Mentor Training for Biomedical Researchers

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Contents

Preface

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 reexamine 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.

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Curriculum Overview

Curriculum Overview

Content, Audience, Format, Implementation and Assessment

Content

The content of each session in this curriculum is designed to address the key concerns and challenges identified by research mentors. The topics include:

- Maintaining Effective Communication
- Aligning Expectations
- Assessing Understanding
- Addressing Equity and Inclusion
- Fostering Independence
- Promoting Professional Development

Each of these topics is critical for mentoring; yet these divisions are, at some level, artificial and overlapping, focusing on one topic in each session allows mentors to delve more deeply into each. In addition to general content about research mentoring, all of the case studies and some of the discussion questions draw specific attention to the unique circumstances and challenges related to mentoring trainees working in biomedical research. Session leaders who use these training materials are encouraged to read through all of the materials ahead of time so they can highlight linkages between topics throughout the training. Additional materials for the topics areas above as well as for other topics, including ethics, are available at: https://mentoringresources.ICTR.wisc.edu

In 2010, *Entering Mentoring* was adapted for clinical and translational researchers as part of a randomized controlled trial to test its effectiveness. The resulting curriculum was *Mentor Training for Clinical and Translational Researchers.* Mentors who engaged in this curriculum requested materials that more closely address their needs within particular sub-fields of clinical and translational research. This inspired a project to create three specialized curricula within this field, *Mentor Training for Biomedical Researchers* being one of them. Curricula targeted for community-engaged researchers and clinical and behavioral researchers were also developed. PDF versions of all of these curricula are freely available at https://mentoringresources.ICTR.wisc.edu .

Audience

This curriculum is designed for those who wish to implement mentorship development programs for academic research mentors in biomedical research. It was tailored for the primary research mentors of graduate students and post-docs engaged in some aspect of biomedical laboratory or animal-based research. Such research is conducted primarily in a laboratory setting, where human interactions are with other researchers, rather than patients or human subjects. Curricula that target more specifically clinical research and behavioral health research or community-engaged research are available at https://mentoringresources.ICTR.wisc.edu.

Mentor-Mentee Relationship Parameters

Interactions in biomedical research settings tend to be communal, with multiple researchers sharing lab space at the same time and often working on the same or inter-related projects. Regularly scheduled lab meetings with all those working within the space are standard and provide a space in which group feedback or mentoring may occur. Mentors and mentees often have economic ties to each other, either

through a dependence on shared equipment and space or through a direct employer/employee relationship where researchers are funded by their mentors' grants.

While the individual activities included in the curriculum may focus on a specific type of research or a specific aspect of a mentoring relationship, the curriculum as a whole is designed to include activities relevant to a broad range of mentors across diverse areas of research and varied stages of the their mentoring relationships.

Format

The structure of this research mentor training program is based on the experience of faculty and staff who implemented the *Entering Mentoring* curriculum at the University of Wisconsin-Madison. These facilitators have learned that the best results come from keeping an open discussion format to allow for participants' diverse experiences to be integrated into the training. Simply asking the mentors a few guiding questions typically leads to vigorous discussion. The case studies and reading materials can provide a tangible starting point, and the mentors will often move quickly from the hypothetical examples to their own experiences with trainees and students. In fact, facilitators are encouraged to use the mentoring situations described by participants in place of the provided case studies, when appropriate. The training is most effective with mentors who are currently working with researchers. The short duration of such training intensifies the urgency of dealing successfully with challenges that arise. Likewise, frequent contact with trainees provides mentors opportunities to immediately implement ideas generated by the discussions. You may want to encourage participants to reflect on any changes they have made in their mentoring practices at the start of each training session.

Implementation: Facilitating Research Mentor Training

Facilitating research mentor training is not the same as teaching it. Your role as facilitator is to enable participants to engage in self-reflection and shared discovery to maximize learning.. Your role in the group is to build a community of mentors learning together toward the common goal of becoming more effective in their mentoring relationships. Your role is to help others work through their thoughts and ideas; it is not your role to be the expert on mentoring. As a facilitator you may also walk a fine line between facilitator and participant—but remember that group members will look to you for guidance and structure. Your own experiences and ideas should enhance the discussion, but not dominate and become the primary focus of the discussion.

Being an effective facilitator is the key to helping the research mentors meet the learning objectives and become more successful mentors. To assist you in and strengthen your own facilitation abilities, we have included a brief facilitator guide in the next section that contains additional information, tips, and tools for facilitation.

Implementation: Using this Guidebook to Facilitate Weekly Sessions

This guidebook contains facilitator instructions and materials for each of the sessions outlined in the sample syllabus. Each session is organized as follows:

1. Introduction
2. Learning objectives
3. "Overview of Activities" table
4. Facilitation guide, including recommended session length, materials needed, objectives in detail, and post-session assignments
5. Activities, case studies, handouts, readings, and mentoring tools

Facilitators should prepare for each session by copying the learning objectives, case studies, worksheets, mentoring tools, and readings for each mentor in the group. Alternatively, all the materials can be copied at the start of the sessions and distributed at the first meeting or posted on a website. The specific themes and objectives for each session are included at the beginning of the materials. Facilitators might consider asking participants to review the themes and learning objectives at the beginning of each session, or to review them after a few weeks to check their progress.

Guiding discussion questions and notes for group facilitators are also included in each session plan. Time estimates for activities and facilitated discussions for each session are indicated in parentheses and can be adjusted at the facilitator's discretion. The facilitator notes provide directive signposts to support the facilitation process as described below:

ACTIVITY	Participants are to engage in some process on their own, in small groups, or as a large group.
TELL	Information that follows needs to be shared with the whole group.
ASK	A specific question needs to be put to the group.
NOTE	Some particular issue or content needs to be emphasized.
DISCUSS	A broader discussion, usually supported by guiding questions, needs to occur. Sometimes more discussion questions are provided than can reasonably be addressed in the time allotted for the activity or group discussion, but the questions suggested for the case studies in this training are based on the experiences of past facilitators.

We have provided an example of how the sessions might be structured as four two-hour sessions (page 14). While the spacing between these sessions is flexible, former participants found separating them by 1-2 weeks to be effective as it allows time for reflection and practice. Further, facilitators may want to consider alternate session pairing and length. An effective alternative could be one two-hour session, followed by two three-hour sessions:

Session 1 (2 hours): *Introductory Session* and *Maintaining Effective Communication*
Session 2 (3 hours): *Aligning Expectations, Assessing Understanding*, and *Addressing Equity and Inclusion*
Session 3 (3 hours): *Fostering Independence, Promoting Professional Development,* and *Articulating Your Mentoring Philosophy and Plan*

Assessment of Research Mentor Training

Following the research mentor training session(s), you might consider asking participants to complete a survey based on their experience. This survey that has been developed for this purpose can be used to collect feedback on the research mentor training sessions themselves, on your skills as a facilitator and to assess the knowledge, skill gains of your participants upon completion of the training. We recommend using a survey that includes the Mentoring Competency Assessment (MCA) which can be found at https://mentoringresources.ICTR.wisc.edu.

Curriculum Outline:
Competencies and Learning Objectives

Introduction to Mentor Training

Learning Objectives for Introduction

Mentors will have the knowledge and skills to:

1. Learn about other mentors in the group and begin building a learning community
2. Reflect on group dynamics and ways to make the group functional
3. Establish ground rules for participation

Maintaining Effective Communication

Learning Objectives for Communication

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 mentees, and within proper personal boundaries)

Aligning Expectations

Learning Objectives for Expectations

Mentors will have the knowledge and skills to:

1. Effectively establish mutual 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 impact expectations, including differences across disciplines when working in multidisciplinary teams

Assessing Understanding

Learning Objectives for Understanding

Mentors will have the knowledge and skills to:

1. Assess their mentees' understanding of core concepts and processes
2. Identify various reasons for a lack of understanding, including expert-novice differences
3. Use multiple strategies to enhance mentee understanding across diverse disciplinary perspectives

Addressing Equity and Inclusion

Learning Objectives for Equity and Inclusion

Mentors will have the knowledge and skills to:

1. Improve and expand understanding of equity and inclusion, and how diversity influences mentor-mentee interactions

2. Recognize the impact of conscious and unconscious assumptions, preconceptions, biases, and prejudices on the mentor-mentee relationship and reflect on how 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

Fostering Independence

Learning Objectives for Independence

Mentors will have the knowledge and skills to:

1. Define independence, its core elements, and how those elements change over the course of a mentoring relationship
2. Employ various strategies to build mentee confidence, establish trust, and foster independence
3. Identify the benefits and challenges of fostering independence, including the sometimes conflicting goals of fostering independence and achieving grant-funded research objectives

Promoting Professional Development

Learning Objectives for Professional Development

Mentors will have the knowledge and skills to:

1. Identify the roles mentors play in the overall professional development of their mentees
2. Develop a strategy for guiding professional development using a written document
3. Initiate and sustain periodic conversations with mentees on professional goals and career development objectives and strategies
4. Engage in open dialogue on balancing the competing demands, needs, and interests of mentors and mentees, e.g., research productivity, grant funding, creativity and independence, career preference decisions, non-research activities, personal development, work-family balance, etc.

Articulating Your Mentoring Philosophy and Plan

Learning Objectives for Articulating Your Mentoring Philosophy and Plan

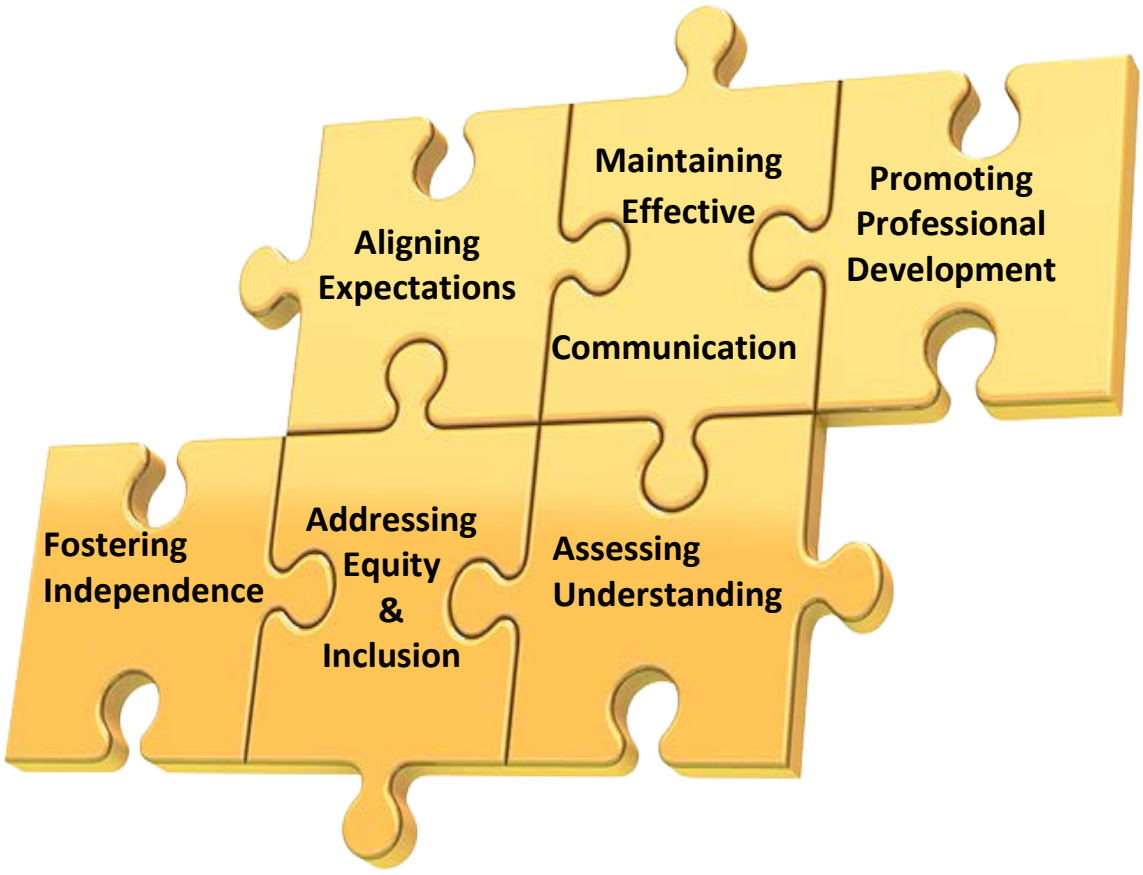
Mentors will have the knowledge and skills to:

1. Reflect on the mentor-training experience
2. Reflect on any behavioral or philosophical changes they intend to make across the mentoring competencies
3. Articulate an approach for working with new mentees in the future

Sample Biomedical Research Mentor Training Schedule

Each session is 2 hours. (See page 13 for a discussion about session structure and pairing).

Sessions	Topics
Session 1	Introductions Maintaining Effective Communication
Session 2	Aligning Expectations Assessing Understanding
Session 3	Addressing Equity and Inclusion Fostering Independence
Session 4	Promoting Professional Development Articulating Your Mentoring Philosophy and Plan



Session Outline

This manual contains facilitator instructions and materials for each of the competencies outlined above. Each session is organized as follows:

1. Introduction
2. Learning Objectives
3. Overview of Activities Table
4. Materials Needed for the Session
5. Detailed Facilitator Instructions
6. Activity Descriptions, Case Studies and Handouts

Note: The Introduction and Learning Objectives should be handed out to the seminar participants at the beginning of each session.

Introduction to Facilitation

Roles of Facilitators

The following materials were designed to assist you in your role as facilitator of the research mentor training curriculum. Specifically, these materials will help you guide the mentors as they work through their thoughts and ideas and engage in self-reflection and shared discovery. Importantly, your role is not to teach others how to mentor, but rather to guide them**.** As a facilitator, your role is to:

- **Make it safe:** Take time to tell the group members that the research mentor training sessions are a safe place to be honest about their ideas and feelings. Everyone's ideas are worth hearing.

- **Keep it constructive and positive:** Remind members of your group to keep things positive and constructive. Ask the group how they want to deal with negativity and pointless venting. Remind them the training is about working together to learn, not complaining about the current situation or discounting the ideas of others in the interest of a personal agenda.

- **Make the discussion functional:** At the start of each session, explain the goals of the session to the group. Try to keep the group on task without rushing them. If the conversation begins to move beyond the main topic, bring the discussion back to the main theme of the session.

- **Give members of the group functional roles and responsibilities:** Assign or ask for volunteers to take notes, keep track of time, and report to the larger group at the end of the session. Functional roles help keep participants engaged.

- **Give all participants a voice**: In a group, there are likely to be issues of intimidation and power dynamics that can play out in ways that allow certain members of the group to dominate while others remain silent. At the start of the conversation, mention that the group is mixed by design, and point out that a diversity of perspectives is an essential part of the process. Remind group members to respect all levels of experience. It's important that everyone's voice is heard.

General Notes on Facilitating a Group

Each group will take on its own feel and personality based on the people in the group, the facilitator's approach, and a host of external factors beyond your control. It helps if you adopt a no-fault clause stating that if a group is not working well, it is through no fault of a single individual, but rather a combination of circumstances. It's hard to not take it personally if a group doesn't function well, but remember, you are just one part of the whole dynamic.

It also helps if you are able to release your expectations for how a meeting or group should go, and instead focus on core aspects of the process. Your role as facilitator is to be intentional and explicit, while remaining flexible and not overly prescriptive. You can only do so much as a facilitator – to a large extent it is up to the participants to take ownership of their own learning especially since this training is designed for adults who have advanced degrees. Individual ownership, self-reflection, and shared discovery and learning will promote the deepest learning for this particular type of program.

As challenging but normal group dynamics surface, the group will look to you to fix problems. But part of your role is to help others see that they are also responsible for fixing problems. You can help them realize this by holding on tightly to the following core ideas of group dynamics (and periodically reminding the team of them):

- Respectful interactions (listening, non-judging, non-dominating, genuine questioning, etc.) are essential.

- Relevant tangents that tie back to a central topic, issue, or question are fine, but don't let them derail the central purpose of the discussion.

- You need to keep moving ahead, but there is no need to push the schedule if the group needs time to reflect or slow down (if you slow down or skip something, you can anticipate participants will feel they are behind or missing out, so reassure them this is normal and the initial schedule is only a guide and there will be time to revisit topics if needed).

- If you try something and it doesn't go well, don't abandon it right away. Step back and think about what went wrong, talk to the group, learn from it, and try it again. It often takes a time or two to get the group warmed up to something new.

- Discomfort and silence are ok, but with a clearly stated context and purpose. Silence may seem like a waste of time in meetings, but it gives people a chance to think, digest, and reflect. Allow for a few silent breaks before, during, and at the end of each meeting.

- Make it easy, rewarding, and fun for people to participate, and encourage others to do the same for each other. Simple things like friendly reminders of meetings; providing coffee, tea, or snacks; and follow-up calls to check in with someone if they miss a meeting all send the message that you care and want to make it easy for individuals to participate.

Adapted from the Creating a Collaborative Learning Guidebook, Center for the Integration of Research, Teaching, and Learning: http://www.cirtl.net/files/Guidebook_CreatingACollaborativeLearningEnvironment.pdf (Accessed April 3, 2014)

Group Dynamics:
Suggestions for How to Handle Challenges

What do I do when no one talks?

- Have everyone write an idea or answer to a question on a piece of paper and toss it in the middle of the table. Each participant then draws a piece of paper from the center of the table (excluding their own) and reads it out loud. All ideas are read out loud before discussion begins.
- Have participants discuss a topic in pairs for three to five minutes before reconvening as an entire group
- Ask the group: "This topic seems challenging for us…why do you think that is?"

What do I do when one person is dominating the conversation?

- Use a talking stone to guide the discussion. Participants may only talk when holding the stone. Each person in the group is given a chance to speak before anyone else can have a second turn with the stone. Participants may pass if they choose not to talk. Importantly, each person holding the stone should share their own ideas and resist responding to someone else's ideas. Generally once everyone has a chance to speak, the group can move into open discussion without the stone.
- Use the Constructive/Destructive Group Behaviors Exercise. Each participant chooses their most constructive and destructive group behavior from a list (see following page). Each person writes the two behaviors on the back of their table tent. Then participants share their choice with the group and explain why they selected those behaviors. This exercise also helps provide the group with a vocabulary so they may name these behaviors as they later note them in themselves and others. It provides a light hearted and nonthreatening way that they can help each other stay on track.
- Acknowledge the contributions of the person dominating the conversation but then say that you would like to hear another's view or thoughts before moving on. Try to be comfortable with silence until another person speaks up.

What do I do when the group members direct all their questions and comments to me, instead of their fellow group members?

- Each time a group member talks to you, move your eye contact to someone else in the group to help the speaker direct their attention elsewhere.
- Ask the participants for help in resolving one of your mentoring challenges. For example, ask them for advice on how to deal with an apathetic mentee. This helps the group members stop looking to you for the right answers and redirects the problem-solving and discussion focus to the entire group.

What do I do when a certain person never talks?

- Have a different participant initiate each day's discussion so that different people have the chance to speak first.
- Assign participants in the group different roles in a scenario or case study and ask them to consider the case from a certain perspective. Ask the participants to discuss the case in the

larger group from the various perspectives. For example, some participants could consider the perspective of the mentee, while others consider the perspective of the mentor.
- Try smaller group discussions (two to three participants per group) as individuals may feel more comfortable talking in smaller groups or without certain other individuals present.

What do I do when the group gets off topic?

- Have everyone write the ideas they want to share on a given topic for three minutes. This short writing time will help participants collect their ideas and decide what thoughts they would most like to share with the group so they can focus on that point.
- Ask someone to take notes and recap the discussion at the half-way and end points of the session to keep the conversation focused. Remind participants of the day's topic or a question that we asked.

Constructive and Destructive Group Behaviors

Choose your single most constructive group behavior and your single most destructive group behavior from the list below. Share your choices with the members of your group so they may draw on your constructive behavior and minimize your destructive behavior as you work together.

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 success of the overall group or project.

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

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, etc.

Rushing: Encourages the group to move on before 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…

Adapted from Brunt. 1993. Facilitation Skills for Quality Improvement. *Quality Enhancement Strategies*. 1008 Fish Hatchery Road. Madison WI 53715

Introduction to Mentor Training

Introduction to Mentor Training

Introduction

Establishing group dynamics and laying the ground rules are perhaps two of the most important steps to launch a successful mentor training program. Once established, these parameters help ensure mentors engage in shared learning of ways to become more effective mentors.

Learning Objectives

Mentors will have the knowledge and skills to:

1. Learn about other mentors in the group and begin building a learning community
2. Reflect on group dynamics and ways to make the group functional
3. Establish ground rules for participation

Overview of Activities for the Introduction to Mentor Training: Please note core activities for this introductory session should be chosen by the facilitator from either the list of options provided or their own experience.

	Learning Objectives	**Core Activities will be chosen by individual facilitators** Example activities are included below.
1	Learn about other mentors in the group and begin building a learning community	Optional pre-introductory activities: online social networking (Activity #1) or mentoring philosophy (Activity #2) Introductory activities (Activity #3) Identify mentoring challenges to solve (Activity #4)
2	Reflect on group dynamics and ways to make the group functional	Constructive and Destructive Group Behaviors (Activity#5)
3	Establish ground rules for participation	Give or Generate Group Ground Rules (Activity #6)

Facilitation Guide

Recommended Session for Introduction to Mentor Training (30 minutes)

- **Materials Needed for the Session:**
  - Table tents and markers
  - Chalkboard, whiteboard, or flip chart
  - Handouts:
    - Copies of introduction and learning objectives for Introduction to Mentor Training (pg 29)
    - Any handouts needed for your chosen introductory activities such as copies of the Constructive/Destructive Behaviors list (see page 25)
    - Additional materials may be needed based on introductory activities selected

- TELL: Remind participants that they are demonstrating a special commitment to mentoring by taking time from their busy schedules to improve their mentoring skills. Mention that over 90% of prior participants have reported research mentor training to be a valuable use of their time and that they found the time to discuss issues with peers as one of the most valuable aspects of

training. Note that while case studies are provided as discussion catalysts throughout the training, they should always be encouraged to bring their own experiences and challenges to the group for discussion.

- **Objective 1: Learn about other mentors in the group and begin building a learning community (15 min)**
  - ACTIVITY #1: Optional Pre Introductory Activity #1
    - ASK: Before the first training session, have mentors join a private online social networking community. This will allow them to become acquainted with each other before the training, may allow for better rapport during the sessions, and provide an opportunity to maintain connections during and after the training. This is especially encouraged if mentors are from different institutions. Instruct mentors to create their own profiles and share basic information about themselves (name, title, department, area of research interest, mentoring experience). An online community may be created through social networking sites such as Ning (www.ning.com), SocialGO (www.socialgo.com) and wall.fm (http://wall.fm) or your own college or university's learning management system. Alternatively, basic information or biographies could be collected from each participating mentor and distributed to the group before the training via email.
  - ACTIVITY #2: Optional Pre Introductory Activity #2
    - TELL: Instruct participants to write a short mentoring philosophy. Let participants know that they can revise their philosophy through the training and reexamine it during or after the last training session. If participants are unsure what to write, encourage them to consider their approaches to each of the curriculum categories: communication, expectations, independence, equity and inclusion, understanding and professional development.

  - ACTIVITY #3: Introductory Activity (10 min)
    - ASK: Invite participants to engage in the activity below, choose an alternate activity from page 33 or use one from your own experience.
    - TELL: Remind participants that everyone sees the world through their own cultural lens and that our diversity comes from our biography, from our own lived experiences.
    - ASK: Ask participants to list three things about themselves that are not directly related to their work or career, and then share those three things in pairs. Assure participants they can share as little or as much as they are comfortable with.
    - Some potential aspects could include educational background/discipline, the educational background of their parents, whether they were raised in urban or rural settings, experiences with people with disabilities, time abroad, languages spoken, preferences in music, etc. List the things that people named on a whiteboard or flip chart (save this list for an activity in the session on Equity and Inclusion).
      - Sample list:
        - Listens to country music
        - Speaks more than one language
        - Has at least one family member who works in medicine, public health or biomedical research
        - Rides a bike or bus to work
        - Grew up in a town with a population of less than 30,000

- Is a first generation college graduate
- Plays a musical instrument
- Has ever been in a play
- Has lived abroad
- Has more than two siblings
- Is a parent

- TELL: Let participants know they will be returning to this list later. Ask them to begin to reflect on how much they know about their mentees, and about how these kinds of factors impact their relationship with their mentees.

➢ ACTIVITY #4 (5 min):
- DISCUSS: Have participants share challenges they hope to resolve or gain insight on during the training. Facilitators should record these on a white board or flip chart Facilitators should be mindful to address these challenges as they continue through each session. Alternatively, instruct participants to email these challenges to the facilitators before the first session.

❖ **Objective 2: Reflect on group dynamics and ways to make the group functional (10 min)**

➢ ACTIVITY #5: Building Constructive Group Dynamics (10 min)
- Choose an activity that will engage participants in a discussion of constructive and destructive group behaviors and how to deal with them. For example:
  1. ASK: Have each participant choose their most constructive and one destructive group behavior from the list on page 25. Ask participants to write them on the back of their table tent. Each participant then explains their choices to the entire group.
  2. DISCUSS: Engage participants in a conversation about ways to handle destructive group behavior. For example, ask participants what facilitators and other participants should do if someone starts to dominate the conversation or completely withdraws from the discussion.
     OR
  3. ASK: Have participants list good and bad group behaviors and brainstorm ways to address these behaviors if they arise in the group.
- NOTE: This exercise helps provide the group with a vocabulary so they may name these behaviors as they later observe them in themselves and others. It provides a light hearted and nonthreatening way that they can help each other stay on track and provides a nice segue to discussing communication.

❖ **Objective 3: Establish ground rules for participation (5 min)**

➢ ACTIVITY #6 Establish Ground Rules (5 min):
- DISCUSS or TELL: Either supply the participants with ground rules or engage them in a discussion to establish group-generated ground rules.
- The list of ground rules should include ways to address:
  1. Confidentiality
  2. Missing sessions and possible make-up work
  3. Destructive group behaviors
  4. Participant roles and responsibilities
  5. Facilitator roles and responsibilities

Introductory Activities: Ways to Help Participants Get to Know One Another

1. Visual Explorer

Spread 30 or more pictures* that broadly depict phenomena related to teaching, mentoring, etc. around the room. Participants choose a visual representation in response to a question or statement, such as "Choose a picture that best represents mentoring." Each participant explains their choice.

*Adapted from *Paulus, C.J., Horth, D.M., and Drath, W.H. (1999) Visual Explorer: a tool for making shared sense of complexity. Center for Creative Leadership Press.* http://www.ccl.org/leadership/index.aspx. Pictures can also be obtained as a packet of postcards, pages from a magazine, printed images from websites, or participants can be asked to find an image on their own and bring it in.

2. Significant Mentor

Have participants think of a mentor they have had that influenced their own practices. This could be a positive or negative example. Have each person briefly share what they learned.

3. Who are You?

Participants add fun information about themselves to the four corners of their nametags. Some examples include:

Hometown
Favorite food
Favorite TV show
Hobby
Favorite kind of music
Number of people in their family (How each person defines family can be very interesting!)

4. Interviews

Participants interview the person next to them and vice versa, and then introduce one another to the entire group.

5. Truth or Lie?

Everyone tells two truths and one lie, and then the group guesses the lie for each person.

6. Memorable Moments

Each person shares something memorable about themselves

7. Letter Names

Each person says their name and shares characteristics that start with the first letter of their name.

Maintaining Effective Communication

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 mentees, and within proper personal boundaries)

Overview of Activities for the Communication Session: Please note that a core activity is listed for each learning objective. We encourage you to engage the mentors in your group in this activity. There is a list of additional activities that can be used if there is extra time in the session or the core activity is not working well for your group.

	Learning Objectives	**Core Activities**	**Additional Activities**
1	Provide Constructive Feedback	Mentors read and discuss Case #1: *Giving Constructive Feedback* (Activity #1)	Mentors read about interpersonal communication and discuss implications for their practice (Activity #4)
2	Communicate effectively across diverse dimensions	Mentors continue discussion about Case #1, focusing on discussion questions #1-3 for Objective #2	Mentors read and discuss Case #2: *The Slob* (Activity #5)
3	Identify different communication styles	Mentors take a communication styles test and discuss their results in pairs (Activity #2)	Mentors generate a list of different communication styles and discuss styles they feel most and least comfortable with (Activity #6) or mentors discuss phrases and how they are said and heard (Activity #7)
4	Engage in active listening	Mentors work in pairs sharing current mentoring challenges, practicing active listening. (Activity #3)	Mentors role play a scripted conversation between mentor and mentee and practice active listening (Activity #8)
5	Use multiple strategies for improving communication	Mentors discuss what they learned from Activity #3 and share specific strategies for improving communication between mentors and mentees	Mentors create a list of barriers to good communication and share strategies for overcoming such barriers (Activity #9)

Facilitation Guide

Recommended Session on Maintaining Effective Communication (90 minutes)

- **Materials Needed for the Session:**
  - Table tents and markers
  - Chalkboard, whiteboard, or flip chart
  - Handouts:
    - Copies of introduction and learning objectives for *Maintaining Effective Communication* (page 37)
    - Copies of Communication Case Study #1: *Giving Constructive Feedback,* (page 41) and the additional case if desired
    - Copies of a Communication Styles Test (URLs on page 40)

- Copies of *Building a Relationship with a Mentee* (This reading can also be sent to mentors prior to the session to review in advance.) (pages 46-49)

❖ **Introductions (5 min):**

➢ TELL: Review the introduction and learning objectives for the session.

❖ **Objectives 1 and 2: Provide constructive feedback and communicate effectively across diverse dimensions (30 min)**

➢ ACTIVITY #1: Case Study

- Distribute *Communication* Case #1: *Giving Constructive Feedback*. Let participants read the case individually for two to three minutes.
- (Objective 1) DISCUSS (15 min) with entire group: You may want to record the ideas generated in this discussion on a white board or flip chart. Use the guiding questions following the case study. Additional questions are listed below.
  1. How can you communicate constructively with a mentee whose progress is disappointing?
  2. What are the characteristics of positive, negative and constructive feedback? Can you give examples? How does each help the mentee improve his/her performance?
  3. Should there be a balance between positive and negative feedback? If so, how do you achieve that balance?
  4. How can you communicate in a way that fosters a change in behavior?
  5. What are the characteristics of good communication? What does it look like? Does it change depending on audience? You may wish to provide the list included in the reading on pages 46-49. Let participants supplement the list in a large group discussion. Don't forget nonverbal communication.
  6. What reasons might result in your mentee having difficulty receiving negative feedback? How can you uncover these reasons and address them?
  7. How can you tell if your mentee heard a comment the way it was intended to be heard?
  8. How can mentors best address silence or other types of mentee behaviors (e.g., defensiveness, total agreement, avoidance, etc.) that can hinder the relationship?
- (Objective 2) DISCUSS (10 min) with entire group: You may want to record the ideas generated in this discussion on a white board or flip chart. Guide the discussion using the following questions:
  1. Discuss the role of trust in this interaction.
  2. What additional things would the mentee have to consider or do if she were using a sign or language interpreter during the presentation?
  3. What if English were the mentee's second language and speaking fluently was a challenge? Would you handle the situation differently? Does it matter that the mentor's first language is not English?
  4. Does a difference in gender affect communication in this case?

❖ **Objective 3: Identify different communication styles (25 min)**

➢ ACTIVITY #2: Communication Styles Test (7 min):

- TELL: Mentors should individually complete a communication styles test and calculate their score. There are many such inventories available online such as the "Effective Communication Styles Inventory"

(http://www.whecare.com/images/form.pdf) or the "PACE Palette" (http://www.paceorg.com).

- ASK: Think about the way you communicate with your current mentees when engaging in the following activity.
- DISCUSS (8 min): Mentors discuss their results in pairs and compare results. Questions to guide their discussion can include (you may wish to write these questions on the whiteboard or flipchart):
  1. Specifically, to what extent did the test confirm or not confirm what you know about yourself?
  2. What did you learn and how can this be applied to future communication with mentees?
- DISCUSS (10 min) with entire group additional questions regarding communication styles:
  1. What did you learn about yourself and how can you apply what you have learned to your mentoring relationship?
  2. In what other situations could you apply this type of assessment?
  3. How can you determine your mentee's communication style?
  4. What are strategies for communicating across different styles?
- NOTE: We acknowledge that all such tests are at some level oversimplifications, but can be an effective starting point for reflection and discussion. As a facilitator, you may want to provide a specific example of how your results helped you reflect on your communication with mentees.

❖ **Objectives 4 and 5: Engage in active listening and use multiple strategies for improving communication (25 min)**

➢ ACTIVITY #3: Active Listening (15 min):

- Mentors form groups of three. One mentor shares a current challenge they are facing in their mentoring relationship(s). The second person practices active listening skills and tries to come to a clear understanding of the situation. The third person acts as observer and notes tone, body language, facial expressions, etc. Participants rotate roles and discuss what they learned as time allows. Refer to the provided reading on pages 46-49 for tips on active listening and for more information on nonverbal communication.
- NOTE: Encourage listeners to ask open-ended questions to explore the situation, and try to summarize or paraphrase what the speaker is saying to confirm understanding. ('What I heard you say was…')
- DISCUSS (10 min): With entire group, have mentors share what they learned from the exercise and the strategies that the groups elicited. You may want to record the ideas generated in this discussion on a white board or flip chart. You may want to separate out general comments from specific strategies for improving communication. You will add to this list of strategies throughout the session and refer to it in the final activity.

➢ **Summary Activity (5 min)**

- REFLECTION (5 min): Invite the mentors to reflect on the handout about interpersonal communication (pages 46-49) and the strategies generated by the group and share two areas for personal improvement.

Maintaining Effective Communication

Case #1: *Giving Constructive Feedback*

As he leaves the crowded conference room, Dr. Tariq tells his post-doc, Dr. Timms, that he'll see her in a few minutes. When Dr. Timms arrives in his office, he meets her gaze and smiles and says with a heavy accent "Thanks for coming by. I wanted to make sure we could review your talk since the conference is in a week and I know you're busy all day tomorrow—and then I'm out of town," he says. Dr. Timms continues to stare without comment, a blank expression on her face. "Well, as you know, I think your research is really important and I'm glad that we have this opportunity to share it. I think this conference will be a great opportunity for you to meet some key colleagues in our field." She nods slightly, and shifts in her seat. "I do think there are a few things that could tighten your presentation." She continues to stare and Dr. Tariq keeps his focus on his notes as he continues. "For example, you had some long sentences, and even whole paragraphs on your slides. While they were well written,"—his computer chimes as a new email arrives, and he glances over to see who it's from. *Oh, not again….* "As I was saying, while they were well written—I mean, you know your writing is strong—it is really too much text for a slide. You could try to shorten some to bullet points. Then you can still make those points without just reading your slides to the audience." He looks up and sees that she is now looking at the floor. "It would also allow you to increase the font size a bit. I think it might have been hard to read from the back of the room." He looks up again and sees she is taking some notes. "To cut back on the time, I think you could cut the four slides on the background and just briefly summarize those." He waits for comment, and the silence drags on a few moments. "What do you think?"

"I can look at it." Her face remains expressionless as she glances up and briefly meets his eye.

"That might allow you to slow down a bit," he continues. "Of course it's natural to get nervous and then one tends to talk faster. Perhaps you could practice it a bit at home and focus on slowing the pace and not looking at your notes as much. Have you tried practicing out loud to yourself at home?

"Yes."

The phone rings. He checks caller ID. *I'll have to call her back when this is over*. "Ok then. I can send you a link to some tips on slide composition and oral presentation and hopefully that will be helpful." There is another long moment of silence. "Well, do you have any questions for me?"

"No, not right now."

"Ok then, well, good luck!" He forces another smile and reaches out to shake her hand as she rises to leave. She takes it and smiles feebly back. "Thanks."

Guiding Questions for Discussion:

1. What are the main issues raised in this case study?
2. How could this situation have been handled differently? What should the mentor do now?
3. How do you interpret silence or minimal response from a mentee?

Additional Activities (if time allows):

Objective 1; Activity #4:
Have mentors read "Building a Relationship with a Mentee" (pgs 46-49). Have them discuss their own communication skills and two areas for improvement. Write these down and return to this topic in the following session. Have they made improvement on those specific skills?

Objective 2; Activity #5:
Case Study #2: *The Slob*
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 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?
2. If you were the mentor, how would you feel?
3. If you were the faculty adviser, how would you feel?
4. Who should be involved in dealing with problems that arise between the mentor and mentee?
5. If you were the adviser, how would you have handled this situation?
6. How does this situation affect the research group environment?

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

Objective 3; Activity #6:
Have mentors generate a list of different communication styles and discuss the styles they feel most and least comfortable with. If time allows, ask mentors to share practical strategies for working with mentees who have very different communication styles from their own.

Objective 3; Activity #7:
Have mentors work in pairs and discuss the following questions as they relate to 1 or 2 of the statements below:

a. How might the statement or questions be heard?
b. What was the likely intent of this statement or question?
c. How could you respond to this statement in a constructive manner?

Statement or Questions	**How might this statement be heard?**	**What is the likely intent of this statement?**	**How could you respond constructively to this statement?**
"Be on time to our group meetings from now on"			
"How much longer do you think it will take you to finish that paper draft?			
"You will never get anywhere in this field if you don't dig in and stick with problems until you solve them."			
"Clean up your office area"			
"I haven't seen you around the department much. Are you taking time off?"			
"I am not sure you have your priorities in order."			
"What's it like to be a woman in this department, anyway?"			
"It seems you might be better suited for an 'alternative' career"			

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

Objective 4; Activity #8:

Have mentors work in pairs and role play the scripted conversation between mentor and mentee below. Then discuss how the mentor could have reacted differently; practice a response that includes good active listening. Use the techniques in the reading to guide your approach. (Alternatively, facilitators could role play the scenario and then discuss with the full group.)

Scripted conversation:

Mentee walks into his mentor's office excited after coming from a meeting with a potential collaborator from across campus.

Mentee: [Knocks and walks in office] Hi! I'm so glad I caught you in your office. I just came from my meeting with Dr. Jahns and I have really exciting news about a possible collaboration. He said --

Mentor: [Interrupting] I was hoping you'd stop by. I just submitted the abstract for the conference next month. I was thinking… [email notification pops up on computer and mentor is distracted]

Mentee: [Patiently waits for mentor to read email]

Mentor: Ooh I just received an email back from Dr. Tram. He agreed to present at the conference. His ideas are so innovative. I want to make sure you meet him. I have to quick run to my next meeting. What were you saying before?

Mentee: Dr. Jahns is really excited about our ideas for collaborating. He and I thought of a few ways to integrate our projects and even generated some ideas about the grant proposal you and I discussed –

Mentor: [Interrupting] That's great but we already decided our approach at the lab meeting two weeks ago. I've discussed these ideas with Dr. Jahns before and didn't agree with this approach. It doesn't make sense.

Mentee: I really think we should consider --

Mentor: [Interrupting] I have to go. We can talk next week. I expect a draft of the grant at our next meeting.

Mentor walks out of his office and hurries down the hall.

Objective 5; Activity #9:

Have mentors brainstorm a list of barriers to good communication, record them on a white board or flip chart, and then have mentors choose two or three barriers and discuss practical ways to overcome them. For example, one barrier might be a lack of time to meet one-on-one. Some solutions might be more frequent email, telecoms, or setting up a time to chat by instant message each week. Mentors could generate a table such as the one below:

Barrier to Effective Communication	**Solutions to Overcome Barrier**	**How will you determine if communication has improved?**

Alternatively, have the mentors create a list of all the forms of communication used by them and their mentee (face-to-face meetings, e-mail, sticky notes, phone calls, etc). Organize the resulting list by types of communication and assign each type to a group of two to three mentors. Each sub-group should then discuss ways each method can be improved.. At the end, have each smaller group report to the entire group. Record all ideas on the whiteboard or flip chart. You may want to send a compiled list to the entire group.

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:

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

- 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.

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

- 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.

Aligning Expectations

Aligning Expectations

Introduction

A shared understanding of what each person expects is critical to establishing effective mentor-mentee relationships. Challenges arise when mentors and mentees have misunderstandings about expectations in the relationship, which naturally changes over time. Therefore, ongoing reflection and communication about expectations is needed to maintain positive and productive mentor-mentee relationships.

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

Overview of Activities for the Expectations Session: Please note that a core activity is listed for each learning objective. We encourage you to engage the mentors in your group in this activity. There is a list of additional activities that can be used if there is extra time in the session or the core activity is not working well for your group.

	Learning Objectives	**Core Activities**	**Additional Activities**
1	Effectively establish mutually beneficial expectations for the mentoring relationship	Mentors read and discuss Case #1: *The Slow Writer* (Activity #1)	Mentors create a list of predicted mentee expectations and discuss how they can determine if these are being met (Activity #4)
2	Clearly communicate expectations for the mentoring relationship	Mentors review compact examples and begin to outline their own (Activity #2)	Mentors discuss how to elicit their mentees' learning goals and incorporate those in individualized compacts (Activity #5)
3	Align mentee and mentor expectations	Mentors have a post-session meeting with their mentee to discuss their drafted compact (see above)	Mentors develop strategies to identify their own expectations, those of their mentee, and align the two (Activity #6)
4	Consider how personal and professional differences may influence expectations	Mentors read and discuss Case #2: *The Second Year Blues*(Activity #3)	Mentors discuss challenges mentees may face when working with multiple mentors and brainstorm solutions to these challenges (Activity #7)

Facilitation Guide

Recommended Session on Aligning Expectations (85 minutes)

- **Materials Needed for the Session:**
  - Table tents and markers
  - Index cards
  - Chalkboard, whiteboard, or flip chart
  - Handouts:
    - Copies of introduction and learning objectives for *Aligning Expectations* (page 53)
    - Copies of *Expectations* case studies (*The Slow Writer* and *The Second Year Blues*) (pages 57-58)
    - Copies of *Example Mentor: Mentee Compacts* (pages 59-84)

- **Introductions (10 min)**
  - REFLECTION: Ask mentors to write down any new mentoring activities they have engaged in since the last session. If none, they should write down something they are thinking about regarding their mentoring relationship based on the previous session
  - ASK: Introduce yourself and share the most important thing you learned from the last mentor-training session.
  - TELL: Review the introduction and learning objectives for the session.

- **Objective 1: Effectively establish mutually beneficial expectations for the mentoring relationship (20 min)**
  - ACTIVITY #1: (20 min)
    - Distribute *Expectations* Case #1*: The Slow Writer* and let participants read the case individually for two to three minutes.
    - NOTE: You may wish to refer mentors to the reading on "Mentoring Research Writers" presented on pp. 138 - 144 in this manual.
    - DISCUSS (17 min) with entire group. You may want to record the ideas generated in this discussion on a white board or flip chart. Use the guiding questions following the case study. Additional questions are listed below.
      1. How do you establish and communicate your expectations of your mentee?
      2. What do you do when your mentee repeatedly does not meet your expectations?
      3. What are strategies for uncovering the unspoken expectations mentees and mentors may have about issues such as authorship, hierarchy, letters of recommendation, etc.?
      4. How can you help a mentee navigate the different expectations articulated by multiple mentors?

- **Objective 2 and 3: Clearly communicate expectations and how to align mentee and mentor expectations (30 min)**
  - ACTIVITY #2: Reviewing Mentor: Mentee Compacts (15 min)
    - ASK: Do any of you use mentor: mentee compacts? If so, what has your experience been in using them?
    - Mentors review sample compacts and circle or highlight the items in the examples that they would like to include in their own compact. Additional compacts can be downloaded from https://mentoringresources.ictr.wisc.edu/ExampleMentoringCompacts.
    - NOTE: We use the term compacts in this curriculum, but others refer to these expectations documents as contracts. Both are agreements between two parties and we use the terms interchangeably. However, contracts are legally binding and compacts are not.
    - TELL: The sample compacts provided include two that have been used primarily with graduate students, one used with post-docs, and another used with undergraduates. Some of the items will resonate with you, while others will not. The goal today is to identify those elements that you would include in your own compact and note additional items you would like to incorporate later. Notice the differences in expectations across career stage. You may want to check out Norman Ramsey's Guide for Research Students (http://www.cs.tufts.edu/~nr/students/guide.pdf).
    - TELL: Remind mentors that while they may create a template expectations document that can be used to initiate a discussion of this topic with mentees; the essential component is

the **process** of sharing goals and expectations and arriving at a common understanding. Individual development plans, like those included in the "Promoting Professional Development" session can be utilized in concert with your expectations template to tailor a holistic plan for each mentee. An additional resource mentors may consider are learning compacts: http://www-distance.syr.edu/contract.html http://cte.uwaterloo.ca/teaching_resources/tips/self-directed_learning_learning_contracts.html

- DISCUSS (15 min) in pairs: Mentors discuss items chosen for their compacts.

❖ **Objective 4: Consider how personal and professional differences may impact expectations, including differences across disciplines when working in multidisciplinary teams (20 min)**

➢ ACTIVITY#3: Case Study (20 min)

- Distribute *Expectations* Case #2: *Second Year Blues – A Mentee's Perspective* and let participants read the case individually for two to three minutes.
- DISCUSS (17 min) with entire group. You may want to record the ideas generated in this discussion on a white board or flip chart. Use the guiding questions following the case study. Additional questions are listed below:
  1. How can you confirm that your expectations take into account a mentee's research training and individual learning style, background, and abilities?
  2. How does a mentee learn the social dynamics and structure of a research group and the sense of hierarchy of personnel and projects? How can a mentor communicate these aspects of research? At what point is it appropriate for the mentor and mentee to discuss these topics?
  3. How might the multidisciplinary nature of this research play into expectations?

➢ **Follow-Up Activity (5 min)**

- TELL: You should try to find time to complete a draft of your mentoring compact and then meet with your mentee to discuss the draft, recognizing that the draft may change based on the discussion. Make sure the compact aligns your expectations with those of your mentee. It will be a document that you can revisit and revise on a regular basis as your relationship and the research evolves.

Aligning Expectations

Case #1: *The Slow Writer*

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 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, so 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 manuscripts, herself. Setting deadlines for detailed outlines, manuscript/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?

Case #2: ***Second Year Blues – A Mentee's Perspective***

Ben is beginning his second year as a multidisciplinary post-doctoral research scholar at BIG U Academic Health Center. Though he has enjoyed working on his mentor's research project, he is becoming anxious that he has not yet started an independent project. When he joined the lab two years ago, he had hopes of pursuing his own independent interests. Every time Ben tries to bring up his concerns with his mentor, it seems like his mentor can never find the time to have a discussion focused on Ben's research goals. This situation is becoming frustrating because he likes his mentor and understands that the past few months have been extremely busy for his mentor due to a host of factors (economic budget constraints, preparing an NIH grant proposal, adoption of a new family member, etc.). Being politically astute, Ben is reluctant to make a "misstep", yet he knows the clock is ticking. He is also concerned that his recent interests in basic mechanistic studies are too divergent from his mentor's translational program and worries that it may conflict with his mentor's expectations. He feels "stuck," but doesn't know what to do.

Guiding Questions for Discussion:

1. What are the main themes raised in this case study?
2. What kind of conversations regarding expectations might have been helpful earlier in this relationship?
3. What kind of conversations would be helpful at this point? Who should be involved in these conversations?

Examples of Mentor-Mentee Compacts

1. **Post-Doctoral Fellow Mentee Examples**
    a. AAMC Compact Between Postdoctoral Appointees and Their Mentors
    b. Professor Jo Handelsman, Yale University

2. **Graduate Student Mentee Examples**
    a. AAMC Compact Between Biomedical Graduate Students and Their Mentors
    b. Professor Trina McMahon, University of Wisconsin - Madison

3. **Undergraduate Student Mentee Examples**
    a. *Entering Research* Mentor-Mentee Contract
    b. Ashley Shade, University of Wisconsin-Madison

Note: All of the examples presented here are designed for one-on-one mentor-mentee relationships. If a mentee has multiple mentors, then s/he may have individual compact agreements with each mentor or create one compact to which everyone agrees.

Compact Between Postdoctoral Appointees and Their Mentors

December 2006

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The *Compact Between Postdoctoral Appointees and Their Mentors* is intended to initiate discussions at the local and national levels about the postdoctoral appointee-mentor relationship and the commitments necessary for a high quality postdoctoral training experience.

The Compact was drafted by the AAMC Group on Graduate, Research, Education, and Training (GREAT) and its Postdoctorate Committee. It is modeled on the AAMC *Compact Between Resident Physicians and Their Teachers*, available at www.aamc.org/residentcompact. Input on the document was received from the GREAT Group Representatives, members of the AAMC governance, and other members of the postdoctoral community, including the National Postdoctoral Association. At its October 8, 2006, annual business meeting, the GREAT Group unanimously endorsed the document. The document was subsequently endorsed by the AAMC Executive Committee on October 20, 2006.

The Compact is available on the AAMC Web site at www.aamc.org/postdoccompact

Compact Between Postdoctoral Appointees and Their Mentors

Postdoctoral training is an integral component of the preparation of scientists for career advancement as scientific professionals. Postdoctoral appointees typically join an institution to further their training in a chosen discipline after recently obtaining their terminal degree (e.g., Ph.D., M.D., D.V.M.). This training is conducted in an apprenticeship mode where she/he works under the supervision of an investigator who is qualified to fulfill the responsibilities of a mentor. The postdoctoral appointee may undertake scholarship, research, service, and teaching activities that together provide a training experience essential for career advancement.

Core Tenets of Postdoctoral Training

Institutional Commitment

Institutions that train postdoctoral appointees must be committed to maintaining the highest standards of training and to providing a program sufficient to ensure, that when completed, the trainee can function independently as a scientific professional. Institutional oversight must be provided for terms of appointment, salary, benefits, grievance procedures, and other matters relevant to the support of postdoctoral appointees. A responsible institutional official must be designated to provide this oversight, and a suitable office should be available for the administrative support of postdoctoral affairs.

Quality Postdoctoral Training

Individuals should be trained to independently formulate meaningful hypotheses, design and conduct interpretable experiments, adhere to good laboratory practices, analyze results critically, understand the broad significance of their research findings, and uphold the highest ethical standards in research. The development of additional skills—including oral and written communication, grant writing, and laboratory management—are considered integral to this training.

Importance of Mentoring in Postdoctoral Training

Effective mentoring is critical for postdoctoral training and requires that the primary mentor dedicate substantial time to ensure personal and professional development. A good mentor builds a relationship with the trainee that is characterized by mutual respect and understanding. Attributes of a good mentor include being approachable, available, and willing to share his/her knowledge; listening effectively; providing encouragement and constructive criticism; and offering expertise and guidance.

Foster Breadth and Flexibility in Career Choices

Postdoctoral appointees must have training experiences of sufficient breadth to ensure that they are prepared to pursue a wide range of professional career options. Effective and regular career guidance is essential and should be provided by the mentor and the institution.

Commitments of Postdoctoral Appointees

- **I acknowledge that I have the primary responsibility for the development of my own career.** I recognize that I must take a realistic look at career opportunities and follow a path that matches my individual skills, values, and interests.
- **I will develop a mutually defined research project with my mentor that includes well-defined goals and timelines.** Ideally, this project should be outlined and agreed upon at the time of the initial appointment.
- **I will perform my research activities conscientiously, maintain good research records, and catalog and maintain all tangible research materials that result from the research project.**
- **I will respect all ethical standards when conducting my research including compliance with all institutional and federal regulations as they relate to responsible conduct in research, privacy and human subjects research, animal care and use, laboratory safety, and use of radioisotopes.** I recognize that this commitment includes asking for guidance when presented with ethical or compliance uncertainties and reporting on breeches of ethical or compliance standards by me and/or others.
- **I will show respect for and will work collegially with my coworkers, support staff, and other individuals with whom I interact.**
- **I will endeavor to assume progressive responsibility and management of my research project(s) as it matures.** I recognize that assuming responsibility for the conduct of research projects is a critical step on the path to independence.
- **I will seek regular feedback on my performance and ask for a formal evaluation at least annually.**
- **I will have open and timely discussions with my mentor concerning the dissemination of research findings and the distribution of research materials to third parties.**
- **I recognize that I have embarked on a career requiring "lifelong learning."** To meet this obligation I must stay abreast of the latest developments in my specialized field through reading the literature, regular attendance at relevant seminar series, and attendance at scientific meetings.
- **I will actively seek opportunities outside the laboratory (e.g. professional development seminars and workshops in oral communication, scientific writing, and teaching) to develop the full set of professional skills necessary to be successful for my chosen career.**
- **At the end of my appointment, in accordance with institutional policy, I will leave behind all original notebooks, computerized files, and tangible research materials so that other individuals can carry on related research. I will also work with my mentor to submit the research results for publication in a timely manner.** I can make copies of my notebooks and computerized files, and have access to tangible research materials which I helped to generate during my postdoctoral appointment according to institutional policy.

Commitments of Mentors

- **I acknowledge that the postdoctoral period is a time of advanced training intended to develop the skills needed to promote the career of the postdoctoral appointee.**
- **I will ensure that a mutually agreed upon set of expectations and goals are in place at the outset of the postdoctoral training period, and I will work with the postdoctoral appointee to create an individual career development plan.**
- **I will strive to maintain a relationship with the postdoctoral appointee that is based on trust and mutual respect.** I acknowledge that open communication and periodic formal performance reviews, conducted at least annually, will help ensure that the expectations of both parties are met.
- **I will promote all ethical standards for conducting research including compliance with all institutional and federal regulations as they relate to responsible conduct in research, privacy and human subjects research, animal care and use, laboratory safety, and use of radioisotopes.** I will clearly define expectations for conduct of research in my lab and make myself available to discuss ethical concerns as they arise.
- **I will ensure that the postdoctoral appointee has sufficient opportunities to acquire the skills necessary to become an expert in an agreed upon area of investigation.**
- **I will provide the appointee with the required guidance and mentoring, and will seek the assistance of other faculty and departmental/institutional resources when necessary.** Although I am expected to provide guidance and education in technical areas, I recognize that I must also educate the postdoctoral appointee by example and by providing access to formal opportunities/programs in complementary areas necessary for a successful career.
- **I will provide a training environment that is suited to the individual needs of the postdoctoral appointee in order to ensure his/her personal and professional growth.** I will encourage a progressive increase in the level of responsibility and independence to facilitate the transition to a fully independent career.
- **I will encourage the interaction of the postdoctoral appointee with fellow scientists both intra- and extramurally and encourage the appointee's attendance at professional meetings to network and present research findings.**
- **I will ensure that the research performed by a postdoctoral appointee is submitted for publication in a timely manner and that she/he receives appropriate credit for the work she/he performs. I will acknowledge her/his contribution to the development of any intellectual property and will clearly define future access to tangible research materials according to institutional policy.**

- **I recognize that there are multiple career options available for a postdoctoral appointee and will provide assistance in exploring appropriate options.** I recognize that not all postdoctoral appointees will become academic faculty. To prepare a postdoctoral appointee for other career paths, I will direct her/him to the resources that explore non-academic careers, and discuss these options.

- **I will commit to being a supportive colleague to postdoctoral appointees as they transition the next stage of their career and to the extent possible, throughout their professional life.** I recognize that the role of a mentor continues after the formal training period.

This compact serves both as a pledge and a reminder to mentors and their postdoctoral appointees that their conduct in fulfilling their commitments to one another should reflect the highest professional standards and mutual respect.

Example Compact for Postdocs from Laboratory of Dr. Jo Handelsman, Yale University

This compact can be used to align expectations around research projects and career development. The primary goal is for the mentor and mentee to agree on timelines and progress milestones.

Name_____

Lab Planning Document for Post-Doctoral Scholars

Annual Planning Document

1. Current Research Activities

Project Title	Central Hypothesis	Key Experiments	Collaborators

2. Publications

Paper title	Authors	Target journal	Main point	Target submission date

3. Grants

Agency/ Program	Project Goal	Specific Aims	Target submission date

4. Career goals and training

Ideal job description	Training to attain ideal job	Needs to attain goals

5. Training plan for the next year

Created by Dr. Jo Handelsman, Professor of Molecular, Cellular and Developmental Biology, Yale University

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Compact Between Biomedical Graduate Students and Their Research Advisors

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These guiding principles, known as the ***Compact Between Biomedical Graduate Students and Their Research Advisors***, are intended to support the development of a positive mentoring relationship between the pre-doctoral student and their research advisor. A successful student-mentor relationship requires commitment from the student, mentor, graduate program, and institution. This document offers a set of broad guidelines which are meant to initiate discussions at the local and national levels about the student-mentor relationship.

The Compact was prepared by the AAMC Group on Graduate Research, Education, and Training (GREAT) and is modeled on the AAMC Compact Between Postdoctoral Appointees and Their Mentors, available at www.aamc.org/postdoccompact. Input on this document was received from the GREAT Group Representatives and the members of the AAMC governance. The document was endorsed by the AAMC Executive Council on September 25, 2008.

The Compact is available on the AAMC Web site at:
www.aamc.org/gradcompact

Compact Between Biomedical Graduate Students and Their Research Advisors

Pre-doctoral training entails both formal education in a specific discipline and an apprenticeship in which the graduate student trains under the supervision of one for more investigators who are qualified to fulfill the responsibilities of a mentor. A positive mentoring relationship between the pre-doctoral student and the research advisor is a vital component of the student's preparation to become not only an independent and successful research scientist but also an effective mentor to future graduate students.

Individuals who pursue a biomedical graduate degree are expected to take responsibility for their own scientific and professional development. Faculty who advise students are expected to fulfill the responsibilities of a mentor, including the provision of scientific training, guidance, instruction in the responsible conduct of research and research ethics, and financial support. The faculty advisor also performs a critical function as a scientific role model for the graduate student.

Core Tenets of Pre-doctoral Training

Institutional Commitment

Institutions that train biomedical graduate students must be committed to establishing and maintaining high-quality training programs with the highest scientific and ethical standards. Institutions should work to ensure that students who complete their programs are well-trained and possess the foundational skills and values that will allow them to mature into independent scientific professionals of integrity. Institutions should provide oversight for the length of study, program integrity, stipend levels, benefits, grievance procedures, and other matters relevant to the education of graduate students. Additionally, they should recognize and reward their graduate training faculty.

Program Commitment

Graduate programs should endeavor to establish graduate training programs that provide students with the skills necessary to function independently in a scientific setting by the time they graduate. Programs should strive to maintain scientifically relevant course offerings and research opportunities. Programs should establish clear parameters for outcomes assessment and closely monitor the progress of graduate students during their course of study.

Quality Mentoring

Effective mentoring is crucial for graduate school trainees as they begin their scientific careers. Faculty mentors must commit to dedicating substantial time to graduate students to ensure their scientific, professional and personal development. A relationship of mutual trust and respect should be established between mentors and graduate students to foster healthy interactions and encourage individual growth. Effective mentoring should include teaching the scientific method, providing regular feedback in the form of praise and constructive

criticism to foster individual growth, teaching the "ways" of the scientific enterprise, and promoting students' careers by providing appropriate opportunities. Additionally, good graduate school mentors should be careful listeners, actively promote and appreciate diversity, possess and consistently exemplify high ethical standards, recognize the contributions of students in publications and intellectual property, and have a strong record of research accomplishments and financial support.

Provide Skills Sets and Counseling that Support a Broad Range of Career Choices

The institution, training programs, and mentor should provide training relevant to academic, industrial, and research careers that will allow their graduate students to appreciate, navigate, discuss, and develop their career choices. Effective and regular career guidance activities should be provided, including exposure to academic and non-academic career options.

Commitments of Graduate Students

- **I acknowledge that I have the primary responsibility for the successful completion of my degree.** I will be committed to my graduate education and will demonstrate this by my efforts in the classroom and the research laboratory. I will maintain a high level of professionalism, self-motivation, engagement, scientific curiosity, and ethical standards.
- **I will meet regularly with my research advisor and provide him/her with updates on the progress and results of my activities and experiments.**
- **I will work with my research advisor to develop a thesis/dissertation project**. This will include establishing a timeline for each phase of my work. I will strive to meet the established deadlines.
- **I will work with my research advisor to select a thesis/dissertation committee**. I will commit to meeting with this committee at least annually (or more frequently, according to program guidelines). I will be responsive to the advice of and constructive criticism from my committee.
- **I will be knowledgeable of the policies and requirements of my graduate program, graduate school, and institution**. I will commit to meeting these requirements, including teaching responsibilities.
- **I will attend and participate in laboratory meetings, seminars and journal clubs that are part of my educational program.**
- **I will comply with all institutional policies, including academic program milestones**. I will comply with both the letter and spirit of all institutional safe laboratory practices and animal-use and human-research policies at my institution.
- **I will participate in my institution's Responsible Conduct of Research Training Program and practice those guidelines in conducting my thesis/dissertation research.**
- **I will be a good lab citizen**. I will agree to take part in shared laboratory responsibilities and will use laboratory resources carefully and frugally. I will maintain a safe and clean laboratory space. I will be respectful of, tolerant of, and work collegially with all laboratory personnel.
- **I will maintain a detailed, organized, and accurate laboratory notebook**. I am aware that my original notebooks and all tangible research data are the property of my institution but that I am able to take a copy of my notebooks with me after I complete my thesis/dissertation.
- **I will discuss policies on work hours, sick leave and vacation with my research advisor**. I will consult with my advisor and notify fellow lab members in advance of any planned absences.
- **I will discuss policies on authorship and attendance at professional meetings with my research advisor**. I will work with my advisor to submit all relevant research results that are ready for publication in a timely manner prior to my graduation.
- **I acknowledge that it is primarily my responsibility to develop my career following the completion of my doctoral degree**. I will seek guidance from my research advisor, career counseling services, thesis/dissertation committee, other mentors, and any other resources available for advice on career plans.

Commitments of Research Advisors

- **I will be committed to the life-long mentoring of the graduate student**. I will be committed to the education and training of the graduate student as a future member of the scientific community.
- **I will be committed to the research project of the graduate student**. I will help to plan and direct the graduate student's project, set reasonable and attainable goals, and establish a timeline for completion of the project. I recognize the possibility of conflicts between the interests of externally funded research programs and those of the graduate student, and will not let these interfere with the student's pursuit of his/her thesis/dissertation research.
- **I will be committed to meeting one-on-one with the student on a regular basis.**
- **I will be committed to providing financial resources for the graduate student as appropriate or according to my institution's guidelines, in order for him/her to conduct thesis/dissertation research.**
- **I will be knowledgeable of, and guide the graduate student through, the requirements and deadlines of his/her graduate program as well as those of the institution, including teaching requirements and human resources guidelines.**
- **I will help the graduate student select a thesis/dissertation committee**. I will assure that this committee meets at least annually (or more frequently, according to program guidelines) to review the graduate student's progress.
- **I will lead by example and facilitate the training of the graduate student in complementary skills needed to be a successful scientist, such as oral and written communication skills, grant writing, lab management, animal and human research policies, the ethical conduct of research, and scientific professionalism.** I will encourage the student to seek opportunities in teaching, if not required by the student's program.
- **I will expect the graduate student to share common laboratory responsibilities and utilize resources carefully and frugally.**
- **I will not require the graduate student to perform tasks that are unrelated to his/her training program and professional development.**
- **I will discuss authorship policies regarding papers with the graduate student**. I will acknowledge the graduate student's scientific contributions to the work in my laboratory, and I will work with the graduate student to publish his/her work in a timely manner prior to the student's graduation.
- **I will discuss intellectual policy issues with the student with regard to disclosure, patent rights and publishing research discoveries.**
- **I will encourage the graduate student to attend scientific/professional meetings and make an effort to secure and facilitate funding for such activities.**
- **I will provide career advice and assist in finding a position for the graduate student following his/her graduation**. I will provide honest letters of recommendation for his/her next phase of professional development. I will also be accessible to give advice and feedback on career goals.

- **I will provide for every graduate student under my supervision an environment that is intellectually stimulating, emotionally supportive, safe, and free of harassment.**
- **Throughout the graduate student's time in my laboratory, I will be supportive, equitable, accessible, encouraging, and respectful**. I will foster the graduate student's professional confidence and encourage critical thinking, skepticism and creativity.

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Example Compact from Laboratory of Dr. Trina McMahon for Graduate Students, University of Wisconsin-Madison

MENTOR-MENTEE CONTRACT

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. 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 participant 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 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 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 in formed 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.

Example of an Undergraduate Mentee Contract

from *Entering Research*: Workshops for Students Beginning Research in Science

Branchaw, J. L., Pfund, C., and Rediske, R. 2010 Entering Research Facilitator's Manual: Workshops for Students Beginning Research in Science, WH Freeman & Company.

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), then s/he 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 / _____

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:

   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):
   a. a written evaluation b. a verbal evaluation c. other: _____

7. When learning new techniques and procedures, the mentor will train the mentee using the following procedure(s) (e.g. write out directions, hands-on demonstration, verbally direct 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: _____

Expectations for All Undergraduate Mentees:
Example from former University of Wisconsin-Madison graduate student mentor, Ashely Shade

1. **Send me weekly e-mail updates by Fridays at 5 p.m.** describing briefly what you've been working on, what you plan to do the following week, and any questions or troubles you had. Important things to include: project you've worked on, broken equipment, storage/equip conflicts, if your data look weird.

2. **Attend lab meeting.** The entire lab assembles approximately once a week to discuss our research. Generally, the person leading lab meeting will distribute reading materials in advance. You should read these materials and come prepared to participate actively in the discussion.

3. **Be organized.** There is a lot of overlap in projects, and it is essential that you keep track of all of the samples in the way that I specify. This includes updating the data spreadsheets and lab notebooks immediately.

4. **Read background information and protocols about our projects, and about the McMahon lab research.** This includes the protocol handout, the wiki, and related journal articles from the lab that I've suggested. I'd love to discuss any journal article or protocol, so just say the word and we'll grab some coffee and chat.

5. **Be consistent with your lab schedule.** E-mail/call me if you are going to be Very Late or unable to make your scheduled lab time.

6. **Be independent.** I am periodically away, and I expect you to get things done well without me. Ask questions when I am around, but don't be afraid to try to do detective work on your own if I am not. We have a helpful, experienced lab so know that folks other than me may be excellent resources.

7. **Respect the lab area and your colleagues.** Keep it neat and ask if you have questions on equipment use, cleaning, etc. It is very important that you tell me if a piece of equipment breaks. Do not be worried that I will be angry. These things happen all the time in labs and the important thing is that I know it is broken and can arrange to have it fixed.

8. **Let me know if you need anything from me as a mentor, or if you have questions.** Be up- front and I will do the same.

9. **I have an "open door" policy.** Let me know if you hare having troubles or concerns that you want to talk about with me, work-related or not. My phone number is XXXXXX.

Additional Activities (if time allows):

Objective 1; Activity #4

Have mentors create a list of the things they believe their mentees expect from them and then discuss how they can determine if these expectations actually exist, are reasonable and how well they are meeting them. You may want to record the ideas generated in this discussion on a white board or flip chart. An example table that mentors could complete is included below.

What does my mentee expect from me?	How do I know?	How can I determine if I have met this expectation?

Objective 2; Activity #5

Mentors discuss how to elicit their mentees' learning goals and incorporate those into individualized compacts. (See comment about Individual Development Plans and learning contracts on page 55-56 and examples pages 153-159). You may want to record the ideas generated in this discussion on a white board or flip chart.

- NOTE: You may want to suggest that mentors focus on only one level of mentee (i.e. undergraduate, graduate student or post-doc) when doing this activity.

Objective 3; Activity #6

Have mentors develop strategies to identify their own expectations, those of their mentee, and align the two**.** You may want to record the ideas generated in this discussion on a white board or flip chart.

Objective 4; Activity #7

Have mentors discuss the challenges that mentees may face when working with multiple mentors and then brainstorm solutions to these challenges. You may want to record the ideas generated in this discussion on a white board or flip chart.

Assessing Understanding

Assessing Understanding

Introduction

Determining if someone understands the content and process of their discipline is not easy, yet critical in a productive mentoring relationship. Developing strategies to assess understanding, especially of core research concepts, is an important part of becoming an effective mentor. Moreover, it is important for mentors to be able to identify the causes for a lack of understanding and strategies to address such misunderstandings.

Learning Objectives

Mentors will have the knowledge and skills to:

1. Assess mentees' understanding of core concepts and processes
2. Identify various reasons for a lack of understanding, including expert-novice differences
3. Use multiple strategies to enhance mentee understanding across diverse disciplinary perspectives

Overview of Activities for the Understanding Session: Please note that a core activity is listed for each learning objective. We encourage you to engage the mentors in your group in this activity. There is a list of additional activities that can be used if there is extra time in the session or the core activity is not working well for your group.

	Learning Objectives	**Core Activities**	**Additional Activities**
1	Assess mentees' understanding of core concepts and processes	Mentors read and discuss the scenarios (Activity #1)	Mentors generate a list of strategies for assessing understanding in face-to-face meetings, over email, through written reports, etc. (Activity #4)
2	Identify various reasons for a lack of understanding, including expert-novice differences	Mentors brainstorm reasons behind a lack of understanding (Activity #2)	Mentors read an excerpt from an expert-novice study and discuss the implications for understanding (Activity #5)
3	Use multiple strategies to enhance mentee understanding across diverse disciplinary perspectives	Mentors share strategies to enhance understanding (Activity #3)	Mentors practice one of the strategies generated in Activity #3 (Activity #6)

Facilitation Guide

Recommended Session on Assessing Understanding (35 minutes)

- **Materials Needed for the Session:**
  - Table tents and markers
  - Chalkboard, whiteboard, or flip chart
  - Handouts:
    - Copies of introduction and learning objectives for *Assessing Understanding* (page 89)
    - Copies of *Understanding Scenarios* (page 93)

- **Overview (5 min)**
  - TELL: Review the introduction and learning objectives for the session. Be clear that this session is about assessing a mentee's understanding of research concepts and processes. While understanding other factors that impact your mentor/ mentee relationships are important, keep the focus on research.

Objectives 1 and 2: Assess mentees' understanding of core concepts and processes and identify reasons for a lack of understanding (20 min)

- ACTIVITY #1: Scenarios (15 min)
  - Distribute the *Understanding Scenarios.* Assign each small group one of the scenarios. Let participants read their assigned scenario individually for two minutes.
  - DISCUSS (7 min) the assigned scenario in small groups. Each group should come up with 3 specific approaches to avoiding or resolving the described situation.
  - ASK (8 min) each small group to share 2 approaches with the entire group. You may want to record the ideas generated in this discussion on a white board or flip chart. Additional questions are listed below.
    1. How do know if your mentee understands something?
    2. How can you help your mentees accurately assess their own understanding?
    3. How often should a mentor check in with their mentee about his or her understanding?
    4. Mentors can make assumptions about a mentee who does not understand. They may think the mentee is blowing off the work. How do you determine the difference between a mentee not understanding something and a mentee not trying?
    5. Why might a mentee have difficulty understanding?
    6. How can you deal with the fact that a mentee may be embarrassed by a lack of understanding?
    7. How would you know if a mentee is in need of alternative communication modes to understand the research, i.e., written instructions to augment verbal? Is it the mentee's responsibility to let you know their needs in this area?
    8. How can mentors balance promoting independence with confirming understanding?
    9. How can you tell the difference between a miscommunication and a true lack of understanding?
    10. How do you decide if you are qualified to assess a mentee's understanding?

- ACTIVITY #2: Follow-up Discussion (5 min)
  - DISCUSS the question below in a large group. You may want to record the ideas generated in this discussion on a white board or flip chart.
    1. Question: What reasons can you think of that would explain a mentee having difficulty understanding?
    2. We all unconsciously make assumptions about ability and level of understanding based on other cues and factors such as race, ethnicity, gender, English fluency, prior experience and background, types of questions someone asks, etc. How can you acknowledge those assumptions and remain open-minded?
  - NOTE: Some of the reasons that may arise include differing backgrounds, i.e. different modes of communication, misunderstandings regarding the level of understanding that is expected, cultural differences, disciplinary differences, etc.
  - NOTE: You may want to ask mentors to consider the difference between an expert perspective and novice perspective, e.g., as an expert, there are many steps in an explanation you may leave out as they are second nature or it is hard to remember what it was like to be a novice. For example, when you see a master chef cooking, it looks easy; however, when you try to make it yourself, you realize that there are many steps that have been left out of the explanation. See included reading on pages 95-97 for more information.

- **Objective 3: Using multiple strategies to enhance mentee understanding across diverse disciplinary perspectives (10 min)**
  - ACTIVITY #3: Identifying Strategies to Enhance Understanding (10 min)
    - ASK: Have mentors generate a list of strategies that can be used to assess their mentee's understanding as well as ways to remedy a lack of understanding. .Ask mentors to consider strategies that can be used in face-to-face meetings, over email, through written reports, etc. You may want to record the ideas generated in this discussion on a white board or flip chart.
    - Strategies you can add to the list include:
      1. Taking a minute to consider any assumptions made about what mentees know or do not know.
      2. Taking time to remember what it was like to not understand something before I became an expert.
      3. Writing out an explanation and asking one of my peers from outside the discipline to identify all of the terms they do not understand.
      4. Asking my mentee to explain something back to me so I can assess their understanding. This could be done verbally during a meeting, or afterwards with the main points briefly summarized via email.
      5. Asking my mentee to explain something to another trainee.
      6. Asking my mentee to organize information with a flowchart, diagram, or concept-map.

    - NOTE: How do you know when you are qualified to assess a mentee's understanding? What do you do if you are not an expert in all aspects of a mentee's research program, such as when you are a secondary mentor.

***Assessing Understanding*: 3 Scenarios**

Scenario A: Revealing Abstract

You have just spent the last month working intensively with your new graduate mentee. You have given her multiple papers to read and have had several discussions about your research. In addition, she has engaged in several different aspects of an ongoing project over the last month. She is hard-working, seems to understand the research your group does, and things seem to be going well. On Monday morning, she hands you a draft of the introduction section for a possible thesis project. After reading through the draft, you are forced to conclude that she does not understand the work your lab does at all.

What can you do to address this situation? How can you avoid this situation in the future? Come up with at least three specific techniques for avoiding this situation.

****

Scenario B: It Seemed So Clear When You Explained It

You have recently explained a complicated technique to your mentee. While you were explaining, he nodded the entire time as if he understood every word you were saying. When you were finished with your explanation, you asked him if he had any questions. He said no. Just to make sure, you asked him if everything was clear. He said yes. Three days later you asked the mentee how his work using this technique was going and he told you he hadn't started, because he did not understand the technique.

What can you do in the future to make sure your mentee understands what you are saying? Come up with at least three specific approaches for assessing your mentee's understanding.

****

Scenario C: It Just Didn't Work

I have a really promising mentee, he's doing well in all of his graduate courses and when we work through experiments together, he knows all the right techniques but he doesn't seem to be able to get experiments to work right when he's by himself. I'm trying to help him figure out what's happening in his failed experiments, but our conversations all seem to go like this:

> "So what happened with your reaction?"
>
> "It didn't work."
>
> "What happened?"
>
> "Nothing. It just didn't work."
>
> "What do you think went wrong?"
>
> "I don't know. But I tried it twice and it didn't work either time."

We're both getting a little frustrated with the lack of progress, and I've noticed that he's started spending less time in the lab.

Think with your colleagues about how to get things back onto the right track? Come up with at least three specific approaches for dealing with this situation.

Additional Activities (if time allows):

Objective 1; Activity #4
Have mentors augment their list of strategies that can be used to assess their mentee's understanding by considering strategies that can be used in face-to-face meetings, over email, through written reports, etc. You may want to record the ideas generated in this discussion on a white board or flip chart.

Objective 2; Activity #5
Have mentors read a summary of how people learn, paying particular attention to the results from expert-novice studies (Mestre, Jose, 2008. Brief Summary and Implications for Teaching from "How People Learn: Brain, Mind, Experience, and School."[3]). Have mentors discuss how they could better help their mentee understand one aspect of their research if they considered it from a novice point of view.

Objective 3; Activity #6
Mentors get in pairs or small groups and practice one of the strategies generated in Activity #3. One option could be having them write out, or verbally describe their research topic or study design and then ask one of the mentors from a different discipline to identify all of the terms they do not understand. They could also incorporate strategies from the reading included in the *Maintaining Effective Communication* session, such as reflective listening, paraphrasing, and summarizing (see page 46-49).

[3]National Research Council. 1999a. How People Learn: Brain, Mind Experience, and School. Commission on Behavioral and Social Sciences and Education, National Academies Press.

How People Learn: Brain, Mind, Experience, and School
Brief Summary & Implications for Teaching

Developing Expertise

Experts have acquired extensive knowledge that affects what they notice and how they organize, represent, and interpret information.

Key Findings:

Experts have a great deal of content knowledge that is highly organized; this organization reflects a deep understanding of the subject matter, and allows them to retrieve information quickly with relatively little attentional effort.

• Experts' knowledge is linked to contexts for applying that knowledge.

• Experts notice features and meaningful patterns that are not noticed by novices.

• Expertise in one domain does not transfer to other domains, e.g., being a chess master does not mean the master is good at solving crossword puzzles or complex math problems.

• Even experts have varying degrees of flexibility in applying their knowledge in new situations.

Implications for Teaching:

• Being an expert on a topic does not imply ability to instruct others effectively on the topic.

• Equally important to teaching the content of a discipline (facts, definitions, and concepts) is helping trainees organize this knowledge and apply it flexibly across many contexts.

Transferring Knowledge Flexibly Across Different Contexts

Ability to transfer knowledge learned in one context to another context is non-trivial.

Key Findings:

• Skills and knowledge must be extended beyond the narrow contexts in which they are initially learned.

• Learning should be linked to conditions of applicability, i.e., learning *what* should be linked to learning *when* the *what* can be applied.

• All new learning depends on previous learning. Students come to the classroom with preconceptions, and if their preconceptions are not engaged, students may fail to grasp new concepts and information that are being taught. Engaging in this context means identifying preconceptions, and, when

preconceptions are misconceptions, actively helping students construct appropriate understanding based on scientific principles.

• Learning by rote rarely transfers; learning in the context of tying material to underlying principles is more effective.

• The more you know about a topic the easier it is to learn more about that topic.

Implications for Teaching:

• Help students identify appropriate contexts and conditions for application of different concepts and strategies.

• Probe often for students' preconceptions during instruction. When misconceptions that interfere with understanding scientific concepts are identified, engage the student to help her or him reconstruct appropriate understanding. Providing the right answer does not suffice in helping students overcome misconceptions.

• Link all teaching and learning to major concepts or principles in the discipline.

Designing Learning Environments

The design of learning environments is linked to issues that are important in the processes of learning, transfer, and competent performance. Those processes, in turn, are affected by the degree to which learning environments are *learner centered*, *knowledge centered*, *assessment centered*, and *community centered*.

Learner Centered:

• Learners use their current knowledge to construct new knowledge. Thus, what they know or believe at the moment affects how they interpret new information; sometimes learners' current knowledge hampers new learning, sometimes it supports learning. Effective instruction must take into account what learners bring to the classroom. Active engagement in learning supports the construction of knowledge.

• Learners should be assisted in developing *metacognitive* strategies. Metacognition refers to people's abilities to monitor their own level of understanding and decide when it is not adequate. Transfer can be improved by helping students become more aware of themselves as learners who actively monitor their learning and performance strategies.

• Learners learn more efficiently and effectively when they are provided with feedback to help them monitor progress. *Deliberate practice* refers to engagement in educational activities that include active monitoring of one's learning. For example, when left on their own to do homework in the physical sciences, students often practice the wrong habits (e.g., equation finding and manipulating), thereby reinforcing such habits. Instead, students need to be given opportunities to practice skilled problem solving and provided with both feedback and support to ensure progress.

Knowledge Centered:

• Instruction should begin with students' current knowledge and skills, rather than assuming students are blank slates ready to absorb knowledge. Emphasis on how knowledge is organized will help to promote this goal.

• Instruction should help students organize knowledge in ways that are efficient for recall and for application in solving problems.

• Instruction should focus on helping students gain deep understanding of the major concepts and principles, rather than acquisition of disconnected facts and skills.

Assessment Centered:

• Formative assessment (assessment done during the course of instruction to monitor students' progress and to help shape instruction) is pivotal for providing feedback to students so that they can revise and improve the quality of their thinking. This should be done continuously, but not intrusively, as a part of instruction.

• Formative assessment strategies should be developed that make students' thinking visible to the instructor, the learner, and other classmates.

• Summative assessments (assessment done at the end of instruction for such purposes as assigning grades or evaluating competence) should reflect the knowledge, concepts, principles, and problem solving & lab skills of the discipline considered crucial by experts.

• Students should learn how to assess their own work and that of peers.

Community Centered:

• Learners are embedded in social contexts. If they are going to make effective use of their prior knowledge, they need to be encouraged to relate the origins of their learning to school-based concepts.

• Students spend only 14% of their time in school, but 53% of their waking hours out of school. It is important to help students see the relevance of their school-based learning to non-school contexts and problem solving.

• Communities of practice need to be encouraged. Local leaders and practitioners can facilitate community-centered learning through internships, class participation, and site visits to illustrate learning and problem solving in the workplace.

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Addressing Equity and Inclusion

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 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 idea by considering how to foster an equitable and 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 how diversity influences mentor-mentee interactions
2. Recognize the potential impact of conscious and unconscious assumptions, preconceptions, biases, and prejudices on the mentor-mentee relationship and reflect on how 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

Overview of Activities for the Equity and Inclusion Session: Please note that a core activity is listed for each learning objective. We encourage you to engage the mentors in your group in this activity. There is a list of additional activities that can be used if there is extra time in the session or the core activity is not working well for your group.

	Learning Objectives	Core Activities	Additional Activities
1	Improve and expand understanding of equity and inclusion, and how diversity influences mentor-mentee interactions	Mentors consider the many ways they are and can be different from their mentees and how these differences affect the mentoring experience for both (Activity #1)	Mentors reflect and share an experience in which they felt like an outsider (Activity #5)
2	Recognize the potential impact of conscious and unconscious assumptions, preconceptions, biases, and prejudices on the mentor-mentee relationship and how to manage them	Mentors reflect on their own unconscious assumptions (Activity #2). Mentors read the results of diversity studies, discuss implications, and brainstorm strategies for reducing bias (Activity #3)	Mentors explore their own biases using an implicit assumptions test and discuss the results (Activity #6); Benefits and Challenges of Diversity reading
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	Mentors break into two or three groups and read one of three case studies (*Is It Okay to Ask?, Language Barriers, or Ethnicity, Disease and Ethics*), then discuss reactions (Activity #4)	Mentors read and discuss Case # 4: *How Long to Wait?* (Activity #7), Case #5: *Second Language* (Activity #8) or Case #6: *Model Organisms* (Activity #9)

Facilitation Guide

Recommended Session on Addressing Equity and Inclusion (60 minutes)

- **Materials Needed for the Session:**
  - Table tents and markers
  - Index cards
  - Chalkboard, whiteboard or flip chart
  - Handouts:
    - Copies of introduction and learning objectives for *Addressing Equity and Inclusion* (page 101)
    - Copies of the *Diversity Study Results* Handout (pages 108-109)
    - Copies of *Equity and Inclusion* case studies (*Is It Okay to Ask? Language Barriers or Ethnicity, Disease and Ethics* (pages 110-111) and the additional cases if desired (pages 112-113)
    - Copies of *"Benefits and Challenges of Diversity"* (pages 115-124)

- **Introduction (5 min)**
  - REFLECTION: Ask mentors to write down any new mentoring activities they have engaged in since the last session. If none, they should write down something they are thinking about regarding their mentoring relationship based on the previous session.
  - TELL: Review the introduction and learning objectives for the session.
  - TELL: Discussion around issue of equity and inclusion can easily exceed the time allotted. If that occurs, the group can decide to forgo some of the suggested activities.

- **Objective 1: Improve and expand understanding of equity and inclusion, and how diversity influences mentor-mentee interactions (10 min)**
  - ACTIVITY #1: Reflecting on Diversity: Consider the many ways mentors are and can be different from their mentees and how these differences affect the mentoring experience for both (10 min)
    - TELL: Acknowledge that, in this society, it is engrained in our subconscious to first think of diversity in terms of race and ethnicity, but remember that it is broader than that. For example, consider the impact of learning and physical disabilities, gender, age/generation, sexual orientation, class, religion, and differences in communication, learning, and work styles. Think about the list we generated in the introductory session. Do participants have any characteristics they would like to add to the list? (If your group did an alternative activity in the introductory session and did not generate a list, you can have them do so now. (See pages 31-32).
    - NOTE: Leave this list displayed throughout the session and tell mentors that they can add to it as you move through the other activities. As you add items, you may discuss how these differences can be viewed as an asset to their mentoring relationships and how varying perspectives and experiences can be capitalized upon to create high quality innovative research.
    - DISCUSS: What do they know about their mentee? How do these differences impact their mentoring relationships and how can they be capitalized on to create high quality innovative research? They may consider the concept of cognitive diversity, or diversity of thought, and how knowledge they've gained from other life experiences has influenced and enriched their thinking as a researcher. List the ideas generated in this discussion on a white board or flip chart.
    - DISCUSS: How do these differences pose challenges to effective mentoring? They may consider how differences in their mentee's beliefs, work ethic and cognitive ability may present challenges. Also, how does one effectively mentor an entire research team comprised of individuals who are different from one another? How does one develop in their research team members an appreciation for (or at least tolerance of and respect for) differences among individuals on the team?

- **Objective 2: Recognize the potential impact of conscious and unconscious assumptions, preconceptions, biases and prejudices on the mentor-mentee relationship and reflect on how to manage them (25 min)**
  - ACTIVITY #2: Reflect on Unconscious Assumptions (10 min)
    - TELL: Think about some of your assumptions when you entered the room on the first day of this training—that there would be electricity, a table, a bathroom etc. Let's think about some of the assumptions we make about the people we work with.

- TELL: Read each word on the list below and ask mentors to focus on the first image that comes to their mind and quickly jot down three words that describe the person they pictured. Pacing is important; only leave about five seconds between each item on the list so that they are focused on the first image that comes to mind.
  1. Cook
  2. Pilot
  3. Mountain Climber
  4. Caretaker
  5. Politician
  6. Researcher
  7. Graduate Student
  8. Postdoc
  9. PI
- DISCUSS (7 min) with entire group: Have mentors share some of the words they noted about each prompt, with special attention given to the graduate student and postdoc. For example, did their images include mention of gender, race, body shape and size, or age? Was there some uniformity in their images?
- TELL: Remind mentors that we all carry these unconscious assumptions and they need not be a source of guilt or embarrassment. We discuss them as a means of raising awareness so that we can be conscious of them and minimize their on our behavior. The following studies highlight how enculturation affects us all and how it may impact the mentoring relationship.

➢ ACTIVITY #3: Implications of Diversity Research (15 min)
- Distribute the *Diversity Study Results* handout and let participants read it individually for two to three minutes.
- NOTE: Many of these studies are summarized in "The Benefits and Challenges of Diversity," which is included in the materials handed out.
- DISCUSS (7 min) in pairs your reaction to one of the studies and the implications for your mentoring practice
- DISCUSS (8 min) with entire group: You may want to record the ideas generated in this discussion on a white board or flip chart. Guide the discussion using the following questions:
  1. What were your initial reactions to the studies?
  2. Which study captured your attention? Why?
  3. What implications do these study results have for your mentoring practice?
  4. What are two to three practical things you could do to minimize the impact of bias, prejudice, and stereotype in your mentoring relationship?

❖ **Objective 3: Identify concrete strategies for learning about, recognizing and addressing issues of equity and inclusion, in order to engage in conversations about diversity with their mentees and foster a sense of belonging (20 min)**

➢ ACTIVITY #4: Case Studies
- Distribute the three *Equity and Inclusion* case studies (*Is It OK to Ask?, Language Barriers,* and *Ethnicity, Disease and Ethics*) and give participants a couple of minutes to review them and choose which one they would like to discuss in a small group so that there are two or three groups.

- TELL(8 min): Discuss in small groups one of the case studies
- DISCUSS (10 min) with entire group. You may want to record the ideas generated in this discussion on a white board or flip chart.
- NOTE: In some groups, mentors can be fairly quiet and reluctant to speak at first in this discussion, but just give them a few minutes. Once mentors get going with the discussion, it is often rich and engaging. Allowing mentors to choose which case they would like to discuss should help. Be sensitive to the fact that some minority mentors get tapped as the token "spokesperson" on issues of diversity. Possible responses to the cases are included below.
- There are a few guiding questions at the end of each case, *Is It OK to Ask?, Language Barriers, and Ethnicity, Disease and Ethics.* Some additional questions include:
  1. As a mentor, would you feel comfortable asking a mentee about how their identity impacts their experiences? How do you decide when asking questions about these issues is appropriate?
  2. Specifically, how would you go about engaging someone in a discussion about their race, ethnicity, class, gender, disability, age, sexual orientation, background and personal values? 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?
  3. How can you view diversity as an asset to a mentor-mentee relationship? Reframe conversations with a mentee in terms of how you can benefit and learn from his/her experiences that differ from your own.
  4. Do you think everyone should be treated the same? Does treating everyone the same mean they are being treated equally?
- Views of the impact of race, class, ethnicity, gender, disability, age, sexual orientation, background on the research experience vary widely. Remember that as a facilitator you are <u>not expected to be an expert</u> on the topic. Given that some facilitators have expressed less comfort mediating this session, we have included some possible responses to the cases below. Given the complexity of human relationships and the importance of situational contexts, these responses are of course by no means exhaustive or comprehensive

- Possible responses to the *Equity and Inclusion* case studies:
  1. General responses to all of the cases:
     - Race, gender, class, ethnicity, sexual orientation, personal values, and other aspects of diversity have nothing to do with a research experience because the experience should focus on research and not on personal characteristics. It would not be fair to treat one lab member differently than another. The approach to the research must be objective and influenced as little as possible by the individual doing the research.
     - Race, gender, class, ethnicity, sexual orientation, personal values, and other aspects of diversity have everything to do with a research experience and permeate every aspect of the experience, impacting perceptions, confidence, and motivation. Ignoring the impact of diversity sends a message that those aspects of a person have no role in ones work, which may turn students off to science. The level of impact will vary across the relationship. At times it may be invisible. At other times, it may be the most important factor.
     - Individuals want to be assessed for their ability, independent of race, gender, etc. The trick is deciding how to balance acknowledging someone's background and

taking it into consideration when deciding how to work with that person, but not letting a person's background bias your interaction with them.

- Regular conversations with ALL mentees to check on how they are doing and whether they are happy in their overall environment are important. This will build relationships that allow mentees to be comfortable sharing concerns AND allow mentors to notice if there are issues surrounding race or other diverse personal characteristics that need to be addressed, or identify opportunities for growth.

2. Possible responses to "*Is It Okay to Ask*"?
   - There is no consensus on if and when it is ―OK to ask. Some feel it is important to ask early, others feel it is never ok to ask, and others still feel there are special situations when it is necessary to ask.
   - It is not ok to ask. Some are tired of telling their story and feel that the question sometimes carries an implicit "explain yourself" or "justify yourself."
   - Establishing a sufficiently personal relationship with ALL mentees allows mentors to better understand diversity-related issues from mentees without directly asking questions about their personal characteristic and background.

3. Possible responses to *"Language Barriers"*
   - Having a common language in the lab is important to research as well as lab cohesion.
   - Emphasizing that everyone be able to communicate in English is different than prohibiting people from speaking to each other in their native language. The issue should be discussed with the whole lab so that others do not feel uncomfortable when lab members are speaking in a language they don't understand.
   - The mentor should meet with lab members to discuss the issue and establish a policy that would then be laid out and explained in writing.
   - Race, language, and ethnicity are intimately tied psychologically and assumptions about one inform assumptions about the others. Thus even if an English-only policy has practical reasons, it could still be perceived as racism and exclusion. This can be particularly true for those who grew up in an environment in the US where you were punished for speaking in another language in school and where assumptions about your abilities are tied to your language, race and ethnicity.

4. Possible responses to *Ethnicity, Disease and Ethics*
   - The research may disproportionally benefit her ethnic group through development of better treatments and/or a cure in the future.
   - There are examples of research on other diseases that affect specific ethnic groups that have benefitted those groups. Alternatively, lack of research on a disease because it does not affect a majority population leads to limited health care options for individual's with that disease.
   - The mentor could emphasize the scientific merits of the project. The objective is to learn more, understand genetic markers and causes for the disease rather than statistical links. The student's project may also help the large number of people in her group susceptible to that disease.
   - The student may need to be given an option to change projects that are not as objectionable.

- FOLLOW-UP ACTIVITY (2 min): Encourage mentors to return to their compacts (if applicable) and make any changes based on their reflections on equity and inclusion.

Activity #3: Diversity Study Results for Discussion
Read the description of the study results and discuss your reaction and the implications for your mentoring practice. See the "Benefits and Challenges of Diversity" article in the guidebook for more details about these and other studies.

Study 1: Studies of hiring involve assigning a man's name or woman's name to the same application and randomly distributing the applications to a group of reviewers. The reviewers are more likely to hire the person if there is a man's name on the application. The sex of the reviewer has no effect on the outcome. The result has not changed much over 40 years of doing the study (Steinpreis, Anders et al. 1999; Dovidio and Gaertner 2000; Moss-Racusin, Dovidio, et al. 2013).

Study 2: Many studies show that when reviewers are asked to review job performance based on a written description of the person's accomplishments, they rate the performance higher if they told that they are reviewing a man. In one study the difference between ratings for men and women candidates was greater when the evaluator was busy or distracted. The sex of the reviewer was not significant (Martell and Leavitt 2002).

Study 3: A linguistic analysis of 300 letters of recommendation for successful candidates applying for (and ultimately being offered) faculty positions at a major medical school showed differences in language and content. Male candidates were referred to more often as "researchers" and "colleagues," whereas women were referred to as "teachers" and "students." There were 4X more references to women's personal lives than to men's and there were more "doubt raisers" in letters about women (Trix and Psenka 2003).

Study 4: An ecology journal initiated double blind review (authors' names not revealed to reviewers, reviewers' names not revealed to authors). During the 6-month period of the trial, the acceptance rate for papers first-authored by women increased significantly. There was no change in the frequency of acceptance of papers first-authored by women in a similar ecology journal during same period (Budden, Tregenza et al. 2008).

Study 5: Evaluators expressed less prejudice against African American candidates if they were instructed to avoid prejudice (Lowery, Hardin et al. 2001).

Study 6: When participants were shown images of admired black figures they associated negative words with black people less than those who were shown pictures of disliked black figures or not shown pictures at all (Blair, Ma et al. 2001; Dasgupta and Greenwald 2001).

Study 7: Subjects were told to select one of two rooms in which to watch a movie. In each situation there is a handicapped person sitting in one of the rooms. If both rooms are showing the same movie, the subjects were more likely to choose the room where the handicapped person is sitting. If the rooms are showing different movies, the subjects are more likely to choose the room where the handicapped person is not sitting. The result is the same independent of which movie is showing in the room with the handicapped person (Snyder 1979).

Study 8: One study examined differences over a ten-year period of whites' self-reported racial prejudice and their bias in selection decisions involving black and white candidates for employment. They report that self-reported prejudice was lower in 1998-9 than it was in 1988-9. At both time points, white participants did not discriminate against black candidates when their qualifications were clearly strong or weak, but they did discriminate when the qualifications were mixed or the decision ambiguous (Dovidio and Gaertner 2000).

Study 9: Stereotype threat is the anxiety people feel about confirming stereotypes of a group to which they belong. When stereotype threat is activated, usually by reminding a person of their race or sex, a person may identify with a negative stereotype and perform less well than without activation. MRI examination of the human brain shows that activating stereotype threat makes blood move from the cognitive centers to the affective centers of the brain (Krendl, Richeson et al. 2008).

Study 10: A wide range of studies show that racial and ethnic minorities tend to receive lower quality healthcare and are less likely to receive routine medical procedures than non-minorities patients, even when the issue of access to health-care is controlled (Smedley, Stith and Nelson, 2003).

Study References:

Blair, I. V., J. E. Ma, et al. (2001). "Imagining stereotypes away: the moderation of implicit stereotypes through mental imagery." J Pers Soc Psychol **81**(5): 828-841.

Budden, A. E., T. Tregenza, et al. (2008). "Double-blind review favours increased representation of female authors." Trends in ecology & evolution (Personal edition) **23**(1): 4-6.

Dasgupta, N. and A. G. Greenwald (2001). "On the malleability of automatic attitudes: combating automatic prejudice with images of admired and disliked individuals." J Pers Soc Psychol **81**(5): 800-814.

Dovidio, J. F. and S. L. Gaertner (2000). "Aversive racism and selection decisions: 1989 and 1999." 319.

Krendl, A. C., J. A. Richeson, et al. (2008). "The negative consequences of threat - A functional magnetic resonance imaging investigation of the neural mechanisms underlying women's underperformance in math." Psychological Science **19**(2): 168-175.

Lowery, B. S., C. D. Hardin, et al. (2001). "Social influence effects on automatic racial prejudice." J Pers Soc Psychol **81**(5): 842-855.

Martell, R. F. and K. N. Leavitt (2002). "Reducing the performance-cue bias in work behavior ratings: can groups help?" J Appl Psychol **87**(6): 1032-1041.

Moss-Racusin, C. A., J. F. Dovidio, et al. (2013). "Science faculty's subtle gender biases favor male students." Proceedings of the National Academy of Sciences 109(41): 16474–16479.

Smedley, B.D., Stith, A.Y. and Nelson, A.R. (2003). Unequal Treatment: Confronting Racial and Ethnic Disparities Washington D.C. National Academies Press.

Snyder, M. L. (1979). "Avoidance of the handicapped - Attibutional abmibuity analysis." J Pers Soc Psychol **37**(12): 2297-2306.

Steinpreis, R. E., K. A. Anders, et al. (1999). "The impact of gender on the review of the curricula vitae of job applicants and tenure candidates: A national empirical study." Sex Roles **41**(7/8): 509-528.

Trix, F. and C. Psenka (2003). "Exploring the Color of Glass: Letters of recommendation for female and male medical faculty." Discourse & Society **14**(2): 191-220.

Many of these studies and others are summarized in: Fine and Handelsman (2005). "The Benefits and Challenges of Diversity" in *Entering Mentoring: A Seminar to Train a New Generation of Scientists*. Madison, WI: University of Wisconsin Press and Handelsman, Miller and Pfund (2005). "Diversity" in *Scientific Teaching*. New York: W.H. Freeman and Co. This activity was taken from the National Academies Summer Institute on Undergraduate Education in Biology (http://www.academiessummerinstitute.org, access June 2010)

Addressing Equity and Inclusion

Case #1: *Is it Okay to Ask???*

Last year I worked with a postdoc who has since left to take a faculty position. We all valued her input and I think that she had a positive experience working with our research team, but there are a few questions that still linger in my mind. This particular postdoc was an African-American woman. I wondered how she felt about being the only African-American woman in our research group. In fact, she was the only African American woman in our entire department. I wanted to ask her how she felt, but I worried 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 impacted her experience, but I could never figure out how to broach the subject.

Guiding Questions for Discussion:

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 the impact be on the mentee?
3. How might you react to this case differently if the mentee was the only openly gay postdoc in the department? 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?

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

Case #2: *Language Barriers*

I am a researcher in a very crowded lab. This fall, two new post-docs started in the lab, both are Chinese. The post-docs were great—they worked hard, got interesting results, were fun to be around, and fit into the group really well. The problem was that they spoke Chinese to each other all day long. And I mean ALL DAY. For eight or nine hours every day, I listened to this rapid talking that I couldn't understand. Finally, one day I blew. I said in a not very friendly tone of voice that I'd really appreciate it if they would stop talking because I couldn't get any work done. Afterwards, I felt really bad and apologized to them. I brought the issue to my peers and was surprised by the length of the discussion that resulted. People were really torn about whether it is okay to require everyone to speak in English and whether asking people not to talk in the lab is a violation of their rights. Our class happened to be visited that day by a Norwegian faculty member and we asked her what her lab policy is. She said everyone in her lab is required to speak in Norwegian. That made us all quiet because we could imagine how hard it would be for us to only speak Norwegian all day long.

Guiding Questions for Discussion:

1. What are the main themes raised in this case study?
2. What is the intent of any English-only policy? What might the impact on lab members be and on the 'lab community' as a whole?
3. How is race a factor in this case? What are the implications of the connections between race, language, and ethnicity?

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

Case #3*: Ethnicity, Disease and Ethics*
You are a senior researcher in lab that is sequencing genes as part of a larger effort to find a genetic marker for susceptibility to a particular disease. A graduate student who has just started in your lab and whom you have been asked to mentor, comes to you and complains that she has decided the project itself is discriminatory because the disease you are examining is much more prevalent among members of her ethnic group. She has even found a paper that confirms this statistical link. She is worried that the research could be used to deny or limit access to health care for this disease, and that this would disproportionately affect her ethnic group.

Guiding Questions for Discussion:

1. What are the main themes raised in this case study?
2. How should the mentor respond?
3. How can you acknowledge a mentee's concerns, respect their value and still move forward on the project?

Additional Activities (if time allows):

Objective 1; Activity #5

Ask mentors to think back to the time when they felt most conspicuous as someone who did not fit in to a situation or setting. Ask: What was the situation, what did it feel like, how did you react? Alternatively, they could share an experience in which they could see that someone else felt like they did not belong or fit in. What kinds of differences make us feel like outsiders and what differences remain irrelevant? Why?

Note: Have each mentor share an experience. If a mentor cannot think of an experience to share, ask them to pass and then come back to them at the end of the activity. As a facilitator, you may need to encourage people to keep their comments relatively short so everyone has a chance to share. The time each person has to talk will depend on the size of the group.

Objective 2; Activity #6

At Project Implicit https://implicit.harvard.edu/implicit/, mentors can find a number of tests that enable them to explore specific biases and assumptions, such as those about gender, disabilities, skin-tone, etc. These are not only informative, but fun and quick to take. These sites could be explored during the session if computers are available or could be distributed on a handout or via email and done outside of the session.

Objective 3; Activity #7

Case #4: *How Long to Wait?*

A new post-doctoral fellow, Dr. Smith, recently started working with you on a research study evaluating the effectiveness of an intervention being implemented in a local medical center. While his initial progress has been good and he always makes your scheduled meetings, you are bothered that you seldom see him in the office. When you ask him about it he explains that he is a single parent with two young children. He doesn't have family nearby to help with childcare, and given his school debt, can't afford full-time help. Thus, he often works from home and after the kids are in bed at night. You say nothing more at the time, but feel uncomfortable that you don't have the opportunity for more informal contact and supervision, and don't have experience working with someone in this situation. Then, the following week Dr. Smith brought his kids with him to a meeting with your research team, explaining that his sitter wasn't available that day. The kids were a little distracting, though not disruptive, and the team members truly didn't seem to mind. However, you wonder if you need to have a talk with your mentee or if you are being overly concerned about something that is not really an issue and should wait to see how things play out.

Guiding Questions for Discussion:

1. What are the main themes raised in this case study?
2. How do you picture Dr. Smith and does his image impact your reaction? If you picture him as white and American, would you react any differently if he were a minority or international student? Do you assume he is straight or gay? Would you react differently if he were a female?
3. To what extent do you expect your mentees to conform to your own professional expectations and to what extent do you alter your own expectations to accommodate theirs? Is class a factor in this case?
4. How does this situation align (or not) with your compact expectations?
5. List three concrete strategies for dealing with this issue.

Objective 3; Activity #8

Case #5: *Second Language*

Dr. Ellen Hlavek is a senior post-doc in your laboratory. She has an excellent training record and has had strong mentoring in research. Although her knowledge of the science and research methodology is sound, she struggles with oral presentations as English is not her first language. Recently while giving an important presentation on her research at a professional meeting, someone in the audience commented that she needed to speak slower because he couldn't understand her. Dr. Hlavek was embarrassed and became very self-conscious. Her Slavic accent became more apparent and she started speaking even faster. She also wondered afterwards if her headscarf influenced the public criticism she received.

Guiding Questions for Discussion:

1. What are the main themes raised in this case study?
2. Dr. Hlavek calls you after this presentation. She is very upset about what transpired at the conference and shares her concerns about why she may have been singled out. As her mentor how do you advise her?
3. What are the implications of connections between religion, ethnicity and language?
   What are the challenges for a mentor when a mentee's second language skills present a barrier to effective communication of his/her research?

Objective 3; Activity #9

Case #6: *Model Organisms*

James, a second-year graduate student in your laboratory is studying physiology. James is a fantastic graduate student - intelligent, productive and collaborative. At this point in his graduate studies, James is making solid progress and has begun to draft his research question and experimental design for his dissertation proposal. When he started drafting his ideas, James seemed very excited about his research questions and his proposed experiments, but over the past two weeks, James has seemed disheartened. Upon expressing your concern, James states that he needs to rethink his entire plan. When you ask him to explain, he declares "I figured out the perfect experiment to test my hypothesis, but it requires me to experiment on rats. That goes against everything I believe."

Guiding Questions for Discussion:

1. What are the main themes raised in this case study?
2. What are the implications when personal beliefs conflict with the progress of research?
3. How can the mentor help James work through his struggle?

Benefits and Challenges of Diversity*

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]

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

- 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]

- 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.

References

1. Manzoni, J.-F., P. Strebel, and J.-L. Barsoux. "Why diversity can backfire on company boards." *MIT Sloan Management Review—Business Insight*, January 22, 2010.
   Herring, C. "Does diversity pay? Race, gender, and the business case for diversity." *American Sociological Review* 74 (2009): 208–224.
   Page, S. E. (2007). *The Difference: How the Power of Diversity Creates Better Groups, Firms, Schools, and Societies.* Princeton, NJ: Princeton University Press.
   Putnam, R. D. "*E Pluribus Unum*: Diversity and community in the twenty-first century—The 2006 Johan Skytte Prize Lecture." *Scandinavian Political Studies* 30 (2007): 137–174.
   van Knippenberg, D., and M. C. Schippers. "Work group diversity." *Annual Review of Psychology* 58 (2007): 515–541.
   Mannix, E., and M. A. Neale. "What differences make a difference? The promise and reality of diverse teams in organizations." *Psychological Science in the Public Interest* 6 (2005): 31–55.
   Cox, T., Jr. (1993).*Cultural Diversity in Organizations: Theory, Research & Practice.* San Francisco: Berrett-Koehler Publishers.
2. University of Wisconsin–Madison, Office of the Provost (2004). "Definition of Campus Climate." (http://wiseli.engr.wisc.edu/climate/Provost_ClimateDefn.pdf)
3. Herring, C. "Does diversity pay? Race, gender, and the business case for diversity." *American Sociological Review* 74 (2009): 208–224.
   Chang, M. J., D. Witt, et al. (2003). *Compelling Interest: Examining the Evidence on Racial Dynamics in Colleges and Universities.* Stanford, CA: Stanford University Press.
   American Council on Education (ACE) and American Association of University Professors (AAUP) (2000). *Does Diversity Make a Difference? Three Research Studies on Diversity in College Classrooms.* Washington, DC: ACE and AAUP.
4. McLeod, P. L., S. A. Lobel, and T. H. Cox, Jr. "Ethnic diversity and creativity in small groups." *Small Group Research* 27 (1996): 248–265.
5. Nemeth, C. J. "Dissent as driving cognition, attitudes, and judgments." *Social Cognition* 13 (1995): 273–291.
   Nemeth, C. J. "Differential contributions of majority and minority influence." *Psychological Review* 93 (1986): 23–32.
   Nemeth, C. J. "Dissent, group process, and creativity: The contribution of minority influence." *Advances in Group Process* 2 (1985): 57–74.
   Schulz-Hardt, S. et al. "Group decision making in hidden profile situations: Dissent as a facilitator for decision quality." *Journal of Personality and Social Psychology* 91 (2006): 1080–1093.
   Sommers, S. R. "On racial diversity and group decision making: Identifying multiple effects of racial composition on jury deliberations." *Journal of Personality and Social Psychology* 90 (2006): 597–612.
   Antonio, A. L., et al. "Effects of racial diversity on complex thinking in college students." *Psychological Science* 15 (2004): 507–510.
6. Kanter, R. M. (1983). *The Change Masters: Innovations for Productivity in the American Corporation*. New York: Simon and Schuster.
7. Antonio, A. L. "Faculty of color reconsidered: Reassessing contributions to scholarship." *Journal of Higher Education* 73 (2002): 582–602.
   Turner, C. S. V. "New faces, new knowledge." *Academe* 86 (2000): 34–37.
   Nelson, S., and G. Pellet (1997). *Shattering the Silences* [videorecording]. San Francisco: Gail Pellet Productions.
8. Milem, J. F. (2003). "The educational benefits of diversity: Evidence from multiple sectors."

In *Compelling Interest: Examining the Evidence on Racial Dynamics in Colleges and Universities*, edited by M. J. Chang, D. Witt, J. Jones, and K. Hakuta, 126–169. Stanford, CA: Stanford University Press.

9. Smith, D. G., et al. (1997). *Diversity Works: The Emerging Picture of How Students Benefit*. Washington, DC: Association of American Colleges and Universities.
10. Astin, A. W. "Diversity and multiculturalism on the campus: How are students affected?" *Change* 25(2) (1993): 44–49.

    Astin, A. W. (1993). *What Matters in College? Four Critical Years Revisited.* San Francisco: Jossey-Bass.
11. Gurin, P., E. L. Dey, et al. "Diversity and higher education: Theory and impact on educational outcomes." *Harvard Educational Review* 72 (2002): 330–366.

    Gurin, P. "Selections from *The Compelling Need for Diversity in Higher Education*, expert reports in defense of the University of Michigan." *Equity & Excellence in Education* 32 (1999): 36–62.
12. Espenshade, T. J., and A. W. Radford (2009). *No Longer Separate, Not Yet Equal: Race and Class in Elite College Admission and Campus Life.* Princeton, NJ: Princeton University Press.
13. Pascarella, E. T., et al. "Influences on students' openness to diversity and challenge in the first year of college." *Journal of Higher Education* 67 (1996): 174–195.
14. Fox, M. F. (2003). "Gender, faculty, and doctoral education in science and engineering." In *Equal Rites, Unequal Outcomes: Women in American Research Universities*, edited by L. S. Hornig, 91–109. New York: Kluwer Academic/Plenum Publishers.

    Carbonell, J. L., and Y. Castro. "The impact of a leader model on high dominant women's self-selection for leadership." *Sex Roles* 58 (2008): 776–783.

    Kutob, R. M., J. H. Senf, and D. Campos-Outcalt. "The diverse functions of role models across primary care specialties." *Family Medicine* 38 (2006): 244–251.

    Bakken, L. L. "Who are physician-scientists' role models? Gender makes a difference." *Academic Medicine* 80 (2005): 502–506.
15. Sheridan, J., and J. Winchell (2006). *Results from the 2006 Study of Faculty Worklife at UW–Madison*. Madison, WI: WISELI.

    Sheridan, J., and J. Winchell (2003). *Results from the 2003 Study of Faculty Worklife at UW–Madison*, Madison, WI: WISELI.

    Harvard University Task Force on Women Faculty (2005). *Report of the Task Force on Women Faculty*. Cambridge, MA: Harvard University.

    Astin, H. S., and C. M. Cress (2003). "A national profile of academic women in research universities." In *Equal Rites, Unequal Outcome: Women in American Research Universities*, edited by L. S. Hornig, 53–88. New York: Kluwer Academic/Plenum Publishers.

    Zakian, V., et al. (2003). *Report of the Task Force on the Status of Women Faculty in the Natural Sciences and Engineering at Princeton*. Princeton, NJ: Princeton University Press.

    Allen, W. R., et al. (2002)."Outsiders within: Race, gender, and faculty status in US higher education." In *The Racial Crisis in American Higher Education: Continuing Challenges for the Twenty-First Century*, edited by W. A. Smith, P. G. Altbach, and K. Lomotey, 189–220. Albany, NY: State University of New York Press.

    Trower, C. A., and R. P. Chait. "Faculty diversity: Too little for too long." *Harvard Magazine* 104 (2002): 33–37, 98.

    Turner, C. S. V. "Women of color in academe: Living with multiple marginality." *Journal of Higher Education* 73 (2002): 74–93.

    Aguirre, A., Jr. "Women and minority faculty in the academic workplace: Recruitment, retention, and academic culture." *ASHE-ERIC Higher Education Reports* 27 (2000).

Foster, S. W., et al. "Results of a gender-climate and work-environment survey at a midwestern academic health center." *Academic Medicine* 75 (2000): 653–660.
Turner, C. S. V., and S. L. Myers Jr. (2000). *Faculty of Color in Academe: Bittersweet Success*. Boston, MA: Allyn & Bacon.
MIT Committee on Women Faculty (1999). *A Study on the Status of Women Faculty in Science at MIT*. Boston, MA: Massachusetts Institute of Technology.
Blackburn, R. P., and C. Hollenshead (1999). *University of Michigan Faculty Work-Life Study Report*. Ann Arbor, MI: University of Michigan.
Riger, S., J. Stokes, et al. "Measuring perceptions of the work environment for female faculty." *Review of Higher Education* 21 (1997): 63–78.
16. Turner, C. S. V., and S. L. Myers Jr. (2000). *Faculty of Color in Academe: Bittersweet Success*. Boston, MA: Allyn & Bacon.
Turner, C. S. V. "Women of color in academe: Living with multiple marginality." *Journal of Higher Education* 73 (2002): 74–93.
17. Rankin, S. R. (2003). *Campus Climate for Gay, Lesbian, Bisexual, and Transgender People: A National Perspective.* New York: National Gay and Lesbian Task Force Policy Institute.
Suarez-Balcazar, Y., et al. "Experiences of differential treatment among college students of color." *Journal of Higher Education* 74 (2003): 428–444.
Hurtado, S., D. F. Carter, and D. Kardia. "The climate for diversity: Key issues for institutional self-study." *New Directions for Institutional Research* 98 (1998): 53–63.
Cress, C. M., and L. J. Sax. "Campus Climate Issues to Consider for the Next Decade." *New Directions for Institutional Research* 98 (1998): 65–80.
Nora, A., and A. F. Cabrera. "The role of perceptions of prejudice and discrimination on the adjustment of minority students to college." *Journal of Higher Education* 67 (1996): 119–148.
Smedley, B. D., H. F. Myers, and S. P. Harrell. "Minority-status stresses and the college adjustment of ethnic minority freshmen." *Journal of Higher Education* 64 (1993): 434–452.
Hurtado, S. "The campus racial climate: Contexts of conflict." *Journal of Higher Education* 63 (1992): 539–569.
18. Salter, D. W., and A. Persaud. "Women's views of the factors that encourage and discourage classroom participation." *Journal of College Student Development* 44 (2003): 831–844.
Crombie, G., et al. "Students' perceptions of their classroom participation and instructor as a function of gender and context." *Journal of Higher Education* 74 (2003): 51–76.
Swim, J. K., L. L. Hyers, et al. "Everyday sexism: Evidence for its incidence, nature, and psychological impact from three daily diary studies." *Journal of Social Issues* 57 (2001): 31–53.
Whitt, E. J., et al. "Women's perceptions of a "chilly climate" and cognitive outcomes in college: Additional evidence." *Journal of College Student Development* 40 (1999): 163–177.
Sands, R. G. "Gender and the perception of diversity and intimidation among university students." *Sex Roles* 39 (1998): 801–815.
Foster, T. J., et al. "An empirical test of Hall and Sandler's 1982 report: Who finds the classroom climate chilly?" Paper presented at the annual meeting of the Central States Communication Association, Oklahoma City, OK, April 1994.
Hall, R. M., and B. R. Sandler (1982). *The Classroom Climate: A Chilly One for Women?* Washington, DC: Project on the Status and Education of Women, Association of American Colleges.
19. Spencer, S. J., C. M. Steele, and D. M. Quinn. "Stereotype threat and women's

math performance." *Journal of Experimental Social Psychology* 35 (1999): 4–28.
Steele, C. M. "A threat in the air: How stereotypes shape intellectual identity and performance." *American Psychologist* 52 (1997): 613–629.
Steele, C. M., and J. Aronson. "Stereotype threat and the intellectual test performance of African Americans." *Journal of Personality and Social Psychology* 69 (1995): 797–811.
20. Burgess, D. J., A. Joseph, et al. "Does stereotype threat affect women in academic medicine?" *Academic Medicine* 87 (4) (2012): 506–512.
Brodish, A. B., and P. G. Devine. "The role of performance-avoidance goals and worry in mediating the relationship between stereotype threat and performance." *Journal of Experimental Social Psychology* 45 (2009): 180–185.
Davies, P. G., S. J. Spencer, and C. M. Steele. "Clearing the air: Identity safety moderates the effects of stereotype threat on women's leadership aspirations." *Journal of Personality and Social Psychology* 88 (2005): 276–287.
Croizet, J.-C., G. Després, et al. "Stereotype threat undermines intellectual performance by triggering a disruptive mental load." *Personality and Social Psychology Bulletin* 30 (2004): 721–731.
Keller, J., and D. Dauenheimer. "Stereotype threat in the classroom: Dejection mediates the disrupting threat effect on women's math performance." *Personality and Social Psychology Bulletin* 29 (2003): 371–381.
Schmader, T., and M. Johns. "Converging evidence that stereotype threat reduces working memory capacity." *Journal of Personality and Social Psychology* 85(3) (2003): 440–452.
Steele, C. M. "A threat in the air: How stereotypes shape intellectual identity and performance." *American Psychologist* 52 (1997): 613–629.
21. Krendl, A. C., J. A. Richeson, et al. "The negative consequences of threat: A functional magnetic resonance imaging investigation of the neural mechanisms underlying women's underperformance in math." *Psychological Science* 19 (2008): 168–175.
22. Plant, E. A., and P. G. Devine. "The antecedents and implications of interracial anxiety." *Personality and Social Psychology Bulletin* 29 (2003): 790–801.
23. Dovidio, J. F. "On the nature of contemporary prejudice: The third wave." *Journal of Social Issues* 57 (2001): 829–849.
24. Biernat, M., M. Manis, and T. E. Nelson. "Stereotypes and standards of judgment." *Journal of Personality and Social Psychology* 60 (1991): 485–499.
25. Biernat, M., and M. Manis. "Shifting standards and stereotype-based judgments." *Journal of Personality and Social Psychology* 66 (1994): 5–20.
26. Dovidio, J. F., and S. L. Gaertner. "Aversive racism and selection decisions: 1989 and 1999." *Psychological Science* 11 (2000): 315–319.
27. Bielby, W.T., and J. N. Baron. "Men and women at work: Sex segregation and statistical discrimination." *American Journal of Sociology* 91 (1986): 759–799.
28. Biernat, M., and M. Manis. "Shifting standards and stereotype-based judgments." *Journal of Personality and Social Psychology* 66 (1994): 5–20.
29. Deaux, K., and T. Emswiller. "Explanations of successful performance on sex-linked tasks: What is skill for the male is luck for the female." *Journal of Personality and Social Psychology* 29 (1974): 80–85.
30. Martell, R. F. "Sex bias at work: The effects of attentional and memory demands on performance ratings of men and women." *Journal of Applied Social Psychology* 21 (1991): 1939–1960.
31. Eagly, A. H., and S. Sczesny (2009). "Stereotypes about women, men, and leaders: Have

times changed?" In *The Glass Ceiling in the 21st Century: Understanding Barriers to Gender Equality*, edited by M. Barreto, M. K. Ryan, and M. T. Schmitt, 21–47. Washington, DC: American Psychological Association.

Eagly, A. H., and A. M. Koenig (2008). "Gender prejudice : On the risks of occupying incongruent roles." In *Beyond Common Sense : Psychological Science in the Courtroom*, edited by E. Borgida and S. T. Fiske, 63–81. Malden, MA: Blackwell Publishing.

Heilman, M. E., A. S. Wallen, et al. "Penalties for success: Reactions to women who succeed at male gender-typed tasks." *Journal of Applied Psychology* 89 (2004): 416–427.

Ridgeway, C. L. "Gender, status, and leadership." *Journal of Social Issues* 57 (2001): 637–655.

32. Dovidio, J. F., et al. "On the nature of prejudice: Automatic and controlled processes." *Journal of Experimental Social Psychology* 33 (1997): 510–540.
33. Trix, F., and C. Psenka. "Exploring the color of glass: Letters of recommendation for female and male medical faculty." *Discourse & Society* 14 (2003): 191–220.
34. Steinpreis, R. E., K. A. Anders, and D. Ritzke. "The impact of gender on the review of the curricula vitae of job applicants and tenure candidates: A national empirical study." *Sex Roles* 41 (1999): 509–528.
35. Wennerås, C., and A. Wold. "Nepotism and sexism in peer-review." *Nature* 387 (1997): 341–343.
36. Budden, A. E., et al. "Double-blind review favours increased representation of female authors." *Trends in Ecology & Evolution* 23 (2008): 4–6.
37. Johns, M., T. Schmader, and A. Martens. "Knowing is half the battle: Teaching stereotype threat as a means of improving women's math performance." *Psychological Science* 16 (2005): 175–179.
38. Good, J. J., J. A. Woodzicka, and L. C. Wingfield. "The effects of gender stereotypic and counter-stereotypic textbook images on science performance." *Journal of Social Psychology* 150 (2010): 132–147.

Quotes

Hurtado, Sylvia. "Linking diversity with the educational and civic missions of higher education." *Review of Higher Education* 30 (2007): 186.

Uhlmann, Eric Luis, and Geoffrey L. Cohen. "'I think it, therefore it's true': Effects of self-perceived objectivity on hiring discrimination." *Organizational Behavior and Human Decision Processes* 104 (2007): 208.

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Fostering Independence

Fostering Independence

Introduction

An important goal in any mentoring relationship is helping the mentee become independent, yet defining what an independent mentee knows and can do is often not articulated by the mentor or the mentee. Defining what independence looks like and developing skills to foster independence is important to becoming an effective mentor. Defining independence becomes increasingly complex in the context of team science.

Learning Objectives

Mentors will have the knowledge and skills to:

1. Define independence, its core elements, and how those elements change over the course of a mentoring relationship
2. Employ various strategies to build mentee confidence, establish trust, and foster independence
3. Identify the benefits and challenges of fostering independence, including the sometimes conflicting goals of fostering independence and achieving grant-funded research objectives

Overview of Activities for the Independence Session: Please note that a core activity is listed for each learning objective. We encourage you to engage the mentors in your group in this activity. There is a list of additional activities that can be used if there is extra time in the session or the core activity is not working well for your group.

	Learning Objectives	**Core Activities**	**Additional Activities**
1	Define independence, its core elements, and how those elements change over the course of a mentoring relationship	Mentors share ideas on the core elements of independence and then organize the list based on career stage (Activity #1)	Mentors read and discuss Case #3: *How Much to Help?* (Activity #4) Mentors discuss independence in the context of multidisciplinary science (Activity #5)
2	Employ various strategies to build mentee confidence, establish trust, and foster independence	Mentors read and discuss Case #1: *Launching an Independent Career?* or Case #2: *Forced Guidance* (Activity #2)	Mentors share strategies they have used to foster independence (Activity #6)
3	Identify the benefits and challenges of fostering independence	Mentors list the benefits of an independent mentee, as well as the challenges (Activity #3)	Mentors read and discuss Case #4: *Ready Mentee?* (Activity #7)

Facilitation Guide:

Recommended Session on Fostering Independence (60 minutes)

- **Materials Needed for the Session:**
  - Table tents and markers
  - Chalkboard, whiteboard, or flip chart
  - Handouts:
    - Copies of introduction and learning objectives for *Fostering Independence* (page 131)
    - Copies of *Independence* case studies (*Launching an Independent Career* and *Forced Guidance*) (page 135) and the additional cases if desired (pages 136-137)
    - Copies of *Mentoring Research Writers* (pages 139-143)

- **Overview (5 min)**
  - TELL: Review the introduction and learning objectives for the session.

- **Objective 1: Define independence, its core elements, and how those elements change over the course of a mentoring relationship (25 min)**
  - ACTIVITY #1: Defining Independence (15 min)

- ASK: Please describe your definition of independence. What does independence look like across career stages? Include in your discussion what it means at your institution and how that might differ from other places.
- TELL: We recognize that independence looks different at various stages of a researcher's career. As we list the elements of independence, let us also note the most appropriate career stage for each element.
- You may want to record the ideas generated in this discussion on a white board or flip chart, writing elements of independence along a continuum based on the discussion. The continuum should stretch from 1st year graduate student/ master student to finishing PhD student to 2nd year post-doc.
- NOTE: Some elements of independence include:
  - Advanced knowledge of discipline, including expertise in their sub-area
  - Ability to critically read the literature and find answers to questions through extended literature searches and consulting experts
  - Ability to write a grant proposal for an entire research project
  - Ability to design and give an oral presentation on their work at a national meeting
  - Ability to design experiments for an entire grant proposal and conduct them

- DISCUSS (10 min) with entire group the following questions:
  1. How can you tell if a certain level of independence is achieved? For example, what does independent thinking and behavior look like?
  2. Do mentees know what level of independence is expected of them? Do they understand that this will change as they progress in their career?
  3. Do you think your mentee's estimations of their level of independence are aligned with yours?
  4. Is there ever a point in the mentoring relationship in which the mentee is so independent that they no longer need the mentor?
  5. How can a mentee work both as an independent researcher and as a member of a research team?

- FOLLOW-UP ACTIVITY: Draw your own timeline for establishing independence and discuss it with your mentee to see if it aligns with their expectations. You may consider adding this timeline to your compact (if applicable).

❖ **Objective 2: Employ various strategies to build mentee confidence, establish trust, and foster independence (20 min)**

➢ ACTIVITY #2: Case Study

- Distribute either *Independence* Case #1: *Launching an Independent Career?* or Case #2: *Forced Guidance*, and let participants read the case individually for two to three minutes.
- DISCUSS (17 min) with entire group. You may want to record the ideas generated in this discussion on a white board or flip chart. Use the guiding question following the case study. Additional questions are listed below:
  1. What does independent research look like at different stages in a trainee's career?
  2. How does a mentor come to understand a mentee's decision-making ability so that the mentor can trust the mentee's decisions?
  3. How can you foster collegial sharing or partnership within an existing power dynamic between a mentor and mentee?

4. How does your mentoring approach differ based on what stage the person is in their training or career?
5. How can you determine what level of independence a mentee is ready for? How do you account for your mentee's strengths and weaknesses in this decision?
6. How can you determine if you are making assumptions about a mentee's ability based on their productivity or work style, especially if they differ from yours?
7. A natural consequence of fostering early independence can sometimes be a reduced quality and quantity of data produced. Is this a worthwhile sacrifice?
8. How do you convey the level of independence you expect from your mentee?
9. How can team mentoring help or hinder in this case study?
10. How can you create an environment where a mentee feels confident to ask questions without fear that it may reflect poorly on his/her competence?

- NOTE: You may wish to distribute the *Mentoring Research Writers* on pages 139-143 which provides specific strategies for helping mentees become more effective, independent writers.

❖ **Objective 3: Identify the benefits and challenges of fostering independence (10 min)**

➢ ACTIVITY #3: Identifying Benefits and Challenges of Fostering Independence (10 min)

- ASK: Please share one benefit or one challenge of a mentee achieving independence. You may want to record the ideas generated in this discussion on a white board or flip chart.
- NOTE: Benefits and challenges that may be included are:

1. Benefits
   - ♦ Affirmation of your ability to train another researcher
   - ♦ Increased capacity in your research field
   - ♦ Increased creativity and research in translational research related to your field
   - ♦ Authorship on joint publications
   - ♦ Increased capacity and skill in your research group
   - ♦ Broadening diversity within your research group
   - ♦ Enhanced professional reputation when your mentees are promoted
2. Challenges
   - ♦ Expense
   - ♦ Competing demands on time and need to get research done
   - ♦ Slower progress toward achieving grant-funded objectives
   - ♦ Greater risk of new ideas not panning out
   - ♦ Issues of intellectual property
   - ♦ Time needed to mentor effectively
   - ♦ Misalignment of expectations and goals
   - ♦ Addressing the challenges of interdisciplinary work
   - ♦ Overlapping research interests
   - ♦ Allowing the relationship to evolve to a more collegial one once independence is achieved

Fostering Independence

Case #1: *Launching an Independent Career?*

Dr. Klein is very excited about the grant proposal she is writing to NIH. The proposal builds upon research she has been conducting as a post-doc in the laboratory of Dr. Janco. She feels strongly that the proposal clearly describes the logical next steps in the project as well as relates the research to her previous research. When Dr. Klein meets with Dr. Janco to discuss the grant proposal, she is surprised to discover that Dr. Janco is less than enthusiastic about the proposal. Dr. Janco informs her that the proposal is too closely aligned with Dr. Janco's current work and its future direction. She says that the proposal needs to be reworked and focused on a different, more independent direction of research. Dr. Klein leaves the meeting frustrated, disappointed, and unsure how to proceed.

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?
3. How is independence redefined in a restricted funding climate and an era of collaborative research?
4. What if Dr. Klein's proposal describes research that is closely aligned with the project of a graduate student in the same research group? How can boundaries between the projects be established and how can ownership be clearly defined?

*Note: This case is taken from the mentee's perspective, providing mentors a slightly different lens.

Case #2: *Forced Guidance*

I am working with a graduate student this semester and I just can't seem to communicate effectively with him. I told him at the beginning of the semester that I thought we should have weekly meetings to talk about his progress, and he agreed. At our next meeting, I asked him to run through a list of the things he'd accomplished that week. He had no notes and seemed pretty unprepared for talking about his work in the level of detail that I expected. He's been canceling most of our meetings at the last minute − either he doesn't feel well, or he suddenly remembers an assignment for another class that's due the next day. I know that he's doing the work, because at the few meetings he keeps, he has a lot to say − but his progress on this project is very uneven, both in time taken and in quality, and I'm often forced to suggest that he redo crucial pieces. I fear these critical meetings leave him demoralized and less interested in accepting guidance from me, but I don't know how else to get him to understand that he needs my help.

Guiding Questions for Discussion:

1. What are the main themes raised in this case study?
2. What other issues might be at play in this case? What should the mentor's next steps be?
3. How can you determine if you are making assumptions about a mentee's ability based on their productivity or work style, especially if they differ from yours? What is your responsibility to "force guidance"?

Additional Activities (if time allows):

Objective 1; Case #3: *How Much to Help?*

Thuy-Dan is a graduate student who is nearing the end of her PhD, but wishes to continue her training in her mentor's lab as a post-doctoral researcher. Thus, she is independently applying for a post-doctoral fellowship from the NIH. Thuy-Dan's mentor believes that she is a very valuable asset to the lab and is highly supportive of Thuy-Dan continuing her training in this lab, but does not have any other funding to support her salary. The mentor has agreed to advise Thuy-Dan in the preparation of the application, although noting that it should represent her independent work. When she provides her mentor with a draft of the application, he becomes concerned about the quality of the writing. The research ideas are fairly solid, but the research plan has some minor flaws and the proposal is very poorly written.

Thuy-Dan's mentor believes that the fellowship proposal in its current form would not be a strong candidate for funding. Although the application should reflect her work, he has a vested interest in the proposal succeeding so that he can keep one of his most productive researchers. The mentor is unsure how to improve her proposal while still retaining it as Thuy-Dan's independent work. Moreover, Thuy-Dan has invested more than a month in preparing this application and is not accustomed to criticism of her writing, so the mentor is concerned that her defensiveness may create a further obstacle to improving the proposal.

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?
3. How would independent research be defined in this case?

Objective 1; Activity #5

Have mentors engage in a follow up conversation to Activity #1, with a more in-depth discussion of multidisciplinary science, and how an increasing reliance on expertise from other disciplines is transforming how independence is defined. Ask mentors to think through who it is they include in the 'team' and what each contributes. For example, are they counting statisticians, editors, program coordinators and support staff? How do other partners fit into the team, and does that influence how they think about independence?

Objective 2; Activity #6

Have mentors generate a list of strategies that can be used to foster independence. Ask mentors to consider strategies that can be used in face-to-face meetings, over email, through written reports, etc. You may want to record the ideas generated in this discussion on a white board or flip chart.

Objective 3; Case #4: *Ready Mentee*

An experienced graduate researcher was constantly seeking input from his mentor on minor details regarding his project. Though he had regular meetings scheduled with his mentor, he would bombard her with several e-mails daily or seek her out anytime she was around, even if it meant interrupting her work or a meeting that was in progress. It was often the case that he was revisiting topics that had already been discussed. This was becoming increasingly frustrating for the mentor, since she knew the

student was capable of independent work (having demonstrated this during times she was less available). What should the mentor do to encourage and support the student to be more independent?

Guiding Questions for Discussion:

1. What are the main themes raised in this case study?
2. How do you convey the level of independence you expect from your mentee?
3. What is the mentor's responsibility in this case?

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

Mentoring Research Writers

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Recognizing the Power of Writing as a Component of the Research Process

As a mentor you have a great opportunity to encourage your trainees to set high goals for their research writing and to help them achieve those goals. You should recognize, in fact, that you have a serious responsibility to motivate and to help researchers-in-training become excellent writers. Why should you and your trainees make writing a priority? The answer is clear to all experienced researchers: researchers earn their living and develop their careers *through the writing they do*—writing proposals to fund research, writing conference abstracts and posters and papers to disseminate new knowledge and to influence future research and the shape of their fields, documenting their research methods and findings, writing reviews of literature, writing reviews of colleagues' manuscripts, and writing letters of recommendation. Writing pervades the research process, and successful researchers spend a significant amount of their time planning, drafting, and revising complex forms of writing. Experienced researchers also know that writing is not just a way to communicate completed findings and polished arguments: writing is actually a powerful form of thinking and learning, one that clarifies thought and makes analyses and arguments more precise.

Acknowledging the Complexity of Research Writing

In order to appreciate the complexity of research writing and to guide new researchers, mentors need to understand that writing is a highly situated practice—that is, it is not a generic, general skill. Successful researchers need to achieve very specific purposes and speak persuasively to particular groups of readers. What is valued in writing and what is conventional and effective in writing varies across particular scientific communities and even within particular communities of researchers.

As researchers transition from writing within particular disciplines or professions to new ones, they often struggle to write successfully, even if they had success in previous writing situations. Given how varied purposes and audiences are for advanced research writing, as a research mentor, you should have intentional conversations about research writing with your mentees—working on and talking about writing are natural and important parts of training programs, and you should not expect new biomedical researchers to be accomplished writers from the start. Becoming an excellent research writer takes time, effort, and dedicated, consistent mentoring.

Mentors should also remember that researchers-in-training, like all students, bring varied literacy backgrounds to each new writing challenge. Some of your research trainees will have done lots of writing and reading, been held to high standards for written communication, and learned to receive and give critical feedback on writing. Others may feel that their intellectual strengths lie in quantitative rather than verbal areas. Some may have great strengths in oral communication rather than academic writing. Others may be multilingual writers, who are very skilled communicators in their first or second languages and who have great cross-cultural linguistic knowledge, but less experience writing and reading English. Some multilingual writers may have internalized

organizational structures or styles for academic writing from their first language that are at odds with standard patterns in English. Still other writers may have a tenuous grasp on the subject that they are writing about, and their conceptual struggles may manifest themselves in their writing. At the same time, many researchers find writing difficult and as a consequence avoid writing, procrastinate, and eventually end up in stressful time crunches that reinforce their dislike for writing.

Given what varied experiences and strengths researchers-in-training may bring, you should ask your mentees about their previous experience and about their perceived strengths and areas for improvement. Acknowledge that research writing is always hard work, especially when researchers are learning to write in a new field or in a new genre, when they are making arguments that are more complex than they have made before, or when they're not sure what their findings mean or what is interesting or important in their findings. For these reasons, research writers need their mentors to be patient and encouraging as well as critical. And above all, mentors need to *normalize revision*; revision is a normal and crucial part of writing, not a sign that a writer has failed because she or he did not achieve perfection in an early draft. Research shows that experienced, successful writers spend a lot of time revising their work.

Writing is hard work and time-consuming for mentees. Let's face it—--helping mentees learn to become strong research writers is hard work and time-consuming for you as a mentor. Although the recommendations that follow should make the time you spend on mentoring more successful and effective for you and for the writers you are mentoring, there are no shortcuts. Reading drafts carefully and critically and charitably; discerning what is and what is not working well in a draft; giving clear, specific, helpful, and encouraging feedback; reading yet another draft; meeting to talk through your feedback and the writer's plan for revision—these critical tasks will always require concentration and time. But they are what every writer needs in order to learn and to improve—to become the strongest possible research writer they can be and to launch their research career.

Key Principles In Mentoring Writers

1. Signal from the very start and reinforce frequently that excellent writing is a high priority for you, for your research group, and for all successful researchers.
2. Figure out what your mentees already know about research writing and find ways to help them learn what they need to learn.
3. Work collaboratively with your research mentees to motivate them to write every week, sometimes every day.
4. Talk with your mentees regularly about their writing—analyzing successful examples, planning new pieces of writing, brainstorming, kicking ideas around, discussing drafts, and planning revisions.
5. Schedule meetings to plan and work on drafts. Make discussions of in-progress writing in progress part of the culture and rhythm of your research group.
6. Give clear, specific, encouraging feedback. Start first with global concerns and then move on to more local, smaller concerns.
7. Be sure your feedback identifies strengths and potential as well as problems.
8. Honor and celebrate successful research writing within your research group.

Here are some specific strategies, drawn from research and practice, for mentors to try.

Before the First Draft

Find ways to signal that writing is crucial to research in your field and that mentoring researchers to become strong writers is a high priority for you and for your research group. When, for example, a prospective researcher interviews with you, talk about writing and your commitment to mentoring writing. If you use some form of written expectations, such as a mentoring compact, you might consider including a section for your mentees on writing. Create a culture within your group of sharing and discussing drafts and of sharing and celebrating successful writing. In your meetings or discussions, always find time to talk about writing—even long before it is time to begin writing.

Talk with trainees about their writing processes, and yours. You might read and discuss writing resources, which offer valuable advice about establishing good habits for academic writing. You might also want to share some drafts of your own research writing in progress, seeking feedback from your mentees—learning to give constructive, critical feedback helps writers grow, and sharing your drafts will give you valuable feedback and model the drafting, critique, and revision process that you are trying to teach.

Recognize that *talk* is a crucial part of writing. Be sure that you are talking regularly with trainees about their writing in progress. Your mentoring discussions about research questions, methods, literature, and results are all critical for helping a newer researcher figure out how they will explain their research project in research publications, in funding proposals, in presentations, and in interviews. In discussions, ask questions that point toward future writing, such as

"How are you thinking about organizing your literature review?"
"How might you phrase that as a research question?"
"In your results, what's new? What's most significant?"

These kinds of questions and many others help researchers clarify their thoughts through talk and help them prepare for writing. And by your choice of questions, you are helping reinforce the key principles of scientific research and helping researchers imagine the audiences for whom they will be writing.

Your trainees will benefit if you ask them to prepare and discuss the main information and arguments in their papers. Researchers benefit from having to organize information in a logical outline and giving colleagues a chance to ask questions and offer advice *before* investing hours and hours in drafting sentences and paragraphs. You might ask them to prepare and discuss informally, with you and with peers, a few PowerPoint slides outlining the main information and arguments they hope to include in their paper. Another good reason to invest time upfront clarifying key ideas and arguments: if you and your mentee do *not* clarify and agree on the main points and arguments for the paper early in the process of writing, don't be surprised if your mentee is reluctant to make major changes after she or he has invested all the time that it takes to write a full draft.

New research writers need to develop a robust understanding of the *genres* commonly written by researchers in their discipline. Strong, successful research writers can take an aerial view of a document and can talk intentionally about the purpose of a particular piece of writing and about the choices authors have made about the content and organization for a given genre. Mentors should work systematically with mentees to identify and to analyze the key genres (or kinds of writing) in relevant fields or subfields, looking at what a particular kind of writing accomplishes and how it is tailored to a particular audience. For each key genre, mentors should first explore mentees' experience and understanding about that genre. As you have these discussions, you might want to ask trainees to analyze, together with you, the different kinds of articles in major journals in your field. In talking about genre, try to focus not on surface features of a genre (e.g., the citation system) but aim to develop—in yourself as a mentor and in your mentees—an ability to talk about the

rhetoric of each genre; that is, the purpose of that genre, its audience, and its persuasive elements. For example, talk systematically about which questions get answered in the introduction, in the literature review, in the methods, in the results, and in the discussion sections. How is information organized *within* a particular section (such as the results section)? How much detail do authors give? What do the authors assume about the knowledge their readers already have about the topic under study?

Engage in "prewriting." Before your mentee begins drafting a proposal or research report, use your conversations to help your mentee plan and do what is called "prewriting." You can use your time—and your mentee's time—wisely by doing some explicit planning of a paper before your mentee starts actually drafting sections of it. Through collaborative talk and questions, you can help an author clarify the purpose of a piece of writing, central research questions, a plan, an outline, lists of main points, and the logic of an argument. Moreover, you can capture good ideas, plans, and important language—the mentee's and yours—by writing them down often as they emerge in these conversations. Your conversation and interest and encouragement also provide crucial motivation for doing the hard work of starting a writing project. And by correcting major misconceptions at this stage, you're helping writers, rather than waiting for a writer to invest countless hours in writing a full draft that may be misguided in some fundamental ways.

Set intermediate deadlines for portions of a draft, and insist that mentees meet those deadlines. Less experienced research writers need to write a partial draft long before they think they are ready to write, in order to give mentors a chance to give formative feedback and in order to give mentees plenty of time to revise. Early drafts, tough but encouraging critical feedback, and lots of revisions—these are what produce strong thinking and strong scientific writing. You might consider scheduling a weekly draft discussion for all lab members, with different members scheduled to share their work each week. It is natural for busy postdocs or graduate students to fall behind with deadlines, and of course mentors should be understanding and flexible, but you are not doing your mentees a favor if you allow them to delay writing for too long. Be sure your expectations for writing are clear and that the mentee understands the consequences of falling behind in writing given the number of publications they are expected to produce while working with you.

Ask your trainees to include a cover sheet with each draft. Each time your mentee provides you with a draft of their writing it should be accompanied by a cover sheet, which can orient you as a reader. This cover sheet might include relevant questions, such as

- What is this draft?
- Who is the intended audience?
- How is it organized?
- What are your main points?
- What do you think is working well? What are you pleased with?
- What would you especially like me to focus on as I read, or what would you like my help with?

Answers to these questions can guide your reading, and you will be able to use your time more effectively and be sure to respond to the writer's needs. Learning to reflect critically on their own writing is valuable for writers as well; experienced writers can talk effectively about their writing, can offer an aerial view of a draft, and can ask readers for particular kinds of help.

Giving Feedback and Guiding Revisions on Drafts

Encourage mentees to welcome criticism and advice about their writing. Before you ever give specific feedback on a draft, find comfortable ways to ask your mentees about their experience receiving feedback on drafts and about their feelings about feedback and criticism. Talk about your own feelings about advice and criticism and encourage your mentee to welcome and consider all feedback, to ask for clarification during an in-person conversation, and to feel comfortable choosing not to accept some advice but justifying that choice. Explain that the strongest, most successful writers seek out tough, critical readers while their writing is still changeable.

Explain your approach to feedback and contextualize your comments. For example, if you have commented only on big ideas or the next steps you are suggesting, be sure to tell that to the writer. Otherwise, it is easy for a writer to assume that because you have not commented on something that means there are no problems with it. If you commented on local concerns only in one section but similar problems continue in other parts of the draft where you did not comment, be sure to explain this lack of feedback that so that writers do not have to guess what it means.

Focus first on global concerns before local concerns. In your reading, in your comments, and in your conversations with the writer, focus first on whether the big picture is working well by addressing *global, high-level concerns* like these:

- Is the central research question clear?
- Is the significance of the research clear and persuasive?
- Is the progression of ideas and arguments logical?
- Does the writer demonstrate a clear understanding of the major concepts under study?
- Does the review of literature emphasize the most important ideas?
- Are findings clearly explained and easy to grasp—in figures and graphs as well as in the text?
- Are ideas thoroughly explained?
- Is the discussion focused on the most important points?

Later in the process of writing and revising, when the big stuff is working pretty well, narrow your focus and the writer's to more *local concerns* like these:

- Are there effective transitions between sections?
- How can the style be improved?
- Where do sentence or word problems interfere with the writer's ability to communicate clearly?
- Are there any grammatical errors?
- How can the word choice be improved?
- Are there punctuation errors?
- Are there proofreading mistakes?

Why is it important to start our feedback with global concerns? First, it is just a matter of efficiency—you have limited time to give feedback and your trainees have limited time to revise, so there is not much point to your commenting on small edits and not much point to the writer's making small edits when the writer needs to make larger changes. Second, research shows that less experienced writers are often confused by what faculty and mentors want them to concentrate on in their writing and in their revisions. They may think, for example, that correcting semicolon mistakes or rephrasing part of a sentence is as important as clarifying the logic of

their discussion or anticipating and addressing counterarguments or emphasizing some ideas and subordinating others. And mentor comments on their writing too often lead writers to make only superficial revisions to words and sentences, overlooking larger conceptual, rhetorical, and structural revisions that would most improve a paper. By starting your feedback with global concerns, mentees get clear guidance from you about how to strengthen their ideas, their analyses, and their arguments, so that they have papers worth editing and polishing. *Then* you can turn your attention—and your trainees' attention—to improving sentences, words, and punctuation.

Identify strengths and potential in a draft, teach from success, and offer encouragement. In your comments, instead of jumping right into what's wrong or needs improving, try starting with what you see as the specific strengths in a draft, what's promising, and what's working well. And it's important to make some of your praise specific, as specific as some of your criticism. So instead of saying "Good start," or just "Good," try identifying what in particular is working well in a draft. This does not mean to offer false or insincere praise, but writers need to know what they are doing well and they need to see you as a reader who is genuinely interested in what they have to say and eager for them to succeed, rather than seeing you only as an error hunter. Teaching or coaching for success means if a writer has done something well in one section of a draft (if, for example, their topic sentences orient a reader well to the topic and main point of a paragraph) but not in another section, you can encourage the writer to do what they have already done well elsewhere.

Be direct and clear in your request for revisions. When giving feedback, indicate in specific terms how much work remains to be done. For example, "This will need a fair amount of revision in order to clarify your key research questions and to report your key findings effectively. As you revise, here are my key suggestions: (1) . . . ; (2) . . . ; (3) . . . ." Or "After you've worked on focusing the literature review around just a few central concepts, you'll need to do some substantial editing to clarify sentences. I've shown the kinds of edits in the first paragraph of the lit review, but the rest of the draft needs that same kind of editing." You can be clear and constructive in your feedback, even if you are delivering bad news, but you are not doing a writer any favors if you hide or sugarcoat how much work remains to be done.

Ask writers to document their revisions. When you're reviewing a revised version of something you've read before, ask the writer to attach a cover sheet explaining the major changes they've made since you last read it. Asking trainees to do this signals that you expect them to make major revisions before you read something again. This kind of cover letter resembles what you would write in a cover letter or email with a revised manuscript if you received a "revise and resubmit" decision from a journal editor. In addition, you might want to ask the trainee to use "track changes" so that you can focus your reading on what's changed.

Close your comments with some encouragement and a look forward. Be sure to include notes of encouragement and expectation with your feedback. For example, you might say, "Looking forward to reading the next draft of this," or "Looking forward to seeing this in print soon!" or "Looking forward to meeting on Thursday to talk through your plans for revising."

Within your research group, create a culture that celebrates important milestones in writing. Acknowledge and celebrate proposals and manuscripts when they are submitted, when revisions are completed, grants funded, publications accepted, and publications appear.

Mentors play a critical role in helping researchers-in-training become excellent, independent writers. Be sure to set the bar high for your trainees' thinking, research, and writing and then provide them with support to meet those expectations. If at any point you feel that a mentee requires additional feedback and support, seek out local resources and encourage your mentee to take advantage of them.

Promoting Professional Development

Promoting Professional Development

Introduction

The ultimate goal of most mentoring situations is to enable the mentee to identify and achieve some academic and professional outcomes after the training period. Along the way, there are many objectives to be achieved, all of which must be consciously considered so they do not get lost or forgotten. While non-research professional development activities are sometimes seen as distractions from the core business of doing research, they are often critically important to identifying and successfully meeting the mentee's long-term career objectives. Therefore, it is important to recognize and promote relevant professional development opportunities for mentees.

Learning Objectives

Mentors will have the knowledge and skills to:

1. Identify the roles mentors play in the overall professional development of their mentees
2. Develop a strategy for guiding professional development using a written document
3. Initiate and sustain periodic conversations with mentees on professional goals and career development objectives and strategies
4. Engage in open dialogue on balancing the competing demands, needs, and interests of mentors and mentees (e.g., research productivity, grant funding, creativity and independence, career preference decisions, non-research activities, personal development, work-family balance, etc.)

Overview of Activities for the Professional Development Session: Please note that a core activity is listed for each learning objective. We encourage you to engage the mentors in your group in this activity. There is a list of additional activities that can be used if there is extra time in the session or the core activity is not working well for your group.

	Learning Objectives	**Core Activities**	**Additional Activities**
1	Identify the roles mentors play in the overall professional development of their mentees	Mentors brainstorm a list of the roles mentors play in the professional development of their mentee beyond research, and rank them in order of importance (Activity #1)	Mentors discuss the ways in which their own mentors supported and promoted their professional development in the past (Activity #5) Mentors review and discuss Case #2: *Mum's the Word* (Activity #6)
2	Develop a strategy for guiding professional development using a written document	Mentors review and discuss three different documents that could be used as guides to create Individual Development Plans (IDPs) (Activity #2)	Mentors revise the draft compact they created in the *Expectations* session to include more specific expectations for professional development (Activity #7)
3	Initiate and sustain periodic conversations with mentees on professional goals and career development objectives and strategies	Mentors use the written professional development plan created in Activity #2 as a guide for a conversation with their mentee about career development (Activity #3)	Mentors use the revised expectations compact created in the *Aligning Expectations* session to guide a conversation with their mentee about career development (Activity #8)
4	Engage in open dialogue on balancing competing demands, needs, and interests of mentors and mentees, e.g., research productivity, grant funding, creativity and independence, career preference decisions, non-research activities, personal development, work-family balance, etc.	Mentors read and discuss Case #1: *To Be or Not to Be a Research Tenure-Track Professor* (Activity #4)	Mentors read and discuss Case #3: *Life Changes* (Activity #9) Mentors read and discuss Case #4: *Looking for Balance* (Activity #10)

Facilitation Guide

Recommended Session on Promoting Professional Development (90 minutes)

- **Materials Needed for the Session:**
  - Table tents and markers
  - Index cards
  - Chalkboard, whiteboard, or flip chart
  - Handouts:
    - Copies of introduction and learning objectives for *Professional Development* (page 147)
    - Copies of the three example Individual Development Plans (pages 153-159)
    - Copies of the *Professional Development* Case #1, *To Be or Not to Be a Research Tenure Track Professor*, (page 152) and the additional cases if desired (pages 160-161)

- **Introduction (10 min)**
  - REFLECTION: Ask mentors to write down any new mentoring activities they have engaged in since the last session. If none, they should write down something they are thinking about regarding their mentoring relationship based on the previous session.
  - TELL: Review the introduction and learning objectives for the session.

- **Objective 1: Identify the roles mentors play in the overall professional development of their mentees** (30 min)
  - ACTIVITY #1: Brainstorming Mentor Roles in Professional Development
    - ASK (5 min): In pairs, please list all of the roles mentors can or should play in the professional development of their mentee, beyond research training
    - DISCUSS (15 min) with entire group the roles each pair listed. You may want to record the ideas generated in this discussion on a white board or flip chart.
    - NOTE: Some elements of professional development include:
      1. Networking-social and professional
      2. Socialization to local professional culture
      3. Finding funding
      4. Managing staff, role definition
      5. Time management
      6. Leadership skills
      7. Writing or IRB protocols
      8. Career path exploration and guidance
      9. Work-life balance
      10. Public speaking
      11. Research ethics
      12. Writing skills
      13. Drafting a grant budget
      14. Fostering informal mentoring relationships

    - DISCUSS (10 min) with entire group the following questions:
      - Which of the roles on the list are the most important? Why?
      - Are there some roles on the list that should not be the mentor's concern? Why?
      - How do you decide which roles you will play in the relationship?

- **Objective 2: Develop a strategy for guiding professional development using some form of written format (15 min)**
  - ACTIVITY #2: Reviewing Individual Development Plans and Mentoring Plans
    - REVIEW (15 min) individually: Mentors review example plans individually and make notes on them to indicate which aspects of the plans they would like to adopt for use with their own mentees. Some mentors may already use such plans and may wish to share their own versions.
    - TELL: Suggest that IDPs be used in the mentor selection process. Mentors have found them helpful as a means of assessing fit.
    - NOTE: Additional examples are available at: https://mentoringresources.ictr.wisc.edu. Mentors may also wish to refer their mentees to http://myidp.sciencecareers.org where they can develop their IDP through a guided, online process.

- **Objective 3: Initiate and sustain periodic conversations with mentees on professional goals and career development objectives and strategies** (15 min)
  - ACTIVITY #3: Using the Individual Development Plans and Mentoring Plans
    - ACTIVITY (10 min) in pairs: Mentors share specific ways they could introduce the idea of an individual development plan to their mentee and how the completed plan can be used to navigate the mentoring relationship.
    - DISCUSS (5 min) with the entire group. You may want to record ideas generated on a whiteboard or flip chart
    - FOLLOW-UP ACTIVITY: With their mentees, mentors should collaboratively choose or adapt an IDP and ask their mentee to complete it annually (at a minimum). The completed plan should be used to guide a conversation between mentor and mentee about professional development needs and expectations. For additional examples of IDPs visit: https://mentoringresources.ictr.wisc.edu/MentorIDPTemplates
    - NOTE: These plans are an important step towards creating some form of expectations document that can be used to initiate a discussion on goals and expectations with mentees. Mentoring compacts, like those included in the "Aligning Expectations" session can be utilized in concert with these IDPs to tailor a holistic plan for each mentee. An additional resource mentors may consider are learning compacts:
      https://www.msu.edu/user/coddejos/contract.htm
      http://www-distance.syr.edu/contract.html
      http://cte.uwaterloo.ca/teaching_resources/tips/self-directed_learning_learning_contracts.html

- **Objective 4: Engage in open dialogue on balancing the competing demands, needs, and interests of mentors and mentees (20 min)**
  - ACTIVITY #4: Case Study (20 min)
    - Distribute *Professional Development* Case #1: *To Be or Not to Be a Research Tenure-Track Professor* and let participants read the case individually for two to three minutes.
    - DISCUSS (17 min) with entire group. You may want to record the ideas generated in this discussion on a white board or flip chart. Use the guiding questions following the case study. Additional questions are listed below:
      1. What are the responsibilities of the mentor to every mentee, regardless of career path?
      2. To what extent are the differing value systems of the mentor and mentee a factor in their relationship?

3. Do the genders of the mentee and mentor impact your assessment of this case?
4. How do issues of socialization arise in this case study? What does it look like to belong to the academic enterprise?
5. How might non-research interests and personal goals or obligations play into a mentee's decision of career path? How might the mentor draw these factors out in discussion?
6. How could issues of the dual-career family play into this mentee's decision and thus influence the discussion?

- NOTE: Encourage mentors to return to their compact (if applicable) and include text on how both they and the mentee are expected to communicate a sudden change in the work plan due to health issues, family issues, etc., and how they will move forward.
- NOTE: For more information, a mentor training module on work-life balance can be found at http://mentoringresources.ictr.wisc.edu.

Promoting Professional Development

Case #1: *To Be or Not to Be a Research Tenure-Track Professor*

You are currently mentoring two post-doctoral scholars in your research group. Both are very talented and hard-working; however one has made it clear that his career goals do not include becoming a tenure track professor at a research university. He is interested in pursuing a career in industry. The other scholar has her heart set on pursuing a research university tenure track professorship. Lately, you find yourself spending more time giving professional development advice to the post-doc who intends to pursue the research tenure track career. You rationalize this by saying that you are more familiar with this career path and thus have more to offer. Secretly you worry that you are writing off the other post-doc, believing that he is not worth your time and advice if he is leaving academic research.

Guiding Questions for Discussion:

1. What are the main themes raised in this case study?
2. What should the mentor do now? What value judgments are being made by the mentor?
3. What would the implications be if everyone did become a principal investigator in academia? What other career paths are possible?
4. How do you advise on these paths with which you do not have personal experience? How can you discuss potential career paths with your mentee in an unbiased manner?

Examples of Individual Development Plans (IDPs)

1. **University of Pittsburgh Schools of the Health Sciences**

2. **Duke University School of Medicine**

3. **University of California-Davis**

Additional examples are available at: https://mentoringresources.ictr.wisc.edu. Mentors may also wish to refer their mentees to http://myidp.sciencecareers.org where they can develop their IDP through a guided, online process.

*Example #1: Postdoctoral Individual Development Plan (IDP)**

Individual Development Plan for the Next Year

An Individual Development Plan is a professional tool which outlines objectives that you and your mentor/supervisor have identified as important for your professional development. A comprehensive review of your career goals and objectives identified at the beginning of your appointment and during your semi-annual appraisal provide constructive feedback from your mentor/supervisor that can help you become an independent investigator.

Career Goals/ Objectives	Educational Activities	Research Projects Products/Dates
Goal One: Objective 1. 2. 3.		
Goal Two Objective 1. 2. 3.		
Goal Three Objective 1. 2. 3.		

Please describe the plan that you and your mentor have for your transition from your current position to the next position.

Additional Comments:

*****Adapted from IDP used with post-docs at the University of Pittsburgh Schools of the Health Sciences. http://www.caph.pitt.edu/PostDocSemiAnnualEval.pdf Accessed 04/13/12

*EXAMPLE #2: MENTORING PLAN WORKSHEET**

YOUR GOALS

Take some time to think about and write down your research and professional goals. You may want to articulate one- and five-year goals. For example, a short-term goal might be "to complete a series of experiments" and a long-term goal might be "to have enough publications to get a faculty job."

Short-term Goals (next year)	**Long-term Goals (next 5 years)**
1.	1.
2.	2.
3.	3.

IDENTIFY MENTORSHIP NEEDS

Identify competencies that you will need to gain expertise in to reach your goals (see Table below for examples). Identify people who can assist you in achieving these competencies and in meeting your goals. These can be mentors internally at your institution, or at other institutions. A blank grid is included on the next page to help you organize your thoughts. Put your initial thoughts down on paper before you approach a mentor, and then revise it as your relationship changes.

Designing research	Establishing goals
Writing grants	Finding funding
Managing your career	Managing staff
Leading teams	Preparing for promotion
Cultural competence	Navigating institution
Organizational dynamics	Managing conflict
Speaking before groups	Knowing career paths
Teaching effectively	Hiring personnel
Collaborating effectively	Managing budgets
Managing data	Mentoring others
Giving feedback	Evaluating literature
Assessing students	Medical informatics

POTENTIAL MENTORS

Identify people who can assist you in developing the competencies you identified and therefore help you to reach your goals. For each potential mentor, identify objectives, develop a list of what you can offer, and propose outcomes. Put your initial thoughts down on paper before you approach a mentor, and then revise it as your relationship changes.

APPROACHING MENTORS

We suggest that you first approach mentors by sending an e-mail that includes a request for a meeting, a brief summary of your goals, and why you think there would be a good fit between you and the mentor. Let potential mentors know how you are hoping to work with them, such as one-on-one, as one of many mentors, or as part of a mentoring team or committee. You might want to let them know how you think they would be able to contribute.

MANAGING RELATIONSHIPS WITH YOUR MENTORS

Relationships should be nurtured and respected. If you and your proposed mentor develop a working relationship, have some guidelines for how you will work together. Here are some tips:

- Schedule standing meetings ahead of time and keep them
- Give your mentor(s) plenty of time to review drafts of grants and manuscripts
- Don't be a black hole of need – limit the number of requests you make of any given mentor
- Develop authorship protocols so that expectations are clear
- Saying thank you is priceless

Mentoring Plan					
Mentor	***Long and/or Short Term Goal*** *(e.g. manage own research group)*	***Competency*** *(e.g. learn how to mentor)*	***Activity*** *(e.g. mentor an undergrad)*	***What I can offer*** *(e.g. increase lab's capacity to do research)*	***Outcome*** *(e.g. increased productivity in lab)*

*Adapted from Ann J Brown, MD MHS, Vice Dean for Faculty, Duke University School of Medicine. Accessed 5/28/10 at http://facdev.medschool.duke.edu

*Example #3: Mentoring Worksheet**

Mentor: _____ Mentee: _____

Date of Meeting: _____

Goal: Research ☐Goal met ☐Making Progress ☐No Progress

Accomplishments:_____

_____

_____

Obstacles:_____

_____

_____

New goal or strategy to overcome obstacles (if needed):_____

_____

Goal: Teaching ☐Goal met ☐Making Progress ☐No Progress

Accomplishments:_____

_____

_____

Obstacles:_____

_____

_____

New goal or strategy to overcome obstacles (if needed): _____

_____

Goal: Service ☐Goal met ☐Making Progress ☐No Progress

Accomplishments:_____

_____

_____

Obstacles:_____

_____

_____

New goal or strategy to overcome obstacles (if needed): _____

_____

Goal: Self Development ☐Goal met ☐Making Progress ☐No Progress

Accomplishments:_____
_____
_____

Obstacles: _____
_____
_____

New goal or strategy to overcome obstacles (if needed): _____
_____

Goal: Networking ☐Goal met ☐Making Progress ☐No Progress

Accomplishments:_____
_____
_____

Obstacles: _____
_____
_____

New goal or strategy to overcome obstacles (if needed): _____
_____

Goal: Work/Life Balance ☐Goal met ☐Making Progress ☐No Progress

Accomplishments:_____
_____
_____

Obstacles:
_____
_____
_____

New goal or strategy to overcome obstacles (if needed): _____
_____

Goal: Additional Mentors ☐Goal met ☐Making Progress ☐No Progress

Accomplishments:_____
_____
_____

Obstacles:_____
_____
_____

New goal or strategy to overcome obstacles (if needed): _____
_____

*Accessed from University of California-Davis on 5/15/10 at *www.ucdmc.ucdavis.edu/.../NewCareerMtrgMentoringUpdateWkst.doc*

Additional Activities (if time allows):

Objective 1; Activity #5

Have mentors discuss the ways in which their mentors supported and promoted their professional development in the past (or what they wish their mentor had done). In general, how did they get where they are now and how did their mentors, formal and informal, play a role in that process? You may want to record the ideas generated in this discussion on a white board or flip chart.

Objective 1; Activity #6

Professional Development* Case #2: *Mum's the Word

Jack and Jill are graduate students in Biology, working at the same university but in different labs. They are friends and frequently discuss their projects, which are often along similar lines. One day, Jill tells Jack about her progress and discloses a lot of details about her experimental design and data. However, she mentions to Jack that she has gotten stuck and can't move forward because her lab doesn't have the resources to move her work along. Jack, as it turns out, is not only very interested in Jill's work, but his lab is well-supported, and his mentor likes him and would support Jack's ideas. Without telling Jill, Jack spends the next few months working out his own version of Jill's experiment with great support from his mentor. He then publishes an important paper that Jill had no idea about until she sees it appear in a high-impact journal. Jill proceeds to share information with Jack's mentor.

Guiding Questions for Discussion:

1. What are the responsibilities of mentors to educate their trainees about the ethics of research collaboration and authorship?
2. How can a mentor model these behaviors?
3. As Jack's mentor, how would you follow up with Jack? Should there also be follow up with Jill and her mentor?

Adapted from CTSPedia.org, Clinical Research Ethics Educational Materials (John Banja, PhD, Emory University).

Objective 2; Activity #7

Ask mentors to revise the draft compact they created in the *Aligning Expectations* session to include more specifics about professional development expectations, incorporating goals and ideas generated from mentees' individual development plans (see note on page 150).

Objective 3; Activity #8

Have mentors use the revised expectations compact created in the session on aligning expectations as a guide to conversation with their mentee about professional development. Ask mentors to make certain their expectations are in alignment with those of their mentee after this conversation.

Objective 4; Activity #9

Professional Development* Case #3: *Life Changes

Your mentee had been productive with research and manuscript writing. However, over the last year his (or her) mother was diagnosed with and recently died from pancreatic cancer. Prior to her diagnosis and illness, his (or her) mother provided substantial support for the mentee's family including childcare, cooking, and general support. This life event has put the mentee's productivity on a slower course, and your mentee needs support to complete a pilot project before you submit the next grant to the NIH. What is your advice?

Guiding Questions for Discussion:

1. What are the main themes raised in this case study?
2. To what extent should mentors have a role in helping mentees with work/life balance?
3. How have you as a mentor dealt with similar situations?

Adapted from the University of California, San Francisco, Clinical Translational Science Institute (CTSI), Mentor Development Program. Accessed on 5/14/10 at http://ctsi.ucsf.edu/training/mdp-cases

Objective 4; Activity #10

Professional Development* Case #4: *Looking for Balance- The Mentee's Perspective

Dr. Feinstein is a post-doc. Dr. Feinstein's wife is expecting their first child and he would like to request a three-month parental leave. However, Dr. Feinstein has not raised this issue with his mentor, a 60-year-old professor whom he senses is already growing frustrated that he does not put in the number of hours that his generation did when they were coming up. Additionally, Dr. Feinstein has heard a rumor that his mentor is considering mentoring a new post-doc this spring. Dr. Feinstein has heard that this new post-doc is a real "go-getter" working 70-80 hours a week. Dr. Feinstein fears this new post-doc will make him look as if he is not serious about his research career.

Guiding Questions for Discussion:

1. What are the main themes raised in this case study?
2. Discuss the role of the mentee's gender. How is maternity leave treated differently than paternity leave?
3. How can the concept of workforce flexibility be translated for scientists in clinical and translational research?

Adapted from the University of California, San Francisco, Clinical Translational Science Institute (CTSI), Mentor Development Program. Accessed on 5/14/10 at http://ctsi.ucsf.edu/training/mdp-cases

Articulating Your Mentoring Philosophy and Plan

Articulating Your Mentoring Philosophy and Plan

Introduction

Reflecting upon your mentoring relationships is a vital part of becoming a more effective mentor. This is especially important immediately following a mentor-training session so that you can consider how to implement changes in your mentoring practice based on the training. Reflection on your mentoring practice at regular intervals is strongly encouraged.

Learning Objectives

Mentors will:

1. Reflect on the mentor-training experience
2. Reflect on any intended behavioral or philosophical changes across the mentoring competencies
3. Articulate an approach for working with mentees in the future

Overview of Activities for the Mentoring Philosophy and Plan: Please note that only core activities are included for this final training session.

	Learning Objectives	Core Activities
1	Reflect on the mentor-training experience	Mentors engage in an open discussion of the knowledge and skills they have learned from the mentor-training sessions (Activity #1)
2	Reflect on intended behavioral or philosophical changes across the mentoring competencies	Mentors reflect on each of the mentoring competencies and write about their mentoring practices before and after the mentor-training sessions (Activity #2)
3	Articulate an approach for working with mentees in the future	Mentors discuss approaches for working with a new mentee (Activity #3)

Facilitation Guide

Recommended Session for Articulating Your Mentoring Philosophy and Plan (30 minutes)

- **Materials Needed for the Session:**
  - Table tents and markers
  - Chalkboard, whiteboard, or flip chart
  - Handouts:
    - Copies of introduction and learning objectives for *Articulating Your Mentoring Philosophy and Plan* (page 165)
    - Copies of the *Mentoring Competencies Reflection Worksheet* (page 168)
    - Copies of the *Mentor Self-Reflection Template* (page 169)

- **Objective 1: Reflect on the mentor-training experience** (10 min)
  - ACTIVITY #1: Group Discussion of Lessons Learned from Mentor Training
    - ASK: Please share with the group one or two ideas that stand out from the mentor-training sessions. These can include lessons learned, ideas that did or did not resonate with you, etc. Once everyone has a chance to share, we can share additional comments.
    - You may want to record ideas generated in this discussion on a white board or flip chart.

- **Objective 2: Reflect on behavioral or philosophical changes across the mentoring competencies** (10 min)
  - ACTIVITY #2: Individual Written Reflection Across the Competencies (10 min)
    - Have each participant individually complete the Mentoring Competencies Worksheet.
    - If there is not enough time to complete the writing activity, they may finish later.

- NOTE: Encourage mentors to edit their compact (if applicable) with these ideas. They can use the *Mentor Self-Reflection Template* to aid the in this process as well. Another similar tool can be found in "Nature's Guide for Mentors."[4]

❖ **Objective 3: Articulate an approach for working with new mentees in the future** (10 min)

➢ ACTIVITY #3: Discussion of Ways to Begin a New Mentoring Relationship

- TELL: You will soon begin formally mentoring a new postdoc member in your department. The two of you have talked by phone several times over the past year to discuss project ideas and you have met a few times since her arrival at your institution.
- DISCUSS (8 min) with entire group. You may want to record the ideas generated in this discussion on a white board or flip chart. Guide the discussion using the following questions:
  1. Specifically, what steps would you take to prepare for meeting with the new mentee in three weeks?
  2. What will you do before the mentee arrives?
  3. What will you do within the first month of the mentee's arrival?
  4. What do you think is the most important thing you can do to start this new mentoring relationship off on the right foot?

[4] Lee, Adrian, Carina Dennis and Philip Campbell. 2007. Nature's Guide for Mentors. *Nature* 447: 791-797.

Mentoring Competencies Reflection Worksheet

For each mentoring competency, please list one or two specific approaches you have taken in the past and plan to take in the future.

Competency	Approaches you have used in the past	Approaches you intend to try in the future
Maintaining Effective Communication		
Aligning Expectations		
Assessing Understanding		
Addressing Equity and Inclusion		
Fostering Independence		
Promoting Professional Development		

Mentor Self-Reflection Template				
	What were the unique challenges and opportunities from the past year?	**What was your role?**	**What happened? What were the results?**	**Was there any further action?**
Meetings & Communication **+** –				
Expectations & Feedback **+** –				
Career Development **+** –				
Research Support **+** –				
Psychosocial Support **+** –				
Upcoming Year				
• What do you want to keep doing? • What would you like to try differently with your mentee in upcoming year? • What different resources or training would be helpful to you as the mentor?				

From Anderson L, Silet K, Fleming M. 2011. Evaluating and Giving Feedback to Mentors: New Evidence-Based Approaches. *Clinical and Translational Science* 5(1) 71-77.

Case Study Appendix

Below are all the case studies included in the curriculum, listed by mentoring competency.

Maintaining Effective Communication

Case #1: *Giving Constructive Feedback*

As he leaves the crowded conference room, Dr. Tariq tells his post-doc, Dr. Timms, that he'll see her in a few minutes. When Dr. Timms arrives in his office, he meets her gaze and smiles and says with a heavy accent "Thanks for coming by. I wanted to make sure we could review your talk since the conference is in a week and I know you're busy all day tomorrow—and then I'm out of town," he says. Dr. Timms continues to stare without comment, a blank expression on her face. "Well, as you know, I think your research is really important and I'm glad that we have this opportunity to share it. I think this conference will be a great opportunity for you to meet some key colleagues in our field." She nods slightly, and shifts in her seat. "I do think there are a few things that could tighten your presentation." She continues to stare and Dr. Tariq keeps his focus on his notes as he continues. "For example, you had some long sentences, and even whole paragraphs on your slides. While they were well written,"—his computer chimes as a new email arrives, and he glances over to see who it's from. *Oh, not again.*…. "As I was saying, while they were well written—I mean, you know your writing is strong—it is really too much text for a slide. You could try to shorten some to bullet points. Then you can still make those points without just reading your slides to the audience." He looks up and sees that she is now looking at the floor. "It would also allow you to increase the font size a bit. I think it might have been hard to read from the back of the room." He looks up again and sees she is taking some notes. "To cut back on the time, I think you could cut the four slides on the background and just briefly summarize those." He waits for comment, and the silence drags on a few moments. "What do you think?"

"I can look at it." Her face remains expressionless as she glances up and briefly meets his eye.

"That might allow you to slow down a bit," he continues. "Of course it's natural to get nervous and then one tends to talk faster. Perhaps you could practice it a bit at home and focus on slowing the pace and not looking at your notes as much. Have you tried practicing out loud to yourself at home?

"Yes."

The phone rings. He checks caller ID. *I'll have to call her back when this is over*. "Ok then. I can send you a link to some tips on slide composition and oral presentation and hopefully that will be helpful." There is another long moment of silence. "Well, do you have any questions for me?"

"No, not right now."

"Ok then, well, good luck!" He forces another smile and reaches out to shake her hand as she rises to leave. She takes it and smiles feebly back. "Thanks."

Guiding Questions for Discussion:

4. What are the main issues raised in this case study?
5. How could this situation have been handled differently? What should the mentor do now?
6. How do you interpret silence or minimal response from a mentee?

Case Study #2: *The Slob*

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 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?
2. If you were the mentor, how would you feel?
3. If you were the faculty adviser, how would you feel?
4. What is the most effective way to communicate who should be involved in dealing with problems that arise between the mentor and mentee?
5. If you were the adviser, how would you have handled this situation?
6. How does this situation affect the research group environment?

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

Aligning Expectations

Case #1: *The Slow Writer*

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 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, so 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 manuscripts, herself. Setting deadlines for detailed outlines, manuscript/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?

Case #2: *Second Year Blues – A Mentee's Perspective*

Ben is beginning his second year as a multidisciplinary post-doctoral research scholar at BIG U Academic Health Center. Though he has enjoyed working on his mentor's research project, he is becoming anxious that he has not yet started an independent project. When he joined the lab two years ago, he had hopes of pursuing his own independent interests. Every time Ben tries to bring up his concerns with his mentor, it seems like his mentor can never find the time to have a discussion focused on Ben's research goals. This situation is becoming frustrating because he likes his mentor and understands that the past few months have been extremely busy for his mentor due to a host of factors (economic budget constraints, preparing an NIH grant proposal, adoption of a new family member, etc.). Being politically astute, Ben is reluctant to make a "misstep", yet he knows the clock is ticking. He is also concerned that his recent interests in basic mechanistic studies are too divergent from his mentor's translational program and worries that it may conflict with his mentor's expectations. He feels "stuck," but doesn't know what to do.

Guiding Questions for Discussion:

1. What are the main themes raised in this case study?
2. What kind of conversations regarding expectations might have been helpful earlier in this relationship?
3. What kind of conversations would be helpful at this point? Who should be involved in these conversations?

Assessing Understanding

Scenario A: Revealing Abstract

You have just spent the last month working intensively with your new graduate mentee. You have given her multiple papers to read and have had several discussions about your research. In addition, she has engaged in several different aspects of an ongoing project over the last month. She is hard-working, seems to understand the research your group does, and things seem to be going well. On Monday morning, she hands you a draft of the introduction section for a possible thesis project. After reading through the draft, you are forced to conclude that she does not understand the work your lab does at all.

What can you do to address this situation? How can you avoid this situation in the future? Come up with at least three specific techniques for avoiding this situation.

****

Scenario B: It Seemed So Clear When You Explained It

You have recently explained a complicated technique to your mentee. While you were explaining, he nodded the entire time as if he understood every word you were saying. When you were finished with your explanation, you asked him if he had any questions. He said no. Just to make sure, you asked him if everything was clear. He said yes. Three days later you asked the mentee how his work using this technique was going and he told you he hadn't started, because he did not understand the technique.

What can you do in the future to make sure your mentee understands what you are saying? Come up with at least three specific approaches for assessing your mentee's understanding.

****

Scenario C: It Just Didn't Work

I have a really promising mentee, he's doing well in all of his graduate courses and when we work through experiments together, he knows all the right techniques but he doesn't seem to be able to get experiments to work right when he's by himself. I'm trying to help him figure out what's happening in his failed experiments, but our conversations all seem to go like this:

> "So what happened with your reaction?"
>
> "It didn't work."
>
> "What happened?"
>
> "Nothing. It just didn't work."
>
> "What do you think went wrong?"
>
> "I don't know. But I tried it twice and it didn't work either time."

We're both getting a little frustrated with the lack of progress, and I've noticed that he's started spending less time in the lab.

Think with your colleagues about how to get things back onto the right track? Come up with at least three specific approaches for dealing with this situation.

Addressing Equity and Inclusion

Case #1: *Is it Okay to Ask???*

Last year I worked with a postdoc who has since left to take a faculty position. We all valued her input and I think that she had a positive experience working with our research team, but there are a few questions that still linger in my mind. This particular postdoc was an African-American woman. I wondered how she felt about being the only African-American woman in our research group. In fact, she was the only African American woman in our entire department. I wanted to ask her how she felt, but I worried 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 impacted her experience, but I could never figure out how to broach the subject.

Guiding Questions for Discussion:

1. What are the main themes raised in this case study?
2. What have the mentor's intent have been in asking the question, and what might the impact be on the mentee?
3. How might you react to this case differently if the mentee was the only openly gay postdoc in the department? 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?

Case #2: *Language Barriers*

I am a researcher in a very crowded lab. This fall, two new post-docs started in the lab, both are Chinese. The post-docs were great - they worked hard, got interesting results, were fun to be around, and fit into the group really well. The problem was that they spoke Chinese to each other all day long. And I mean ALL DAY. For eight or nine hours every day, I listened to this rapid talking that I couldn't understand. Finally, one day I blew. I said in a not very friendly tone of voice that I'd really appreciate it if they would stop talking because I couldn't get any work done. Afterwards, I felt really bad and apologized to them. I brought the issue to my peers and was surprised by the length of the discussion that resulted. People were really torn about whether it is okay to require everyone to speak in English and whether asking people not to talk in the lab is a violation of their rights. Our class happened to be visited that day by a Norwegian faculty member and we asked her what her lab policy is. She said everyone in her lab is required to speak in Norwegian. That made us all quiet because we could imagine how hard it would be for us to only speak Norwegian all day long.

Guiding Questions for Discussion:

1. What are the main themes raised in this case study?
2. What is the intent of any English-only policy? What might the impact on lab members be and on the 'lab community' as a whole?
3. How is race a factor in this case? What are the implications of the connections between race, language, and ethnicity?

Case #1 and #2 are adapted from Handelsman, J., Pfund, C., Miller Lauffer, S., and Pribbenow, C.M. 2005. *Entering Mentoring: A Seminar to Train a New Generation of Scientists*. University of Wisconsin Press: Madison, WI.

Case #3*: Ethnicity, Disease and Ethics*

You are a senior researcher in lab that is sequencing genes as part of a larger effort to find a genetic marker for susceptibility to a particular disease. A graduate student who has just started in your lab and whom you have been asked to mentor, comes to you and complains that she has decided the project itself is discriminatory because the disease you are examining is much more prevalent among members of her ethnic group. She has even found a paper that confirms this statistical link. She is worried that the research could be used to deny or limit access to health care for this disease, and that this would disproportionately affect her ethnic group.

Guiding Questions for Discussion:

1. What are the main themes raised in this case study?
2. How should the mentor respond?
3. How can you acknowledge a mentee's concerns, respect their value and still move forward on the project?

Case #4: *How Long to Wait?*

A new post-doctoral fellow, Dr. Smith, recently started working with you on a research study evaluating the effectiveness of an intervention being implemented in a local medical center. While his initial progress has been good and he always makes your scheduled meetings, you are bothered that you seldom see him in the office. When you ask him about it he explains that he is a single parent with two young children. He doesn't have family nearby to help with childcare, and given his school debt, can't afford full-time help. Thus, he often works from home and after the kids are in bed at night. You say nothing more at the time, but feel uncomfortable that you don't have the opportunity for more informal contact and supervision, and don't have experience working with someone in this situation. Then, the following week Dr. Smith brought his kids with him to a meeting with your research team, explaining that his sitter wasn't available that day. The kids were a little distracting, though not disruptive, and the team members truly didn't seem to mind. However, you wonder if you need to have a talk with your mentee or if you are being overly concerned about something that is not really an issue and should wait to see how things play out.

Guiding Questions for Discussion:

1. What are the main themes raised in this case study?
2. How do you picture Dr. Smith and does his image impact your reaction? If you picture him as white and American, would you react any differently if he were a minority or international student? Do you assume he is straight or gay? Would you react differently if he were a female?
3. To what extent do you expect your mentees to conform to your own professional expectations and to what extent do you alter your own expectations to accommodate theirs? Is class a factor in this case?
4. How does this situation align (or not) with your compact expectations?
5. List three concrete strategies for dealing with this issue.

Case #5: *Second Language*

Dr. Ellen Hlavek is a senior post-doc in your laboratory. She has an excellent training record and has had strong mentoring in research. Although her knowledge of the science and research methodology is sound, she struggles with oral presentations since English is not her first language. Recently while giving an important presentation on her research at a professional meeting, someone in the audience commented that she needed to speak slower because he couldn't understand her. Dr. Hlavek was embarrassed and became very self-conscious. Her Slavic accent became more apparent and she started speaking even faster. She also wondered afterwards if her headscarf influenced the public criticism she received.

Guiding Questions for Discussion:

1. What are the main themes raised in this case study?
2. Dr. Hlavek calls you after this presentation. She is very upset about what transpired at the conference and shares her concerns about why she may have been singled out. As her mentor how do you advise her?
3. What are the implications of connections between religion, ethnicity and language? What are the challenges for a mentor when a mentee's second language skills present a barrier to effective communication of his/her research?

Case #6: *Model Organisms*

James, a second-year graduate student in your laboratory is studying physiology. James is a fantastic graduate student - intelligent, productive and collaborative. At this point in his graduate studies, James is making solid progress and has begun to draft his research question and experimental design for his dissertation proposal. When he started drafting his ideas, James seemed very excited about his research questions and his proposed experiments, but over the past two weeks, James has seemed disheartened. Upon expressing your concern, James states that he needs to rethink his entire plan. When you ask him to explain, he declares "I figured out the perfect experiment to test my hypothesis, but it requires me to experiment on rats. That goes against everything I believe."

Guiding Questions for Discussion:

1. What are the main themes raised in this case study?
2. What are the implications when personal beliefs conflict with the progress of research?
3. How can the mentor help James work through his struggle?

Fostering Independence

Case #1: *Launching an Independent Career?*

Dr. Klein is very excited about the grant proposal she is writing to NIH. The proposal builds upon research she has been conducting as a post-doc in the laboratory of Dr. Janco. She feels strongly that the proposal clearly describes the logical next steps in the project as well as relates the research to her previous research. When Dr. Klein meets with Dr. Janco to discuss the grant proposal, she is surprised to discover that Dr. Janco is less than enthusiastic about the proposal. Dr. Janco informs her that the proposal is too closely aligned with Dr. Janco's current work and its future direction. She says that the proposal needs to be reworked and focused on a different, more independent direction of research. Dr. Klein leaves the meeting frustrated, disappointed, and unsure how to proceed.

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?
3. How is independence redefined in a restricted funding climate and an era of collaborative research?
4. What if Dr. Klein's proposal describes research that is closely aligned with the project of a graduate student in the same research group? How can boundaries between the projects be established and how can ownership be clearly defined?

*Note: This case is taken from the mentee's perspective, providing mentors a slightly different lens.

Case #2: *Forced Guidance*

I am working with a graduate student this semester and I just can't seem to communicate effectively with him. I told him at the beginning of the semester that I thought we should have weekly meetings to talk about his progress, and he agreed. At our next meeting, I asked him to run through a list of the things he'd accomplished that week. He had no notes and seemed pretty unprepared for talking about his work in the level of detail that I expected. He's been canceling most of our meetings at the last minute − either he doesn't feel well, or he suddenly remembers an assignment for another class that's due the next day. I know that he's doing the work, because at the few meetings he keeps, he has a lot to say − but his progress on this project is very uneven, both in time taken and in quality, and I'm often forced to suggest that he redo crucial pieces. I fear these critical meetings leave him demoralized and less interested in accepting guidance from me, but I don't know how else to get him to understand that he needs my help.

Guiding Questions for Discussion:

1. What are the main themes raised in this case study?
2. What other issues might be at play in this case? What should the mentor's next steps be?
3. How can you determine if you are making assumptions about a mentee's ability based on their productivity or work style, especially if they differ from yours? What is your responsibility to "force guidance"?

Case #3: *How Much to Help?*

Thuy-Dan is a graduate student who is nearing the end of her PhD, but wishes to continue her training in her mentor's lab as a post-doctoral researcher. Thus, she is independently applying for a post-doctoral fellowship from the NIH. Thuy-Dan's mentor believes that she is a very valuable asset to the lab and is highly supportive of Thuy-Dan continuing her training in this lab, but does not have any other funding to support her salary. The mentor has agreed to advise Thuy-Dan in the preparation of the application, although noting that it should represent her independent work. When she provides her mentor with a draft of the application, he becomes concerned about the quality of the writing. The research ideas are fairly solid, but the research plan has some minor flaws and the proposal is very poorly written.

Thuy-Dan's mentor believes that the fellowship proposal in its current form would not be a strong candidate for funding. Although the application should reflect her work, he has a vested interest in the proposal succeeding so that he can keep one of his most productive researchers. The mentor is unsure how to improve her proposal while still retaining it as Thuy-Dan's independent work. Moreover, Thuy-Dan has invested more than a month in preparing this application and is not accustomed to criticism of her writing, so the mentor is concerned that her defensiveness may create a further obstacle to improving the proposal.

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?
3. How would independent research be defined in this case?

Case #4: *Ready Mentee*

An experienced graduate researcher was constantly seeking input from his mentor on minor details regarding his project. Though he had regular meetings scheduled with his mentor, he would bombard her with several e-mails daily or seek her out anytime she was around, even if it meant interrupting her work or a meeting that was in progress. It was often the case that he was revisiting topics that had already been discussed. This was becoming increasingly frustrating for the mentor, since she knew the student was capable of independent work (having demonstrated this during times she was less available). What should the mentor do to encourage and support the student to be more independent?

Guiding Questions for Discussion:

1. What are the main themes raised in this case study?
2. How do you convey the level of independence you expect from your mentee?
3. What is the mentor's responsibility in this case?

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

Promoting Professional Development

Case #1: *To Be or Not to Be a Research Tenure-Track Professor*

You are currently mentoring two post-doctoral scholars in your research group. Both are very talented and hard-working; however one has made it clear that his career goals do not include becoming a tenure track professor at a research university. He is interested in pursuing a career in industry. The other scholar has her heart set on pursuing a research university tenure track professorship. Lately, you find yourself spending more time giving professional development advice to the post-doc who intends to pursue the research tenure track career. You rationalize this by saying that you are more familiar with this career path and thus have more to offer. Secretly you worry that you are writing off the other post-doc, believing that he is not worth your time and advice if he is leaving academic research.

Guiding Questions for Discussion:

1. What are the main themes raised in this case study?
2. What should the mentor do now? What value judgments are being made by the mentor?
3. What would the implications be if everyone did become a principal investigator in academia? What other career paths are possible?
4. How do you advise on these paths with which you do not have personal experience? How can you discuss potential career paths with your mentee in an unbiased manner?

Case #2: *Mum's the Word*

Jack and Jill are graduate students in Biology, working at the same university but in different labs. They are friends and frequently discuss their projects, which are often along similar lines. One day, Jill tells Jack about her progress and discloses a lot of details about her experimental design and data. However, she mentions to Jack that she has gotten stuck and can't move forward because her lab doesn't have the resources to move her work along. Jack, as it turns out, is not only very interested in Jill's work, but his lab is well-supported, and his mentor likes him and would support Jack's ideas. Without telling Jill, Jack spends the next few months working out his own version of Jill's experiment with great support from his mentor. He then publishes an important paper that Jill had no idea about until she sees it appear in a high-impact journal. Jill proceeds to share information with Jack's mentor.

Guiding Questions for Discussion:

1. What are the responsibilities of mentors to educate their trainees about the ethics of research collaboration and authorship?
2. How can a mentor model these behaviors?
3. As Jack's mentor, how would you follow up with Jack? Should there also be follow up with Jill and her mentor?

Adapted from CTSPedia.org, Clinical Research Ethics Educational Materials (John Banja, PhD, Emory University).

Case #3: *Life Changes*

Your mentee had been productive with research and manuscript writing. However, over the last year his (or her) mother was diagnosed with and recently died from pancreatic cancer. Prior to her diagnosis and illness, his (or her) mother provided substantial support for the mentee's family including childcare, cooking, and general support. This life event has put the mentee's productivity on a slower course, and your mentee needs support to complete a pilot project before you submit the next grant to the NIH. What is your advice?

Guiding Questions for Discussion:

4. What are the main themes raised in this case study?
5. To what extent should mentors have a role in helping mentees with work/life balance?
6. How have you as a mentor dealt with similar situations?

Adapted from the University of California, San Francisco, Clinical Translational Science Institute (CTSI), Mentor Development Program. Accessed on 5/14/10 at http://ctsi.ucsf.edu/training/mdp-cases

Case #4: *Looking for Balance- The Mentee's Perspective*

Dr. Feinstein is a post-doc. Dr. Feinstein's wife is expecting their first child and he would like to request a three-month parental leave. However, Dr. Feinstein has not raised this issue with his mentor, a 60-year-old professor whom he senses is already growing frustrated that he does not put in the number of hours that his generation did when they were coming up. Additionally, Dr. Feinstein has heard a rumor that his mentor is considering mentoring a new post-doc this spring. Dr. Feinstein has heard that this new post-doc is a real "go-getter" working 70-80 hours a week. Dr. Feinstein fears this new post-doc will make him look as if he is not serious about his research career.

Guiding Questions for Discussion:

1. What are the main themes raised in this case study?
2. Discuss the role of the mentee's gender. How is maternity leave treated differently than paternity leave?
3. How can the concept of workforce flexibility be translated for scientists in clinical and translational research?

Adapted from the University of California, San Francisco, Clinical Translational Science Institute (CTSI), Mentor Development Program. Accessed on 5/14/10 at http://ctsi.ucsf.edu/training/mdp-cases