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7 "Mentoring Up": Learning to Manage Your Mentoring Relationships

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Research mentoring relationships are critical for academic and professional success, yet vary considerably in their effectiveness.[1] This variability is often attributed to the ability of the research mentor to shape and guide the research experience for mentee(s). It is common to hear stories that range from inspiring mentors who help transform their mentees, to mentors who appear inaccessible and even sometimes a hindrance to their mentees' success. In this chapter we reframe the mentoring relationship as one in which there is shared responsibility and a continuous two-way conversation between mentor and mentee.

To highlight the mentee's role in this relationship, we advance the term "mentoring up" and offer specific strategies that mentees can use to consciously contribute to and guide the mentoring relationship. We also advocate for the importance of equipping mentees with the knowledge, skills, and confidence that will empower them to navigate through difficult situations, and to avoid passive patterns of behavior that may limit their own success.

Two case studies are presented to illustrate some of the common challenges that new mentees face as they learn to navigate their research mentoring relationships. In both cases new graduate students encounter challenges, which they address with varied methods and therefore obtain different results. These case studies are based upon real situations, with altered names to maintain confidentiality of the people involved, and are situated within contexts commonly encountered in STEMM (science, technology, engineering, math, and medicine) disciplines. While the authors' experience and

scholarly background is in these disciplines, we postulate that the skills needed to effectively "mentor up" are relevant and can be easily adapted across other disciplines.

Case Study #1: Moving Target

Dan's start in graduate school has not been as auspicious as he had hoped. He applied to multiple top-tier research universities, but wasn't admitted into any of his favorite schools. He was finally admitted to his "safety school," his last resort, and was grateful for the opportunity. But even here he has struggled to find a research mentor. He spoke with many professors, but was disappointed when most turned him down. The faculty told him that tightened research budgets limited the number of students that they could accept. Things seemed to finally turn a corner when Dan met Professor Nevan, a new assistant professor who described many exciting projects and invited him into her research group.

Dan joined Professor Nevan's group and began working there. They planned his first project together, which seemed fascinating and suitable because it overlapped with his prior experiences and interests. Dan dove into the project, eager to impress his mentor and prove his worth. One month later, however, Professor Nevan approached him and strongly encouraged him to drop the original project and tackle a new research question. Dan was uncertain about the change, but Professor Nevan seemed excited about this new opportunity, so he followed accordingly. However, the same thing happened again two months later, when Professor Nevan came up with another entirely new research project and encouraged Dan to pursue it.

Dan is confused and frustrated, because he perceives that Professor Nevan is giving him a moving target. He also doesn't like that the process has been inefficient, taking more of his precious time and energy to wrap up the old project and begin a new direction. But he's also feeling trapped, because he doesn't have other faculty to consider, and doesn't know how to begin talking with his mentor about his frustrations without appearing ungrateful for being welcomed into the research group and unresponsive to his mentor's suggestions for research projects worth pursuing.

While Dr. Nevan's actions in the case study may frustrate Dan, they are understandable. As a new professor, she is learning how to mentor students, while struggling to find viable research projects that will help her and her students to succeed in a competitive funding environment. She may not be aware of the impact that the frequent changes in projects are having on Dan and may be receiving little or no guidance on how to be an effective mentor beyond her own experiences as a mentee. While there are many ways Dr. Nevan might have handled the situation differently, there are also many ways that Dan can address the challenges in his research mentoring relationship and play a more active role in improving it.

Traditional models of mentoring and training for mentoring relationships often focus on the mentor's responsibility to guide and direct the relationship. However, this de-emphasizes the importance of the mentee's responsibilities, opportunities for growth, and impact upon the relationship. For example, in the case study above, Dan has a tremendous opportunity and a responsibility to actively participate in the decision-making process when it comes to determining which project to focus on. Dan and Dr. Nevan *both* need to improve their communication so they better understand one another's reasoning, intentions, strengths, and weaknesses. Dan cannot react passively and expect Dr. Nevan to magically understand him and provide everything that he needs. He must actively engage in and share responsibility for making the relationship beneficial for himself and Dr. Nevan. He must "mentor up."

"Mentoring Up"

"Mentoring up" is a concept that empowers mentees to be active participants in their mentoring relationships by shifting the emphasis from the mentors' responsibilities in the mentor-mentee relationship to equal emphasis on the mentees' contributions. "Mentoring up" is adapted from the concept of "managing up," introduced in Gabarro and Kotter's classic paper in the *Harvard Business Review* (1980). Gabarro and Kotter conducted field research on how business managers worked productively and discovered that effective managers not only managed their employees, but also managed their peers laterally and their supervisors upwardly. Their investigations led to the groundbreaking publication "Managing Your Boss," which provided case studies and strategic advice to managers on how to consciously work with their bosses for the benefit of their working

relationship and the company. Despite criticism that they were promoting false flattery or political manipulation, Gabarro and Kotter's original ideas have persisted. The *Harvard Business Review* reprinted their paper twice (in 1993 and 2005) and their concept of managing up appears in multiple books and countless blogs directed at young managers.

Though Gabarro and Kotter's original audience consisted of managers in the corporate world, many of the principles and strategies they proposed can be applied in academic mentoring relationships. Their advice is based upon the understanding that the relationship with one's mentor involves *mutual dependence* between *fallible* persons. Thus, they stress the importance of assessing the mentor's and mentee's strengths, weaknesses, and preferences in working and communication. Most importantly, they stress the powerful role that mentees play when they proactively engage in the relationship: "Some superiors spell out their expectations very explicitly. But most do not. Ultimately, the burden falls on the subordinate to discover what the boss's expectations are" (Gabarro and Kotter 1980, 99). This means mentees must actively seek to understand their mentor's priorities and pressures, not passively assume that the mentor will be aware of and able to meet a mentee's needs. This does not mean the responsibility for an effective relationship lies solely with the mentee; rather, it points to the power mentees have to shape the relationship to meet their needs.

Adapting Gabarro and Kotter's concept, *we define* mentoring up *as the mentee's proactive engagement in the mentor-mentee relationship, so that both parties mutually benefit from the relationship and move forward towards an agreed-upon purpose or vision*. Mentoring up is a process in which the mentee continually learns about the relationship and develops skills to engage in it as the relationship evolves. Ultimately, learning the skills needed to proactively manage an evolving mentoring relationship will contribute significantly to the mentee's ability to effectively navigate and manage a career.

Core Principles in Mentoring Relationships

Gabarro and Kotter provided a valuable approach to working effectively with one's boss; we believe a similar approach can be applied to mentoring relationships in higher education. Here we integrate their approach with core principles that have emerged from two evidence-based mentor and mentee training programs, *Entering Men-*

toring (Handelsman et al. 2005) and *Entering Research* (Branchaw, Pfund, and Rediske 2010), which have been shown to improve mentored research experiences and mentoring relationships. We place them into the "mentoring up" framework and show that the core principles upon which they are based align well with Gabarro and Kotter's original ideas and provide a framework for "mentoring up."

Entering Mentoring uses a process-based approach to research mentor training in which mentors working with mentees discuss and attempt to solve mentoring challenges across a range of core themes. Through these discussions, participants gain knowledge and skills needed to improve their mentoring practice. The *Entering Mentoring* curriculum was developed based on the experience of research mentors in the biological sciences; it draws on core principles in mentoring from a range of disciplines, including business. A combination of qualitative and quantitative data indicate that compared to untrained mentors, the mentors who participated in the *Entering Mentoring* training assess their mentees' skills and communicate with them more effectively. Moreover, undergraduate researchers indicated that they had a better experience with the trained, as compared to untrained, mentors (Pfund et al. 2006). One version of the *Entering Mentoring*–based curricula, targeting the faculty mentors of clinical and translational researchers, was tested in a randomized controlled trial conducted at 16 institutions with 283 mentor-mentee pairs. Mentors assigned to the training showed significantly higher skills gains compared with the control. This held true across career stage, institution, and gender. Mentors assigned to the training self-reported improvements in their mentoring behaviors, which were corroborated by their mentees (Pfund et al. 2014; Pfund et al. 2013).

Entering Research is a parallel curriculum for research mentees that brings undergraduate researchers together to discuss the challenges they face as novice researchers in learning to do research and in navigating their mentoring relationships. Like *Entering Mentoring*, it is a process-based curriculum in which the specific content of each session emerges from the mentees' experiences. The framework used to guide discussions in *Entering Research* was developed from the experience of undergraduate research program directors and the literature on undergraduate research experiences. Qualitative and quantitative data collected from undergraduate student mentees ($N = 64$) who participated in the *Entering Research* training showed significantly higher self-reported gains in research skills, knowledge,

and confidence when compared to a control group of students (N = 144) who also participated in undergraduate research experiences but not the *Entering Research* training. Of particular relevance were the *Entering Research* students' gains in "understanding the career paths of science faculty" and "what graduate school is like," which were significantly greater than those of the control students. In addition, 41% of *Entering Research* students reported that the training helped them learn how to effectively communicate and interact with their research mentors (Balster et al. 2010).

The principles described in *Entering Mentoring* and *Entering Research* form the foundation for effective mentoring relationships, and address various aspects of the relationship. Here we use these principles as a framework for applying the concept of "mentoring up" to mentors and mentees working in academic research settings. Below we present core principles that underlie these two evidence-based curricula. Each principle is accompanied by a short description adapted from the *Entering Mentoring* and *Entering Research* materials.

1. *Maintaining Effective Communication*. Good communication is a key element of any relationship and a mentoring relationship is no exception. It is critical that mentors and mentees seek to understand their own and the other's communication styles, and take time to practice communication skills.
2. *Aligning Expectations*. Another key element of effective mentor-mentee relationships is a shared understanding of what each person expects from the relationship. Problems and disappointment often arise from misunderstandings about expectations. Importantly, expectations change over time, so reflection, clear communication, and realignment of expectations are needed on a regular basis.
3. *Assessing Understanding*. Determining what you understand as well as if someone truly understands you is not easy, yet is critical to a productive mentor-mentee relationship. Developing strategies to self-assess and assess others' understanding is an important part of being an effective mentor and mentee.
4. *Addressing Equity and Inclusion*. 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.

5. *Fostering Independence.* An important goal in any mentoring relationship is helping the mentee become independent; yet defining what an independent mentee knows and can do is not often articulated by either the mentor or the mentee. Identifying milestones towards independence and setting goals are key strategies to fostering independence in a mentoring relationship.
6. *Promoting Professional Development.* 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. It is the responsibility of both the mentor and mentee to identify and articulate these goals and to strive towards them together.
7. *Ethics.* Mentors and mentees must engage in and model ethical behavior, while openly discussing issues dealing with gray areas. Moreover, it can be important to acknowledge when a mentoring relationship includes an unequal power dynamic and any additional ethical considerations it raises.

The seven core principles above provide a foundation to understand the various aspects of an effective mentoring relationship that can mutually benefit the mentee and mentor. This chapter focuses specifically on the skills mentees need to develop to be effective, proactive, and successful partners in their mentoring relationships. However, we recognize that both the mentor and the mentee must gain mentoring knowledge and skills and intentionally engage in effective mentoring practices.

Core Skills in Mentoring Up

The principles described above point to the need for mentees to effectively communicate across differences, align their own expectations with their mentors', assess their knowledge and understanding of concepts in the field, act in an ethical manner, and ultimately achieve independence in their professional career. One critical skill underlying all of these principles is the ability of mentees to understand themselves and the mentors with whom they are working.

Gabarro and Kotter discussed *the importance of understanding oneself and one's superior* in their original paper (1980, 94). The ability to self-assess is a critical aspect of mentoring up that impacts all of the core principles described above. For example, if mentees have inaccurate assessments of their communication skills or academic achievements, it will be more difficult to align their expectations with their mentors'. Therefore, before mentees can effectively manage their mentoring relationships, they must accurately assess themselves and develop the metacognitive skills needed to understand their own skills, preferences, strengths, and weaknesses. Numerous tests and resources for self-assessment are available, such as the Myers-Briggs Type Indicator (MBTI) personality inventory, StrengthsFinder (Rath and Conchie 2008), and the myIDP website (http://myidp.sciencecareers.org). Additionally, self-reflection exercises such as writing one's "Seven Success Stories" and "Forty-Year Vision" (Bolles 2013) can provide orthogonal and more comprehensive perspectives on strengths and weakness, experiences, and preferences.

Studies have shown that many people are not aware of their own strengths and weaknesses, thus reinforcing the value of self-assessments (Kruger and Dunning 1999; Dunning et al. 2003). As shown in the case study above, lack of awareness of one's strengths and weaknesses can lead to difficult obstacles in academic and professional development. Dan had high hopes for his applications to top-tier graduate programs, but was not granted admission, suggesting that he may not have accurately assessed his strengths, and/or that he has difficulty communicating his strengths effectively. Furthermore, his problems finding a research advisor suggest that he may not be effectively marketing his strengths to the faculty. An accurate self-assessment with validated tests and tools could have given Dan a framework and vocabulary for understanding and communicating his strengths and preferences to others. Generally, increased understanding of human behavior empowers mentees to make accommodations for themselves and those they work with, enables them to observe and detect healthy and unhealthy patterns, and sharpens their own strengths.

Extending from this critical element of mentoring up are specific strategies based on the core principles that mentees can use to foster their mentor-mentee relationships. Below we list several strategies for each core principle. This is not meant to be a comprehensive list,

but rather a sample of approaches in mentoring up that mentees can use to make their mentoring relationships more effective.

1. *Maintaining Effective Communication*
    A. Determine your mentor's preferred medium of communication (face-to-face, phone, or email) and acknowledge if it differs from your own personal preference.
    B. Schedule a regular time to meet or check in with your mentor.
    C. Keep track and share progress toward project and professional goals, both verbally and in writing.
    D. Identify challenges and request your mentor's advice/intervention when appropriate.
    E. Prepare for meetings with your mentor by articulating specifically what you want to get out of the meeting and how you will follow up after the meeting.
2. *Aligning Expectations*
    A. Ask your mentor for his or her expectations regarding
        i. mentees at your stage of career generally.
        ii. you as an individual scholar.
        iii. the research project.
    B. Share your expectations regarding
        i. your career as a scholar and professional.
        ii. the research project.
    C. Ask others in the research group, who know your mentor better, about the mentor's explicit and implicit expectations.
    D. Write down the expectations you agree to and revisit them often with your mentor. Use a mentor-mentee contract to formalize the expectations.
3. *Assessing Understanding*
    A. Ask questions when you do not understand something. If you are afraid to ask your mentor directly, start by asking your peers.
    B. Talk and write about your project, asking peers and mentors who know the field for feedback.
    C. Ask peers and mentors to share their perspectives on

your work and its meaning in the context of the field more broadly.

D. Explain your project to someone who is new to the field and help them to understand your project and its significance.

4. *Addressing Equity and Inclusion*
   A. Be open to seeking out and valuing different perspectives.
   B. Engage in honest conversation about individual differences with your mentor and co-workers.
   C. Contribute positively to shared understandings and solutions to problems.
   D. Talk to peers and mentors when you feel conflicted about the ways in which your personal identity intersects with your academic identity.
5. *Fostering Independence*
   A. With your mentor, define what it takes to do independent work in your field.
   B. Define a series of milestones to independence with your mentor and set goals for meeting these milestones as part of your research plan.
   C. Ask peers and mentors to share with you their strategies for achieving independence.
6. *Promoting Professional Development*
   A. Create an Individual Development Plan (IDP) to set goals and guide your professional development, using resources such as Science Career's myIDP website (http://myidp.sciencecareers.org).
   B. Seek out and engage multiple mentors to help you achieve your professional goals.
   C. Ask peers and mentors to discuss with you the fears and reservations you may have about pursuing a certain career path.
7. *Ethics*
   A. Take responsibility for your own behavior.
   B. Seek out formal and informal ways to understand the accepted norms of practice in your field.
   C. Learn about ethical issues associated with your work

and proactively address them.

D. Learn about your university's policies for dealing with unethical behavior.

Returning to the case study, we can see how some of these strategies may have helped Dan in overcoming challenges he is facing in his mentoring relationship. The case suggests that Dan needs stability in this relationship—understandably, because he faced much uncertainty as he struggled to find a graduate program that would admit him, and then a research mentor who would accept him into a research group. Thus, Dan must learn how to request stability from his mentor, particularly in this critical, early stage of their relationship. Perhaps Dan could request a meeting with Professor Nevan to investigate some of the root principles of their discipline, so that he could work on learning some basic techniques or skills that would be valuable for multiple directions of their research. Thus, if the research question changed again, this initial training would still be valuable, and also provide some initial stability for Dan in the early stages of working under Professor Nevan. Alternatively, Dan could ask for Professor Nevan's long-term goals for their research projects. Dan perceives these research questions as dramatically different from each other, but perhaps for Professor Nevan they are simply different approaches that address the same, ultimate research question.

Dan might also consider how effective communication requires acknowledging the difference between intention and impact. In personal interactions, there are often unspoken intentions that have an impact on the other person. In Dan's mentoring relationship with Professor Nevan, he is experiencing the impact of a constantly moving target. If he does not communicate this impact to Professor Nevan, she may not be aware of it. She may genuinely intend to find a suitable research project for Dan and plan to adjust the project to fit Dan's interests and experiences, but if he does not communicate his need for stability and the impact of constantly changing projects, she may assume that he accepts and perhaps even welcomes these changes.

It is also critical for mentees to learn their responsibilities in the mentoring relationship. As Gabarro and Kotter wisely point out, most mentors do not explicitly spell out their expectations for the mentee, leaving the mentee to discover those expectations and responsibilities on their own (1980, 99). Thus, a primary responsibility

for the mentee is to identify the spoken and unspoken responsibilities for their working relationship. For example, Dan has a responsibility to communicate the impact of the changing research projects on his level of stress and commitment to the projects, and to propose reasonable solutions to his problem.

The concept of mentoring up aims to empower mentees in what may appear to be powerless situations. However, mentees have enormous power and influence in their mentoring relationships. To exert their power effectively, it is critical that mentees are able to accurately self-assess, thereby allowing them to proactively reposition themselves in the relationship as it evolves. At the same time, effective and mutually beneficial mentoring relationships involve the mentee respectfully listening to mentors and engaging them in dialogue. Just as mentees need to develop skills in leadership, they also need to allow themselves to be "mentorable." They must exhibit respect, humility, patience, and flexibility in the relationship. Effective mentees learn to seek a balance between deferring to a mentor's greater experience, challenging the mentor with new ideas, and advocating for their own needs. Effective mentees also realize that this balance changes over time as mentees gain experience and achieve greater independence of thought and approach.

To reveal how these skills might be practiced, consider the case study on the facing page, which, in contrast to the first case study, provides a positive example of mentoring up. This is also based upon a real situation, with names altered to maintain confidentiality.

This second case study illustrates a sticky situation in which a mentee faces challenges not only with her faculty mentor, but also with the postdoc who functions as another informal mentor in her research group. Heather appears to be stuck between the interests of her research professor and the postdoc. Following the mentoring-up principles, Heather first attempts to assess her *understanding* of the project, asking questions when she does not understand and the protocols are not working. Unfortunately, her attempts to understand are brushed aside by the postdoc. Importantly, Heather does not jump to the assumption that she is doing something wrong. Rather she sensitively considers reasons that might be contributing to the postdoc's response.

To improve the situation, Heather attempts to improve *communication* among the parties involved, wisely requesting a joint meeting with the postdoc and the professor. Having everyone together in person allows all to be able to speak and listen carefully,

Case Study #2: Navigating Between Two Mentors

Heather is a new grad student and has recently joined a research group with Professor Roman as her primary mentor. She was given multiple projects, including one started by a postdoctoral scholar in the group. She assumed that the postdoc would help her with the project, serving as an informal mentor.

Heather began working in the lab by following instructions that were written by the postdoc, but noticed problems with the results. When she asked the postdoc to confirm the instructions, he brushed her off with quick answers, and said that he didn't follow the written instructions exactly and that it contained errors. Heather was confused by his behavior, and began to suspect that the project had been taken from him and that he resented her work on it.

To better understand her project and resolve problems with her results, she asked for a joint meeting with both of her mentors: Professor Roman and the postdoc. In the joint meeting, she made sure that the postdoc was given an opportunity to speak openly and confirm that he approved handing the project over to Heather. However, after the meeting Heather continued to have problems with the instructions, and the postdoc continued to brush her off with quick and cryptic responses. Heather still suspected that the postdoc only agreed to hand over the project to her because he was afraid to disagree with Professor Roman. Heather is frustrated, because her progress depends on the past work and experiments that were started by the postdoc, so she is unable to proceed at a sufficient pace. The postdoc has not been helpful and seems to behave passive-aggressively towards her questions and requests for help.

Furthermore, the postdoc has asked that he be given first authorship if a paper were to be published, which Heather believes is acceptable since he started the project. But he has also started insisting that he be given first authorship on a second paper, even though Heather would have done most of the experimental work and writing of the paper. As Heather considered her various options, she discussed her multiple projects with Professor Roman and began to shift her energy towards other projects.

and forge a common understanding of the situation. Thus Heather understands the importance of clear and effective communication. In contrast, if Heather had tried to approach this sticky situation by email, or by communicating with her professor and the postdoc separately, the chances of miscommunication would have greatly increased. In the meeting Heather considers the *expectations* of both the mentor and the postdoc and allows the postdoc to express his feelings about Heather's role in the project, thus providing an opportunity for expectations to be verbalized for her and Dr. Roman.

However, after the joint meeting Heather suspects that the postdoc did not speak candidly, and continues to struggle with experimental problems from faulty instructions. She begins to think about the *ethical* considerations of authorship as well as her need to establish an *independent* research project with her as a first author. Heather must think about her own *professional development* needs as well as a solution that is *equitable* for everyone involved.

As the situation worsens, and in light of the postdoc's unreasonable demands, she realizes that she has alternatives that still allow her to progress. Heather is proactive and displays many of the critical skills involved in mentoring up, but also realizes that she has come to an impasse. By adapting with grace and wisdom, she sidesteps the impasse by refocusing on her other projects. The next step in this situation would be for Heather to tactfully inform her mentor and the postdoc that she is pursuing alternate interests, so that the postdoc can return to his project if he desires and the research group can complete that original direction of investigation.

Mentoring Up at Different Career Stages

The case studies presented above involve two graduate students at the beginning and middle stages of their academic development. However, with a little imagination, one can consider very similar scenarios along the entire continuum in higher education: from undergraduate to graduate students to postdoctoral scholars and even junior faculty. From the beginning to later stages of professional development there will be colleagues who serve as subordinates, peers, and superiors—and even colleagues with unclear roles and responsibilities. Thus, the seven core principles of mentoring relationships are relevant and valuable across the spectrum. This section considers how these skills in mentoring up evolve across academic stages in the STEMM disciplines.

For *undergraduate students,* who likely have limited experiences with mentoring relationships, simply learning how to seek mentors in ways that are relevant and expected within their academic discipline and context is the starting point. Given their limited experience, self-assessment with respect to the field may be difficult. However, general self-assessment tools like the MBTI can still be effective at this stage in their careers if used with strong interpretative guidance. Undergraduate students can observe and record how they react to various styles of mentorship and guidance. Comparing notes with other students within a facilitated conversation can be very revealing. If the discipline involves research group meetings with a mentor and other group members, as is common in the sciences and engineering, being able to attend the research group meetings will allow the undergraduate mentee to observe how the mentor interacts with students and staff. They should also take advantage of opportunities to tutor, serve as a teaching assistant, or take on other leadership roles as ways to develop their leadership and mentorship styles. These types of experiences will help them to develop professional skills in communication, assess their own understanding, align their goals and expectations with those of others, and address diverse cultures and working styles.

Graduate students will likely have sharpened communication and leadership skills, but will need to continue seeking growth opportunities. They often are asked to select a research advisor among multiple options, and so will need to evaluate whether a potential partnership will meet their needs. They should reflect on current and past mentoring relationships, and evaluate how these relationships have impacted their academic and professional progress. Self-assessment tests can reveal preferred decision-making processes (for example, T- or F-types in the MBTI) and sharpen decision-making skills. Resources such as the myIDP website can help in the assessment of interests and strengths, and provide a framework for creating a plan to reach their academic and professional goals. If the discipline involves research rotations, as is common in biomedical research programs, these brief research experiences provide invaluable information as to whether or not a relationship might become productive and mutually beneficial for both the mentee and mentor. Graduate students should actively seek multiple mentors—formal, informal, and even peer mentors—who will create a community of support and provide multiple perspectives (Light and Micari 2013; Hunter, Laursen, and Seymour 2007). Lastly, graduate school can provide a

valuable opportunity to begin developing one's mentorship skills simultaneously as a mentee and mentor. Graduate students will be able to see both sides of the relationship and begin testing new skills in mentoring and mentoring up.

Postdoctoral scholars (postdocs) should focus on deepening and broadening their skills in communication and leadership. As they expand their experiences in new contexts, they will foster their own independence through the creation and pursuit of novel research directions, yet still be in a position to benefit from the guidance of a research mentor. Postdocs should focus on increasing their network of connections, which will enable further development of their community of formal and informal mentors, peers, and mentees, who can support their professional development.

Junior faculty will likely focus much of their attention on mentoring students and postdocs, and they will likely have a lot of experience and skill development in mentoring from personal experiences and from participating in formal training for mentors. However, it is also important at this stage in one's career to continue to seek formal and informal mentors. In an academy that highly values independence, one runs the risk of becoming isolated. As junior faculty achieve greater success, it is still valuable to use networks for support and encouragement. These support networks can be essential as junior faculty try to manage increasing demands on their time (Sorcinelli and Yun 2007).

Awareness of one's strengths and styles is critical in all mentor-mentee relationships and at all career stages. The principles for fostering strong relationships outlined in this chapter can serve to anchor and guide one's continuous development of skills needed on both sides of the relationship and across all stages of one's career.

Our Experiences in Training Mentees to Mentor Up

As described above, *Entering Research* provides a curriculum focused on mentoring-up principles for undergraduate researchers. Author Janet Branchaw serves as the course director of the *Entering Research* seminar for beginning undergraduate researchers at the University of Wisconsin–Madison. Similarly, author Christine Pfund directs the *Entering Mentoring* seminars for the pre-faculty and faculty mentors of these undergraduate students at the University of Wisconsin–Madison. Most recently, an adapted version of the *Entering Mentoring* curriculum was developed to train senior under-

graduate students to transition from their role as a mentee to that of a peer research mentor. In this chapter we have described efforts undertaken for training graduate student mentees. The authors' perspectives, drawn from our collective experiences in the STEMM disciplines, may help readers determine which aspects are most relevant and valuable for their needs as a mentee or mentor, or in training others in mentoring relationships.

Author Rick McGee serves as the program director, and author Steve Lee recently served as the assistant director, of an NIH-funded initiative to enhance the scientific development of PhD students in the biosciences at Northwestern University. This program, called CLIMB (Collaborative Learning and Integrated Mentoring in the Biosciences), is partially supported by an NIH IMSD (Initiative to Maximize Student Development) award. Although the NIH funding supports underrepresented minority students, program activities are open to all bioscience PhD students. The training focuses on the first two years of the students' PhD programs, in order to address many of the transitional issues that incoming students encounter in their graduate programs. We provide frequent workshops on a wide variety of topics, such as choosing a research mentor, self-assessment, adapting to graduate-level courses, oral presentation skills, written communication skills, career planning, and (in a four-part series) mentoring up.

After an introduction to foundational principles of mentoring, this workshop series on mentoring up focuses on four specific areas: communication, aligning goals and expectations, diversity and unconscious assumptions, and fostering independence. These workshops have largely been based on training materials from the University of Wisconsin—that is, from *Entering Research*. Student feedback has been positive, but we are continuing to improve and adjust the workshops. As an example, during a workshop on aligning expectations, one student shared a communication struggle she was having with her mentor. The following week, based on the workshop and discussions, she initiated a more direct conversation with her mentor about her needs, which led to an immediate and dramatic improvement in communication between them.

These mentoring-up concepts have been warmly welcomed by faculty and program directors, who have experienced firsthand the need to train incoming graduate students in how to communicate effectively with their research advisers as they work together. During

recent discussions with PhD program directors, the idea of teaching mentoring up to graduate students was met with unanimous and enthusiastic support; program directors were universally looking for ways to encourage students to take more active roles in their own mentoring. Even though we have started explicitly using the term mentoring up only recently, we have been using many of these concepts in our training for the past six years of our program's existence. Much of our training actually involves using case studies of the kind presented here to help the students consider how to navigate through and avoid difficult situations that they might encounter in their relationships with mentors. The feedback from students has been largely positive. Over the past six years, 81% of CLIMB students have agreed or strongly agreed that the program "made a positive impact upon my start to graduate school."[2]

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In the academic world and beyond, mentoring and networking relationships play a key role in career satisfaction, productivity, and advancement. This is especially true for those in early stages of their academic and professional careers, such as graduate students, postdoctoral fellows, and junior faculty. To engage in the academic community, new mentees need to learn to participate in a full and intentional manner. But as young mentees are learning how to navigate within their academic disciplines, it can be incredibly challenging to quickly learn the unwritten (and often unclear) rules, adapt to new situations, and discern which options and people will help them become successful.

These challenges can be faced by learning to mentor up, just as Heather did in the second case study. In teaching the principles and skills of mentoring up, our goal is to equip, empower, and encourage new entrants to position themselves to become confident and contributing members of the academy. The authors have developed interventions that teach the skills of mentoring up and believe that these skills will not only empower mentees to be effective and proactive contributors to their mentoring relationships, but also effective and proactive mentors of the next generation of scholars.

Notes

1. Representative publications in this area include Bland et al. 2009; Cho, Ramanan, and Feldman 2011; Feldman et al. 2010;

Garman, Wingard, and Reznik 2001; Palepu et al. 1998; Raggins and Kram 2007; Ramanan et al. 2002; Sambunjak, Straus, and Marusic 2010; Shea et al. 2011; Steiner et al. 2004; Keyser et al. 2008; and Silet, Asquith, and Fleming 2010.

2. Furthermore, the concept of mentoring up was presented by Lee in October 2013 at the national Society for Advancement of Chicanos and Native Americans in Science (SACNAS) conference. Afterwards, the evaluation revealed that 85% of respondents (N = 41) indicated that the ideas/resources they will use from the workshop were either very good (41%) or excellent (44%). He will be providing similar workshops at his new institution, the University of California, Davis. Additionally, researchers at UW-Madison have collected resources on their website (https://mentoringresources.ictr.wisc.edu/MentoringResources) to help mentees proactively navigate their relationships, including questions to consider when choosing a new mentor and tips on effectively communicating with a mentor.

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