



Ciencia Puerto Rico

Promoviendo las ciencias y la investigación en Puerto Rico
Promoting science and research in Puerto Rico

Yale University

**CENTER FOR COLLABORATIVE RESEARCH IN HEALTH DISPARITIES
PROFESSIONAL DEVELOPMENT: BIOMEDICAL WORKFORCE**

REPORT: Graduate Student Focus Group

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Analysis of UPR-RCMI Investigator's and Trainees Needs and Opportunities Graduate Student Focus Group

Executive Summary

Background. On March 12, Dr. Giovanna Guerrero-Medina, Director of the Yale Ciencia Initiative and Ciencia Puerto Rico conducted a 1.5 hr focus group with graduate students from the University of Puerto Rico Medical Sciences Campus (UPR-MSC) who were enrolled in Dr. Emma Fernández Repollet's Research Integrity and Survival Skills workshop.

The purpose of this focus group was to explore areas of professional and academic development need and opportunity among graduate students in Puerto Rico to:

- a) Help guide academic biomedical research graduate programs at the UPR-MSC with respect to recruitment and preparation of graduate students, and
- b) Provide insights that could inform collaborations between Yale, CienciaPR and the UPR-MSC, such as the Yale Ciencia IPERT Program (NIH R25) and the Puerto Rico Mentoring Network (proposed as part of the NIH's National Research Mentoring Network).

Methods. Participants consisted of seven students, four male and three female who were masters and doctoral graduate students in the departments of Biochemistry and Physiology of the UPR-MSC.

Dr. Guerrero-Medina prepared ahead of time an introductory script explaining the purpose of the focus group, guidelines for how to conduct the meeting, and a set of questions to address. The focus group was taped and responses were recorded in an anonymous fashion. The recording was transcribed, analyzed and the main themes were identified. The findings are presented below.

Recommendations. Conversation with the students brought up several themes and areas of need and opportunity to enhance the recruitment, engagement, and training of students. Based on these themes, we present several recommendations that can be easily implemented to improve the current programs or services of the UPR-MSC and Ciencia Puerto Rico.

1. Recruitment and Outreach

- a. UPR-MSC Graduate Programs should work with Puerto Rican undergraduate institutions to better advertise undergraduate research opportunities and graduate programs. This includes advertising laboratory openings, participating in recruitment fairs, and organizing lab open houses. This will help better inform students about graduate training opportunities at the UPR-MSC they might not be aware of and better prepare students for graduate programs.
- b. The UPR-MSC Graduate Programs should work with counselors and administrators of undergraduate programs during admissions season in order to advertise the program, distribute informational materials, conduct orientations and make sure students have all the necessary information.

- c. CienciaPR and the UPR RCMI program should repeat their successful undergraduate student symposium to inform students about graduate studies and opportunities.
- d. CienciaPR should continue to disseminate information about research opportunities and graduate programs and place more emphasis on communicating the importance of these experiences in preparing for graduate school, acquiring confidence in research skills and professional goals, and learning more about potential graduate programs.

2. Professional Development

- a. The UPR-MSc Graduate Programs should encourage career exploration and academic and professional development from the outset. This can be achieved by hosting discussions with professionals, hosting conversations with near peers (older graduate students and postdocs), requiring the development of an IDP and yearly discussions with research mentors as part of graduate training.
- b. The UPR-MSc Graduate Programs should consider providing training to their students on: scientific and technical writing and communication, graduate school milestones and preparing for a postdoc, effective networking, managing a mentor-mentee relationship, developing an IDP, marketing your skills, managing a lab, effective strategies in science teaching, etc.
- c. The UPR-MSc should consider providing training to its faculty regarding how to help their mentees identify their professional goals and work towards them.
- d. CienciaPR will soon launch the Yale Ciencia IPERT program that will provide opportunities for graduate students to converse with established role models in a variety of academic and non-academic scientific careers, learn through discussions with peers, receive training on a variety of academic and professional development topics and become involved in outreach. The focus group provided validation for the design of the program and its need. The conversation with students identified several topics to be covered through the role model and peer group discussions.

3. Graduate School Environment

- a. The UPR-MSc should establish more interdepartmental exchanges, such as seminar series, retreats, science cafés, and/or “tea time” in order to create a more “tightknit”, creative, and productive academic environment.
- b. An interdepartmental curriculum committee should be implemented to oversee curricular offerings and assure that courses complement and build-off each other and do not overlap.

Focus Group Questions

Discussion was guided by a set of questions aimed at gathering feedback about graduate students perceptions of needs and opportunities to improve their recruitment, training, retention, and academic and professional development. Approximately 10 minutes were budgeted per question.

1. When you were younger, did you know that you wanted to be a scientist? What motivated you or inspired you to pursue graduate studies in biomedical research?
2. How did you go about exploring your options for graduate studies? What type of counseling or mentoring did you receive?
3. What kind of advice would you have liked to receive during that academic stage?
4. Now that you are in graduate school, how many have clear career goals and aspirations? For those who have identified goals, do you have a good idea about how to achieve them?
5. How many of you have more than one mentor or professional advisor? What type of advice or counseling are you looking for at this stage of your training?
6. Those of you who are considering a postdoc, do you have a good idea about how to make that transition?
7. Are there any skills that you think would be important for you to develop your career aspirations?
8. If you could have periodic discussions on topics of academic and professional development, what issues would you like to discuss?
9. What kind of resources would you like to have access to through CienciaPR? How do you think you can benefit the most from the network?
10. Is there anything else you would like to share?

Summary of Discussion

Motivations to Pursue a PhD - The conversation began by asking students to identify what had initially attracted them to science and to doctoral studies.

- Exposure to undergraduate research was the most common experience that motivated students to consider graduate training programs.
 - All of the students interviewed had conducted research as undergraduates or as postbacs.
 - One student said that initially he thought graduate school would be challenging, but after meeting graduate students and talking with them, he realized that research skills were the most important aspect of graduate school. His previous experiences with undergraduate research bolstered his confidence in his research skills and that in turn allowed him to visualize success as a graduate student.

- For one student, being able to do both research and a medical internship helped her determine that she preferred research to medicine. She emphasized the importance of these diverse internship experiences to help students find where their interests really lie.
- Most students expressed they were attracted by the creativity inherent in science, and the challenge of problem solving and analysis.
- Most students entered graduate school without a clear-cut goal regarding their professional future. Although many contemplated going into academia, teaching, or industry, most students were not wed to one career outcome over another and many expressed the desire to take some time before making a career commitment.
- For one student, the motivation to enroll in graduate school was to improve the way science is taught at the grade school level and in college. He expressed that science is often taught in a “boring” and outdated fashion. This motivated him to pursue a graduate degree to “make a difference” in college teaching. The student would like to see scientists become more involved in society and leave the ivory tower to help the public understand the importance of science.
 - Recent social studies have found that social impact is a larger driver for women and underrepresented minorities and that a lack of role models in these areas often drives students away from academic careers.
- Before being exposed to research, several students thought they wanted to study medicine. Some students were initially enrolled in non-science majors such as art or psychology. Regardless, all students said they did not have awareness of research or science as a career when they were in high school. Many said their K-12 science and math classes were not very enticing and that negative scientific stereotypes were very prevalent.

Awareness of Graduate School Opportunities and of the Application Process - The group proceeded to discuss the graduate school application process and how informed and prepared they had felt during their applications to graduate school.

- Many students indicated that they had not been well informed about graduate school opportunities, programs, benefits, or applications deadlines or processes. More information, particularly for graduate programs in Puerto Rico, was not perceived to be readily available. They saw this as an area for improvement.
- Many students sought and received advice from peers or research mentors. College counselors did not seem to be very helpful or have been utilized.
- Students suggested that the most effective way of reaching them with information about graduate programs included email notifications and reminders; posters and flyers; accurate, complete and visible website information; in-person presentations and fairs at colleges and universities; Open Houses
- One student commented that STEM outreach is necessary not just for high school students but also for undergraduates. Many students don't realize their interest for STEM disciplines until they reach college and begin taking courses. Many of them don't know or

understand the opportunities that graduate school presents or what graduate school entails.

- The GRE's, particularly the fact that the test is in English, was intimidating for most of the students. They would appreciate having access to resources that could help them prepare for the test.

Career Exploration, Goal-Setting and Professional Development Opportunities - The group then discussed their career goals and plans and any strategies they were employing to explore career options or develop their professional and academic skill sets.

- Most students had a general idea of the type of career they wanted (e.g. research intensive or non-intensive faculty positions, industry, science policy, etc.) or the types of activities they liked or disliked (e.g. teaching, lab work, community outreach, entrepreneurship, communications, mentoring, etc.) but indicated they were still exploring possibilities. Only one student seemed very certain of what he wanted to do once he graduated—a fact that was not surprising since most of the students were in their first year.
- The student who had decided on his career goal said that this decision had helped to better define his approach and goals for his thesis and graduate work.
- Many students seemed unsure about career possibilities and what would be required in order for them to secure careers in academia or industry, how to go about securing a postdoc, or the considerations, risks, opportunities of doing a postdoc. They expressed that exploring and thinking about different careers by themselves was overwhelming and confusing.
- Students expressed concern about the availability of academic or industry jobs and whether they would be able to secure them once they graduated. They stated that these types of positions are very competitive and there aren't many opportunities in Puerto Rico. Some thought that candidates with PhDs from outside of Puerto Rico might be more highly considered.
- Students discussed the importance of monitoring scientific trends in industry and academia to stay competitive and thought that some fields might be more in demand than others. They discussed wanting to acquire specific research skill sets that would position them for jobs in the future (e.g. bioinformatics or systems biology for a research focused student and microbiology or biochemistry for industry).
- Students discussed the importance of the postdoc as a stepping stone, helping them complement their graduate training in order to to enhance or gain additional marketable skills before pursuing a job in academia or industry.
- Students discussed the “politics” of science. The students' initial discussion centered on how politics are pervasive in the Puerto Rican academic environment.
- Placing the political situation of Puerto Rico aside, students then discussed how “whom you know” is always important in securing a job, not just in Puerto Rico and not just for science. They then went on to discuss the importance of professional contacts and connections and how to establish them.

- Professional contacts can make them aware of training and/or fellowship opportunities
- Professional contacts might be their future reviewers or evaluators for papers, fellowships or grants
- Professional contacts might be crucial in helping them secure their postdoc
- When changing research fields, professional contacts might help them navigate the new field.
- Being “visible” as a scientist helps in establishing a reputation as an expert in your field.
- One student said, “Showing interest is important and is always viewed positively. You have to look at it from the point of view of the other person.”
- One student mentioned that her professional society’s annual meeting was a good place for her to make professional connections and reach out to investigators who are in institutions where she wants to do a postdoc.
- Another student mentioned that he had established good professional relationships with people through his research, when he asked for published reagents for example, and by having the opportunity to invite the faculty member to give a talk for his graduate program.
- A few students said they had not started doing networking because they were still only in their first and second years and thought this is something you do later in your career as a graduate student. One student said that he didn’t like it when the interactions are forced and he preferred to approach people in a more “informal and natural” way.
- Students thought the following resources could be useful in helping them think about their career goals and how to achieve them:
 - A dedicated program or web resource because “professors are sometimes too busy or they don’t have the right knowledge and connections”
 - A forum for exchanging information and for discussing issues with other graduate students in Puerto Rico and the U.S.
 - Tips or trainings for mentors about how to facilitate opportunities. One student said his mentor had been a great facilitator, introducing him to his own professional network at conferences and “showing him” how to network. Seeing how others do it is very empowering according to several students
 - One student who is in the RISE program had begun making an Individual Development Plan and she found it very useful, she particularly liked the myIDP online tool provided by the AAAS/Science Careers website. She would have liked to use it from the very beginning.
- With respect to non-research skills, students would really like to receive trainings or workshops in:
 - Scientific and technical writing. Apparently the Anatomy Department has several technical writing workshops but they don’t know if students from other departments can participate.

- How to seek out a postdoc
- How to establish a name for yourself and how to market your expertise and your skills
- What's involved in being a PI (i.e. day-to-day tasks and responsibilities)
- Teaching strategies and skills as well as more opportunities to teach. They would like it if teaching assistantships were easier to find and obtain at the Medical Science Campus.
- Knowing how to manage the relationship with your research mentor and what to expect as a graduate student

Graduate School Environment - At the end of the conversation students brought up some suggestions they would like to see implemented by the graduate school administration in order to enhance the learning environment and their experience as graduate students

- Students would appreciate a more collaborative environment and more opportunities for sharing with other students and faculty, especially since the architecture of the building keeps every laboratory separated from one another.
- Students are interested having access to and feeling part of a broader scientific community of mentors, peers, and advisors.
- They would like it if there were more interdepartmental seminars and perhaps an interdepartmental “tea time” once a week, where students, staff, and faculty could congregate informally.
 - Interdepartmental seminars would help them open their minds to thinking about science in new ways and have a better sense of scientific trends and innovations outside of their fields.
 - A “tea time” at the end of the week is common in many U.S. graduate programs and is self-managed by the graduate students and financed by contributions from the “tea time” participants.
- It would be good if academic departments also exchanged more information about course content and trainings opportunities for students. One student mentioned that he has found that different courses cover the same material and are repetitive. Perhaps a curriculum committee should be established to oversee course offerings for graduate students.
- Students would also be interested in more collaborations and interactions among the UPR campuses. The Inter American University was mentioned as a model for how to integrate programs among different campuses.



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