

MENTORING UNDERGRADUATE RESEARCHERS

Challenges & Best Practices

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Challenges of Mentoring Undergrad Researchers

- **Expertise is needed to conduct scholarly work:** reading research literature, knowing how to synthesize results, using a foreign language, applying for IRB approval, following lab protocol, etc.
- **In some disciplines, research is a solitary endeavor**
- **What happens if you lose a student-researcher who leaves the university or just drops motivation/interest in the work?**
- **Students with an overwhelming number of other responsibilities cannot always make research a high priority**

Addressing the Challenges is Imperative

Mentored UR
opportunities
increase
students'
understanding
and
confidence

In an NSF survey of undergrad researchers,

- 88% reported increased understanding of how to conduct a research project
- 83% said their confidence in their research skills increased

(Russell, Hancock & McCullough, 2007)

Faculty mentors report extensive learning gains by students who engage in UR

- Collecting data
- Relating well to people of different backgrounds
- Collaborating with other researchers
- Understanding & synthesizing research literature
- Formulating a hypothesis
- Designing a study
- Analyzing data
- Orally presenting results
- Thinking creatively and independently
- Learning a topic in depth
- Applying knowledge to real-world situations
- Demonstrating proficiency in lab techniques
- Working independently

Cox & Andriot, 2009; Kardash, 2000; Lopatto, 2003; Zydney et al., 2002

Mentoring Matters

Student-researchers report that *personal relationships* (with other students & mentors) are the most important elements of their research experience.



(Falconer & Holcomb, 2008)

Mentoring Matters

**Relationships with
mentors are
emphasized over
learning gains by
student-researchers**



(Falconer & Holcomb, 2008)

To learn and grow significantly
from their research experiences,
students require a strong
mentor relationship.

(Guterman, 2007)

Mentoring \neq Teaching



Teaching

Communicating

- knowledge
- principles
- theories
- methods

of our disciplines

Mentoring

Communicating those principles, theories, and methods, but also conveying

the everyday experiences

of working in our disciplines

Teaching

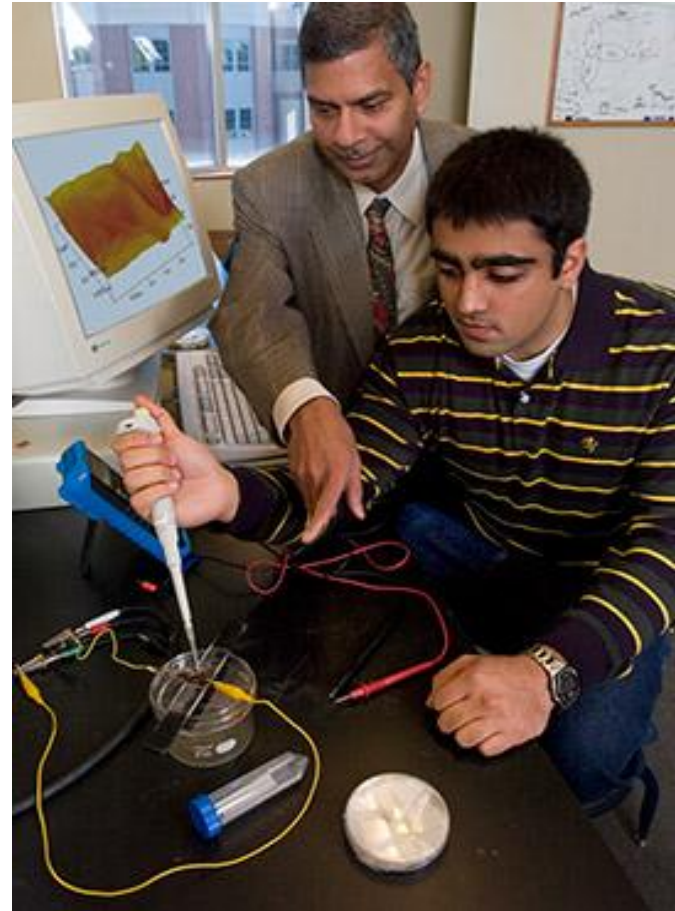
Communicating

- **knowledge**
- **principles**
- **theories**
- **methods**

of our disciplines

The need for effective research mentoring is more critical than ever before

Student-
researchers have
to evaluate an
**increasing
amount of
information** and
learn to use
**constantly
changing
technologies**



The need for effective research mentoring is more critical than ever before

Current
cohort of
students is the
most diverse
in history





Historically,
universities have
shown little interest in
formal mentoring.

Homogeneity
enabled fairly easy
enculturation

(González, 2006)

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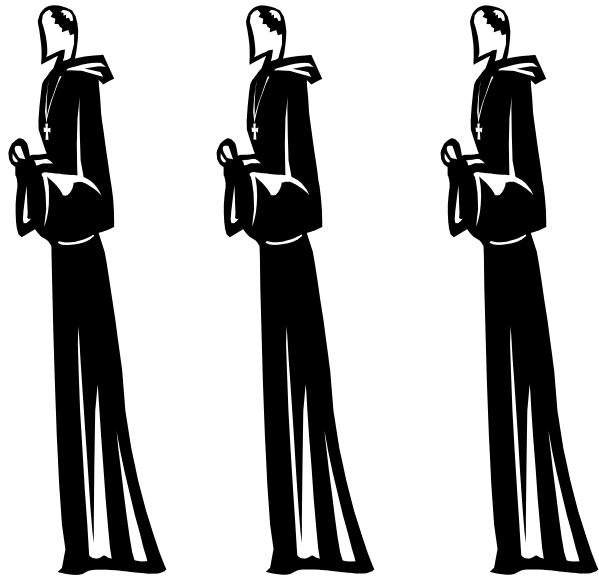
(González, 2006)



What do UR mentors have in common with medieval monks?

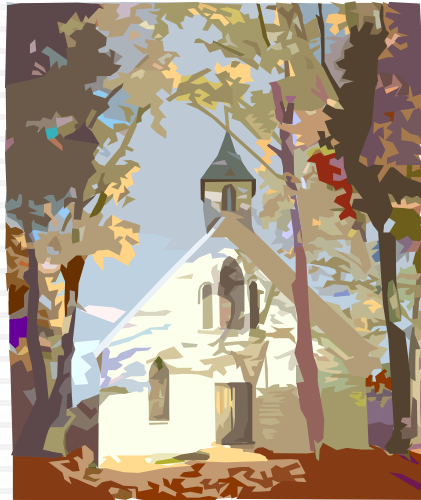


Cristina González and her student, Christopher Flesoras, found that medieval churches (Roman Catholic and Greek Orthodox) used mentoring ***to acculturate new members from diverse ethnic and cultural groups.***



Mentor monks provided **continuity in traditions** and prevented the breaking off of denominations.


Protestantism broke from the model.



And as Gonzáles points out, American universities are predominantly Protestant in origin—
as well as, perhaps, in our approach to mentoring.



How do we effectively mentor students *today* in undergraduate research experiences?



The literature shows significant and particular benefits of mentoring for **women, racial & ethnic minorities, and first-generation college students**, including increased retention & continuing education rates

(Burke, McKeen & McKenna, 1994; González, 2006; Ishiyama, 2007; Whiteley, Dougherty & Dreher, 1991)

Expectations about the mentor's role vary from student to student



But researchers have identified trends in those expectations, particularly regarding the importance of **expertise** versus **socio-emotional support**

(Campbell & Campbell, 2007; Cruz & Crisp, 2010; Ishiyama, 2007)

Mentor Role Expectations (Ishiyama, 2007)

Gives advice about careers & grad school
Guides my research techniques
Listens to my ideas
Helps me find research literature
Stands up for me and works on my behalf

Very Important

Helps me find internship opportunities
Guides selection of my research topic
Listens to my personal concerns
Is my friend

Somewhat Important

Characteristics of a Good Mentor

First-Generation Students

1. **Expert in the Field**
2. Accessible
3. Communicative about Goals & Plans
4. Helpful with Project
5. Personal Concern
6. **Friendly**

Continuing-Generation Students

1. Accessible
2. **Expert in the Field**
3. Communicative about Goals & Plans
4. Helpful with Project
5. **Friendly**
6. Personal Concern

Characteristics of a Good Mentor

Male Students

1. **Expert in Field**
2. Accessible
3. Helpful with Project
4. Communicative about Goals & Plans
5. Friendly
6. Personal Concern

Female Students

1. Accessible
2. Helpful with Project
3. **Expert in Field**
4. Friendly
5. Communicative about Goals & Plans
6. Personal Concern

Utilitarian focus of first-gen students & male students

More frequent use of **personal descriptors** by continuing-gen students and female students

Among all demographic groups, good mentors are described as

- ▣ **experts** in their field
- ▣ **accessible**
- ▣ **communicative** about goals/plans

“Best Practices” of mentoring UR



Nurture Students' Self-Sufficiency

- Include guidelines for the next steps in the research process:

“You might consider answering this question: _____”


“These are the results you have identified so far. Talk me through what’s important here” (Watkins, 2005)

- Encourage—and help prepare students for—presentations and UR publications

(Mabrouk 2009; Shore 2005)

Build Interpersonal Respect and Trust

- Create an open environment for questions and informal conversation
- Cultivate approachability and patience
- Communicate that the students' work is a priority for you
- Provide a physical space for student work and/or set aside office hours specifically for UR consultations

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- Provide precise/direct and timely feedback
 - Offer positive responses: “I like how you approached that problem. Can you discuss your thinking on this one?”
 - Be sensitive to the changing needs of students through the research process

(González, 2006; Watkins, 2005)

Promote Shared Power

- Go beyond advice-giving and knowledge-dispensing: share power by serving as *sponsor* and *advocate*
- Offer responses that remind students that the work is their own; even when students are assisting with your research, be clear about their distinct roles
- Invite students to take risks with ideas and questions within an appropriately “safe” context

(Dolan & Johnson, 2009; Gonzáles, 2006; Shore, 2005; Watkins, 2005)

IT'S CLEAR:

Effective faculty mentoring is crucial to student success in undergraduate research

Conclusions from the Research Literature

Be intentional about your role as a mentor

Be attentive to students' academic, career, and emotional needs

Be empathetic in your feedback

Be giving of your power



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