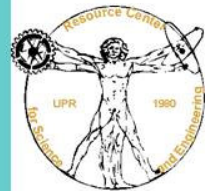




PUERTO RICO LOUIS STOKES ALLIANCE
FOR MINORITY PARTICIPATION



PR-LSAMP

2006-07 ANNUAL PROGRESS REPORT

YEAR 1 PHASE IV

Submitted to:

The National Science Foundation
August 2007



Dr. Manuel Gomez, PI

Dr. Ana C Piñero, Co-PI

**PR-LSAMP 2006-07 ANNUAL REPORT
YEAR 1 OF PHASE IV**

	Page
I. Introduction	1
II. Major Accomplishments	1
III. Participants and Collaboration with other NSF Programs	2
IV. Activities and Findings	4
Activity #1 – Enhancing Students Knowledge and Skills for Graduate Studies	4
Activity #2 – Mentored Undergraduate Research Experience	5
• PRISM	8
• Travel to Scientific Meetings	9
• NIST Summer Internships	9
• Pfizer Fellowships	10
• FaST and SULI Programs	10
Activity #3 – Role Model Seminars	11
Activity #4 – The Annual Best Practices Conference on Teaching and Learning	11
Activity #5 – The Bridge-to-the-Doctorate Program	12
V. Other Institutional Initiatives to Strengthen Undergraduate STEM Education	20
VI. Contributions to the Development of Human Resources	24
• Baccalaureate STEM Degrees Awarded	24
• Enrollment in STEM Disciplines	26
• PhD STEM Degrees	27
VII. Dissemination, Publications and Products	30

I. Introduction

The Puerto Rico Louis Stokes Alliance for Minority Participation (PR-LSAMP) is an alliance of the main 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 in Phase IV.

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 2006, 23,825 students were enrolled in STEM fields at PR-LSAMP institutions.
2. In academic 2006-07, 3,240 baccalaureate degrees were awarded in STEM disciplines.
3. Seventeen percent (17%) of the Hispanics who received a PhD nationwide in a natural science field, from 2000 to 2005, received their BS degree from a PR-LSAMP institution (NORC data).
4. Seventeen percent (17%) of the Hispanics who received a PhD nationwide in engineering, from 2000 to 2005, received their BS degree from a PR-LSAMP institution (NORC data).
5. The University of Puerto Rico awarded a total of 29 PhD degrees in STEM fields in academic year 2006-07.
6. A fifth Cohort of twelve BDP Fellows will begin graduate studies in August 2007, for a total of 58 BDP fellowships awarded by PR-LSAMP under this initiative.
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 2006-07, PR-LSAMP awarded 348 stipends (\$278,400) to undergraduate STEM students to participate in research experiences. Also, 262 stipends (\$52,400) were awarded by PR-LSAMP to researchers to cover laboratory materials for PR-LSAMP participants.
9. Three hundred sixty one (361) STEM students (259 undergraduates and 102 graduates presented their research projects at the annual Puerto Rico Interdisciplinary Scientific Meeting (PRISM), to an audience of 328 faculty members and students, for a total participation of 689 participants.
10. Seven (7) undergraduate STEM students received PR-LSAMP travel stipends (\$11,450) to present their research projects in national conferences.

11. The National Institute of Standards and Technology provided \$53,340 to seven undergraduate STEM students to participate in research experiences at their main site with nationally recognized scientists.
12. PR-LSAMP institutions secured \$26.9M in external and institutional funds to implement educational projects geared at strengthening STEM education at their institutions.
13. Pfizer Corp awarded 11 fellowships to Pharmaceutical Sciences majors for a total contribution of \$53,500.
14. PR-LSAMP received a \$46,500 supplemental award from NSF to participate in the FaST and SULI Programs.
15. One hundred and fifty five (155) STEM faculty members from 14 institutions attended de PR-LSAMP 2006 Annual Best Practices Conference on Teaching and Learning.

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 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 BDP 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-Rio 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. Noemí Cintrón, UPR-Río Piedras (Biology)
Dr. Jeannette Santos, UPR-Mayaguez (Engineering)
Dr. Denny S. Fernández, UPR-Humacao (Biology)
Prof. Luis Pérez, UPR-Cayey (Physics)
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. The RCSE also provided content and pedagogical training to science and math teachers in the public school system, through the Institute of Continuing Education for Math and Science Teachers.

At the undergraduate level, in addition to PR-LSAMP, the RCSE is coordinated 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 Puerto Rico Experimental Program to Stimulate Competitive Research (PR-EPSCoR), co-funded by NSF. NSF recently awarded the UPR Resource Center for Science and Engineering a three year grant to implement the PR-EPSCoR Institute for Functional Nanomaterials (IFN). 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 will work with five strategic national partners: Argonne National Laboratory; Purdue University; UMass, NASA Glenn Research Center, and Northwestern University, all nationally recognized for their center 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 fellowships 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 BDP Fellows.

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. In prior years, the RCSE coordinated the following projects that successfully completed their implementation cycle: Puerto Rico Statewide Systemic Initiative (PR-SSI); Puerto Rico Collaborative for Excellence in Teacher Preparation (PR-CETP), and the Puerto Rico Graduate Teaching Fellows in K-12 Education (GK-12).

IV. Activities and Findings for Year 1 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. Sixty freshman STEM students will be selected (30 from UPR-Rio Piedras and 30 from UPR-Mayaguez) to participate in 10 core skill workshops and 17 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 1:

At UPR-Rio Piedras: A total of 37 freshman students were selected (seven more than the original target). All students participated in the twelve workshops (four skill workshops and eight scientific workshops) designed and offered during academic year 2006-07. **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 2006-07**

Workshop	Speaker	Area
Introduction to University Life	Gerardo Morell	Physics
Statistical Skills	José Alonso	Physics
How to Prepare a Resume and Make Oral Presentations	Sandra McSoud	Education
Introduction to Scientific Literature	Jorge Colón	Chemistry
The History of Physics: From the Greeks to Our Times	Wilfredo Mattos	Physics
Introduction to Botany	Eugenio Santiago	Botany
Evolutionary Biology of Bats	Armando Rodriguez	Biology
The Orchids of Puerto Rico	James Ackerman	Biology
Puerto Rican Birds	José Colón	Ornitologist
Introduction to Microbiology Concepts	Gary Toranzos	Biology
Caribbean Geology	Hernán Santos	Geology
An Introduction to the Study of Fossils	Jorge Vélez	Geology

At UPR-Mayaguez: A total of 36 freshman students were selected (six more than the original target). All students participated in the ten workshops (four skill workshops and eight scientific workshops) designed and offered during academic year 2006-07. **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-Rio Piedras, Academic Year 2006-07

Workshop	Speaker	Area
The University Experience: A Perspective from Graduate Students	Graduate Students	Science and Engineering
Research Opportunities in Engineering	Jeannette Santos	Engineering
Introduction to Biotechnology	Carlos Rios	Biology
Spirit and Opportunity in Mars	Jim Bell	NASA
STEM Research Opportunities through the PR-LSAMP Program	Juan Gonzalez Lagoa	Marine Sciences
Chemical Analysis: Methodology and Equipment	Belinda Pastrana	Chemistry
Electronic Microscopic	Vivian Navas	Biology
The Geology of Puerto Rico	Hernán Santos	Geology
Applied Electromagnetism	Sandra Cruz Poll	Engineering

All participants demonstrated academic progress during their first year of studies and will begin their research projects next August.

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 the PR-LSAMP institutions. 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 1:

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	Biology
	Efrain O'Neill	Engineering
UPR-Humacao	Denny Fernandez	Biology
UPR-Cayey	Wilfredo Resto	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

Each institution offered during the year at least eight workshops to program participants. All institutions offered the four core workshops: 1) using data bases; 2) ethics in research; 3) analytical reading and thinking skills, and 4) basic lab safety. **Table 4** presents the workshops offered at each institution. The institutions' calendar of workshops was posted in the PR-LSAMP web page, so students from any institution could attend those of their choice.

Table 4
Workshops Offered at each PR-LSAMP Institution
Academic Year 2006-07

Institution	Workshops Offered
UPR-Rio Piedras	Ethics in Research Laboratory Safety Reading and Thinking Skills Resume and Oral Presentations Preparing for the GRE Graduate School Opportunities at Colorado State University
UPR-Mayaguez	How to Prepare a Research Article Laboratory Safety Critical Thinking How to Prepare a Lab Report Introduction to Research Methodology Team Working Research Ethics Dissecting a Research Paper

UPR-Humacao	<p>How to Write a Personal Statement Orientation for Graduate School Material Safety Data Sheet Creating a Data Base in the Web Writing of a Scientific Article Research Ethics Data Bases for Research Laboratory Safety</p>
UPR-Cayey	<p>Basic Lab Safety Ethics in Research Use of Data Bases Basic SPSS Data Bases and Information Aptitude, Skills and Results Stress Management</p>
UPR-Arecibo	<p>Lab Safety Techniques Preparation of Solutions and Culture Media Scientific Literature Search and Integration into Project How to Prepare a Poster and Make an Oral Presentation Analytical Reading and Thinking Skills SOP Preparation Problem Solving Methodology Ethics in Research The Use of the Computer in Research Research Congress</p>
UPR-Bayamón	<p>Ethics in Science The Use of Data Bases An Introduction to Ecoinformatics How to Present your Research Data in a Poster How to Prepare a Poster Science -vs- Seudo Science Statistics without Mathematics Analytical Reading and Thinking Skills</p>
UPR-Aguadilla	<p>How to Use Data Bases Using the Web for Information Search How to Prepare for the GRE How to Write a Proposal Research Opportunities in Graduate School How to Write a Scientific Article Basic Lab Safety Analytical Reading and Thinking Skills</p>
Pontifical Catholic University	<p>Using Data Bases in the Research Laboratory Summer Internships and Graduate School Application How to Prepare a Scientific Presentation Basic Laboratory Safety Techniques Profile of the Scientist of Ethic Integrity in Research Analytical Reading and Thinking Skills Conversational English for the Science Student How to Prepare a Scientific Bibliography</p>

IAU-Bayamón	The Use of Data Bases Lab Safety Research Strategies and the Preparation of a Research Article Ethics in Research How to Present your Research Data in a Poster How to Prepare a Poster A Visit to a Biotechnology Industry Analytical Reading and Thinking Skills
IAU-Metro	Team Working Using Data Bases – Bioinformatics Analytical Reading and Thinking Skills – Part I Analytical Reading and Thinking Skills – Part II Scientific Writing Basic Lab Safety How to Prepare an Oral Presentation and a Poster Ethics in Research

PR-LSAMP awarded 348 stipends to STEM undergraduate majors to participate in mentored research experiences. Also, 262 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 2006-07 and Summer 2007

Institution	# of Stipends Awarded to (Students)*	# of Stipends Awarded to Researchers*	\$ Awarded to Students	\$ Awarded to Researchers for lab materials	Total \$ Awarded per Institution
UPR-Rio Piedras	95	73	\$76,000	\$14,600	\$90,600
UPR-Mayaguez	122	86	\$97,600	\$17,200	\$114,800
UPR-Humacao	23	18	\$18,400	\$3,600	\$22,000
UPR-Cayey	11	8	\$8,800	\$1,600	\$10,400
UPR-Bayamón	13	8	\$10,400	\$1,600	\$12,000
UPR-Arecibo	21	15	\$16,800	\$3,000	\$19,800
UPR-Aguadilla	9	8	\$7,200	\$1,600	\$8,800
UPR-Ponce	8	4	\$6,400	\$800	\$7,200
Pontifical Catholic U.	10	7	\$8,000	\$1,400	\$9,400
UIA-Metro	7	7	\$5,600	\$1,400	\$7,000
UIA-Bayamón	26	18	\$20,800	\$3,600	\$24,400
Others	3	10	\$2,400	\$2,000	\$4,400
TOTAL	348*	262	\$278,400*	\$52,400*	\$330,800*

* 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 carry-over funds from Phase III (\$105,761).

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 AGEF Program. The

2006 PRISM was held at the Inter American University Bayamón Campus. A total of 361 STEM students, 259 undergraduate and 102 graduate students (302 in the sciences, 52 in engineering, and 7 in mathematics) from the different PR-LSAMP institutions presented their research projects to an audience of 328 students and faculty members, for a record number of 689 participants..

The invited plenary speaker was Dr. Ramón E. López, professor in the Department of Physics and Space Sciences at Florida Institute of Technology. His current research focuses on magnetospheric storms and substorms, and making detailed quantitative comparisons between the results of global 3-D MHD simulations and observations during actual events. He leads a research group that is working in both space physics and science education. The topic of the conference offered at PRISM was “*Space Weather: Storms from the Sun*”. He discusses the factors that drive space weather and how this affects human activities both in space and on the earth. He also discussed recent efforts to create predictive models of the geospace environment to be used in forecasting space weather.

Travel to Scientific Meetings

During 2006-07 PR-LSAMP provided a total of \$11,450 in travel stipends for students to present their research projects in national conferences. Twenty-five STEM students from five PR-LSAMP institutions benefited from this PR-LSAMP initiative. Examples of national forums attended are the AAAS, ACS, and AIChE. **Table 6** presents by institution the number of students that received travel stipends and total amount of funds awarded.

Table 6
Travel Stipends Awarded to STEM Undergraduate Students
To Present Research Projects at National Forums 2006-07

Institutions	Number of Participants	Funds Awarded (\$)
UIA-Bayamón	1	\$200
UPR-Bayamón	2	\$1,000
UPR-Humacao	3	\$1,500
UPR-Mayaguez	10	\$4,250
UPR-Rio Piedras	9	\$4,500
Total	25	\$11,450*

* Includes carry-over funds from Phase III (\$4,700)

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 2007, seven students, from five different PR-LSAMP institutions participated in the 9 to 12 week Summer Internship Program. NIST provided a total of \$53,340 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 7** presents the name of the participants and their research projects.

Table 7
NIST Summer of 2007
Name of PR-LSAMP Participants, Institution and STEM Field

Name of Student	Institution	STEM Field
Marisel Villafañe	UPR-Bayamón	Electrical Engineering
Mariel Cruz	UIA-Bayamón	Electrical Engineering
Janice Sotomayor	Pontifical Catholic U.	General Sciences
Angelica Muñiz	UPR-Mayaguez	Electrical Engineering
Miguel Rios	UPR-Mayaguez	Computer Engineering
Amanda David	UPR-Rio Piedras	Chemistry
Marcos Salgado	UPR-Rio Piedras	Biology

Pfizer Fellowships

PR-LSAMP joined efforts with Pfizer Corporation and six students in 2006-07 and five in 2007-08 received a Pfizer fellowship for studies in Pharmaceutical Sciences, as shown in **Table 8**. Fellowships cover their cost of studies and research.

Table 8
Pfizer 2006-2007 Fellowship Recipients and Institution

Name and Academic Year of Award	Institution
Sandraliz Espinosa (2006-07)	UPR-Medical Sciences
Yaritza Inostroza (2006-07)	UPR-Humacao
Juan Rodríguez (2006-07)	UPR-Mayaguez
Luis O. Serrano (2006-07)	UPR-Medical Sciences
Kevin Torres (2006-07)	UPR-Mayaguez
Brenda Valle (2006-07)	UPR-Medical Sciences
Lismarie Delgado (2007-08)	UPR-Medical Sciences
Wandalys Vargas (2007-08)	UPR-Mayaguez
Jessica Torres (2007-08)	UPR-Medical Sciences
Sonia de la Torres (2007-08)	UPR-Rio Piedras
Joshua León (2007-08)	UPR-Mayaguez

FaST (Faculty and Student Teams) Program

PR-LSAMP received a \$46,500 Supplemental award to participate in the DOE FaST and SULI Programs. With these funds two professors and their students spent the Summer of 2007 at Argonne National Laboratory: Dr. Eduardo Ortiz a Computer Engineering professor at UPR-Mayaguez and two of his students, Angel Reyes and Luis Rodriguez worked with Dr. Guenter Conzelmann ; and Dr. Luis Rivera, a Chemistry professor at UPR-Mayaguez, and two of his students, Melixa Rivera and Michelle Rosa, worked with Dr. Luis Nuñez on the development and characterization of gold nanoparticles. Joel Hernández, and undergraduate Chemical Engineering students at UPR-Mayaguez, received funds under the SULI Program to also do research at Argonne National Laboratory during the Summer of 2007.

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 1:

The Pontifical Catholic University of PR invited Dr. Elizabeth Castañeda, Director of Columbia's National Institute of Health. Dr. Castañeda was the main speaker at The IX Annual Conference of the Mycological Society, with the topic: "La Criptococosis y su Agente Etiológico: Los Datos Colombianos". She also offered conferences to STEM students at UPR-Medical Sciences Campus, UPR-Mayaguez, UPR-Aguadilla, and Turabo University.

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

Description of Activity #4:

PR-LSAMP will continue to offer 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 be reinforced electronically through the PR-LSAMP Website.

Findings for Year 1:

For the past five years PR-LSAMP has been sponsoring an annual conference on Best Teaching and Learning Practices to Improve Students' Academic Performance. In 2006, the conference was held at the Dorado Embassy Suites Hotel, and 155 STEM faculty members from the different PR-LSAMP institutions attended the conference. This year we had three invited speakers: Dr. Robert Chang, Director of the National Center for Learning and Teaching in Nanoscale Science and Engineering at Northwestern University; Dr. John Jungck, Co-Founder of Bio-QUEST and Mead Chair of the Sciences and Professor of Biology at Beloit College, and Dr. Howard Adams, President of H.G. Adams and Associates. Dr. Chang covered the topic "*How Our Inquiry and Designed-based Programs are Impacting STEM Education*"; The Materials World Modules (MWM) program developed Dr. Chang uses inquiry and design to stimulate discovery and creativity in students who use the modules. Dr. Jungck covered the topic "*Using Ten Equations that Changed Biology in Implementing NRC Bio 2010's Recommendations for More Mathematics in Undergraduate Biology Education*", and Dr. Adams covered the topic "Mentoring STEM Students: Myths, Modes, and Models". Also two local professors from UPR-Humacao, Dr. Denny S. Fernández and Dr. Elio

Ramos presented the undergraduate course they have developed that integrates ecological concepts with computational and mathematical modeling techniques.

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

In August 2003 PR-LSAMP received its first Supplemental Award to initiate the Bridge-to-the-Doctorate Program. Ten fellowships were awarded that year to the first Cohort of BDP Fellows. As of today, PR-LSAMP has awarded 46 fellowships to PR-LSAMP graduates, covering four Cohorts. Recently NSF funded a fifth cohort and 12 new fellowships will be awarded in August 2007 (Cohort #5), bringing the total number of fellowships to 58.

Performance of Fellows from Past Cohorts:

Cohort#1 (2003) – Ten BDP fellowships were awarded for former PR-LSAMP participants to pursue graduate studies in a STEM field (one in Biology, one in Physical Chemistry and eight in Chemistry). Four of the ten Cohort #1 Fellows will obtain their PhD degrees in May 2008, at which time they would have completed the degree requirements within a five-year period, two years less than the prevalent 7-year average time for graduation. The remaining six will obtain their PhD degree in year six (2009). **Table 9** shows academic progress of Cohort #1 Fellows

Table 9
Academic Progress of Cohort #1 (2003-05) BDP Fellows, as of December 2006

Fellows	STEM Field	GPA	Presentations in Scientific Conferences	Publications	Number of Credits	Graduation Date
Azlin Biaggi	Physical Chemistry	3.9	11	2	46	PhD 06/08
Michelle Cartagena	Chemistry	3.5	-	-	70	PhD 05/09
Agustín Díaz	Chemistry	4.0	14	4	76	PhD 05/08
Yamaris Pacheco	Chemistry	3.77	14	3	76	PhD 05/09
Daniel Caballero	Chemistry	3.8	5	2	68	PhD 05/09
Jessica Oyola	Chemistry	3.67	6	1	68	PhD 05/09
Karilys Gonzalez	Chemistry	3.81	7	1	84	PhD 05/08
Marilyn García	Chemistry	3.75	6	2	105	PhD 05/08
Omar Cruz	Chemistry	3.68	2	-	68	PhD 05/09
Luzed Díaz	Biology	3.92	3	1	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. Ten fellows are pursuing graduate studies in the fields of Marine Sciences (3), Chemistry (4), Civil Engineering (2) and Chemical Engineering (1). At UPR-Mayaguez all science and engineering students must complete a master's degree and pass qualifying

exams before entering a PhD Program. The exception is Chemical Engineering where the Fellow could enter directly into a PhD Program. Four Fellows have obtained their MS degree: two in Civil Engineering and two in Chemistry. The remaining two Fellows opted for employment after their first year of graduate studies. **Table 10** shows academic progress of Cohort #2 Fellows.

Table 10
Academic Progress of Cohort #2 (2004-06) BDP Fellows, as of December 2006

Fellows	STEM Field	GPA	Presentations in Scientific Conferences	Publications	Number of Credits	Graduation Date
Olga Abreu	Marine Sciences	3.49	5	-	37	MS 05/08
Deborah Acevedo	Chemistry	3.25	11	1	33	MS 12/07 PhD 2010
Yashira Estrada	Marine Sciences	3.3	5	-	33	MS 12/07
Miguel Gonzalez	Chemistry	3.41	8	1	33	MS 05/2007 PhD 05/2011
Luis Gonzalez	Civil Eng.	3.3	4	0	36	MS 05/07
Laura Granell	Chemistry	3.68	8	2	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) - The twelve BDP Fellows from Cohort #3 began graduate studies in August 2005, and will complete their first two years of graduate studies in July 2007. Of the five biology majors, two have been accepted into the PhD program at the University of Puerto Rico and one will pursue PhD studies at North Carolina University. Of the three physics majors, one entered the PhD Program directly, and one has plans to pursue PhD studies in Texas A&M University. Of the four Chemistry majors, three have been accepted into the PhD program at UPR-Rio Piedras. All Chemistry and Physics majors took and passed the qualifying exams during the Summer of 2006. Félix Araujo (Biology) will attend North Carolina University this Summer to conduct research in Evolutionary Biology. Sofia Burgos attended the 2007 Aquatic Sciences Meeting of the American Society of Limnology and Oceanography (ASLO) in Santa Fe, New Mexico, and presented her research work on benthic biofilm metabolism. José González (Biology) presented his research work in The Translational Control Meeting held in Long Island, and Enid Contes and Damaris Suazo (Chemistry) will travel to Turkey this Summer to take a course on fuel cells to be taught by internationally renowned scientists in this field. In the particular case of Francisco Solá he is conducting joint research with the Lawrence National Laboratory and travels every other month to use the facilities of

the Electronic Microscopy Center. His research is on the electric properties of nanoscale materials. **Table 11** shows academic progress of Cohort #3 Fellows.

Table 11
Academic Progress of Cohort #3 (2005-07) BDP Fellows, as of December 2006

Fellows	STEM Field	GPA	Presentations in Scientific Conferences	Publications	Number of Credits	Graduation Date
Felix Araujo	Biology	3.60	2	-	27	MS 05/08 PhD in North Carolina
Sofia Burgos	Biology	3.87	9	1	28	PhD 2010 UPR-Rio Piedras
Yizaira Diaz	Chemistry	3.75	6	-	34	PhD 2010 UPR-Rio Piedras
Enid Contes	Chemistry	3.33	7	1	26	PhD 2011 UPR-Rio Piedras
Giselle Flores	Chemistry	3.66	6	2	26	PhD 2010 UPR-Rio Piedras
Jose González	Biology	3.88	4	-	29	PhD 2009 UPR-Rio Piedras
Ana Longo	Biology	3.67	15	1	27	MS 2008 UPR-Rio Piedras
Jazmin Martínez	Physics	3.33	7	-	25	MS 2008 PhD 2011
Pamela Medina	Biology	4.00	10	2	27	MS 2008 UPR-Rio Piedras
Manuel Rivera	Physics	3.00	7	6	12	MS 2008 PhD UPR-Rio Piedras
Francisco Solá	Physics	3.80	4	2	30	PhD 2009 UPR-Rio Piedras
Damaris Suazo	Chemistry	3.20	5	-	26	MS 2008 UPR-Rio Piedras

Support Activities Offered to Cohort #3 Fellows during their Second Year of Fellowship

During academic year 2006-07, PR-LSAMP offered seventeen support activities to Cohort #3 BDP Fellows during their second year of studies, as shown in **Table 12**.

Table 12
BDP Supporting Activities for Cohort #3 Fellows During their Second Year of Graduate Studies
Academic Year 2006-07

Topics	Resource(s)
Scientists as Entrepreneurs	Manuel Figueroa and Luis Romero, two successful local entrepreneurs
The Nature of Science (joint activity with Cohort #4)	Dr. Daniel Altschuler, UPR-Rio Piedras
Pre-Columbian Cultures in the Americas with Emphasis in Caribbean Migration	Dr. Ivonne Narganes, UPR-Rio Piedras

How to do a Poster and Effective Oral Presentations (Workshop)	Dr. Gerardo Morell, UPR-Rio Piedras
Coral Reefs: Its Natural History and Evolution (workshop)	Prof. Cedar García, UPR-Humacao
The Concept of Scale in the Universe (Workshop)	Dr. José Alonso, Arecibo Observatory
PR-LSAMP Best Practices Conference (joint activity with Cohort #4)	Dr. Robert Chang, Northwestern University; Dr. Howard Adams, Adams Consulting, and Dr. John Jungck, Beloit College
System Dynamics Congress (3-day retreat; joint activity with Cohort #4)	Dr. Andrew Jones, The Sustainability Institute; Dr. Juan Martinez, Barcelona University Ramón Llul; Hans Fusch, University of Zurich
Science, Magic and Education (Conference – joint activity with Cohort #4)	Israel de Jesús, Consultant
The Puerto Rico Interdisciplinary Scientific Meeting (joint activity with Cohort #4)	Dr. Ramón López, Florida Institute of Technology
Integration of Music with Physics and Mathematics (workshop)	Dr. Errol Montes, UPR-Cayey
Role Models Series (joint activity with Cohort #4)	Dr. José Lasalde, UPR-Rio Piedras
Population Genetics: Finding out our Ancestors	Dr. Martinez Cruzado, UPR-Mayaguez
The History of Plastic Arts in Puerto Rico (conference)	Dr. Haydee Venegas, Puerto Rico School of Plastic Arts
The History of Mathematics: The Mathematical Equations that Made Possible the Scientific Revolution (workshop)	Dr. Errol Montes, UPR-Cayey
Natural History of Caja de Muertos (Field trip – joint activity with Cohort #4)	Prof. Javier Figueroa, UPR-RCSE
PR-EPSCoR Annual Meeting (Conference – joint activity with Cohort #3)	Various National and Local Speakers
Geology and Biogeographical Patterns of the Southwestern Area of P.R (field trip – joint activity with Cohort #4).	Dr. Hernán Santos, UPR-Mayaguez, and Dr. Eugenio Santiago, UPR-Rio Piedras

Also Cohort #3 Fellows had the opportunity to identify and invite national and international scientists working in research related to their thesis work. Invited scientists worked with the Fellows in their labs for a period of three to four days. These scientists in addition to enhancing the Fellow's research knowledge, served as role models, and a collaborative web was developed for future activities, such as Summer internships and post-doctoral positions in their institutions. PR-LSAMP covered their travel and lodging expenses. **Table 13** presents the scientists invited by five of the Fellows.

Table 13
Scientists Invited by Cohort #3 Fellows
Academic Year 2006-07

BDP Fellow	Invited Scientists
José Gonzalez, Biology	Dr. Alan Jacobson, Director Department of Molecular Genetics and Microbiology, School of Medicine, UMASS
Félix Araujo, Biology	Dr. Carol Wilusz, Department of Molecular Genetics, Colorado State University
Damaris Suazo, Chemistry	Dr. Shelly Minter, Chemistry and Nanotechnology, Saint Louis University
Sofia Burgos, Biology	Dr. Jennifer Tank, Limnologist, University of Notre Dame
Enid Contes, Chemistry	Dr. Vicky Colvin, Director of the Center for Nanotechnology, Rice University

Conferences Attended by Cohort #3 Fellows – Table 14 presents the scientific seminars attended by Cohort #3 Fellows.

**Table 14
Scientific Conferences Attended by Cohort #3 BDP Fellows**

Name	Conference	Site	Date of Travel
Ana Longo	Chytrid Fungi Histology Training	Carbondale, IL	December 11 – 18, 2005
	Congreso Latino Americano de Herpetologia	Cuernavaca, Morelos, Mexico	August 19, 2005
	AAAS Meeting	UIA-Bayamon, PR	October, 2005
	Primer Simposio de Herpetologia Puertorriqueña	UPR-Arecibo, PR	March 2006
	Joint Meeting of Ichthyologists and Herpetologists	New Orleans, Louisiana	July 17, 2006
Manuel Rivera	Materials Research Society	Boston, MA	November 27 – December 2, 2005
Sofia Burgos	54 th Annual Meeting of the North American Benthological Society	Anchorage, Alaska	June 5-9, 2006
	ASLO Student Symposium Aquatic Sciences Meeting	Santa Fe, New Mexico	February 4-9, 2007
Yisaira Diaz	33 rd ASP Meeting Photostability	Rio Grande, PR	July 9-12, 2006
Enid Contes	ACS Annual Meeting	San Diego, CA	March 2005
	ECS Meeting	Cancun, Mexico	October 2006
	AAAS Meeting	San Francisco, CA	February 2007
Giselle Flores	Cambridge Healthtech Institute's Inaugural Engineering Protein Therapeutics for Delivery	Boston, MA	April 26-27, 2006
Jose A. Gonzalez	Translation Control Meeting	Long Island, NY	September 6-10, 2006
	SACNAS	Miami, FL	October 26-29, 2006
	10 th Research Center in Minority Institutions Annual Meeting	San Juan, PR	December 13-17, 2006
Pamela Medina	2006 Joint Meeting of Ichthyologists and Herpetologists	New Orleans, LA	July 12-17, 2006
	Primer Campamento Ambiental Criollo	Caguas, PR	November 2006
	Earthwatch Volunteer Teams, Las Casas de la Selva	Patillas, PR	May 9, June 8, December 18, 2006 and January 2, 2007

Name	Conference	Site	Date of Travel
Francisco Sola	SPIE	San Diego, CA	July 2005
	International Workshop on Semiconductor Nanocrystals	Budapest, Hungary	September 2005
	MRS Spring Meeting	San Francisco, CA	April 2006
	MRS Spring Meeting	San Francisco, CA	April 2007
Damaris Suazo	AAAS	San Francisco, CA	February 15-19, 2007
Yazmin Martinez	Annual MGE@MSA/WAESO Student Research Conference	San Juan, PR	April 2006 & April 2007

Cohort #4 (2006) – The twelve Cohort #4 Fellows began graduate studies in August 2006 – six in Chemistry; two in Biology; two in Mathematics, and two in Physics. They successfully completed their first year of graduate studies. **Table 15** presents Cohort #4 Fellows by STEM disciplines and BS granting institution, and **Table 16** presents their academic progress in their first semester of graduate studies.

Table 15
Cohort #4 Bridge-to-the-Doctorate Fellows – August 2006

Name of Fellow	BS Degree Granting Institution	Program/Field
Edward Avilés	UPR-Rio Piedras	Chemistry
Barbara Casañas	UPR-Rio Piedras	Chemistry
Yanira Enriquez	UPR-Rio Piedras	Chemistry
Maria Garcia	UPR-Rio Piedras	Chemistry
Griselle Hernández	UPR-Rio Piedras	Chemistry
Pamela Vallejo	UPR-Rio Piedras	Chemistry
Jesuan Betancourt	UPR-Rio Piedras	Physics
Iván López	UPR-Rio Piedras	Physics
Mariely Hernández	UPR-Cayey	Mathematics
Fernando Piñero	UPR-Rio Piedras	Mathematics
Franchesca Ruiz	UPR-Humacao	Biology
Pablo Hernández	UPR-Rio Piedras	Biology

Table 16
Academic Progress of Cohort #4 (2006-08) Fellows, as of December 2006

Fellows	STEM Field	GPA	Presentations in Scientific Conferences	Publications	Number of Credits	Graduation Date
Edward Avilés	Chemistry	3.67	2	-	13	PhD 2010
Jesúan Betancourt	Physical Chemistry	3.89	1	-	27*	PhD 2010
Barbara Casañas	Chemistry	3.33	1	1	13	MS 2009

Yanira Enríquez	Chemistry	3.68	3	-	13	PhD 2011
Griselle Hernández	Chemistry	3.3	2	-	13	MS 2009
Pablo Hernández	Biology	3.71	6	-	21*	MS 2008 PhD 2012
María del Mar García	Chemistry	3.0	5	-	13	PhD 2011
Mariely Hernández	Mathematics	3.33	1	-	9	MS 2009
Iván López	Physics	3.00	6	-	12	MS 2008
Fernando Piñero	Mathematics	3.80	1	-	15	MS 2008
Francesca Ruiz	Biology	3.67	2	1	9	MS 2009 PhD 2012
Pamela Vallejo	Chemistry	4.0	2	-	13	PhD 2010

* Took graduate courses as undergraduates

Supporting BDP Activities for Cohort #4 Fellows

Table 17 shows the twenty activities offered by PR-LSAMP to Cohort #4 Fellows during their first year of graduate studies.

Table 17
BDP Supporting Activities for Cohort #4 Fellows, Academic Year 2006-07

Topics	Resource(s)
How to be an Effective Mentor (Workshop)	Dr. Lizzette Velázquez, UPR-Rio Piedras
Strategies for Success in Graduate School (Workshop)	Dr. Ana Guadalupe, UPR-Rio Piedras
The Nature of Science (Conference)	Dr. Daniel Altschuler, UPR-Rio Piedras
How to do a Poster and Effective Oral Presentations (Workshop)	Dr. Gerardo Morell, UPR-Rio Piedras
Introduction to System Dynamics Thinking (Workshop)	Dr. Joaquin Medín, UPR-Bayamón
PR-LSAMP Best Practices Conference (joint activity with Cohort #3)	Dr. Robert Chang, Northwestern University; Dr. Howard Adams, Adams Consulting, and Dr. John Jungck, Beloit College
The Concept of Scale in the Universe (Workshop)	Dr. José Alonso, Arecibo Observatory
System Dynamics Congress (3-day retreat; joint activity with Cohort #3)	Dr. Andrew Jones, The Sustainability Institute; Dr. Juan Martinez, Barcelona University Ramón Llul; Hans Fusch, University of Zurich
Science, Magic and Education (Conference – joint activity with Cohort #3)	Israel de Jesús, Consultant
The Puerto Rico Interdisciplinary Scientific Meeting (joint activity with Cohort #3)	Dr. Ramón López, Florida Institute of Technology
Role Models Series (joint activity with Cohort #3)	Dr. José Lasalde, UPR-Rio Piedras
Role Models Series	Dr. Carlos Cabrera, UPR-Rio Piedras
The History of Mathematics (workshop)	Dr. Errol Montes, UPR-Cayey
Problem Solving in the Phylogeny of Plants (workshop)	Dr. Eugenio Santiago, UPR-Rio Piedras
Pre-Columbine Cultures in Puerto Rico (conference)	Dr. Ivonne Narganes, UPR-Rio Piedras

Coral Reefs: Its Natural History and Evolution (workshop)	Prof. Cedar García, UPR-Humacao
Natural History of Caja de Muertos (Field trip – joint activity with Cohort #3))	Prof. Javier Figueroa, UPR-RCSE
Integration of Music with Physics and Mathematics (workshop)	Dr. Errol Montes, UPR-Cayey
PR-EPSCoR Annual Meeting (Conference – joint activity with Cohort #3)	Various National and Local Speakers
Geology and Biogeographical Patterns of the Southwestern Area of P.R.	Dr. Hernán Santos, UPR-Mayaguez, and Dr. Eugenio Santiago, UPR-Rio Piedras

Also Cohort #4 Fellows had the opportunity to identify and invite national and international scientists working in research related to their thesis work. Invited scientists worked with the Fellows in their labs for a period of three to four days. These scientists in addition to enhancing the Fellow's research knowledge, served as role models, and a collaborative web was developed for future activities, such as Summer internships and post-doctoral positions in their institutions. PR-LSAMP covered their travel and lodging expenses. **Table 18** presents the scientists invited by the Fellows.

Table 18
Scientists Invited by Cohort #4 Fellows

BDP Fellow	Invited Scientist
Mariely Hernández, Mathematics	Dr. John Cook, Department of Biostatistics and Applied Mathematics, Anderson Cancer Center, University of Texas
Edward Avilés, Chemistry	Dr. Daniel Romo, Organic Chemistry, Texas A&M University
Pablo Hernández, Biology	Dr. Michael Paul, Center for Ecological Sciences, University of Colorado at Boulder
Jesúan Betancourt, Physics	Dr. Isacc Balberg, Hebrew University, Racah Institute of Physics, Jerusalem, Israel

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

Table 19 presents the scientific conferences attended by BDP Cohort #4 Fellows during their first year of fellowship.

Table 19
Scientific Conferences attended by Cohort #4 Fellows
Academic Year 2006-07

Name	Conference	Site	Date of Travel
Edward Aviles	ACS National Meeting	Chicago, IL	March 25-27, 2007
Barbara Casañas	ACS National Meeting	Chicago, IL	March 25-27, 2007
Pablo Hernandez	SICB Meeting 2007	Phoenix, AZ	January 2007
Mariely Hernandez	Inter Collegial Seminar on Mathematics Research	Ponce, PR	February 23-24, 2007
Ivan Lopez	APS March Meeting	Denver, CO	March 5-9, 2007

Name	Conference	Site	Date of Travel
Fernando Piñero	Workshop Complexity Coding and Communication	Minneapolis, MN	April 16-20, 2007
Francheska Ruiz	III International Orchid Conservation Conference	San Jose, Costa Rica	March 19-23, 2007

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.

Mentoring of Undergraduate Students

In Year 2 BDP Fellow from Cohort #4 will be assigned in their labs an undergraduate STEM student to work with him/her in his/her research project. The BDP fellow served as mentor and role model in this process.

VI. Other Institutional Initiatives at PR-LSAMP Institutions to Strengthen Undergraduate STEM Education

During academic year 2006-07 PR-LSAMP institutions secured a total of \$26.9M to enhance, strengthen, and sustain their STEM Programs. **Tables 20 to 27** 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 20 - UPR-Aguadilla

Project Description	Sponsor	Amount of Funds
Technology for Teaching Initiatives	Hewlett Packard	\$15,500
Monofilament Recovery and Recycling Program in PR	Fish and Wildlife	\$36,621
Monofilament Recovery and Recycling Program in PR	Toyota Foundation	\$9,734
Science Teachers' Certification Program	PR Council of Higher Ed	\$83,350
TECH PREP Alliance	PRDE	\$5,000
Math Teachers' Certification Program	PRDE	\$156,566
TOTAL		\$306,771

Table 21 - UPR-Arecibo

Project Description	Sponsor	Amount of Funds
Biotechnology Lab Materials	UPR Arecibo	\$13,657
Lab Materials for the Microbial Technology Program	ABBOTT	\$2,500
Faculty Internship in Biotechnology	ABBOTT	\$2,000
Integrated Science Multi-use Laboratory	NASA	\$30,000
Enhancement of Biology and Physics/Chemistry Curricula through the Implementation of Technology Mediated Reforms and Establishment of Environmental Classrooms/Labs	USDE-MSEIP	\$100,000
Curricular and Professional Development Activities to Support Associate Degree Program in Biotechnology Operations	NSF-ATE	\$190,000
Improving Academia Outcomes for Science and Math Students through a Technology-based Program	USDE	\$100,000
Collaboration through Technology Initiatives to Enhance Academic Students and Library Support Services	USDE	\$443,107
Society of Toxicology Minority Travel Awards for Undergraduate Students (4)	SOT	\$8,000
Society of Toxicology Minority Travel Awards for Advisors (1)	SOT	\$2,000
Improvement of the Arecibo Optical Astronomical Observatory at UPR-Arecibo	UPR-Arecibo	\$425,000
Student Support to present their Research Projects at the Undergraduate Research Poster Session, 233 ACS National Meeting in Chicago	UPR-Arecibo	\$1,600
Support to a STEM Professor to Attend the Chicagoland Orchid Festival	UPR-Arecibo	\$500
Professional Development Activities for STEM Faculty	UPR-Arecibo	\$12,086
Naval Research Laboratory Summer Internship	NRL	\$4,500
TOTAL		\$1,334,950

Table 22 - UPR-Cayey

Project Description	Sponsor	Amount of Funds
Establishment of an Office of Sponsored Research	NIH	\$91,800
RISE	NIH	\$377,226
Puerto Rico Math and Science Partnership	NSF	\$1,086,193
Certification of Chemistry Teachers	PR Council on Higher Ed	\$207,229
Reinvigorating the Chemistry Curriculum with Fourier-Transform Nuclear Magnetic Resonance Spectroscopy	NSF	\$116,349
Title V – Strengthening Developing Institutions	USDE	\$590,542
Howard Hughes	HHMI	\$131,050
Program to Certify Teachers at the Elementary and Secondary Levels	PRDE	\$2,946,600
Support for Biology Students	ACS	\$19,700
Environmental Institute at UPR-Cayey	City of Caguas	\$60,000
TOTAL		\$5,626,689

Table 23 - UPR-Rio Piedras

Project Description	Sponsor	Amount of Funds
Ford Foundation Fellowship	Ford	\$2,500
Two Fellowships ISRS and Ocean Conservancy	Ocean Con.	\$28,481
UMEB Undergraduate Research on Tropical Ecosystems from Rainforest to Cities	NSF	\$157,408
Title V Strengthening Developing Institutions	USDE	\$537,008
CREST	NSF	\$175,417
Center for Nanoscale Materials	NASA	\$2,459,955
Graduate Student Research – NASA Training Grant	NASA	\$24,000
NSEC: Center for Hierarchical Manufacturing	UMass	\$38,000
Acquisition of a Focus Ion Beam	NSF	\$50,000
C*Algebra: Structure, Classification and Application	NSF	\$195,000
CREST	NSF	\$348,057
CREST	NSF	\$165,649
Student Workshops and Projects on Sustainable Transfers	EPA	\$20,000
Establishment of a Professional Development Program for STEM Faculty	UPR	\$101,118
Pfizer contribution to Research in Chemistry	Pfizer	\$1,500
Improvements to the Cellular and Molecular Neurobiology Lab	UPR-RCSE	\$31,000
Teaching Ecological Complexity Field through Science Inquiry	NSF	\$39,953
IDEA Network Biomedical Research Excellence	UPR-RCSE	\$119,695
Puerto Rico Math and Science Partnership	NSF	\$5,804,416
Howard Hughes Medical Institute – Undergraduate Biological Sciences Ed.	HHMI	\$17,416
REU Site: Tropical Ecology and Evolution	NSF	\$73,565
Accelerating Pr Students into the National Research Effort in Math and Computer Science	NSF	\$500,000
CREST	NSF	\$310,875
Marc U* Star Development Program	USHHS	\$176,303
Support for University Biomedical Excellence	USHHS	\$1,209,337
Recruitment and Retention of Graduate Students in the Chemistry Department	Industry	\$8,000
TOTAL		\$12,594,653

Table 24 - UPR-Mayaguez

Project Description	Sponsor	Amount of Funds
Funds donated by industries to Strengthen Science and Engineering Programs at the Institution	Various	\$188,668
Summer Transportation Institute	Various	\$52,469
Summer Pre-Engineering Program	Various	\$50,000
Plan Coop – Outreach Activities	Various	\$15,625
Science on Wheel	NSF	\$300,000
Caribbean Coral Reef Institute	NOAA	\$15,000
Partnership for Research and Education Materials	NSF	\$20,000
CASA – Outreach and Undergraduate Research	NSF	\$12,000
TOTAL		\$653,762

Table 25 - UPR-Humacao

Project Description	Sponsor	Amount of Funds
RUI: Microbial Observatories	NSF	\$663,030
MARC: Undergraduate Research Training Program	NIH	\$448,554
CREST-CATEC	NSF	\$6,019
RISE: Minority Biomedical Enhancement	USHHS	\$252,535
Advance Institutional Transformation	NSF	\$246,042
PENN-UPRH Partnership for Research and Education Materials (PREM)	NSF	\$443,276
RUI: Electronic Device Fabrication Based on Polymer Nanofibers: Motivating Students Towards Research in Material Science	NSF	\$50,000
Improving Academic Outcomes for Science and Math Students Trough a Technology Based Consortium	USDE	\$100,000
Enhancement of the Mathematics Component of the 2004 SACNAS Conference	NSA	\$72,588
Humacao Research Scholarships: Increasing Student Achievement in Computational Mathematics	NSF	\$85,070
Minority Science and Engineering Improvement Program (MSEIP)	USDE	\$73,706
MBRS-SCORE	USHHS	\$1,017,806
Student Support Services	USDE	\$367,011
Collaboration Through Technology Initiatives	USDE	\$689,998
Talent Search Program	USDE	\$250,261
Communication Competencies at UPR-Humacao	USDE	\$238,180
Ronald McNair Post Baccalaureate Achievement Program	USDE	\$220,000
Upward Bound Program	USDE	\$234,624
TOTAL		\$5,458,700

Table 26 – UPR-Ponce.

Project Description	Sponsor	Amount of Funds
Strengthening Technological Infrastructure in order to Empower Faculty to Improve Teaching and Learning Process Using Technology	USDE	\$192,925
Computer Assisted Laboratories for Biology Students (CALBS)	Hewlett Packard	\$24,605
Strengthening Learning and Teaching Strategies and Practices for a New Generation of Learners	USDE	\$575,000
Infusing Technology into the Teaching and Assessment of Pre-Calculus, Statistics and Calculus Courses (MSEIP)	USDE	\$121,166
TOTAL		\$913,696

Table 27 - Pontifical Catholic University of P.R.

Project Description	Sponsor	Amount of Funds
MSEIP – Enhancement Biology, Chemistry and Environmental Sciences Laboratory Experiences and Undergraduate Research	USDE	\$92,264
Puerto Rico Space Grant Consortium	NASA	\$10,000
TOTAL		\$102,264

VII. Contributions to the Development of Human Resources

In academic year 2006-07, PR-LSAMP institutions awarded 3,240 baccalaureate degrees in science, technology, engineering, and mathematics (STEM) disciplines. Since 1991, **PR-LSAMP institutions have awarded a total of 45,313 BS degrees in STEM fields, making a significant contribution to the STEM workforce.** Table 28 presents the number of STEM degrees awarded per academic year, and Table 29 the number of BS degrees awarded in 2006-07 by PR-LSAMP institution.

Table 28
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	3,240
TOTAL	45,313

Table 29
BS Degrees Awarded by PR-LSAMP Institution in Academic Year 2006-07

Institution	Year 2006-2007
University of Puerto Rico	2,748
Pontifical Catholic University	95
Inter American University	397
TOTAL	3,240

Table 30 presents the number of BS degrees awarded per STEM discipline in Academic Year 2006-07.

Table 30
STEM Baccalaureate Degrees Awarded by Discipline in 2006-07

STEM Discipline	BS Degrees Awarded
Chemistry	434
Physics/Astronomy	104
Mathematics	92
Life Science	252
Computer Science	13
Engineering	614
Geosciences	1574
Agricultural Sciences	40
Environmental Sciences	117
TOTAL STEM Disciplines	3,240

SME Baccalaureate Degrees Awarded Nationwide

The URP/STEM Bachelor's Degrees Report for Academic Year 2004-05 (Reporting Year 2005) shows that 24,642 degrees were awarded nationally to underrepresented minorities. Of this total, 11,758 degrees were awarded to Hispanics or Latinos. In 2005 PR-LSAMP institutions awarded 3,106 baccalaureate degrees in STEM disciplines, accounting for 26.4% of the degrees awarded to Hispanics nationwide, as shown in **Table 31**.

Table 31

STEM Baccalaureate degrees Awarded Nationwide to Underrepresented Minorities
UREP/STEM Bachelor's Degrees Report
Academic Year 2004-05, Reporting Year 2005

Discipline	Total Minority Groups	Hispanics	PR-LSAMP Institutions (Percent of Hispanics)
Agricultural Sciences	813	386	109 (13.4%)
Chemistry	1055	526	278 (52.8%)
Computer Science	4687	1642	291 (17.7%)
Engineering	7467	3922	976 (24.8%)
Environmental Science	354	194	38 (19.5%)
Geosciences	205	135	32 (23.7%)
Life/Biological Sciences	8251	4042	1223 (30.2%)
Mathematics	1390	612	27 (4.4%)
Physics/Astronomy	420	299	132 (44.1%)
Total	24,642	11,758	3,106 (26.4%)

Enrollment in STEM Disciplines at PR-LSAMP Institutions

Table 32 shows undergraduate STEM enrollment from 1991 to 2006. **Table 33** shows undergraduate enrollment by STEM discipline in the Fall 2006, and **Table 34** presents STEM undergraduate enrollment by institution.

Table 32
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

Table 33
FT/PT Undergraduate Enrollment at PR-LSAMP Institutions By STEM Discipline
Fall 2006

STEM Discipline	Undergraduate Enrollment Fall 2006
Chemistry	2247
Physics/Astronomy/Electronics	1247
Mathematics	516
Computer Science	2883
Geosciences	110
Engineering	5684
Life Sciences	9840
Environmental Science	410
Agricultural Science	885
TOTAL ALL STEM DISCIPLINES	23,825

Table 34
Undergraduate STEM Enrollment by PR-LSAMP Institution Fall 2006

Institution	STEM Enrollment Fall 2006
UPR-Rio Piedras	2,414
UPR-Mayaguez	8,091
UPR-Humacao	965
UPR-Cayey	863
UPR-Bayamón	894
UPR-Arecibo	570
UPR-Aguadilla	1,051
UPR-Ponce	737
Inter American University	7,180
Pontifical Catholic University	1,060
TOTAL	23,825

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 2000 to 2005 that:

- 17% 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 (302 out of 1,784). UPR-Río Piedras and UPR-Mayaguez are the leading baccalaureate institutions of U.S. Hispanic Ph.D.'s in Science.
- 17% 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 35 shows the leading U.S. Baccalaureate Institutions of U.S. Hispanic Ph.D.'s in the natural sciences for the 2000-2005, and **Table 36** for engineering fields.

Table 35
Top 25 Baccalaureate Institutions of U.S. Hispanic PhDs (U.S. Citizens Only)
Natural Sciences 2000-05

Baccalaureate Origin Institution	Degrees Awarded	
1. University of Puerto Rico – Rio Piedras	158	PR-LSAMP Institutions UPR-Rio Piedras = 158 UPR-Mayaguez = 82 UPR-Humacao = 20 UPR-Cayey = 17 Pontifical Catholic U. = 10 UPR-Medical Sciences = 8 IAU at San Germán = 7 Total = 302
2. University of Puerto Rico – Mayaguez	82	
3. University of California – Berkeley	40	
4. University of California – Davis	31	
4. University of Texas at Austin	30	
5. University of California – Los Angeles	30	
6. University of California – San Diego	29	
7. Texas A&M University	27	
8. Univ. of California – Irvine	27	
9. University of Florida	24	
10. Univ. of New Mexico – Main Campus	24	
11. New Mexico State Univ. – Main campus	23	
12. Harvard University	21	
13. MIT	21	
14. Stanford University	21	
15. University of Miami	21	
16. Cornell University	20	
17. Florida International University	20	
18. University of Texas at El Paso	20	
19. University of Arizona	20	
20. Univ. of California – Santa Cruz	20	
21. University of Puerto Rico – Humacao	20	
22. The University of Texas at San Antonio	17	
23. Univ. of Illinois at Urbana	17	
24. University of Puerto Rico – Cayey	17	
25. University of California at Santa Barbara.	15	
Total Top 25 Institutions	795	
Total Doctorates Granted to Hispanics	1,784	

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 (10); UPR-Medical Sciences Campus (8), and Inter American University at San Germán (7). In summary, institutions in Puerto Rico accounted for 38% of the baccalaureate origins of the Hispanic PhDs in the natural sciences from the top 25 institutions of Hispanic doctorate recipients, and 17% of all institutions.

Table 36
Top 21 Baccalaureate Institutions of U.S. Hispanic PhDs (U.S. Citizens Only)
Engineering 2000-05

Baccalaureate Origin Institution	Degrees Awarded
1. University of Puerto Rico – Mayaguez	62
2. MIT	21
3. University of Texas at El Paso	15
4. University of California – Berkeley	13
5. Texas A&M University	11
6. University of Texas at Austin	11
7. University of Illinois at Urbana	10
8. Purdue University – Main campus	9
9. University of California – Davis	9
10. University of Florida	9
11. University of Puerto Rico – Rio Piedras	9
12. California Polytechnic State U. – San Luis Obispo	8
13. Cornell University	7
14. New Mexico State University – Main campus	7
15. Rensselaer Polytechnic Institute	7
16. University of Colorado at Boulder	7
17. University of Houston	7
18. University of New Mexico – Main Campus	6
19. California Institute of Technology	5
20. University of Miami	5
21. University of South Florida	5
Total Top 21 Institutions	243
Total Research Doctorates in Engineering	425

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 29 PhD degrees in science and engineering in 2007. **Table 37** presents the number of PhD degrees awarded by these three campuses in 2006-07 by science and engineering field. **Table 38** presents the number of PhD degrees awarded by the three campuses from 1990 to 2007.

Table 37
Number of PhD Degrees Conferred in 2006-07 by UPR System

Institution	Number of PhD Degrees	Science and Engineering
UPR-Rio Piedras	19	Biology (8) Chemistry-Physics (1) Chemistry (10)
UPR-Medical Sciences	6	Microbiology (2) Biochemistry (4)
UPR-Mayaguez	4	Chemical Engineering (1) Civil Engineering (2) Computer Engineering (1)
Total	29	

Table 38
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
TOTAL	411

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.

This year 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.