

## Initial Suggestions for Supervising and Mentoring Undergraduate Research Assistants at Large Research Universities

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Undergraduate students attending large research universities often have the opportunity to participate in the design, conduct, analysis, and dissemination of research initiated by faculty, postdoctoral fellows, and graduate students. To date, guidelines for the conduct of this specific type of relationship – that of an academic researcher to an undergraduate research volunteer in a large team-based research laboratory – remain absent from the peer-reviewed education literature. The Boyer Commission on Educating Undergraduates in the Research University recently called for further integration and depth of experience for undergraduates into the research process. Although not impossible, in order for large research universities to respond, it is necessary to act in a strategic and well-planned manner. Included are specific suggestions for success in facilitating this relationship within the context of a large, research-oriented university department.

Undergraduate research is on the rise, as is the presence of undergraduate research posters and papers at national conferences (Kierniesky, 2005; Palladino, Carsrud, Hulicka, & Benjamin, 1982). The benefits of mentored research include greater understanding of a research topic, social and personal growth, and acquisition of skills for future employment (Miller, 2002). However, much of the published literature regarding mentored undergraduate research is based on the assumption that this relationship consists of one-on-one relationships where students conduct independently-initiated research projects under the supervision of a faculty mentor (e.g., Gibson, Kahn, & Mathie, 1996; Hunter, Laursen, & Seymour, 2007; Page, Abramson, & Jacobs-Lawson, 2004; Spilich, 1997). At large research institutions this type of research mentorship arrangement occurs infrequently, as faculty members generally direct that type of focused attention towards graduate students and postdoctoral fellows (Bettencourt, Bol, & Fraser, 1994; Wood, 2003).

Within departments at large research institutions, it is often the graduate students and postdoctoral fellows, themselves academic apprentices in training, who mentor and supervise undergraduate research assistants (Carsrud, 1984; Dooley, Mahon, & Oshiro, 2004; Killeen, 2001; Merkel, 2003). For new supervisors and mentors, this responsibility can understandably be an area of weakness or self-doubt (Schuh & Karukstis, 2004). To date, while guidelines for the conduct of the mentoring and supervisory relationship between the academic researcher and the undergraduate research assistant may be available (e.g., via department

websites, individual lab policies, and procedures manuals), such suggestions remain absent from the peer-reviewed education literature. Considering the increase in undergraduate research, specific suggestions for mentoring and supervising undergraduate research assistants at large research institutions are timely and have high practical value. Here we outline specific recommendations for use by researchers – graduate students, postdoctoral fellows, and faculty members – who aim to provide high-quality mentorship and supervision when working collaboratively and in a team-based fashion with undergraduate research assistants.

For some readers, the information provided here may be considered standard procedure. In other settings, graduate students and postdoctoral fellows may not have a set of guidelines to direct and mentor undergraduate research assistants (herein referred to as URAs), and some research laboratories have neither formalized expectations nor provided orientation as to what is expected in terms of mentoring and supervising (Schuh & Karukstis, 2004). The suggestions provided here are aimed at new supervisors and mentors, such as postdoctoral fellows and graduate students who may be thrown, sometimes unexpectedly, into the role of mentor without significant previous experience. These suggestions are based, to the extent possible, on the literature that exists as well as the combined knowledge and experience of the authors, who have supervised and mentored well over 300 undergraduate researchers across five large psychology research laboratories. What follows are specific suggestions for the integration and maintenance of URAs.

## Suggestions for Successful Integration of URAs into Research Laboratories

### *Interviewing and Orienting Potential URAs*

We ask potential URAs to bring a copy of their résumé to the initial interview. A résumé request may be novel and can serve as an opportunity for a potential URA to create a résumé on which the interviewer can provide feedback on the content or format. We also instruct interviewees to bring an unofficial copy of their academic transcript, schedule for the term, and a brief statement (bullet points acceptable) discussing the reasons why they are interested in joining the specific project (e.g., How do you see this experience fitting in with your undergraduate education? What are your future career goals? What skills would you most like to develop and why?). At times, this request may overwhelm students. In such cases, direct them to the campus writing or career development centers for help. For students unwilling or unable to complete this task, it is a useful indicator for both the student and the researcher that this laboratory is unlikely to be a good match.

During the initial 15 to 30 minute interview, the supervisor/mentor provides an overview of the research project, the structure of the research laboratory, and expectations of the URA (see “Informed Consent” section below). We encourage students to ask questions at any point throughout the interview in order to encourage informed consent and to model methods of professional communication. It is critical, based on our experience, to spend time going over students’ course, activity, and work schedules to determine a realistic estimate of how many hours they can reasonably commit. This discussion can serve as an informal contract, increasing the likelihood that lab responsibilities will be carried out, including attendance at lab meetings (Monte, 2001).

It is also valuable to question potential URAs about their own career aspirations, research interests, and the reasons why they have chosen to pursue work in this research laboratory specifically. If students’ interests are a better match with another research lab, we try to facilitate an interview with that lab. For students appearing to fit well with the laboratory, create a file for the documents that they brought for the interview and the supervisor’s notes about students’ goals and research interests. Other documents – interim evaluations, copies of the written work produced during the course of the term – can be added later. Eventually, this information can be used to help form the basis of a recommendation letter, if requested.

We find that the interview process is an integral part of having a well functioning research laboratory. First, it sets a precedent of organization and

thoughtfulness and communicates expectations for students’ work within the research laboratory. Second, it allows URAs to have personal, one-on-one contact with their future supervisor/mentor. With a steeper initial hurdle, we hope to send the message that the position of URA is important and that this job requires that the student exhibit professional behavior. Thus, this interview structure provides a framework for the undergraduate research experience to be viewed as a desirable, beneficial, and challenging opportunity.

### *Informed Consent Regarding Expectations of Student*

We advocate informing potential URAs of the possible drawbacks of the laboratory (e.g., more independent work than they may be accustomed to, the sometimes chaotic nature of the laboratory), and asking them to think seriously about whether joining the laboratory is a realistic option at this time. It is essential that the potential research assistant know what to expect before committing to a research laboratory (Mickley, Kenmuir, & Remmers-Roeber, 2003). Of course, during the process of conducting research, there are often unexpected hurdles that arise. One can orient potential URAs reasonably well as to what will happen.

It is practical to provide a syllabus, or a detailed written description of URA responsibilities, the role and responsibilities of the supervisor/mentor, tips for success, and even information regarding letters of recommendation to be written at the close of time with the project. For example, some students pursue undergraduate research with the intention of gaining research experience in the lab of a highly regarded researcher, hoping to garner a recommendation letter from that person. It is easier to make recommendation letter expectations clear and in writing from the outset. The syllabus can be reviewed during the interview process and then signed if students decide to join the lab. This type of informed consent is valuable, not only in terms of increasing the students’ understanding of what they are committing to, but when expectations are spelled out clearly and up-front, it is likely to increase URAs’ compliance to their duties (Monte, 2001). Scisney-Matlock and Matlock (2001) write that failed mentorship relationships occur when expectations are unclear from the outset (i.e., both the student’s expectation of the mentor/supervisor and vice versa).

### *Confidentiality Considerations*

When URAs work directly with research participants, particularly those with physical or mental disorders, the importance of training in confidentiality cannot be overemphasized. We have each student sign an explicit confidentiality form which is kept in his or her file. Creating a roundtable discussion of participant

confidentiality among the URAs and the higher level researchers can be a good way to address this issue at the very outset of new URA participation. At this discussion, we address procedures for what to do if someone recognizes a research participant from “real life,” with whom students can discuss any potentially distressing experiences that they encounter and any additional concerns the URAs might have.

#### Suggestions for Successful Maintenance of URAs in Research Laboratories

##### *Recognize that “the Cream Rises to the Top”*

Schneider (2002) suggests that undergraduate research allows all types of students to thrive in the research environment, including those who do not readily display their academic talents in a traditional classroom setting. In settings where there are a large number of URAs, “the cream rises to the top.” Mickley and colleagues (2003) designate seasoned URAs, (those who have remained in the same lab for a long period of time, learned beyond the basic laboratory tasks, and who are positive role models), an official lab position: Senior Laboratory Associates. Accordingly, we promote our senior URAs into supervisory roles and provide opportunities to conduct complex tasks (i.e., data analyses, poster presentation preparation) and to participate in projects of direct benefit to the URA (i.e., empirical articles, posters). One method for garnering URA supervisory experience is to pair them with one or two less senior URAs. Senior URAs can orient the newer students or serve as project managers (see “Specific Projects Assignments” section below). In addition to providing senior URAs with supervisory experience, this hierarchical model functions to reduce graduate student, postdoctoral fellow, and faculty supervisory burden.

##### *Individual URA Meetings*

Some researchers meet individually with their URAs every week regarding the students’ performance, professional progress, and goals. This would be ideal; however, for most researchers supervising more than one or two URAs, this high level of involvement is not possible. End of term or mid-term individual meetings, generally lasting 20 to 30 min, work well and are appreciated by undergraduates. During this meeting, constructive feedback is given regarding URAs’ performance. It is more effective to frame feedback in a way that is behaviorally specific and descriptive rather than more broad and trait descriptive (e.g., “It is difficult for others to complete their hours when you miss your scheduled appointments with them,” versus “It seems that you are not motivated and don’t care

about this research project.”). Following feedback, one should assess how URAs’ impressions fit with their personalized feedback. These individual meetings can also include a discussion of students’ long-term goals (e.g., planning for post-graduate job or graduate school applications). Individual professional development goals are made for the next meeting. A list of these goals is kept in each URA’s file for discussion or revision at subsequent meetings.

It is useful to elicit feedback from URAs about their experiences. Individual meetings are a time when URAs are asked about their impressions of the research project. For example, a supervising researcher might elicit specific feedback about what operational aspects of the project work best and what work less well in regards to both the overall study and delegation of tasks, particularly the tasks assigned specifically to them. It is important that the supervising researcher ask and receive this feedback in a non-defensive manner that displays a genuine interest in URAs’ responses, demonstrating a sincere desire to run the research project as smoothly as possible. We have found that many students find the individual meeting to be one of the most enriching parts of their research experience because of their chance for reflection and summarization, in addition to individual and specific feedback, which is rare in a large university setting. Feedback from URAs is also advantageous to the researcher, as there may be potential problems with the administration of the project that researchers would not be aware of without these frank conversations about day-to-day operations.

##### *Specific Project Assignments*

There are a number of different types of tasks and projects that occur in a research laboratory, varying by area of study. We find that when one URA or a small group of URAs (rather than all URA members of the research team) are responsible for a specific task or project, the task is more likely to be completed in a timely manner with fewer errors. Further, based on our combined experiences, this also appears to be related to a greater sense of mastery by the URA(s). One of the authors, a graduate student supervisor of URAs, routinely assigns projects to URAs that are within reach in terms of students’ demonstrated abilities. The supervisor sets up a weekly 30 to 60 min meeting where the URA(s) and the researcher work collaboratively on the particular project. At the end of the weekly project meeting, she assigns specific goals to the student(s) to complete before the next meeting. This method works effectively, not only in terms of keeping the URA(s) on task, but also keeping the supervising researcher from avoiding aversive or difficult tasks. An additional useful step is to designate the URA or small group of

URAs with an official title (e.g., “Eating Behavior Study Participant Coordinator,” “Alcohol and Sexual Behavior Literature Review Group”). A title allows for social identification by research supervisors and labmates and increases the likelihood of the URA being given “credit” for responsibilities because roles are more clearly delineated.

### *Tracking Projects Efficiently*

During these weekly project meetings, we find it useful to take notes (in the body of an email) of meeting accomplishments (minutes), specific task assignments and goals for the following week (action items), and sometimes long-term calendar goals (e.g., “paper introduction due November 20”). This email is sent at the end of the meeting to all relevant parties. Regarding project email correspondence, it is useful to designate a specific subject title to be used in all email interactions regarding the specific project (e.g., “Re: Ethics Paper: Ursula, Mychal, & Jo”). Dated meeting minutes in email form allow for faster sorting of project materials in a cluttered Inbox and for a rapid review of what was discussed and accomplished during the last meeting.

### *Regular Team or Lab Meetings*

We suggest that URA research teams meet often, weekly for 1 hour, to discuss both individual and overall project progress and goals, as well as to impart information (content knowledge, administrative updates) to the undergraduates and enhance the sense of team membership. One of the most difficult aspects of organizing a larger meeting like this one can be scheduling. It is useful to have a copy of all the URAs’ schedules represented visually, in a calendar or spreadsheet format, to ease this process. In fact, it can be one URA’s role to serve as “Meeting Administrator,” engaging in duties such as gathering schedules, finding a meeting time that fits for all relevant team members, sending meeting reminders noting the location and time, drafting and sending the agenda, and taking minutes.

Providing a meeting agenda for all attendees produces clear meeting expectations and helps focus the discussion, a quick list on a white board is sufficient. As part of the agenda, each URA provides a brief individual update on the progress of his or her specific project, including problems encountered and progress made. Information about problems encountered provides other URAs with helpful information, should they have the same difficulties on the same or a different project. Problem discussion may also prevent other students from repeating work, thereby enhancing overall lab efficiency.

If weekly individual or small group meetings are occurring, then a brief summary of each project by the mentor or a URA will suffice, thus allowing more time to emphasize the educational content of the specific project and other major findings in the field that provide the broader research context. During the didactic segment, we cover various topics. URAs vote from a list of topics which are based on the knowledge of the meeting facilitator. It can also be useful to provide a discussion series with invited guest speakers (such as members of the university community from outside the lab), on planning for work or graduate school admissions, on topics related to the specific area of the project, or on other topics of interest indicated by the students.

### *Inclusion of the Sponsoring Faculty Member*

As previously discussed, URAs at large research universities may not have exposure to the lead research faculty member in the laboratory, and are more likely to interface with graduate student or postdoctoral fellow “middle managers.” Therefore, it is recommended that the lead faculty member meet at least once or twice per term with the team of URAs. The goal of this meeting is twofold. First, this meeting allows the faculty member to become better acquainted with the undergraduates who are carrying out his/her research each day. Second, this meeting provides the undergraduates with exposure to a faculty member in an environment where they might ask questions or request that the faculty member share his/her views on certain topics of professional interest to the students (e.g., research, teaching, graduate school admissions). Additionally, regular faculty involvement increases the chances of the student obtaining a letter of recommendation from the faculty member, either co-signed or individually signed by the research faculty, because the faculty member knows the student on a more individual level. These meetings can also take the form of celebrations of the collective accomplishments of URAs. Celebration meetings create a relaxed atmosphere for the faculty member to answer questions, give specific or general advice to the students, and thank students in person for the students’ contributions to the work of the lab. This is a good format for the faculty member to genuinely recognize that each URA is truly an integral part of their research team.

### Summary and Discussion

A common mission at large research universities is to create an educational environment that benefits undergraduates and simultaneously allows the research-oriented faculty, postdoctoral fellows, and graduate

students to conduct high-quality research programs with important scientific and social implications (Gonzalez, 2001). These aims fit well with those regarding mentored research outlined by Neidhardt (1997), which include engaging students in guided learning while also aiding in the research, teaching, and professional growth of the mentoring researcher. However, some have concluded that the benefits cited for the undergraduate research experience are not feasible at a large research university (Schneider, 2002). Based on our own experiences, we argue that this is not the case. We have found, using the suggestions outlined above, that URAs and researchers accrue a number of benefits despite the overall lack of availability of faculty one-on-one mentoring for students at the undergraduate level. These benefits, however, are specific to large, team-based research laboratories and this model does not necessarily apply to smaller one-on-one laboratory settings.

The Boyer Commission on Educating Undergraduates in the Research University (Kenny, 1998, 2002) recently called for further integration and depth of experience for undergraduates into the research process. Although not impossible, in order for large research universities to respond, it is necessary to act in a strategic and well-planned manner. It is our hope that these suggestions will serve as a starting point for further discussion of practical suggestions related to effectively integrating undergraduates into research within large research-oriented departments.

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