CoHemis...Update

Overcoming through cooperation

10th Anniversary

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"REPAIRING AND REHABILITATING THE BUILDINGS AND BRIDGES OF THE AMERICAS"

Proceedings to be published soon

The activity "Repairing and Rehabilitating the Buildings and Bridges of the Americas: a Hemispheric Workshop on Future Directions" held last April 23rd and 24th in Mayagüez was a great success and extremely fruitful for its participants and assistants. For North American researchers, interacting with practitioners, hardware and software developers and Latin American counterparts with different perspectives was an eye-opening experience. A Latin American participant commented that he was very pleased, particularly because he met cutting edge experts —even one from his own country—that he had not contacted before, which opened serious possibilities of regional cooperation and collaboration.

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MICROSOFT RESEARCH, U.P.R.M.:
IMPROVING LATIN AMERICAN ENGINEERING

The following people met at the Electric and Computer Engineering Department of the Universidad de Campinas to plan the future workshop: Jorge Vélez-Arocho from CoHemis/UPRM; Mauro Miskulin, ISTEC Director and Campinas faculty member; John Spencer, Manager of Microsoft Research; Hugo Hernández from Campinas; UPRM's Lueny Morell, and Campinas Department Director Leo Pini Maghalaes.

The Research and University Relations Division of Microsoft Corporation has launched a pilot program that seeks to set up ties between the company and Latin American and Caribbean universities. UPRM has been selected as the host institution of this initiative, which centers around the installation of the most recent technological infrastructure generated by the company coupled with technical publications, visits, and training. As part of this program, UPRM will present the successful workshop organized by CoHemis "The Learning Factory" in seven participating Latin American institutions.

This pilot program currently includes universities from Chile, Brazil, Argentina, Mexico, and Puerto Rico, and it is initially intended for electrical and computer engineering departments. CoHemis Co-

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CoHemis Coordinates Visit and Future Workshops
VENEZUELA-U.P.R.M. COLABORATIONS

CoHemis coordinated the visit of three UPRM research program and center directors to various Venezuelan scientific research and education institutions with the purpose of strengthening ties and encouraging collaborative work. Dr. Domingo Rodríguez, Director of PRECISE; Dr. Luis Jimenez, Coordinator of the joint NSF-CENSSIS program; and Prof. Rafael Fernández-Sein, Director of VITEC, UPRM's business incubator and at the UPRM-NSF project TCESS, traveled with Dr. Jorge Vélez-Arocho, CoHemis' Co-Director.

The group met with colleagues from the *Universidad Central de Venezuela, Universidad Simón Bolívar*, the Engineering Institute Foundation, Sartenejas Technology Park, Venezuela's Institute of Scientific Research, and the *Universidad de los Andes*. Through these meetings important agreements were reached that link UPRM and the Venezuelan institutions in academic as well as technological research aspects and entrepreneurial development. As part of the agreements, UPRM has undertaken the task of developing a joint workshop in Venezuela on Remote Sensing applications to terrestrial ecology, biomedicine, and water resources.

Other possible joint activities mentioned

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INSIDE THIS ISSUE:

CoHEMIS' PERUVIAN GUEST MEETS WITH PUERTO RICAN PUBLIC OFFICIALS TO DISCUSS HEMISPHERIC EDUPLAN

Julio Kuroiwa and the Secretary of Transportation and Public Works of Puerto Rico, Eng. José Izquierdo, exchange ideas.

Eng. Julio Kuroiwa, Professor Emeritus at Peru's Universidad Nacional de Ingeniería and a Member of the Advisory Committee of the United Nations' Regional Development Center, met with Puerto Rican government officials as a Cohemis' sponsored sequel of his visit to Puerto Rico as a speaker in the Repair and Rehabilitation Workshop. Kuroiwa is an assistant to the general coordinator of *EDUPLANhemisférico*, a program sponsored by the Organization of American States and the United Nations to reduce the impacts of disasters through education.

Among dozens of publications, he has written the book "Disaster Prevention: Living in Harmony with Nature"—destined mostly for Peruvian schoolchildren—and has received the United Nations' support to publish a second book for a wider public.

The CoHemis Center, together with the Puerto Rican State Department, put engineer Kuroiwa in contact with key university researchers and government agencies to discuss issues related to disaster prevention and impact reduction. In a meeting with Pablo Rivera, Special Assistant to the Secretary of Education, they discussed the possibility of distributing and using an adapted version of his "Disaster Prevention" book in the island's primary schools. This idea was supported in a later meeting with Alberto Rodríguez and Luis Island, from the Puerto Rican National Guard and the Emergency Management Office respectively, as an important measure to reduce disasters' impacts.

In meetings with Dr. José Molinelli, Environmental Sciences professor at UPR, and planner Rafael Pumarada, they discussed the idea of Sustainable Cities and possibilities of cooperation between Peruvian organizations and the UPR on this issue. Sustainable Cities are an integral part of EDUPLAN-hemisferico, and they include security as a basic attribute, which requires urban planning and intensifying education. This same concept was presented informally to Eng. Izquierdo between sessions in the NSF-CoHemis structure repair workshop.

Education Against Disasters

Education is a determining factor in the reduction of vulnerability to natural disasters, therefore a key ingredient for preventing disasters and mitigating their effects. Recognizing this fact, the OAS initiated in the education sector a process to create and implement a hemispheric action plan for disaster reduction. The process, widely supported by national, regional and international organizations, culminated in EDUPLANhemisférico, adopted in 1997.

EDUPLAN has three program areas: physical infrastructure, which includes the development of adequate and safe educational buildings; public participation, that includes training and education of the general public; and academic aspects, including changes in the curriculum of primary-, secondary-, and university- level education. Julio Kuroiwa is promoting internationally the training and education aspect of the Plan. The Puerto Rican Department of Education would be joining the EDUPLAN model by adopting Kuroiwa's book on disaster prevention and strengthening education related to sustainable cities and adequate responses to disasters.

Panamanian Public Official Visits UPRM

Samuel Moreno, negociating economist for Panama's Ministry of Trade and Industry, visited UPRM on December 8th, 2000 with the purpose of examining possible strategies of cooperation between Panamanian institutions and CoHemis and other UPRM dependencies. His visit was arranged by Puerto Rico's State Department as part of a tour sponsored by the U.S. State Department.

Flanked by Eduardo Rey and Luis Pagan, from Puerto Rico's State Department, are UPRM's Jorge Vélez-Arocho and Laura Cotte, and Samuel Moreno.

CoHemis' co-directors met with Mr. Moreno and identified several areas of common interest: the City of Knowledge, technologyparks, management of hydrographic basins, and technology-based entrepreneurship. The City of Knowledge is an interesting concept that is being created in a part of the Canal Zone recently returned to Panama. Contiguous facilities are being occupied in this ambitious project by technology-based firms, incubated businesses, university programs, and research programs. They all have an international perspective and a commitment to collaborate among themselves.

As a result of this visit the Directors of CoHemis are planning a trip to Panama.

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HEALTH WORKSHOP HELD IN VENEZUELA

With the collaboration of CoHemis, the National Institute of Geology and Mining of Venezuela (INGEOMIN) will hold the "Metals, Health and the Environment" workshop on July 25th through 27th in Caracas. The workshop is co-sponsored by the US Armed Forces Pathology Institute (AFIP), the US Geological Survey (USGS), the US Environmental Protection Agency (EPA), and the University of Puerto Rico at Mayagüez (UPRM). The world reknown workshop's speakers have participated in several workshops on trace metals and health in the Americas with the coordination of the CoHemis Center.

The scope of the event is to share the most recent information on the relationship between toxic metal ions, trace elements, and their impact on environmental and public health issues. The topics will include: environmental toxicology, environmental pathology, extent, patterns and consequences of exposures to toxic metal ions in the general environment, geochemistry, biological risk assessment studies, geoenvironmental epidemiology, modern trends in metal analysis and updates on the geology, toxicology, and pathology of metal ion exposures.

The workshop's speakers will be: Dr. José A. Centeno and Dr. Florabel Mullick from AFIP; Dr. Robert Finkelman, from USGS; and Dr. Herman Gibb, from EPA. Dr. Centeno, a UPRM alumnus, has served on several international environmental and human health committees, including the International Agency for Research on Cancer, the US TASCA-Interagency Testing Committee and the International Working Group on Medical Geology. He has conducted research and teaching activities in Mexico, China, Taiwan and New Zealand. Dr. Mullick, a graduate from UPR's School of Medicine and Principal Deputy Director of AFIP, is a physician executive and managing scientist responsible for the development of an international computer database of both human and animal lesions resulting from toxic drugs and chemicals. Dr. Finkelman, current coordinator of coal quality activities at the US Geological Survey, has focused his attention on health impacts of geologic materials and conducted research in Yugoslavia, Romania, China, and New Zealand. Finally, Dr. Gibb is the Assistant Director of the National Center for Environmental Assessment at EPA and currently serves as Chairman of a Pan American Health Organization advisory board to the University of Chile on an epidemiological study being conducted in Santiago on the acute gastrointestinal effects of copper.

The workshop is intended for geologists, geochemists, ecologists, chemists, biologists, environmental and occupational scientists from the diverse educational institutions in Venezuela, as well as health professionals and personnel from government agencies related to public health. Participants will be able to evaluate case studies, improve their understanding of the natural and anthropogenic sources of trace elements and toxic metal species, while making professional contacts that can generate more collaboration and cooperation between the different institutions, agencies, and individuals who work with public health issues in Venezuela.

FDA, FSIS AND UPR CREATE ALLIANCE TO FACILITATE HEMISPHERIC TRADE

CoHemis Belongs to the Alliance's Executive Committee

On May 14th, 2001, CoHemis Director Dr. Luis Pumarada-O'Neill participated in a meeting of the Executive Committee of the Partnership between the University of Puerto Rico, the Food and Drug Administration (FDA) and the Food Safety and Inspection Service (FSIS). This FDA-FSIS-UPR Partnership seeks to improve the capacity of Latin America to produce food, medicine, and medical equipment that meet US regulations so that they can increase exports to this country in the framework of the Trade Area of the Americas (FTAA).

The Executive Committee met in Washington to discuss a Plan of Action prepared by the Partnership's Operational Committee, as well as suggestions and contributions from the various entities invited. The plan centers on short courses to be presented in Spanish by resources from the UPR and the US agencies in Puerto Rico for key personnel from Latin America and the Caribbean. It also includes outreach programs and cooperative activities with regional organizations such as the Pan American Health Organization (PAHO) and other academic institutions. UPR's School of Medicine offered the first two short courses of the Partnership in San Juan this past May and June.

Due to globalization, there is a concern in the United States that pathogens can arrive there in 24 hours or less through food or other vectors from anywhere in the world. Safety and sanitation in food and agriculture have therefore become priority issues for the FTAA. The FDA-FSIS-UPR Partnership provides a framework for supporting and encouraging science-based regulatory systems in the countries in the Americas and may lead to further collaboration among regulatory authorities, ensuring similar standards for all countries involved.

The CoHemis Consortium and the Association of Research Institutions and Universities of the Caribbean (UNICA) will participate in the Partnership involving their respective networks, posting the courses and identifying candidates to take them, and serving as links among institutions. CoHemis and UNICA were also asked to survey the capacities and interests of their member institutions relevant to the Partnership's objectives.

The FSIS delegation was headed by Dr. Thomas J. Bill and Ronald Hicks while the FDA delegation was headed by Dr. Bernard A. Schwetz and Maritza Colon-Pullano, the Partnership's General Coordinator. UPR's delegation was composed by: Dr. José I. Carlo, Acting Dean of the School of Medicine (also representing UPR's Acting President); Dr. Mildred A. Chaparro, representing UPRM's Acting Chancellor; Edna Negrón, Coordinator of the Food Science and Technology Program, Dr. Ilia Oquendo, Dean of Pharmacy; and Dr. Luis Pumarada. Representatives from agencies and NGOs that work in fields related to the Partnership's objectives also attended: the Puerto Rico Department of Agriculture; the Puerto Rico Health Department; UNICA; the United Nations' Food and Agriculture Organization (FAO); the Inter American Institute of Cooperation in Agriculture (IICA); the Pan American Health Organization (PAHO); the Commission for Education, Science and Culture of the Senate of Puerto Rico; US Pharmacopeia; and USAID.

The FDA is part of the Department of Health and Human Services and FSIS is part of the Department of Agriculture. The Executive Committee's next meeting has been scheduled for November in Puerto Rico.

U.P.R.M. PUBLISHES AN INTERNATIONAL MAGAZINE ON INFRASTRUCTURE AND NATURAL DISASTERS

UPRM's Civil Engineering Department published in May this year the first number of its **International Magazine on Natural Disasters, Accidents, and Civil Infrastructure**. UPRM's Luis E. Godoy and Luis E. Suarez are the main editors. Assistant editors are Ricardo R. Lopez, also from UPRM; Carlos A. Prato, from the Universidad Nacional de Cordoba in Argentina; Emir J. Macari, from Louisiana State University, and Alex Barbot, from the Universidad Nacional de Cataluña in Spain. The publication addresses the Spanish and Portuguese-speaking public of the Americas, Spain and Portugal.

The magazine means to be a forum for topics related to construction, destruction, design, and repair, where engineers can contribute evaluations, innovations, recent developments, designs, alternative scenarios, and solutions. These questions are at the intersection of the development of civil infrastructure and the threats posed by natural and human-generated actions.

The articles of this first issue are" "Experimental Determination of the Mechanical Properties of LOSAS (SLABS?) for Fiber Reinforced Polymer (FRP) Bridges;" "Spectrum of Designs for the Main Cities of Puerto Rico Based on Global Acceleration Registries;" "Cost- Effective Criteria for Seismic Retroadaptation;" "Application of Weibull's Distribution to Estimate the Remaining Life of Flexible Pavements;" "Reabilitaçao estructural do prédio do aeroporto Santos Dumont após danos causados por incêndio;" "Verification of HAZUS Capacity Curves for Puerto Rico;" "Inspeçao e recuperaçao estructural de um reservatório d'água;" and "Characterization of a Slow Sand Filter with a Horizontal Flow Gravel Pre-filter." The articles' authors come from the following institutions: UPRM, Georgia Tech, Universidad Politecnica de Cataluña, UNIPRO-AEP, Universidad Federal do Rio de Janeiro, and the Unviersidad Federal Fluminense de Brasil.

The second issue will be published in November, 2001 and papers are being accepted. For information or subscriptions please contact the editors at (1-787) 265 – 3815, or send a fax to (1-787) 833 – 8260, or write to <revista@ce.uprm.edu>.

Workshop on PROSPECTIVE:
A Tool for Building Desirable Futures
Important event in CoHemis' 10th anniversary

On February 26th and 27th of the current year the CoHemis Center invited Dr. Francisco José Mojica to UPRM to present his seminar "Prospective" as part of the Center's 10th anniversary. The seminar combined Prospective theory and methodology with workshops and applications for the participating public's immediate environment. With a post-doctoral degree in Prospective from the University of Paris V René Descartes under the direction of world renown futurist Michel Godet, Dr. Mojica is a professor in the *Universidad Externado de Colombia* and the founder of the Latin American Prospective Network. CoHemis Co-directors were duly impressed when they saw a presentation by Dr. Mojica as part of an international seminar held in the *Universidad Autónoma del Caribe* in Barranquilla, Colombia. Right then and there, they invited him to present his seminar in Puerto Rico.

Contrary to what many people think, prospective is not synonymous with forecasting. Forecasting is a profound, exhaustive, integrated, systematic analysis of social, economic, technological, and scientific trends that tries to predict the direction of such trends. Prospective studies analyze trends, but they also include identifying objectives and key variables; exploring scenarios or possible futures (referred to as "futuribles") and their consequences; and systematic analysis of the variables that must be affected to reach the most desirable *futuribile* for the entity conducting the study.

The seminar dealt with various topics, such as: theory and development of Prospective as a systems analysis methodology that facilitates empowerment over the future; identification of priorities; delimitation of objectives and goals; creation of possible scenarios; quantification and measurement methods; identification of social actors and their levels of power; etc. In various workshops, participants learned to use tools and methods of analysis for variable prioritization, categorization according to dependence and influence levels; identification of causality; scenario creation and evaluation, etc.

The theoretical section combined the history of the discipline with fascinating analyses and presentations of multiple trends in contemporary society —Latin American society in particular— characterized by globalization and its consequences. The analysis included the immediate effects and characteristics of globalization as well as predictions of where it is headed. Dr. Mojica concluded that the exacerbation of economic inequality and the concentration of capital and power as well as technology and knowledge in some sectors of global human society are two of the most aggravating effects of the social, economic, and cultural globalization of the planet.

Another consequence is the weakening of the nation-states to deal with these and other problems suffered by their populations: the number of elements that the state no longer has jurisdiction over is ever increasing. Parallel to this phenomenon is the emergence of civil society—non-governmental organizations, environmentalist parties, civic and religious organizations, etc. From a prospective point of view, Dr. Mojica convincingly argued that the immediate future of Latin American countries within the global system depends mostly on the interaction of forces between Latin American civil society, the dehumanizing global capitalist system, and the states.

Dr. Mojica also presented experts' technological forecasting studies that predict that the information era we currently live in will soon be replaced by the idle or free time era. This in turn will be followed by a bio-scientific era, a mega-materials era, a new atomic age, and a new space age, each era focused on a technological change of great magnitude that transforms society around it.

The participants in UPRM took advantage of the workshops to analyze a local situation of common interest, categorizing problems according to their tractability; identifying the actors involved and their roles; constructing probable scenarios; and defining actions to take both to avoid the least desirable scenarios and to reach the target scenario. At the end, participants agreed on the importance of the seminar and prospective methodology for planning and for the study of complex problems in natural and physical sciences as well as social sciences, economics, engineering, etc.

The prospective method combines the techniques of strategic planning, systems analysis, and evaluation of objectives with the level of analysis required for forecasting, to produce precise results of significant validity.

CoHEMIS SPONSORED INTERNATIONAL PARTICIPATION IN THE IInd INTERNATIONAL ENCOUNTER OF THOUGHT AND EDUCATION

The CoHemis Center facilitated the participation of Drs. Daniel Piedra-Herrera and Luiz Carlos Scavarda do Carmo in the IInd International Symposium of Education and Thought celebrated in UPRM last March 14th to 16th. Professor of Havana's Latin American School of Medicine and Scientific Policy Secretary of the Cuban Academy of Sciences respectively and Development Projects Director at the Pontificia Universidad Católica at Río de Janeiro, they both offered plenary conferences to the hundreds of Puerto Rican and international participants.

Dr. Daniel Piedra-Herrera, who was the delegate of Cuba's Academy of Sciences in the NSF-sponsored conference that resulted in the foundation of the CoHemis Center in 1991, presented "Latin American School of Medicine: an Innovative Experience in the Formation of Health Professionals." Dr. Scavarda presented "Considerations in Engineering Education in Latin America in the Context of a Globalized Economy." Both conferences were very well received by the audience.

In his presentation Dr. Piedra spoke primarily of the development gap that divides the world in two, one half characterized by abundant consumption of goods, services and technology, and the other half, characterized by scarcity, which includes most of Latin America's and the world's population. "One of the most characteristic traits of the poverty that envelops the great majority of humanity is a dearth of health services… [and] scarcity of doctors and health facilities…"

The recent disasters brought about by hurricanes Mitch and Georges evidenced the insufficient number of Central American and Caribbean doctors to handle not only emergencies, but the daily health problems of their populations. Founded in 1999, the Latin American School of Medicine in Havana was opened as a response to this situation. Its students come from poor rural families and they are selected by the relevant authorities according to the number of places available in the School. Oriented towards the formation of primary care physicians, the School has 3,440 students currently enrolled from more than fifty ethnic groups across Latin America, and is an example of how education and international cooperation can combine to respond successfully to pressing social problems.

Dr. Scavarda do Carmo talked about the internationalization of education, par-

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The **IInd International Symposium on Education and Thought: Economy, Technology, Education, and Thought** dealt with the implications for educational practices, specially those that are oriented towards the development of reflexive and critical thinking of "the economic and technological changes that are produced in our societies." 230 scholars assisted from Puerto Rico, the Caribbean and Latin America to listen to four keynote conferences, presentations of research papers, and to discuss the implications of their results for the future of education in our hemisphere.

Besides Piedra and Scavarda, two other keynote speakers were Margarita de Sánchez from Venezuela and Cesar Rey-Hernández, Puerto Rico's Secretary of Education.

UPRM and Venezuela...

Visit to IVIC: *Together with UPRM visitors and other IVIC officials and researchers are Roberto Callaroti, Head of IVIC's Technical Center (to the left), and Dr. Jesus R. Del Castillo, sub-director of this prestigious scientific research center (up front).*

were:

*Developing a GIS Data Network for the Caribbean

*Developing a joint Ph.D. program between UPRM and the *Universidad Central de Venezuela* (UCV) in Electrical and Computer Engineering, as well as offering distance learning courses between UPRM and UCV.

*Facilitating access to research centers and installations in Venezuelan institutions to UPRM researchers, and vice versa.

*Having Venezuelan researchers present conferences in UPRM and vice versa; facilitating study trips for UPRM students to Venezuelan institutions.

*Using well documented Venezuelan forested areas and coral reefs to validate radar penetration algorithms developed in UPRM.

*Initiating collaboration between the *Universidad Simón Bolívar's* marine research center in Puerto Cabello and UPRM's research boat.

*Offering short courses to Venezuelan researchers and professionals through the Engineering Institute Foundation.

CoHEMIS RECOMMENDS GREATER INTERNATIONAL REPRESENTATION FOR PUERTO RICO IN SCIENCE & TECHNOLOGY

CoHemis Director Dr. Luis Pumarada-O'Neill presented a statement before the Commission on Federal and International Affairs of the House of Representatives of Puerto Rico in a public hearing called to investigate and revise the benefits and possibilities of Puerto Rico's participation in international bodies and organizations. Dr. Pumarada's main recommendation, within a framework of Science & Technology collaboration, focused on Puerto Rico's need to create a national science and technology organization (NSTO) that coordinates and helps finance research and cooperation in science and technology. This organization would also facilitate Puerto Rican participation at a regional and international level through direct interaction with the other NSTOs of the Americas.

Due to the island's political subordination to the United States, Puerto Rican S & T institutions confront serious obstacles when they try to represent Puerto Rico in international bodies. In some cases, the island cannot have full membership because the organization already has a US representative, under whose sovereignty Puerto Rico is included. In other cases, participation is not allowed because the Latin or regional character of the organization excludes US participation, and Puerto Rico is seen as part of that country.

Until now, Puerto Rican institutions and individuals that have procured participation in these forums have had diverse results: either they are permitted to participate as observers, with the limited rights such a role entails; they are denied participation; or they are told that they already participate through the US delegation. The problem with this last case is that US delegations, as is expected, represent a reality that is completely different from that of Puerto Rico, not only in scientific development and income level, but also in population characteristics, culture, outlook, and geography. Therefore, US delegations not only do not effectively represent Puerto Rico: they deprive the island's institutions of the exchange and learning opportunities that direct contact with international institutions can provide.

The House of Representatives is evaluating a resolution to have its Commission of Federal and International Affairs conduct a study regarding the current state of Puerto Rico's participation in international and regional organizations that deal with science, technology, culture, tourism, sports, and education: that is, regional and international organizations that contribute in one way or another to national development. The main objectives of this study would be: evaluating the current status of the country's participation and the diverse degrees of membership that Puerto Rico can adopt; identify organizations in which Puerto Rico should be participating; and recommending what legislative and political measures the Puerto Rican government needs to implement to support, facilitate, and promote the country's full participation.

Fragments from CoHemis' Presentation: «...create in Puerto Rico a National Science & Technology Organization»

"CoHemis' trips and projects throughout Latin America frequently put us in contact with persons and situations whose knowledge could be useful for Puerto Rico, just as we identify opportunities for our island's professionals. Our country's relationship with the US contributes to place Puerto Rico in leading positions in matters of science, technology, and innovation, but at the same time it hampers our direct interaction with the knowledge and technology generated in Latin America. On the other hand, our problems and our level of economic development make us more similar in many respects to Mexico, Costa Rica, Chile and Brazil than to the United States.

These observations and experiences have led us to conclude that in the globalizing world that surrounds us, it is not only advantageous but necessary for Puerto Rico to insert itself more prominently in international global and regional organizations.

Many measures can be taken to encourage this participation. Regarding the fields of science and technology, we recommend the creation and funding of a national science and technology organization (NSTO) that would belong to international NSTO bodies and that could, among other things, sponsor international membership of specialized Puerto Rican institutions. A Puerto Rico NSTO would evaluate proposals of local institutions that wish to belong to international organizations, based on criteria such as following: the amount and the need of the requested funding; the institution that requests them; the organization it wants to belong to; and how the benefits of such membership would extend to other persons and institutions in Puerto Rico.

Scientists and engineers from all parts of the world live in the United States and generate a great deal of the world's knowledge. Puerto Rican researchers participate in US scientific meetings and institutions, but it is important to increase this participation, especially in science and technology. This could be another task for our future NSTO."

THIRD MEETING OF INGENIE-RED

INGENIE-Red, the Network of Engineering Graduate Education and Research in Latin America and the Caribbean, will celebrate its 3rd[rd] meeting on October 2-4, 2001[t] in the Universidad Central de Venezuela in Caracas. The CoHemis Center is a founding member of INGENIE-Red and its Co-director, Dr. Jorge Vélez-Arocho, is part of the Organizing Committee.

The goals of this important meeting include: promoting cooperation and exchange between INGENIE-Redparticipants in engineering research and graduate education through direct contact and interaction; identifying, promoting and facilitating concrete possibilities of cooperation between the Network and the industrial sector; and promoting the incorporation of new members. Member institutions will present papers revealing possibilities and achievements of institutional exchange and cooperation; speakers from the industrial sector as well as governmental and academic institutions will also be presenting.

The topics to be presented are: successful experiences of cooperation; concrete proposals for cooperation and exchange between member institutions through diverse modalities; joint projects that apply engineering to solve regional socioeconomic problems; and University-Industry connection in regional development. There will be plenary conferences, poster sessions, and a forum with representatives from academia, industry, and government sectors.

For more information you may contact: <ing3org-l@elecrisc.ing.ucv.ve> or visit neutron.ing.ucv.ve/comunicaciones/Red_Ing/default.htm >.

LATIN AMERICAN STUDENTS IN UPRM:

Improving Medicine Through Computers

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

When he was a small boy, Daniel Burbano dreamed of becoming a doctor. Despite his fascination with machines and how things worked, and his increasing interest in computers and electronics, Daniel still wanted to study medicine. But after suffering an accident, he changed his mind. He decided to study electronic engineering, with the intention of working in the development of medical technology applications.

He began his undergraduate degree in the Pontificia Universidad Javeriana in Bogota. He finished his studies in the Universidad del Bosque, previously the Colombian School of Medicine, where an Electronic Engineering Department had just been opened that facilitated combining his academic interests. In the Universidad del Bosque and as part of the COLFuturo program he participated in a study abroad semester in the United States. COLFuturo is a program of the Colombian government with some private funding that encourages students to pursue graduate studies abroad by facilitating undergraduate and graduate exchange programs. Upon his return he completed his undergraduate thesis in electrocardiography, receiving First Place in the 6th Research Symposium of the Universidad del Bosque.

Upon graduation, Daniel worked for British Petroleum in the area of solar energy, and then in PROCalculo y PROSis, a firm that developed GIS hardware equipment. His semester in the US had opened up new academic possibilities for him, and in the meantime he searched online for information on universities and opportunities abroad, particularly the United States. The high cost of graduate education in the US turned his attention to Australia, but before he committed to an Australian university that accepted his application, a coworker's brother mentioned UPRM and advised him to apply. Daniel became interested not only because of the academic program, but because of the availability of assistantships and the low cost of an excellent education with close links to research institutions in the US and Latin America.

Instead of applying to electrical engineering, Daniel opted for doing a master's degree in Computer Engineering, because "cutting edge technology is developing around software. Software's necessities are what transform hardware to go beyond its present limitations." Daniel received a research assistantship working with Chilean professor Dr. Jaime Seguel in the parallel processing project Beowulf. He explains: "technology today is mostly based on linear

processing. Programs execute instructions linearly, fast, but linearly. Parallel processing systems are being developed to allow instructions to be executed simultaneously, using multiple processors."

His thesis project is still "under construction," but he is focusing on the combination of electromedicine with the Beowulf project he's working on. "I would like to develop specific applications for medicine of image parallel processing, particularly in relation to tomography. This is an advanced technology that is substituting radiography imaging and allows the study of different systems of the human body in multiple dimensions."

Dr. Seguel supports the direction that Daniel is giving his graduate research. "Professor Seguel is excellent, very flexible, and he encourages his students to innovate. I like the project we're working on (Beowulf) because it represents a paradigmatic change in technology, a paradigmatic change in problem solving."

Despite many differences, Mayagüez has become familiar to him: he has met many Colombians here, (at least one he knew from back home), and the climate is similar to his native city, Girardot. Daniel enjoys living in Puerto Rico, although he complains that Mayagüez "empties out" on weekends and the summer. "I would change one thing about the program: Electrical Engineering and Computer Engineering are too similar, and I think they would both be better if they were more differentiated."

In the future, Daniel wants to return to Colombia and establish his own company, developing cutting-edge image processing technology for medical applications. Perhaps he can work with his father, who is a doctor in Girardot.

THE CENTER FOR TRANSPORTATION TECHNOLOGY TRANSFER AT U.P.R.M.

On 2001 the Transportation Technology Transfer Center (CTTT) at UPRM's Civil Engineering Department celebrates 15 years of providing technical assistance to towns and agencies in Puerto Rico and the US Virgin Islands. The Center is funded by the US Federal Highway Administration and belongs to the Pan American Highway Institute.

The CTTT's main objective is providing assistance and training to administrators, surveyors, laboratory analysts, maintenance brigades, engineers, operators, and technicians from Puerto Rico's municipalities, Department of Transportation of Public Works and its Highway Authority, and to parallel agencies in the Virgin Islands. The Center also provides information on planning, design, construction, maintenance, and operation of transportation facilities through seminars, workshops, conferences, movies, the publication of special guides and its newsletter "El Puente" (the bridge), and special projects. They also give support in legal and ethical issues, basic administration concepts, statistics, the use of computer models and programs, and the drafting of technical reports in English and Spanish.

For more information you may contact the Center's coordinators, Drs. Benjamín Colucci and Felipe Luyanda at (1-787) 834 – 6385 or visit the Center's web page at: <www.prt2.org>.

MAYAGUEZ BAY BASIN MANAGEMENT PLAN

Progress Report of a Joint Project OF CoHEMIS and the Water Resources Institute

The project to develop the Integrated Management Plan of Mayagüez Bay's Hydrographic Basin is in its third year. This joint initiative of the United States Environmental Protection Agency (EPA), the Puerto Rico Institute for Water Resources and Environmental Research, and the CoHemis Center has sparked the interest of many CoHemis Consortium members in Latin America and the Caribbean.

The project's initial phase has been completed: community and citizen participation has been organized through a Forum of Stakeholders, a body responsible for developing a Management Plan and preparing its statutes. The Forum of Stakeholders has identified and assigned priorities to the main issues that the plan shall be addressing, a prerequisite for designing appropriate and successful resource management strategies.

The Forum will be advised both by an Administrative Advisory Council and a Technical Advisory Council organized around specific statutes defined by the participating constituents. The first Call for Proposals to fund research projects aiming to provide data needed to support future decisions about the identified vital issues has been well received. Finally, an educational campaign is underway in schools and community organizations in the towns within the basin..

Roxana Torres defended her master's thesis, titled "Decision Process: Comprehensive Plan for the Integrated Management of the Hydrographic Basin of the Mayagüez Bay," which she developed while working in the project.

For information on the project, please visit http://www.ece.uprm.edu/cohemis/vip.

First Summit of the Mayagüez Basin Management Plan

On June 29th the First Summit of the Comprehensive Plan was held. Three panels were held to discuss: financing opportunities for the projects carried out in the basin's towns; the role of community participation; and the permit process necessary to develop such a plan.

Besides various constituents, the following individuals participated: Añasco's mayor Pablo Crespo and Mayagüez' José Guillermo Rodríguez; Ferdinand Lugo of the Department of Natural Resources; José Luis Ramírez of the Environmental Quality Board; Frederick Muhlach from Puerto Rico's Planning Board; and Pedro Gelabert, from EPA, the sponsoring agency.

MAURICIO SARRAZIN: NATIONAL MANAGEMENT OF R&D

EX-PRESIDENT OF CHILE'S C.O.N.I.C.Y.T. AND CoHEMIS' FOUNDING DELEGATE

As part of the CoHemis Center's tenth anniversary celebrations, Dr. Mauricio Sarrazín, from the University of Chile, was invited to offer presentations in UPRM and the Puerto Rico State Department. Sarrazín was president of Chile's National Science and Technology Council (CONICYT) until last year. In 1991 he was a founding delegate of the CoHemis Center, representing CONICYT. Afterwards he facilitated the participation of the University of Chile in the CoHemis Consortium and became one of the five consulting delegates of CoHemis in representation of CONICYT.

Dr. Sarrazin, on the right, with CoHemis' Director Dr. Luis Pumarada.

The conference, entitled "Research and development: the roles of the state and the private sector in the Chilean experience," was presented in UPRM on March 29th, and the next day, with some variations, in the auditorium of the State Department in San Juan. Sarrazín underlined the importance that research in science and technology has for social and economic development in today's context. He also emphasized the increasing importance of the state's role in facilitating or cooperating with research for the generation of capital and employment as well as for long-term planning and reinforcing innovation and its multiplying impacts. "Economic globalization and the technological revolution led by the telecommunications and information industries define the context in which countries must develop; technology has become much more important now than it ever was. Because technological changes are constant and rapid, a firm compromise with technological innovation is a key ingredient for a country's economic success."

Dr. Sarrazín presented specific cases of successful Chilean industries that were actively encouraged by the concerted participation of the state and the private sector, such as the excellent export-oriented wine and salmon. He described the roles and functioning of the Chilean government agencies that measure, coordinate, encourage, and finance research and industrial development and emphasized the importance of international collaboration.

In San Juan, there was a forum after the presentation. Its presenters included the Government Development Bank, UPR's International Business Education Center, and the Program for Research and Development Incentives of the P.R. Industrial Development Company.

INTERNATIONAL COURSES ON SUSTAINABLE AGRICULTURE

The International Programs Office of UPRM's School of Agriculture offers short technical training courses related primarily to the sustainable production of food. This year they offered "Using Organic Residuals for Animal Nutrition and Feeding." to students from the Dominican Republic. The course "Principles and Management of Microirrigation Systems" will be offered on July 23rd through August 7th this year. The courses "Technical Training in Porcine Management and Production" and "Production and Use of Conserved Forages in the Tropics" are ready to be offered if a sufficient number of possible assistants are interested.

The short courses, of diverse duration, can be requested any time by interested people. They are coordinated through the Office and scheduled at a date that is convenient for both the professor and the interested individuals. Some short course areas are: extension, crops, coffee, natural resources, food technology, pesticides, animal industries

For more information you may contact Mrs. Fatima Ortiz-Colberg at the International Programs Office at (1-787) 265-3861; fax (1-787) 834-3413; <f_ortiz@rumac.upr.clu.edu>. You may also visit the Office's web page at <www.uprm.edu/progint>.

IInd International Encounter...

ticularly engineering education, and how it can help Latin American countries to achieve a more advantageous and successful insertion in the global economy. Dr. Scavarda's stated objectives were threefold. First, presenting the role of engineers as responsible for the development and applications of technology. Second, discussing the present economic moment with its tendency to form regional free trade markets, as well as the relevance of engineering education as a mechanism to achieve healthy regional integration. And finally, analyzing the importance of developing more connectivity between the diverse university activities—research, education, and the internationalization of both—especially in engineering.

According to his presentation, education has gone from being an ideological and moral question alone, to including an economic dimension and becoming a basic step to full citizenship. Therefore, educational and research institutions must adjust to the tendencies of a new economy and new social realities, reorganizing themselves around an interdisciplinary character that generates knowledge and skills applicable to real problems. Higher education—engineering education in particular—is called on to make a stronger contribution to the productive process and competitiveness; and participate in its social environment, incorporating issues like employment and national development.

Congresses on Construction Pathology and Quality Control

The Dominican Republic's Technological Institute (INTEC) invites researchers and professionals interested in Civil Engineering and construction to CONPAT 2001, which will take place on October 9th through 12th this year in Santo Domingo. The event consists of two congresses on construction, the VI Congress on Construction Pathology and the VII Congress on Construction Quality Control. For more information you may visit CONPAT's web page at < www.intec.edu.do/area-ingenieria/conpat2001> or contact INTEC's Dean of Engineering, Daniel Comarazamy, by e-mail: <danielc@mail.intec.edu.do>.

VIth International Congress on Numerical Methods in Engineering and Applied Sciences

The global scientific and technical community encounters the growing need to precisely and effectively approach problems whose analysis and prognosis require the use of increasingly sophisticated mathematical models. This complexity demands the development and adoption of numerical strategies that are adequate for each specific problem. The Venezuelan Society of Numerical Methods in Engineering has assumed a national and regional role in promoting research and diffusion of knowledge in this field, and together with the Universidad Simon Bolivar and the Universidad Central de Venezuela they will sponsor the VIth International Congress on Numeric Methods in Engineering and Applied Sciences. It will be held between April 10th 'and 13th on 2002 in Caracas, Venezuela.

Participants should include scientists, engineers, and researchers from academia as well as the private and state sectors. There will be space for exhibiting products, programs and literature related to the activities and topics of the Congress. The Congress' organizers will be accepting abstracts (in English, Spanish, or Portuguese) of potential presentations until September this year. For more information, you may contact the Organizing Committee by phone, at (+58 212 9063364), (+58 212 6053150); by fax at (+58 212 6053135); or via e-mail at <cimenicsvi@cesma.usb.ve>. You can also access the Congress' web site at: <www.cimenics2002.eventos.usb.ve>.

XIII Argentinean Congress on Transit and Highways

The XIIIth Argentinean Congress on Highway Administration and Transit will be held in Buenos Aires in October 1-5, 2001. This congress has become one of Argentina's most important forums on issues related to the highway sector. Expovial Argentina 2001 will be held simultaneously with the Congress, displaying the most up-to-date products, materials, services, and equipment. Professionals and firms from anywhere in the world can participate in both events.

For more information you may visit the Argentinean Highway Association's web page <www.aacarreteras.org> or contact them by e-mail at <aac@sinectis. com.ar>.

UPRM - Microsoft...

Director Dr. Jorge Velez-Arocho and UPRM Prof. Lueny Morell are in charge of the project. Both of them have presentations in the workshop along with UPRM's Drs. Jose Luis Zayas and Miguel Torres, and Penn State's John Lamancusa.

The goal of the workshop is helping the engineering faculties adopt and adapt a curriculum development model created with the support of the National Science Foundation between 1994 and 1996. This model facilitates the design and instrumentation of educational strategies, which can be applied to meet national or regional accreditation processes besides contributing to standardization and academic exchange at a regional level. In Puerto Rico and the US this model has been adapted to prepare for accreditation by the United States' Accreditation Board for Engineering and Technology (ABET).

At the end of the workshop, participants should be able to:

* Adopt the Learning Factory's model to the particular needs of each faculty and institution. Faculty will be prepared to implement a full course, a modified course, or a series of short courses; and/or redesign their own course(s), as well as the materials needed to redesign them.

* Discern the importance of strategic planning and integration and application of its components.

* Dominate the development strategies of the Learning Factory model.

* Determine systematically a set of goals for an academic program, and integrate expected results in the curriculum or the design of courses.

* Develop and maintain the support of industrial partners.

The Research and University Relations Division of Microsoft Corporation seeks to establish partnerships with universities, institutions, firms, and individuals who want to improve the teaching and learning experiences; encourage technological innovation; and facilitate ties with Microsoft as its main technological partner for higher education. The rapid and constant changes that characterize telecommunications technology increase the demand for better-qualified personnel with a capacity to continue learning and adapting. The mission of this division of Microsoft is improving the knowledge and skills of graduate students around the world, so that they are more productive and can create technological and commercial opportunities in their regions. These initiatives are designed to launch a long-term relationship with the key universities in the region, leaders in the field of technology.

Microsoft's Research Labs in Latin America

Microsoft will install a Research Laboratory in each institution that is participating in the corporation's pilot program. This laboratory will have servers, wireless work stations, and exhibition panels, besides digital cameras and software. Microsoft will sponsor the cost of a student working as a laboratory consultant, supervising the lab and helping users. Microsoft will also provide equipment to a facilitating professor who will supervise the student in the administration of the facilities and who will be part of Microsoft's Board of Consultants of Latin American Universities, acting as the firm's official liaison.

Repairing & Rehabilitating...

Organized by the CoHemis Center under the direction of Dr. Daniel Wendichansky of the Civil Engineering Department of UPRM, the workshop was sponsored by the US National Science Foundation (NSF) and the University of Puerto Rico, and co-sponsored by: ISIS Canada; West Virginia University's Constructed Facilities Center (CFC); John Hopkins University's Non-Destructive Evaluation Center; the Pan American Highway Institute (IPC); and UPRM's Civil Infrastructure Research Center. North Carolina University's Constructed Facilities Laboratory and Puerto Rico's Professional Association of Engineers and Surveyors also collaborated.

The activity focused on the following topics: non-destructive evaluation of structural conditions, life cycle cost estimation of repaired structures, fiber-reinforced polymers (FRP), and sensors. It concluded with three concurrent workshops: FRP, non-destructive evaluation and structural assessment (NDE), and future directions. Participants of the workshops identified information necessities, discussed case studies, and recommendations for future investigations.

The seminar's main objective was bringing together researchers from a variety of perspectives, national as well as functional and sector-related, to generate knowledge and direction in order to improve, efficiently and effectively, the quality, durability, and efficiency of the repair and rehabilitation of buildings and bridges.

Around 60 engineers from the private sector, government agencies, fabricators of relevant products, designers, and constructors attended the event. An engineer from Mitsubishi Corporation came all the way from Japan! 29 experts from 10 countries of North, South and Central America and the Caribbean presented papers.

In the initial plenary session presentations focused on the cutting-edge of each topic, establishing a common framework for the concurrent topic sessions and workshops. Dr. Daniel Wendichanksy welcomed the participants and assistants, followed by Mildred Chaparro, UPRM's Special Assistant to the Chancellor, and José Izquierdo, Puerto Rico's Secretary of Transportation & Public Works. Dr. Peter Chang, Program Director of NSF's Civil and Mechanical Systems Division (CMS) presented the seminar's opening with an overview of relevant NSF-CMS Programs.

The presentations that first day were: "Life Cycle Based Cost Estimation for R&R Work," by Cornelia Demers from Arizona State University and Rita Oberle from Georgia Tech; "ACI Design Guidelines for FRP Application," by Sami H. Rizkalla from North Carolina State University; "Nondestructive Evaluation of Bridges," by Robert E. Green from Johns Hopkins University; "FRPs for Infrastructure Rehabilitation: R&D Activities and Field Application in Canada," by Kenneth W. Neale from the University of Sherbrooke-ISIS Canada; "Structural Repair & Liability," by Jack Scalzi, recently retired from the National Science Foundation.

In the fiber-reinforced polymer session, the following papers were presented: "Ductility of Carbon Fiber Strengthened Concrete Bridge Girders," by Riyad Aboutaha from Syracuse University; "Glass Fiber Reinforced Composite Wraps for Railroad Structures," by Hota Ganga Rao from West Virginia University; "Repair of Unreinforced Masonry Structure Using FRPs," by Roberto León from Georgia Institute of Technology; "Mechanical Properties of Fiber Reinforced Polymeric Bridge Decks," by Felipe Acosta from

Continues on the next page

UPRM; and "Shear Resistance of GFRP Reinforced Concrete Beams," by Guilherme Sales Melo from the University of Brasilia.

In the case-study session the following papers were presented: "Case Study of Failure, Damage Assessment, and Repair of Multi-span Prestressed Bridges in Argentina," by Carlos Prato from the Universidad Nacional de Córdoba, Argentina; "New R&R Technologies for Masonry Buildings," by John Bolander from the University of California at Davis; "Rehabilitation and Repair of Bridges in Perú," by Jack López-Acuña from the Universidad Nacional de Ingeniería; "Analysis of the Structural Collapse of a 26-story Building," by Guiseppe Guimaraes from the Pontificia Universidad Católica de Rio de Janeiro; "Reducing the Risk of Buildings & Bridges in Latin America," by Julio Kuroiwa from the Universidad Nacional de Ingeniería, Perú; and "Repair and Rehabilitation of a Pony Truss Span Bridge During Service Time," by Miguel Cruz from the Universidad de Costa Rica.

Dr. Peter Chang, Director of NSF's Program of Large Structures and Structural Systems, presents the research topics that NSF is currently sponsoring. Before him are the former director, Jack Scalzi, and Sami Rizkalla.

The presentations on the non-destructive evaluation and structural assessment workshop were: "Fiber Optic Sensor Networks for Monitoring Existing Bridges," by Richard Livingston from the Federal Highway Administration; "Structural Health Monitoring in Canada," by Roger Cheng from the University of Alberta-ISIS Canada; "Use of Ground Penetrating Radar (GPR) & Infrared (IR) Thermography Techniques for Evaluating Plastic Wrapped Reinforced Concrete Columns," by Moavin Islam from CORRPRO Companies, Inc; "Current R&D Activities of the FHWA in Nondestructive Evaluation for Bridges," by Steven Chase from the Federal Highway Administration - Pan American Institute of Highways; "A New Method for the Objective and Non-destructive Evaluation of Seismic Damages to Reinforced Concrete Elements," by Carl Lüders from the Pontificia Universidad Católica de Chile; "Condition Assessment of FRP Composite Bridge Components Using Infrared Thermography," by Udaya Halabe from West Virginia University; "Overview of the HERMES Bridge Inspection System R&D Project at LLNL," by José E. Hernández from Lawrence Livermore National Laboratory (LLNL); and "Mean Removal Through Multiple Layer Alignment of GPR Data," by Carlos E. Romero from LLNL.

Finally, the in the session on innovation and other topics the following papers were presented: "Use of Embedded Self-Repair Adhesives in Concrete Bridge Members to Repair to Prevent Failure from Severe Dynamic Loading," by Carolyn Dry from the University of Illinois at Urbana-Champaign; "Development and Evaluation of Simplified Procedures for the Analysis and Design of Buildings with Passive Energy Dissipation Systems," by Oscar Ramírez from the Experimental Engineering Center of Panama's Technological University; "Seismic Vulnerability of Bridges in Colombia and Strategies for Rehabilitation," by Luis E. Yamín from the Universidad de los Andes at Bogota, Colombia; and "Application of steel-free concrete deck slabs to rehabilitation projects," by John Newhook from the University of Calgary, ISIS-Canada.

This was the third activity that NSF and the CoHemis Center organize together since 1994 on this topic. The workshop's webpage <http://ce.uprm.edu/rr> is still accessible, and should continue to be available as a tool for establishing links and facilitating collaboration. It is directed by Arsenio Caceres, a UPRM Civil Engineering professor. The majority of the papers presented will be published as Proceedings.

MEETING AT THE P.R. HIGHWAY AUTHORITY

Various experts who presented papers in the Repair and Rehabilitation Hemispheric Workshop met on April 25th in San Juan with personnel from the Puerto Rico Highway and Transportation Authority. The meeting was aimed at identifying common interest areas and discussing alternatives for the solution of diverse problems that Puerto Rico's highway system confronts in the fields of non-destructive evaluation, repair and rehabilitation, and life cycle cost estimation of bridges.

Experts Cornelia Demers, Robert Green, Kenneth Neale, Carlos Prato, Sami Rizkalla, Julio Kuroiwa, Moavin Islam, Rita Oberle, and Peter Chang, from the US, Canada, Peru and Argentina, met at the Department of Transportation and Public Works where they listened to brief descriptions about relevant problems confronted by Puerto Rico's transportation structures. Researchers reacted and provided feedback to these presentations and discussed alternatives and solutions. The topics discussed were, among others: structural capacity determination; foundation identification; structural deterioration in reinforced and prestressed concrete bridges; non-destructive evaluation techniques of FRP retrofitted bridges; seismic rehabilitation; reparation vs. replacement; prioritizing; etc.