

## **Project Description**

We propose the implementation of a coordinated campus effort to achieve an institutional transformation to increase the participation and advancement of women faculty in the natural and social sciences in the University of Puerto Rico at Humacao (UPR-H).

### **Institution Background**

The UPR-H has a population of approximately 4,300 undergraduate students and is a member institution of the University of Puerto Rico (UPR) system. The Middle States Association of Colleges and Schools (MSA) have continuously accredited UPRH since 1965, with its last accreditation in 1999. UPR-H is also a member of the American Association of Colleges and Universities. The Puerto Rico Council of Higher Education licenses its academic programs. No graduate degrees are offered at the UPR-H.

Considering the size of the Institution, it is among the most productive undergraduate science and mathematics institutions in Puerto Rico. Recent UPR-H classes produced more Chemistry, Physics, and Mathematics baccalaureate graduates in these basic sciences than any other institution in Puerto Rico, including the flagship institution, UPR-Río Piedras, and the second largest institution, UPR-Mayagüez. These statistics are expected to increase in the immediate future. The UPR-H is highly committed to the promotion of undergraduate research and faculty research projects are designed to actively involve undergraduates. The funding for research is provided by institutional funds and federal agencies including the National Science Foundation, the National Institutes of Health, and the Office of Naval Research. The departments involved in this effort are Chemistry, Biology, Physics and Electronics, Computational Mathematics, and Social Sciences. They have a total student body of 985 and a faculty of 104.

The Department of Chemistry offers a baccalaureate program in Industrial Chemistry. It was a pioneer in developing science programs and academic offerings that are unique in Puerto Rico. The Department of Chemistry has a faculty of 23 professors and 236 students. Their research efforts include polymer chemistry, laser spectroscopy, organic synthesis, and computational chemistry.

The Department of Biology is the largest in the science faculty. It offers a BS program in Biology with four specialization areas: General Biology, Coastal Marine Biology, Applied Microbiology, and Wildlife Management. The Department has 405 students and 34 professors. The main areas of research are microbiology/cellular/molecular biology and terrestrial and marine tropical ecology.

The Physics and Electronics Department is actively engaged in teaching, research and service to the community. The baccalaureate program develops a physicist with a strong background in electronics. This Department has a faculty of 16 and 95 students majoring in Physics Applied to Electronics. Graduates can insert themselves in the electronics industry or continue graduate studies in physics, engineering, and related areas. The areas of research include polymers science, micro-systems development, embedded systems, astrophysics, and astronomy. In 1998, it formalized a collaboration with the University of Pennsylvania Materials Research and Engineering Center. This was made possible by a NSF-CIRE grant. The strengthening of the materials component led the Department to propose a new MS program in Physics of Materials. The proposal is being considered by UPR administration and if approved will be the first materials program in Puerto Rico and the first graduate program in UPR-H. In 1999 the Department was granted the first NSF- REU physics program in Puerto Rico. The

Department also runs a small Astronomical Observatory, visited by dozens of students and member of the community each week.

The Department of Mathematics has 63 students enrolled in the Computational Mathematics Program and 19 professors. The Computational Math is the leader in undergraduate research in computer science, mathematics and computational mathematics in Puerto Rico. Since 1998 they have implemented the Summer Institute in Mathematics for Undergraduates (SIMU). The SIMU is funded by NSI and NSF-REU. The areas of research are applied algebra, differential equations and neuron models, coding theory, networking and simulations.

The Department of Social Sciences has a faculty of 12 and 67 students. It offers a variety of courses in sociology, politics, social work, psychology, geography, and economics. Its faculty has experience in action and participatory research as well as in more traditional research. It also has established network research and academic exchange with the Caribbean community including universities that work with the “diaspora” in New York.

### **Current Status of Women in Science**

The UPR has one of the highest rates of women participation in science and engineering of the US. Nevertheless, women faculty participation and advancement is very low when you compare it to what seems to be significant number of potential faculty. A superficial look at the numbers of women science and engineering at UPR may give the impression that compared to other US universities the problems of women faculty in science here are less severe and that implementing an action program to change the status of women scientists is not a priority. A closer look of the status of women scientists at different levels in the academic ladder reveals the need of a systematic study to understand why women’s participation in undergraduate science programs in UPR-H is so high, why this not translated in women’s participation and advancement in academe and to develop strategies to keep them advancing into academic positions at similar rates.

**Undergraduates:** The number of women undergraduate in science at UPR-H is very high except in physics and electronics. The statistics in table 1 show that currently 73% of the students in social sciences, 72% of the students in biology, 67% in chemistry, 46% in computational mathematics, and 26% in physics and electronics are women. The number of women students in science programs has increased steadily for the last ten years and the graduation rates are similar. While in other programs the number of women has increased naturally, in physics and electronics the 26% of women students in physics and electronics is the result of a program initiated by the PI six years ago. The program includes workshops for new women students, mentoring, increasing undergraduate research opportunities for women, and a program for junior-high and high school girls.

**Faculty:** Table 1 shows the number of women faculty in the science programs at UPR-H. The proportions of women to men in the faculty contrast dramatically with the proportion of female to male students: 2/14 in physics and electronics, 6/13 in computational mathematics, 10/13 in chemistry, 18/16 in biology, and 4/8 in social sciences. However, except for physics and electronics, the rates of women faculty seem to be very good compared to universities in the US mainland. To have a better sense of the real situation of women faculty in science, we need to look at other data. Table 1 also shows the number of faculty with a PhD degree. Having a PhD implies a higher salary, more opportunities of obtaining funds for research, best chances of tenure

and promotions, and in general having a higher academic standard than those without the degree that normally are expected to be dedicated exclusively to teaching service courses. The proportions of female to male faculty with PhD are 1/9 in physics and electronics, 1/6 in computational mathematics, 3/9 in chemistry, 5/10 in biology, and 2/5 in social sciences.

	<b>Physics and Electronics</b>		<b>Computational Math</b>	
	<b>F</b>	<b>M</b>	<b>F</b>	<b>M</b>
<b>Undergraduates</b>	25	70	29	34
<b>Faculty</b>	2	14	6	13
<b>Faculty with PhD</b>	1	9	1	6

  

	<b>Chemistry</b>		<b>Biology</b>	
	<b>F</b>	<b>M</b>	<b>F</b>	<b>M</b>
<b>Undergraduates</b>	159	77	405	158
<b>Faculty</b>	10	13	18	16
<b>Faculty with PhD</b>	3	9	5	10

  

	<b>Social Sciences</b>	
	<b>F</b>	<b>M</b>
<b>Undergraduates</b>	49	18
<b>Faculty</b>	4	8
<b>Faculty with PhD</b>	2	5

Table 1: Number of Women (F) vs. Men (M) – undergraduates, faculty, and faculty with PhD in the natural and social sciences programs, UPR-Humacao 2001

**Faculty Ranks:** Table 2 shows the distribution of science faculty at UPR-H by gender and by rank. The table can be divided into two groups: physics and electronics, computational mathematics and social sciences in the first group; and chemistry and biology in the second. In the first group there are none or only one woman with full professorship. In the 20 years of existence of the physics and electronics department only four women have been in a tenure track position and only one (the PI) remained in the department long enough to obtain tenure. In the second group, the number of men and women with full professorship is the same. However when we interviewed the faculty to develop this proposal we found that while men obtained the full professorship earlier in their careers, women tend to obtain it when they are about to retire. One of the proposed activities for this project (see Activities to Reach Goals) involves a study of the time in rank of women and men faculty at UPR-H.

**Faculty Salaries:** In UPR-H the faculty basic salary scale is strictly based on degree, rank and years in the position. The salaries tend to be lower than in the US even though the cost of living is comparable to that of many states in the nation. Currently, the maximum annual basic salary is \$62,000 for a Full Professor with a PhD in engineering or architecture and more than 30 years in the position. To increase the salary a faculty must accept a higher teaching load (the normal is 12

credit per semester), accept an administrative position or bring external funds to the institution. UPR-H recently approved a new salary scale for faculty who bring external funds for research.

**Faculty in Research:** Faculty with an active and productive research project and with external funds to support it have the highest prestige and recognition. They have higher salaries, space for research, and a lower teaching load. Of the science faculty currently involved in research activities 36 (11 women) have funds to support undergraduate students research projects, 20 of them (6 women) have funds from other sources for research, and 15 (3 women) have funds for research with indirect costs. Only three women in the institution have these senior positions. The three women are from the biology, chemistry, and physics and electronics departments. Having external funds with indirect costs is necessary to reach the highest salary scale. The PI and Co-PI believe that at UPR-H having external funds for research is a better indicator of a higher academic than the rank.

**Other Support for Women Faculty:** UPR-H grants full maternity leave benefits to all women employees, including women faculty. The university also runs a daycare center for employees children.

	<b>Physics and Electronics</b>		<b>Computational Math</b>	
	<b>F</b>	<b>M</b>	<b>F</b>	<b>M</b>
<b>Faculty</b>	2	14	6	13
<b>Instructors</b>	0	4	2	2
<b>Assistant Professors</b>	2	0	2	4
<b>Associate Professors</b>	0	5	2	4
<b>Full Professors</b>	0	5	0	3

  

	<b>Chemistry</b>		<b>Biology</b>	
	<b>F</b>	<b>M</b>	<b>F</b>	<b>M</b>
<b>Faculty</b>	10	13	18	16
<b>Instructors</b>	2	2	2	0
<b>Assistant Professors</b>	0	3	5	3
<b>Associate Professors</b>	2	2	4	6
<b>Full Professors</b>	6	6	7	7

  

	<b>Social Sciences</b>	
	<b>F</b>	<b>M</b>
<b>Faculty</b>	4	8
<b>Instructors</b>	1	1
<b>Assistant Professors</b>	1	1
<b>Associate Professors</b>	2	2
<b>Full Professors</b>	1	4

Table 2: Number of Women (F) vs. Men (M) – faculty by rank in natural and social sciences programs, UPR-Humacao 2001

## **Barriers to Women's Advancement that the Proposed Project will Address**

- Family-work conflicts particularly for women that are in childbearing years
- Differences in tenure and promotion for men and women faculty
- Marginalized and exclusion from significant academic roles
- Differences in salary, space, awards, and resources between men and women faculty
- Isolation from current research issues and women in academic role models
- Teaching and service overload
- Gender discrimination and unequal treatment of women faculty
- Lack of time management and negotiation skills and fear of being perceived as complainers

## **Goals of the Proposed Project**

- To identify problems faced by faculty women at UPR-Humacao that prevent them from advancing to higher positions in the academe and compare them to other UPR units, other universities in Puerto Rico, and with universities in the mainland.
- To increase the number of women faculty with senior ranks and leadership positions in the natural and social sciences in UPR-Humacao.
- To increase the number of women faculty with active and funded research projects in UPR-Humacao.
- To increase the recruitment of tenured and tenure-track women in the sciences.
- To promote awareness of gender discrimination that prevent women faculty in advancing in the academe and establish an institutional transformation to address their needs.

## **Activities to Reach Goals**

### **1. Training for administrators**

All UPR-H academic administrators that participate in faculty recruitment, hiring and promotion processes will participate in training sessions on 1) gender equality and diversity in the institution, and 2) UPR regulations dealing with recruitment, hiring and promotion of faculty and their relation to the first topic.

### **2. Revise regulations for hiring and promoting faculty and develop and Action Plan to improve faculty diversity in the UPR-H.**

A committee formed by representatives from: Dean of Academic Affairs, Chairs of Science and Math Departments, Office of Human Resources, Office of Equal Opportunities, Committee on the Status of Women, PI and Co-PI of ADVANCE will be responsible of revising regulations for recruitment, hiring and promoting faculty at UPR-H and developing an **Action Plan** to eliminate gender discrimination and actively seeks qualified women candidates for recruitment, particularly in areas of difficult recruitment.

### **3. Establish a multidisciplinary Coordinating Committee (CC) to promoting women faculty.**

The CC is composed of representatives from programs and offices, already in place in the UPR-H, that develop activities that support the goals of the ADVANCE program. They will collaborate in the development, promotion, and implementation of the objectives of the proposed project to increase the number and advancement of women in the natural and social sciences in the UPR-H. The members of the CC are (see internal memorandum of understanding): Chancellor, Dean of Academic Affairs, Chairs of Science and Math Departments, Office of Human Resources, Equal Employment Opportunities, Women's Affairs, Committee, Library, Office of Academic Computing, Employees Support Office, Office of Planning Development, and Child Care Center.

**4. Research to understand the causes and consequences of the extraordinary participation of undergraduate women in science in UPR-Humacao, how the success at the undergraduate level can be used to develop strategies to increase participation of women in the science professorate, to discover if the experiences of senior women faculty in Science form a pattern of gender based discrimination that have impacted or impaired their performance as educators, leaders in research and as models for women students and to compare these experiences with those of women faculty in other UPR units, other universities in Puerto Rico, and with universities in the mainland**

○ Methodology:

The research will focus in two different groups: current undergraduate science students and science women faculty at UPRH. The research methodology includes a survey of undergraduate students and a focus group interview to collect quantitative and qualitative data on their experiences and graduate studies plans, expectations and barriers. It will also include a focal group, personal interviews and secondary document analysis to collect qualitative data on the experience and perception of the women faculty in science about the process and the results of their academic career in science.

The research will be designed and carry out in collaboration with the women faculty in science. This collaborative approach will provide the participants with a first step towards understanding the gender issues associated with their experiences and create the needed environment for empowerment and commitment to change. The research process, as well as its results will be shared with the participants to receive feedback and promote empowerment among women faculty and students in science at UPR-H.

○ Data Collection:

1. Faculty data

- Allocation of resources
  - Salaries, space allocation, resources for research, equipment, travel
- Compensation and awards
  - Named chairs and deans, prizes, awards,

- Types of contracts at hiring, time for tenure, time in ranks,
- Teaching load and assignments
- Department and Institutional committees and assignments
- Student orientated assignments and obligations
- Service assignments and activities
- Perception about their status and of their female colleagues
- Satisfaction with their career
- Evaluation of the impact of gender on their careers

## 2. Students

- What criteria or elements were used to decide about their undergraduate studies?
- Perception about their status as female students in science
- Satisfaction with their studies and choice of career
- What criteria or elements are been considered to decide on their graduate studies
- Expectations, plans and barriers for undergraduate studies
- Evaluation of the impact of gender on their undergraduate studies and future graduate studies

### ○ Data analysis procedures:

- Content Analysis of documents.
- Analysis of the data from student and faculty surveys using descriptive statistics
- Qualitative matrix on barriers and facilitators

### ○ Use of Results:

- Provide short and long term solutions and recommendations to administrators and faculty.
- Elaborate action plans and identify strategies to best justify the need for female role models/mentors in the science faculty.
- Develop strategies to increase advancement of women in the science faculty.
- Replication of the program in other units of the system and in other disciplines.
- Revise training and workshops contents and materials.

## 5. Research support for women faculty

Support for release time and research-related expenses (small pieces of equipment materials, travel to scientific conferences, etc.) for young female faculty starting a research project or for women who interrupted research and want to continue. Funds can be renewed for one additional year. After that time women are expected to continue the efforts with funds obtained from other sources. Workshops on proposal writing, how to seek information on funding sources and how to build research teams and collaborations will be introduced and made available. The training and mentoring components of the program will help them seek these funds.

## 6. Workshops for new women faculty

Experienced faculty from UPR-Humacao and other universities will offer these workshops for new women faculty. They will share their own experiences and offer practical information that will help young women faculty to succeed in their academic science careers. In addition, the workshops will provide new women faculty the opportunity to interact with female role models, initiate mentoring and networking relationships. The topics covered in the workshops include:

- a. **Family-work conflicts:** how to successfully combine both roles and reduce their impact in their careers.
- b. **Tenure and Promotion:** what is needed and what is not needed. Negotiation of academic duties. Applying for tenure and promotions at UPR-Humacao.
- c. **Research:** Going beyond the thesis. Research in undergraduate institutions. Publications.
- d. **Networking:** The importance of networking and contacts. Attending conferences and meeting the right people.
- e. **Getting Funding:** Strategies for obtaining funding. How to write a good proposal.
- f. **Teaching:** How to link research and teaching. How to contribute to curricula improvement.
- g. **Time Management:** How to get this all done: teaching, service, research and life outside of work.
- h. **Gender Equality:** Social construction of gender. Gender discrimination. Strategies to deal with gender discrimination.

## 7. **CD-ROM with workshops contents**

The contents of the workshops for new women faculty will be incorporated in a CD-ROM. All the workshops will be recorded and the CDROM will include transparencies, video and audio recordings, etc. Each year of the grant period improvements or new material can be added to the CDROM.

The CDROM will be used to trained new faculty who cannot attend the workshops. It will also be sent to our collaborators in other universities in Puerto Rico (see letters of support) to train their faculty.

## 8. **Establish a network of women in science at UPR-Humacao, the UPR system and other institutions in the island and in the mainland**

A dynamic and efficient mentoring program for women faculty to help them seek support to continue their research efforts. This will include the generation of a network of experienced, tenured female faculty at UPR-Humacao and new female faculty. Experienced women faculty from the other units of the UPR system, other universities in the Island, and Puerto Rican/Latinas in universities in the mainland will be invited to participate in research areas where we do not have tenured women faculty. All new female faculty or experienced faculty desiring to continue research projects will be placed one-on-one with a member of the network. Network workshops will be held when appropriate to consolidate the group identity and enhance interactions.

## **9. Outreach program to increase the number of women faculty in Physics and Electronics and Computational Mathematics**

Historically the UPR-H has had some difficulty recruiting faculty in the science and technology, including the social sciences. Since the language of instruction is Spanish we have been limited to either our graduates, graduates from Latin American institutions or graduates from American Institutions who will teach in English and who usually offered a great deal of resistance to try to lecture in Spanish (with some wonderful and notable exceptions of course ). This lead us into suggesting NSF to allow us to support a small amount of intellectually gifted female undergraduates interested in academic careers. In our experience during the last decade, the females receiving baccalaureates from UPR-H and with clear academic inclinations, have finished their PhD and most are teaching at UPR-H (or are in the pipeline with close ties to UPR-H). With this experience in hand we have set up a motivational and instructional program for these selected undergraduates continual involvement with UPR-H and return as faculty.

Each year talented women undergraduates interested in pursuing an academic career will participate in a series of activities designed to prepare them to succeed in graduate school and to join UPR-H faculty after completing a PhD in science. The activities include:

- a. Undergraduate Research Support; working with a female researcher if one is available in the area of interest.
- b. Mentoring
- c. Workshops on gender issues, applying to graduate school, GRE, etc.
- d. Support for graduate studies: UPR Presidential Scholarship or UPR-H Faculty Scholarship.
- e. Job offer after completing the PhD

## **10. ADVANCE Annual Meeting**

An additional activity that will cut across goals is a yearly scientific meeting for all participants of the ADVANCE program and CUSEP. This meeting will be organized in the traditional scientific-meeting format where faculty and students will have the opportunity to present results and work in progress. The activity will finalize with an open discussion session to establish the direction for the following year and for the not-so-near future. This activity will have large impact, as we will invite to attend to all academic community and other individuals working with women and women in science issues in Puerto Rico.

### **Anticipated Impact**

- Revision and development of policies, protocols and procedures to address gender discrimination of women faculty in science.
- Increased number of full professors among women faculty in science.
- Increased number of mentors among women faculty in science.
- Increased number of women faculty in science with active research projects.

- Increased number of women faculty in science that are recruited with tenure and tenure track positions.
- Understand the gender issues associated with women faculty and undergraduate in science experiences.
- Create the needed environment for empowerment and commitment to change.
- Receive feedback and promote empowerment among women faculty and students in science at UPR-H.
- Improved coordination, awareness and information sharing among campus administrations.
- Administrator's commitment to addressing gender discrimination towards women faculty in science.
- Awareness of the policies, protocols, processes and services on campus.
- Women faculty in science knowledgeable about gender issues and its effects on their careers.

### **Institutional Resources Committed to the Effort**

- Release time for PI, Co-PI and women faculty participants
- Staff
  - To develop and review procedures for action plan
  - To implement and promote procedures and action plan
  - Provide training in gender issues and gender discrimination
  - Provide Statistics: data and analysis
  - Childcare for women faculty
  - Counseling and support for women faculty
  - Seven technicians in physics, chemistry, computational mathematics, biology, and microscopy laboratory
  - Two experts in multimedia development
  - Training and support for writing grant proposals
- Research and computer facilities
  - Ten Research Laboratories in Chemistry, Physics, and Biology
  - Computational Mathematics Research Laboratory
  - Five Computer Laboratories with specialized software (mathematics, physics, biology, social sciences)
  - Video Conference Room
  - Machine Shop, Chemical Storage Room
- Equipment
  - AFM/STM Microscope, SEM microscope, High Impedance Materials Analyzers (110k-2GHz), system for processing photoformable tapes, basic electronics instrumentation, High Speed Centrifuge, HidroLab, Medium Vessel with oceanographic equipment, HPLC, FT-NMR, FT-IR's, ESR, GC, GC-MS, thermal cycler for PCR, Electron Microscope, Inverted Microscopes, Foto/analyses archiver, Polarographer, Spectral Energy UV-Vis irradiation system, Diode array spectrometer, Spectrofluorimeter, Epifluorescent microscope.
- Presidential and UPR-H Faculty Scholarship for Graduate Studies
- Full Maternity Leave Benefits

## **Plan to Enable Effective and Sustainable Institutional Transformation**

UPR-H has a good record of absorbing federally funded programs into its administrative mainstream. The Assessment Program, the Honor Program, the Center for the Design and Production of Instructional Resources (CEDPRI, its Spanish acronym), and the Institute for the Enhancement of Teaching and Learning (IDEAS, its Spanish acronym) were initiated as discretionary grants and were institutionalized as part of the Institution's commitment to extend and improve services.

UPR-H will integrate the project's activities and outcomes into the institution's regular administrative and academic process. The Dean of Academic Affairs will also ensure the continued financial support for the activities. During the implementation process, the chancellor and the Administrative Board will be analyzing budget requirements for the institutionalization of the activities.

Specific plans include:

- The Action Plan developed during the grant period and approved by the chancellor will be used by the Departments to recruit and promote women faculty. The Office of Equal Opportunities will work with the science departments in the implementation.
- The workshops for new women faculty will be incorporated into the regular orientation week for new faculty organized by the Dean of Academic Affairs. All the training materials, the CD-ROM, and the human resources offering the workshop will be available to support this effort.
- The funds for the research grants for new faculty will be provided by the Dean of Academic Affairs Fund for Research.
- The Department of Physics and Electronics, and Computational Mathematics will continue mentoring talented women students and requesting graduate scholarships for them to increase the number of women in the faculty.

The network of women in science developed during the grant period will continue supporting and encouraging other women in the faculty. We think this is the most important step for institutional transformation.

## **Assessment and Evaluation Plan**

A team of independent evaluators with expertise on gender issues will do the ongoing evaluation and assessment of the Program. The work for The University Center for Psychological Research and Services (CUSEP, for its name in Spanish) CUSEP is a highly recognized center for training, research, and psychological services unit. The designated evaluator is Nélica Torres. The proposed evaluation plan is summarized in table 3.

TABLE 3

**Evaluation Plan**

<b>Goals</b>	<b>Assessment techniques</b>	<b>Expected outcomes</b>	<b>Data collection procedure</b>	<b>Use of the results</b>
<b>To increase the number of women faculty with senior and leadership positions in the natural and social sciences in UPR-Humacao</b>	<p>Self-administered questionnaire for the pre and posttest to measure change in experiences and on procedures and policies to promote opportunities for women faculty in science.</p> <p>Analysis of training materials, content, structure to assess pertinent objectives and educational methodology.</p> <p>Pre-post test to measure knowledge acquired as result of the training</p> <p>Record of educational activities with brief description of type and number of participants</p> <p>SAQ to assess participant's evaluation of training received</p>	<p>Revision and development of policies, protocols and procedures to address gender discrimination of women faculty in science.</p> <p>Increased number of full professors among women faculty in science.</p> <p>Increased number of mentors among women faculty in science.</p>	<p>Establish a system for recording and filing of all meetings minutes.</p> <p>Keep and maintain a systemized file with all communications</p> <p>Establish a file for all documents (guides, policies, protocols, procedures, etc.)</p> <p>Design the self-administered questionnaire</p> <p>Tabulate the questionnaire's results.</p> <p>Analyze the data from the questionnaires.</p> <p>Set the categories for the content analysis of documents (minutes, policies, procedures, reports)</p> <p>Carry out the analysis.</p> <p>Write the report on the results</p>	<p>Formative evaluation to monitor accomplishment of objectives.</p> <p>Outcome evaluation to measure program efficiency.</p> <p>Targeted direction for future activities and needs on campus.</p>
<b>To increase the number of women faculty in science with active and funded research projects in UPR-Humacao</b>	<p>Official Reports and documents from the Dean of Academic Affairs</p> <p>External funding reports and survey</p>	<p>Revision and development of policies, protocols and procedures to address gender discrimination of women faculty in science and for allocation of research funds, equipment and labs.</p> <p>Increased number of women faculty in science with active research projects.</p>	<p>Design external funding survey,</p> <p>Tabulate and analyze survey results.</p> <p>Set the categories for the content analysis of documents (minutes, policies, procedures, reports)</p> <p>Carry out the analysis.</p> <p>Write the report on the results</p>	<p>Formative evaluation to monitor accomplishment of program objectives.</p> <p>Outcome evaluation to measure program efficiency.</p> <p>Targeted direction for future activities and needs on campus.</p>
<b>To increase the recruitment of tenured and tenure-track women in the sciences</b>	<p>Analysis of recruitment policies and procedures in each Department</p> <p>Human Resources reports.</p>	<p>Revision and development of recruitment policies, protocols and procedures to address gender discrimination of women faculty in science.</p> <p>Increased number of women faculty in science that are recruited with tenure and tenure track positions.</p>	<p>Set the categories for the content analysis of documents (minutes, policies, procedures, reports)</p> <p>Carry out the analysis.</p> <p>Write the report on the results</p>	<p>Formative evaluation to monitor accomplishment of program objectives.</p> <p>Outcome evaluation to measure program efficiency.</p> <p>Targeted direction for future activities and needs on campus.</p>
<b>To identify problems faced by faculty women at UPR-Humacao that prevent them from advancing to higher positions in the academe and compare them to other UPR units, other universities in</b>	<p>Survey of undergraduate students and a focus group interview.</p> <p>Women faculty in science focal group and personal interviews</p> <p>Secondary document analysis</p>	<p>Understand the gender issues associated with women faculty and undergraduate in science experiences</p> <p>Create the needed environment for empowerment and commitment to change.</p> <p>Receive feedback and promote empowerment among women faculty and students in science at UPR-H.</p>	<p>Quantitative and qualitative data on women student and faculty in science experiences</p> <p>Qualitative data on the experience and perception of the women faculty in science about the process and the results of their academic career in science.</p>	<p>Provide short and long term solutions and recommendations to administrators and faculty.</p> <p>Elaborate action plans and identify strategies to address the need for female role models/mentors in the science faculty.</p> <p>Develop strategies to increase advancement of women in the</p>

Goals	Assessment techniques	Expected outcomes	Data collection procedure	Use of the results
<b>Puerto Rico, and with universities in the mainland</b>				science faculty.  Dissemination of results.  Replication of the program in other units of the system and in other disciplines.  Revise training and workshops contents and materials.
<b>To promote awareness of gender discrimination that prevent women faculty in advancing in the academe and establish an institutional transformation to address their needs</b>	<p>Documents generated in establishing the community awareness and collaboration (guides, policies, protocols, procedures, etc</p> <p>Self-administered questionnaire (SAQ) for members of the Coordinating Committee to evaluate accomplishment of objectives specially those addressing the community coordination and collaboration response;</p> <p>Pre and post test questionnaires/attitude scales to measure change in knowledge and attitudes toward women faculty in science and other selected variables.</p>	<p>Revision and development of campus policies, protocols and processes.</p> <p>Improved coordination, awareness and information sharing among campus administrations.</p> <p>Administrator's commitment to addressing gender discrimination towards women faculty in science.</p> <p>Awareness of the policies, protocols, processes and services on campus.</p> <p>A women faculty in science that is knowledgeable about gender issues and its effects on their careers.</p>	<p>Revise and evaluate the content and training methodology on an ongoing basis. This will take into consideration participant's evaluation of the activity after the first training.</p> <p>SAQ administered at the beginning and at the end of the training.</p> <p>Trainers will submit a summary report of all training with relevant evaluation data (attendance, evaluation results, satisfaction, and their own evaluation of the process) At the end of each program period (semester).</p> <p>Evaluation Q will be administered at the end of the training workshop.</p> <p>Tabulate the questionnaire's results.</p> <p>Analyze the data from the questionnaires.</p> <p>Carry out the analysis.</p> <p>Write the report on the results</p>	<p>Formative evaluation to monitor accomplishment of program objectives.</p> <p>Outcome evaluation to measure program efficiency.</p> <p>Targeted direction for future activities and needs on campus.</p>

## Administrative Structure and Personnel Qualifications

The ADVANCE program will be managed and administered by the PI and Co-PI. They will provide the leadership necessary to produce an institutional transformation to increase the number and advance the positions of women. During the last two and a half years the PI has administered and managed the UPR-Humacao/Penn CIRE grant worth \$1.3 M and several other substantial research grants in research and education. The Co-PI is experienced in managing external funds too.

PI: **Idalia Ramos** is a condense matter physicist. Since she was hired in 1993, Prof. Ramos has organized different activities to increase the number of women in physics and electronics. As part of that effort she has organized workshops for women admitted to the programs of Physics and Electronics, a mentoring program for new women students, conferences with women scientists

who serve as role models for the students, recruitment activities for high school girls such as open houses, talks and brochures, and incorporating the theme of *Contributions of Women to Physics* into the Physical Sciences course. She is the advisor of the *Women in Physics and Electronics Association*, a group founded three years ago by the women students in the Department. As Co-PI of the Women Gateway to Success (WEA) funded by the US Dept. of Education, Prof. I. Ramos is currently teaching Physics and Engineering to 65 girls from the town municipalities of Humacao, Vieques and Culebra. Prof. Ramos has also supervised more than 20 students in undergraduate research projects, has funded research projects including an NSF collaborative project between UPR and the University of Pennsylvania, and is the project director of a multidisciplinary summer research program for undergraduate students.

Co-PI: **Sara Benitez** is a sociologist and teaches courses on research methods. She developed most of the participatory action research courses for the Experimental Baccalaureate Degree in Social Action Research. Currently she is engaged in a research on domestic violence and social support. She is also involved in the Community Organization and Participatory Research in the Caribbean Network's research project on systematizing community-based participation. She has extensive experience coordinating research networks. For three years, she coordinated a Puerto Rican University women's research network on gender issue. In addition she was the Coordinator of Atlanta, a UPR research exchange program between UPR faculty and their peers in the Caribbean. As the Atlanta's coordinator, she oversaw 21 research networks, at least 25 short-term research and exchange projects, and an administrative and communication website for the project and Atlanta's publications. She has provided leadership to university projects in curriculum development, strategic planning; self-studies for re-accreditation agencies. She is member of the University Senate, was chair of the Social Science Department, a member of the *Administrative Board and Director of the Office of Planning and Development*. She is a feminist activist with extensive experience in gender issues and co-coordinates the first UPR Violence Against Women on Campus Program.

The PI and Co-PI have worked together for several years in gender related issues and other academic activities. They are members of UPR-H's *Women Affairs Committee* and *Congreso Universitario para las Mujeres y los Géneros*, a coordinating committee of university organizations dealing with gender issues in Puerto Rico. They also collaborate in the UPRH Violence Against Women on Campus Program, and in the multidisciplinary research group to study water resources in the Humacao region of Puerto Rico.

**External Evaluator:** Nérida Torres Burgos, from CUSEP, obtained her M.A. from the University of Puerto Rico in 1981 with a specialty in social community psychology. She joined the Department of Psychology in 1994 and is now Assistant Research Professor at the University Center for Psychological Services and Research. She has extensive professional experience in prevention and educational programs with special focus on women and youth. She is a former director of the Community Education Division of the Commission of Women Affairs, Office of the Governor. She has served as a consultant to the Graduate Program of Criminal Justice of the Inter American University of Puerto Rico and to Project Life a research project of the School of Public Health at Harvard University. Her special areas of interests include women and HIV-AIDS, economic development and women, program development and evaluation, social marketing of prevention programs and gender issues in education and health. She has published several articles in her areas of expertise. Ms. Torres Burgos was the Project Coordinator of a M-

RISP project for the development and evaluation of an HIV prevention program for heterosexual women since 1994. She was the external evaluator for the San Juan AIDS TASK FORCE this past summer. Currently she is the external evaluator of the Program for the Prevention of Violent Crimes Against Women at the University of Puerto Rico, Humacao Campus. Ms. Torres Burgos has worked at different levels of various research projects, giving particular attention to the development and refinement of questionnaires, qualitative data analyses and the design and implementation of program evaluation projects.

**Educational Coordinator:** The Educational Coordinator, will organize, and coordinate all the training activities of the grant and will be responsible of designing and distributing the educational materials. She will be responsible of maintaining the program's web page and producing the CDROM with the training workshops. She will work closely with the PI and Co-PI in the day-to-day implementation of the program and in determining the contents of the educational materials. The expected qualifications are a BS or MS in a natural or social sciences program, courses or working experience in gender-related issues, knowledge of multimedia development.

**Administrative Coordinator:** will assist the PI, Co-PI and Educational Coordinator in the administration of the project.

### **Dissemination of Results**

All information gathered will be shared with other universities to promote the understanding of the barriers that prevent women from advancing in academic science and to provide a model of a collaborative effort to increase the participation and advancement of women faculty in the natural and social sciences.

We will:

- Organize ADVANCE Annual Meeting; all the project participants will meet for a two-days meeting at UPR-Humacao. The objective of this is to gather researchers, faculty members and administrators to exchange experiences that successfully empower women in the academia.
- Research, training and implementation results will be presented in conferences.
- Establish a clearinghouse at the UPR-H to provide information to government, women's organizations, research centers, researchers, and others.
- Create a newsletter and a web-site bulletin board
- Publish information about the program in UPR's and local newspapers
- Produce training and educational materials
- Action Plan to increase the participation and advancement of women in the natural and social sciences