

The Role of the Funder in Providing Mentoring Experiences for Grantees

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Objectives:

- Explore the national landscape of mentoring in STEMM
- Introduce national models and resources used to optimize mentoring relationships with diverse trainees and their mentors.
- Introduce current research and resources that funders can use to support grantees.
- Discuss a range of implementation approaches being used nationally.
- Breakout Session: Develop and share implementation plans for creating sustainable efforts in mentorship training locally, taking into consideration barriers and supports to those efforts.

Some Framing Thoughts

Mentoring relationships are the incubating space in which emerging scientists are developed and the future scientific workforce is forged.

The research mentoring relationship is the primary mechanism for growing the next generation of scientists.

Funders can influence the mentoring relationships of their grantees.



What We Know about Mentoring

- Mentorship impacts persistence, research productivity and career satisfaction (; McGee and Keller, 2007; Sambunjak *et al*, 2010; Williams *et al*, 2015; Bordes-Edgar *et al.*, 2011; Steiner and Lanphear, 2002; 2007; Wingard *et al*, 2004; Schapira *et al*, 1992; Beech *et al*, 2013)
- Mentorship for graduate students is the **most important** aspect of their training while also often being the **most disappointing** aspect of their training (Katz & Harnett, 1976).
- Mentoring is not the *only* factor in trainee success but it is a *major determinant* in the likelihood of success (Brunsma *et al.*, 2017)

What We Know about Trainees

- Trainees have unequal access to mentoring and quality mentoring varies by groups.
- Trainees need something that they are not getting in their mentoring relationships—beyond disciplinary training in mentorship.

(Noy & Ray 2012)

What We Know about Trainees

- Students from UR racial/ethnic groups report that their primary advisor is less respectful of their ideas compared to White students.
- Women from UR groups report less respectful and sometimes less instrumental primary advisors than all other groups.
- Systematic disadvantage by discipline: Students in biological/physical sciences report their primary and secondary advisors to be overwhelmingly **less supportive** than those in the social sciences and humanities.

What We Know about Faculty Mentors

- Many have not received mentor training (Pfund et al., 2006)
- Many do not believe socioemotional, instrumental functions are part of their mentorship role (Laursen et al. 2010)
- Most did not pursue an academic career to be change agents (Byars-Winston, *in review*)
- Many do not know of or believe the realities that many of their trainees experience, especially those from groups underrepresented in STEM (Alexander & Hermann, 2016)
- Many adopt a colorblind ideology in general (Prunuske et al., 2014)

A National Focus on Mentoring



- ▶ National Academies of Science
 - ▶ New Report on Mentored Undergraduate Research Experiences
 - ▶ Revitalizing Graduate Education for the 21st Century
 - ▶ Consensus Study: The Science of Effective Mentoring IN STEM



- ▶ National Institutes of Health (NIH)
 - ▶ Mentored K awards (e.g. K24)
 - ▶ National Research Mentoring Network (NRMN)
 - ▶ New T32 requirements



- ▶ National Science Foundation (NSF)
 - ▶ Post-doctoral mentoring plans
 - ▶ AAAS/ PASEMEN STEM Mentoring 2030 Meeting




- ▶ Sloan Foundation
 - ▶ University Centers of Mentoring Excellence




- ▶ Howard Hughes Medical Institute and Burroughs Wellcome Fund
 - ▶ Mentor and mentee training for the Gilliam Fellow and PDEP Programs

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The background features a complex network diagram with nodes and connecting lines. Some nodes are represented by circular icons of diverse people, while others are simple colored circles. The lines are a mix of solid and dashed, creating a web-like structure.

The Science of Effective Mentorship

A CONSENSUS STUDY OF THE NATIONAL ACADEMIES
OF SCIENCES, ENGINEERING, AND MEDICINE

The Science of Effective Mentoring in STEMM:

The Need... Science, technology, engineering, mathematics, and medicine (STEMM) fields reflect the people who participate in them. Strong mentorship is critical in the development of undergraduate and graduate students in STEMM—especially for many members of historically underrepresented populations.

The Goals... 1) Determine the current state of the science of mentorship and identify gaps and potential areas for future research and 2) Provide mentors and mentees with the evidence-based knowledge and skills necessary to ensure highly productive and sustainable mentoring relationships.

The Outcomes... A written report and an online interactive guide of effective programs and practices that can be adopted and adapted by institutions, departments, and individual faculty.

The People



Angela Byars-Winston (*Chair*)
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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

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NIGMS T32 Webinar


March 2019

Program Oversight


- Ensure that trainees are in research environments that promote responsible conduct as well as rigor and transparency
- Oversight throughout the training process is essential
- Select faculty based on commitment to training and mentoring
- Provide mentor training
- Ensure faculty participate in career advising (e.g., use of IDPs)
- Provide a mechanism for:
 - Matching mentors/mentees
 - Monitoring mentee/mentor relationships and plans for removing faculty showing poor mentorship qualities from the program

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HHMI Gilliam Graduate Student Fellowship and the BWF Postdoctoral Diversity Enrichment Programs

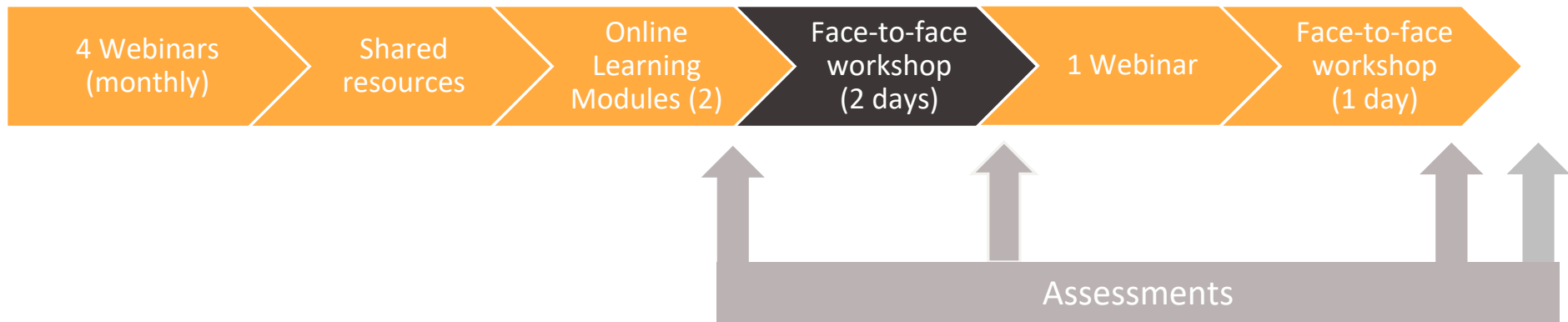
A Strategic Collaboration

- 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



Team: Angela Byars-Winston, Christine Pfund, Sherilynn Black, Bruce Birren, Leah Nell Adams, David Asai, Cliff Poodry, Sonia Zarate, Alfred Mays

One Year Program for Mentors (25-30 hours)



Attributes for Effective Research Mentoring Relationships

<p>RESEARCH SKILLS</p> <ul style="list-style-type: none"> · Developing disciplinary research skills · Teaching and Learning disciplinary knowledge · Developing technical skills · Accurately assessing mentees' understanding of disciplinary knowledge and skills · Valuing and practicing ethical behavior and responsible conduct of research 	<p>DIVERSITY/CULTURALLY-FOCUSED SKILLS</p> <ul style="list-style-type: none"> · Advancing equity and inclusion · Being culturally responsive · Reducing the impact of bias · Reducing the impact of stereotype threat
<p>INTERPERSONAL SKILLS</p> <ul style="list-style-type: none"> · Listening actively · Aligning mentor and mentee expectations · Building trusting relationships/ honesty 	<p>SPONSORSHIP SKILLS</p> <ul style="list-style-type: none"> · Fostering mentees' independence · Promoting professional development · Establishing and fostering mentee professional networks · Actively advocating on behalf of mentees
<p>PSYCHOSOCIAL SKILLS</p> <ul style="list-style-type: none"> · Providing motivation · Developing mentee career self-efficacy · Developing mentee research self-efficacy · Developing science identity · Developing a sense of belonging 	<p>Pfund <i>et al.</i> 2016</p>

Broader Impact of Training: “How will what you learned in this training affect how you approach your interactions with others?”


“I have been an advocate for diversity in admissions committees but now I feel empowered and hope to use evidence to change attitudes”

“More humility; better understanding about different experiences and cultures. Stronger advocacy for the importance of mentoring”


“Will change, dramatically, my role in PhD admissions and mentoring in my lab. Will make me aware of THEIR viewpoint and needs to succeed”

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- ▶ Health Research Alliance 

NIH DIVERSITY CONSORTIUM



National Research Mentoring Network (NRMN)



Building Infrastructure Leading to Diversity (BUILD)

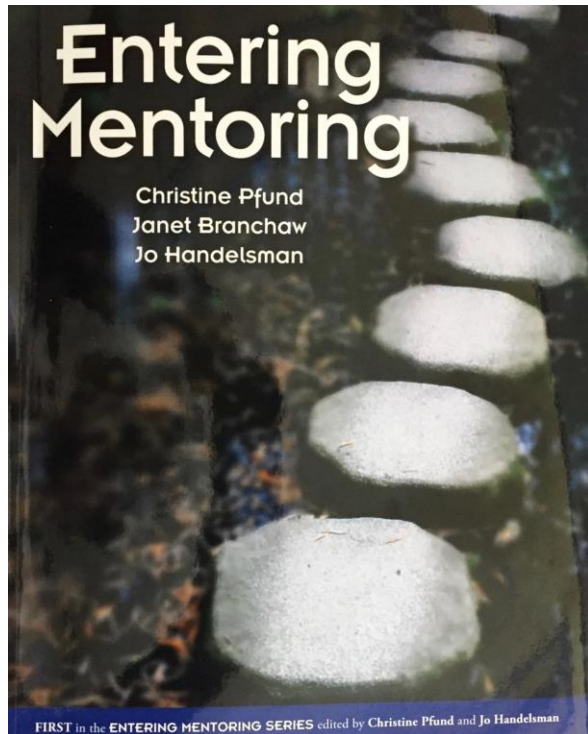


NRMN Mentor Training Core: Expanded, Enhanced, and Studied Ways to Optimize Research Mentoring Relationships

- Face-to-face mentor training workshops
- Face-to-face mentee training workshops
- Self-paced online training
- Synchronous online training
- Train-the-trainer workshops
- Implementation workshops



Mentor Training Curriculum

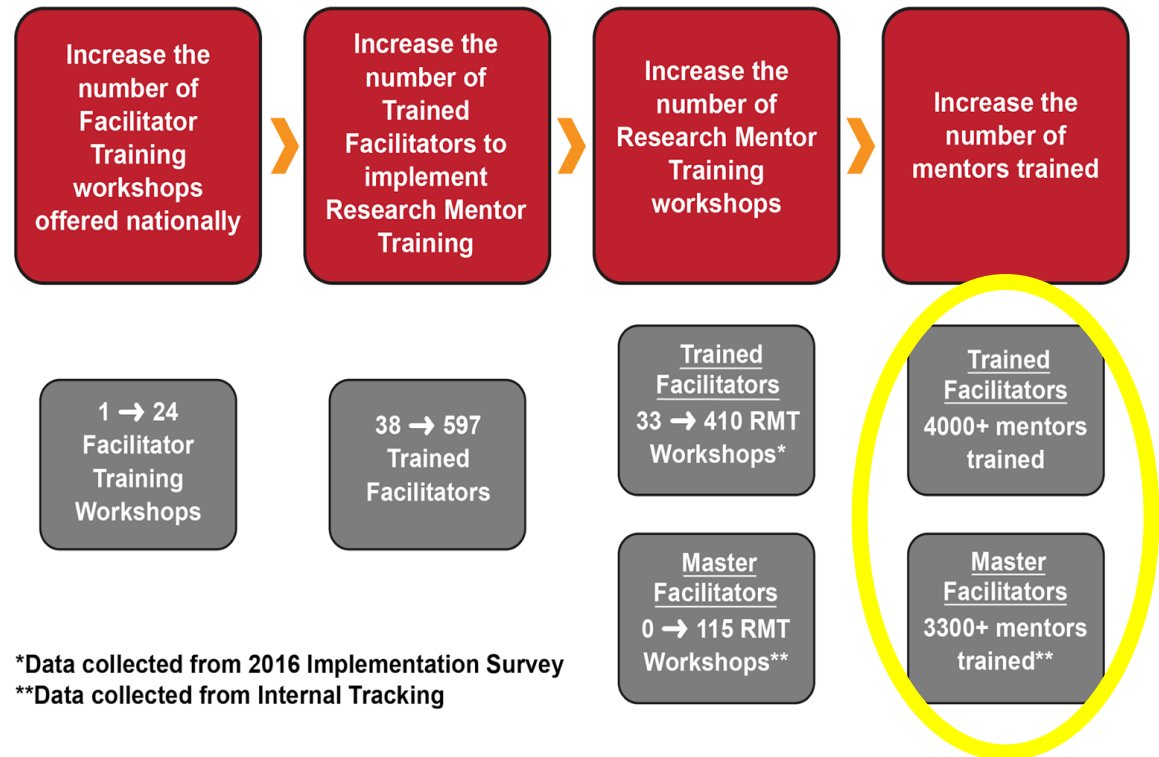


Key elements of mentor training:

- Process-based using case studies and group problem solving
- Aimed at awareness-raising and reflection across targeted competencies
- 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

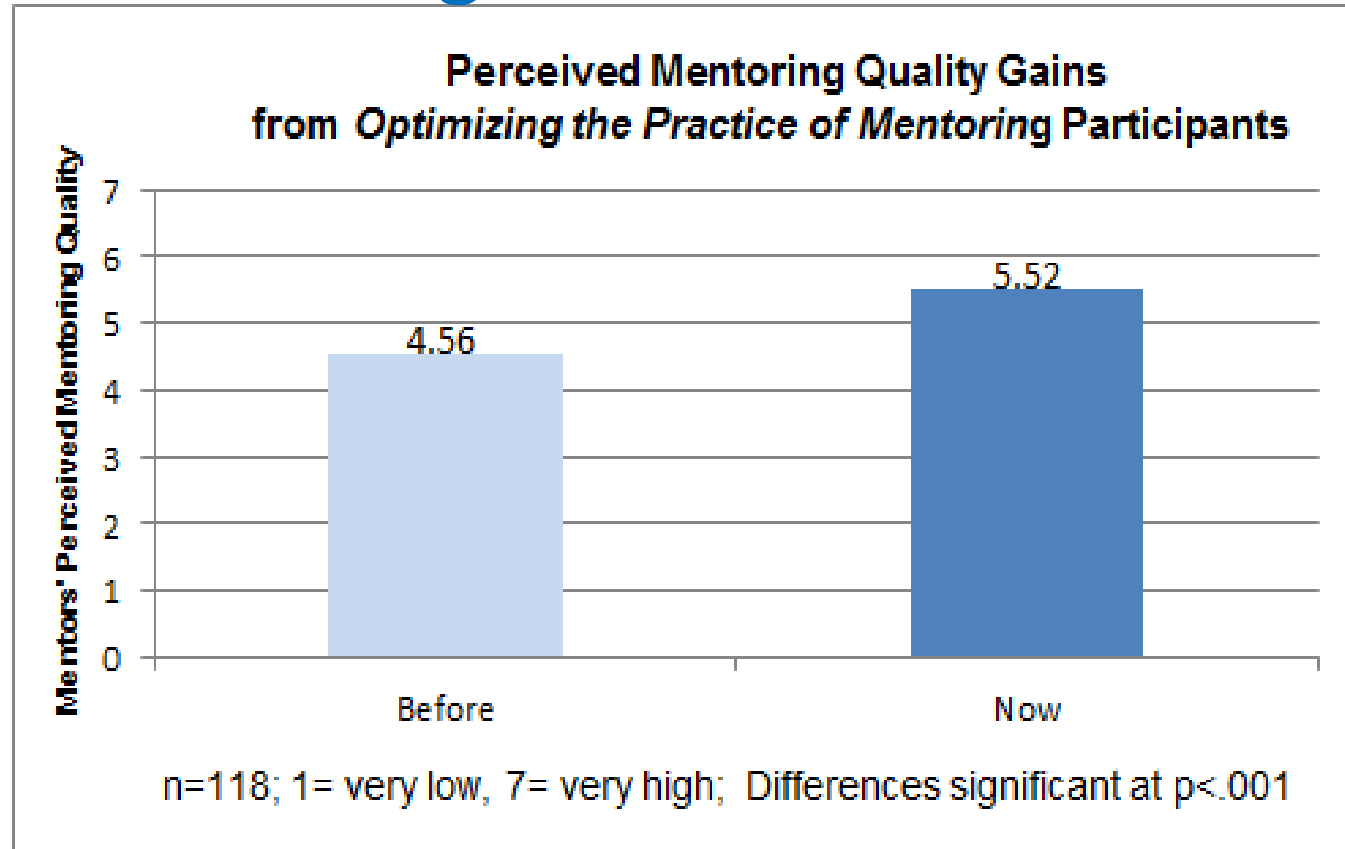
Expanding: Train-the-Trainer Approach to National Dissemination

- TTT approach to dissemination has resulted in the preparation of nearly 600 trained facilitators, representing 152 academic institutions
- Trained Facilitators have implemented mentor training for over 4,000 graduate student, junior faculty, and senior faculty mentors



Enhanced Online, Self-Paced Mentor Training

- Online, self-paced training for mentors of graduate students, postdocs, and junior faculty
- Adaptation for mentors of undergrads is in development (in final programming phase)



Weber-Main AM., Shanedling J., Kaiser A., Connett J., Lamere M., El-Fakahany E. A Randomized Controlled Pilot Study of the University of Minnesota's Mentorship Excellence Training Academy: A Hybrid Learning Approach to Research Mentor Training. [Manuscript in preparation]

Adapted Intervention: Motivation Module

Research Report

A Randomized Controlled Trial of Mentoring Interventions for Underrepresented Minorities

Vivian Lewis, MD, Camille A. Martina, PhD, Michael P. McDermott, PhD, Paula M. Trief, PhD, Steven R. Goodman, PhD, Gene D. Morse, PharmD, Jennifer G. LaGuardia, PhD, Daryl Sharp, PhD, RN, and Richard M. Ryan, PhD

Enhancing Motivation using the
CARES Mentoring Model

The Role of
Motivation

The CARES
Model

Two Additional
Factors

The Evidence

The CARES
Conversation

Next Steps

What are the key factors that
affect mentees' motivation?

How can we create an
optimal environment to support them?

In this module, you'll learn about basic motivation concepts and their well-researched impact on satisfaction, performance, and persistence in educational and professional settings. You'll be introduced to a motivation-focused model of mentoring that has a strong theoretical foundation. And you'll explore strategies for putting the model's principles into action, with the goals of 1) better understanding your mentees' core psychological needs, including how these needs might be affected by issues of work-life balance and diversity, and 2) establishing a framework with your mentees for regularly discussing and attending to those needs together.

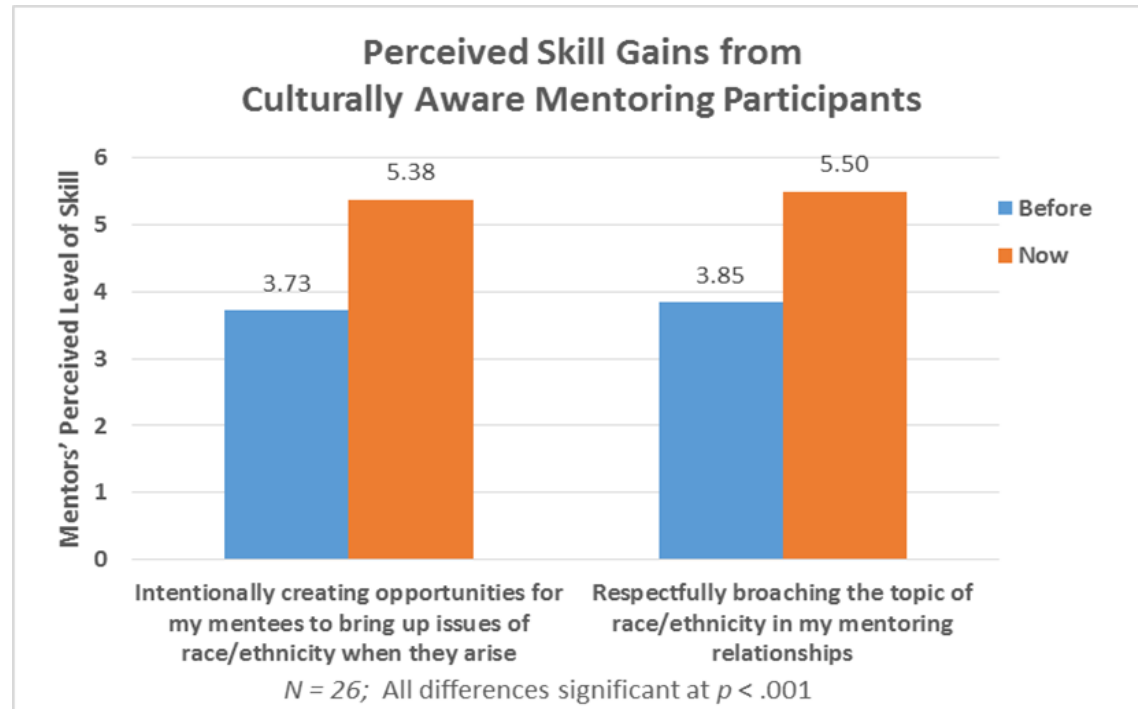
This module should take
approximately 60
minutes to complete.



**Find out what you'll be able to
do by completing this module**

New Modules: Culturally Aware Mentor Training

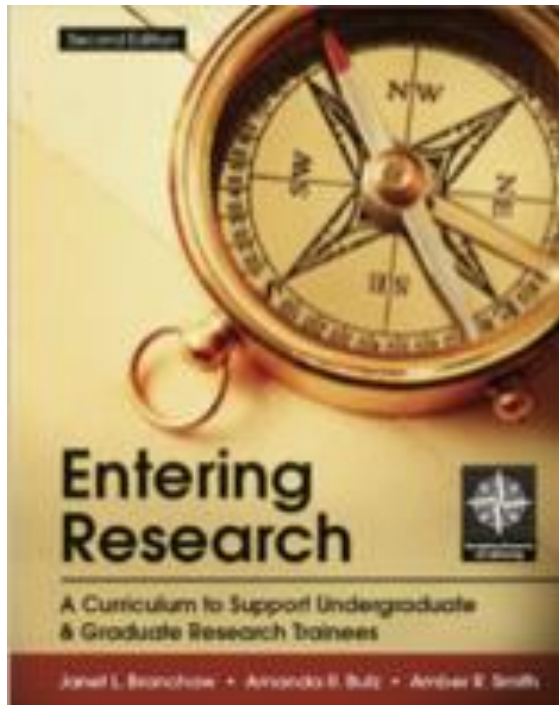
- Full-day level 2 mentor training workshop
- Implemented at 12 sites with 257 participants
- Pilot data (n=70) show self-reported significant gains
- Sample of Impact 24 months Post Pilot Training
 - Greater realization of their own racial and ethnic biases and insensitivities
 - More individualized mentoring strategies
 - Better engagement with historically underrepresented (HU) students, even by HU faculty



Building from R01 GM094573 (Byars-Winston and Pfund)

Byars-Winston et al. (2018). *Journal of Clinical and Translational Science*, 2(2), 86-94.

Developed and Tested Training for Mentees



Key elements of mentee training:

- Process-based using case studies and group problem solving
- Introduces undergraduate and graduate 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.

Mentoring Up

Adapted from Gabarro and Kotter (1980) *Harvard Business Review*.

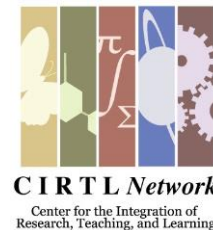
Mentoring Up: Learning to Manage Your Mentoring Relationships
Lee, S., Pfund, C., Branchaw, J., and McGee, R. (2018) In *The Mentoring Continuum: From Graduate School Through Tenure*.
Glenn Wright, ed. Syracuse, NY: The Graduate School Press of
Syracuse University.

Beyond “Finding Good Mentors” to “Building and Cultivating Your Mentoring Team” (2015) Rick McGee, Steve Lee, Christine Pfund, Janet Branchaw. National Postdoc Association

Acknowledgements



UNIVERSITY OF WISCONSIN
**Center for Women's
Health Research**



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 trainer
- 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)