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

1

DIVERSITY
PROGRAM
CONSORTIUM
Supported by the National Institutes of Health

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 you 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 workshop (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.

Pfund *et al* 2016: McGee 2016

Research Says Mentoring Matters

Strong mentorship has been linked to:

- **Enhanced science identity, sense of belonging, and self-efficacy**
  (Palepu *et al*, 1998; Garman *et al*, 2001; Paglis *et al*, 2006; Lopatto, 2007; Bland *et al*, 2009; Feldman *et al*, 2010; Cho *et al*, 2011; Chemers *et al*, 2011; Thiry and Laursen, 2011)

- **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)

4

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)

6

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)**

The Committee on Graduate STEM Education for the 21st Century
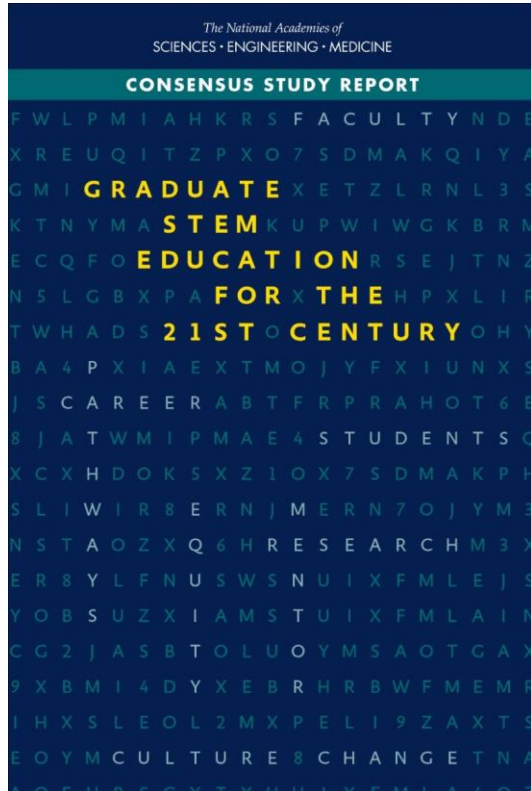
Key Takeaways: Mentoring

- **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

8

The Science of Effective Mentorship

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

NRMN

The People

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

Erin Dolan
University of Georgia

Richard (Rick) McGee
Northwestern University Feinberg School of Medicine

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

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

Juan E. Gilbert
University of Florida & iAAMCS

Christiane Spitzmueller
University of Houston

Sylvia Hurtado
University of California, Los Angeles

Keivan G. Stassun
Vanderbilt University

Laura Lunsford
Campbell 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**.

DIVERSITY PROGRAM CONSORTIUM
Supported by the National Institutes of Health

NRMN
Mentoring to Diversify the Biomedical Workforce

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

NRMNet: A Platform for Mentoring and Networking

NRMN Participants Across the Country

Zip Code Key
- Mentees
- Mentors

Geographic representation of participants registered for NRMNet in the U.S. and U.S. territories, based on collected zip codes, as of 2/28/18.

Training through NRMN Mentor Training Core

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

Theoretical Framework to Study Mentoring: Social Cognitive Career Theory
(Lent, Brown & Hackett, 1994, 2000)
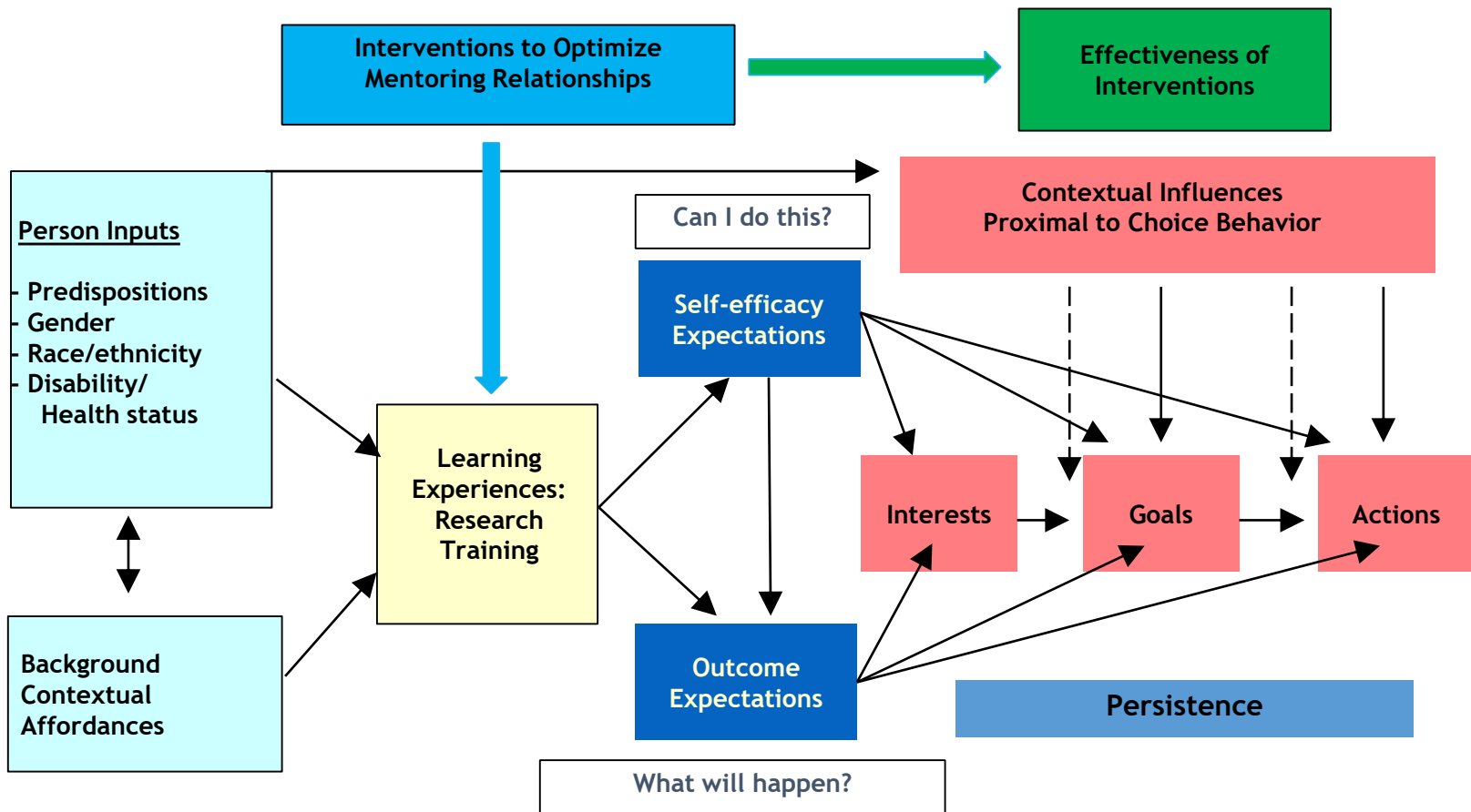
We developed a mentor training curriculum…

Entering Mentoring

Christine Pfund
Janet Branchaw
Jo Handelsman

FIRST in the ENTERING MENTORING SERIES edited by Christine Pfund and Jo Handelsman
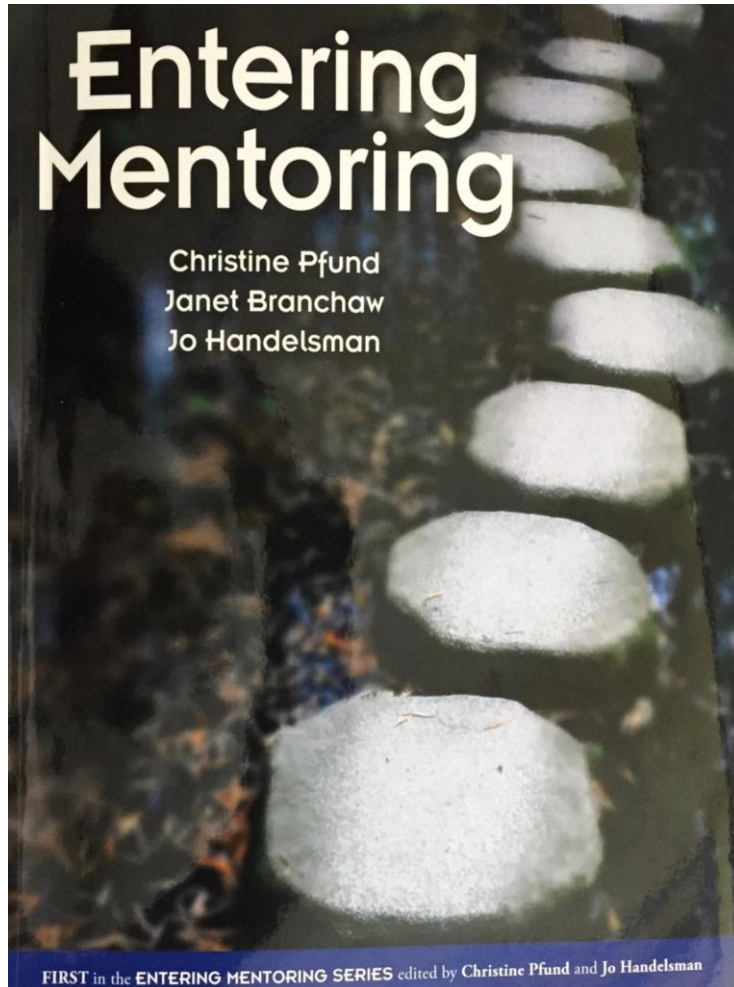
Key elements of mentor training:

- 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

18

...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

Fleming M, House S, Hanson VS, Yu L, Garbutt J, McGee R, Kroenke K, Adebin Z, Rubio D. (2013). The Mentoring Competency Assessment: Validation of a New Instrument to Evaluate Skills of Research Mentors. *Acad Med*. 88(7):1002-1008.

...and adapted it for different career stages and disciplines...

...and we studied it extensively.

Pfund, C., Pribbenow, C., Branchaw, J., Miller Lauffer, S. and Handelsman, J. (2006). The merits of training mentors. *Science* 311:473-474.

Pfund C, House S, Spencer K, Asquith P, Carney P, Masters K, McGee R, Shanedling J, Vecchiarelli S, Fleming M. (2013). A Research Mentor Training Curriculum for Clinical and Translational Researchers. *Clin Trans Sci*. 6:26-33.

Fleming M, House S, Hanson VS, Yu L, Garbutt J, McGee R, Kroenke K, Adebin Z, Rubio D. (2013). The Mentoring Competency Assessment: Validation of a New Instrument to Evaluate Skills of Research Mentors. *Acad Med*. 88(7):1002-1008.

Sorkness CA, Pfund C, Asquith P, Drezner M. (2013). Research Mentor Training: Initiatives of the University of Wisconsin Institute for Clinical and Translational Research. *Clin Transl. Sci*. 6(4):256-258.

Pfund C, House SC, Asquith P, Fleming MF, Buhr KA, Burnham EL, Eichenberger Gilmore JM, Huskins WC, McGee R, Schurr K, Shapiro ED, Spencer KC, Sorkness CA. (2014). Training Mentors of Clinical and Translational Research Scholars: A Randomized Controlled Trial. *Acad Med.* 89:774-782.

Pfund, C., Spencer, K., Asquith, P., House, S., Miller, S., Sorkness, C. (2015). Building National Capacity for Research Mentor Training: An Evidence-Based Approach to Training-the-Trainers. CBE Life Sciences Education 14 (2).

McDaniels, M., Pfund, C. and Barnicle, K. (2016). Creating Dynamic Learning Communities in Synchronous Online Courses: One Approach from the Center for the Integration of Teaching and Learning (CIRTL). Online Learning.

...we have also developed and tested training for mentees across career stages
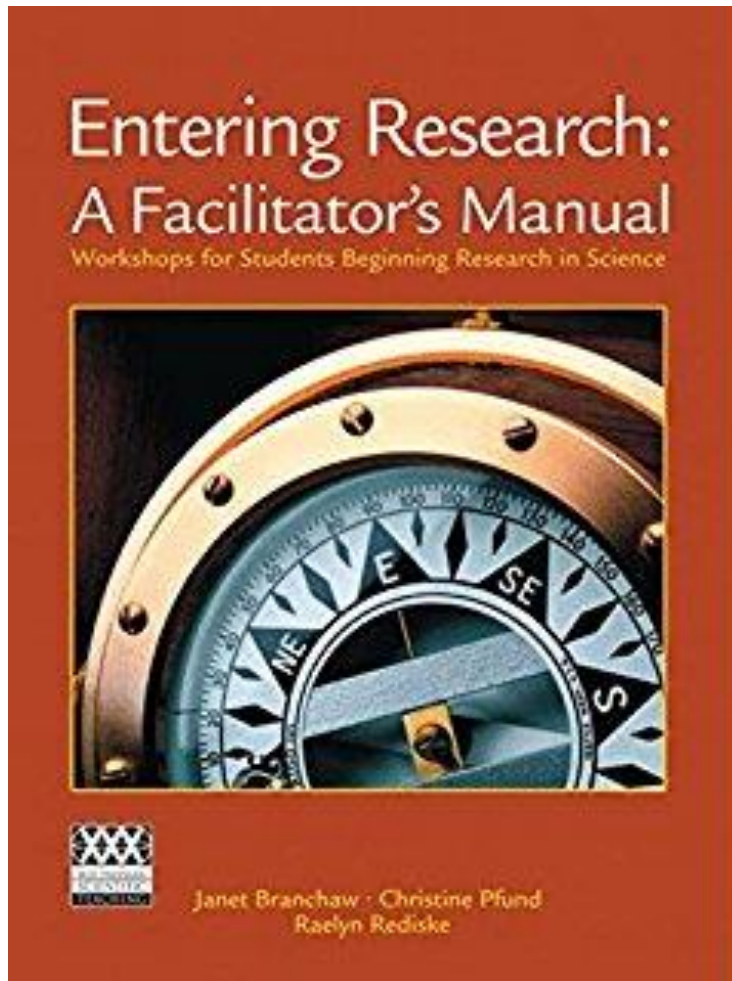
Key elements of mentee training:

- 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.

Entering Research: A Facilitator's Manual
Workshops for Students Beginning Research in Science

Janet Branchaw · Christine Pfund
Raelyn Rediske

Attributes for Effective Research Mentoring Relationships

RESEARCH SKILLS	DIVERSITY/CULTURALLY-FOCUSED SKILLS
· 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	· **Advancing equity and inclusion** · Being culturally responsive · Reducing the impact of bias · Reducing the impact of stereotype threat
INTERPERSONAL SKILLS	**SPONSORSHIP SKILLS**
· **Listening actively** · **Aligning mentor and mentee expectations** · Building trusting relationships/ honesty	· **Fostering mentees' independence** · **Promoting professional development** · **Establishing and fostering mentee professional networks** · Actively advocating on behalf of mentees
PSYCHOSOCIAL SKILLS	
· Providing motivation · Developing mentee career self-efficacy · **Developing mentee research self-efficacy** · Developing science identity · Developing a sense of belonging	Pfund *et al.* 2016

23

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

MTC Curriculum Development and Testing	Mentors			Mentees		
	Development	Beta Testing	Complete	Development	Beta Testing	Complete
Virtual Guided Mentorship Videos						
Entering Research Mentee Training Adaptations	Not Applicable					Spring 2019
Asynchronous Online Training Adaptations		Fall 2018	Spring 2019	Not Applicable		
Synchronous Online Training				Not Applicable		
Work-Life Integration						
Providing Motivation		Fall 2018	Spring 2019	Not Applicable		
Career Coaching			Spring 2019			Spring 2019
Culturally Aware Mentoring						Spring 2019
Research Self-Efficacy						

Resources

CIMERProject.org

CIMER: Providing resources for organizations and institutions to improve mentoring relationships

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 practioners 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.

CIMER

Investigating and improving research mentoring relationships

CONTACT

♀ 1025 W. Johnson St. Madison, WI 53705
☎ (608) 265-2410
✉ leah.neil.adams@wisc.edu

SUBSCRIBE TO OUR LISTSERV

Email [   ] Go!

UW and WCER logos coming soon.

PARTNERS

mentoringresources.ictr.wisc.edu

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

http://z.umn.edu/OptimizingMentoring

"Optimizing the Practice of Mentoring"
Online self-study for mentors of grad students, postdocs, and faculty


28

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.
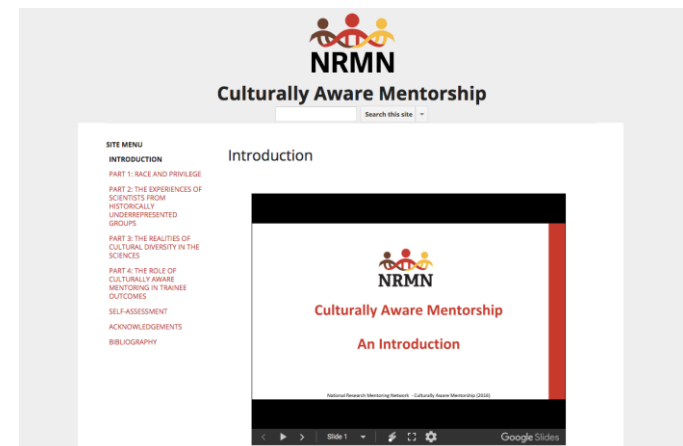
Example Implementations

- 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

hhmi
Howard Hughes
Medical Institute

BURROUGHS
WELLCOME
FUND

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
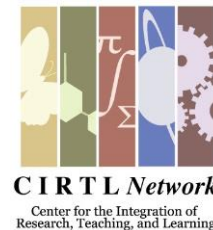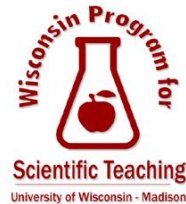 - Post online resources to read

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 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)