Pontifical Catholic University of Puerto Rico
College of Sciences
Sponsored Research Programs Office
Scientific Research Center

SUMMARY FINAL REPORT

Submitted to
AIR FORCE OFFICE SCIENTIFIC RESEARCH

Research Agreement No. F49620-98-1-0472

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13. ABSTRACT (Maximum 200 words)

The objective of this project was to acquire state-of-the art laboratory instrumentation that will improve the research and education programs in chemistry, biology, and environmental sciences at the bachelor's and master's levels at Pontifical Catholic University of Puerto Rico (PCUPR). Introduction of modern chemical instrumentation in the chemistry, biology, and environmental science curricula provides a valuable experience for students and stimulation for the faculty. The major concern now facing the chemistry, biology, and environmental science faculty at PCUPR is the inability to demonstrate in the laboratory some of the most important techniques in environmental analysis such as Induced Couple Plasma (ICP) Spectroscopy, High Performance Liquid Chromatography (HPLC) and UV/Vis Spectroscopy that are emphasized in lectures.

The funds requested in this Research Agreement with the U.S. Army Research Office were used to purchase a Perkin Elmer Optima 3000XL Induced Couple Plasma (ICP) Spectrometer, a Perkin Elmer Lambda 20 UV/Vis Spectrophotometer, a Hewlett-Packard 1100 High Performance Liquid Chromatograph, the corresponding accessories and other small analytical chemistry and environmental sciences equipment.

It is no question that the acquisition of all these instruments has improved both laboratory education and undergraduate research in the departments of Biology and Chemistry at Pontifical Catholic University of Puerto Rico. Furthermore, the number and quality of under-represented and low income puertorican students that will be Involved in science and engineering will increase as a result of this project funded by the U.S. Department of Defense under the Air Force Office of Scientific Research.

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Instrumentation to Improve Chemistry and Environmental Science Laboratory Curricula

Summary Final Report

The objective of this project was to acquire state-of-the art laboratory instrumentation that will improve the research and education programs in chemistry, biology, and environmental sciences at the bachelor's and master's levels at Pontifical Catholic University of Puerto Rico (PCUPR). Introduction of modern chemical instrumentation in the chemistry, biology, and environmental science curricula provides a valuable experience for students and stimulation for the faculty. The major concern now facing the chemistry, biology, and environmental science faculty at PCUPR is the inability to demonstrate in the laboratory some of the most important techniques in environmental analysis such as Induced Couple Plasma (ICP), Spectroscopy High Performance Liquid Chromatography (HPLC) and UV/Vis Spectroscopy that are emphasized in lectures.

Puerto Rico has a relatively large number of chemical and pharmaceutical companies, which have to comply with increasingly stringent environmental remediation and pollution prevention standards. Therefore, training in the use, theory, and applications of state-of-the-art chemical instrumentation is becoming a necessity for our B.S./M.S. chemists and biologists entering graduate school or the workforce. How effectively we can do this, in turn, depends on having the necessary infrastructure to train students for careers in industry, government, and academia. In addition, the early use of chemical instrumentation is specially important for recruiting women and minorities into the sciences because they usually have less exposure to technology than other groups and are, therefore, more likely to be intimidated by it. The lack of necessary instrumentation also limits our students' involvement in creative research projects that emphasize diversity in approach to chemical and biological problem solving. Traditionally, PCUPR has had strong infrastructure for undergraduate studies in chemistry and biology. Instruments acquired by this project have already improved the types of experiments and independent research projects in which our students are involved.

We requested funds to purchase a Perkin Elmer Optima 3000XL Induced Couple Plasma (ICP) Spectrometer, a Perkin Elmer Lambda 20 UV/Vis Spectrophotometer, a Hewlett-Packard 1100 High Performance Liquid Chromatograph, the corresponding accesories and other small analytical chemistry and environmental sciences equipment. The Environmental Science Analytical Laboratory (ESAL) will strengthen the analytical chemistry skills of chemistry and biology majors as well as the research and instructional capabilities of faculty members in chemistry and biology. The acquired Hewlett Packard 1110 HPLC is a completely integrated liquid chromatograph consisting of a separations module with internal column bypass module, an advanced photodiode array detector controlled through a single data acquisition and processing scheme. The system is easy to operate and is optimized for LC analysis by mass and UV detection. The Perkin Elmer Induced Couple Plasma (ICP) Spectrometer, the Perkin Elmer Lambda 20 UV/Vis Spectrophometer, the Hewlett Packard 1110 HPL Chromatograph have complement other available

major scientific equipment to allow the University to establish an Environmental Science Analytical Laboratory (ESAL). Other requested small equipment needed for the ESAL laboratory were an air compressor, an Orion Portable Dissolved Oxygen meter, an Orion portable pH meter and rotary evaporator. The acquisition of these instruments will strengthen the analytical environmental chemistry skills of graduate and undergraduate chemistry and environmental science students and the research and instructional capabilities of faculty member. The equipment will also impact on several chemistry and environmental science courses.

Enclosed you will find the final property inventory report with all pieces of acquired equipment and in what laboratory are localized.

It is no question that the acquisition of all these instruments has improved both laboratory education and undergraduate research in the departments of Biology and Chemistry at Pontifical Catholic University of Puerto Rico. Furthermore, the number and quality of under-represented and low income puertorican students that will be involved in science and engineering will increase as a result of this project funded by the U.S. Department of Defense under the Air Force Office of Scientific Research.

Submitted by the Sponsored Research Programs Office, Pontifical Catholic University of Puerto Rico.

Dr. Gabriel A. Infante
Director

8/31/99
Date

PONTIFICAL CATHOLIC UNIVERSITY OF PUERTO RICO
SPONSORED RESEARCH PROGRAMS OFFICE
SCIENTIFIC RESEARCH CENTER

FINAL PROPERTY INVENTORY REPORT TO THE OFFICE OF NAVAL RESEARCH
RESEARCH AGREEMENT NO. F49620-98-1-0472
AUGUST 31, 1999

EQUIPMENT OR INSTRUMENT	LABORATORY LOCATION	UNIVERSITY PROPERTY NUMBER	COST
ICP OPTIMA 3300 XL **PERKIN ELMER CORPORATION**	ENVIRONMENTAL TOXICOLOGY LABORATORY DR. LIZETTE SANTOS	20712	$100,854.17
LAMBDA 20 UV/VIS **PERKIN ELMER CORPORATION**	ENVIRONMENTAL CHEMISTRY LABORATORY DR. GABRIEL A. INFANTE	20256	$13,375.00
HPC100 AUTOMATED QUATERNA LC3D SYSTEM, INCLUDES: QUATERNARY PUMP, VAC. DEGASSSER, AUTOSAMPLER, DIODEARRAY DETECTOR WITH STD. FLOW CELL, CHEMSTATION FOR LC3D, WINNT 4.0, COLUMN & CHECK OUT SAMPLE. **HEWLETT-PACKARD**	ORGANIC CHEMISTRY LABORATORY DR. ARNALDO CARRASQUILLO	20720, 20721, 20722, 20723, 20724, 20725, 20726, 20727	$43,869.05

AIR COMPRESSOR, 20 GALLONS-125 LBS., 110 VOLTS (FOR INDUCE COUPLED PLASMA SPECTROPHOTOMETER) **AGA GENERAL GASES**	ENVIRONMENTAL CHEMISTRY LABORATORY DR. GABRIEL A. INFANTE	20748	$572.25
PURCHASE OF ACCESORIES FOR THE ICP EQUIPMENT **UNIVERSAL STEEL TRADING CORP.**	ENVIRONMENTAL TOXICOLOGY LABORATORY DR. LIZETTE SANTOS		$100.00
ORION PORTABLE DISSOLVED OXYGEN METER MODEL 835, ITEM#083500 ORION PORTABLE pH/MV, ORP/TEMP., METER MODEL 250A, ITEM.#0250A **BIOANALYTICAL INSTRUMENTS**	ENVIRONMENTAL CHEMISTRY LABORATORY DR. GABRIEL A. INFANTE ENVIRONMENTAL CHEMISTRY LABORATORY DR. GABRIEL A. INFANTE	21013 21014	$1,209.20 $508.70
MS TRAP (HUMIDITY), 100 cc. 1/4 IN FITTING, HP PART #3150-0533 HYDROCARBON REMOVAL TRAP, 1/4 IN FITTING, HP PART 5181-8871 **HEWLETT PACKARD**	ENVIRONMENTAL CHEMISTRY LABORATORY DR. GABRIEL A. INFANTE ENVIRONMENTAL CHEMISTRY LABORATORY DR. GABRIEL A. INFANTE		$198.00 $198.00
YAMATO ROTARY EVAPORATOR, RE200 EVAPORATOR, BM100 ANALOG 3.7L WATER BATH, A STANDARD DIAGONAL GLASSWARE **BIOANALYTICAL INSTRUMENTS**	ENVIRONMENTAL CHEMISTRY LABORATORY DR. GABRIEL A. INFANTE	21229, 21230	$2,198.84

ONE CILINDER OF ARGON ONE REGULATOR **AGA GENERAL GASES**	ENVIRONMENTAL TOXICOLOGY LABORATORY DR. LIZETTE SANTOS	FOR ICP SYSTEM 20712, PAGE 1	$105.20 $122.50
HIGH PERFORMANCE LIQUID CHROMATOGRAPHY, MODEL HP 1100: QUATERNARY PUMP WITH DEGASSER, AUTOSAMPLER, THERMOSTATTED COLUMN COMPARTMENT, DIODE-ARRAY DETECTOR. **HEWLETT-PACKARD**	ENVIRONMENTAL CHEMISTRY LABORATORY DR. GABRIEL A. INFANTE	21813 -21817	$24,000.00
		TOTAL	$187,310.91

Certity correct Gabriel A. Infante Date 8/31/95

Dr. Gabriel A. Infante, Director
Sponsored Research Programs Office