

Mentoring Undergraduate Researchers: Where to begin?

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Workshop for the UW Postdoctoral Association

December 12, 2006



Student Comment

“Having a mentor is great, because it gives you a window into your profession and helps you see what a field is like on the inside before you commit yourself fully to it.”

Introduction

- **Goals of the Workshop**

“A mentor is someone who takes a special interest in helping another person develop into a successful professional.” (National Academy Press, 1997, pp. 1-2)

- **Agenda**

- Phase I: Planning for a Mentee
- Phase II: Integrating the Mentee into the Research Environment
- Phase III: Fostering Growth

Mentoring Scenario 1

- In groups of 3 or so: Take a couple of minutes to introduce yourselves to each other and discuss Mentoring Scenario 1.
 - *If you were the undergraduate student, how would you feel?*
 - *If you were the faculty adviser, what would you do?*
- Pick a spokesperson to share your discussion points with the larger group.

Phase I: Planning for a Mentee

Planning for Mentor Designed Projects

- Identify a project

Elements of a Good Research Project

- Projects should have a reasonable scope
- Projects should be feasible
- Projects should generate data that the student can present
- Projects should not simply include cookbook experiments
- Projects should have built-in difficulties that will be faced after the student has developed some confidence
- Projects should be multifaceted

From: Handelsman, J., Pfund, C., Miller Lauffer, S., and Pribbenaw, C. (2005). *Entering mentoring: A seminar to train a new generation of scientists*. The Wisconsin Program for Scientific Teaching, University of Wisconsin.

Defining the Project

- A good project description:
 - will be understandable for a non-expert
 - will clearly describe what the student will do, and how the project fits into the bigger picture
 - will include number of hours per week, any course prerequisites or required experience, project duration, and oversight
- Consider the level of independence the project requires and design selection process accordingly.
- Identify other resource materials that an interested student may use to prepare for the interview, such as a website or an article.

Selecting a Student

- Project description may be posted on departmental or UW-URP website, or with student support groups such as WISE (Women in Science and Engineering) or NASA Space Grant
- Identify an application process for interested students
 - Use combination of written materials and interview
 - Check references
 - Try to ascertain the level of intellectual independence of the student -- May look at: past accomplishments, extracurricular activities, ask the student what she or he has done that demonstrates intellectual independence, etc.

Some Specifics for Postdocs

- Be part of the hiring process if possible
- If supervising an undergraduate researcher, make sure that faculty sponsor is familiar with student's work and progress
- In case you leave before the mentee, have a plan in place to hand off the student to another mentor
- If student is assigned to you, try to meet with the exiting mentor to debrief; meet with student to re-orient (your style of work and expectations may differ from prior mentor)

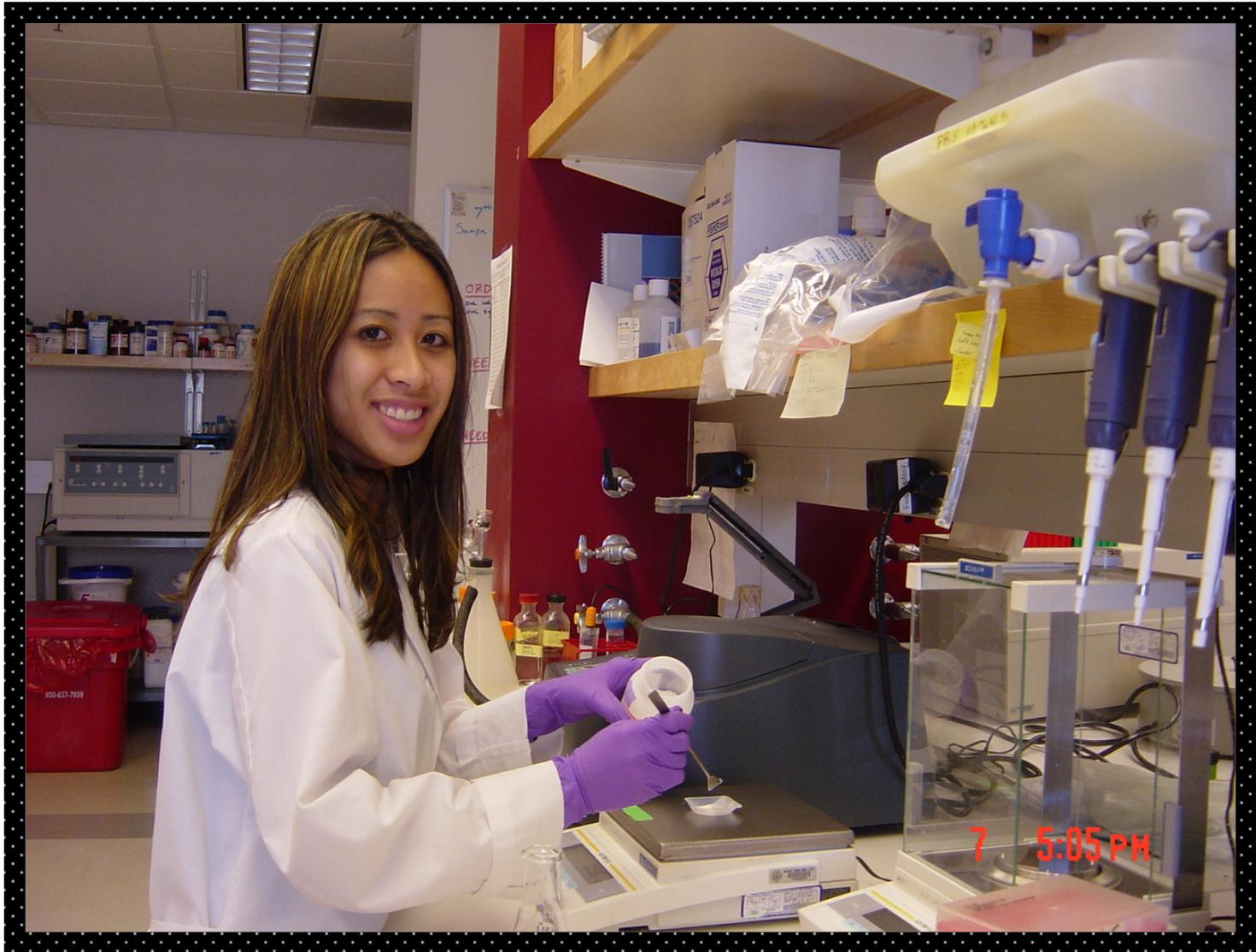
Planning for Student-Initiated Research

Develop a project prospectus together:

- Discuss student's interests and background
- Be sure student is familiar with current research related to their idea (Suggest reading if necessary)
- Develop research question/hypothesis/specific focus and outline approach
- Have student write a project description
- Assist student in applying for Human Subjects Approval, if necessary (See resource list.)

Phase II:

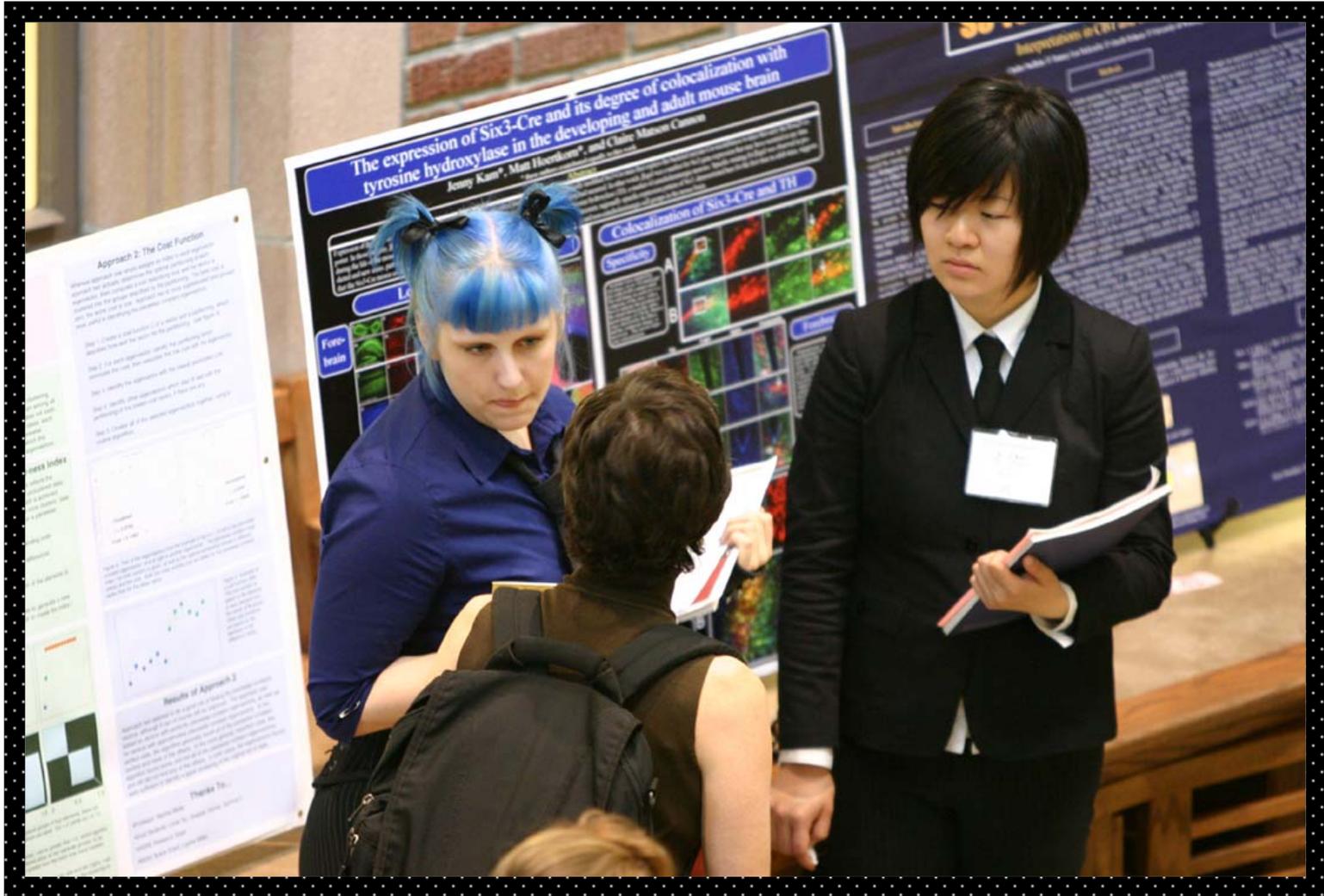
Integrating the Mentee into
the Research Environment



Keep in Mind

- No matter what her/his maturity level or experience, this is an *undergraduate student!*
- Undergraduates have very busy, often rigid, course schedules that *change every quarter*
- Students may need some flex time during peak stress periods—midterms and finals
- Most undergraduate researchers work 7-12 hrs/wk on a research project.
- Most research positions are unpaid; many students opt to receive academic credit (See resource list)
- If there is some limited funding, consider Work Study (See resource list)
- Respect holiday/vacation schedules

The Millennial Generation



Some Generalizations of Millennials

- Seven Distinguishing Traits:

“The Millennial generation has seven distinguishing traits: **special, sheltered, confident, team oriented, achieving, pressured, and conventional.** . . . [W]hile members of Generation X could be described as independent and survival oriented, Millennials may be described as **sheltered and team oriented.**”

- They need the “big picture”:

“Millennial students **have ambitions but no plans, or unrealistic plans to achieve them.** . . . [they] have limited knowledge about their chosen occupations, about educational requirements, or about future demand for these occupations.”

More on Millennials

- They get “stressed-out”:
“Another characteristic that makes the Millennials unique is the amount of pressure they are under. . . . This pressure on students may result in them becoming stressed or depressed”
- Don’t diagnose but be aware that there are resources available on campus, such as the Counseling Center (See resource list).

Millennials and Diversity

- They're ethnically diverse:

“According to Cornett-DeVito and Reeves (1999), empathy has been identified as a key skill in effective intercultural communication. Advisers should also illustrate ‘behavior flexibility toward students from different cultures. . . . In addition to competent advisor-advisee role negotiation and basic rapport building, advisors need to expand their knowledge of other cultural groups’ (Keeling, 2003, p. 35).”

More on Diversity

- “Many mentors find it challenging to work with students whose personalities differ from their own. Some find cultural differences awkward; some wonder whether their students experience a different lab environment from the one they experience. Some have never thought about any of these issues (Handelsman et al., 2005, p. 67).
- “Understand the diverse factors that influence students’ mentoring needs,” such as gender, sexual orientation & gender identity, race and ethnicity, disabilities, being from another country, age, family responsibilities, prior work experience and career aspirations, and socioeconomic background (From *The Graduate School Faculty Mentoring Guide*, pp.16-32).

Expectations

- Clarify expectations (remember: your student may not have held a job before)
- You can establish from the outset what work habits are important to you and the project, such as showing up when expected and procedures for informing you if she/he can't come in as planned, following through on project work, and maintaining a neat work area.
- Ask questions, share ideas
- No cookbooks: gaining insight through failure
- Devise a work plan
- Information on awarding academic credit (See resource list.)

Student Comments

Advice from an undergraduate researcher:

“Enter your research experience with a plan. Work with your research mentor to form such a plan and realize how much work it will take to successfully carry out that plan. Don't just go through the motions to check off the "I worked in a lab" box. Also, make sure you do some reading on the field before you get fully involved.”

Orientation

- Introduce student to resources, including people and equipment
- Determine training needs and how student will go about getting the training (e.g., independent study materials, one-on-one training), how quickly student is expected to master requisite skills, and how student will practice these skills.
- Establish meeting schedule and expectations for progress reports
- Discuss/identify milestones of success
- Discuss intellectual property issues

Phase III: Fostering Growth



Keep Communications Open

- Be sure that students regularly report to you or your designee to:
 - Discuss her/his progress and recognize accomplishments;
 - Ask questions; and,
 - Review resources and documentation of research
- Check-in regarding coursework, stress level, and address frustration with progress of research.

Student Comments

“At the Eureka stage, one has a great idea, something to work with or work from to accomplish a task; but, as we all know, research isn't always so straightforward - it takes time, effort, and a little bit of luck to take an idea from conception to product.”

Personal Interaction Tips

When you meet your mentee, especially for the first time, you should:

- Make direct eye contact
- Be enthusiastic
- Introduce them to your lab and your lab mates
- Acquaint them with the building
- Get them started on a lab notebook
- Talk about the “big picture”
- Discuss lab policies
- Discuss the mentee’s background
- Get to know your mentee

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Student Comments

“My mentor is such a bright and intelligent person, who is enthusiastic and passes that enthusiasm along to me in a big way.”

Entering the Research Community

- Opportunities for interacting with other researchers
 - Lab meetings
 - Lectures
- Presenting at conferences
 - The UW Undergraduate Research Symposium, May 18, 2007 (Submission deadline: February 23rd)
 - Other conferences (See resource list.)
- Funding opportunities for undergraduate researchers, (e.g., Mary Gates Research Scholarships) (See handout and resource list.)
- Publishing

Student Comments

“My research mentor has given me such a more solid foundation in social science statistics and social research processes than I previously had and I am much more capable of seeing the connections between research and funding, how to make stories compelling through numbers and stats. This goes a long way in social service work!”

Student Comments

“I've learned a lot about the entire research process, such as submitting applications to perform the research, obtaining data, analyzing it, and then putting it all together to share with others. My mentors helped me so much in doing all these things and explaining things I didn't understand.”

“My research mentor is amazing and he has offered to let me work with him and one other woman on a paper after my graduation, which is very exciting.”

Student Comment

“When I initially returned to the UW in 2002, I was terrified by the thought of undergrad research, but through my own curiosity and passion, I overcame my fear and found my life's direction. By working with my mentor, I have solidified the area of biology that I will continue to research through graduate school (invasion biology). She has provided guidance and has increased my ability to think critically about the multitude of ways invasives can affect entire ecosystems. All of this (curiosity, passion, critical thinking, etc) all will be invaluable aids and tools for my future.”

A significant investment that brings rewards. . .

- Good mentoring requires an investment of time and effort; time up front saves time in the long run
- Benefits of mentoring
 - Undergraduate student projects are exploratory in nature; high risk/high gain; real potential for contribution and meaningful collaboration
 - Help mentor a student early in academic career—help define interests
 - Mentoring undergraduate researchers is close to a teaching role; can help mentor gain insight into undergraduate student experience; valuable experience as you apply for faculty and research positions.



Final Thoughts

- You don't need to have all the answers—utilize resources
- Contact URP with questions/concerns
- Encourage mentees to visit URP
- Subscribe to the URP Listserv for monthly updates
(<https://mailman1.u.washington.edu/mailman/listinfo/urplistserv>)