrong as well?"

- Confrontation: Use questions or statements to encourage mentees to face difficult issues without accusing, judging, or devaluing them. This can include gently pointing out contradictions in mentees' behavior or statements, as well as guiding mentees to face an issue that is being avoided. For example, "It's great that you are so committed to mentoring the younger researcher in the group. However, I am concerned that you are not dedicating enough time to your own research."

A number of attitudes and/or behaviors can serve as barriers to communication—these can be verbal or nonverbal. Verbal barriers to communication that should be avoided include the following:

- Moralizing: Making judgments about a mentee's behavior, including calling it right or wrong, or telling them what they should or should not do.
- Arguing: Disagreeing with instead of encouraging the mentee.
- Preaching: Telling the mentee what to do in a self-righteous way.
- Storytelling: Relating long-winded personal narratives that are not relevant or helpful to the mentee.
- Blocking communication: Speaking without listening to the mentee's responses, using an aggressive voice, showing impatience, showing annoyance when interrupted, or having an authoritative manner. These behaviors often lead to the mentee feeling down, humiliated, scared, and insecure. As a result, the mentee may remain passive and refrain from asking questions, or distrust the mentor and disregard his or her recommendations.
- Talking too much: Talking so much that the mentee does not have time to express themselves. As a mentor, it is important not to dominate the interaction.

Examples of nonverbal barriers to communication include shuffling papers, not looking directly at the mentee when he or she is speaking, and allowing interruptions or distractions. These barriers may have consequences for both the mentor and the mentee. They may lead to a poor sharing of information, fewer questions being asked by the mentee, difficulty in understanding problems, uncomfortable situations, and a lack of motivation on the part of the mentee.

Establishing Trust

Establishing trust is an essential component in building rapport with a mentee. Trust is the trait of believing in the honesty and reliability of others.[2] Some mentees may be nervous about working with a mentor. To put them at ease, create a trusting relationship by empathizing with their challenges, share knowledge without being patronizing, and remain nonjudgmental. Along with the other communication skills listed above, establishing a trusting dynamic is essential for a productive and positive mentor/mentee relationship.

The following list provides some ideas for how the mentor can build trust with the mentee:

- Share appropriate personal experiences from a time when they were being mentored.
- Acknowledge mentee strengths and accomplishments from the onset of the mentoring process.
- Encourage questions of any type and tell the mentee that there is no such thing as a bad question.
- Take time to learn culturally appropriate ways of interacting with your mentee and helping your mentee to interact appropriately with their peers.
- When appropriate, consider how local knowledge can be incorporated into the mentoring experience.
- Acknowledge the mentee's existing knowledge and incorporate new knowledge into existing knowledge.
- Ask for and be open to receiving feedback from mentees, apply constructive feedback to improve mentoring skills.
- Eat a meal with the mentee to get to know him or her in a non-work setting.

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[1] Mehrabian, Albert. Nonverbal communication. Chicago: Aldine-Atherton, Chicago; 1972.

[2] WordNet. Princeton, NJ: Princeton University, Cognitive Science Library; c2006 [cited 2008 5 June]. Available from: http://wordnet.princeton.edu.

Aligning Expectations

Introduction

One critical element of an effective mentor-mentee relationship is a shared understanding of what each person expects from that relationship. Problems between mentors and mentees often arise from misunderstandings about expectations. Importantly, expectations change over time so frequent reflection and clear communication is needed to maintain a collaborative relationship.

Learning Objectives

Mentors will have the knowledge and skills to:

1. Effectively establish mutually beneficial expectations for the mentoring relationship
2. Clearly communicate expectations for the mentoring relationship
3. Align mentee and mentor expectations
4. Consider how personal and professional differences may influence expectations, including differences across disciplines when working in multidisciplinary teams

Case Study: "The Slow Writer" (BRC)[3]

A third year graduate student in my group is adept at performing experiments and analyzing data, but is a very slow writer. Last fall, I set multiple deadlines that this graduate student missed, while another student in my group wrote an entire thesis chapter, submitted a paper, and did experiments. Over the winter break, the slow writer had a breakthrough and produced a fairly reasonable draft of a prelim proposal. However, because she produced it so close to the (planned) prelim date and did not have the presentation ready either, I delayed the exam. To avoid delays in publications, I have taken the lead in writing manuscripts based on her work. However, to graduate with a PhD, I realize that she must write the dissertation, as well as the next manuscript, herself. Setting deadlines for detailed outlines, manuscripts/thesis sections, figures, etc. hasn't worked. Communicating the importance of manuscripts to the scientific endeavor hasn't worked. Encouragement hasn't worked. Veiled threats don't seem professional. Other than being patient, what should I do?

Guiding Questions for Discussion:

1. What are the main themes raised in this case study?
2. What could have been done to avoid this situation? What should the mentor do now? What should the mentee do now?
3. How do you find out what expectations your mentee has of you and for their research experience?

[3] Pfund, C., Branchaw, J., and Handelsman, J. (2014). *Entering Mentoring*. New York, NY: W.H. Freeman & Company.

Tool: Co-Completed Contract for Undergrad Mentee[4]

Undergraduate Mentee:

Graduate or Postdoc Mentor:

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

1. Our major goals are:
    a. Research project goals:

    b. Mentee'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 ____ semesters.
4. The mentee will work at least _____ hours per week on the project during the academic year, and _____ hours per week in the summer.

    The mentee will propose his/her weekly schedule to the mentor by the ____ week of the semester.

    If the mentee must deviate from this schedule (e.g., to study for an upcoming exam), he or she will communicate this to the mentor at least _____ (weeks / days / hours) before the change occurs.
5. On a daily basis, our primary means of communication will be through (circle):

    face-to-face / phone / email / instant messaging / other: _____
6. 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.

    It will be the (mentee's / mentor's) responsibility to schedule these meetings. (circle)

    In preparation for these meetings, the mentee will:

    In preparation for these meetings, the mentor will:

[4] Adapted from Branchaw, J. L., Pfund, C., and Rediske, R. (2010). *Entering Research: A Facilitator's Manual: Workshops for Students Beginning Research in Science*, W. H. Freeman & Company.

At these meetings, the mentor will provide feedback on the mentee's performance and specific suggestions for how to improve or progress to the next level of responsibility through (circle):

written evaluation / verbal evaluation / other: _____

7. The mentor will train the mentee on new techniques and procedures using the following (e.g., written directions, hands-on demonstration, verbal direction as mentee does procedure, etc.):

8. If the mentee 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:

9. The standard operating procedures for working in our research group, which all group members must follow and the mentee agrees to follow, include (e.g., wash your own glassware, attend weekly lab meeting, reorder supplies when you use the last of something, etc.):

10. 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.

Mentee's signature: _____ Date: _____

Mentor's signature: _____ Date: _____

Professor's signature: _____ Date: _____

Tool: Mentor Expectations Document for Grad Student Mentee[5]

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 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 professor is to train and advise students. I must contribute to your professional development and process 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
- Obtain your degree
- Work hard - don't give up!

You will take ownership over your educational experience

- **Acknowledge 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.

[5] From Professor Trina McMahon, University of Wisconsin-Madison. Published in Pfund, C., Branchaw, J., and Handelsman, J. (2014). *Entering Mentoring*. New York, NY: W.H. Freeman & Company.

- **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. 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 information 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 participant confidentiality are protected. Be respectful to, 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 way 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.

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 master's degree will be expected to author or make major contributions to at least one journal paper submission. Students pursuing a doctoral degree will be expected to lead author on at least two journal paper 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 1 hour per week to peruse current tables of content 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 back up your computer data to the 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 process.** Deadlines can be managed in a number of ways, but I expect you to do 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 and 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 1 week prior to submission deadlines for me to read and respond to short materials, such as conference abstracts, and 3 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 of 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 prepare 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; postdocs and staff at least 40 hours per week. I expect that most lab members will not exceed 2 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/postdocs 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 coauthors.

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 meetings 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 faculty meetings and will have limited time.

- **I will help you navigate your graduate program of study**. As stated previously, you are responsible for keeping up with deadlines and being knowledgeable about requirements for your specific program. However, I am available to help you 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 do 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, grant writing, lab management, mentoring, and scientific professionalism.** I will encourage you to see 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 be sure 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 adviser. I will be able to help you with any problems you have with other students, professors, or staff.

Similarly, we should discuss any concerns you have with respect to my role as your adviser. 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.

Tool: Priorities for Mentoring ("Mentoring for What?")

To be completed by both the mentee and mentor.

Prompt for Mentee: It is important to become clear about what your priorities are for professional development. This will enable mentor-mentee pairs to make priorities for how they will use their time together. Identify your top 4 or 5 areas of need.

Prompt for Mentor: It is important to become clear about what areas you feel you are most able to support in a mentee's development. Identify the top 4 or 5 areas you feel most able to provide support to your mentee.

Prompt to Both: Compare your results. A "good" mentor-mentee relationship does not require a match between responses. The results (as indicated by degree of alignment between mentee needs and mentor ability) will help you start a conversation about the areas within which: (1) the mentor can provide the mentee with direct support; or (2) the mentor is better suited to focus their efforts on helping the mentee seek out resources they need from other mentors.

Domains of Mentoring Needs	**Mentee Need**	**Mentor Ability**	**Notes**
Oral Communication			
Written Communication			
Managing Difficult Conversations			
Managing Expectations			
Work-Life Balance			

Affective (e.g., motivation, self-confidence, emotional support)			
Public Speaking			
Networking with Funding Sources			
Networking with Community Stakeholders			
Networking with Research Community			
Data Analysis			
Methods and Research Skills			
Frameworks, Models			
Collaborating with Community Stakeholders			
Grant Writing			

Evaluation			
Writing for Community and/or Non-Academic Stakeholders			
Research Resources			
Research Integrity and Ethics			
Authorship			
Career Options			
Job Opportunities			
Organizations			
Other:			
Other:			

Tool: Mapping Your Mentoring Network

Prompt to Mentor and Mentee: Based upon the results indicated in the worksheet titled “Priorities for Mentoring,” utilize this worksheet to identify the constellation of mentors who will support the professional development priorities of the mentee.

Domains of Mentoring Needs	**Mentor - At My Institution**	**Mentor - External to My Institution**	**Mentor - Community Partner**	**Have No Mentor**	**Do Not Need a Mentor**
Oral Communication					
Written Communication					
Managing Difficult Conversations					
Managing Expectations					
Work-Life Balance					
Affective (e.g., motivation, self-confidence, emotional support)					
Public Speaking					

Networking with Funding Sources					
Networking with Community Stakeholders					
Networking with Research Community					
Data Analysis					
Methods and Research Skills					
Frameworks, Models					
Collaborating with Community Stakeholders					
Grant Writing					
Evaluation					
Writing for Community and/or Non-Academic Stakeholders					

Research Resources					
Research Integrity and Ethics					
Authorship					
Career Options					
Job Opportunities					
Organizations					
Other:					
Other:					

Tool: Process of Mentoring (The "How" of Mentoring)[6]

EXPECTATIONS – GENERAL COMMUNICATION	**NOTES**
Through what channel will we communicate? (e.g., email, text, cell phone, other)	
What is our expectation for a timely response?	
Are there certain days of the week or times of the day we prefer to communicate? Are there "sacred" times during which no communication should occur?	
To what degree is the content/context of our conversations confidential?	
What should we do if confidentiality is a concern?	
How should we handle conflict if it arises?	
EXPECTATIONS – PROJECT MEETINGS	**NOTES**
How often should we meet and for how long?	
What channel should we use for these meetings (e.g., Skype, Zoom, other)?	

[6] © 2018 Melissa McDaniels and the Center for the Improvement of Mentored Experiences in Research (www.cimerproject.org)

What should a mentor do in preparation for a project meeting?	
What should a mentee do in preparation for a project meeting?	
How goal oriented or free form should our meetings be?	
If one of us needs to cancel, what should we do?	
How should we follow-up on meetings? (e.g., communicate advice taken, information promised, support offered)	
EXPECTATIONS – FORMAL FEEDBACK	**NOTES**
In what form and how often will a mentor give the mentee feedback on project progress?	
How much time should be allowed to review short documents?	
How much time should be allowed to review longer documents? (e.g., grants, manuscripts)	

EXPECTATIONS – WORKING WITH OTHER MENTORS	**NOTES**
What other mentors will be involved in the mentee's experience?	
How will the mentor interact with other mentors (if at all)?	
EXPECTATIONS – COLLABORATION	**NOTES**
Co-Authorship: Will we consider it? Under what circumstances?	
Grant Collaboration: Will we consider it? Under what circumstances?	
OTHER EXPECTATIONS	**NOTES**

Cultivating Ethical Behavior

Introduction

Mentors play an important role in both teaching and modeling ethical behavior. There are ethical issues centering on the science itself--how to conduct, report, and write scientific studies--as well as relationships between mentors and their mentees. Most relationships in science establish a power dynamic, and it is a mentor's responsibility to learn how to manage their power. Reflecting upon and discussing ethical behavior is an important part of becoming an effective mentor.

Learning Objectives

Mentors will have the knowledge and skills to:

1. Articulate ethical issues they need to discuss with their mentees
2. Clarify their roles as teachers and role models in educating mentees about ethics
3. Manage the power dynamic inherent in the mentoring relationship

Case Study: "Tweaking the Data" (EM)[7]

John is a postdoc mentoring a new graduate student in the lab and has assigned her to collect data for one of the experiments for an upcoming manuscript resubmission. When the dataset is complete, he sits down to analyze it and finds his predictions completely disconfirmed. Dismayed, he calls her into his office and asks her to describe, in great detail, what she did when collecting the data. He wants to make sure that these anomalous results can't be more easily explained by mistakes in the lab. Their conversations lasts quite a while, but at the end, he is still frustrated and puzzled by the data, and he sends her home so he can think about it some more.

Later, John is eating lunch in the cafeteria when he overhears his mentee talking to her classmate. Sounding very upset, she tells her classmate, "I think John is mad at me," and describes their recent meeting. John is surprised to realize that his mentee took his questioning very personally. When John's mentee finishes venting, her classmate replies, "If he's so mad, you probably did make a mistake somewhere. After all, this project is just a confirmation study for the manuscript resubmission. Right? Maybe you should tweak the data a little next time so he can submit the paper."

Guiding Questions for Discussion:

1. Who are the stakeholders in this case (individuals, institutions, public)?
2. What are the facts? What assumptions are you making about the situation?
3. What courses of action are possible? Which ones are preferable and why?
4. What, if anything, could have been done to prevent the situation?

[7] Pfund, C., Branchaw, J., and Handelsman, J. (2014). *Entering Mentoring*. New York, NY: W.H. Freeman & Company.

Case Study: “A Drive in the Country” (EM)[8]

A female graduate student and her male mentor were planning to attend the annual disciplinary conference in a city that is an 8-hour drive from their university. A few weeks before the meeting, the mentor went into the lab and suggested to the student that they drive to the meeting together. He said they could stay over in a hotel to break up the driving into two days, and it would still cost less than flying. He commented on how it was a very scenic drive, they might be able to collect some research samples along the way, and it would give them unbroken time to talk about research and her plans after graduating. As the student hesitated, she saw all of her lab mates stealing curious glances at her while the mentor waited for an answer.

Guiding Questions for Discussion:

1. What is the power dynamic in the mentoring relationship and what factors create it?
2. How might power issues have affected the trainees choices? For example, if another graduate student had offered to travel together, would her response have differed? Why?
3. Even assuming that the mentor and student have a strong, trusting relationship, why might the student be uncomfortable in this situation?
4. How might the mentor have handled the situation differently?
5. Is it acceptable for mentors to travel with mentees of the opposite sex (or of the same sex)? To professional meetings? For fieldwork? If not, does this, on average, disadvantage female trainees? Why?

[8] Pfund, C., Branchaw, J., and Handelsman, J. (2014). *Entering Mentoring*. New York, NY: W.H. Freeman & Company.

Addressing Equity and Inclusion

Introduction

Diversity, along a range of dimensions, offers both challenges and opportunities to any relationship. Learning to identify, reflect upon, learn from, and engage with diverse perspectives is critical to forming and maintaining both an effective mentoring relationship as well as a vibrant learning environment.

In the last session, your group discussed the importance of assessing mentees' understanding and how to best facilitate their learning. In this session, mentors will expand upon this by considering how to foster an inclusive environment where everyone can do their best learning and create the highest quality of research, both because of and in spite of their diverse perspectives.

Learning Objectives

Mentors will have the knowledge and skills to:

1. Improve and expand understanding of equity and inclusion and their influence on mentor-mentee interactions
2. Recognize the potential impact of conscious and unconscious assumptions, preconceptions, biases, and prejudices have on the mentor-mentee relationship and acquire skills to manage them
3. Identify concrete strategies for learning about, recognizing, and addressing issues of equity and inclusion in order to engage in conversations about diversity with mentees and foster a sense of belonging

Activity: 1-Minute Diversity Challenge[9]

In less than 1 minute, list as many ways that you are or perceive to be different from your mentee.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

Follow-up: Identify which differences from your list above enhance your mentoring relationship and discuss how you can (or do) capitalize on these differences to create a high quality research experience for your trainee.

[9] Developed by Kelly Diggs-Andrews

Case Study: “Is It OK to Ask?” (EM)[10]

Last summer, I worked with a fantastic graduate mentee. She was very intelligent and generated a fair amount of data directly relevant to her project. I think that she had a positive research experience, but there are a few questions that still linger in my mind. This particular mentee was an African American woman from a small town. I always wondered how she felt on a big urban campus. I also wondered how she felt about being the only African American woman in our lab. In fact, she was the only African American woman in our entire department that summer. I wanted to ask her how she felt, but I worried that it might be insensitive or politically incorrect to do so. I never asked. I still wonder how she felt and how those feelings may have affected her experience.

Guiding Questions for Discussions:

1. What are the main themes raised in this case study?
2. What might the mentor’s intent have been in asking the question, and what might have been the impact on the mentee?
3. How might you react to this case differently if the mentee’s difference was one of sexual orientation? How do you engage in such conversations based on interest without feeling or expressing a sense of judgment about differences? How do you ask without raising issues of tokenism?

[10] Pfund, C., Branchaw, J., and Handelsman, J. (2014). Entering Mentoring. New York, NY: W.H. Freeman & Company.

Benefits and Challenges of Diversity[11]

By Jo Handelsman and Eve Fine

The diversity of a university's faculty, staff, and students influences its strength, productivity, and intellectual personality. Diversity of experience, age, physical ability, religion, race, ethnicity, gender, and many other attributes contributes to the richness of the environment for teaching and research. We also need diversity in discipline, intellectual outlook, cognitive style, and personality to offer students the breadth of ideas that constitute a dynamic intellectual community.

A vast and growing body of research provides evidence that a diverse student body, faculty, and staff benefits our joint missions of teaching and research by increasing creativity, innovation, and problem solving. Yet diversity of faculty, staff, and students also brings challenges. Increasing diversity can lead to less cohesiveness, less effective communication, increased anxiety, and greater discomfort for many members of a community.[1] Learning to respect and appreciate each other's cultural and stylistic differences and becoming aware of unconscious assumptions and behaviors that may influence our interactions will enable us to minimize the challenges and derive maximum benefits from diversity.

This article summarizes research on the benefits and challenges of diversity and provides suggestions for realizing the benefits. Its goal is to help create a climate in which all individuals feel *personally safe, listened to, valued, and treated fairly and with respect.*[2]

> *It is time to renew the promise of American higher education in advancing social progress, end America's discomfort with race and social difference, and deal directly with many of the issues of inequality present in everyday life.*
>
> - Sylvia Hurtado

Benefits for Teaching and Research

Research shows that diverse working groups are more productive, creative, and innovative than homogeneous groups, and suggests that developing a diverse faculty will enhance teaching and research.[3] Here are some of the findings.

- A controlled experimental study of performance during a brainstorming session compared ideas generated by ethnically diverse groups composed of Asians, blacks, whites, and Latinos to those generated by ethnically homogenous groups composed of whites only. Evaluators who were unaware of the source of the ideas found no significant difference in the number of ideas generated by the two types of groups. However, when applying measures of feasibility and effectiveness, they rated the ideas generated by diverse groups as being of higher quality.[4]

- The level of critical analysis of decisions and alternatives was higher in groups exposed to minority viewpoints than in groups that were not. Minority viewpoints stimulated discussion of multiple perspectives and previously unconsidered alternatives, whether or not the minority opinion was correct or ultimately prevailed.[5]

- A study of corporate innovation found that the most innovative companies deliberately established diverse work teams.[6]

[11] Handelsman, J., Pfund, C., Miller Lauffer S., and Pribbenow, C. M. (2005). *Entering Mentoring: A Seminar to Train a New Generation of Scientists,* Madison, WI: University of Wisconsin Press.

- Data from the 1995 Faculty Survey conducted by UCLA's Higher Education Research Institute (HERI) demonstrated that scholars from minority groups have expanded and enriched scholarship and teaching in many academic disciplines by offering new perspectives and by raising new questions, challenges, and concerns.[7]

- Several investigators found that women and faculty of color more frequently employed active learning in the classroom, encouraged student input, and included perspectives of women and minorities in their coursework.[8]

Benefits for Students

Numerous research studies have examined the impact of diversity on students and educational outcomes. Cumulatively, these studies provide extensive evidence that diversity has a positive impact on all students, minority and majority.[9] Here are some examples.

- A national longitudinal study of 25,000 undergraduates at 217 four-year colleges and universities showed that institutional policies fostering diversity of the campus community had positive effects on students' cognitive development, satisfaction with the college experience, and leadership abilities. These policies encouraged faculty to include themes relating to diversity in their research and teaching, and provided students with opportunities to confront racial and multicultural issues in the classroom and in extracurricular settings.[10]

- Two longitudinal studies, one conducted by HERI in 1985 and 1989 with over 11,000 students from 184 institutions and another in 1990 and 1994 with approximately 1,500 students at the University of Michigan, showed that students who interacted with racially and ethnically diverse peers both informally and within the classroom showed the greatest "engagement in active thinking, growth in intellectual engagement and motivation, and growth in intellectual and academic skills."[11] A more recent study of 9,000 students at 10 selective colleges reported that meaningful engagement rather than casual and superficial interactions led to greater benefit from interaction with racially diverse peers.[12]

- Data from the National Study of Student Learning indicated that both in-class and out-of-class interactions and involvement with diverse peers fostered critical thinking. This study also found a strong correlation between "the extent to which an institution's environment is perceived as racially nondiscriminatory" and students' willingness to accept both diversity and intellectual challenge.[13]

- A survey of 1,215 faculty members in departments granting doctoral degrees in computer science, chemistry, electrical engineering, microbiology, and physics showed that women faculty played important roles in fostering the education and success of women graduate students.[14]

Challenges of Diversity

Despite the benefits that a diverse faculty, staff, and student body provide to a campus, diversity also presents considerable challenges that must be addressed and overcome. Here are some examples.

- Numerous studies have reported that women and minority faculty members are considerably less satisfied with many aspects of their jobs than are majority male faculty members. These aspects include teaching and committee assignments, involvement in decision making,

professional relations with colleagues, promotion and tenure, salary inequities, and overall job satisfaction.[15]

- A study of minority faculty at universities and colleges in eight midwestern states showed that faculty of color experience exclusion, isolation, alienation, and racism in predominantly white universities.[16]

- Multiple studies demonstrate that minority students often feel isolated and unwelcome in predominantly white institutions and that many experience discrimination and differential treatment. Minority status can result from race, ethnicity, national origin, sexual orientation, disability, and other factors.[17]

- Women students, particularly when they are minorities in their classes, may experience unwelcoming climates that can include sexist use of language, presentation of stereotypic or disparaging views of women, differential treatment from professors, and/or sexual harassment.[18]

- When a negative stereotype relevant to their identity exists in a field of interest, women and members of minority groups often experience "stereotype threat"—the fear that they will confirm or be judged in accordance with the stereotype. Such stereotype threat exists both for entry into a new field and for individuals already excelling in a specific arena. Situations or behaviors that heighten awareness of one's minority status can activate stereotype threat.[19] Research demonstrates that once activated, stereotype threat leads to stress and anxiety, which decreases memory capacity, impairs performance, and reduces aspirations and motivation.[20] Human brain imaging, which shows that activating stereotype threat causes blood to move from the cognitive to the affective centers of the brain, indicates how situational cues reduce cognitive abilities.[21]

- Research has demonstrated that a lack of previous positive experiences with "outgroup members" (minorities) causes "ingroup members" (majority members) to feel anxious about interactions with minorities. This anxiety can cause majority members to respond with hostility or to avoid interactions with minorities.[22]

Influence of Unconscious Assumptions and Biases

Research studies show that people who have strong egalitarian values and believe that they are not biased may unconsciously behave in discriminatory ways.[23] A first step toward improving climate is to recognize that unconscious biases, attitudes, and other influences unrelated to the qualifications, contributions, behaviors, and personalities of our colleagues can influence our interactions, *even if we are committed to egalitarian views*. Although we all like to think that we are objective scholars who judge people on merit, the quality of their work, and the nature of their achievements, copious research shows that a lifetime of experience and cultural history shapes every one of us and our judgments of others.

People confident in their own objectivity may overestimate their invulnerability to bias.
- Eric Uhlmann and Geoffrey Cohen

The results from controlled research studies demonstrate that people often hold unconscious, implicit assumptions that influence their judgments and interactions with others. Examples range from expectations or assumptions about physical or social characteristics associated with race, gender, age,

and ethnicity to those associated with certain job descriptions, academic institutions, and fields of study. Let's start with some examples of common social assumptions or expectations.

- When shown photographs of people of the same height, evaluators overestimated the heights of male subjects and underestimated the heights of female subjects, even though a reference point, such as a doorway, was provided.[24]

- When shown photographs of men of similar height and build, evaluators rated the athletic ability of black men higher than that of white men.[25]

- When asked to choose counselors from a group of equally competent applicants who were neither exceptionally qualified nor unqualified for the position, college students chose white candidates more often than African American candidates, exhibiting a tendency to give members of the majority group the benefit of the doubt.[26]

These studies show that we often apply generalizations about groups that may or may not be valid to the evaluation of individuals.[27] In the study on height, evaluators applied the statistically accurate generalization that men are usually taller than women to estimate the height of individuals who did not necessarily conform to the generalization. If we can inaccurately apply generalizations to objective characteristics as easily measured as height, what happens when the qualities we are evaluating are not as objective or as easily measured? What happens when, as in the studies of athletic ability and choice of counselor, the generalizations are not valid? What happens when such generalizations unconsciously influence the ways we interact with other people? Here are some examples of assumptions or biases that can influence interactions.

- When rating the quality of verbal skills as indicated by vocabulary definitions, evaluators rated the skills lower if told that an African American provided the definitions than if told that a white person provided them.[28]

- When asked to assess the contribution of skill versus luck to successful performance of a task, evaluators more frequently attributed success to skill for males and to luck for females, even though males and females performed the task identically.[29]

- Evaluators who were busy, distracted by other tasks, and under time pressure gave women lower ratings than men for the same written evaluation of job performance. Sex bias decreased when they took their time and focused attention on their judgments, which rarely occurs in actual work settings.[30]

- Research has shown that incongruities between perceptions of female gender roles and leadership roles can cause evaluators to assume that women will be less competent leaders. When women leaders provided clear evidence of their competence, thus violating traditional gender norms, evaluators perceived them to be less likable and were less likely to recommend them for hiring or promotion.[31]

- A study of nonverbal communication found that white interviewers maintained higher levels of visual contact, reflecting greater attraction, intimacy, and respect, when talking with white interviewees and higher rates of blinking, indicating greater negative arousal and tension, when talking with black interviewees.[32]

Several research studies conclude that implicit biases and assumptions can affect evaluation and hiring of candidates for academic positions. These studies show that the gender of the person being evaluated significantly influences the assessment of résumés and postdoctoral applications, evaluation of journal articles, and the language and structure of letters of recommendation. As we attempt to enhance campus and department climate, the influence of such biases and assumptions may also affect selection of invited speakers and conference presenters, committee membership, interaction and collaboration with colleagues, and promotion to tenure and full professorships. Here are some examples of assumptions or biases in academic contexts.

A study of over 300 recommendation letters for medical faculty hired by a large American medical school found that letters for female applicants differed systematically from those for males. Letters written for women were shorter, provided "minimal assurance" rather than solid recommendations, raised more doubts, and included fewer superlative adjectives.[33]

- In a national study, 238 academic psychologists (118 male, 120 female) evaluated a junior-level or a senior-level curriculum vitae randomly assigned a male or a female name. These were actual vitae from an academic psychologist who successfully competed for an assistant professorship and then received tenure early. For the junior-level applicant, both male and female evaluators gave the male applicant better ratings for teaching, research, and service and were more likely to hire the male than the female applicant. Gender did not influence evaluators' decisions to tenure the senior-level applicant, but evaluators did voice more doubts about the female applicant's qualifications.[34]

- A study of postdoctoral fellowships awarded by the Medical Research Council of Sweden found that women candidates needed substantially more publications to achieve the same rating as men, unless they personally knew someone on the selection panel.[35]

- A 2008 study showed that when the journal *Behavioral Ecology* introduced a double-blind review process that concealed the identities of reviewers and authors, there was a significant increase in the publication of articles with a woman as the first author.[36]

Reaping the Benefits and Minimizing the Challenges of Diversity

To reap the benefits and minimize the challenges of diversity, we need to overcome the powerful human tendency to feel more comfortable when surrounded by people we resemble. We need to learn how to understand, value, and appreciate difference. Here is some advice for doing so.

Become aware of unconscious biases that may undermine your conscious commitment to egalitarian principles.

One way of doing this is to take the Implicit Association Test (IAT) offered by Project Implicit, a research collaborative at the University of Virginia, Harvard University, and the University of Washington (https://implicit.harvard.edu/implicit/demo).

Consciously strive to minimize the influence of unintentional bias.

Question your judgments and decisions and consider whether unintentional bias may have played a role. One way to do so is to perform a thought experiment: ask yourself if your opinions or conclusions would change if the person was of a different race, sex, religion, and so forth. Some questions to consider include the following:

- Are women or minority colleagues/students subject to higher expectations in areas such as number and quality of publications, name recognition, or personal acquaintance with influential colleagues?
- Are colleagues or students who received degrees from institutions other than major research universities undervalued? Are we missing opportunities to benefit from the innovative, diverse, and valuable perspectives and expertise of colleagues or students from other institutions such as historically black universities, four-year colleges, community colleges, government, or industry?
- Are ideas and opinions voiced by women or minorities ignored? Are their achievements and contributions undervalued or unfairly attributed to collaborators, despite evidence to the contrary in their publications or letters of reference?
- Is the ability of women or minorities to lead groups, raise funds, and/or supervise students and staff underestimated? Are such assumptions influencing committee and/or course assignments?
- Are assumptions about whether women or minorities will "fit in" to an existing environment influencing decisions?
- Are assumptions about family obligations inappropriately influencing appointments and other decisions?

Seek out opportunities for greater interaction with women and minority colleagues.

Get to know women and minority colleagues in your department, your campus, and your professional associations. Pursue meaningful discussions with them about research, teaching methodologies, and ideas about the direction of your department, college, and profession. Listen actively to any concerns they express and try to understand and learn from their perspectives and experiences.

Focus on the individual and on their personality, qualifications, merit, and interests.

Consciously avoid the tendency to make assumptions about an individual based on the characteristics (accurate or not) of their group membership. Likewise, avoid the tendency to make assumptions about groups based on the behavior, personality, or qualifications of an individual group member. Instead, concentrate on the individual and their qualities.

Treat all individuals—regardless of race, sex, or status—with respect, consideration, and politeness.

- Greet faculty, staff, and students pleasantly in hallways or in other chance encounters.
- Make requests to faculty, staff, and students politely—even when the work you are asking for is part of their obligations.
- Acknowledge and appreciate the work, assistance, and contributions of faculty colleagues, staff, and students. Do so in public forums as well as privately.
- Address individuals by their appropriate titles or by their preferred forms of address.

Actively promote inclusive communities.

- In classroom, committee, laboratory, and departmental settings, work to ensure that everyone has a chance to voice opinions, concerns, or questions. Acknowledge and attribute ideas, suggestions, and comments accurately. Women and minorities often report that their remarks or contributions are ignored or unheard.
- Support efforts to ensure that leadership and membership of departmental and professional committees are diverse with respect to age, gender, nationality, race, ethnicity, and so on.
- Support efforts to ensure that departmental events such as seminar series and sponsored conferences include presenters of various ages, genders, nationalities, races, and ethnicities.
- Promote inclusive language by example. Avoid using only male pronouns when referring to groups of both sexes. Avoid language that makes assumptions about marital status and or/sexual orientation; for example, consider using "partner" rather than "spouse."
- Welcome new departmental members by initiating conversations or meetings with them. Attend social events hosted by your department and make efforts to interact with new members and others who are not part of your usual social circle.

Avoid activating stereotype threat.

In addition to the preceding advice for actively promoting inclusive communities, the following suggestions can prevent the activation of stereotype threat or counteract its effects:

- Teach students and colleagues about stereotype threat.[37]
- Counter common stereotypes by increasing the visibility of successful women and minority members of your discipline. Ensure that the posters and/or photographs of members of your department or discipline displayed in hallways, conference rooms, and classrooms reflect the diversity you wish to achieve. Choose textbooks that include the contributions and images of diverse members of your discipline.[38]
- Support and encourage your students by providing positive feedback as well as constructive criticism to ensure that they know their strengths and develop confidence in their abilities. Save your harshest criticism for private settings so that you do not humiliate or embarrass students in front of either their peers or more senior colleagues. Such respectful practices are important for all students, but are likely to be more important for women and members of minority groups, who may have received less encouragement and may be at greater risk of being discouraged due to the influence of stereotype threat. Demonstrate similar respect and encouragement for your colleagues.
- For more suggestions, see http://reducingstereotypethreat.org/reduce.html.

Conclusion

Diversity is not an end in itself. Diversity is a means of achieving our educational and institutional goals. As such, merely adding diverse people to a homogeneous environment does not automatically create a more welcoming and intellectually stimulating campus.

Long-term efforts, engagement, and substantial attention are essential for realizing the benefits that diversity has to offer and for ensuring that all members of the academic community are respected, listened to, and valued.

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Mentoring Action Plan

Competency	**What can I do differently in the future?**
Maintaining Effective Communication	
Aligning Expectations	
Cultivating Ethical Behavior	
Addressing Equity and Inclusion	