

ACTIVITIES AND FINDINGS

RESEARCH AND EDUCATION ACTIVITIES:

THE BRIDGE-TO-THE-DOCTORATE PROGRAM-FINAL REPORT COHORT VII

The Bridge-to-the-Doctorate Program, designed by PR-LSAMP and successfully implemented the following components:

- a. Stipends and Bonuses for Demonstrated Academic Progress.** BD Fellows receive each year of the award a monthly stipend of \$1,500 and three bonuses of \$4,000 each (one in December, one in May and one in July) for excellence in academic performance, for a total annual fellowship of \$30,000 for two years. The BD Program also covers during this two-year period the Fellows' tuition costs, basic health insurance and basic institutional fees. (Table 1)
- b. Travel Funds to Attend National Scientific Meetings/Conferences** – BD Fellows receive \$1,500 in travel stipends per year to attend scientific conferences such as the annual meeting of the American Association for the Advancement of Science (AAAS), the American Chemical Society (ACS), or the American Physical Society.
- c. Funds for Educational Materials** – BD Fellows receive funds each year of the award for educational and lab materials.
- d. A Support Program to Enhance the Academic Preparation of BD Fellows**
In addition to the fellowship, Fellows participate in a Support Program to enhance their academic preparation and their integration into the BD initiatives to sustain the K-16+ educational pipeline. This program helps to ensure that BD Fellows successfully complete their first two years of graduate studies, and that they enroll, remain, and graduate from a doctoral program in a STEM field. Tables 2 and 3, in the Supplemental Documents Section, present the different types of activities offered as part of the BD Support Program.
- e. Mentoring** – Each BD Fellow serves as mentor to an undergraduate student participating in the PR-LSAMP Undergraduate Research Experiences Component. This strategy supports the PR-LSAMP a Mentor Undergraduate Research Program, system-wide approach to educational reform by linking all educational levels, and to integrate research and education. All fellows were supported via teaching or research assistantships by the Institution or other STEM programs (Table 4).
- f. BDP Fellows Visits to High Schools** – BD Fellows visit public high schools to serve as role models for high school students. BD Fellows talk to the students about his/her academic experiences during their high school, undergraduate and graduate years, and about their future career plans. They give special emphasis to the role that undergraduate research experiences play in their academic preparation. As role models they motivate them to excel academically and exhort them to continue careers in STEM fields. Schools participating in the GK-12 program were included in these visits (Table 5).

g. Presentations at the Puerto Rico Interdisciplinary Scientific Meeting (PRISM) - All BD Fellows and their mentored student present their research projects at PRISM, the largest annual local scientific forum sponsored by PR-LSAMP and the local chapter of the American Chemical Society.

h. Additional seminars, workshops and conferences offered by the STEM Departments and PR-AGEP.

Each STEM Department offers 10 to 15 scientific seminars per semester to enhance students academic and research preparation. The Puerto Rico Alliance for Graduate Education and the Professoriate (PR-AGEP) offers activities that connect BD fellows to the doctoral program. PR-AGEP students serve as mentors and role models to the BD Fellows. The STEM Departments offer a Teaching Assistant (TA) Training Program to broaden and deepen TA teaching skills. This two-week summer seminar assists graduate students in preparing for the TA experience that occurs during the first year of studies. TAs engage in other activities throughout the year, including working with PR-LSAMP faculty in assessing and redesigning teaching/learning approaches and participating in faculty development workshops in teaching/learning. All TAs are encouraged to participate in teaching/learning workshops offered by the campus and to consider career opportunities in academia. Fellows also participate in the PR-EPSCoR Annual Conference, present their research projects in the poster session, and benefit from the Conference's activities.

The BD program activities together with the on-going activities described above have proven essential to the preparation and success of our graduate students. Cohort VII fellows have been integrated into the established BD Program.

FINDINGS:

Track record of BD fellows of the first eight cohorts has been collected up to December 2010, obtaining a 100% response rate. Data was collected for all BD Fellows that are still in the PhD pipeline, 69 students. Students that already obtained a MS or PhD degree, and/or are no longer in STEM fields are not required to complete the questionnaire. Academic data for this report was updated as of May 2011 (Table 6). The major findings of this data are:

1. A seventh cohort of twelve BDP Fellows began graduate studies in August 2009, for a total of 82 BDP fellowships awarded by PR-LSAMP under this initiative.
2. At the end of this reporting period seven (7) of twelve fellows have a GPA of 3.50 or higher and nine of them approved their qualifying exams (Table 6).
3. All fellows approved their graduate courses with an average of 30 credits per student by the end of this academic year (Table 6).

4. BD cohort VII fellows were able to participate in twenty – two national and six international conferences and workshops (Table 7). Also, funds were awarded for the purchasing of educational and laboratory materials needed by the fellows to perform their research work.
5. Fellows and mentees presented their research work in the Puerto Rico Interdisciplinary Scientific Meeting (PRISM) (Table 4).
6. During the fellowship period of two years Cohort VII students contributed to six scientific publications (Table 8).
7. Cohort VII fellows participated of two educational field trips, one in the Southwestern part of Puerto Rico to learn about the Geology and Natural History of the area; the other to Cornell University to learn about the research that is conducted in a Research One Institution (Table 9).
8. All fellows participated in Role Model and Outreach activities of the PR-LSAMP, visit to GK-12 Schools, NanoDays, talks to undergraduates to describe the opportunities to conduct undergraduate research under the sponsored of PR-LSAMP and the science teacher workshops sponsored by the Institute of Functional Nanomaterials (Table 5).
9. The University of Puerto Rico awarded a total of 49 Ph.D. degrees in STEM fields in academic year 2009-10 (Table 10).
10. The number of STEM PhD degrees in Natural Sciences granted to Hispanics from PR-LSAMP institutions has increased from 302 for Cohort 2000-05 to 413 for Cohort 2004-09, a 37% increase (NORC data) (Table 11).
11. The number of STEM PhD degrees granted to Hispanic in Engineering from PR-LSAMP institutions has increased from 71 for Cohort 2000-05 to 219 for Cohort 2004-09, a 68% increase (NORC data) (Table 12).
12. The BD initiative has been successful in retaining fellows in STEM fields as 91% continue in the PhD pipeline or have obtained their MS o PhD degree and have been incorporated to the STEM workforce (Table 13).

The value added of the BD Fellowship Program is evaluated by comparing the performance of BD and non BD students of the same year. The results of the evaluation of the comparative cohort study were as follows: 1) regarding GPAs and number of credits approved, the difference between BD and non-BD students was not significant; 2) of significance is that all BD Fellows are in a PhD Program, while the goal of many of the non-BD students is to obtain a master's degree as a final degree; 3) the average number of years to complete a doctoral degree traditionally has been, at UPR, between 8 and 10 years, well above the

national median of 7.7 years (NORC data). BD Fellows are expected to complete their degree at a comparable rate to the national median; 4) all BD Fellows served as mentors to undergraduate STEM students and as role models to middle and high school students, an experience not made available to non-BD students; 5) BD Fellows had twice as many presentations in research conferences than non-BD students, providing for a broader exposure to other research areas and the establishment of network of peers and potential future employers.

TRAINING AND DEVELOPMENT:

During academic years 2009-11, Cohort VII fellows participated of two educational field trips one in the Southwestern part of Puerto Rico to learned about the Geology and Natural History of the area and the other one to Cornell University to learn about the research that is conducted in a Research One Institution. All fellows participated in Role Model and Outreach activities of the PR-LSAMP, visit to GK-12 Schools, NanoDays, talks to undergraduates to describe the opportunities to conduct undergraduate research under the sponsored of PR-LSAMP and the science teacher workshops sponsored by the Institute of Functional Nanomaterials. (Table 8 and 9)

Outreach Activities:

Visits to High Schools: During year one of the program each BDP fellow visited a public high school to serve as a role model to these students. The visiting BDP fellow shares with students their high school and undergraduate experiences, including preferred courses, teachers and professors that were their role models, and insights on how to succeed in a university environment. But most importantly, they serve as role models to these high school students, and motivate them to pursue careers in STEM fields. Schools from the GK-12 program were included in these visits (Table 5).

During the period of this award, BD Fellows participated for two years as presenters in NanoDays, a national outreach event that brings nanoscience and technology to the general public. During this activity, BD fellows worked together with trained high school students offering interactive demonstrations in Nanotechnology to the general public impacting more than 11,000 people in a two-year period.

During the past month of February BD fellows participate as presenters in the Miami Dade College science week activities that included the NanoDays and Teacher Training. Fellows served as role models to the two year college science students in Miami Dade and they also gave talks to the junior high and high school teachers participating students in this activities.

WEB/INTERNET SITE:

www.prlsamp.org: The PR Bridge to the Doctorate program shares the PR-LSAMP website.

CONTRIBUTIONS

Contributions within Discipline:

BD Fellows visited 12 high schools to serve as role models and encourage students to pursue studies in STEM fields. More than 300 high school students benefited from this role model activity. Schools from the GK-12 program were included in these visits (Table 5).

During the period of this award, BD Fellows participated as presenters in NanoDays, a national outreach event that brings nanoscience and technology to the general public. During this activity, BD fellows worked together with trained high school students offering interactive demonstrations in Nanotechnology to the general public impacting more than 11,000 people in a two-year period. (Table 5)

Contributions to Other Disciplines:

N/A

Contributions to Human Resource Development:

The PR-LSAMP program has made a significant contribution to the NSF goal of a diversified STEM workforce. It has increased the number of STEM PhD granted to Hispanics from PR-LSAMP Institutions in Natural Sciences from 302 for cohort 2000-05 to 413 for cohort 2004-09¹, a 37% increase; and the number of STEM PhD granted to Hispanic in Engineering from PR-LSAMP Institutions from 71 for cohort 2000-05 to 119 for cohort 2004-09, a 68% increase (Tables 11-12).

At the local level, the University of Puerto Rico's three graduate institutions, UPR-Rio Piedras, UPR-Mayaguez, and UPR-Medical Sciences awarded 49 PhD degrees in science and engineering in 2010. Table 10 presents the number of PhD degrees awarded by these three campuses in 2009-10 by science and engineering field.

Contributions to Resources for Research and Education:

N/A

Contributions Beyond Science and Engineering:

N/A