



PUERTO RICO LOUIS STOKES ALLIANCE
FOR MINORITY PARTICIPATION



PR-LSAMP

2007-08 ANNUAL PROGRESS REPORT

YEAR 2 PHASE IV

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**PR-LSAMP 2007-08 ANNUAL REPORT
YEAR 2 OF PHASE IV**

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I. Introduction

The Puerto Rico Louis Stokes Alliance for Minority Participation PR-LSAMP) is an alliance of three major higher education institutions in Puerto Rico, jointly working to strengthen STEM undergraduate education. Created in 1991, the PR-LSAMP alliance aims at increasing the number of STEM BS graduates, and the number of BS graduates that enroll in graduate school and eventually complete a PhD degree in a STEM field. To achieve this goal, PR-LSAMP works at improving the effectiveness and efficiency of undergraduate STEM education by transforming the teaching and learning culture of the participating institutions. During Phase IV (2006-11) the following institutions are members of the PR-LSAMP alliance: University of Puerto Rico System, Inter American University System, and Pontifical Catholic University of Puerto Rico. The Polytechnic University of P.R. will no longer be a member of the alliance due to its performance on the project's activities. The reduction in the number of degrees reported is therefore the result of this action, as they contributed approximately 300 degrees annually.

During Phase IV, PR-LSAMP will develop and implement four main strategies:

1. Enhancing Students Knowledge and Skills for Graduate Studies
2. A Mentored Undergraduate Research Experience, including an annual local scientific forum for students to present their research projects, and travel stipends to present research results at national scientific conferences
3. A Role Model Series to expose students to successful professionals in science and engineering fields
4. The Annual Best Practices Conference on Teaching and Learning to continue to expose STEM faculty to successful strategies to improve the teaching and learning process.

Also, through Supplemental Grants requests, PR-LSAMP will continue to provide, through the Bridge-to-the-Doctorate Initiative, 2-year fellowships to former PR-LSAMP graduates to pursue graduate studies in STEM fields.

II. Major Accomplishments

1. In the Fall of 2007, 23,975 students were enrolled in STEM fields at PR-LSAMP institutions.
2. In academic 2007-08, 2,625 baccalaureate degrees were awarded in STEM disciplines.
3. 18.4% of the Hispanics who received a PhD nationwide in a natural science field, from 2001 to 2006, received their BS degree from a PR-LSAMP institution (NORC data).
4. 19.2% of the Hispanics who received a PhD nationwide in engineering, from 2001 to 2006, received their BS degree from a PR-LSAMP institution (NORC data).
5. The University of Puerto Rico awarded a total of 51 PhD degrees in STEM fields in academic year 2007-08.
6. A fifth Cohort of twelve BDP Fellows began graduate studies in August 2007, for a total of 58 BDP fellowships awarded by PR-LSAMP under this initiative. In August 2008, twelve new Fellows will be recruited for a total of 70 fellowships.
7. Seventy three (73) freshman students were selected to participate in a sustain 5-year effort (from entrance to graduation) to prepare them for graduate school and pursue a doctoral degree in a STEM field.
8. In academic year 2007-08, PR-LSAMP awarded 364 stipends (\$291,200) to undergraduate STEM students to participate in research experiences. Also, 352 stipends (\$70,400) were awarded by PR-LSAMP to researchers to cover laboratory materials for PR-LSAMP participants.

9. Three hundred ninety five (395) STEM students (281 undergraduates and 114 graduates presented their research projects at the annual Puerto Rico Interdisciplinary Scientific Meeting (PRISM), to an audience of 400 faculty members and students, for a total of 795 participants.
10. Twenty seven (27) undergraduate STEM students received PR-LSAMP travel stipends (\$14,580) to present their research projects in national and international conferences.
11. The National Institute of Standards and Technology provided \$29,260 to five undergraduate STEM students to participate in research experiences at their main site with nationally recognized scientists.
12. PR-LSAMP institutions secured \$22.9M in external and institutional funds to implement educational projects geared at strengthening STEM education at their institutions.
13. Pfizer Corp awarded 5 fellowships to Pharmaceutical Sciences majors for a total contribution of \$45,000.
14. PR-LSAMP received a \$55,500 supplemental award from NSF to participate in the FaST and SULI Programs.
15. One hundred and thirty five (135) participants attended de PR-LSAMP 2007 Annual Best Practices Conference on Teaching and Learning (87 STEM faculty members, 31 graduate students, and 13 undergraduate students, from 14 institutions).
- 16.

III. Participants and Collaboration with Other NSF Programs

Participating Institutions

The participating PR-LSAMP institutions in Phase IV are: The University of Puerto Rico System (www.upr.edu); Inter American University System (www.inter.edu), and Pontifical Catholic University of Puerto Rico (www.pucpr).

PR-LSAMP Staff

The UPR Resource Center for Science and Engineering serves as the umbrella organization in this alliance, promoting the maximum collaboration of all institutions and synergy of efforts. The Project Investigator is Dr. Manuel Gómez, Director of the UPR Resource Center for Science and Engineering. The Co-PI and Coordinator at the Central Administration is Dr. Ana C. Piñero, the Associate Director for the UPR Resource Center for Science and Engineering. She is responsible for the overall administration of the project and for the close articulation of PR-LSAMP and BD Programs with other RCSE systemic endeavors, such as PR-AGEP, PR-EPSCoR, Title V-USDE, and institutional initiatives. The Assistant Coordinator is Prof. Javier Figueroa, who is also the Coordinator of the BD Program, and coordinates the implementation of the Mentored Undergraduate Research Program and the Role Model Series. The Management Coordinator is Mrs. Ana Feliciano, responsible for the administrative and budgetary aspects of the project, and the Secretary, Ms. Liz Bultrón. They are all located at the UPR Resource Center for Science and Engineering main facility at the UPR-Río Piedras Campus.

The Dean of Science and the Dean of Engineering at the participating institutions collaborate with PR-LSAMP in the implementation of the PR-LSAMP strategies, and in articulating them with other STEM reform initiatives at the institution. In institutions where the organizational structure does not provide for a science or engineering dean, the academic dean is the PR-LSAMP collaborator. A STEM faculty member is appointed at each institution by the dean to serve as the PR-LSAMP Liaison Officer, responsible for the on-site implementation of the program. For Phase IV, the PR-LSAMP Liaison Officers are:

Dr. Ivelisse Rubio, UPR-Río Piedras (Computer Science)
Dr. Jeannette Santos, UPR-Mayaguez (Engineering)
Dr. Carlos Rios, UPR-Mayaguez (Science)
Dr. Denny S. Fernández, UPR-Humacao (Biology)
Dr. Belinda Román, UPR-Cayey (Biology)
Dr. Migdalia Sotomayor, UPR-Aguadilla (Biology)

Dr. Maiella Ramos, UPR-Arecibo (Chemistry)
Dr. Concepción Rodríguez, UPR-Bayamón (Biology)
Dr. Lizette Roig, UPR-Ponce (Chemistry)
Dr. Rafael Canales, UIA-Bayamón (Mathematics)
Dr. Rosa Brito, UIA-Metro (Chemistry)
Dr. Carmen Asencio, Pontifical Catholic University (Biology)

Information on the PR-LSAMP staff is found in the web page (www.prlsamp.org).

Other Collaborating Organizations

The Universidad Central del Caribe Medical School and the UPR Medical Sciences Campus provide students with research opportunities, particularly to biology and chemistry majors. The National Institute of Standards and Technology (NIST) of the U.S. Department of Commerce and the Smithsonian Institute provide students with research experiences during the summer. Students also benefit from the REU Programs across the nation.

Collaboration with Other NSF Sponsored Programs

The Resource Center for Science and Engineering (RCSE) of the University of Puerto Rico serves as the coordinating unit for this alliance, promoting the maximum collaboration of all institutions and synergy. The RCSE coordinates all major STEM systemic educational reforms on the Island, therefore, it provides for an integrated, systemic strategy to increase participation of Puerto Rican students in the STEM pipeline. At the K-12 level, the RCSE has implemented a Distance Learning Program for K-12 Science and Math Teachers. The first of its kind in Puerto Rico, the program makes use of distance learning technologies, and one of its key features is the integration of high-level learning computer technologies (mind tools) to train participants in the use of these tools to enhance the teaching and learning process. The project was implemented in 80 schools, covering all educational levels and has impacted more than 1,500 teachers. Other K-12 projects implemented by the RCSE included the Statewide Systemic Initiative (SSI); the Collaborative for Excellence in Teacher Preparation (CETP), and the GK-12 Program.

At the undergraduate level, in addition to PR-LSAMP, the RCSE coordinates the efforts of the Title V Developing Institutions Consortium that includes three UPR campuses: Rio Piedras, Humacao and Arecibo. Through this project a series of modules are being developed to assist STEM students in a variety of science and math courses at the three institutions, eventually becoming available to any Hispanic student desiring to use them. The modules deal with foundation knowledge and skills, key concepts, and areas that have proven difficult to master adequately. In the process of developing the modules, STEM faculty have developed techniques for making the teaching-learning environment more student-centered. In addition, they are becoming aware of the need for adequate assessment. Models and protocols are being developed for developing additional support materials using technology.

At the graduate level, RCSE coordinates the Institute of Functional Nanomaterials (IFN) sponsored by the Puerto Rico Experimental Program to Stimulate Competitive Research (PR-EPSCoR), co-funded by NSF. The IFN brings together 28 scientists and engineers actively working in nanoscience and technology problems from the University of Puerto Rico two main campuses: the research-intensive Rio Piedras Campus, and the Mayaguez graduate engineering programs. They are organized into three thematically coherent research clusters: 1) Functional dispersed nanostructures; 2) Functional nanostructures at the Interface, and 3) Multifunctional nanostructures. These clusters will function as Multicampus Interdisciplinary Research Groups (IRG) that share infrastructure and develop new group research projects and proposals. The IFN works with six strategic national partners: Argonne National Laboratory; Purdue University; UMass, NASA Glenn Research Center, Northwestern University, and Cornell University, all nationally recognized for their centers for nanotechnology research. The educational plan of the Institute explicitly calls for joint courses and co-supervision of thesis by the 28 professors, grouping participating PhD students into a single

community of learners in the fields of nanoscience and nanotechnology. PR-EPSCoR has been key in the strengthening of the Puerto Rico scientific community by increasing the number of competitive researchers and building a sustainable infrastructure for competitive research at the main research universities. PR-EPSCoR has been fundamental in improving the quality of research training in the Island's main STEM Ph.D. programs by providing research opportunities to students in areas that are critical to local as well as national interests, and by providing fellowships to graduate students and supporting post-doctoral positions. In addition, the NSF sponsored Alliance for Graduate Education and the Professoriate (AGEP) provides support to doctoral STEM students and has in place an effective Mentoring and TA Training Program. AGEP fellows serve as mentors to undergraduate PR-LSAMP participants and to BD Fellows. Former BD Fellows have been awarded AGEP fellowships.

The coordination of these systemic initiatives by the RCSE has promoted the articulation of the pipeline as a unified and coherent effort, fostering a shared vision, the transfer of educational strategies, the cross-fertilization of efforts and the pooling of resources among all levels of the pipeline, leading to a synergistic effect that is critical for achieving lasting change. .

IV. Activities and Findings for Year 2 of Phase IV

ACTIVITY #1: ENHANCING STUDENTS KNOWLEDGE AND SKILLS FOR GRADUATE STUDIES

Description of Activity #1:

The target of this activity are STEM students at UPR-Rio Piedras and UPR-Mayaguez, the two alliance institutions with graduate programs. Freshman STEM students will be selected (30 from UPR-Rio Piedras and 30 from UPR-Mayaguez) to participate in core skill workshops and seminars on frontier science and engineering topics to be offered at each institution during the 5-year grant period. This core of students will be tracked for progress as they move through the undergraduate pipeline, from entrance to exit, and enter graduate school to pursue a doctoral degree in a STEM field.

Findings for Year 2:

At UPR-Rio Piedras: Fifty three STEM students are participating in this PR-LSAMP activity, with 100% retention from last year's program. Thirteen workshops/conferences were offered during academic year 2007-08 (five skill workshops and eight scientific workshops). **Table 1** presents the topic of the workshops, the name of the resource professor, and the resource person's STEM field.

Table 1
Workshops Offered at UPR-Rio Piedras, Academic Year 2007-08

Workshop	Speaker	Area
Introduction to Code Theory	Fernando Piñero BD Cohort #4 Fellow	Mathematics
Structures and Dynamic Properties of Ribonucleic Acids	Annette Casiano Former Undergraduate PR-LSAMP Student and now a graduate student at Michigan State University	Biochemistry
Introduction on How to Read a Scientific Paper	Ana Guadalupe	Chemistry
Introduction to Scientific Writing (I to IV)	Eugenio Santiago, Javier Figueroa UPR-Rio Piedras & UPR-RCSE	Biology Ecology
Taxonomy and Molecular Evolution of Yeast	Meredith Blackwell Louisiana State Univ., Baton Rouge	Micology

Workshop	Speaker	Area
Introduction to the Fungi Kingdom	Paul Bayman UPR-Rio Piedras	Ecology/Taxonomy
Ecosystems, Complexity and Beauty	Carla Restrepo UPR-Rio Piedras	Ecology
Tropical Aquatic Insects	Alonso Ramirez UPR-Rio Piedras	Limnologist/Biology
Caribbean Geology with Emphasis on Volcanic Formations	Lisette Rodriguez UPR-Mayaguez	Geology
Climate, Climate Change, and Education	Edwin Nuñez, COLSA Corp. Jim Kastings, Penn State U. Graig Lingley, Univ. of Alaska	Meteorology Paleoclimatologist Glaciologist

All participants completed successfully their second year of undergraduate studies and 52 are working in a research project.

At UPR-Mayaguez: Twenty one students are currently participating in the program. Thirteen workshops were offered during academic year 2007-08 (eight skill workshops and five scientific workshops). **Table 2** presents the topic of the workshops, the name of the resource professor, and the resource person's STEM field.

Table 2
Workshops Offered at UPR-Mayaguez, Academic Year 2007-08

Workshop	Speaker	Area
Structures and Dynamic Properties of Ribonucleic Acids	Annette Casiano Former PR-LSAMP Student and now a graduate student at Michigan State University	Biochemistry
Climate, Climate Change, and Education	Edwin Nuñez, COLSA Corp. Jim Kastings, Penn State U. Graig Lingley, Univ. of Alaska	Meteorology Paleoclimatologist Glaciologist
Electromagnetic Interactions Between the Sun and the Earth	Juan Gonzalez Lagoa UPR-Mayaguez	Marine Sciences
Photochemical Sensors to Detect DNA Molecules	Angel Marti, former PR-LSAMP student and now professor at Rice University	Chemistry
A New Approach to the Discovery of Transcription Factor Effectors: FAC-MS gives the FACTS	Ricardo Marti, former PR-LSAMP student and now a Postdoctoral Fellow at Los Alamos National Laboratory	Chemistry
Effective Oral and Written Presentations (part 1 and Part 2)	Sandra Cruz Poll, UPR-Mayaguez Robert Sherwin, UPR-Mayaguez	Electrical Engineering Geology
Developing Your Self-Esteem	Bernadette Delgado, UPR-Mayaguez	Education
How to Use a Data Base	Jackeline Alvarez, UPR-Mayaguez	Librarian
A Critical Evaluation of a Scientific Article	J. Gonzalez Lagoa, UPR-Mayaguez	Marine Sciences
Time Management	Virgen Aponte, UPR-Mayaguez	Academia Advisor
Developing Critical Thinking Skills	Marla Perez, UPR-Mayaguez	Sociology

The twenty-one students satisfactorily completed their second year of undergraduate studies, and eleven are working on a research project.

ACTIVITY 2 – MENTORED UNDERGRADUATE RESEARCH EXPERIENCE

Description of Activity #2:

During Phase IV PR-LSAMP will offer between 275 and 280 research stipends per year to an average of 200 students per year (a student may participate more than once in a given year) to participate in a mentored research experience. PR-LSAMP will provide participating PR-LSAMP undergraduate students a multi-faceted mentoring program at each institution, consisting of a Mentoring Coordinator, research mentors, and peer mentors. The Mentoring Coordinator at each institution will coordinate the mentorship strategies at each level (group mentorship through workshops, research mentorship, and peer mentorship). Research Mentors will be responsible for developing in PR-LSAMP students basic research skills, while participating in a given research project. Peer Mentors (a PR-LSAMP upper level student in the case of a 4-year institution and an AGEP graduate student or BDP Fellow in graduate institutions) will coach the PR-LSAMP undergraduate student through the stages of development while participating in the research experience and will also serve as a role model. The extent of the Mentored Research Program at each PR-LSAMP institution will vary depending on the number of students participating in research experiences and the number of research mentors.

Seminars will be offered during the academic year and the summer at each PR-LSAMP institution. The topics for the four core seminars to be offered at each PR-LSAMP institution are: 1) using data bases; 2) ethics in research; 3) analytical reading and thinking skills, and 4) basic lab safety. Topics for the other seminars will be determined jointly by the mentoring coordinator, the Research Mentors and the Peer Mentors and will target specific identified needs of the participants at each institution.

A central part of this activity will continue to be the Puerto Rico Interdisciplinary Scientific Meeting (PRISM), the major local scientific forum for students from universities across the island to share their research projects and experiences with their peers and STEM faculty members. As part of this component, PR-LSAMP will also provide participants with travel stipends to present their research projects at national conferences.

Findings for Year 2:

All ten PR-LSAMP institutions designed and established the mentored research experience program in their institution. Each institution appointed a Mentoring Coordinator, responsible for coordinating the program and the group activities. **Table 3** presents the names of the Coordinators per institution.

Table 3
Mentoring Coordinator by PR-LSAMP Institution

PR-LSAMP Institution	Mentoring Coordinator	STEM Field
UPR-Rio Piedras	Javier Figueroa	Biology
UPR-Mayaguez	Carlos Rios Héctor Carlo	Biology Industrial Engineering
UPR-Humacao	Denny Fernandez	Biology
UPR-Cayey	Belinda Román	Chemistry
UPR-Arecibo	Jose Arvelo	Biology
UPR-Bayamón	Alex Sloan	Biology
UPR-Aguadilla	Jesús Lee	Biology
Pontifical Catholic Univ.	Lisette Santos	Chemistry
IAU-Bayamón	Carolyn González	Engineering
IAU-Metro	Rosa Brito	Chemistry

Table 4 presents the workshops offered at each institution as part of the program. The institutions' calendar of workshops was posted in the PR-LSAMP web page, so students from the different PR-LSAMP institutions could attend those of their choice.

Table 4
Workshops Offered by the Mentored Undergraduate Research Experience Program
Academic Year 2007-08

Institution	Workshops Offered
UPR-Rio Piedras	Structures and Dynamic Properties of Ribonucleic Acids Climate, Climate Change, and Education Introduction to the Fungi Kingdom Tropical Aquatic Insects Introduction to Scientific Writing (four sessions) Taxonomy and Molecular Evolution of Yeast
UPR-Mayaguez	From the Research Problem to the Hypothesis Scientific Journal Round Tables Structures and Dynamic Properties of Ribonucleic Acids Climate, Climate Change, and Education Lab Safety: Bloodborne Pathogens PR-LSAMP Science Recap Meeting How to Prepare a Scientific Poster Getting Ready for Graduate School Table Etiquette Among Researchers: A Networking Strategy NEA Alliance and Setting the Basis for Collaborations Effective Power Point Presentations Team Work and Conflict Resolution Orientation to Graduate Schools
UPR-Humacao	Ethics in Scientific Writing (Part 1 and Part 2) Writing a Winning Personal Essay Computational Statistics Laboratory Security following the MSDS Protocol Imaging Analysis The New Pre-Engineering Program
UPR-Cayey	Making the Most of Undergraduate Research Experience: Preparing for Graduate School Biotechnical Techniques for Protein Purification Safety Techniques in a Laboratory Environment Use of Data Bases Basic Research Statistics I and II
UPR-Arecibo	Preparation of Solutions and Culture Media Management of Hazard Materials following the MSDS Protocol Biotechnology Techniques Literature Search for Research Projects How to Prepare a Poster and Make Effective Oral Presentations Design and Stages of Research Projects Sampling Techniques in Freshwater Sources to Know Heavy Metal, Organic Compounds and Bacteria Technical Writing Techniques How to Write a Scientific Paper How to Prepare a Resume Ethics in Scientific Research
	Ecology of the Caribbean Land Crab Paradigm Shifts in the History of Science

Institution	Workshops Offered
UPR-Bayamón	Climate, Climate Change, and Education Introduction to System Dynamics Using the GAIA Perspective Statistics for Scientific Research Systematics and Evolution of Puerto Rican Orchids Introduction to Statistical Analysis Using Type R Strategies Introduction to Scientific Literature TBA I and II
UPR-Aguadilla	What is Scientific Research Statistical Analysis for Scientific Data Basic Lab Safety Analytical Reading and Thinking Skills Summer Internships and Graduate School Applications How to Prepare and Present a Scientific Poster Ethics in Scientific Research Science –vs- Seudoscience: The Educational Perspective
Pontifical Catholic University	Graduate School Opportunities at Michigan State University Graduate School Opportunities at the Big Ten Universities Laboratory Safety Basic SPSS Ethics in Research Analytical Reading and Thinking Skills Preparing for the GRE Problem Solving Methodologies Stress Management
IAU-Bayamón	Conversational English (4 workshops) How to Prepare a Poster Presentation Caribbean Geology Climate, Climate Change, and Education Summer Research Internship Opportunities Preparing your Oral Presentation for PRISM Use of Data Bases Institutional Scientific Congress Laboratory Safety Field Trip to The Mata de Plátano Ecological Reserve How to Present your Research Project Using Power Point Effective Proposal Writing Techniques Environmental Ethics Climate Change and Our Changing Planet
IAU-Metro	Research Opportunities and Summer Internships Analytical Reading and Thinking Skills Ethics in Scientific Research (Part 1 and Part 2) How to Make Effective Oral Presentations (Part 1 and Part 2) Problem Solving in Chemistry Courses

PR-LSAMP awarded 364 stipends to STEM undergraduate majors to participate in mentored research experiences. Also, 352 stipends were awarded to the researchers to cover laboratory materials to be used by the students during their research experiences (\$200 per student), as shown in **Table 5**.

Table 5
PR-LSAMP Undergraduate Research Experiences
Academic Year 2007-08 and Summer 2008

Institution	Stipends Awarded to Students*	Stipends Awarded to Researchers for Lab Materials*	\$ Awarded to Students*	\$ Awarded to Researchers for Lab Materials*	Amount of Funds Awarded
UPR-Rio Piedras	134	123	\$ 107,200.00	\$ 24,600.00	\$ 131,800.00
UPR-Mayaguez	108	108	\$ 86,400.00	\$ 21,600.00	\$ 108,000.00
UPR-Humacao	22	24	\$ 17,600.00	\$ 4,800.00	\$ 22,400.00
UPR-Cayey	7	7	\$ 5,600.00	\$ 1,400.00	\$ 7,000.00
UPR-Bayamón	17	14	\$ 13,600.00	\$ 2,800.00	\$ 16,400.00
UPR-Arecibo	15	15	\$ 12,000.00	\$ 3,000.00	\$ 15,000.00
UPR-Aguadilla	8	8	\$ 6,400.00	\$ 1,600.00	\$ 8,000.00
UPR-Ponce	5	0	\$ 4,000.00	\$ -	\$ 4,000.00
Pontifical Catholic Univ.	12	12	\$ 9,600.00	\$ 2,400.00	\$ 12,000.00
IAU Metro	5	5	\$ 4,000.00	\$ 1,000.00	\$ 5,000.00
IAU Bayamon	31	31	\$ 24,800.00	\$ 6,200.00	\$ 31,000.00

* This figure is not headcount. A student and a researcher may participate more than once during the academic year and Summer research experiences. Funds include institutional funds for PR-LSAMP activities.

Summer 2008 Undergraduate Research Experiences Abroad

Through a concerted effort, PR-LSAMP has been extremely successful in securing undergraduate research experiences abroad for PR-LSAMP students for the summer of 2008. Twenty one students, as shown in **Table 6** conducted summer research at 11 different sites. In the case of the University of Texas, Arlington, the five undergraduate students were accompanied by five BD Fellows, for a total of 10 participants at this site.

Table 6
Summer of 2008 Undergraduate Research Experiences Abroad

Name of Student	Research Site	Research Area
Carlos Rivera	University of Notre Dame, Environmental Research Center	Comparison of Ecosystems with little or no degradation from human activities with human disturbed ecosystems
Richard Garcia Ivan Ojeda	University of Berkeley Mathematical Sciences Research Institute	Experimental Mathematics
Charlene Berrios Aurora Otero	Indiana University Department of Cellular and Integrative Physiology	Molecular Biology, Biochemistry, Immunology, Cell Biology and Neuropharmacology
Aura Alonso	Rocky Mountain Biological Laboratory	Avian and Mammalian Adaptations to High Elevation Ecosystems
Enmanuel Perez	University of Miami	Neuroscience Research
Nayla Delgado	Columbia University	Neuroscience Research
Alexandra Amaro	University of Arizona	Chemical Sciences

Name of Student	Research Site	Research Area
Omar Delanoy	Georgia Institute of Technology	Biochemistry
Edna Santos	Goddard Space Flight Center Eliophysics Division	Development of Solar and Space Physics Missions
Milena Bobea Gladys Bonilla Axel Cortés John Jones Molina José López	University of Texas, Arlington	Computational Modeling of Electromagnetic Solar Storms
Stephanie Montalvo Raiza Cortés Paul Fuentes Angélica Muñiz Axel Rivera	National Institute of Standards and Technology (NIST)	Physics Computer Sciences Electrical Engineering Electrical Engineering Computational Mathematics

These students will share their summer research experiences with the other PR-LSAMP students in a scientific congress to be held in the Fall of 2008.

The Puerto Rico Interdisciplinary Scientific Meeting – The Puerto Rico Interdisciplinary Scientific Meeting (PRISM) is the annual islandwide forum for undergraduate and graduate STEM students to present their research projects to their peers and STEM faculty members. For the past 16 years PR-LSAMP has co-sponsored this activity with the local chapter of the American Chemical Society and the AGEP Program. The 2008 PRISM was held at the University of Puerto Rico, Arecibo Campus. A total of 395 STEM students, 281 undergraduate and 114 graduate students (331 in the sciences, 58 in engineering, and 6 in mathematics) from the different PR-LSAMP institutions presented their research projects to an audience of 400 students and faculty members, for a record number of 795 participants..

The invited plenary speaker was Dr. Angel García, Professor of Physics and Biocomputation and Bioinformatics at Rensselaer Polytechnic Institute. A BS and MS graduate from the University of Puerto Rico at Rio Piedras, Dr. García obtained a Ph.D. in Theoretical Physics from Cornell University. He received the Edward Bouchard Award of the American Physical Society in 2006.

Dr. García's research interests are theoretical and computational aspects of the structure, dynamics and stability of biological molecules. The title of his conference was ***"The Study of the Molecules that Give Origin to Life"***. He discussed the essential functions on how the cell works based on the physical principles of force, energy, and system dynamics. His studies are geared at understanding at the atomic and molecular level the dynamics of proteins and nucleic acids, using computational methods based on molecular dynamics.

Travel to Scientific Meetings

During 2007-08 PR-LSAMP provided a total of \$14,580 in travel stipends for students to present their research projects in national conferences. Twenty-seve (27) STEM students from five (5) PR-LSAMP institutions benefited from this PR-LSAMP initiative. Examples of national forums attended are the AAAS, ACS, and AICHE. **Table 7** presents by institution the number of students that received travel stipends and total amount of funds awarded.

Table 7
Travel Stipends Awarded to STEM Undergraduate Students
To Present Research Projects at National Scientific Conferences in 2007-08

Institutions	Number of Participants	Funds Awarded (\$)
UPR Rio Piedras	10	\$5000
UPR Humacao	3	\$1400
UPR Mayaguez	10	\$6180
UIA Bayamon	3	\$1500
UPR Bayamon	1	\$500
Total	27	\$14,580

NIST Summer Internships

Since Phase I the National Institute of Standards and Technology (NIST) of the U.S. Department of Commerce, has been providing summer research experiences to PR-LSAMP students. During the summer of 2008, five students, from four different PR-LSAMP institutions participated in the 9 to 12 week summer Internship Program. NIST provided a total of \$29,260 to cover stipends, housing, and travel expenses. This internship provides students with the opportunity to work in research projects with mainland STEM students and nationally recognized researchers. **Table 8** presents the name of the participants and their research projects.

Table 8
NIST Summer of 2008
Name of PR-LSAMP Participants, Institution and STEM Field

Name of Student	Institution	STEM Field
Stephanie Montalvo	UPR-Mayaguez	Physics
Raiza Cortés	UPR-Mayaguez	Computer Science
Paul Fuentes	UIA-Bayamón	Electrical Engineering
Angélica Muñiz	UPR-Mayaguez	Electrical Engineering
Axel Rivera	UPR-Humacao	Computational Mathematics

Pfizer Fellowships

PR-LSAMP joined efforts with Pfizer Corporation and five students in 2007-08 received a Pfizer fellowship for studies in Pharmaceutical Sciences, as shown in **Table 9**. Fellowships cover their cost of studies and research.

Table 9
Pfizer 2007-2008 Fellowship Recipients and Institution

Name	Institution
Sonia de la Torre	UPR Rio Piedras
Lismarie Delgado	UPR Medical Sciences Campus
Joshua Leon	UPR Mayaguez
Jessica Torres Lebron	UPR Medical Sciences Campus
Wandylis Vargas	UPR Mayaguez

FaST (Faculty and Student Teams) Program

PR-LSAMP received a \$55,500 Supplemental award to participate in the DOE FaST and SULI Programs. With these funds two professors and their students spent the Summer of 2008 at Argonne National Laboratory: Dr. Eduardo Ortiz a Computer Engineering professor at UPR-Mayaguez and three of his students, Zulinette Rodriguez, Angel Reyes and Luis Rodriguez worked with Dr. Guenter Conzelmann ; and Dr. Luis Rivera, a Chemistry professor at UPR-Mayaguez, and three of his students, Chyara Rivera, Eileen Zayas and Christian Aponte, worked with Dr. Leo Chin. Jason Trinidad, an undergraduate Computer Engineering student from UIA Bayamon, received funds under the SULI Program to do research at Fermi National Accelerator Laboratory during the Summer of 2008.

ACTIVITY #3 – ROLE MODEL SEMINARS

Description of Activity #3:

Role Model Seminars will be established at each participating PR-LSAMP institution to provide students an opportunity to hear and meet nationally renowned scientists, local researchers and scientists, and engineers working in industrial settings in Puerto Rico. The program will have a dual purpose, to enhance students' academic preparation through the scientific topic to be covered by each speaker, and to have the speakers serve as role models. Speakers will share pivotal events and influences on their educational, personal and scientific careers, such as significant events that shaped their decision to remain in school and conduct studies in a scientific or engineering field; mentors; major influences, such as research experiences or participation in scientific fairs, and particularly, obstacles encountered and how they overcame them. Following this presentation designed to establish rapport with the students, speakers will cover a scientific topic based on his/her field of research. Former and current PR-LSAMP BDP Fellows will attend these conferences to also serve as role models and share with undergraduate students their graduate experience.

Findings for Year 2:

The Turabo University of PR invited Dr. Meredith Blackwell, from Louisiana State University. Dr. Blackwell was the main speaker at The X Annual Conference of the Mycological Society, with the topic: "Identification and Segregation of Yeast Associated to Insects" She also offered conferences to STEM students at UPR-Rio Piedras, UPR-Mayaguez, UPR-Aguadilla, and Turabo University.

ACTIVITY #4: THE ANNUAL BEST PRACTICES CONFERENCE ON TEACHING AND LEARNING

Description of Activity #4:

PR-LSAMP offers the Annual Best Practices Conference on Teaching and Learning. Approximately 200 STEM faculty members attend this event. Local and national resources are selected to present their successful teaching and learning strategies. The event continues to sustain the network of support developed among STEM faculty members from the different PR-LSAMP institutions. This network is also reinforced electronically through the PR-LSAMP Website.

Findings for Year 2:

For the past five years PR-LSAMP has been sponsoring an annual conference on Best Teaching and Learning Practices to Improve Students' Academic Performance. The conference was held on September 28, 2007, and this year's topic was "**Climate, Climate Change, and Education**". Four main speakers addressed the latest research trends in this area: Dr. Edwin Nuñez from COLSA Corporation; Dr. Jim

Kasting from The Pennsylvania State University; Dr. Craig Lingle from The University of Alaska, and Dr. José Molinelli from the University of Puerto Rico at Rio Piedras.

BD Fellows from the different cohorts attended the activity together with 91 STEM undergraduate students, 74 STEM faculty members, and 5 high school students. Participants received a copy of the book “The Atlas of Climate Change: Mapping the World’s Greatest Challenge” by Kristin Dow and Thomas Dowing. Eighty seven (87) STEM faculty members, 31 graduate students, and 13 undergraduate students attended the activity for a total of 131 participants.

Activity #5 - The Bridge-to-the-Doctorate Program

The thrust of this activity is to motivate former PR-LSAMP students to continue graduate studies in a STEM field. The BD Program offers 12 fellowships annually (except for Year 1 when only 10 fellowships were awarded) for the first two years of graduate studies. In August 2003 PR-LSAMP received its first Supplemental Award to initiate the Bridge-to-the-Doctorate Program.

Findings for the BD Program

As of August 2007 the BD Program has awarded 58 BD fellowships. Fifty six Fellows are in the pipeline for the Ph.D. Fellows represent all STEM disciplines, as shown on **Table 10**.

Table 10
Number of BD Fellows by STEM Discipline

STEM Discipline	Fellows
Chemistry	28
Biology	12
Engineering	7
Physics	6
Marine Sciences	3
Mathematics	2
Total	58

A survey conducted in March 2007 shows that:

1. Forty three Fellows have a GPA of 3.5 or higher; 16 with a GPA of 4.0
2. Fellows have benefited from 90 workshops, conferences and field trips offered by the BD Support Program during this 5-year period
3. Thirty one Fellows intend to pursue post-doctoral studies either in Puerto Rico or the US mainland
4. Fifty Fellows will apply for faculty positions at research-oriented institutions
5. The research work of the Fellows has resulted in 62 papers published in peer review journals
6. All 58 Fellows have presented their research work in scientific conferences at the national level
7. Four hundred and nine local, national, and international conferences have been attended by Fellows
8. Twenty one Fellows have presented their research work at international congresses held in Australia, Austria, Brazil, Denmark, France, Germany, Greece, Guadeloupe, Guatemala, Holland, Hungary, India, Italy, Mexico, New Zealand, Poland, Spain, Turkey, and United Kingdom.
9. During the summer of 2008 a group of nine Fellows will be attending the International Conference on Global Warming to be held in Istanbul, Turkey. Other 12 Fellows will attend the 4th International Congress on Bioengineering and Nanotechnology in Dublin, Ireland.

Table 11 shows per Cohort, the number of Fellows and the scientific conferences attended.

Table 11
Fellows and Scientific Conferences attended by BD Cohort

Cohort	Fellows	Scientific Conferences
1	10	112
2	12	66
3	12	115
4	12	83
5	12	33
Total	58	409

Tables 12-15 and 19 show the Fellow's academic progress by Cohort.

Cohort #1 (2003-05) - Ten BD fellowships were awarded (one in Biology, one in Physical Chemistry and eight in Chemistry). **Table 12** shows academic progress of Cohort #1 Fellows

Table 12
Academic Progress of Cohort #1 (2003-05) BD Fellows, as of June 2008

Fellows	STEM Field	GPA	Presentations in Scientific Conferences	Number of Credits	Graduation Date
Azlin Biaggi	Physical Chemistry	3.9	11	46	Obtained PhD 06/08
Michelle Cartagena	Chemistry	3.5	-	70	PhD 06/09
Agustín Díaz	Chemistry	4.0	14	76	PhD 06/09
Yamaris Pacheco	Chemistry	3.77	14	76	PhD 06/09
Daniel Caballero	Chemistry	3.8	5	68	PhD 06/09
Jessica Oyola	Chemistry	3.67	6	68	PhD 06/09
Karilys Gonzalez	Chemistry	3.81	7	84	PhD 06/09
Marilyn García	Chemistry	3.75	6	105	PhD 06/09
Omar Cruz	Chemistry	3.68	2	68	PhD 05/09
Luzed Díaz	Biology	3.92	3	42	PhD 05/09

Cohort #2 (2004) - The twelve Cohort #2 Fellows began graduate studies in August 2004 and completed their first two years of graduate studies in July 2006. **Table 13** shows academic progress of Cohort #2 Fellows.

Table 13
Academic Progress of Cohort #2 (2004-06) BDP Fellows, as of March 2007

Fellows	STEM Field	GPA	Presentations in Scientific Conferences	Number of Credits	Graduation Date
Olga Abreu	Marine Sciences	3.49	5	37	MS 05/08
Deborah Acevedo	Chemistry	3.25	11	33	MS 12/07 PhD 2010
Yashira Estrada	Marine Sciences	3.3	5	33	MS 12/07
Miguel Gonzalez	Chemistry	3.41	8	33	MS 05/2007 PhD 05/2011
Luis Gonzalez	Civil Eng.	3.3	4	36	MS 05/07
Laura Granell	Chemistry	3.68	8	32	MS 05/07
Yeira Padilla	Chemical Engineering	3.55	7	37	PhD 12/08
Yaritza Maldonado	Marine Sciences		7	30	MS 12/08
Luis Rodriguez	Civil Engineering	4.0	-	36	MS 05/07
Priscilla Santiago**	Chemistry				MS 05/07
Madalis Casiano	Chemistry	-	-	-	Opted for Employment
Lourdes Cabello	Chemistry	-	-	-	Opted for Employment

**Attending university in the US Mainland.

Cohort #3 (2005) – Fellows from Cohort #3 began graduate studies in August 2005, and completed their first two years of graduate studies in July 2007. **Table 14** shows the academic progress of Cohort #3 Fellows.

Table 14
Academic Progress of Cohort #3 (2005-07) BDP Fellows, as of June 2007

Fellows	STEM Field	GPA	Presentations in Scientific Conferences	Number of Credits	Graduation Date
Felix Araujo	Biology	3.60	2	30	MS 05/08 PhD in North Carolina
Sofia Burgos	Biology	3.91	14	40	PhD 2010 UPR-Rio Piedras
Yizaira Diaz	Chemistry	4.0	11	50	PhD 2010 UPR-Rio Piedras
Enid Contes	Chemistry	3.5	8	32	PhD 2011 UPR-Rio Piedras
					PhD 2010

Fellows	STEM Field	GPA	Presentations in Scientific Conferences	Number of Credits	Graduation Date
Giselle Flores	Chemistry	3.66	11	42	UPR-Rio Piedras
Jose González	Biology	3.92	6	42	PhD 2009 UPR-Rio Piedras
Ana Longo	Biology	3.79	18	29	MS 2008 UPR-Rio Piedras
Jazmin Martínez	Physics	3.40	7	30	MS 2008 PhD 2011
Pamela Medina	Biology	4.00	10	30	MS 2008 UPR-Rio Piedras
Manuel Rivera	Physics	3.10	7	25	MS 2008 PhD UPR-Rio Piedras
Francisco Solá	Physics	3.80	5	49	PhD 2009 UPR-Rio Piedras
Damaris Suazo	Chemistry	3.37	5	50	MS 2008 UPR-Rio Piedras

Cohort #4 (2006-08) – The twelve Cohort #4 Fellows began graduate studies in August 2006 – six in Chemistry; two in Biology; two in Mathematics, and two in Physics. **Table 15** presents their academic progress in their second year of graduate studies.

Table 15
Academic Progress of Cohort #4 (2006-08) Fellows, as of June 2008

Fellows	STEM Field	GPA	Presentations in Scientific Conferences	Number of Credits	Graduation Date
Edward Avilés	Chemistry	3.80	5	36	PhD 2010
Jesúan Betancourt	Physical Chemistry	3.68	6	42*	PhD 2010
Barbara Casañas	Chemistry	3.00	7	36	MS 2009
Yanira Enríquez	Chemistry	3.85	7	38	PhD 2011
Griselle Hernández	Chemistry	3.14	6	38	MS 2009
Pablo Hernández	Biology	3.64	8	31*	MS 2008 PhD 2012
María del Mar García	Chemistry	3.28	10	38	PhD 2011
Mariely Hernández	Mathematics	3.12	3	30	MS 2009
Iván López	Physics	3.63	8	31	MS 2008
Fernando Piñero	Mathematics	3.83	1	49	MS 2008
Francesca Ruiz	Biology	3.88	7	28	MS 2009 PhD 2012
Pamela Vallejo	Chemistry	4.0	5	36	PhD 2010

* Took graduate courses as undergraduates

Supporting BDP Activities for Cohort #4 Fellows

Table 16 shows the activities offered by PR-LSAMP to Cohort #4 Fellows during their second year of graduate studies.

Table 16
BD Supporting Activities for Cohort #4 Fellows, Academic Year 2007-08

Topics	Resource(s)
Educational Methodologies for Science Education	Dr. Lizzette Velazquez
Global Structure and Dynamic Properties of RNA Molecules	Ms. Annette Casiano, Graduate Student
Climate, Climate Change and Education	Dr. Craig Lingle, Dr. Jim Kasting and Dr. Edwin Nuñez
Introduction to Ecological Micology	Dr. Paul Bayman
Best Practices on Teaching and Learning Annual Conference	Dr. James Beckvar, Dr. Ronald Miller and Dr. Arleen Russel
Tropical Aquatic Insects	Dr. Alonso Ramirez
Leaders and Leadership in STEM Education	Dr. Jeanne Narum
Field Trip to Isla Magueyes Marine Laboratory UPR	Dr. Juan Gonzalez Lagoa, Dr. Roy Armstrong and Dr. Jorge Corredor
The Use of Photochemical Techniques in the Study of DNA Molecules	Dr. Angel Marti
Up in the Andes to down in the Lab: Journeys of a Plant Evolutionary Biologist	Dr. Jason Rauscher
Puerto Rico Interdisciplinary Scientific Meeting	Dr. Angel Garcia
Geological Oceanography	Dr. Maritza Barreto
PR-EPSCoR Annual Meeting	Dr. Ricardo Marti
Workshop on Micology	Dr. Meredith Blackwell

Conferences Attended by Cohort #4 Fellows during their Second Year of Graduate Studies

Table 17 presents the scientific conferences attended by BDP Cohort #4 Fellows during their second year of fellowship.

Table 17
Scientific Conferences attended by Cohort #4 Fellows
Academic Year 2007-08

Name	Conference	Site	Date of Travel
Jesúan Betancourt	Visita al Dr. Freddy Zipman en Columbia University	Columbia University, NY	September 30-October 3, 2007
	Global Conference on Global Warming	Istanbul, Turkey	July 6-10, 2008
Jesúan Betancourt	BIAMS 2008 9 th International Workshop on Beam Injection Assessment of Microstructures in Semiconductors	Toledo, Spain	June 29- July 3, 2008

Name	Conference	Site	Date of Travel
	Research Experiences in Space and Weather Storms from the Sun	Arlington, Texas	July 19-26, 2008
Bárbara Casañas	31 st ACS Senior Technical Meeting	Mayagüez, Puerto Rico	November 2-3, 2007
Bárbara Casañas	235 th ACS National Meeting and Exposition	Louisiana, New Orleans	April 6-10, 2008
Bárbara Casañas	28vo Congreso Latinoamericano de Química	San Juan, Puerto Rico	July 27- August 1, 2008
	International Congress on BioEngineering and Nanotechnology	Dublin, Ireland	July 21-24, 2008
Yanira Enríquez	235 th ACS National Meeting and Exposition	Louisiana, New Orleans	April 6-10, 2008
	International Congress on BioEngineering and Nanotechnology	Dublin, Ireland	July 21-24, 2008
María del Mar García	235 th ACS National Meeting and Exposition	Louisiana, New Orleans	April 6-10, 2008
	International Congress on BioEngineering and Nanotechnology	Dublin, Ireland	July 21-24, 2008
Mariely Hernández	9 th World Conference of the International Society for Bayesian Analysis (ISBA)	Hamilton Island, Queensland, Australia	July 21-25, 2008
Griselle Hernández	235 th ACS National Meeting and Exposition	Louisiana, New Orleans	April 6-10, 2008
	International Congress on BioEngineering and Nanotechnology	Dublin, Ireland	July 21-24, 2008
Iván López	5 th International Conference on Broadband Dielectric Spectroscopy and Its Applications	Lyon, France	August 25-29, 2008
	Global Conference on Global Warming	Istanbul, Turkey	July 6-10, 2008
	Research Experiences in Space and Weather Storms from the Sun	Arlington, Texas	July 19-26, 2008

Name	Conference	Site	Date of Travel
Francheska Ruiz	6 th World Congress of Herpetology	Manaus, Brasil	August 17-24, 2008
Pamela Vallejo	235 th ACS National Meeting and Exposition	Louisiana, New Orleans	April 6-10, 2008
	Global Conference on Global Warming	Istanbul, Turkey	July 6-10, 2008
Pablo Hernandez	Global Conference on Global Warming	Istanbul, Turkey	July 6-10, 2008
	Research Experiences in Space and Weather Storms from the Sun	Arlington, Texas	July 19-26, 2008
Edward Aviles	Global Conference on Global Warming	Istanbul, Turkey	July 6-10, 2008
	Research Experiences in Space and Weather Storms from the Sun	Arlington, Texas	July 19-26, 2008
Fernando Piñero	Research Experiences in Space and Weather Storms from the Sun	Arlington, Texas	July 19-26, 2008

Cohort #5 (2007-09) – Cohort #5 Fellows (12 students) began graduate studies in August 2007. **Table 18** presents the names of the Fellows, the BS granting institution, and their STEM discipline, and **Table 19** presents their academic progress during their first year of graduate studies.

Table 18
Cohort #5 Fellow – August 2007

Name of Fellow	BS Degree Granting Institution	Program/Field
Dionne Hernandez	UPR-Humacao	Chemistry
Ismael Alicea	UPR-Humacao	Chemistry
Manuel Delgado	UIA-Arecibo	Biology
Ida Pantoja	UPR-Rio Piedras	Biology
Karinel Nieves	UPR-Rio Piedras	Chemistry
Ana R. Cameron	UPR-Mayaguez	Chemical Engineering
Ruth Hidalgo	UPR-Mayaguez	Mechanical Engineering
Denisse Soto	UPR-Mayaguez	Chemical Engineering
Damian Reyes	UPR-Mayaguez	Chemical Engineering
Carlos A. Rodriguez	UPR-Rio Piedras	Biology
Rosalyn Gonzalez	UPR-Cayey	Biology
Juan Burgos	UPR-Rio Piedras	Physics

Table 19
Academic Progress of Cohort #5 (2007-09) Fellows as of June 2008

Fellows	STEM Field	GPA	Presentations in Scientific Conferences	Number of Credits	Graduation Date
Ismael Alicea	Chemistry	4.0	1	22	2012
Juan Burgos	Physics	4.0	2	22	2009
Ana Cameron	Chemical Engineering	4.0	1	19	2012
Manuel Delgado	Biology	3.57	3	25	2010
Rosalyn Gonzalez	Biology	3.15	2	16	2012
Dionne Hernandez	Chemistry	3.67	3	21	2012
Ruth Hidalgo	Chemical Engineering	3.38	4	22	2012
Ida Pantoja	Biology	3.60	4	18	2012
Karinel Nieves	Chemistry	4.0	2	22	2011
Damian Reyes	Chemical Engineering	4.0	2	22	2012
Carlos Rodriguez	Biology	4.0	4	18	2010
Denisse Soto	Chemical Engineering	3.9	2	30	2011

Supporting BDP Activities for Cohort #5 Fellows

Table 20 shows the activities offered by PR-LSAMP to Cohort #5 Fellows during their first year of graduate studies.

Table 20
BD Supporting Activities for Cohort #5 Fellows, Academic Year 2007-08

Topics	Resource(s)
Climate, Climate Change and Education	Dr. Craig Lingle, Dr. Jim Kasting and Dr. Edwin Nuñez
Best Practices on Teaching and Learning Annual Conference	Dr. James Beckvar, Dr. Ronald Miller and Dr. Arleen Russel
Leaders and Leadership in STEM Education	Dr. Jeanne Narum
Field Trip to Isla Magueyes Marine Laboratory UPR	Dr. Juan Gonzalez Lagoa, Dr. Roy Armstrong and Dr. Jorge Corredor
The Use of Photochemical Techniques in the Study of DNA Molecules	Dr. Angel Marti
Up in the Andes to down in the Lab: Journeys of a Plant Evolutionary Biologist	Dr. Jason Rauscher
Puerto Rico Interdisciplinary Scientific Meeting	Dr. Angel García
Geological Oceanography	Dr. Maritza Barreto
PR-EPSCoR Annual Meeting	Dr. Ricardo Marti
Workshop on Micology	Dr. Meredith Blackwell

Conferences Attended by Cohort #5 Fellows during their First Year of Graduate Studies

Table 21 presents the scientific conferences attended by BD Cohort #5 Fellows during their first year of studies.

Table 21
Scientific Conferences attended by Cohort #5 Fellows
Academic Year 2007-08

Name	Conference	Site	Date of Travel
Juan Burgos	2007 Annual Meeting of the Division of Nuclear Physics	Newport News, Virginia	October 10-13, 2007
	Global Conference on Global Warming	Istanbul, Turkey	July 6-10, 2008
Ana R. Camerón	The XVth International Congress on Rheology/The Society of Rheology 80 th Annual Meeting	Monterrey, California	August 3-8, 2008
	International Congress on BioEngineering and Nanotechnology	Dublin, Ireland	July 21-24, 2008
Manuel Delgado	Neuroscience 2007	San Diego, California	November 3-7, 2007

Name	Conference	Site	Date of Travel
	International Congress on BioEngineering and Nanotechnology	Dublin, Ireland	July 21-24, 2008
Rosalyn González	2008 Annual Meeting of American Society for Biochemistry and Molecular Biology	San Diego, California	April 5-9, 2008
	International Congress on BioEngineering and Nanotechnology	Dublin, Ireland	July 21-24, 2008
Ruth Hidalgo	TMS 2008 Annual Meeting and Exhibition	Louisiana, New Orleans	March 8-12, 2008
	International Congress on BioEngineering and Nanotechnology	Dublin, Ireland	July 21-24, 2008
Denisse Soto	The 11 th Conference on Electrorheological Fluids and Magnetorheological Suspensions	Dresden, Germany	August 25-29, 2008
	International Congress on BioEngineering and Nanotechnology	Dublin, Ireland	July 21-24, 2008
Karinel Nieves	Global Conference on Global Warming	Istanbul, Turkey	July 6-10, 2008
Carlos A. Rodriguez	Global Conference on Global Warming	Istanbul, Turkey	July 6-10, 2008
Ida Pantoja	Global Conference on Global Warming	Istanbul, Turkey	July 6-10, 2008
Damian Reyes	International Congress on BioEngineering and Nanotechnology	Dublin, Ireland	July 21-24, 2008
Dionne Hernandez	International Congress on BioEngineering and Nanotechnology	Dublin, Ireland	July 21-24, 2008
Ismael Alicea	International Congress on BioEngineering and Nanotechnology	Dublin, Ireland	July 21-24, 2008
Denisse Soto	The 11 th Conference on Electrorheological Fluids and Magnetorheological Suspensions	Dresden, Germany	August 25-29, 2008
	International Congress on BioEngineering and Nanotechnology	Dublin, Ireland	July 21-24, 2008

Visits to High Schools

Each BDP fellow visited annually a public high school participating in the PR-LSAMP Pre-College-to-College bridging component. As part of the workshops conducted by PR-LSAMP on Saturdays at the selected schools, 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 motivated them to pursue careers in STEM fields.

Undergraduate STEM Education

During academic year 2007-08 PR-LSAMP institutions secured a total of \$22.9M to enhance, strengthen, and sustain their STEM Programs. **Tables 22 to 29** present the educational initiatives initiated or continued at each PR-LSAMP institution. Projects are presented by funding source and amount of funds assigned for that year.

Table 22 - UPR-Aguadilla

Project Description	Sponsor	Amount of Funds
Institute for the Development of Math Knowledge	DoE	\$128,376
CECIMAT	DoE	\$1,273,376
Monofilament Recovery and Recycling Program of Puerto Rico	Toyota Foundation and EPA	\$62,000
CAM	DoE	\$148,200
Faculty Development Workshop Day	UPR	\$6,000
Professional Development Workshops for the Physics, Electronics, Math and Natural Sciences Departments	UPR	\$5,500
TOTAL		\$1,623,452

Table 23 - UPR-Arecibo

Project Description	Sponsor	Amount of Funds
Improving Academia Outcomes for Science and Math Students through a Technology-Based Consortium Program (TV-TBC).	US DoE	\$100,000
Collaboration through Technology Initiatives to Enhance Academic, Student and Library Support Services (TV-COOP)	US DoE	\$700,000
Curricular and Professional Development Activities to support Associate Degree in Biotechnology Operations	NSF	\$201,244
Institute for the Understanding of Science and Mathematics Integrating Research and Technology	PR DoE	\$211,000
Planetary Habitability: Modeling the Specific Growth rate of Microorganisms in the Dynamic Temperatures of Natural Environments	UPR	\$6,765
Implementation of SOP and Experiments in Biotechnology using Bioreactors	UPR	\$5,939
Integrated Science Multiuse Laboratory (ISMuL)	PR Space Grant-NASA	\$30,000
Development of Basic Skills Program in Mathematics	UPR	\$10,722
ACS National Meeting Travel Grant (NMTG)	ACS	\$300
Grant for chemical technology students to travel to the 235th ACS National Meeting in New Orleans	UPR	\$2,900
Minority Travel Awards for Undergraduate Students (2)	Society of Toxicology	\$5,000

Project Description	Sponsor	Amount of Funds
Minority Travel Award for Advisors (1)	Society of Toxicology	\$2,500
2008 Summer Internships for STEM students (1 Chemical Technology, 1 Life Sciences and 1 Computer Sciences)	Naval Research Lab	\$13,500
2008 Summer Internships for STEM students (4 students)	NSF REU	\$12,000
2008 Summer Internship for STEM student (1 Life Sciences)	Proctor and Gamble	\$3,500
Student Summer Internship (1 chemical technology)	Bacardi	\$2,000
Liaison with Local Biotechnology Industries	Abbott Biotechnology Ltd.	\$6,500
Student Summer Internship	Bacardi	\$433
TOTAL		\$1,314,303

Table 24 - UPR-Cayey

Project Description	Sponsor	Amount of Funds
Campus Suicide Prevention	SAMSHA	\$74,236
ALACIMA – Puerto Rico Math and Science Partnership	NSF	\$1,086,193
Center for Training and Technological Development for the Community	PR DoE	\$936,865
Howard Hughes	HHMI	\$131,050
Institute for the Support of the Learning Centers of the Community	PR DoE	\$478,034
Strategies to Create a Peaceful Climate in our Schools	PR DoE	\$500,000
Training in the Use and Management of the Quizdom Application	Camera Mundi	\$9,500
Title V Cooperative	US DoE	\$590,542
Research Infrastructure for Minority Institutions	NIH	\$842,802
Donations for Students	ACS	\$17,950
The Forest and the Community	Department of Natural Resources	\$68,541
TOTAL		\$4,735,713

Table 25 - UPR-Rio Piedras

Project Description	Sponsor	Amount of Funds
Advanced Instrumentation for Enhancement of Nanotechnology Education and Research	DOD	\$258,000
Support for University Biomedical Excellence at UPR-Rio Piedras	DHHS	\$1,375,575
Strengthening Institutions-Hispanic Serving Institutions	USDE	\$542,333
Puerto Rico Math and Science Partnership	NSF	\$6,834,881
Research Experience for Teacher LTER	NSF	\$74,000
Developing a Sustainable Education and Research Agenda at El Verde Field Station	NSF	\$17,328
Development of Contextual and Integrated Curriculum at the Elementary Level	USDE	\$1,182,012
Teaching Ecological Complexity in the Field Through Science Inquire	University of Portland	\$24,899
Establishment of a Professional Development Program Between the UPR-PUPR-06	UPR-Mayaguez	\$51,300
TOTAL		\$10,360,328

Table 26 - UPR-Mayaguez

Project Description	Sponsor	Amount of Funds
Summer Transportation Institute	FHA	\$52,000
Summer Research Internship	US Army Corp of Engineers	\$300,000
Topography and Surveying Internship	CIAPR	\$15,000
Pre-Engineering Summer Camp	Xerox, PR Nasa Space Grant and CPES	\$38,000
Mechanical Engineering Summer Camp	Boeing, GM, UTC, CIAPR, Kimberly & Clark, Henkel	\$30,000
Biomind	Amgen Foundation of California	\$250,000
Science on Wheels	NSF	\$300,000
PREM	NSF	\$32,000
REU	NSF	\$120,000
Collaborative Adaptive Sensing of the Atmosphere and Engineering Research Center	NSF	\$20,000
REU-Premur	NSA	\$96,000
2008 Math Competitions	American Mathematical Society Epsilon	\$7,500
Academic Affairs Department and Coop Plan	Boeing and Exxon	\$17,500
NOAA UPR-Mayaguez Educational Partnership	NOAA	\$10,000
Cooperative Agreement of Undergraduate Summer Research	NOAA	\$47,250
Total		\$1,335,250

Table 27 - UPR-Bayamon

Project Description	Sponsor	Amount of Funds
Spatial-Temporal Microclimate Modeling of the of the UPR-Bayamon Campus	UPR	\$18,522
Use of Rotation and Movement Matrix and Implementation of Algorithms of Robot Control	UPR	\$15,915
The Effect of Introduced Primates on Plants Populations in the Southwest of Puerto Rico: Seed Dispersal and Germination	UPR	\$12,631
Coenobita Clypeatus in Puerto Rico	UPR	\$7,241
Antigua and Barbuda Management Program: Natural Hazards Inventory and Risk Management	UPR	\$3,936
TOTAL		\$58,245

Table 28 – UIA-Bayamon

Project Description	Sponsor	Amount of Funds
Enhancement of Science Laboratories	McNeill Consumer Products	\$40,000

Project Description	Sponsor	Amount of Funds
Enhancement of Engineering Laboratories	Dialn Internative Learning	\$24,500
Improvement to References Publication for Engineering	International Society of Pharmaceutical Engineering	\$4,500
Engineering	Texas Instruments	\$8,000
TIGRE: The Interamerican Geospace Research Experiment	NASA	\$10,500
Title II-B: Mathematics and Science Partnership Program	US DoE	\$740,027
Student Support Services Program	US DoE	\$271,074
PR Space Grant Consortium	NASA	\$20,000
MSP21 Middle School Teacher	PR DE	\$1,582,747
MRI: Acquisition of a full-wave Interferometric Digital Radio System for Space Research and University Education	NSF	\$226,025
Gas Turbine Engine Mini Lab "Infrastructure Development for Education and Research the Mechanical Engineering Department at the Inter American University"	Department of the Army- Material Command	\$282,453
TOTAL		\$3,209,826

Table 29 - Pontifical Catholic University of P.R.

Project Description	Sponsor	Amount of Funds
MSEIP: Enhancement Biology, Chemistry and Environmental Sciences Lab Experiences and Undergraduate Research	USDE	\$45,583
MSEIP: An Online Lecture and Laboratory Experience in General Chemistry without Compromising Academic Rigor for Nontraditional Students	USDE	\$176,479
Puerto Rico Space Grant Consortium	NASA	\$19,950
TOTAL		\$242,012

VII. Contributions to the Development of Human Resources

In academic year 2007-08, PR-LSAMP institutions awarded 2,674 baccalaureate degrees in science, technology, engineering, and mathematics (STEM) disciplines. Since 1991, **PR-LSAMP institutions have awarded a total of 47,401 BS degrees in STEM fields, making a significant contribution to the STEM workforce.** Table 30 presents the number of STEM degrees awarded per academic year, and Table 31 the number of BS degrees awarded in 2007-08 by PR-LSAMP institution.

Table 30
Total Number of BS STEM Degrees Awarded by Academic Year

Academic Year	Number of STEM BS Degrees Awarded
1990-91	1,709
1991-92	1,840
1992-93	1,896
1993-94	2,086
1994-95	2,281
1995-96	2,674
1996-97	2,754
1997-98	2,726
1998-99	2,789
1999-00	2,771
2000-01	2,893
2001-02	3,094
2002-03	3,207
2003-04	3,123
2004-05	3,106
2005-06	3,124
2006-07	2,654
2007-08	2,674
TOTAL	47,401

Table 31
BS Degrees Awarded by PR-LSAMP Institution in Academic Year 2007-08

Institution	Year 2007-2008
University of Puerto Rico	1,987
Pontifical Catholic University	89
Inter American University	598
TOTAL	2,674

Table 32 presents the number of BS degrees awarded per STEM discipline in Academic Year 2007-08.

Table 32
STEM Baccalaureate Degrees Awarded by Discipline in 2007-08

STEM Discipline	BS Degrees Awarded
Chemistry	332
Physics/Astronomy	118
Mathematics	40
Life Science	254
Computer Science	17
Engineering	633
Geosciences	1136

Agricultural Sciences	41
Environmental Sciences	103
TOTAL STEM Disciplines	2,674

Enrollment in STEM Disciplines at PR-LSAMP Institutions

Table 33 shows undergraduate STEM enrollment from 1991 to 2007. **Table 34** shows undergraduate enrollment by STEM discipline in the Fall 2007, and **Table 35** presents STEM undergraduate enrollment by institution.

Table 33
Total Undergraduate STEM Enrollment By Academic Year
At Participating PR-LSAMP Institutions

STEM Undergraduate Enrollment	Academic Year
12,572	1991-92
14,557	1992-93
14,818	1993-94
16,344	1994-95
19,139	1995-96
23,159	1996-97
24,767	1998-99
23,476	1999-00
23,427	2000-01
26,524	2001-02
27,529	2002-03
27,068	2003-04
28,299	2004-05
27,993	2005-06
23,825	2006-07
23,975	2007-08

Table 34
FT/PT Undergraduate Enrollment at PR-LSAMP Institutions By STEM Discipline
Fall 2007

STEM Discipline	Undergraduate Enrollment Fall 2007
Chemistry	2,153
Physics/Astronomy/Electronics	1,099
Mathematics	635
Computer Science	2,630
Geosciences	112
Engineering	5,937
Life Sciences	10,118
Environmental Science	409
Agricultural Science	882
TOTAL ALL STEM DISCIPLINES	23,975

Table 35
Undergraduate STEM Enrollment by PR-LSAMP Institution Fall 2007

Institution	STEM Enrollment Fall 2007
UPR-Rio Piedras	2493
UPR-Mayaguez	8291
UPR-Humacao	992
UPR-Cayey	1004
UPR-Bayamón	1175
UPR-Arecibo	566
UPR-Aguadilla	901
UPR-Ponce	n/a
Inter American University	7414
Pontifical Catholic University	1139
TOTAL	23,975

Baccalaureate Graduates that Continue Graduate Studies

If we track the baccalaureate origin of the nationwide PhD recipients, the National Opinion Research Center (NORC), which reports Ph.D. data, shows for the years 2001 to 2006 that:

- 18.47% of the Hispanics (U.S. citizens) that obtained a **PhD in a Natural Science** field nationwide, received their BS degree from a PR-LSAMP institution (340 out of 1,845). UPR-Río Piedras and UPR-Mayaguez are the leading baccalaureate institutions of U.S. Hispanic Ph.D.'s in Science.
- 19.2% of the Hispanics that obtained a **PhD in Engineering** nationwide, received their BS degree from a PR-LSAMP institution (71 out of 425). UPR-Mayaguez is the leading baccalaureate institution of U.S. Hispanic Ph.D.'s in Engineering.

Table 36 shows the leading U.S. Baccalaureate Institutions of U.S. Hispanic Ph.D.'s in the natural sciences for the 2001-2006, and **Table 37** for engineering fields.

Table 36
Top 25 Baccalaureate Institutions of U.S. Hispanic PhDs (U.S. Citizens Only)
Natural Sciences 2001-06

Baccalaureate Origin Institution	Degrees Awarded	
1. University of Puerto Rico – Rio Piedras	152	PR-LSAMP Institutions UPR-Rio Piedras = 152 UPR-Mayaguez = 98 UPR-Humacao = 31 UPR-Cayey = 18 UPR-Medical Sciences = 16 Pontifical Catholic U. = 12 IAU at San Germán = 8 UPR-Aguadilla = 5
2. University of Puerto Rico – Mayaguez	98	
3. University of California – Berkeley	45	
4. University of California – Los Angeles	36	
5. University of California – Davis	33	
6. University of Puerto Rico – Humacao	31	
7. University of Texas at Austin	29	
8. University of California – Irvine	29	
9. University of Florida	28	

		Total = 340
11. Univ. of New Mexico – Main Campus	25	
12. New Mexico State Univ. – Main campus	24	
13. University of Texas El Paso	24	
14. Texas A&M University	23	
15. MIT	22	
16. University of Miami	22	
17. Cornell University	21	
18. Harvard University	21	
19. University of Texas San Antonio	21	
20. University of Arizona	21	
21. Florida International University	19	
22. Univ. of California – Santa Cruz	19	
23. University of Puerto Rico – Cayey	18	
24. Stanford University	16	
25. University of Puerto Rico – Medical Sciences	16	
Total Top 25 Institutions	820	
Total Doctorates Granted to Hispanics	1,845	

Source: NSF/NIH/USED/NEH/USDA/NASA, Survey of Earned Doctorates, Williams-Kim@norc.org.

Other institutions in Puerto Rico with BS graduates that went on to receive a PhD during this period of time were: Pontifical Catholic University of Puerto Rico (12); UPR-Medical Sciences Campus (8), Inter American University at San Germán (8), and UPR-Aguadilla (5). In summary, institutions in Puerto Rico accounted for 41% of the baccalaureate origins of the Hispanic PhDs in the natural sciences from the top 25 institutions of Hispanic doctorate recipients, and 18.4% of all institutions.

Table 37
Top 19 Baccalaureate Institutions of U.S. Hispanic PhDs (U.S. Citizens Only)
Engineering 2001-06

Baccalaureate Origin Institution	Degrees Awarded
1. University of Puerto Rico – Mayaguez	75
2. MIT	18
3. University of Texas at El Paso	18
4. University of California – Berkeley	14
5. University of Puerto Rico – Rio Piedras	12
6. University of Florida	11
7. Texas A&M University	10
8. University of Texas at Austin	10
9. California Polytechnic State U. – San Luis Obispo	9
10. University of California – Davis	9
11. University of Illinois at Urbana	9
12. Purdue University – Main campus	8
13. Rensselaer Polytechnic Institute	8
14. Cornell University	7
15. University of Houston	7
16. University of Miami	6
17. University of New Mexico – Main Campus	6

18. New Mexico State University – Main campus	5
19. University of South Florida	5
Total Top 21 Institutions	247
Total Research Doctorates in Engineering	454

Source: NSF/NIH/USED/NEH/USDA/NASA, Survey of Earned Doctorates, Williams-Kim@norc.org

At the local level, the University of Puerto Rico's three graduate institutions, UPR-Rio Piedras, UPR-Mayaguez, and UPR-Medical Sciences awarded 51 PhD degrees in science and engineering in 2007. **Table 38** presents the number of PhD degrees awarded by these three campuses in 2007-08 by science and engineering field. **Table 39** presents the number of PhD degrees awarded by the three campuses from 1990 to 2007.

Table 38
Number of PhD Degrees Conferred in 2007-08 by UPR System

Institution	Number of PhD Degrees	Science and Engineering
UPR-Rio Piedras	26	Chemistry (10) Biology (10) Chemical Physics (6)
UPR-Medical Sciences	6	Microbiology (2) Biochemistry (4)
UPR-Mayaguez	19	Marine Sciences (2) Engineering (9) Chemistry (1) Computer Science (7)
Total	51	

Table 39
**Number of PhD Degrees Conferred by the University of Puerto Rico
by Science and Engineering Field from 1990 to 2007**

Academic Year	Number of PhD Degrees Conferred
1990	14
1991	9
1992	9
1993	17
1994	12
1995	10
1996	17
1997	16
1998	31
1999	22
2000	25
2001	36
2002	32
2003	30
2004	23

2005	31
2006	48
2007	29
2008	51
TOTAL	462

VIII. Dissemination, Publications and Products

Dissemination

The PR-LSAMP Web Page

The PR-LSAMP web page (www.prlsamp.org) describes the PR-LSAMP program, including the calendar for the current year activities; information on past, current, and up-coming main events, such as the Puerto Rico Interdisciplinary Scientific Meeting and the Annual Best Practices Conference on Teaching and Learning. It also includes the PR-LSAMP Annual Reports with detailed descriptions on the activities and findings, and the data on enrollment and degrees awarded by institution.

A new electronic data base system was added to the PR-LSAMP Web Page which provides for: 1) electronic registering for all PR-LSAMP activities; 2) an electronic file on STEM researchers; 3) electronic evaluation of PR-LSAMP participants in undergraduate research experiences by the researchers; 4) electronic evaluation of all applications by the staff for compliance with PR-LSAMP requirements; 5) sending e-mails in group format; 6) electronic letters of recommendations and certification of work; 7) immediate access to individual data of PR-LSAMP participants, and 8) statistics on enrollment and degrees for any given year.

Other Dissemination Efforts

PR-LSAMP Liaison Officers, STEM faculty members and PR-LSAMP undergraduate and graduate students continue to be our best spoke-persons for the project as they attend and/or present their research projects in national scientific conferences

Publications

The PR-LSAMP Newsletter

A Newsletter is published twice a year and disseminated to all institutions in Puerto Rico and to LSAMP institutions nationwide. It includes the highlights of the activities and main events. Also, special issues are produced to cover significant events, such as the Bridge-to-the-Doctorates Fellowship Program

The PR-LSAMP Annual Report

A copy of the PR-LSAMP Annual Report is sent to the Presidents, Chancellors, Deans and Department Directors of all the PR-LSAMP institutions. A copy is also sent to the PI of the LSAMP institutions nationwide.