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

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 ≠ Teaching
Communicating

- knowledge
- principles
- theories
- methods

of our disciplines
<table>
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<th>Mentoring</th>
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| Communicating those principles, theories, and methods, but also conveying the everyday experiences of working in our disciplines | 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

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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.
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

(Ishiyama, 2007)
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

(Ishiyama, 2007)
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
• 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

(Gonzáles, 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
References


