

Facilitator Introductions



St Xavier's (Community College)
Tata Institute for Fundamental Research
Yale University



Dickinson College
University of Cincinnati (Med)

Miami University

*Professor of Biology
Dir. of Undergraduate Research
PI: NSF-URM, NSF-MRI
NSF Program Officer*

Austin College

*Chair; Dir. of U.R.
PI: NSF-IUSE*

UNC Charlotte

Dir. of Undergraduate Research

The views and opinions expressed during this workshop are those of the author(s) and do not necessarily reflect the official policy or position of their affiliated academic institutions, employers, or any sponsoring organizations.

Disciplinary Professional Organizations

ASCB
GSA
SfN
AACU-PKAL
Sigma Xi
Academy of Science

Council on Undergraduate Research

Divisional Rep [LB, JF]
Biology Chair [LB]
Board [LB]
Councilor [JF]
Advocacy [JF]

WE ARE CUR





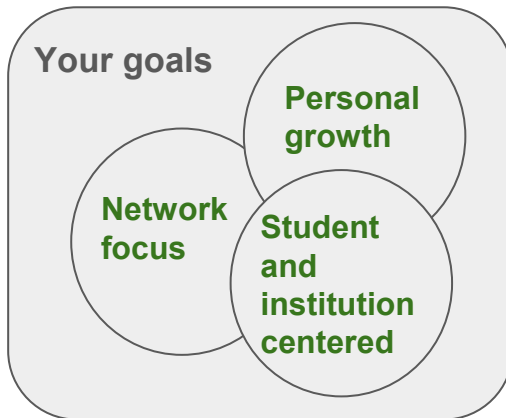
Outline of Workshop Goals

1. Introduce CUR and its resources

- a. Consider how CUR language and tools can frame your statewide efforts
- b. Discuss some promising practices to support efforts

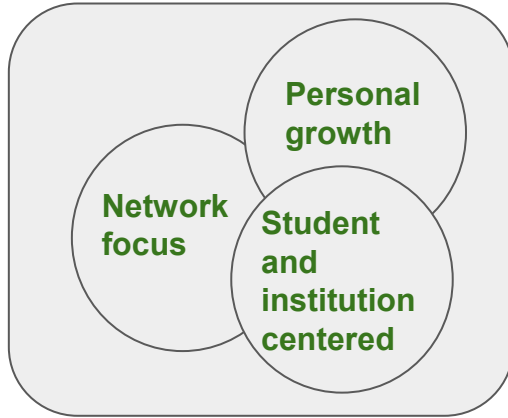
2. Strengthen community amongst NSHE

- a. Learn collaboratively from each other
- b. Establish goals and objectives for this community
- c. Empower you to collaborate & share resources to accomplish goals
- d. Create foundations for sustained collaborations & accomplishments





Your goals



Contexts

HDRFS Broadening Participation Plan components



NSHE Goals

1. Increase **access** to higher education.
2. Improve student **success**.
3. Close institutional performance **gaps**.
4. Meet **workforce** needs in Nevada.
5. Increase solutions-focused **research**.
6. Ensure system **coordination**, **accountability**, and **transparency**.



Values, Challenges and Opportunities for Research Experiences and Mentorship *in Nevada*

Lance Barton
Joyce Fernandes

Council on Undergraduate Research

Mission of CUR

Support and Promote high-quality mentored undergraduate research, scholarship, and creative inquiry.

the creation of new knowledge and/or the use existing knowledge in a new and creative way so as to generate new concepts, methodologies and understandings.



<https://www.pinterest.com/pin/46619298914199562/>

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Australian Research Council, 2018



<https://www.pinterest.com/pin/466192998914199562/>

Undergraduate research, scholarship, and creative inquiry is fundamentally a *pedagogical approach* to teaching and learning.

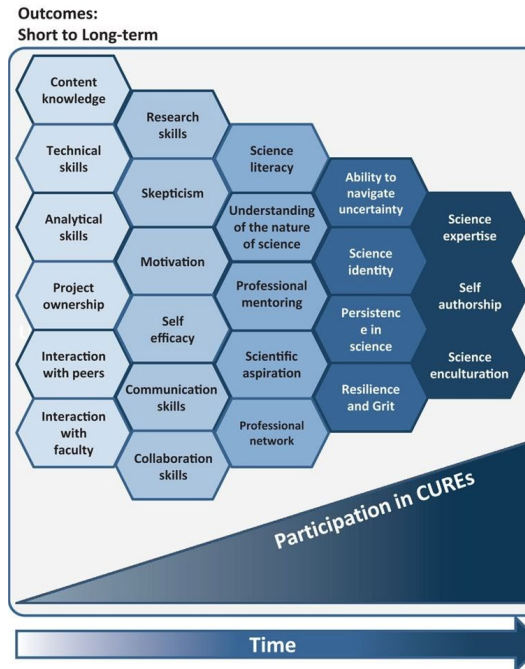
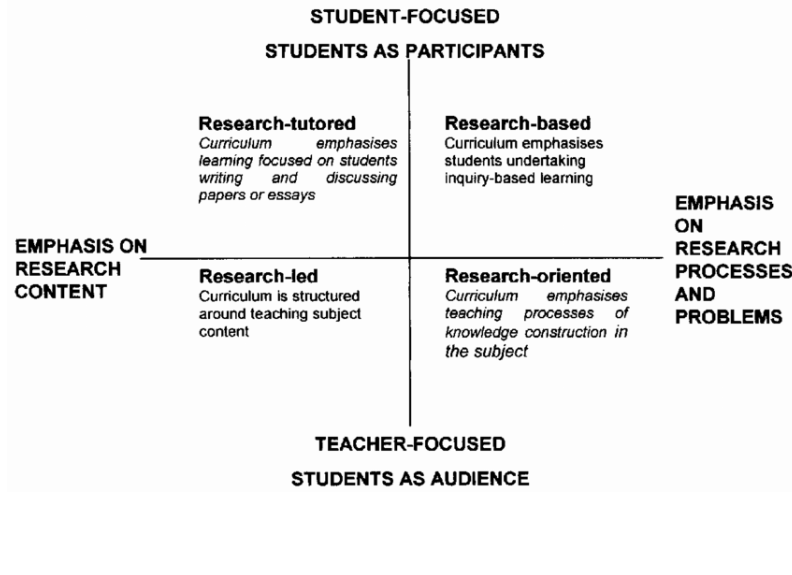
With an *emphasis on process*, CUR defines undergraduate research as: A *mentored investigation* or creative inquiry conducted by undergraduates that seeks to make a scholarly or artistic *contribution to knowledge*.

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Undergraduate Research as Pedagogy

Undergraduate research, scholarship, and creative inquiry is fundamentally a *pedagogical approach* to teaching and learning with an *emphasis on process*



What is Mentoring?

In 2004, David Clutterbuck, an academic who studied mentoring relationships, coined an acronym for what mentors do:

- **M**anage the relationship
- **E**ncourage
- **N**urture
- **T**each
- **O**ffer mutual respect
- **R**espond to the learner's needs



<https://mindthegraph.com/blog/important-qualities-of-a-mentor/>

Why Research Mentoring Matters

STUDENTS

- Gains in **knowledge** and transferable professional **skills**
- Developing an **identity** of a scholar
- Experiencing a **community** of researchers
- Prepares students for employment and/or graduate school/**careers**

FACULTY

- Opportunities to **mentor** and train the next generation of researchers
- Integration of teaching and research (your **growth**)
- **Advance your research**, scholarly, and creative outcomes
- Contribute to departmental/program/institutional/state goals

INSTITUTIONS

- Increases retention and graduation rates (**university metrics**)
- Improves faculty satisfaction (**distinction to multiple audiences**)
- Provides evidence of education quality
- Promotes a culture of innovation and creativity

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UR supports responsibilities of an Academic Institution

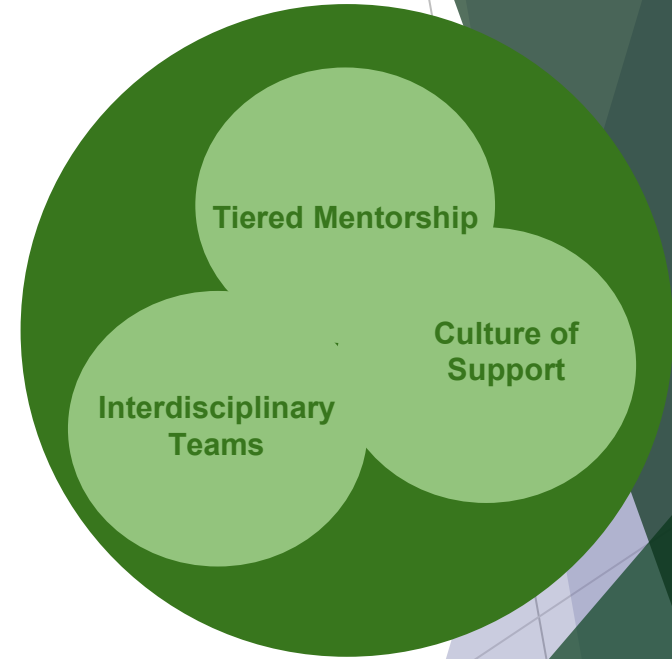
- **Teaching/Instruction:** CUREs, Theses, Scholarship of Teaching and Learning, (SoTL), Mentorship
- **Research:** Building your research group, conference presentations, grant-writing, publications, collaborations, contributions to state priorities
- **Service:** Student development and career success, Professional societies, community engagement [institution, schools, local area]



The Institute Goals

Supporting the research enterprise in Nevada through:

- Mentorship that fosters *inclusivity* and building of *mentor constellations*
- Connected and effective *interdisciplinary teams*
- *Culture of support* that promotes career advancement



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Mentoring Relationships

Worksheet:

Consider a successful mentoring relationship.

1. How did it develop?
2. What aspect(s) made it successful?
3. What features of mentorship models (teams, interdisciplinary, inclusion) are present?
4. What are/were the outcomes?

1. SEARCH 2. CONNECT 3. JOURNEY 4. ASSESS 5. EXPLORE

STEP 1: SEARCH

How do you decide who to enter into a mentoring relationship with and how do you do it?

MENTORS

- ✓ What experiences and learning can I bring to the mentoring relationship?
- ✓ What are my own expectations for the relationship?
- ✓ What are the skills, area of focus, and strengths that I would like the mentee to possess?
- ✓ Are there any obstacles that could impede the relationship's development?

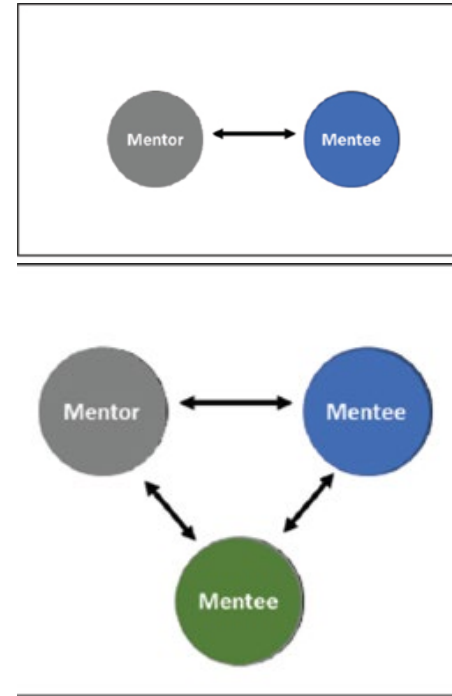
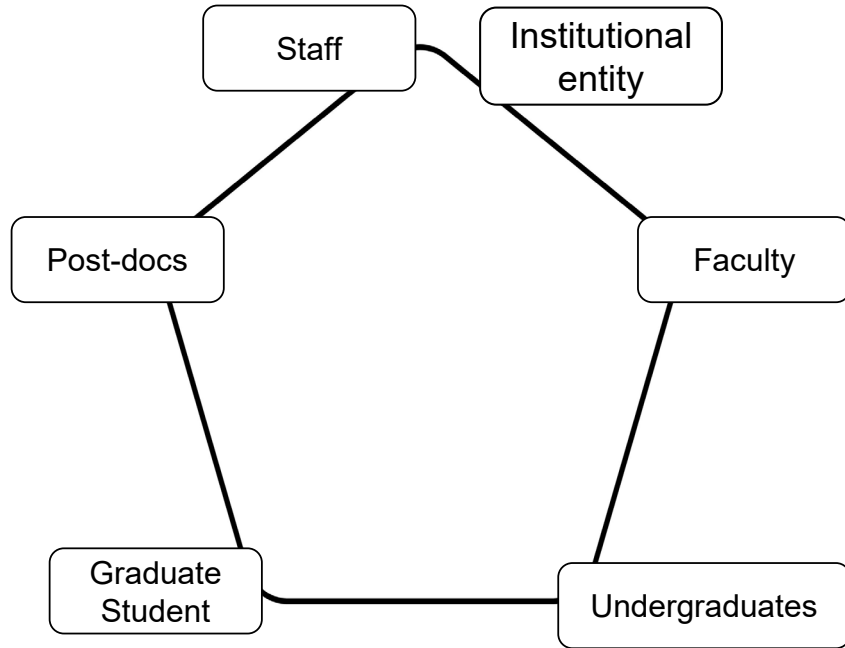
RESOURCES

- ✓ Questions To Ask Yourself Before You begin
- ✓ Mentee Selection Information

MENTOR SIGN UP

SIGN UP TO BE A MENTOR →

Tiered Mentoring



Interdisciplinary Research

LAND AND NATURAL RESOURCES

Water Resources
Sustainable Energy.....
Environment and Natural Hazards.....
Agriculture and Food Security.....
Policy and Economics.....

INTEGRATED HEALTH AND WELLNESS

Health Care Access and Research.....
Microbiology and Immunology.....
Neuroscience.....
Policy and Economics.....

DIGITAL TECHNOLOGIES

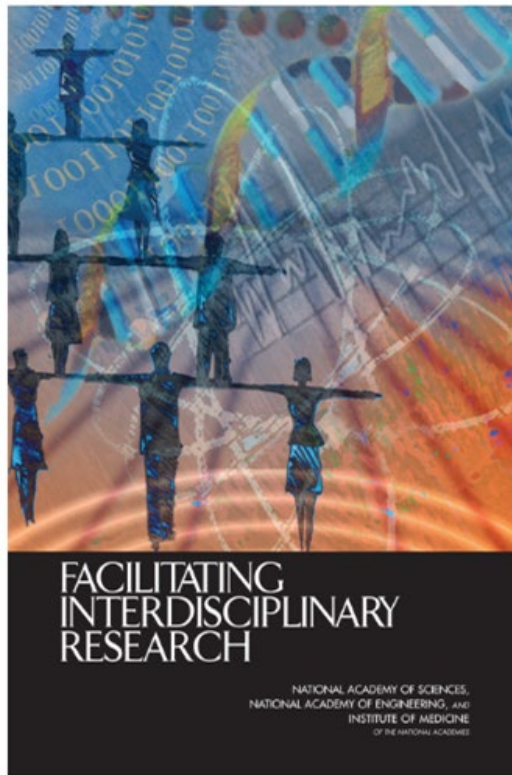
Networking
Cybersecurity
(Big) Data Management.....
Computing Systems
Software and Automation
AI/ML and Analytics

INFRASTRUCTURE AND INDUSTRIAL TECHNOLOGY

Transportation
Advanced Materials
Biotechnology.....
Robotics
Advanced Manufacturing.....
Logistics.....
Mining.....

COMMON STRATEGIES FOR SUCCESS

Workforce Development.....
Technology Transfer.....
Cyberinfrastructure
Communication and Outreach
Convergence Research.....



2005 NAS Report

Recommendations for
students, post-docs
and faculty



Interdisciplinary Research

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Policy and Economics.....

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[HDRFS Nv EPSCoR](#)

Nevada EPSCoR
S & T PPlan, 2020



Interdisciplinary Research

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*The National
Academies of*

SCIENCES
ENGINEERING
MEDICINE

NAE GRAND CHALLENGES FOR ENGINEERING™

MAKE SOLAR ENERGY ECONOMICAL
PROVIDE ENERGY FROM FUSION
DEVELOP CARBON SEQUESTRATION METHODS
MANAGE THE NITROGEN CYCLE
PROVIDE ACCESS TO CLEAN WATER
RESTORE AND IMPROVE URBAN INFRASTRUCTURE
ADVANCE HEALTH INFORMATICS
ENGINEER BETTER MEDICINES
REVERSE-ENGINEER THE BRAIN
PREVENT NUCLEAR TERROR
SECURE CYBERSPACE
ENHANCE VIRTUAL REALITY
ADVANCE PERSONALIZED LEARNING
ENGINEER THE TOOLS OF SCIENTIFIC DISCOVERY

www.engineeringchallenges.org

Mindsets



TALENT, RESEARCH

Through mentored research and/or creative projects, students develop research and creative skills.



VIABLE BUSINESS, ENTREPRENEURSHIP

Students acquire understanding of the importance of business and entrepreneurship through coursework and/or co-curricular activities.



MULTIDISCIPLINARY

Students engage in areas outside of their home field of study. The engineering mindset can be leveraged for multidisciplinary collaboration.



MULTICULTURALISM

Students immerse themselves in culture(s) other than their own to develop and implement viable solutions specific to the culture.



SOCIAL CONSCIOUSNESS

Through involvement in activities related to service and social responsibility, students' concerns must translate over to engineering solutions.

CUR™

Effective Culture of Support





WMS RESEARCH CULTURE: OUR VISION

Values-focused approaches

CUR Community Values:

- **Excellence** in all that we do.
- **Respect** and **integrity** in all of our interactions.
- Flexibility, responsiveness, and **innovation** in our implementation.
- Recognizing and **valuing differences** in our community.

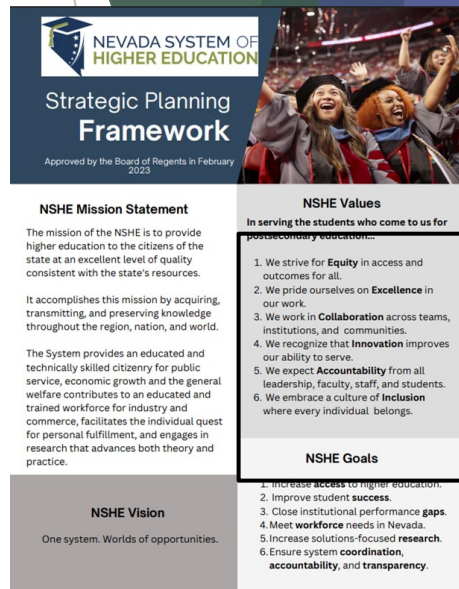
NSHE Values:

- We strive for **Equity** in access and outcomes for all.
- We pride ourselves on **Excellence** in our work.
- We work in **Collaboration** across teams, institutions, and communities.
- We recognize that **Innovation** improves our ability to serve.
- We expect **Accountability** from all leadership, faculty, staff, and students.
- We embrace a culture of **Inclusion** where every individual belongs.

What are the values that frame the work you do to support research?

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[NSHE- Strategic Plan, Mission, Values, Goals](#)



The image shows the cover and content of the NSHE Strategic Planning Framework. The cover features the Nevada System of Higher Education logo, the title 'Strategic Planning Framework', and a photo of graduates. The content includes the NSHE Mission Statement, NSHE Values, NSHE Vision, and NSHE Goals.

NEVADA SYSTEM OF HIGHER EDUCATION

Strategic Planning Framework

Approved by the Board of Regents in February 2023

NSHE Mission Statement

The mission of the NSHE is to provide higher education to the citizens of the state at an excellent level of quality consistent with the state's resources.

It accomplishes this mission by acquiring, transmitting, and preserving knowledge throughout the region, nation, and world.

The System provides an educated and technically skilled citizenry for public service, economic growth and the general welfare contributes to an educated and trained workforce for industry and commerce, facilitates the individual quest for personal fulfillment, and engages in research that advances both theory and practice.

NSHE Values

In serving the students who come to us for postsecondary education...

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NSHE Vision

One system. Worlds of opportunities.

NSHE Goals

1. Increase **access** to higher education.
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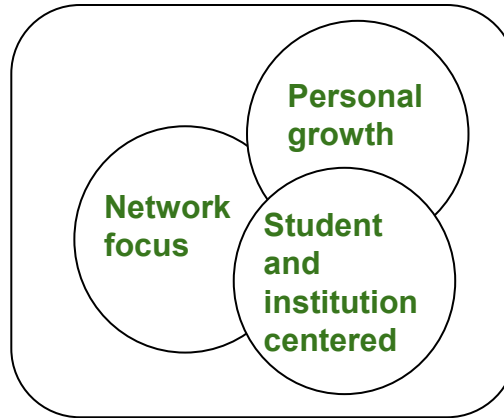


Realities of Existing Challenges

- ❑ Public confidence in higher education is very low
- ❑ Federal Funding sources are changing, slowing, disappearing
- ❑ Politicalization of higher education areas
- ❑ Increased focus on workforce development and career orientation
- ❑ Institutional mergers, closings, etc.

Commiserating to Collaborating

- ❑ How we convert challenges into opportunities?
- ❑ What you said you wanted to accomplish....
- ❑ Stay true to values



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Success Stories (Panel and Speed networking)

What are some successes (outcomes)? What has made it a success (resources)?

What are the common challenges facing programs?

What expertise/experience do you bring to the table that would benefit needs within the network?

10:00 – 10:50 PANEL – Programs, Practices and Partnerships that Promote Mentorship, Cultures of Support and Research Integration in NSHE

10:50 – 11:00 Break

11:00 – 12:00 Speed Networking Event – Getting to know About NSHE Programs and adding to post-its

Discussion Prompts: *Also see worksheet*

- What program did you enjoy the most?
- What components of the program were most interesting to you? And why?
- Think about a program that identified a challenge- what were the barriers?
- (*Pertinent for Speed Networking*) Examples of (1) Tiered mentorship (2) Interdisciplinary research (3) practices that are supportive of inclusion.
- (*Pertinent for Speed Networking*) Challenges and successes related to (1) Tiered mentorship (2) Interdisciplinary research (3) practices that are supportive of inclusion.
- What expertise/experience do you bring to the table that would benefit needs within the network?

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October 8, PM session

1- 1.45pm: Characteristics of Excellence in Undergraduate Research (COEUR) - A Roadmap: Building Excellence in Undergraduate Research

1.45-3pm: From Guidance to Growth: Defining Tiered Mentorship and Mapping Needs and Assets

3.15-430pm: Mentorship at the Margins: Building Projects Where Inclusion and Collaboration Meet

430-5pm: Reflection and looking forward - to Day 2

Characteristics of Excellence in Undergraduate Research (COEUR) - A Roadmap: Building Excellence in Undergraduate Research



You can download the full *Characteristics of Excellence in Undergraduate Research 2.0* including the characteristics and supporting chapters as a PDF for free. [Visit the CUR store](#) to access it. You do not need to be a CUR member, but you will need to create an account to download it.

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Characteristics of Excellence: a roadmap

Campus mission and culture

Institutional commitment, Scholarly faculty, Faculty commitment, Broad disciplinary participation, Accessible opportunities for undergraduates, Integration with other engaging and high-impact opportunities, Strategic planning

Administrative support

Internal budgetary support, Startup funding, Faculty load credit for supervising undergraduate research, Reassigned time for research-related tasks, Undergraduate research administrative support, Travel and other student funding, Research grants office

Research Infrastructure

Physical and virtual research space, Instrumentation and equipment, Library resources, Computational resources, Other research resources, Research oversight structures, Support, administrative, and technical staff

Professional development opportunities

Research leaves, Research training opportunities, Non-research-related professional development, Mentorship training

Recognition

Promotion and tenure guidelines, Salary review, Campus awards, Prominent publicity for research accomplishments

External funding

Faculty Research Funding, Institutional funding for research

Dissemination

Peer-reviewed publication, exhibition, and performance; Presentation at professional meetings, Student research conferences, On-campus symposia

Student centered issues

Opportunities for early and sustained involvement, Establishing and communicating expectations, Developmentally appropriate expectations and intellectual ownership, Community of student scholars, Peer mentoring and teamwork, Expansion and integration of student research opportunities

Integration into the curriculum

Research-supportive curricula, Additional training opportunities and workshops, Student course credit for research and other compensation, Requiring undergraduate research

Summer research programs

Research-supportive teaching calendar, Faculty compensation, Student compensation, Student housing and access to facilities and student services, Student programming, Summer research symposia, Coordination among multiple programs, Hosting visiting students

Assessment

Assessment of student learning, Program assessment and evaluation



Characteristics of Excellence: a roadmap

TAKE AWAYS- (see worksheet)

1. Panel
2. Speed Networking
3. AM facilitator presentation

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Reflect, Share, Discuss

See worksheet Part 3



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COEUR: *Theory to Practice*

Integration into the curriculum

Research-supportive curricula, Additional training opportunities and workshops, Student course credit for research and other compensation, Requiring undergraduate research

Examples

Course-based Undergraduate
Research Experiences (CURE)

Honors Thesis

Senior Research Requirement

First Year Research Courses

Introductory Biology Inquiry Lab

Research Methods Courses

Research Designated Courses

Transcript Designation

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COEUR: *Example 1*

Interdisciplinary teams: Comparative Religion, Philosophy, Psychology, Geology, Classical Studies- Rivers, Societies and Geopolitics

Need: Introduce First Year Honors students to interdisciplinary research

Structure & Resources:

Two term FY Research course.

A faculty learning community ran in parallel to the course Support:
Center for Teaching Excellence, Honors, Undergraduate Research
Office

Timeline: Three academic terms

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COEUR: *Theory to Practice*

Student centered issues

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Examples

Scaffolded Programming
Empower Student Skill Building
Leadership Opportunities
Peer Mentoring
Team Discovery Approach

COEUR: *Example 2*

Tiered Mentorship

Need: manage workload and provide opportunity for undergraduates

Structure & Resources:

- Structured peer mentored teams and group meetings that promoted collaboration, teamwork, and leadership.
- Students received intentional instruction in all areas.
- Department developed evaluation rubric
- 1-2 novice students + 1 experienced student per team.
- Project proposals, notebooks, and reports were all collaborative.



COEUR: *Theory to Practice*

Professional development opportunities

Research leaves, Research training opportunities, Non-research-related professional development, Mentorship training

Examples

CURE Faculty Learning Community

Research Lecture Series

Communicating Research Workshops

Research Skills Workshops

Mentor Trainings & Workshops

Career Readiness

CUR Webinars, Resources, Workshops

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COEUR: *Example 3*

Culture of Support - MIRIC

Need: Sustained support for faculty development of CUREs

Structure & Resources:

- Group of “Mentors” and “Mentees”
- Monthly Large group meetings (JC, IDEAS)
- Monthly smaller, topics-based “affinity groups”
- Sharing of practices, challenges, resources, accountability

Timeline: Runs annually September-April

Sign up on [MIRIC website](#) (part of CUR)

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COEUR: *Example 4*

Culture of Support - Graduate Students

Need: Graduate Student Professional Development

Structure & Resources:

- Workshop series
- Conducted by ORU director
- Required readings, presentations, worksheets and discussions
- Promoted through Graduate School

Timeline: One semester, every two weeks, 4 workshops

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From Guidance to Growth: Defining **Tiered Mentorship** and Mapping Needs and Assets

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Reflection questions

Who is a mentor?

What does a mentor do?

Why do we develop mentoring relationships?

Think back to this morning - what makes mentoring relationships successful?



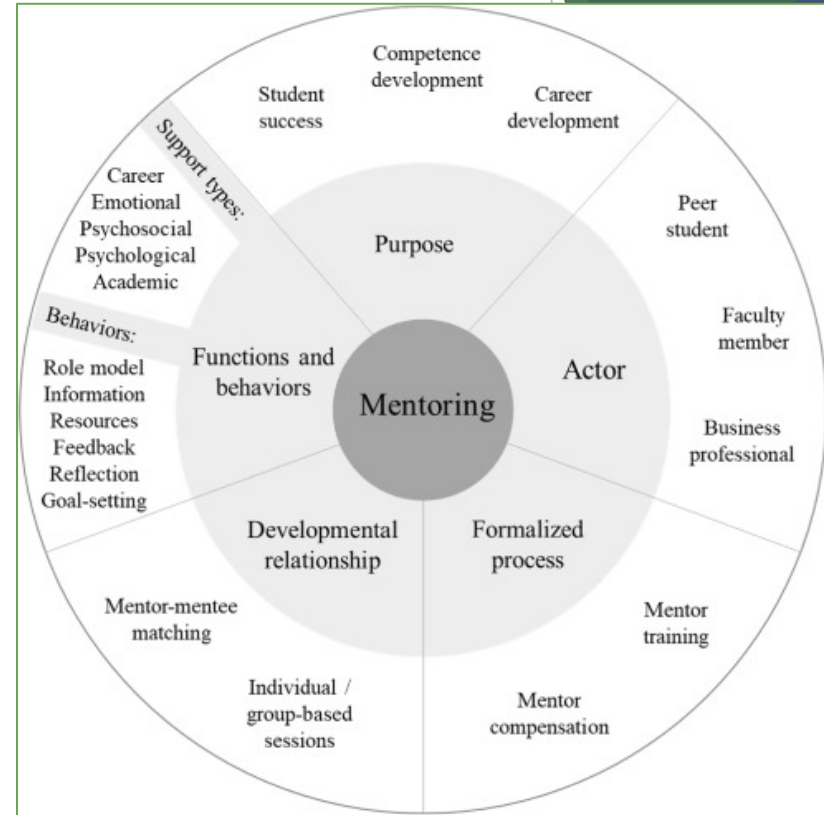
Consider a definition

“Mentoring is a personal and reciprocal relationship in which a more experienced (usually older) faculty member acts as a guide, role model, teacher, and sponsor of a less experienced (usually younger) student or faculty member. A mentor provides the mentee with knowledge, advice, counsel, challenge, and support in the mentee’s pursuit of becoming a full member of a particular profession”

Mentoring framework

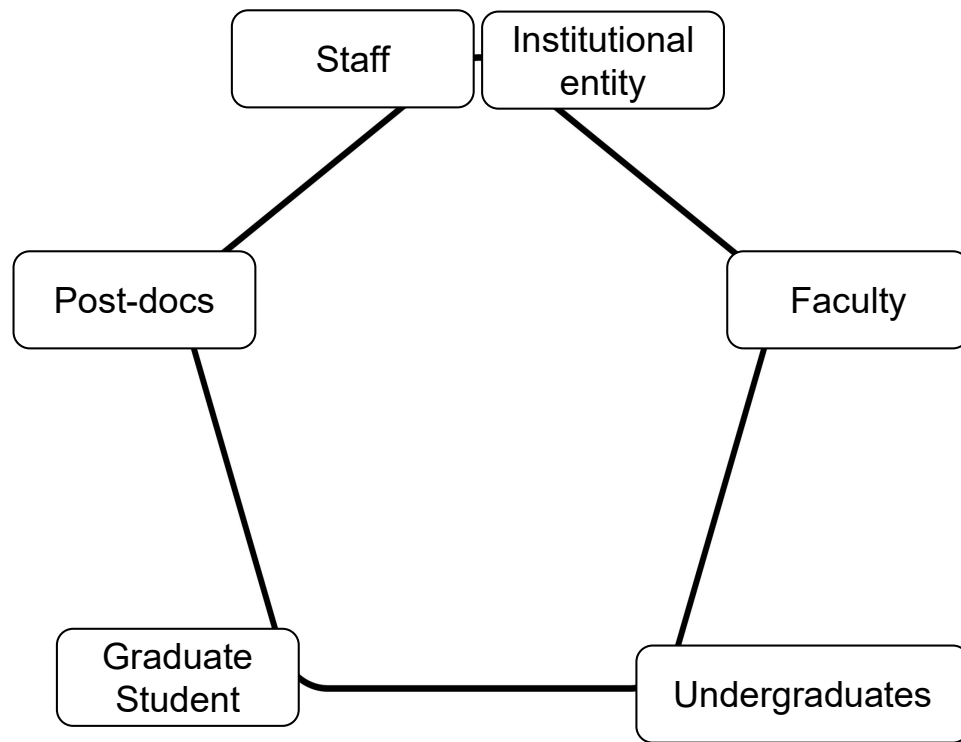
Note:

1. Types of support
2. Cross-cutting characteristics
3. Differing roles
4. Structures & processes





What is Tiered Mentoring?



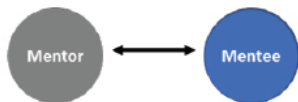
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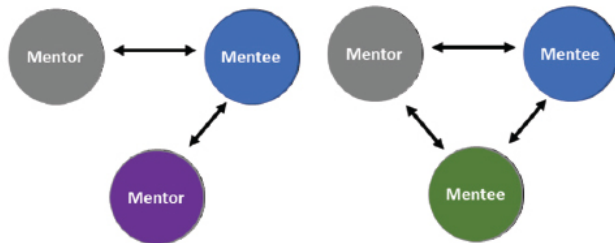
<https://www.alamy.com/nevada-state-usa-map-glowing-silhouette-outline-made-of-stars-lines-dots-triangles-low-polygonal-shapes-communication-internet-technologies-concept-image502345874.html>



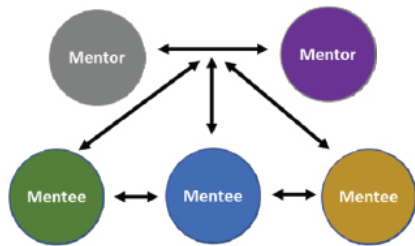
A. Dyad



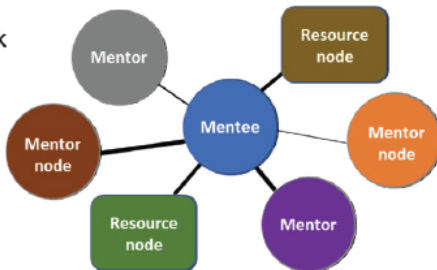
B. Triads



C. Collective or Group



D. Network



What are the advantages of:

Near peer mentors?

Multiple mentors?

Mentors at different career stages?

<https://nap.nationalacademies.org/read/25568/chapter/6#76>



What are the outcomes- i.e how would the structure and its work benefit your work, your institution, your network?

Tiered Mentoring- *Vertically Integrated Projects*

Vertically Integrated GEM3 Approach

Education through Vertically Integrated Projects (VIP)

Faculty, postdocs, PUI faculty

- Engage in team science and collaboration
- Mentoring graduate and undergraduate students
- Teaching courses with GEM3 elements
- Lead summer research experiences

Graduate Students

- Mentoring undergraduates
- Team science and collaboration on research
- Developing and teaching GEM3 modules for undergraduate courses
- Cross-training in labs/methods
- Internships with stakeholders

University undergraduates

- VIP courses
- Summer research experiences
- Mentoring peers
- Internships with stakeholders
- VIP Ambassadors

PUI and graduates

- Labs with GEM3 modules
- Summer research experiences

Statewide-GEM3
Team Leadership

GEM3 Science
Objective

Core Team
Faculty
Postdocs
Grads
Undergrads
PUI Bridge Faculty

Summer
Research Experience
Undergrads

External Partners
Industry
Agencies
Tribal Entities

Workforce and Professional Development Training

Faculty and postdocs

- Mentor training
- Pedagogical training
- Team science and collaboration skills
- Career mapping and individual development plans
- Proposal development training
- Collaborative working groups

Graduate students

- Mentor training
- Team science and collaboration skills
- Career mapping and individual development plans
- Proposal development training
- Interdisciplinary working groups
- Training in creative theorizing and problem solving

Undergraduates

- Mentor training
- Career mapping and individual development plans
- Authentic research experiences
- Internships
- Training in creative theorizing and problem solving

Compare to VIP (Vertically Integrated Projects)

[https://www.vip-
consortium.org/](https://www.vip-consortium.org/)

Examples:

[University of Arizona](#)

[Kennesaw State University](#)





Mentoring Goals for NSHE

1. Establishment of new mentor- mentee relationships across multiple levels (tiers)
2. Career development of diverse, aspiring future scientists and educators through mentorship
3. Creation of sustainable tiered mentorship approach across multiple levels (high school, PUI, undergraduate, graduate, scientist)

What do you need for the development of mentorship infrastructure on NSHE campuses for support of faculty and students to engage in research?

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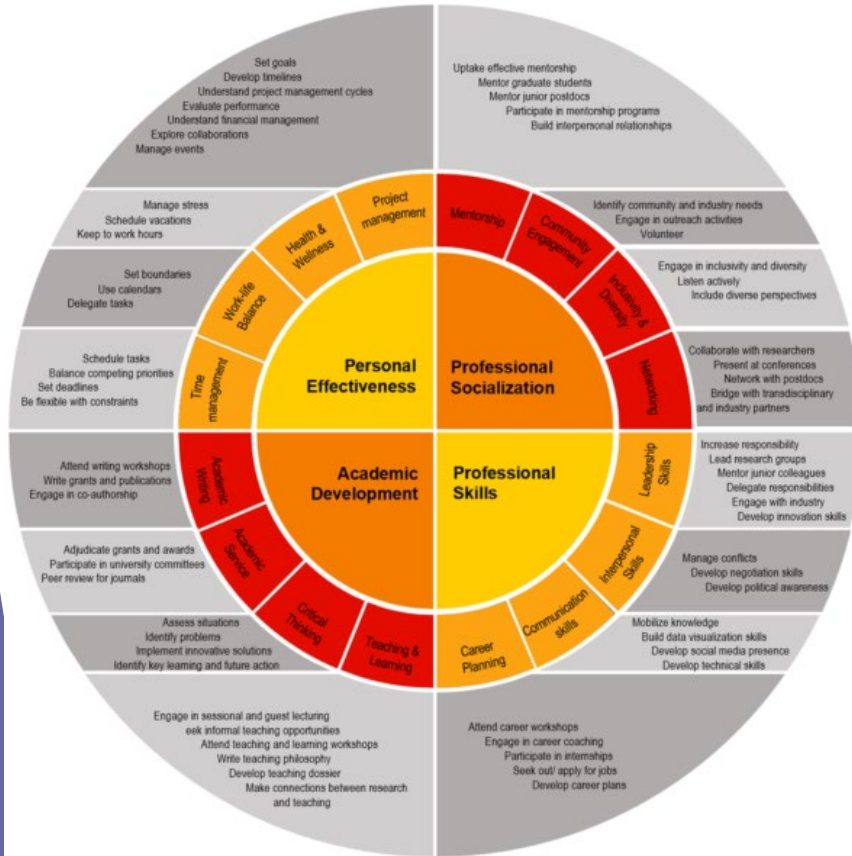
Achieving Excellence

How do you evaluate success?

How do you know if successful?

How do you know when to change course?

Frameworks for mentorship



Nowell, 2021 <https://doi.org/10.1108/SGPE-10-2020-0067>



Wendy Nuis, et al Conceptualizing mentoring in higher education: A systematic literature review, Educational Research Review, 2023, <https://doi.org/10.1016/j.edurev.2023.100565>





The comprehensive researcher development framework (CRDF): Core learning outcomes for research training.

1. Foundational Disciplinary Knowledge
2. Practical and Cognitive Research Skills
3. Ethical and Responsible Research Practices
4. Research Communication Skills
5. Interpersonal Research Skills
6. Researcher Self-Beliefs and Attitudes
7. Knowledge and Skills to Pursue a Research or Research-Related Career
8. Knowledge and Skills to Administer and Manage Research Projects and Teams

Branchaw, 2025. doi.org/10.1371/journal.pone.0332587

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Frameworks for Research



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john.willison@adelaide.edu.au

Researchers...

Curious
Facts
of
Research

- Embark & Clarify**
Respond to or initiate research and clarify or determine what knowledge is required, heading ethical, cultural, social and team (ECST) considerations.
- Find & Generate**
Find and generate needed information/data using appropriate methodology.
- Evaluate & Reflect**
Determine and critique the degree of credibility of selected sources, information and of data generated. Metacognitively reflect on processes used.
- Organise & Manage**
Organise information/data to reveal patterns and themes, and manage teams and research processes.
- Analyse & Synthesise**
Analyse information/data critically and synthesise new knowledge to produce coherent individual/team understandings.
- Communicate & Apply**
Discuss, listen, write, present and perform the processes, understandings and applications of the research, and respond to feedback, accounting for ethical, cultural, social and team (ECST) issues.

Table 1: Researcher Skill Development Framework

A conceptual framework for the explicit, coherent, incremental and cyclic development of the skills associated with researching. ©Willison & O'Regan, August 2008/October 2015

← supervisor instigated

↔ researcher instigated

→ discipline leading

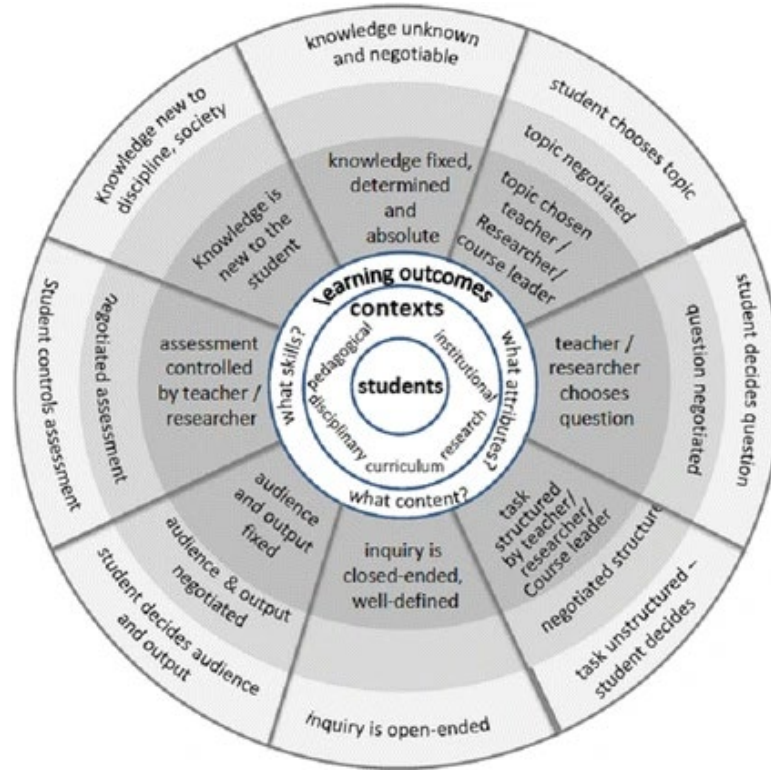
	Prescribed Research Level 1	Bounded Research Level 2	Scaffolded Research Level 3	Self-initiated Research Level 4	Open Research Level 5	Adopted Research Level 6	Enlarging Research Level 7
	Highly structured directions and modelling from supervisor prompt the researcher(s) to ...	Boundaries set by and limited directions from supervisor channel the researcher(s) to ...	Scaffolds provided by supervisor enable the researcher(s) to independently...	Researchers initiate and supervisor guides.	Researcher(s) determine guidelines that are in accord with discipline or context.	Researcher(s) determine others' agendas.	Researcher(s) enlarge the field of inquiry.
Respond to questions/ tasks provided explicitly. Use a provided approach to clarify questions, expectations and ECST issues.	Respond to questions/ tasks implicit in directions. Choose from several provided structures to clarify questions, expectations and ECST issues.	Respond to questions/ tasks generated from instructions. Choose from a range of provided structures or approaches to clarify salient elements including ECST issues.	Generate questions/aims/ hypotheses framed within structured guidelines. Anticipate and prepare for ECST issues.	Generate questions/aims/ hypotheses based on experience, expertise and literature. Delve into and prepare for ECST issues.	Identify previously unstated gaps in literature and articulate research directions and ECST issues in response to gaps.	Articulate research directions that expand or direct the field and anticipate the corresponding ECST issues.	
Collect and record required information/data using a prescribed methodology from a prescribed source in which the information/data is clearly evident.	Collect and record required information/data using a prescribed methodology from prescribed source(s) in which the information/data is not clearly evident.	Collect and record required information/data from self-selected sources using one of several prescribed methodologies.	Collect and record self-determined information/data, choosing an appropriate methodology based on structured guidelines.	Collect and record self-determined information/data, choosing or devising an appropriate methodology.	Synthesise others' methods to formulate novel methods/methodologies or apply existing methods to novel applications.	Generate new methods/methodologies that are used widely.	
Evaluate sources/ information/data using simple prescribed criteria to specify credibility and to reflect on the research process.	Evaluate sources/ information/data using a choice of provided criteria to specify credibility and to reflect on the research process.	Evaluate information/data and inquiry process using self-selected sources related to the aims of the inquiry. Reflect insightfully to improve own processes used.	Evaluate information/data and the inquiry process using self-generated criteria based on experience, expertise and the literature. Renews others' processes.	Evaluate information/data and inquiry process using self-determined criteria developed within structured guidelines. Refines others' processes.	Evaluate information/data and inquiry process using self-generated criteria based on experience, expertise and the literature. Renews others' processes.	Generate substantial research outcomes, so that ideas, practices or interpretations are cited/implemented by others.	Generate substantial research outcomes, so that ideas, practices or interpretations become foundational in field or discipline.
Organise information/data using a choice of given structures. Manage a process provided (with pre-specified team roles).	Organise information/data using a choice of given structures. Manage a process which has alternative pathways (and specify team roles).	Organise information/data using recommended structures. Manage self-determined processes (including team function) with multiple pathways.	Organise information/data using self or team-determined structures, within supervisor's parameters.	Organise information/data using self or team-determined structures and management of processes.	Form a research team or a team of community-based practitioners.	Form and develop research networks/communities.	
Interpret given information/data and synthesise knowledge into prescribed formats. Ask emergent question.	Interpret several sources of information/data and synthesise to integrate knowledge into standard formats. Ask relevant, researchable questions.	Analyse trends in information/data and synthesises to fully integrate components specified. Ask rigorous, researchable questions.	Analyse information/data and synthesizes to fully integrate components, consistent with parameters set. Fill knowledge gaps that are stated by others.	Analyse and create information/data to fill researcher-identified gaps or extend knowledge.	Synthesise others' concepts or interpretations to frame novel outcomes. May also address substantial concerns of a community.	Develop new concepts or interpretations that expand the field or discipline. May also address substantial concerns across communities.	
Use prescribed genre to develop and demonstrate understanding from a specified perspective. Apply to a similar context the knowledge developed. Follow prompts on ECST issues.	Use discipline specific language and prescribed genre to develop understanding, and demonstrate it to a specified audience. Apply to different contexts the knowledge developed. Clarify ECST issues.	Use discipline specific language and genres to demonstrate scholarly understanding for a specified audience. Apply the findings to diverse contexts. Specify ECST issues that emerge.	Use appropriate language and genre to address gaps of a self-selected audience. Apply innovatively the knowledge developed to a different context. Probe and specify ECST issues in each relevant context.	Use appropriate language and genre to extend the knowledge of a range of audiences. Apply innovatively the knowledge developed to multiple contexts. Probe and specify ECST issues that emerge broadly.	Change the conversation within the discipline/field through publicly available communication of knowledge/understanding. Articulate and promote relevant ECST issues.	Change the direction of the conversation across disciplines/fields. Articulate and promote ECST issues that were previously unstated.	

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<https://www.adelaide.edu.au/melt/university-learning>



Framework for UR pedagogy





Common Features

1. Trans-disciplinary
2. Establish **focus areas** for instruction and assessment
3. **Align expectations** across stakeholders and constituencies
4. **Make expectations transparent** for all involved
5. **Understand how researchers develop** across programs



Reflect, Share, Discuss

What resources and assets do you already have?

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Mentorship at the margins: *Building Projects Where Inclusion and Collaboration Meet*

Group 1: Faculty, Staff

Group 2: Student, Postdoc, Staff

- ☐ Evaluation with Meghan
- ☐ Discussion with facilitators- *Part 5*



How do the goals of NSHE align with current roles and future career aspirations? *Grads, post docs, Staff*

Teaching

- Establishment of new mentor- mentee relationships across multiple levels (tiers)

Research

- Career development of diverse, aspiring future scientists and educators through mentorship

Career Aspirations

- Creation of sustainable tiered mentorship approach across multiple levels (high school, PUI, undergraduate, graduate, scientist)



How do the goals of NSHE align with faculty responsibilities of Teaching, Research, & Service?

Teaching

- ❑ Establishment of new mentor- mentee relationships across multiple levels (tiers)

Research

- ❑ Career development of diverse, aspiring future scientists and educators through mentorship
- ❑ Creation of sustainable tiered mentorship approach across multiple levels (high school, PUI, undergraduate, graduate, scientist)

Service

Interdisciplinary Team Goals

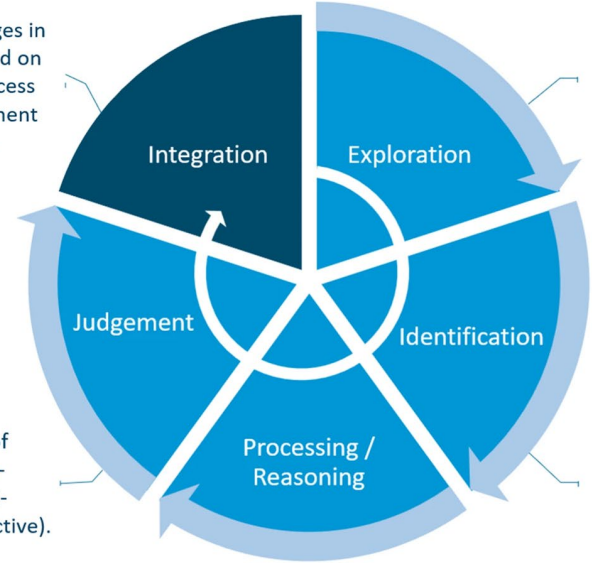
What are the considerations for mentoring interdisciplinary teams?

1. Develop approaches to team activities & shared responsibilities
1. Encourage cross-discipline information and exchanges
1. **Create opportunities for Team Science**

Learning Model: Reflective Sense-making

Temporal changes in inferences based on iteration of process in the development of judgements.

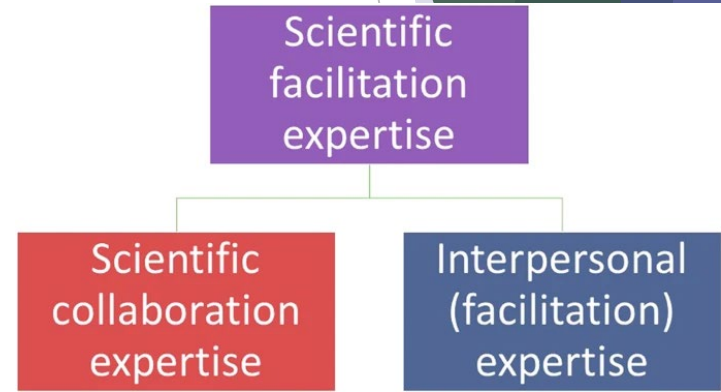
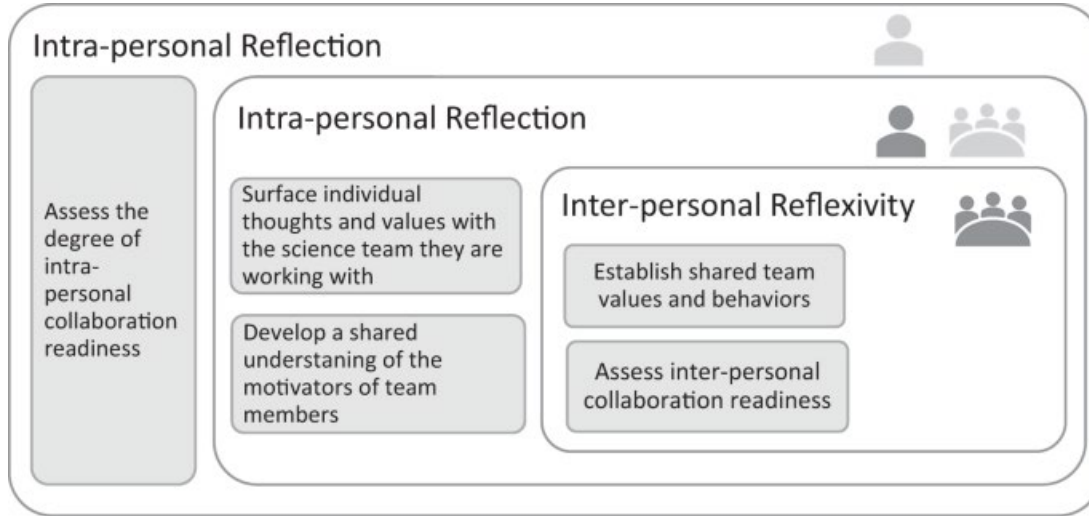
Process of discovery; providing evidence of curiosity, drive.



Interpretation of knowledge (pre-reflective, quasi-reflective, reflective).

Focusing in on what is important to the individual.

Building Effective Teams



Lotrecchiano, G.R., Bennett, L.M. & Vovides, Y. A framework for developing team science expertise using a reflective-reflexive design method (R2DM). *Humanit Soc Sci Commun* 10, 810 (2023). <https://doi.org/10.1057/s41599-023-02298-2>

Cravens, A.E., Jones, M.S., Ngai, C. et al. Science facilitation: navigating the intersection of intellectual and interpersonal expertise in scientific collaboration. *Humanit Soc Sci Commun* 9, 256 (2022). <https://doi.org/10.1057/s41599-022-01217-1>

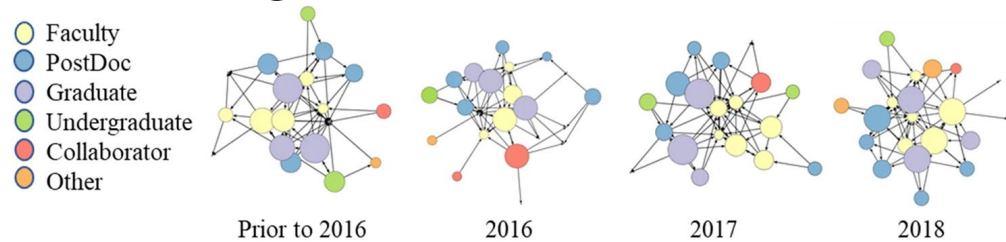
Effective Culture of Support Goals

How do you build mentoring environments that support inclusive culture?

1. Establishing mechanisms for communication between all team members for feedback & assistance
2. Developing pathways for communication with outside groups
3. Opportunities for junior scientists and researchers to broaden professional networks
4. **Developing junior researchers into independent investigators**

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Mentoring trains future scientists.



Each circle or node represents a person on the team. The nodes are sized by outdegree to show who reported receiving mentorship. Node size indicates how many mentors an individual reported, and arrows indicate nodes that served as mentors.

Love, H.B., Cross, J.E., Fosdick, B. et al. Interpersonal relationships drive successful team science: an exemplary case-based study. *Humanit Soc Sci Commun* 8, 106 (2021). <https://doi.org/10.1057/s41599-021-00789-8>



Critical Features of Effective Teams

- Psychological safety.
- Clear and meaningful goals.
- Not just the right people or collective intelligence, but how they interact and development opps.

Duhigg Ch (2016) What google learned from its quest to build the perfect team-The New York Times.

Woolley AW, Chabris CF, Pentland A, Hashmi N, Malone TW (2010) Evidence for a collective intelligence factor in the performance of human groups. *Science* 330(6004):686–688.

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“our major implications of our findings:

(1) interactional and contributory expertise are intertwined;

(2) team size, tacit knowledge gained from previous project, and interdisciplinary knowledge were used to effectively and efficiently train scientists;

(3) the team increased scientific productivity through interpersonal relationships; and

(4) the team fulfilled the land grant mission of the University by integrating teaching/training, research/discovery, and extension/engagement into the team’s activities.”

Love, H.B., Cross, J.E., Fosdick, B. *et al.* Interpersonal relationships drive successful team science: an exemplary case-based study. *Humanit Soc Sci Commun* 8, 106 (2021). <https://doi.org/10.1057/s41599-021-00789-8>





YOUR PROJECT IDEAS

(From Part 5 of worksheets)

LIST TBD



430-5: Reflection and looking forward - to Day 2

- ❑ Select “projects” that meet network needs (from Part 5)
 - ❑ *Consider that this work will be presented at the 2026 event*
- ❑ Participants affiliate with “project groups”

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October 9, 2025

8:30 am – 8:50 am

Debrief & Launchpad: Mapping the Mentoring Path to MI2026

8:50 am – 9:30 am

Achieving **Excellence in Research Mentorship** with Collaboration & Inclusive Culture

9:30 am – 10:00 am

Aligning Resources to Vision: Leveraging Resources to Achieve Undergraduate Research Mentorship with Collaboration & Inclusive Culture Excellence

10:15 am – 11:15 am- *Include time for sharing with the purpose of feedback*

Blueprints & Timeline for Impact: Advancing Communities of Practice through Mentorship with Collaboration & Inclusive Culture

11:15 am – 11:45 am

Vision to Reality: Preparing for a Transformative Mentoring Institute 2026 – Establishing 1 Year Outcomes

11:45 am – 12:00 pm

The Final Bite: Reflections, Evaluations, and Continued Dialogue

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Debrief & Launchpad: Mapping the Mentoring Path to MI2026

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NSHE Values

In serving the students who come to us for postsecondary education...

1. We strive for **Equity** in access and outcomes for all.
2. We pride ourselves on **Excellence** in our work.
3. We work in **Collaboration** across teams, institutions, and communities.
4. We recognize that **Innovation** improves our ability to serve.
5. We expect **Accountability** from all leadership, faculty, staff, and students.
6. We embrace a culture of **Inclusion** where every individual belongs.

NSHE Goals

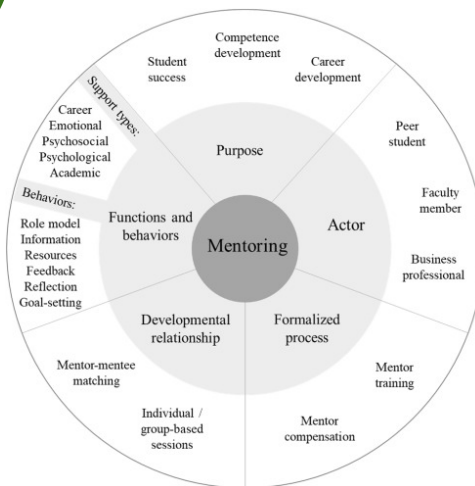
1. Increase **access** to higher education.
2. Improve student **success**.
3. Close institutional performance **gaps**.
4. Meet **workforce** needs in Nevada.
5. Increase solutions-focused **research**.
6. Ensure system **coordination, accountability, and transparency**.

HDRFS Broadening Participation Plan components



COEUR2.0

Characteristics of Excellence in Undergraduate Research



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MI 2026

YOUR PROJECT IDEAS

(From Part 5 of worksheets)

LIST

Achieving **Excellence** in Research Mentorship with Collaboration & Inclusive Culture

Aligning Resources to Vision

Part 6: Developing your collaborative project- Worksheet

Your Collaborative Project Title:

Purpose/Goals

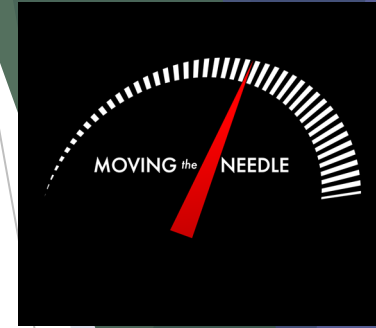
What are the outcomes you envision?

What is your deliverable as a group, for the 2026 meeting?

Who will participate- Names/Institutions/Departments; Identify leads/co-leads for the project

What resources will be needed (Time, Personnel, Materials, etc)

How often will you meet? What do you hope to accomplish at each meeting?



Blueprints & Timeline for Impact:

Advancing Communities of Practice through Mentorship with Collaboration & Inclusive Culture

Vision to Reality: Preparing for a Transformative Mentoring Institute 2026 – Establishing 1 Year Outcomes

PART 7: Feedback on Work plan, Retool, Submit

Each group makes brief presentations on their project, its timeline and deliverables
Obtain feedback, and retool as needed

A work plan for each community of learners/ community of practice is submitted to workshop organizers. Identify leads and co-leads for each group.

11:45 am – 12:00 pm

The Final Bite: Reflections, Evaluations, and Continued Dialogue

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RESOURCES

Also see [worksheet](#)

SPUR

SCHOLARSHIP AND PRACTICE OF UNDERGRADUATE RESEARCH

The Journal of the Council on Undergraduate Research

How Research and Mentorship Shape STEM Paths for
Community College Students

Online Student Engagement in Social Science Research
Laboratories: Expert Advice on the Opportunities and
Challenges

Undergraduate Research Benefits Student and Faculty Skills
and Retention

Supporting Undergraduate Researchers with Teacher-Mentors

Training Postgraduates for Inclusive and Effective
Undergraduate Research Mentorship



COUNCIL ON UNDERGRADUATE RESEARCH

IN THIS ISSUE OF

SPUR

SCHOLARSHIP AND PRACTICE OF UNDERGRADUATE RESEARCH

The Journal of the Council on Undergraduate Research

Introduction—Mentorship Best Practices in
Undergraduate Research Scholarship and
Creative Inquiry

Editorial—How Did I Get Here?

Commentary—Building Strong Mentorship
Ecosystems to Support Positive URE Student
Outcomes

Commentary—Mentoring Undergraduates
to Engage with the 'So What?' of Scholarly
Inquiry

Entering Mentoring

MENTOR CURRICULA: Entering Mentoring



The curricula, called *Entering Mentoring*, is for mentors of research trainees. It was originally developed for mentors across science, technology, engineering, mathematics, and medicine (STEMM) disciplines at different career stages, working with undergraduate and graduate students, postdoctoral fellows, and junior faculty.

Our mentor training materials are designed for those who wish to implement process-based, professional development workshops for research mentors. You may choose one of our complete, pre-assembled curriculum packages or build your own customized curriculum to meet your needs.

The *Entering Mentoring* curricula series addresses the new [NIGMS guidelines](#) ² regarding the preparation of mentors involved in training grants.

Themes and Concepts:

- Aligning Expectations
- Articulating Your Mentoring Philosophy and Plan
- Assessing Understanding
- Cultivating Ethical Behavior
- Enhancing Work-Life Integration
- Fostering Independence
- Fostering Wellbeing
- Maintaining Effective Communication
- Promoting Mentee Research Self-Efficacy
- Promoting Professional Development
- Reflecting on Diversity & Establishing a Practice of Inclusion
- Enhancing Cultural Awareness*

View the list of learning objectives from the curriculum [here](#) ²

*To access this module, please complete this [application form](#) ²

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