Approaches and Resources for Optimizing the Mentoring Relationships in Your Program

A webinar for the Health Research Alliance
The Research Workforce and Early Career Development Working Group”

Christine Pfund, PhD.
Director, Center for the Improvement of Mentored Experiences in Research (CIMER)
Co-PI, National Research Mentoring Network (NRMN)
Wisconsin Center for Education Research
Institute for Clinical and Translational Research
University of Wisconsin-Madison

facebook.com/NRMNet
@NRMNet

The National Research Mentoring Network (NRMN) is supported by the U54 GM119023 (9/2014 – 6/2019), administered by NIGMS.
Learning More About You!

- In your role, do you support (directly or indirectly) mentoring relationships for graduate students, post-docs or junior faculty? Yes, no
- Is your program/organization currently engaged in efforts to optimize mentoring relationships? Yes, no, I do not know
- Which of the following resources does your program/organization offer?
  - Online resources for mentors
  - Online resources for mentees
  - Mentoring sessions at annual meetings
  - Mentor training workshops (face-to-face or online)
  - Mentee training workshops (face-to-face or online)
Mentoring is...

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 person 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.

Research Says Mentoring Matters

Strong mentorship has been linked to:

- **Enhanced science identity, sense of belonging, and self-efficacy**

- **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)

- **Enhanced recruitment of URMs**
  (Hathaway *et al*, 2002; Nagda *et al*, 1998)
Uneven Research, Mentoring Landscape

• White investigators significantly more likely than Black and Hispanic investigators to win R01 awards (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)
• Minority investigators indicate that inadequate mentoring posed obstacles to obtaining funding (Ginther et al, 2011)
A National Focus on Mentoring

- **National Science Foundation (NSF)**
  - Post-doctoral mentoring plans
  - Undergraduate research AND mentoring programs
  - AAAS/ PASEMEN STEM Mentoring 2030 Meeting

- **Sloan Foundation**
  - University Centers for Exemplary Mentoring

- **Howard Hughes Medical Institute**
  - Mentor and mentee training program for Gilliam Scholar Programs

- **National Academies of Science**
  - New Report on Mentored Undergraduate Research Experiences
  - The Science of Effective Mentoring in STEMM
  - Graduate STEM Education for the 21st Century

- **National Institutes of Health (NIH)**
  - Mentored K awards
  - Individual development plans (IDPs)
  - NIGMS T32 Requirement
  - National Research Mentoring Network (NRMN)
A National Focus on Mentoring

- **National Science Foundation (NSF)**
  - Post-doctoral mentoring plans
  - Undergraduate research AND mentoring programs
  - AAAS/ PASEMEN STEM Mentoring 2030 Meeting

- **Sloan Foundation**
  - University Centers for Exemplary Mentoring

- **Howard Hughes Medical Institute**
  - Mentor and mentee training program for Gilliam Scholar Programs

- **National Academies of Science**
  - New Report on Mentored Undergraduate Research Experiences
  - The Science of Effective Mentoring in STEMM
  - Graduate STEM Education for the 21st Century

- **National Institutes of Health (NIH)**
  - Mentored K awards
  - Individual development plans (IDPs)
  - NIGMS T32 Requirement
  - National Research Mentoring Network (NRMN)
Key Takeaways: Mentoring

- **Mentoring Matters:** Notably for doctoral students
- **Mentors and Advisors Need Support and Resources:** set expectations, improve mentoring
- **Incentives and Recognition:** incentivize and reward contributions to mentoring and advising
- **Mentors and Advisors, Networks of Support:** Through exposure and opportunities, students should be able to build networks to gain different expertise and support

Chaired by Dr. Alan Leshner, CEO Emeritus, AAAS
Released in May 2018
The Science of Effective Mentorship

A consensus study of the National Academies of Sciences, Engineering, and Medicine
The People

Angela Byars-Winston (Chair)
University of Wisconsin–Madison

Erin Dolan
University of Georgia

Joe (Skip) G.N. Garcia [NAM]
University of Arizona College of Medicine–Tucson

Juan E. Gilbert
University of Florida & iAAMCS

Sylvia Hurtado
University of California, Los Angeles

Laura Lunsford
Campbell University

Richard (Rick) McGee
Northwestern University Feinberg School of Medicine

Christine (Chris) Pfund
University of Wisconsin–Madison & CIMER

Christiane Spitzmueller
University of Houston

Keivan G. Stassun
Vanderbilt University

Renetta Tull
University System of Maryland & University of Maryland, Baltimore County

STAFF
Maria Lund Dahlberg, Study Director
Thomas Rudin, BHEW Director
Frederic Lestina, Senior Program Assistant
Irene Ngun, Research Associate
Joe Alper, Consultant Writer

CONTACT
For more information, please visit www.nas.edu/mentoring or email mentoring@nas.edu
What the Committee Will Produce

• A final report of a consensus study identifying evidence (or lack thereof) of successful programs and practices for mentoring HU individuals in STEMM fields
• An online interactive guide of effective programs and practices that can be adopted and adapted by institutions, departments, and individual faculty members

Available October 2019

http://nationalacademies.org/mentoring
Email: mentoring@nas.edu, NAS Study Director Maria Dahlberg
National Research Mentoring Network (NRMN)

Provides biomedical research trainees with evidence based mentorship and professional development programming that emphasizes the benefits of diversity, inclusivity and culture within mentoring relationships.
Focus of NRMN Programming

- Increase access to mentoring across all career stages through **MATCHING & LINKING**

- Improve mentoring relationships and outcomes through **TRAINING** for research mentors, grant writing coaches, career coaches & mentees

- Increase awareness of the value of career mentoring across the nation through **PROMOTING & REFERRING**

- Provide career-enhancing **RESOURCES** and info to broaden knowledge of biomedical careers
NRMNNet: A Platform for Mentoring and Networking

NRMN Applications

- **MyNRMN**: Browse profiles of mentors and mentees from around the country and build your network by connecting with users that share interests with you.
  - Take Me There

- **Guided Virtual Mentorships**: Engage in a one-on-one mentorship involving a weekly discussion over the course of 4 months where you and your partner will receive prompts and suggested discussion topics to guide your interactions each week.
  - Take Me There

- **MyTraining**: Discover and take part in NRMN programs and events. Use your NRMN calendar to apply to participate in upcoming training programs and workshops, register for online webinars, discussion panels, and more.
  - Take Me There
NRMN Participants Across the Country

Geographic representation of participants registered for NRMNNet in the U.S. and U.S. territories, based on collected zip codes, as of 2/28/18.
Through a cadre of Master Facilitators, NRMN serves as a national training hub to improve mentoring relationships.

**Types of Training:**
- Research Mentee
- Research Mentor
- Facilitator
- Culturally Aware Mentor

**Modes:**
- Face-to-face
- Self-paced online
- Synchronous online

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

Background Contextual Affordances

Learning Experiences: Research Training

Interventions to Optimize Mentoring Relationships

Can I do this?

Self-efficacy Expectations

Contextual Influences Proximal to Choice Behavior

Interests

Goals

Actions

Outcome Expectations

Persistence

Effectiveness of Interventions

What will happen?
We developed a mentor training curriculum...

Key elements of mentor training:

• Process-based using case studies and group problem solving

• Aimed at awareness-raising and reflection

• Provides a confidential and brave forum to share the collective experience of mentors across a range of experiences

• Distribute and adapt resources to improve mentoring
...with standardized competencies and a Mentoring Competency Assessment tool...

1. Aligning expectations
2. Promoting professional development
3. Maintaining effective communication
4. Addressing equity and inclusion
5. Assessing understanding
6. Fostering independence
7. Cultivating ethical behavior

...and adapted it for different career stages and disciplines...
...and we studied it extensively.


...we have also developed and tested training for mentees across career stages

Key elements of mentee training:

• Process-based using case studies and group problem solving
• Introduces students to the culture of research
• Teaches valuable research skills
• Alleviates some of the work of faculty and lab personnel associated with mentoring novice researchers.
### Attributes for Effective Research Mentoring Relationships

<table>
<thead>
<tr>
<th>RESEARCH SKILLS</th>
<th>DIVERSITY/CULTURALLY-FOCUSED SKILLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>∙ Developing disciplinary research skills</td>
<td>∙ <strong>Advancing equity and inclusion</strong></td>
</tr>
<tr>
<td>∙ Teaching and Learning disciplinary knowledge</td>
<td>∙ Being culturally responsive</td>
</tr>
<tr>
<td>∙ Developing technical skills</td>
<td>∙ Reducing the impact of bias</td>
</tr>
<tr>
<td>∙ <strong>Accurately assessing mentees’ understanding of disciplinary knowledge and skills</strong></td>
<td>∙ Reducing the impact of stereotype threat</td>
</tr>
<tr>
<td>∙ Valuing and practicing ethical behavior and responsible conduct of research</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INTERPERSONAL SKILLS</th>
<th>SPONSORSHIP SKILLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>∙ Listening actively</td>
<td>∙ <strong>Fostering mentees’ independence</strong></td>
</tr>
<tr>
<td>∙ Aligning mentor and mentee expectations</td>
<td>∙ Promoting professional development</td>
</tr>
<tr>
<td>∙ Building trusting relationships/ honesty</td>
<td>∙ Establishing and fostering mentee professional networks</td>
</tr>
<tr>
<td></td>
<td>∙ Actively advocating on behalf of mentees</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PSYCHOSOCIAL SKILLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>∙ Providing motivation</td>
</tr>
<tr>
<td>∙ Developing mentee career self-efficacy</td>
</tr>
<tr>
<td>∙ <strong>Developing mentee research self-efficacy</strong></td>
</tr>
<tr>
<td>∙ Developing science identity</td>
</tr>
<tr>
<td>∙ Developing a sense of belonging</td>
</tr>
</tbody>
</table>

Pfund et al. 2016
NRMN Mentor Training Core
Accomplishments to Date

- Directly trained 4,604 mentors and 1,553 mentees across the nation
- Directly trained 606 facilitators at 152 institutions
- Developed or adapted training materials for both mentors and mentees with a focus on attributes known to impact persistence

<table>
<thead>
<tr>
<th>MTC Curriculum Development and Testing</th>
<th>Mentors</th>
<th>Mentees</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Development</td>
<td>Beta Testing</td>
</tr>
<tr>
<td>Virtual Guided Mentorship Videos</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entering Research Mentee Training Adapts</td>
<td>Not Applicable</td>
<td></td>
</tr>
<tr>
<td>Asynchronous Online Training Adaptations</td>
<td></td>
<td>Fall 2018</td>
</tr>
<tr>
<td>Synchronous Online Training</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work-Life Integration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Providing Motivation</td>
<td></td>
<td>Fall 2018</td>
</tr>
<tr>
<td>Career Coaching</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Culturally Aware Mentoring</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research Self-Efficacy</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Resources
CIMER Project.org

Effective mentoring relationships are critical to developing the next generation of researchers. Learn how to improve these relationships and promote a cultural change that values mentoring as a critical aspect of diversifying the scientific workforce.

Who are we?
Researchers and practitioners dedicated to improving the mentoring relationships among all levels of post-secondary researchers through theoretically-grounded, evidence-based, and culturally-driven training interventions and investigations.

What do we do?
CIMER faculty and staff investigate approaches for advancing research mentoring relationships, and develop, implement and evaluate mentor and mentee training towards this end.
mentoringresources.ictr.wisc.edu

For the mentors of grad students, postdocs, and junior faculty

Effective mentoring is a key component to the advancement of the scientific research enterprise. This website is designed to provide resources to improve research mentoring relationships. It provides curricula, assessment tools, and resources relevant for mentors and mentees, as well as those who would like to implement mentor training.

Mentor & Mentee Resources

Find resources to improve mentoring across each phase of the relationship.

Training Curricula

Learn about effective approaches to training mentors and how to use our freely available training materials.

Impact of Training

View feedback from participants in our research mentor training program.

Our UW-Madison team is leading the Mentor Training Core® of the National Research Mentoring Network® (NRMN). NRMN is part of a broader NIH consortium serving mentors and mentees that strive to enhance diversity in the biomedical research workforce.
http://z.umn.edu/OptimizingMentoring

“Optimizing the Practice of Mentoring”
Online self-study for mentors of grad students, postdocs, and faculty
CAM Training Curriculum

A 7hr intensive training designed for mentors across all career stages who have already completed some form of mentor training.

During the workshop, mentors learn how to:

• Identify how their cultural beliefs, worldviews, and identities influence their mentoring practices.
• Recognize how cultural diversity can impact their research mentoring relationships.
• Acknowledge the impact of conscious and unconscious assumptions, privilege, stereotype threat, and biases in the mentor-mentee relationship.
• Use culturally responsive mentoring principles to guide them in talking about cultural diversity matters with their mentees.
• Apply evidence-based strategies to reduce and counteract the impact of biases, stereotype threat, and privilege to foster trusting, culturally responsive mentoring relationships.

CAM Online Module

A ~1hr, self-directed session that reviews key cultural diversity terms and research on the relevance of race, ethnicity, and other dimensions of cultural diversity to research training in the biomedical, behavioral, and clinical sciences.
Example Implementations

• Require program mentors to engage in some form of mentor training
  • 90 min online module +/- discussion
  • 8 hours of face-to-face training in one day or spread out over time
  • Training spread out over a full year (e.g. HHMI Gilliam Program)
HHMI Gilliam Graduate Student Fellowship and the BWF Postdoctoral Diversity Enrichment Programs

A Strategic Collaboration

• Support the development of a diverse scientific workforce
• Recruit and support highly competitive scholars
• Engage fellows in multiple years of research training and professional development activities, guided by mentors
• Optimize the mentoring relationships and training environments of the scholars
One Year Program for Mentors (25-30 hours)

4 Webinars (monthly)  →  Shared resources  →  Online Learning Modules (2)  →  Face-to-face workshop (2 days)  →  1 Webinar  →  Face-to-face workshop (1 day)

Program elements built from tested interventions supported by HHMI, NIH (NRMN and NIGMS R01) and NSF
Example Implementations

• Require/encourage program mentors to engage in some form of mentor training
  • 90 min online module +/- discussion
  • 8 hours of face-to-face training in one day or across time
  • Training spread out over a full year (e.g. HHMI Gilliam Program)

• Require/encourage trainees to engage in some form of mentee training/“mentoring up”
  • Online webinars
  • Workshop or series of face-to-face sessions
  • Post online resources to read
Example Implementations (continued)

• Have someone from your organization attend a facilitator training so they can implement mentor or mentee training at your annual meeting
  • CIMER offers regular facilitator training events
Acknowledgements
Questions?
Research Mentor Training Funding

- Original *Entering Mentoring* curriculum (HHMI Professors Program, PI: Handelsman)
- Adapted for use across science, technology, engineering, math, and social sciences (NSF #0717731, PI: Pfund) and clinical and translational science (CTSA) award mentors (NIH/NCRR ARRA UL1RR025011, PI: Drezner)
- Workshops and curricula have been developed for faculty mentors (NSF #0717731, PI: Pfund) including training workshops for T32 and R25 trainers
- NIH has funded a study to develop better understanding of specific factors in mentoring relationships that account for positive student outcomes (NIH #1R01GM094573-0 PI: Byars-Winston, co-I: Pfund) and renewal to focus on cultural aspects of mentoring relationships (PIs: Byars-Winston and Pfund)
- The curriculum has been adapted for use in a synchronous, online venue through the NSF-funded Center for the Integration of Research, Teaching and Learning (CIRTL) Network (NSF DUE-0717768, PI: Mathieu)
- CIRTL and APS partnered to adapt the curriculum for physic mentors.
- NIH has funded legacy website (3UL1RR025011-05S1, PI: Drezner), randomized controlled trial (3UL1RR025011-03S1, PI: Drezner) and train-the-trainer workshops (R13GM106445, Co-PIs: Pfund and Sorkness)
- *Optimizing the Practice of Mentoring* online module developed at the University of Minnesota’s NIH-funded Clinical and Translational Science Institute (UL1TR000114)
- NIH has funded National Research Mentoring Network (NRMN) (U54 MD0009479-01)