# THE
# LEADERSHIP ALLIANCE

## Mentoring Undergraduates in Summer Research Programs

A companion guide for the Leadership Alliance
Summer Research - Early Identification Program

The Leadership Alliance is an academic consortium of institutions of higher learning, including leading research and teaching colleges and universities. The mission of the Leadership Alliance is to develop underrepresented students into outstanding leaders and role models in academia, business and the public sector.

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## *INTRODUCTION*

The Leadership Alliance is a consortium of institutions of higher education dedicated to improving the participation of underrepresented students in graduate school. Our flagship program is the Summer Research-Early Identification Program (SR-EIP) in which undergraduates work for eight to ten weeks under the guidance of a faculty mentor at one of our twenty-one research sites.

The purpose of the SR-EIP is to foster and support students in scholarly and scientific research endeavors to help them view the academy as a positive environment in which they might pursue advanced academic training. SR-EIP participants attend the Leadership Alliance Symposium, which brings together about 300 undergraduates to present the results of their summer research projects to a national audience of peers, faculty and members of the private and public sectors.

More than 2000 undergraduates have completed the SR-EIP since the program began in 1993. To date, more than 60% of the SR-EIP students who have completed their undergraduate studies have enrolled in graduate programs, and of that group, 23% have enrolled in PhD programs and 3% in MD/PhD programs.

The Leadership Alliance recognizes the importance of faculty who serve as mentors and the valuable contribution they make to support students during the summer. Students judge their summer research experiences primarily by their interaction with their mentors. Thus, the role of the faculty mentor in a short-term

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summer research program is crucial to the program's success. This brochure is designed to assist the faculty mentor to understand the purpose of the SR-EIP and the expectations of their summer interns.

Faculty members usually choose to mentor because of a commitment to the ideals and goals of scholarly research. They understand that a successful mentor-protégé relationship requires a significant investment of time and energy. Because it does not yield an immediate, tangible benefit, some faculty consider the role of a mentor an altruistic endeavor in a short-term summer research program. Although not every mentor-protégé relationship is successful, mentoring has the potential to be an extraordinarily rewarding experience for both parties. We hope this guide will help faculty and students make the most of this opportunity to learn, share and teach one another.

*From a mentor:*

*"I think career counseling is the most important take-home lesson. Very few students have a realistic understanding of what a scientist does for a living as compared to other professions such as a doctor, dentist or shoe salesman. Within a short time after rotating in the lab, they will be making decisions about attending graduate school, or not. I hope they get a glimpse of this and other career paths that one can take with a Ph.D. I hope they see how the job changes over time and are somewhat better informed and therefore more confident that this is what they want to do for the next forty years of their lives. I do hope they see frustration and failure and learn whether they need instant gratification from their work to be satisfied."*

## ROLE OF A MENTOR

Although an eight- to ten-week research experience is brief, there is potential to have a considerable impact on your protégé. One of the key characteristics to a successful mentoring experience is the willingness to guide, instruct and assist students to reach their research objectives. Beyond serving as an advisor or supervisor on a research project, the mentor takes an active interest in the student's academic and professional development as a budding scientist and scholar. The ideal mentor seeks to quickly establish a positive working relationship with the student to promote confidence, student inquiry, focus and discipline. In the SR-EIP, the mentor's responsibilities can be divided into three parts: your role prior to the start of the program, your role upon the student's arrival and your role at the end of the summer.

### Prior to Arrival of the Student

- Assess your student's interests, knowledge and ability. The program administrator should provide you with a copy of your student's application so that you may familiarize yourself with the student's coursework, research experience and interests.

- Develop a tentative project or proposal.

- Contact your student via phone or e-mail to welcome them and discuss the proposed project.

- Provide or suggest some preparatory reading material.

- If your student will be working primarily with a graduate student or postdoc, explain this and provide some information about the person.

- Make sure there is adequate space for your student.

- The summer program administrator on your campus should provide you with information about the expectations of the program and extra-curricular activities so that you are aware of any responsibilities and commitments your student may have.

Recognize that your student may be nervous about meeting you. By contacting your student prior to the beginning of the program, you can begin to put him or her at ease while you learn more about his or her interests and background. Providing information in advance about your area of research will facilitate your student's initiation of a research project. Thorough preparation prior to the beginning of the program will convey a positive message to your new student.

### Upon Arrival of the Student

- Meet with your student during the first week to discuss the project and expectations. Take the time at this initial meeting to clearly define your expectations and make sure the logic and rationale of the project is clear to your student. Develop and adhere to a schedule of regular meetings with your student (and co-mentors, if applicable). Ideally, meetings should occur at a fixed time at least once per week.

- If you are not on campus for a period of time, continue to keep in touch with your student via e-mail or phone.

- Make an effort to get to know your student on an informal basis by sharing lunch at least once over the course of the summer. In addition to developing a more personal relationship, you can use this time to advise your student about graduate school, career options, course selections, etc.

*Integrate your student into your daily activities whenever possible.*

- Talk about various issues associated with choosing and preparing for graduate school and what it means to be a scientist and an academic. Discuss career options with your student and the importance of making the most of his/her remaining undergraduate studies.

- When possible, include your student in some of the day-to-day tasks of your professional responsibilities, i.e., grant writing, staff meetings, data analyses, editing journals, etc.

- Each Leadership Alliance student is expected to make either an oral or poster presentation at the Leadership Alliance symposium at the end of July. Review the presentation data the student will use, and, if possible, help your student prepare presentation materials. If your student elects to give a poster, try to set aside some time at least a week before the symposium to stage a mock poster presentation. If your student is planning an oral presentation, it would be helpful to assemble a small audience to critique it.

Regular communication with your student is a fundamental element of a successful summer research experience. Do not let a week pass without communicating with your student at least once; if you can't meet face-to-face, talk on the phone or send an e-mail. Do not under estimate the value of informal conversation – these can be productive and revealing exchanges. Involving your student in some of your professional activities is an excellent way to convey a sense of academic life.

*Be honest but temper your criticism with kindness.*

## *At the Conclusion of the Program*

- Provide either a written or oral evaluation of the student. (See sample appraisal in the center of this guide.)

- If satisfied with your student's performance, offer to write letters of recommendation.

- Let your student know if you are available for advice and counseling in the future.

- Share your impressions of the student with program administrators, and give them feedback on any suggestions you may have for improving the program.

It is very important for students to receive constructive criticism of their performance during the summer. You may use the sample appraisal form in this handbook as a guide for your comments during the last meeting with your students. Be aware that your comments and suggestions about the program and your experience as a mentor are highly valued by the program administrator and the Leadership Alliance. You are encouraged to submit a copy of your appraisal directly to the Leadership Alliance Executive Office.

## *COMMUNICATING EFFECTIVELY*

Successful navigation of the mentor-protégé relationship requires the establishment of effective communication from the start. As a mentor, you must be sensitive to issues of race, ethnicity, culture, gender and academic preparation.

- Do not make assumptions about prior knowledge by under- or overestimating academic skills and abilities. Regularly encourage your student to speak up if there is something that is not understood, then take the necessary steps to fill in any gaps in knowledge.

- Your student may come from an environment that provides a "hands-on" style of mentoring with very specific direction. The student may be reluctant to admit that he or she is not accustomed to acting independently.

- Do not hesitate to give critical feedback when necessary but temper it with kindness.

- Promptly communicate to program administrators any problem that may arise with your student so they may resolve the issue as quickly as possible.

- Acknowledge that students may have difficulty understanding foreign-born speakers with pronounced accents and assure them that it is okay to ask the speaker to repeat what is not understood.

- Ask your student about his or her hometown. Learning about your student's origins and sharing information about your own will contribute to a mutual understanding.

> *Be a good listener.*

## *MENTORING STUDENTS IN THE SCIENCES*

The culture that surrounds the student doing scientific research often involves working in a laboratory as part of a team. Assessing your student in advance and helping him or her to acclimate as quickly as possible to your laboratory environment will set the stage for a constructive summer.

### *Orientation*

- Use the first week to explain the project, consider relevant background literature and review techniques, including computer software. Make sure your student receives any necessary formal training in laboratory safety, in accordance with your institution's requirements.

*Hold your student to high standards but don't forget he/she is a novice.*

- Develop a tentative schedule for completion of various aspects of the project, and discuss the hours your student is expected to maintain.

- Clearly explain the rules for keeping a laboratory notebook and other lab records.

- Outline your student's role in lab meetings and any other required meetings or seminars.

- Explain the role of the graduate student or postdoc as mentor.

If a postdoc or senior graduate student is assigned to co-mentor and supervise the student, explain this. Make sure the student clearly understands the role of other individuals in the lab. The student should know to whom various questions should be addressed and ought to feel comfortable relying on a lab colleague for certain types of assistance.

Selection of this individual is crucial to the overall experience of the summer intern. Be sensitive to cultural issues and misunderstandings that may occur between summer intern and the postdoc or graduate student. Have the postdoc or graduate student become familiar with the philosophy and goals of the SR-EIP by sharing this brochure and your views about mentoring under-graduates.

### Formulating a Research Project

- It is essential that students are supplied with some materials to familiarize them with your field of research as well as your lab's research goals and techniques prior to arrival. Continue to encourage them to read relevant materials that arise during the course of the summer.

- Your student should conduct work that relates to a specific aim of the research goals of your lab. Identify a project with a clearly definable goal and scope that can be reasonably attained within the span of eight to ten weeks.

- Whenever possible, include your student in the formulation of the underlying hypotheses and expected outcomes of the experiments. Make sure students are thoroughly trained in the appropriate set of techniques and understand their relevance to the project.

- It is important that your student understands the project's relevance to the broader scientific goals of the lab, as well as the lab's overall contributions to its scientific field. This can be discussed in regular meetings with the student while reviewing his/her progress in the lab or the assigned literature.

- Do not assign a project that depends on a single technique, given the possibility that the technique may not work.

- You should anticipate alternate approaches or parts of the project to assign to your student in the event that he or she becomes stuck on the original assignment. Considering alternatives in advance will help ensure that the student has a meaningful lab experience and relatively little "downtime."

### Asking Questions

It is essential that your student learns how to ask questions that will yield a greater understanding of the work conducted in your lab. Suggest that your student write down questions and bring them to share during regular meetings.

- Stress the importance of asking appropriate questions, particularly during critical periods, in order to move the research forward.

- Strive to create an atmosphere that makes a student feel empowered to ask questions, and reassure your student that it's okay to ask all kinds of questions. Do not make him or her feel inferior while learning to formulate better questions. There is no such thing as a "bad" or "dumb" question, particularly in research!

- Do not hesitate to ask hard questions of your student but do not forget that he or she is still a novice in your discipline and may lack some basic academic preparation.

*Methodologies*

Discuss various methods of scientific investigation with your student. Keep in mind that students with limited research experience may not be familiar with diverse methods of inquiry.

- Ask students explicitly about research methods they may have used in the past and question them about their understanding of methods they will use in the summer program.
- Cite examples of the kinds of methods and techniques that can be used to address research questions.
- Instructing a student in laboratory techniques should include an explanation of the techniques, not simply a demonstration.

## MENTORING STUDENTS IN THE HUMANITIES AND SOCIAL SCIENCES

Summer research in the humanities and social sciences is distinctly different from laboratory-based research experiences. Because of the independent nature of the research, students need to clearly understand the expectations inherent in this environment. Some social science research environments (e.g., those that involve administering surveys or running subjects through research protocols) share some similarities with laboratory-based research environments, so you may find some helpful suggestions in the previous section.

> *Clearly articulate your expectations at the beginning of the program.*

*Orientation*

Research in the humanities and social sciences is often conducted in libraries, going through primary and secondary sources and sorting through information that may yield potentially interesting data. It entails significant amounts of time spent on one's own, wrestling with the

research question, writing and interpreting data. Keep in mind the following suggestions for preparing and supporting students as they work independently.

- At the initial meeting, work with your student to develop a research plan that includes short-term and long-term goals as well as a timeline for completion of the work.

- Inform your student realistically about how frequently you will be able to meet with them and when. If you have a heavy travel schedule or will be away for a significant length of time, make sure the student is aware of this. Provide ways to ensure the student can continue to receive feedback while you are away, e.g., via e-mail or phone calls.

- Tell students that it is their responsibility to contact you if they need anything. Remind them that independent, self-directed work often defines humanities and social sciences research but it does not mean that they should not seek help if they are confused or unsure about the direction of their research.

- Discuss the resources that are available to the student as he/she pursues independent research during the summer. Mention the services offered in university libraries and explain the roles of archivists, reference librarians, information technology experts, database managers and curators. You may wish to encourage the student to make arrangements to meet with these professionals.

- Let your student know how often you will provide feedback and be explicit about the level of criticism to expect (detailed and extensive vs. sparse).

- Discuss the level and the amount of writing that is expected over the course of the summer, and let him or her know the number of drafts you expect.

### *Defining a Research Project*

Students may arrive with a specific research project in mind or they may simply have a broad interest in the field. You must help the student define a project that is realistic within the given time frame of the research program but will also allow the student to be introduced to the depth and breadth of the available literature.

- Listen carefully to the student's perspective about the kind of research they wish to pursue over the summer. Ask the student to share an article or essay as an example of the work he/she would like to do. Question your student about familiarity with the available literature to help you gauge his or her knowledge of the field.

- If appropriate, discuss ways in which race, gender, sexual orientation, ethnicity, socio-economic status and other characteristics help to expand the types of questions asked in a particular discipline and the various methodologies used for answering them.

- Your student should have a clearly defined research project by the end of the second week of the program so they have adequate time to pursue the work in appropriate depth over the summer. It is critical that students come up with a few research questions they can realistically address within the timeline you've established together.

- Once the project has been defined, help your student assemble a reading list to provide some direction and guidance. Although you may have a particular bias about the research, you should provide competing hypotheses and divergent theories. Help your student understand how diverse perspectives have come about and provide examples of how his/her research can be placed in the context of these different perspectives.

### Asking Questions

- Discuss with your student the importance of learning to ask appropriate questions, particularly during critical periods, in order to move the research forward.

- Do not hesitate to appropriately challenge assumptions held by your student about his/her research topic but remember that your student is still a novice in your discipline.

- Encourage your student to write down all of the questions he/she has and bring them to share during regular meetings. Be open to exchanging ideas with your student. Strive to create an atmosphere that makes a student feel empowered to ask questions. Help your student learn to formulate better questions but do not make him or her feel inferior while doing so.

- Model how to ask questions within the context of the discipline. Help the student clearly delineate the different levels of questions and the kinds of questions to ask during the research process. For instance, broad research questions need to be honed down to specific questions related to the data or information found, which may in turn lead to different levels of analyses and additional questions.

- Research in the humanities and social sciences relies on the ability of the investigator to pose insightful questions and then find the appropriate primary and secondary resources necessary to answer these questions. Students must recognize that their questions may require understanding of a wider variety of disciplines than they may have originally considered.

### *Methodologies*

Researchers in the humanities and social sciences utilize a wide variety of both qualitative and quantitative methods in their research. It is important for you to discuss the appropriate methodologies currently used in your discipline as well as the wide variety of qualitative and quantitative methods. Keep in mind that students with limited research experience may not be familiar with diverse methods of inquiry.

- Ask students explicitly about research methods they may have used in the past and question them about their understanding of methods they may use in the summer program.

- Provide a variety of examples of the kinds of methods that can be used to address research questions. You may also wish to provide readings that contain examples of how various research methods have been used by other researchers.

- If using survey instruments, archival materials or large databases, arrange for your student to meet with appropriate professional staff for training in the use of these resources.

## *SUMMARY OF LEADERSHIP ALLIANCE EXPECTATIONS*

- Design a manageable project that can be accomplished over the course of the summer.

- Meet at least once a week with your student to monitor progress and provide guidance.

- Review the data your student will use in a presentation for the Leadership Alliance Symposium at the end of July, and if possible, help your student prepare the presentation.

- If you experience any difficulty with your student, bring it to the attention of the summer program administrators on your campus as soon as possible so they may help to resolve the issue.

- If satisfied with the student's performance, offer to provide letters of recommendation. If you are asked to write a recommendation, indicate to the student what you plan to write.

- Give your student an appraisal at the final meeting of the program and offer advice about course selection, career choices and graduate program options.

- Complete and return survey(s) about your student and the program.

*Review data used in your student's final presentation to ensure its accuracy.*

## *CONCLUSION*

The Leadership Alliance is deeply grateful for your contribution of time and effort expended to mentor our students. Mentors are the cornerstone of the Summer Research-Early Identification Program, and your hard work and dedication are sincerely appreciated.

## *APPENDIX*

**(see insert)**

• Performance Appraisal (to be shared with student
  at end of summer)

PREPARED FOR THE LEADERSHIP ALLIANCE BY

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# The Leadership Alliance
## Member Institutions

Brooklyn College
Brown University
Chaminade University of Honolulu
Claflin University
Columbia University
Cornell University
Dartmouth College
Delaware State University
Dillard University
Harvard University
Howard University
Hunter College
Johns Hopkins University
Montana State University-Bozeman
Morehouse College
Morgan State University
New York University
Prairie View A&M University
Princeton University
Spelman College
Stanford University
Tougaloo College
Tufts University
University of Chicago
University of Colorado at Boulder
University of Maryland, Baltimore County
University of Miami
University of Pennsylvania
University of Puerto Rico
University of Virginia
Vanderbilt University
Xavier University of Louisiana
Yale University

# Summer Research Early Identification Program
## Performance Appraisal of Student

Mentor Name _____ Date_____

Student Name _____

| Short description of research performed by student: | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | |

CIRCLE ONE: 1=Excellent ➤ 5=Needs Improvement

| Knowledge Application | | | | | | |
|---|---|---|---|---|---|---|
| • Ability to apply knowledge to solve problems | 1 | 2 | 3 | 4 | 5 | n/a |
| • Ability to search independently for and apply knowledge from online, library resources or co-workers | 1 | 2 | 3 | 4 | 5 | n/a |
| **Problem Solving Skills** | | | | | | |
| • Ability to identify a real world problem as a member of a certain class of problems | 1 | 2 | 3 | 4 | 5 | n/a |
| • Ability to see underlying connections between concepts from different subject areas | 1 | 2 | 3 | 4 | 5 | n/a |
| **Lab Skills** | | | | | | |
| • Use of laboratory equipment | 1 | 2 | 3 | 4 | 5 | n/a |
| • Follows laboratory safety procedures | 1 | 2 | 3 | 4 | 5 | n/a |
| • Ability to design and conduct tests | 1 | 2 | 3 | 4 | 5 | n/a |
| • Ability to analyze results of testing | 1 | 2 | 3 | 4 | 5 | n/a |
| • Lab record keeping and data gathering | 1 | 2 | 3 | 4 | 5 | n/a |
| **Teamwork Skills** | | | | | | |
| • Ability to give and receive constructive criticism | 1 | 2 | 3 | 4 | 5 | n/a |
| • Ability to take charge of, and complete, assigned tasks | 1 | 2 | 3 | 4 | 5 | n/a |
| **Communication Skills** | | | | | | |
| • Presentation skills | 1 | 2 | 3 | 4 | 5 | n/a |
| • Writing skills | 1 | 2 | 3 | 4 | 5 | n/a |
| **Ethics** | | | | | | |
| • Understanding of professional and ethical responsibilities | 1 | 2 | 3 | 4 | 5 | n/a |
| **Subject Knowledge** | | | | | | |
| • Knowledge of current issues in discipline | 1 | 2 | 3 | 4 | 5 | n/a |

Areas of strength:

Areas that need improvement and suggestions on how to improve: