



CoHemis... Update

Overcoming through cooperation

10th Anniversary

Founded with the support of the
National Science Foundation. (NSF)

University of Puerto Rico, Mayagüez Campus (UPRM)

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Sponsored by Microsoft:

“Learning Factory” at Chile, Brazil & Mexico

As part of a joint UPRM-Microsoft initiative and following successful presentations in Argentina, CoHemis is organizing six new “Learning Factory” workshops. The workshops will be presented in 2002 in Brazil (at Universidad de Campinas and Universidad de Sao Paulo) and in Mexico (UNAM and the Instituto Tecnológico de Monterrey). In addition, the “Learning Factory” will be given two more times in Chile later in 2002. With a second round of workshops in Chile responding to local demands, the strategic alliance between Microsoft Research and UPRM—through the CoHemis Center—will have made a significant contribution to a renovation of engineering education in this key nation.

The first workshops in Chile were held on July, 16-17 and 19-20, 2001 in Universidad de Chile and Pontificia Universidad Católica de Chile (PUC-Chile) respectively.

Continues on page 8

COHEMIS VISITS ECUADOR AND PANAMÁ



Participants of the CoHemis meeting at FUNDACYT-Ecuador, representing the science and technology educational institutions of Quito. Fourth from left is Dr. Fernando Ortiz (RIP), FUNDACYT's Executive Director, who organized the meeting.

The CoHemis co-directors, Dr. Luis Pumarada-O'Neill and Dr. Jorge I. Vélez-Arocho, made a productive trip to Panama and Ecuador on May 27-June 2, 2001. Even though CoHemis had previous contact and relations with several institutions from both countries, these nations were undergoing

important transformations and neither of them were represented in the consortium. The purposes of the visits were to: establish relations with institutions that have similar objectives to those of the CoHemis Center; assess the situation of both countries in terms of education and research in science and technology; explore opportunities and possible collaboration between persons or institutions from the CoHemis network and their counterparts from the two countries; and attain membership from one or more institutions from both countries into the

Continues on page 4

At Universidad de Santiago, Chile

Short Course on Toxic Metals, Trace Elements, Health and Environment

The University of Santiago and the Armed Forces Institute of Pathology will present the seminar “Toxic Metals, Health, and the Environment.” in Santiago, Chile on April 10-12, 2002. This event is co-sponsored by the United States Geological Survey, the United States Environmental Protection Agency, and the Co-Hemis Center of the University of Puerto Rico, Mayagüez.

The seminar is for geologists, geochemists, ecologists, chemists, biologists, environmental and occupational scientists, medical professionals, toxicologists, epidemiologists, pathologists, and other professionals whose fields are related to health, the environment, and earth sciences. It is also for anyone interested in the effects of toxic trace metals on human health, ecology, or the quality of the environment. The scientific

Continues on page 14

INSIDE THIS ISSUE:

CoHemis-X: creation & siting
UPRM: new PhD programs
New Consortium members
Climate change project
UPRM's exchange students
UPRM Industrial Biotechnology
UPRM project with Yale Univ.
Internet-2 at UPR
Future events

UPRM to be a cornerstone for PR's TechnoEconomic Corridor

Puerto Rico has embarked in a strategic initiative to foster its economic development: the Puerto Rico TechnoEconomic Corridor. PRTEC consists of a conglomerate of public and private entities with overlapping economic and social interests and located mostly in the western part of the Island that aims to promote economic development with particular emphasis in facilitating and commercializing new and innovative technologies. UPRM's capabilities in R&D will be a very important component of this crucial initiative.

PRTEC aims to:

- ∑ retain existing jobs and create new ones;
- ∑ attract new businesses;
- ∑ support the development of an R&D culture;
- ∑ support the development of an entrepreneurial culture; and
- ∑ help Puerto Rico to be recognized as a center of high-tech excellence

The conglomerate that is developing

this strategy comprises the following sectors:

1. academia, represented by UPRM's Chancellor;
2. government, represented by Puerto Rico's Secretary of Commerce and Economic Development;
3. industry, represented by the president of the Puerto Rico Manufacturers' Association (PRMA), a representative from PRMA's western division, and a representative from the South West Industrial Association;
4. commerce, represented by the president of Puerto Rico's Chamber of Commerce (CCPR) and a representative from CCPR's western division;
5. banking, Economic Strategy, Science & Finance represented by local and external advisors; and
6. PRTEC Clusters, represented by their leaders.

The PRTEC celebrated its first congress, "Partnering for Innovation and Technology for Economic Development", on November

10-11, 2001 in Mayagüez, Puerto Rico. Local and invited speakers presented the following papers :

- "The Medical Device Cluster";
- "The Working Group on Infrastructure";
- "Puerto Rico's Western Region Techno-Economic Centers";
- "Puerto Rico's Science and Technology Policy: Setting the Technology Roadmap for Economic Development";
- "Singapore's Experience, from a University Administrator's Point of View";
- "Collaboration for Success: An Industry Cluster Strategy";
- "Clustering for Innovation and Coupling Technology for Economic Development";
- "Partnering for Innovation & Technology for Economic Development";
- "NU's Perspective: Singapore's Experience"; and
- "The Imperative of Multi-Sectorial Collaboration in Economic Development Initiatives: the Experience of Your Jurisdiction"

New Doctoral Programs Being Offered at UPRM

The University of Puerto Rico, Mayagüez Campus (UPRM), is pleased to announce its graduate programs at the doctoral level. Two new PhD programs have been opened in the last two years, and three more are expected to open soon. Current programs are:

- PhD in **Marine Sciences**
- PhD in **Civil Engineering (Structural and Environmental)**
- PhD in **Chemical Engineering**
- PhD in **Computing and Information Sciences and Engineering**

New programs to open soon are:

- PhD in **Applied Chemistry**
- PhD in **Mechanical Engineering**
- PhD in **Biotechnology**

We invite qualified individuals to be part of this growth in graduate programs. Apply today! Application deadlines are: **February 15** for admission in the first (Fall) term, and **September 15** for admission in the second (Spring) term.

Application forms, instructions, requirements and pertinent information related to these and other graduate programs can be found in our website: **grad.uprm.edu**. Additional contact information is available through:

Tel.: 1-787-265-3809 / 1-787-832-4040 Extensions 3442 and 3598
Fax: 1-787-265-5489; e-mail: **graduados@uprm.edu**.

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UPRM'S INTERNATIONAL STUDENT EXCHANGE PROGRAM PROVIDES TRUE GLOBAL PERSPECTIVES



Gildreth González, ISEP Director, discusses alternatives with two UPRM students interested in studying a semester outside Puerto Rico.

One of the unique opportunities that a college education provides is to be able to take courses at an institution in another country. This experience takes on even more value in a modern context of economic and educational globalization.

Visit to Puerto Rico by U.S. Commission on Ocean Policy arranged by CoHemis

The CoHemis Center along with other institutions made arrangements for an official visit of a subcommission of the U.S. Ocean Policy Commission to San Juan, Puerto Rico on February 20-21, 2002.

The United States Congress created this high-ranking commission, constituted by 16 people from different sectors of government, education, and industry, to examine its ocean management.

The Commission on Ocean Policy has to present its proposal to the President and Congress by March 2003. Its members will develop a series of policies that may serve to inform the public and protect the environment. The proposal will include such aspects as: educating school students on marine and coastal issues, so that in the long run a well-informed public could have some influence on the policies that may be adopted; the availability of scientific and technological resources to obtain and analyze oceanic data; provide new opportunities so that the citizens can enjoy and benefit from the marine environment.

The first day, the subcommission visited to the Fajardo Lighthouse, which is located in an area that is regarded an ecological and historical reserve in north-eastern Puerto Rico. The Conservation Trust of Puerto Rico, a non-governmental agency that administers the light-house, and a several representatives from Puerto Rican organizations and agencies interested in developing strategies for the conservation of natural resources met with the commissioners to discuss this important issue. The next morning the commissioners met with the organization Community Defenders of Coastal Areas. The rest of the day, the commissioners attended two forum discussions on coastal topics in which members from government, education, and industry participated.

The arrangements for the visit were conducted by the CoHemis Center, the Sea-Grant program at UPRM, and the President of the Commission of Natural Resources from the Puerto Rican Senate, Senator Cirilo Tirado Jr. Doctor Fernando Gilbes, professor from the Department of Geology at UPRM, coordinated the event.

CoHemis Center collaboration on its 10th Anniversary

As another contribution of CoHemis to the Mayagüez university community and in celebration of its tenth anniversary, the center co-sponsored the 2001 edition of the International Flavor and Folklore Festival of the Office of International Students Exchange Program and International Students Services of UPRM. This festival was celebrated November 6, 2001 at the UPRM Students Center.

Sponsoring the presentation of the Band *Alma Latina* (Latin Soul), CoHemis literally brought music to the crafts exhibitions series and typical meals sale that annually in November some of the hundreds of international students of the Mayagüez Campus set up between 9am and 2pm. In addition, the CoHemis Center set up an exhibition with all the Latin American graduate students who have been interviewed in ten years of publication of the *CoHemis... Update* newsletter, and posters allusive to its mission and accomplishments.

It is readily feasible when the institutions are members of programs that set guidelines for both administrative and academic affairs, as well as for the individual support given to its participants.

The International Student Exchange Program, in which UPRM is a member institution, has allowed students to serve as ambassadors of Puerto Rico and UPRM in places like Mexico, Argentina, Costa Rica, Spain, Sweden, and Hungary. The students have had the opportunity to demonstrate the academic excellence that characterizes both them and their university, while at the same becoming enriched by the education, culture, customs, and traditions of the host countries. Student exchanges between UPRM and U.S. universities are handled by another program.

On the other hand, UPRM has received students from Finland, Sweden, Hungary, United Kingdom, Mexico, Argentina, Colombia, and Nicaragua. These students return home to their countries after having experienced the hospitality and joviality of our culture, and taking with them a number of unforgettable experiences plus the knowledge acquired. They also leave behind a series of relationships with friends and families that in

Continues on page 11

Panama and Ecuador...

CoHemis Consortium.

Ecuador

The trip began with a visit to Quito. Dr. Fernando Ortiz (RIP), who at the time was the Scientific Director of the Science and Technology Foundation (FUNDACYT in Spanish, the executive branch of the National S&T Secretariat) made the arrangements for this visit. He had worked as a professor in Puerto Rico several years ago, and in 1995 had organized in Quito a landmark seminar, "CoHemis-Caterpillar-FUNDACYT Workshop on Sanitary Landfills".

On May 28 the co-directors visited FUNDACYT, an institution supported by the Interamerican Development Bank, which foment and supports S&T research and education in Ecuador. They were welcomed there by Dr. Ortiz and exchanged ideas with him and Dr. Santiago Carrasco, President of FUNDACYT and Secretary of Science and Technology. Soon afterward they met with a group of key persons from national institutions of higher learning—invited by Dr. Ortiz—and conducted a presentation about CoHemis and UPRM. When the presentation was over, there was discussion about possible collaboration between the parties, in which a general interest in biodiversity and the study of the economic potential of Ecuadorian plants was shown. The use of remote sensing to classify agricultural production and for natural resources management was mentioned. There is also interest in the possibility of establishing "sandwich-like" post-graduate programs with UPRM, since some have already been established with European universities. In such a program, the student takes courses at his home university and then goes to the foreign university to take courses and/or conduct dissertation research. Upon completion of the program the student is granted a degree from his home university or the degree is awarded jointly by the two institutions. For example, the Escuela Politécnica Nacional has a "doctoral sandwich" with University of USALA in Sweden in which the students take courses and obtain a degree from both institutions. The Ph.D. thesis is approved by an International Degree Panel with international opponents.

The Pontificia Universidad Católica became interested in pest control and in the molecular identification of the fruit flies that

A landmark in hemispherical and inter-institutional collaboration

The City of Knowledge (CDS in Spanish) complements wonderfully with the central location of Panama and its infrastructure and international culture in services, communications and exchanges. It also benefits from of the biotropical and ethnic diversity of the country. Its mission officially consists of facilitating the creation and establishment of programs of excellence in education, research, technological development and innovation; promoting joint-efforts between institutions and programs; and consolidating the relationship between the academic, scientific, and business world. It has the support of international organisms such as UNESCO, IDB, and USAID.

The CDS comprises a group of educational and research programs with international scope run by a number of prestigious national European, Japanese, and American institutions that have been joining it ever since its foundation was announced. These programs are grouped by thematic areas such as, tropical medicine, computer science, multimodal transport, biological and environmental studies, and strategic technological developments.

This educational component is located on magnificent installations, adjacent to the other two principal components of the CDS: a technological park and its business incubator. The international technopark has 19 buildings in a 20 hectare area. Converging there are research centers, established businesses—some in incubation—and technological services of an innovative nature that comply with environmental regulations and have an international scope.

The CDS management foment and facilitates interdisciplinary interaction between all the participating institutions and businesses. The City also provides living quarters and other need for the students, professors, and researchers. It also assists in the process of obtaining fiscal incentives, visas, permits, and official requisites. There are many renowned universities and centers participating in novel ways. Florida Atlantic University and St. Claire College offer master's degrees in business administration (MBA) related to the environment and international commerce respectively. While the Canadian University of McGill offers a semester on neotropical environment studies. Among various international centers in incubation there is an International Center for Native-Indian Studies and another on social management.

Sciences applicable to watersheds are emphasized: the canal zone and its basin, which is very much protected and studied extensively, is a natural laboratory for watershed management and marine science. There is a drinking water research center, and the marine-coastal zone is monitored by a German institution. The CDS is interested in establishing a joint coastal management center with various international institutions.

prevent exportation of some Ecuadorean fruits. The Escuela Politécnica Nacional expressed its interest in collaborating on topics related to food science, pesticides, the application of emerging technologies for the preservation of food, and the use of different containers and packaging.

On the other hand, Universidad Central became interested in Masters in Food Science and Technology offered by UPRM and in possible remote sensing consulting and water resource management. At Universidad Politécnica Nacional there is interest in photo-chemistry and biodiversity, and the possibility of serving internships at

UPRM. Dr. Ortiz expressed that FUNDACYT could support sending Ecuadorians to serve internships for using some of UPRM's electronic microscopes. He also shared an interest with Universidad Central and Pontificia Universidad Católica in UPRM's new Doctoral Program in Computer and Information Science. He also mentioned the possibility of FUNDACYT funding graduate studies for Ecuadorians.

That afternoon along with Dr. Ortiz, Vélez and Pumarada visited Pontificia Universidad Católica. There they met with Dra. Laura Arcos-Terán, Department Chair of

Continues on the next page

Panama and Ecuador...

the Biological Sciences Department. Her department, which has a variety of joint projects with NYU and the University of California at Davis, is interested in bioremediation of oil spills, industrial oil recycling, evolutionary genetics, and applications of remote sensing to land ecology and other fields.

Later, they met with Diego Andrade, Dean of Engineering. He showed interest in asphalt, old concrete pathologies, supervision of construction, pavement design, and asphalt maintenance. He would like experts in these fields to offer short courses on these topics at his institution.

The next day, Dr. Ortiz took CoHemis' co-directors to Escuela Politecnica Nacional (EPN), where they met with its Chancellor and a group of professors. The Politecnica is interested in possible internships at UPRM and in exchanging ideas in areas of practical impact such as remote sensing applications. Its Geo-physical Center has shown interest in joint projects in volcanology, seismology, and natural disasters. Professor Ernesto de la Torre, who works in metallurgy and mineral processing, has shown particular interest in heavy metals and their effects. Dr. Jenny Ruales pointed out her interest in biopolymers and industrial uses of starches, and is interested in contacting UPRM researchers in the field. The EPN designated Professor Oswaldo Bultron as a contact

Our deepest sympathy...

Dr. Fernando Ortiz, the person that orchestrated the visit of CoHemis to Ecuador, and so graciously accompanied us to the main universities of Quito, who in 1997 had organized the most concurred and encompassing of the Caterpillar-CoHemis seminars about design, construction and operation of sanitary landfills, died in October 2001. His accidental death occurred while he was immersed in his life's main pursuit, doing research in ecology in a volcanic lake in his beloved Ecuador.

On behalf of the Center and his friends in Puerto Rico, where he worked as a Biology professor for a few years, we offer our condolences and respect for his distinguished work to his family and friends. Thank you, Dr. Ortiz for having an extraordinarily productive life!

with CoHemis.

Universidad Central was visited in the afternoon. The Dean of Engineering explained the needs of his faculty, which offers degrees in Computer, Civil, and Chemical Engineering. The University is very much interested in having faculty members that do not have post-graduate degrees leave the country to obtain them in the near future. There is also interest in doing research, virtual classrooms and improving and modernizing laboratory facilities. The institution would like to develop workshops on sanitary landfills, remote sensing, watershed management, and pavements as joint

months earlier.

This visit began with a meeting held in the offices of the Ciudad del Saber (CDS), an original concept of international collaboration created in November, 1999 in a segment of the vast installations recently returned to the government of Panama along with the Panama Canal (see photo). Then, Dr. Jorge Arsomena, Executive Director of the City, and Dr. Rodrigo Tarté (BS in Agricultural Sciences, UPRM, 1958), and director of the academic area of the City, made their presentation. Several points of interest arose between CDS and CoHemis that would later be discussed in depth.



collaboration projects. There was also an interest in improving on computer science, creating projects and courses on alternate energy sources, and offering a course in natural disasters. At present two master's degrees are being designed, one in Engineering and another one in Industrial Production Support. There is also interest in having faculty members from UPRM to come to offer advanced, specialized courses at the UC.

Panama

The visit to Panama began at noon on June 30. Rosario Tapia, negotiator for the Ministry of Industry and Commerce, organized the meeting with the help of economist Samuel Moreno from the same ministry and who had visited CoHemis a few

In the afternoon there was a meeting in the Ministry of Industry and Commerce. Universidad Tecnológica de Panamá was represented by Gregorio Urriola, Director of External Relations; Dr. Oscar Ramírez who had been in UPRM—in April—at the Workshop of Reparation and Rehabilitation; Eng. Ricardo González; and Prof. Victor Guillén. The National Secretariat of Science and Technology (SENACYT) was represented by Dr. José Espinosa and Manuel Ossa. Dr. Tarté, in representation of La Ciudad del Saber and its hostess Mrs. Tapia, also participated.

In Universidad Tecnológica de Panamá there is interest in collaborating on topics related to corrosion, applied radar technol-

Continues on page 11

On How CoHemis Was Created and Its Being in Puerto Rico

In November 1991, thirteen delegates from different national organizations of science and technology in the Americas participated in a conference to promote hemispheric cooperation for research in science and engineering. The conference was sponsored by the National Science Foundation (NSF) and was convened by the UPRM. In its final session the enthusiastic delegates decreed the creation of a Center for Hemispheric Cooperation in Research and Education in Engineering and Applied Science, better known as CoHemis, within UPR's Mayaguez Campus. NSF supported CoHemis for two years and the University of Puerto Rico has been supporting it ever since.

What motivated the NSF to sponsor the conference? And what motivated the unanimous decision of the delegates from Argentina, Canada, Chile, Costa Rica, Cuba, the Dominican Republic, Guatemala, Mexico, Peru, Trinidad and Tobago, United States, Uruguay, and Venezuela to create the center and make Puerto Rico its official site?

In 1990 before the United States became interested in exchanges or free trade with Latin America, Dr. Jack Scalzi (see photo on page 7), visionary director of the structural engineering program at NSF, saw the need for an institution that would parallel that of the successful East-west Center in the University of Hawaii. The Hawaiian center, supported by the United States and with contributions to specific programs from other prosperous countries from the Pacific Basin, conducted and facilitated exchanges and joint research, educational, scientific, and cultural programs.

Dr. Scalzi promoted a study to determine which were the best locations within the United States to create a possible north-south center, in which Florida and Puerto Rico turned out as favorites. The fact that Puerto Rico had the only Spanish-speaking, accredited university that focused on science and technology was to its advantage. It had a more central location and more comfortable surroundings for Latin Americans interested in doing research because of the Spanish spoken there, its Latin character, and its political tolerance. But the people who conducted the research said that a significant number of Latin American researchers interviewed did not consider Puerto Rico

a Latin American country, instead they regarded it as a part of the United States. Thus, perceiving that the choice was between two places that were essentially American, they preferred Florida for its proximity to other U.S. resources.

Dr. Scalzi, contrary to the majority of the interviewed subjects—the majority of them American residents—had visited the Caribbean island and was conscious of the mistaken perception. He decided to sponsor a hemispheric meeting in Puerto Rico to find out about the disposition of researchers from north and south to work together and their position on Puerto Rico as a possible site for the center. He then asked the Dean of Engineering of UPRM to submit a proposal to that effect, suggesting that it focus on researchers and deal with topics in engineering and civil infrastructure, with the purpose of creating a thematic center that could later expand to include other branches of engineering and applied science.

Throughout its history UPRM has been influenced by both the United States and Latin America. In its first few years it was

sponsored by Cornell University and it has always been within the educational and research system of the United States. Since the fifties it has had a considerable number of Latin American students and professors, and it has played a major role in many United States international programs of education and agricultural research.

Puerto Rico is indeed a Latin American country that is under the political and economic system of the United States and it has always been regarded as a bridge to the Americas. Becoming the center of a research effort at a hemispherical level is a likely objective for the campus of a Puerto Rican public university—such as UPRM—which specializes in engineering, agricultural, environmental, natural, and marine sciences.

The Dean of the College of Engineering, Dr. Leandro Rodríguez, and his Associate Dean of Research, Dr. Rafael Muñoz Candelario, assigned the then Chair of the Department of General Engineering, Dr. Luis Pumarada-O'Neill, and Dr. Carlos Pesquera, a young professor from Civil

Continues on the next page

Conference participants from outside UPRM

Delegates, national S&T institutions:

Numa Capiati, CONICET & PLAPIQUI, Argentina
Robert J. Kavanagh, Natural Sciences and Engineering Research Council (NSERC), Canada
Mauricio Sarrazín, CONYCI & Universidad de Chile
Ismael Mazón, CONICIT & Universidad de Costa Rica
Félix Daniel Piedra, Academy of Science, Cuba
Edgar Bravatti, CONCYT & Universidad San Carlos, Guatemala
Manuel Martínez, CONACYT & UNAM, México
Mario Rojas-Delgado, CONCYTEC & Universidad de San Marcos, Perú
Franklin Martínez, National Planning Office, República Dominicana
Keith Crichlow, NIHERST & University of West Indies, Trinidad & Tobago
Eduardo Muguerza, CONICYT & Universidad de la República, Uruguay
Graciela Sosa, CONICIT (Director of the Planning Office), Venezuela
Wayne Clough, NSF & Virginia Polytechnic Institute (VPI), USA
Rafael L. Bras, NSF & Massachusetts Institute of Technology (MIT), USA

Ivan Rocha, CNPq, Brazil (contributed a paper was unable to attend)

Observers with workshop participation:

Saul Hahn, Science and Technology Division, Organization of American States (OAS)
Alberto Arcodaci, PLAPIQUI, Argentina
Alberto Pignotti (renowned physicist in the private sector: Keynote Speaker) Argentina
David W. Bacon, Queen's University, Canada
Oscar Rodríguez, CONICIT, Venezuela
John B. Scalzi, National Science Foundation (NSF), USA
Jonathan Margolis, State Department, USA
Stephen Carpenter, National Institute for Standards and Technology (NIST), USA
Sylvia I. Correa, Environmental Protection Agency (EPA), USA
James L. Noland, Atkinson-Noland, USA
James O'Shaughnessy, Worcester Polytechnic Institute, USA
Miguel Deynes, PR Development Bank
Gene Rosenberg, American Association for the Advancement of Science (NGO)
Lunch speaker:
Rafael Hernández-Colón, Governor of Puerto Rico

On How CoHemis...

Engineering, to write and present the proposal for the strategic meeting. Dr. Pumarada, a successful writer with a doctorate in systems planning (specializing in strategic planning) had been making improvements in his department and had always been attracted to Latin America. Pesquera was a well-known structures researcher who was successful in gaining financial support from programs directed by Dr. Scalzi. Their proposal was accepted by NSF.

With the collaboration of a number of UPRM's Latin American professors, they devised a plan to gain the backing of both NSF and Latin American delegates for the creation of a hemispheric research center located in UPRM. But this objective was surpassed by the enthused delegates, who proceeded to create the center with UPRM as its site and Drs. Pumarada and Pesquera its director and co-director respectively.

The conference's success had several reasons. Its attendants weren't mainly researchers, but delegates of national organizations of science and technology; and major participation was given to them in the project by having them submit papers a month ahead of time about: their countries research activities and priorities in science and technology, issues hindering joint research at an international level; suggestions for the operation and financing of a research center with international participation; and the contributions their countries could make to such a center. The main points of their papers were integrated into a white paper that was eventually discussed in workshops, ensuring that the approved scheme would satisfy the interests of the region and its diverse countries. The different nationalities of the delegates present — along with a paper written by Brazil's CNPq— proved that the conference was wide in scope, both at the geographical and cultural levels, as well as in the size and scientific interests of the participating countries. The participation of a delegate from Cuba demonstrated that the effort would be a scientific and not a political one. The participation of the governor of Puerto Rico and key Federal agencies, such as the State and Energy Departments, the National Institute of Standards and Technology and two American universities -- MIT and Virginia Polytechnic Institute -- evidenced official and community support at all levels. The event gained international recognition

with the participation of the OAS (Organization of American States) and the co-sponsoring of the United Nations' Environmental Program. The director of the conference stayed in the hotel together with the delegates. Various UPRM research labs were shown to them, and they were introduced to the researchers. The workshops and social activities provided an atmosphere of camaraderie among the delegates, researchers, and other attendants.

Proving the Latin American identity of Puerto Rico was all that was left. In order to do so, an activity was organized to present an interpreter of traditional Puerto Rican music. A child-star singer, eleven years old, was chosen to show that the Latin identity of Puerto Ricans was not a matter of museums and folklorists.

The show was on the eve of the plenary session, in which the delegates were to approve the plan for the creation of the hemispheric center. It began with a *décima* dedicated to the conference written by Joaquín Mulier, leader of the folk group that accom-

Continues on page 12

Dr. Scalzi has retired



Dr. Jack Scalzi, main advisor of the CoHemis Center and the sponsor of its foundation ten years ago, has retired from the National Science Foundation. An Italian-American of global perception and a renowned bridge designer, he created his greatest bridge in 1991, between North and South America. On behalf of so many people that the Center has served in exchanging ideas for the well-being of the population and the environment of the Americas, CoHemis thanks him for his work.

Lyrics sung on the eve of the final plenary session:

At the beginning of the event

JM: *We welcome all our visitors from the low and the highland to this our first joint conference. My beloved and dear island embraces each and everyone. And Puerto Rico being host wants to do its utmost for you who've reached its coast our honest welcome, our love and the warmest Puerto Rican hug.*

LC: *We do not offer the sorrow that once Puerto Rico went through. We spread our happiness today and a happy country we'll stay due to our talent; young and old. And at my very tender age I thought appropriate to say that I do not come here to fuss I just would like to offer all the warmest Puerto Rican hug.*

JM: *There is a possibility that if a joint effort is made it would later translate into true development and progress. And this our university is known for its adequacy for becoming a good center of Science and Technology. A hemispherical center that aids internationally.*

LC: *A technical community exists in our America that is devoted to science.*

And when forming an alliance if all their intentions are good, they become a brotherhood to work with other scientists for development and growth of sister nations and our own.

JM: *Our visitors come from Chile, Canada, Argentina and Mexico with its lovely and fascinating ranchera. This meeting's also composed of Dominican Republic and the republics of Cuba Uruguay and Venezuela but Puerto Rico is the site that's been chosen my fella.*

LC: *And with Trinidad-Tobago Peru and United States too this well-measured verse I'll sing to Guatemala as a gift. And to Costa Rica I give my sincere love and friendship or better said camaraderie, for Latin America knows the sense of hospitality that reigns in my loving country.*

Improvised for closing:

JM: *This conference's almost thru for all our visiting nations and for the Puerto Ricans too who want this association. But a center will come to be that will become universal.*

And its services it will lend in a not so distant future. But this I say for sure friends, that tomorrow'll be the end.

LC: *To Cuba and Puerto Rico Both Antillean sister slands that've shared the same language and sung the same tragic songs, they feel today a special bond. Straight from our warm coast and through this remarkable verse I would like to say one thing first: To crime n' violence don't surrender for tomorrow'll be the end.*

JM: *To the Mexicans I will give my deepest friendship and love to the Dominicans a hug and to all of those here today. Through this my special verse which has had obvious success, I would like to offer my best and thank you for the time spent in this unique joint-conference for tomorrow'll be the end.*

LC: *Argentina is here today Venezuela and Uruguay our one and only «le-lo-lay» and all the native melodies of our unique Latin countries. An important effort is made to preserve our jibaro name and you are our only witness of this meeting you did attend for tomorrow'll be the end.*

FUTURE SUMMIT PAN-AMERICAN ENGINEERING EDUCATION

Pontificia Universidad Católica of Rio de Janeiro (PUC-Rio), the University of Florida (UFL), and the UPRM—through the efforts of CoHemis—are planning to organize a Pan American Encounter in Education and Engineering in Rio De Janeiro, Brazil. The coordinators of the event are Dr. Luis Scavarda do Carmo (PUC-Rio), Dr. Jorge I. Vélez-Arocho (CoHemis/UPRM) and Tim Anderson (UFL).

The objectives of this encounter are to: identify and share tools and activities that support and improve engineering education; create, stimulate, and strengthen national and international collaboration; and establish relationships among professors from the fields of business administration, humanities, science, and technology. Plenary sessions will be held, followed up by workshops, in which its participants will explore the development of cooperative programs and will create a cooperative plan and identify possible funding sources for its instrumentation.

The organizers plan to bring together representatives from institutions at the Pan American level so that they come up with new ideas and develop collaborative activities in engineering education, technology, student training, curricular innovation, and community outreach programs. Some areas of common interest have been identified: distance learning; virtual libraries; courses and activities with emphasis on the practice of auto-evaluation and external evaluation; entrepreneurship, ethics, and the social issues related to economic development; and exchange and internships of faculty and students.

Learning Factory...

Thirty-six professors from the Universidad de Chile attended the workshop held in that same institution, while 52 professors from 32 universities throughout the country attended the one held in PUC-Chile. During the workshop held at PUC, CoHemis received an invitation from the Chilean Council of University Chancellors and Deans to give the workshop in two universities, one on the northern and the other on the southern part of the country, to facilitate the attendance of the principal universities from

UPRM's Environmental Engineering Ph.D. Program

Beginning in January 2002 the Department of Civil Engineering and Surveying activated the Environmental Engineering option of the Doctor of Philosophy (Ph.D.) in Civil Engineering. This option focuses on such multidisciplinary aspects of environmental issues as wastewater characterization and treatment, stormwater management, hydrology, hydraulics, water potabilization. The impacts of natural and manmade hazards, the concept of sustainable development, and the global aspects of environmental engineering will be of interest in this attractive option of the Ph.D. program. A Ph.D. option in Structures has existed for almost a decade. Its research thrust areas are earthquake and wind engineering, rehabilitation of structures, structural dynamics, concrete and other composite materials.

A minimum of 72 credit-hours after the baccalaureate degree, from which 15 credits are in thesis work are required for graduation. A maximum of 30 non-thesis credit-hours of graduate studies can be accepted. A preliminary examination must be taken not later than the third semester after entering the program. A comprehensive examination is required following the completion of the course work.

Students with excellent academic record and a strong motivation in research are invited to apply to the program. Students can be accepted in the program directly after they finish the baccalaureate degree or after finishing the master's degree. Transfer students are considered on their merits. Financial assistance can be available for students who participate as research or teaching assistants. Research at the Department is mainly sponsored by state or federal agencies and obtained on a competitive basis.

The Department has a long tradition participating in environmental research and education. Since the decade of 1970 a master's degree has been offered in water resources and environmental engineering. A significant number of students from Puerto Rico and Latin America have benefit from this program. The Department also offers Master's Degrees in Structures, Transportation and Geotechnical Engineering. Our graduate programs attract qualified candidates from Latin America who wish to attain quality education in their own language while they master English and enjoy the hospitality of the Puerto Rican people.

For more information on these programs, please visit <http://civil.uprm.edu>, or contact Ismael Pagán-Trinidad, Professor and Chairman, by e-mail <ipagan@ce.uprm.edu>, phone 1-787-265-3815, or fax 1-787-833-8260.

these two parts of the elongated country.

In Argentina the workshop was given at Universidad Tecnológica Nacional (November 1-2, 2001) and at Universidad de Buenos Aires (November 5-6). In the particular case of Universidad Tecnológica Nacional the workshop was presented in the Chancellor's home to a group of professors, and simultaneously through video-conference to professors from other branches of the university: La Plata, El Rosario, Bahía Blanca, La Rioja, Resistencia, San Francisco, and Tucumán. Every presentation was announced on the project's web site before the workshop was given so that the participants could have all the workshop materials on hand. One may also see the photos of the development of this workshop in this site. (<http://ece.uprm.edu/lfw>)

These workshops, given by UPRM professors, present a curricular development process for engineering studies which was created by a group of universities, which included UPRM, supported by the National Science Foundation between 1994 and 1996. The process presented and implemented in the workshop facilitates the de-

sign and instrumentation of educational strategies based on the objectives from different sectors interested in engineering graduates. This may be used to comply with national or regional accreditation processes as well as to facilitate standardization, thus allowing international educational exchanges. In Puerto Rico and the United States the process has been adapted to the preparation for accreditation by ABET (Accrediting Board for Engineering and Technology), a United States NGO.

For the Office of International Relations with Universities, a part of the Microsoft Corp. Research Division, sponsoring these workshops is a way to strengthen the bonds between this corporation and Latin American and Caribbean universities.

CoHemis' co-director, Dr. Jorge I. Vélez-Arocho, is in charge of this program together with Prof. Lueny Morell. Both of them participate in the presentations of the workshop with Dr. Miguel Torres. Some other universities and institutions in Science and Technology from different countries of the hemisphere are interested in organizing future presentations of the "Learning Factory" Workshop.

LATIN AMERICAN STUDENTS IN UPRM:

CoHemis...update includes in each issue an interview with one of the hundreds of Latin American science and engineering graduate students in UPRM.

A mind for both micro and macro

Eder Vicuña-Galindo, born in Ayacucho, Peru is doing postgraduate studies in Chemical Engineering at UPRM once again; this time working towards his Ph.D. Having obtained a Master of Science in 1994 from this institution, Eder returned to Peru to work as a professor. A year ago, however, upon finding out that UPRM was offering a Ph.D. in his discipline, he decided to return and culminate his studies. Today he is working in the promising new field of nanotechnology, and is on his way to defining his dissertation project.

Vicuña became a Chemical Engineer in 1987 in the *Universidad Nacional Mayor de San Marcos*, located in Lima, where he has lived since he was 11 years old. He began his postgraduate studies at the same prestigious university, but by 1990 his thesis, focusing on modeling the process of dissolution at the molecular level, was at a standstill due to a lack of experimental resources. Upon a chance meeting with an old friend and classmate who was completing a Master of Science degree at UPRM, he learned about the variety of study programs and financial aid opportunities, the distinguished faculty and the excellent lab facilities of UPRM, and he decided to apply for admission. At the same time Eder convinced another classmate and friend currently living in Lima —whose research work was also held up— to apply to UPRM, and both were admitted in 1991.

Vicuña's research work for Dr. Jaime Benítez —his mentor— helped him acquire the financial aid necessary to cover his expenses for three years. In 1994 he received a Master of Science, having done his dissertation on waste water treatment.

At that time the only doctoral degree



offered at UPRM was in Marine Science. His friend Hugo stayed in Puerto Rico for that Ph. D.; his research focusing on ocean chemistry. Eder, however, did not want to change his field of study and decided to return to Peru. He worked seven years at the *Jorge Basadre* University located in Tacna, a city close to the border with Chile. There he taught mainly about simulation, optimization and process control.

In January 2000 the Department of Chemical Engineering at UPRM began its doctoral program, and exactly a year after that, professor Vicuña Galindo was admitted. He returned to Puerto Rico to keep abreast in the field and do research, initially interested in process-automation and biotechnology. But once in UPRM he entered the field of nanotechnology, the processing of materials at an ultramicroscopic level to improve properties and efficiencies. Eder is currently

taking courses at the doctoral level and works as a research assistant for Dr. Briano, a Chilean Professor and researcher whose work focuses on kinetics and nanotechnological development of clusters of gold and silver. In the year 2002 Eder will formulate and defend his doctoral dissertation topic.

Among Vicuña's plans are to do a post-doctoral internship in the United States or Europe once he completes his Ph.D., and to return to Peru to work as a professor and researcher. He is interested in the possibility of developing products from vegetable resources present in the enormous biodiversity of the Peruvian Amazon. Eder believes that joint collaboration between UPRM and Peruvian institutions to create research and development projects for such an endeavor would be feasible and mutually beneficial. The possibility of technical exchange between the two countries seems a good idea to him because there are areas of benefits for both.

Eder complains about the Mayagüez warm weather, but he chose to return and complete his doctoral degree at UPRM, even though other choices were available to him. What most attracts him about UPRM are its research facilities and being able to experience a culture that is similar to that of Peru and at the same time different. As a Peruvian professor he thinks it is important to point out the educational opportunity that UPRM represents for Peru and other countries in Latin America. In this way UPRM would benefit from having highly motivated and exceptional students and research assistants, and the countries would benefit from maximizing the development of skills of their best human resources.

HPCf:

HIGH POWER COMPUTING FOR EDUCATION AND RESEARCH

The main super-computing center of the University of Puerto Rico is known as HPCf, for High Performance Computing facility. It provides computational high performance for investigators from all the UPR campuses.

The HPCf was founded on 1997, with the collaboration of the EPSCoR program and the Resource Center for Science and Engineering, and assigned to the Office of the Vice-president for Research and Academic Affairs. The HPCf offers the university community an environment of integrated resources for research. It comprises a Center of Numerical Super-computing, a Visualization Laboratory, High Level Facilities for Data Storage, a student-oriented Technical Resources Center, a Multimedia Laboratory for Education, and a Research Infrastructure on Networks.

At the moment, around 25 applications of computational research in chemistry, physics, material sciences, atmospheric and oceanic sciences, neurobiology and bioinformatics are being executed, many of them corresponding to the Mayagüez Campus.

The HPCf has six system administrators and programmers, all experts in the UNIX operating system. In addition, each one is an expert in one of the following areas: networks engineering, bioinformatics, computational physics, and electronic graphic design. Sixteen students of computational, technological, engineering and computer sciences assist them. They have five high performance Silicone

1st International Symposium on Electrotechnology

The First Electrotechnology International Symposium will be held in San Juan, Puerto Rico on November 13-15, 2002. It will include electrical engineering, electronics, computer engineering and related areas. The symposium is being organized by the School of Engineering of the Inter American University of Puerto Rico and co-sponsored by UPRM. CoHemis is in charge of announcing it across the Americas.

The symposium will include keynote addresses. It aims to serve scientists, engineers and researchers from Latin America, the Caribbean and other countries around the world who wish to present and discuss their latest research, projects, developments, applications and ideas.

The official language is English. Abstracts of 250 to 500 words are due on March 31, 2002. Acceptance will be notified by May 1, 2002. Registration and final papers are due on September 15, 2002. The accepted full papers will be published in the symposium proceedings. For additional information please contact: Dr. Edgardo V. Oliveros at e-mail eoliveros@bc.inter.edu or visit http://bc.inter.edu/symposium_2002.

Graphics computers, three in the HPCf main office in Río Piedras and two in the HPCf center at UPRM. Also, the facility presents workshops on bioinformatics, programming and specialized languages, such as Open GL and Python, and the use of the Linux operating system.

For additional information, please contact info@hpcf.upr.edu, or phone 1-787-753-1653.

INTERNET 2 IN THE UNIVERSITY OF PUERTO RICO

In September 1999 the United States' National Science Foundation (NSF) and EPSCoR contributed funds to HPCf (see story on the left) to develop the Internet 2 Project in Puerto Rico. This project began as a high speed network that links 180 research universities and national laboratories in the United States, but today they are spread to other parts of the world (see article on Panama, page 5). It was originally designed to make transmission faster, but it has evolved to develop communication alternatives for education and research.

In Puerto Rico the Internet 2 will initially link the principal UPR campuses and the Arecibo Observatory to the HPCf facilities.

Internet 2 is not a substitute for traditional Internet but it offers additional links at high speed between member institutions. For example, communication between any computer at UPRM with any computer at MIT or Harvard will automatically enter the Internet 2 access line.

Another advantage of Internet 2 is that it allows communications that need a wider band width. An example of the preceding, is the visualization in real time of the brain activity of a patient that is given a CT Scan and whose information is processed by a super-computer located in another city. Another example comes from the field of astronomy. The Keck telescope located on the summit of Mauna Kea, Hawaii, could be used and controlled by astronomers from the University of California in Santa Cruz. Internet 2 is essential for this because of the enormous amount of data generated by the observations and the need to control a telescope with precision.

For more information, you may contact guy@hpcf.edu or call 1-787-753-1653.

Creating entrepreneurs in Industrial Biotechnology



Executive Committee of the Biotechnology Program: Drs. Vélez-Arocho, from Business Administration; Carlos Ríos, Alejandro Ruiz and Buxeda, from Biology; John Gill, Agriculture; Lorenzo Salicetti, Chemical Engineering; Doris Ramírez and Rodolfo Romañac, from Chemistry.

UPRM's successful Industrial Biotechnology program has just added a business element to its interdisciplinary offerings. "We are totally committed to making our graduates feel that their bachelor's degrees are a step towards developing a biotechnology business", said the program's coordinator, Dr. Rosa Buxeda from the Faculty of Arts and Sciences. According to the dean of that same faculty, Dr. René Vieta, among the expectations of the program is the interest in consolidating strategic alliances and turning UPRM into a model for fostering business enterprises.

The graduates from this BS program, which began in 1994, are characterized for having the design quality of an engineer and the mentality of a scientist. Its curriculum integrates courses in chemistry, biology, engineering, and business administration, as well as socio-humanistic subjects.

A total of 37 professors collaborate in the program: seven from Biology, twelve from Chemistry, six from Engineering, seven from Agriculture, and five from Marine Sciences. Under the direction of Dr. Jorge Vélez-Arocho, from the faculty of Business Administration and co-director of

CoHemis, this faculty has been working on a strategic plan that includes five areas: curriculum, research, industrial alliances, dissemination, and evaluation. An important part of this plan is to offer individual attention to the student.

This program is unique in Puerto Rico and it is the most in demand in the UPRM Faculty of Arts and Sciences. It accepts 30 students every year. Out of its first 36 graduates, 43% is working for prestigious industries in and outside of Puerto Rico, and 57% went on to do postgraduate studies outside of Puerto Rico. There are currently 164 students in the program.

For more information visit: <<http://www.ac.uprm.edu/biotec>>.

Panama...

ogy, buildings pathology, and applications of zeolites. Ramírez would like to use the Structures Lab. in the Department of Civil Engineering at UPRM for UTP research. Gregorio Urriola said that he would like UTP to join the CoHemis Consortium. He showed interest in the "Learning Factory" Workshop (see page 1) and in the accreditation process for engineering programs.

Student Exchange Program...

many cases last throughout a lifetime.

The students participating in this program chose a member institution in the country they want to visit and apply for a semester or a year. Tuition fees are the same as in the home university, and participating families offer room and board. Since 1997, the students from UPRM that have gone to Latin America have come from such fields as business administration, humanities, psychology, history, industrial biotechnology, and mechanical, chemical and industrial engineering. In Argentina they have attended the Universidad Católica de Córdoba, and the Universities of Palermo and Del Salvador. In Mexico students have attended the Instituto Tecnológico y de Estudios Superiores de Occidente (ITESO), Universidad La Salle, and Universidad Regiomontana. In Costa Rica they have gone to Universidad Nacional de Heredia.

The Latin American students who have visited UPRM as exchange students come from such universities as: ITESO; Católica de Córdoba; Popular Autónoma de Puebla, México, Pontificia Javeriana de Colombia; and Americana de Managua, Nicaragua. They have applied for: engineering, biology, computer science, and marketing.

For more information about the UPRM international program you may contact its department director, Gildreth González. Her e-mail is: egi_gonzalez@rumac.uprm.edu.

SENACYT is located in Ciudad del Saber (see photo in page 5) and is one of its most important components. Some of its priorities are biodiversity and the environment as well as information and communication technology. Dr. Espinosa was interested in the joint UPR-FDA-FSIS food processing and drug manufacturing project (see the previous issue of the CoHemis Update). He invited CoHemis' directors to visit SENACYT following the meeting. At the agency's headquarters, Pumarada and Vélez met with its president, Dr. Gonzalo Córdoba, Panamá's Secretary for Science, Technology and Innovation, and with his key executives. They were very impressed with the training program on computer systems and with the project for introducing the internet to Panamanian communities. Dr. Córdoba offered to help Puerto Rico to become a part of CYTED, an Ibero-American Program of Science and Technology.

Acknowledgements by CoHemis' founder/director in its 10th Anniversary

On November, 2001 ten years had passed since a meeting of delegates from official organisms of science and technology of the Américas created the CoHemis Center. We believe that in these 10 years, during which with a fixed north we have been developing strategies to accommodate to resources and opportunities, we have not let them down. That north has been our mission: to promote, facilitate and coordinate programs and projects of development and exchange of human resources, joint research and technology assessment to serve the needs of the people of this hemisphere with the participation of engineers, scientists and graduate students from the different countries of the Américas.

In these days of globalization and free commerce at a hemispheric level, the existence of CoHemis, with

- a network ("CoHemis Consortium") of 36 university and research institutions in the Américas, facilitated by a liaison in each institution and an Internet web page with links to each of them and to the Science and Technology organisms of the Americas, and
- a bilingual, semi-annual newsletter of high quality and a circulation at the highest level,

add to the University of Puerto Rico, its Mayagüez Campus, and all the members of the network, a greater international hemispheric reach that adds to their desirability as partners for any multi-institutional proposal, from north or south, that contemplates a hemispheric component.

At the level of Puerto Rico, where for several reasons international contacts are limited, the international experience of CoHemis in conferences and academic and scientific cooperation programs and events merited an invitation to a public hearing on the desirability of Puerto Rico having its own representation in international scientific organisms as well as requests for collaboration from the island's Department of State. The regional and worldwide forums in which CoHemis/UPRM has been the first Puerto Rican presence have been several.

The success of CoHemis has been the success of many: of **Dr. Jorge Iván Vélez-Arocho**, ex-Dean of Business Administration and codirector of CoHemis for 9 1/2 of these 10 years; of its coordinators **Gisela González, Luz Leyda Vega, Blanca Colón, and Ileana Rodríguez**; of its secretaries **Anna, Arlene, Karen and Marielly**; of the writing, translation and edition of **Yesenia**; the work of almost 30 **undergraduate and graduate students**, of the support and in kind collaboration of the **Office of the President of the University** and of **UPRM's Chancellor, the Research and Development Center** and its personnel, the **Office of the Dean of Engineering** and its **Department of General Engineering**, and many **UPRM professors** with whom we have made joint proposals, seminars, conferences and projects of international reach.

The people and organisms that, from within or outside the University of Puerto Rico, have collaborated have been many, specially the **members of the CoHemis Consortium**. Nevertheless, we want to emphasize in special way, for being indispensable and dedicated to the cause of the hemispheric collaboration, a few dear persons, some of them disappeared:

Dr. Jack Scalzi, former program director at the NSF, who conceived the need of a center of hemispheric collaboration and supported the conference in which CoHemis was created, and subsequently entrusting us with the organization of three hemispheric events; **Dr. Norman Maldonado**, former president of the University of Puerto Rico, for his faith, moral and economic support even with very tight budgets; **José Centeno** and **Néstor Ortiz**, both UPRM alumni, who have had successful careers in United States that from their high positions have trusted important international dimensions of their respective institutions to us; international academicians like **Graciela Sosa**, Venezuelan; **Fernando Ortiz**, Ecuadorian; **Juan Villalvazo** and **Adalberto Noyola**, Mexicans; and **Mauricio Sarrazín**, Chilean; Puerto Rico Department of State's public official **Eduardo Rey**; American executives **Wayne Johnson** and **Anthony Dvorak**; multinational corporations **Caterpillar** and **Microsoft Research**; and the national organizations of Science and Technology from **Venezuela, Peru, Trinidad-Tobago** and **Argentina**.

To all of them and all the readers of this newsletter, **THANKS!**

On how CoHemis...

panied singer Luis Daniel Colon. Colon and Mulier alternated stanzas. The song mentioned all the participating countries, the objectives of the conference, and the Spanish character and traditional hospitality of Puerto Ricans. As the singers interpreted one traditional Puerto Rican songs after another, the public's enthusiasm with Luis Daniel's artistry was so obvious that he was asked to improvise a *décima* with Don Joaquín as a closure. According to the improvising tradition existing in many Latin American nations, each 10-verse stanza had to end with an assigned 8-syllable line, and the one chosen by the organizers was *mañana*

será el final (tomorrow will be the end). Witnessing an improviser develop a series of ten-line stanzas that make sense, convey a message, rhyme and end with a line that was provided to him a few minutes ago is an unmatched experience: exciting and impressive. Especially if the improviser is only eleven years old!

The first *décima* was sung by Mulier. Luis Daniel followed up successfully. Each one of them sung one more. When the youth finished his improvisation and the show, the Latin delegates sprang to their feet and rushed toward him to compliment his music and ask him to sign their commemorative posters of the event. The next day, thanks to

the leadership of Venezuelan delegate Graciela Sosa (RIP) and Cuban delegate Daniel Piedra, the participants decided unanimously to create the center and to locate it in Puerto Rico.

Note: A few months after the center was created, Dr. Pesquera got involved in other projects and was substituted by the present co-director of CoHemis, Dr. Jorge Vélez-Arocho, ex-dean of Business Administration and creator of various interdisciplinary programs between Engineering and Business Administration. Seven years later, Luis Daniel Colón returned to UPRM, this time as a student of Civil Engineering, but he still continues to sing and record professionally.

Members 34 and 35 of the CoHemis Consortium

Two Latin American universities, Universidad Tecnológica de Panamá (UTP) and Pontificia Universidad Católica de Chile (PUC-Chile), have recently joined the CoHemis Consortium, bringing the total number of the network's members to 35.



In spite of its comparatively short life, the Panamanian institution is the nation's major public science and technology university, educating engineers and technicians and conducting research oriented towards national interests. Its growing offer includes degrees in civil, electrical, mechanical, industrial and information systems engineering. Its main campus is in Panamá City, but it has seven regional campuses, five research centers, and some specialized programs, such as the one on aviation careers offered in Howard Airport, which is a joint venture with Florida International University. Currently, it serves 15,730 students: 300 in MS programs, 463 in other masters' programs, 7,806 earning BS degrees, and 7,168 in technical careers. UTP has 1,173 faculty, of which 360 are full time.

Chile's main Catholic University, located in Santiago, is 114 years old and one of the best in the country. It has about 19,000 undergraduate and 2,000 graduate students, including over 500 who come from other countries. Its Engineering careers are Civil and Forest Engineering. It also grants degrees in Construction and in Architecture.



The official links to the CoHemis Consortium for these new network members are Gregorio Urriola, Director of the External Relations Department of UTP, and Aldo Cipriano, PUC-Chile's Dean of Engineering. UPRM has already conducted a seminar at PUC-Chile sponsored by Microsoft (see page 1). UTP is arranging to conduct a joint structural engineering project with the UPRM Structures Laboratory.

More information on these institutions is available at <<http://www.utp.ac.pa>> and <<http://www.puc.cl>>. All the members of the network and its official contacts for consortium matters appears at <<http://www.ece.uprm.edu/cohemis/consorcio.html>>.

UPRM priorities for: International Collaborations

UPRM attended a meeting to plan the International Network for Engineering Education and Research-International Conference on Engineering Education (INEER/ICEE) on February 18-20, 2002 in Taipei, Taiwan. There, it presented a summary of initiatives for innovative education of science and technology and delineated the collaboration areas that it wishes to develop jointly with Latin America and the Caribbean.

The following projects were mentioned

- Development of curricula based on expected learning results.
- Strategic planning, ABET 2000, and evaluation of program and student results.
- Exchanges of educational strategies, programs, and projects between Puerto Rico, the Caribbean, and Latin America.
- Collaboration with industry for curricular innovation.
- Techno-Economic corridor of Puerto Rico (collaboration between university-government-industry for incubation, innovation, and economic development (see page 2).
- UPRM Doctoral programs: existing (Computer Science and Engineering, Marine Science, Chemical Engineering, Civil Engineering) and in progress (Applied Chemistry and Biotechnology).

Future collaboration with Latin America and the Caribbean in education and research should include the following areas:

- Accreditation by ABET or an equivalent
- Consulting for the revision of engineering programs with a focus on student learning, and that responds to the needs of those who receive their graduates.
- "Sandwich-type" graduate programs and joint research.
- Student and faculty exchange for courses and research.
- Participation in programs of interest for UPRM ("The Learning Factory" and "Remote Sensing".)
- Specific Workshops:
The Learning Factory
Development of courses based on desired results.

UPRM asks for site International Conference on Engineering Education (ICEE) 2005

The interim chancellor at UPRM, professor Pablo Rodríguez, attended the International Conference of Engineering Education 2001 held in Oslo Norway in August 2001 to request that the ICEE 2005 be held in Puerto Rico. The UPRM delegation to Oslo also presented research projects and participated in pre-conference workshops. The delegation was composed of the following people: Dr. Ramón Vásquez, Dean of Engineering; Professor Lueny Morell, Interim Director of the Center of Research and Development; Dr. Luis Jiménez; Dr. Rosa Buxeda; and the co-director of CoHemis, Dr. Jorge Iván Vélez-Arocho.

During the presentation the chancellor emphasized the advantages for Puerto Rico and the UPRM to sponsor this important event. Many universities associated with the CoHemis consortium sent letters supporting the UPRM initiative. The Executive Committee of the ICEE expects to decide in the next few months the place where such an important meeting on engineering education will be held. Ramón Vásquez, Jorge Vélez-Arocho, and Lueny Morell participated in a pre-conference workshop about strategies to establish cooperative alliances between universities.

The ICEE was held in Chicago in 1997; in Rio de Janeiro in 1998; in Ostrava, Czech Republic in 1999; and in Taipei in 2000. It will be held in Manchester, England in 2002; in Valencia, Spain in 2003; and in Gainesville, Florida in 2004.

Toxic Metals...

topics to be discussed in the seminar will include: environmental toxicology; environmental pathology; geochemistry; environmental epidemiology; degree, pattern and consequences of the exposure to trace elements and toxic metal ions on the environment; biological risk assessment; modern trends in the analysis of metals; and the latest updates in geology, toxicology, and exposure to metal ions pathology.

After the seminar the participants should:

- Have knowledge and access to the latest information on geological sources and processes, environmental health, toxicology, and pathological manifestations of the exposition to different types of toxic metals.
- Gain knowledge and information about geochemical processes, natural and antropogenic sources, spaciaition, and its chemical/molecular compounds to

assess the impact of trace elements and different toxic metal ions on human health and the environment.

- Gain a basic understanding of environmental toxicology, epidemiology, medical geology, and issues related to the evaluation, regulations, and legislation applied to different types of toxic metals and trace elements.

After Chile, the next presentations are planned for: Buenos Aires, Argentina (September, 2001); Christchurch, New Zealand (November, 2001); Jakarta, Indonesia (February, 2002); St. Petersburg, Russia (May, 2001); Beijing, China (August, 2002); Taipei, Taiwan (August, 2002)

This seminar has been designed by the Armed Forces Institute of Pathology (AFIP) in collaboration with the United States Geological Survey (USGS). It began in Washington DC in 1997 and since then it has been presented in the following places: San Juan, Puerto Rico (1998,1999, & 2000); Mexico (1998, 1999); Jackson, Mississippi, United States (1999); Christchurch, New Zealand (2000); Lusaka, Zambia (2001); Johannesburg, South Africa (2001); Caracas, Venezuela (2001)

This workshop presented in Caracas on July 25-27 to which 168 people attended at the National Institute of Geology and Mining in Venezuela was so successful that an agreement was signed to present it every year. Its next presentation will be held in October 2002.

Strategic educational planning and evaluation of results.

Development of tools for academic evaluation.

Ethics throughout the curriculum.

Creativity and innovation.

Integration of undergraduate students into research.

Team development: a necessary step for successful innovation.

Designs using components developed by teams based in different places..

Innovative Climate Change Study at UPRM

A research team from UPRM has received \$1.6 million for their project entitled "*Estudios en los cambios climáticos del Caribe*" ("Study on the Climatic Changes in the Caribbean"). It will be the first study of this nature ever made in a tropical region, according to Dr. Jorge González, principal investigator of the project and chairman of the Department of Mechanical Engineering at UPRM. The co-researchers are Dr. Amos Winter, and Dr. Nazario Ramírez. They will be assisted by professor Pieter van der Meer.

The project will study the interaction of the low atmosphere and soil in Puerto Rico, by the Faculty of Engineering at UPRM, who would be collaborating with researchers from the University of New Mexico, The Arecibo Observatory, and Los Alamos National Laboratory, a CoHemis Consortium member. A program from NASA will contribute \$675 thousand, as will the Central Administration from the University of Puerto Rico, while UPRM will contribute \$330 thousand. The project will last a minimum of three years.

Another purpose of the study is to configure a dynamic atmospheric model that will allow long term weather predictions at a global scale. UPRM is considering the possibility of designing a postgraduate program in Meteorology and Atmospheric Science.

If you wish to learn more about this project you may access: <www.ece.uprm.edu/cmng>

9th Latin American Congress in Heat and Mass Transfer will be held in Puerto Rico

UPRM's Mechanical Engineering Department is its organizer

The Mechanical Engineering Department UPRM is organizing the 9th Latin American Congress in Heat and Mass Transfer (LATCYM 2002), the most important event in this discipline in Latin America. It will be held on October 20-22, 2002 at the Intercontinental San Juan Resort and Casino in San Juan, Puerto Rico.

LATCYM 2002 pretends to bring together the heat and mass transfer community of the Hemisphere by attracting an attendance of more than 150 researchers, educators, and engineers from related industries. It will feature concurrent and plenary technical sessions, open forums and keynote conferences. All technical contributions will be peer-reviewed. Abstracts are due by March 29, 2002.

The Congress' general organizer is Dr. Jorge E. Gonzalez, assisted by Ms. Sonia Avilés. Communications may be sent to latcym_2002@me.uprm.edu, or by fax to 1-787-265-3817. The phone number is 1-787-832-4040, ext. 3719. For more information on the congress and for electronic submittal of abstracts, you may visit: www.me.uprm.edu/latcym2002.

Collaboration with Yale University

Industrial Ecology in UPRM

With the support of the CoHemis Center, a collaboration has been initiated between the Yale School of Forestry and Environmental Studies and UPRM. Three postgraduate students from Business Administration at UPRM have been included into the Yale student teams that are currently working on projects in that field in Puerto Rico. The students are trying to apply the strategy for the minimization of environmental impact proposed by T.E. Graedel and B.R. Allenby in their book *Industrial Ecology*. The projects focus on: the newly created Techno-economic Corridor (see page 2), the projected Transshipment Port of the Americas, and the uses of the analysis of input products in the industrial waste of many manufacturing firms in Puerto Rico.

Dr. Marian Chertow, a renowned authority in the field of industrial symbiosis and in eco-industrial parks, directs this collaboration initiative which also has the support of a few organizations in Puerto Rico and the University of Yale.