The Science of Mentoring

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Webinar Agenda

- Your Mentoring Relationships
- Overview of Mentoring
  - Impact of Mentoring on Persistence
  - National Efforts and Resource to Support Effective Mentoring
- Effective Approaches to Mentoring
  - Case Study
- Cultural Diversity and Mentoring Relationships
- Next Steps
How many graduate students (and post-docs) are you mentoring at this time?

1. None
2. 1
3. 2-3
4. 3-4
5. More than 4
How many hours a week do you spend with your mentees (face-to-face, email, phone, Skype, etc)

1. Less than 1 hour
2. 1-2 hours
3. 3-4 hours
4. 5-8 hours
5. More than 8 hours
In the chat window, share 1 or 2 words that highlight a mentoring challenge you are having (or have had)
Overview of Mentoring
A Mentored Research Experience and Strong Mentorship has been linked to:


- **Persistence** (Gloria *et al.*, 2001; Solorzano 1993; McGee and Keller, 2007; Sambunjak *et al.*, 2010; Williams *et al.*, 2015; Bordes-Edgar *et al.*, 2011; Campbell and Campbell, 1997)

- **Research productivity** (Steiner and Lanphear, 2002; 2007; Wingard *et al.*, 2004)
  - **Higher career satisfaction** (Schapira *et al.*, 1992; Beech *et al.*, 2013)
At its best, mentoring can be a life-altering relationship that inspires mutual growth, learning, and development. Its effects can be remarkable, profound and enduring; mentoring relationships have the capacity to transform individuals, groups, organizations and communities.

(Ragins and Kram, 2007)
Defining Mentoring

A collaborative learning relationship that proceeds through purposeful stages over time and has the primary goal of helping mentees acquire the essential competencies needed for success in their chosen career.

It includes using one’s own experience to guide another through an experience that requires **personal and intellectual growth and development**.

Applies to research mentoring, career coaching, peer mentoring, virtual mentoring, and in some cases advising.

Mentor Success: Gaining the skills and knowledge to:

1) effectively support mentee development
2) facilitate the attainment of the transferrable “competencies” necessary to meet individual mentees’ goals.

This requires the ability to come to a clear understanding of each mentee’s unique needs and desires and the flexibility and humility to adjust one’s approach to support a mentee’s success.

Mentee Success: Gaining:

1) personal and professional competencies necessary to define his/her career goals
2) experience needed for that career
3) the ability and opportunity to progress toward that chosen career goal

(Pfund et al., 2016)
Skill Building Across Attributes for Effective Research Mentoring Relationships

<table>
<thead>
<tr>
<th>RESEARCH SKILLS</th>
<th>DIVERSITY/CULTURALLY-FOCUSED SKILLS</th>
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<tbody>
<tr>
<td>• Developing disciplinary research skills</td>
<td>• Advancing equity and inclusion</td>
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<td>• Teaching and Learning disciplinary knowledge</td>
<td>• Being culturally responsive</td>
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<td>• Developing technical skills</td>
<td>• Reducing the impact of bias</td>
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<td>• Accurately assessing mentees’ understanding of disciplinary knowledge and skills</td>
<td>• Reducing the impact of stereotype threat</td>
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<td>• Valuing and practicing ethical behavior and responsible conduct of research</td>
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<tr>
<th>INTERPERSONAL SKILLS</th>
<th>SPONSORSHIP SKILLS</th>
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<tr>
<td>• Listening actively</td>
<td>• Fostering mentees’ independence</td>
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<td>• Aligning mentor and mentee expectations</td>
<td>• Promoting professional development</td>
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<tr>
<td>• Building trusting relationships/ honesty</td>
<td>• Establishing and fostering mentee professional networks</td>
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<td>• Actively advocating on behalf of mentees</td>
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<th>PSYCHOSOCIAL SKILLS</th>
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<tr>
<td>• Providing motivation</td>
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<td>• Developing mentee career self-efficacy</td>
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<tr>
<td>• Developing mentee research self-efficacy</td>
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<td>• Developing science identity</td>
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<td>• Developing a sense of belonging</td>
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Pfund et al. 2016
A National Focus on Mentoring

- National Science Foundation (NSF)
  - Post-doctoral mentoring plans
  - Undergraduate research AND mentoring programs
  - AAAS/ PASEMEN STEM Mentoring 2030 Meeting
- National Academies of Science
  - New Report on Mentored Undergraduate Research Experiences
  - Participatory Workshop on Effective Mentoring in STEMM
- HHMI
  - Mentor and mentee training program for the Gilliam Scholar Programs
- National Institutes of Health (NIH)
  - Mentored K awards
  - Individual development plans (IDPs)
  - National Research Mentoring Network (NRMN)
- APS
  - National Mentoring Community
Optimizing Mentoring Relationships
Building from evidence-based training to improve mentoring relationships
**Mentor Intervention: Entering Mentoring**

### Sessions and Topics

<table>
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<tr>
<th>Sessions</th>
<th>Topics</th>
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<tr>
<td>Week 1</td>
<td>Introduction to Mentor Training</td>
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<td><em>10-week project design</em></td>
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<td>Week 2</td>
<td>Aligning Expectations</td>
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<td>Week 3</td>
<td>Promoting Professional Development</td>
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<td>Week 4</td>
<td>Maintaining Effective Communication</td>
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<td>Week 5</td>
<td>Addressing Equity and Inclusion</td>
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<td>Week 6</td>
<td>Assessing Understanding</td>
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<td>Week 7</td>
<td>Fostering Independence</td>
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<td>Week 8</td>
<td>Cultivating Ethical Behavior</td>
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<td>Week 9</td>
<td>Articulating Your Mentoring Philosophy</td>
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Case Study

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?

Please share one idea in the chat window
Complete research mentor training curricula (www.cimerproject.org)
Faculty Mentor Satisfaction with Training (n=128 mentors in intervention group)

Was the 8-hour training a valuable use of your time?

- Yes: 88%
- No: 12%

Would you recommend the sessions to a colleague?

- Very Likely: 6%
- Likely: 45%
- Unlikely: 4%
- Very Unlikely: 45%

Mentor Skills Gains (n=124)

Communicating Effectively
Establishing Expectations
Assessing Understanding
Addressing Diversity
Fostering Independence
Professional Development

Significant Change in Mentor Self-Reported Effectiveness

Pfund et al. Academic Medicine 2014
Mentor Behavioral Change
N=141; 3 months post training

Intervention
- No change: 3%
- Awareness: 8%
- Intent: 2%
- Implemented: 87%

Control
- No change: 47%
- Awareness: 10%
- Intent: 1%
- Implemented: 42%

Pfund et al. Academic Medicine 2014

Interventions to Optimize Mentoring Relationships

Person Inputs
- Predispositions
- Gender
- Race/ethnicity
- Disability/Health status

Learning Experiences

Self-efficacy Expectations

Outcome Expectations

Interests

Goals

Actions

Contextual Influences Proximal to Choice Behavior

Can I do this?

What will happen?

Persistence
Mentoring Effectiveness and Cultural Diversity
Rate your level of agreement with the following statement:  Science is colorblind

1. Strongly Agree
2. Agree
3. Neither agree nor disagree
4. Disagree
5. Strongly disagree
Rate your level of agreement with the following statement:
Science is a meritocracy

1. Strongly Agree
2. Agree
3. Neither agree nor disagree
4. Disagree
5. Strongly disagree
Rate your level of agreement with the following statement: Bias has impacted my mentoring relationship(s)

1. Strongly Agree
2. Agree
3. Neither agree nor disagree
4. Disagree
5. Strongly disagree
The Uneven Mentoring Landscape

• White investigators significantly more likely than Black and Hispanic investigators to win R01 awards; minority investigators indicate that inadequate mentoring posed obstacles to obtaining funding (Ginther et al., 2011)
• Science faculty rated male applicant as more competent than identical female applicant; offered male ~ $4,000 more in salary, more career mentoring than to the female (Moss-Racussin et al., 2012)
• URMs and White women’s mentorship requests more ignored than those by White men (Milkman et al., 2014)
• Male biologists less likely to hire and train women in their laboratories (Sheltzer & Smith, 2014).
• URMs typically receive less mentoring than their non-minority peers (Thomas et al., 2001; Helm et al., 2000; Morzinski et al., 2002).
Cultural Diversity Factors

• Gender, race, and ethnicity relate to how mentees perceive their mentored research experience, what they value in a research mentor, and their self-perceptions

  (Byars-Winston et al., 2010; Blake-Beard et al., 2011; Carlone & Johnson, 2007; Hurtado et al., 2009; Ishiyama, 2007; Johnson et al., 2011; Laursen et al., 2010)

• STEM disciplines often presented as neutral to cultural diversity factors
Mentor and Mentee Views on Cultural Diversity in Research Mentoring Relationships

Should you address cultural diversity directly in the mentoring relationship?

* Results compare Yes responses with those responding No or not indicating an opinion.
Qualitative and Quantitative Research Results

- Cultural diversity often viewed as interference variable
- For mentors who experienced culture and science as related, they focused on their mentees’ culture, not their own
- Mentors and mentees disagree on whose role it should be and when to address diversity
- Both mentors and mentees noted that addressing cultural diversity is complex, for which few feel equipped to handle
Consequences of Ignoring the Cultural Context of Mentoring

Ignoring cultural diversity in mentoring relationships can lead to miscommunication, privileging dominant cultural norms, mismatched expectations due to differing value orientations, and conflicts in working styles (Brown et al., 2009)

And ultimately ignoring cultural diversity in mentoring relationship could lead to reduced:

- Science identity, sense of belonging and self-efficacy
- Research productivity
- Career satisfaction
- Persistence
Would You Be Interested in Participating in a Session(s) to Optimize your Mentoring Relationships?

1. Yes, I am interested and would make time
2. Yes, I am interested but don’t see how I can find time to participate
3. Yes, I am interested but would need to engage on my own time (self-paced engagement)
4. No, I am not interested
5. I am on the fence
What Format Would Be of Greatest Interest to You?

1. Interactive webinar, like this one
2. Video-taped seminars that I can watch on my own time
3. Face-to-face session(s), at our annual meeting(s)
4. Face-to-face sessions, at my own institution
5. Readings and other materials I can review on my own time
Acknowledgements

Many, many partners and collaborators

You!
Mentor Training to Optimize Your Mentoring Relationships