Summertime: A chance for reciprocal summer research programs [1]

Submitted by Giovanna Guerrero-Medina [2] on 2 December 2011 - 12:00am

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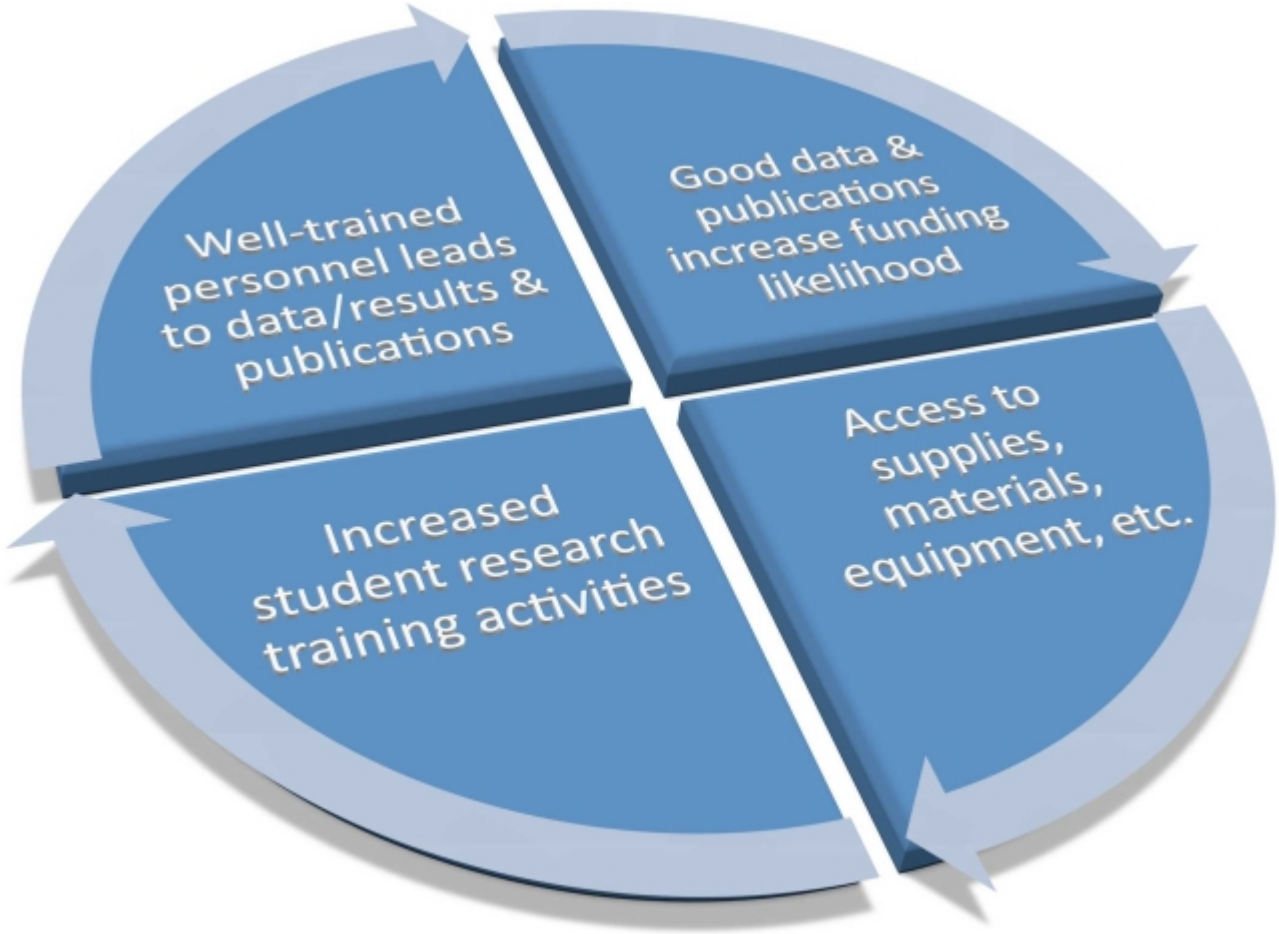

[3]

Propuesta para el desarrollo de programas de verano recíprocos. (Imágen por F. Carrero-Martínez)

Creating an environment conducive to academic research requires a number of critical factors: funds to recruit investigators and pay for the costs of their projects; access to research resources,

reagents, and technologies; institutional systems to support research logistics (e.g. purchasing offices; facilities; administrative support; budget offices; grants and contracts specialists; etc.); and above all, brilliant minds and skilled hands. There is a lot of scientific talent and interest in Puerto Rico—as evidenced by the membership of this website, which grows daily. However, due to the absence of a significant number of doctoral programs and the challenges of recruiting postdoctoral fellows to local laboratories, much of the academic research in the Puerto Rican archipelago is performed by students at the undergraduate or master's degree level.

This makes Puerto Rico a major training center for undergraduate research. In fact, Puerto Ricans comprise a large proportion of the Hispanics who work in science-related positions in the U.S. and according to data from the National Science Foundation (NSF) [4], the University of Puerto Rico (UPR), Rio Piedras and Mayaguez campuses are the top baccalaureate institutions of origin for Hispanics with science and engineering doctorates—a statistic that should be a source of pride for Puerto Rico.

Undergraduate students can contribute significantly to scientific process. This is evidenced by the multitude of publications from Puerto Rico that have undergraduate students as co-authors. However, the work of training undergraduate students in research takes time, dedication and attention, and undergraduate-led projects usually take longer to yield results and are more incremental.

Recently, in **an essay [5] published in the prestigious journal *Science*, Dr. Franklin Carrero-Martínez** [6], **CienciaPR membe**r and professor in the **Biology Department of the UPR-Mayaguez**, highlighted an additional issue related to the high dependence of local research on undergraduate talent: the decrease in talent during the summer when many enterprising undergraduate students leave the Puerto Rican archipelago to participate in research programs across the United States. According to **Dr. Carrero-Martínez** , the months of May through August, when these students are participating in research experiences abroad, are a time of low scientific productivity for himself and other colleagues.

The Importance of Summer Research Programs

In an interview with CienciaPR, Dr. Carrero-Martínez clarified that he did not wish to imply that Puerto Rican students should stop participating in summer research programs. On the contrary, he knows first-hand that this kind of experience helps broaden the student's academic, personal, and professional growth, allows them to become familiar with different doctoral programs, and increases their chances of getting into graduate school. During his pre-doctoral years, Dr. Carrero-Martínez participated in summer research programs at the University of Edinburgh in Scotland, the National Laboratories in Oak Ridge, Tennessee, and the University of Illinois, Urbana-Champaign; opportunities that opened doors in his academic career.

However, according to Dr. Carrero-Martínez's argument, foreign universities with competitive graduate programs should have a vested interest in making sure that participation in summer research programs provides reciprocal benefits to the undergraduate institution. Graduate programs in the U.S. depend to a large extent on non-research intensive baccalaureate institutions for the pool of future graduate students, particularly among Hispanics and African Americans. Ensuring a reciprocal relationship, would not only benefit researchers at the

baccalaureate institutions, but could also improve undergraduate research training by making summer research experiences better integrated and coordinated with research experiences during the academic calendar.

Solutions: Collaborations and Reciprocal Exchanges

Some of Dr. Carrero-Martínez's recommendations to establish reciprocal programs include promoting summer research experiences where the external laboratory helps train the student in techniques and research topics that are relevant for research at the home institution. Faculty at Puerto Rican universities should be more proactive in advising students on which institutions or researchers to participate with during the summer. He also recommends that Puerto Rican faculty make efforts to establish collaborations with summer research mentors to help the student experience last beyond the summer months.

Another model suggested by Dr. Carrero Martínez involves institutional programs where there is a bidirectional exchange of talent between institutions with competitive graduate programs and institutions focused primarily on undergraduate training. For example, graduate students or postdocs in the U.S. could travel to Puerto Rico in the summer to perform research and be trained in teaching techniques. The **National Institutes of Health (NIH)**provide funds to establish exchanges of this type through the **"Institutional Research and Academic Career Development Awards** [7]**" (IRACDA)**, and institutional collaborations such as the **partnership of the Ponce School of Medicine with the Moffitt Cancer Center** [8], the **alliance of the UPR Medical Sciences Campus with MD Anderson** [9], or **Neuro-ID program** [10] **at the UPR Rio Piedras** include similar bidirectional talent exchanges in their design.

The Importance of Taking a Proactive Approach to Solve Research Barriers

Dr. Carrero-Martínez [11]'s research focuses on the development and plasticity of neuronal connections and he recently won a prize for Health Innovation from Merck [12]. However, despite having an active research program, he has also devoted part of his time to identify ways of better attracting Hispanic students to science and exploring the barriers to competitive research in Puerto Rico, with the essay in Science being one result of these "extracurricular" activities.

Part of the mission of CienciaPR is to support the efforts of scientists like Dr. Carrero-Martínez, who want to identify issues affecting the landscape of academic research in our own backyard and ways in which institutions, the government, and scientists themselves can help to improve that landscape. ***In the coming months we hope to launch a survey that will collect the opinions of scientists within and outside our archipelago on barriers and opportunities for competitive research in Puerto Rico and actions that CienciaPR and other institutions can take to ensure a healthy and sustainable ecosystem for research in our archipelago.*** Dr. Carrero-Martínez has identified the design of summer research programs as an area that he thinks could be improved. What other areas would you suggest?

Links
[1] https://www.cienciapr.org/en/monthly-story/summertime-chance-reciprocal-summer-research-

programs?language=en [2] https://www.cienciapr.org/en/user/gguerre?language=en [3] https://www.cienciapr.org/sites/cienciapr.org/files/field/image/circlezoom.jpg [4] http://www.nap.edu/openbook.php?record_id=12984&page=259 [5] http://www.sciencemag.org/content/334/6054/313.short [6] https://www.cienciapr.org/en/user/fcarrero?language=en [7] http://www.nigms.nih.gov/Training/CareerDev/MOREInstRes.htm [8] http://www.moffitt.org/psm-mccpartnership [9] http://www.mdanderson.org/education-and-research/education-and-training/schools-and-programs/research-training/programs-and-courses/partnership-for-excellence-in-cancer-research/index.html [10] http://neuroid.uprrp.edu/ [11] http://biology.uprm.edu/facultad/?prof=61 [12] http://cienciapr.org/news_view.php?id=1709