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# The Science of **Effective Mentorship** in STEMM



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# Is there a Science of Mentorship?

Science is “the intellectual and practical activity encompassing the systematic study of structures and behaviors through observation, experiment, and theory.”

## The Science of Mentorship

- brings together multiple disciplinary perspectives—from organizational and social psychology to discipline-based education
- provides guidance on effective behaviors, theoretical frameworks, measures and assessment techniques, mentoring tools, possible structures of mentoring relationships, and the role of institutional support

# What is Mentorship?

*Mentorship is a professional, working alliance in which individuals work together over time to support the personal and professional growth, development, and success of the relational partners through the provision of career and psychosocial support.*

Mentorship includes **career support functions** (e.g., career guidance, skill development, sponsorship) and **psychosocial support functions** (e.g., emotional support or role modeling) aimed at mentee talent development.

It complements other developmental processes like teaching or coaching to support mentees in developing knowledge and skills, and is essential to holistic development of STEMM professionals, including STEMM identity development.

# How can you Develop Effective Mentoring Relationships?

## Trust

Trust develops when mentors and mentees work together to identify and respond to their mutual goals, needs, and priorities. These change over time and thus may require adjustment.

## Self-reflection

Critical and honest self-reflection occurs at multiple stages of effective mentorship processes.

## Expectations

Explicit declarations of the expectations of both mentors and mentees at the initiation of mentorship—revisited periodically and possibly recorded in writing—can help create an effective mentoring relationship.

## Education

Mentorship is a learned skill, and mentorship education influences mentor and mentee attitudes, self-efficacy, and behaviors.

# How can you Develop Effective Mentoring Relationships?

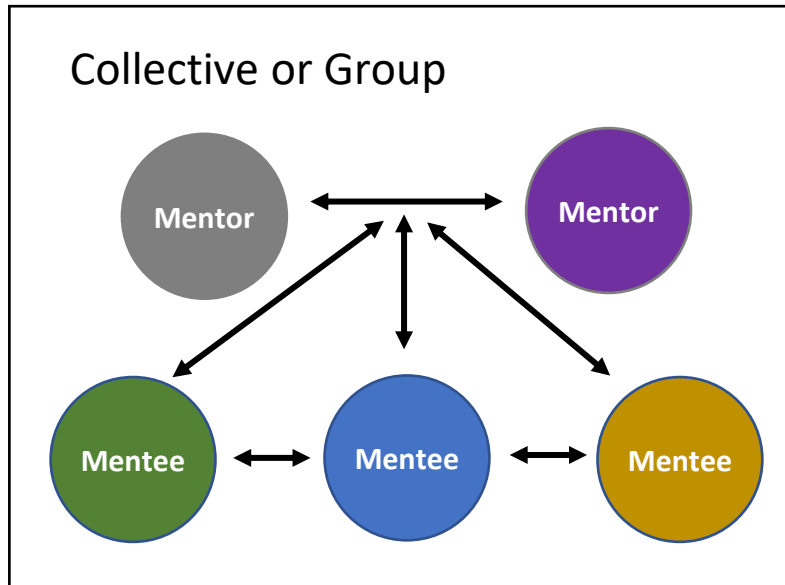
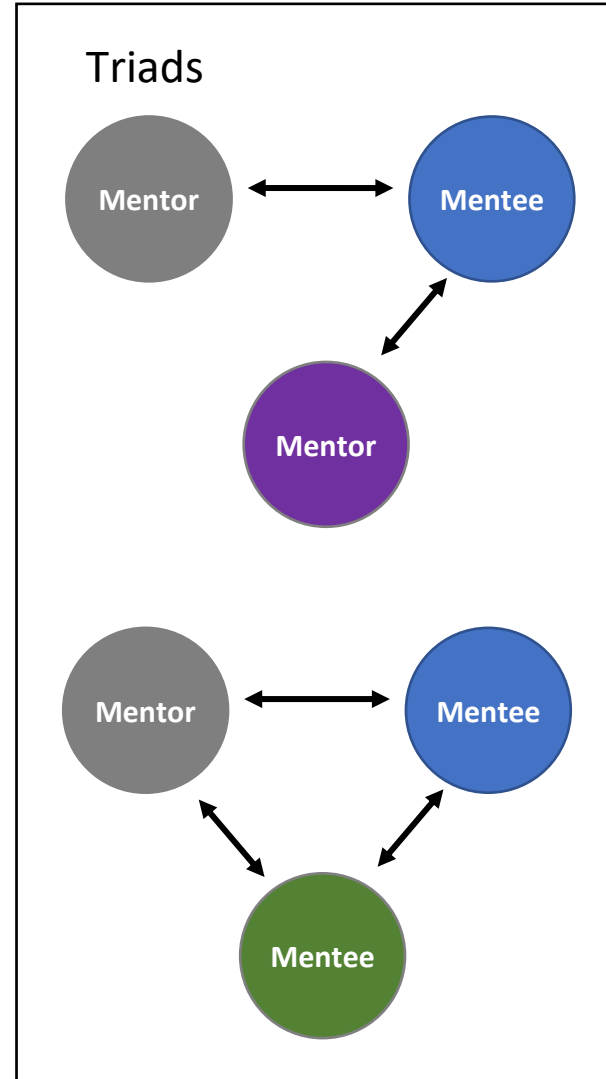
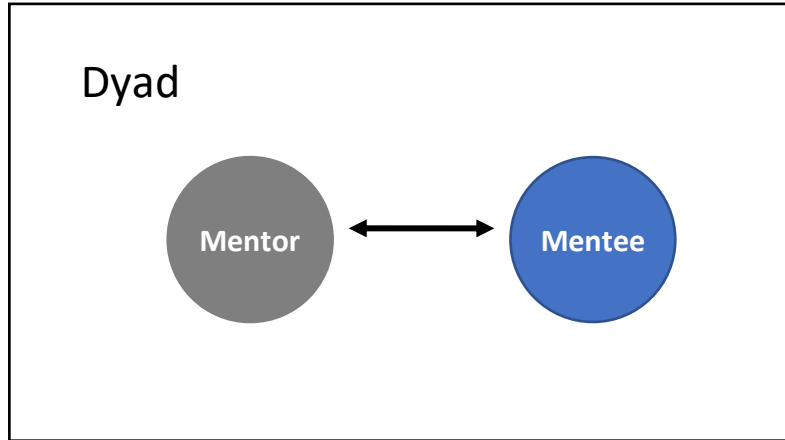
A **series of stages**:

1. Initiation,
2. Cultivation,
3. Separation, and
4. Redefinition

Ongoing collaboration and discussions are key to initiation and sustaining an effective mentoring relationship that is responsive to the needs, goals, interests, and priorities of both mentors and mentees

# How can you Develop Effective Mentoring Relationships?

A **range of structures** support mentees' development, including:



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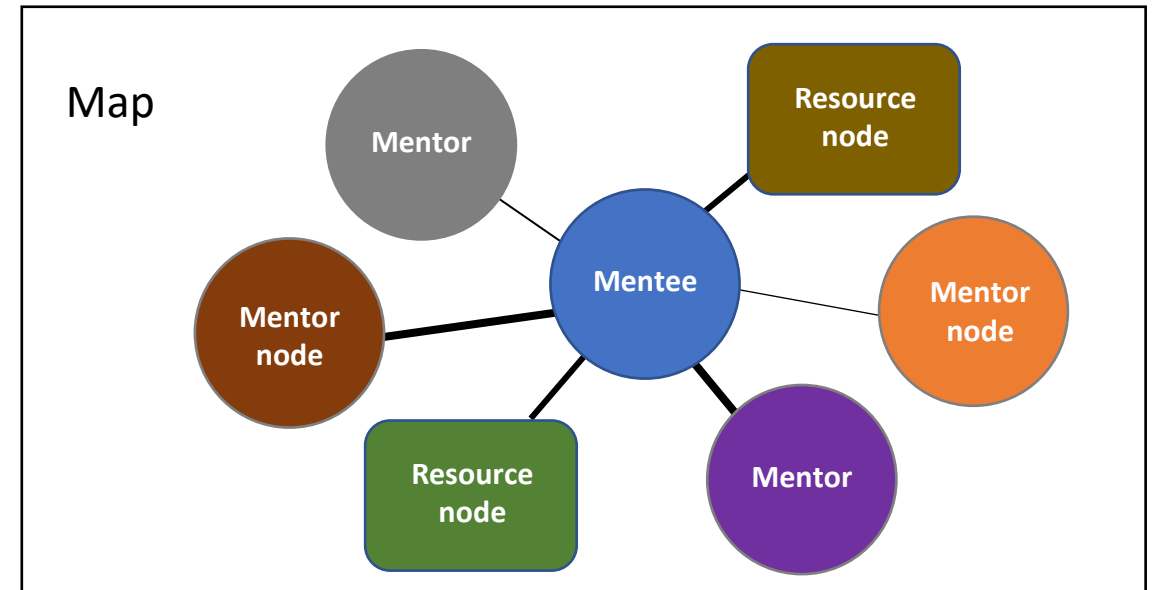
**Culturally responsive mentoring** is a learned skill set in which mentors, regardless of their race or gender, show interest in and value students' cultural backgrounds and social identities. It may help students navigate invalidating experiences in academia, affirm belonging in STEMM contexts, and reinforce their belief in their own ability to be successful in STEMM.

Affinity-based mentorship groups can support individuals from UR groups in STEMM who may not otherwise have access to culturally responsive mentorship.

# How can you Develop Effective Mentoring Relationships?

Consider using **mentoring tools**, including:

- Individual Development Plans
- Mentoring Compacts or Agreements
- Mentoring Plans
- Mentorship Maps





# How can you Develop Effective Mentoring Relationships?

Much of the research on mentorship in STEMM examines mentorship in the **context of research environments**.

- A primary research mentor has **supervisory and evaluative roles** (formal mentorship), but students and faculty often enter into these relationships based upon **mutual interests and respect** (informal mentorship).
- Mentees occasionally choose research advisors based on scant information.
- Trust and responsiveness may develop over time and shift a relationship from advising to mentorship.

Not all mentees and research advisors consider their relationship to be mentorship.

# How do you Create a Culture of Effective Mentorship?

Colleges and Universities can **recognize and address barriers to implementation** of effective mentorship at the institutional level include lack of:

- time,
- resources,
- rewards and incentives,
- expertise, and
- confidence and motivation to implement.

A commitment from institutional leadership to support mentorship could have a profound effect on the quality of mentorship and ultimately the development of undergraduate and graduate students.

# How do you Create a Culture of Effective Mentorship?

Colleges and universities can **support more effective mentorship** on their campuses by

- Providing mentorship education
- Promoting the use of mentorship tools
- Evaluating mentorship effectiveness with validated measures
- Using data and research to hold broader conversations about mentorship activities and innovations
- Encouraging faculty and staff to share mentorship challenges, innovations, and evidence with peers

# How do we Alleviate the “Burden” of Mentorship?

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- Adopt an Operational Definition of Mentorship in STEMM
- Use an Evidenced-Based Approach to Support Mentorship
- Establish and Use Structured Feedback Systems to Improve Mentorship at All Levels
- Recognize and Respond to Identities in Mentorship
- Support Multiple Mentorship Structures
- Reward Effective Mentorship
- Mitigate Negative Mentorship Experiences

# Where can you learn more?

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## **Read the Report**

[www.nap.edu/MentorshipInSTEMM](http://www.nap.edu/MentorshipInSTEMM)

## **Use the Online Guide**

[www.nationalacademies.org/MentorshipInSTEMM](http://www.nationalacademies.org/MentorshipInSTEMM)

## **Listen to the Podcast and Learn about the Project**

[www.nas.edu/mentoring](http://www.nas.edu/mentoring)

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