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WESTERN HEMISPHERE KNOWLEDGE PARTNERSHIPS

A new vision for society is becoming visible on the threshold of *The Knowledge Age* -- even as a fractious world must anticipate that by 2050 an additional three billion people will stress further already straining global ecosystems. Today, these systems support an expanding economy in which, however, poverty and affluence co-exist cheek to jowl. The new vision sees a society in which *all* of the basic human needs and *an equitable share* of human wants can be met while maintaining a healthy, physically attractive, and biologically productive environment. This is a society that is *environmentally sustainable, economically prosperous and equitable, and therefore politically stable*. It is within reach in this new Age. The first year of the twenty-first century is an appropriate time to start fashioning a strategy to pursue that vision.

The strategy will be knowledge based, human driven, and innovation rich. **We propose a planning workshop to lay the groundwork for Western Hemisphere Knowledge Partnerships (WHKP) of disciplines and societal sectors in the Americas to develop this strategy by organizing networks to address issues of (a) education, (b) the health of ecosystems, (c) eco-efficiency, and (d) environmentally benign sources of energy.** The Americas can be the venue for testing the hypothesis that knowledge, broadly construed, can become one of the organizing principles for pursuit of this new vision.¹

This document begins with a context that provides some aggregate detail of the stresses that the globe will undergo during the next five decades. A second section highlights the applicability of the Western Hemisphere as a manageable laboratory within which the strength of knowledge to provide equitable and sustainable growth can be tested. The last section offers a brief introduction to the specific topics to be covered in the workshop; but, more importantly, it provides a list of organizers and participants that suggests how the entire hemisphere might be engaged from the very beginning of this project.

I. Context

The storehouse of human knowledge concerning the physical characteristics of the world we inhabit, and the universe within which that world is embedded, has been steadily expanding. The accumulation of knowledge concerning the social characteristics of civilization is accelerating. An explosion of understanding is under way in biology and in our ability to deliver health care. Revolutionary communications technologies are becoming available for disseminating rapidly expanding knowledge. These advances are propelling society into The Knowledge Age.

The role of humans in this strategy follows from the central role of individuals in the linkage between the human systems and the array of ecosystems of air, water, land, sunlight, and living organisms constituting the natural system that supports the human system. The nexus in the interaction between the human system and the natural system is found primarily in two metrics that characterize the evolution of civilization: (a) changes in

the number of people in the human system, and (b) changes in the capacity of individuals in that system to draw upon the resources of the natural system to produce goods and services to meet the needs and to satisfy the wants of individuals (in terms of economics, this capacity can be reflected, though imprecisely, by the Gross National Product per person, or GNP/cap).

Both of these metrics have been growing exponentially – and at varying rates. Advances in knowledge prompt individuals to innovate² in the institutions and programs that constitute the infrastructure of society. As Debra Amidon has remarked, “The world is experiencing unprecedented changes in applications of knowledge in every dimension of development, growth, revitalization and organization. The demands and opportunities of an interdependent global economy have implications for private and public decision making by enterprises, and communities, whether local, national, regional or global.”³ Taken together, these two metrics and the innovations they generate determine the growth of the global economy. This growth, in turn, impacts the natural system. *A hallmark of The Knowledge Age is the power it vests in individuals to choose demographic and economic paths into the future that permit pursuit of a new vision that is sensitive to its natural basis.*

Historically, world population grew five-fold between 1820 and 1992 and the global average of GNP/cap increased eight-fold.⁴ As a consequence, the global economy expanded forty-fold to ~ \$ 28 trillion (in 1990 dollars), and world trade increased more than five hundred times. The toll of that economic expansion on the natural system was significant. The landmark report of the World Resources Institute, *World Resources 2000-2001. People and Ecosystems: The Fraying Web of Life*,⁵ warned of an “almost certain decline in the ability of ecosystems to yield their broad spectrum of benefits” if we continue present practices of use. This report, developed in concert with the UNDP, the UNEP and the World Bank, has led to plans for the Millennium Ecosystem Assessment -- a four-year, twenty-million dollar analysis of the resilience of ecosystems to continue supporting human activity.

Future demands on those ecosystems will be significant. From the base year of 1998, world population is expected to increase by fifty per cent through the year 2050.⁶ This expansion would require an annual rate of growth in population of about 0.8 per cent, instead of the rate of 1.6 per cent that prevailed during 1975-98.⁷ In The Knowledge Age we are entering, the world average of GNP/cap may be expected to grow three-fold over the same period of time. This would mean an annual growth rate of 2.1 per cent, equal to the 1975-90 growth rate in high human development countries, well above the world average of 1.2 per cent between 1970 to 1990. The combination of growth in world population and GNP/cap would expand the global economy another four- to five-fold to well over \$100 trillion. In light of the impact on world ecosystems by the forty-fold growth in the global economy from 1820 to 1992, reported by the WRI study, serious questions emerge concerning *environmental sustainability*.

Equally serious questions of *economic prosperity and equitability* arise because of the asymmetry in population growth and gains in GNP/cap. For example, in the 29 affluent developed countries in the OECD the annual rate of growth in GNP/cap between 1990 and 1998 was 67 per cent larger than it was in the and the world's 43 least-developed countries

(LDCs).⁷ By 1998 the \$20,900 GNP/cap in the OECD was 77 times greater than the \$270 in the LDCs. On the other hand, the annual rate of population growth in the LDCs from 1975 to 1998 was three times greater than it was in the OECD. The nearly 600 million people in the LDCs produce and consume less than 75 cents worth of goods and services per day. In the OECD countries, this figure for more than a billion people approaches \$60 per day. By putting knowledge to work in order to raise the annual growth rate in GNP/cap to the level (7.1 per cent) that prevailed from 1975 to 1998 in East Asia countries (China, Hong Kong, Republic of Korea, and Mongolia), the figure of 75 cents per day could be increased to \$30 per day by 2050.

These issues of economic prosperity and equity and their implications for social stability were succinctly summarized by the economic historian, David Landes: “Now the big challenge and threat is the gap in wealth and health that separates rich and poor. ... *Here is the greatest single problem and danger facing the world of the Third Millennium.* The only other worry that comes close is environmental deterioration, and the two are intimately connected, indeed are one.”⁸ (emphasis added) In another vein, E. O Wilson remarked in *Consilience* that “A great deal of serious thinking will be needed to navigate the decades immediately ahead. ... *only unified learning, universally shared,* makes accurate foresight and wise choice possible. ... we are learning the fundamental principle that ethics is everything.”⁹ (emphasis added)

The present moment is the time to marshal, unify and share knowledge to make “accurate foresight and wise choice possible.” A concerted effort will be necessary to develop fully the potential utility of the cascading knowledge¹⁰ that involves the discovery, integration, dissemination, and application¹¹ of knowledge concerning the nature of – and the interaction among -- matter, living organisms, energy, information, and human behavior.

The task will demand entirely new kinds of partnerships among the physical, biological, medical, and social sciences, engineering, and the humanities. Profound issues of human values will be involved. New partnerships will also have to be forged among academia, business & industry, government, and non-governmental organizations. A regional initiative is in order to test the hypothesis that knowledge, broadly construed, can play a major role in assuring an attractive human prospect.

II. The Western Hemisphere as a Laboratory for Testing the Power of Knowledge.

We propose that this test be conducted in the Western Hemisphere.^{12, 13} The issues of environmental sustainability, economic prosperity, and social stability in the Americas mirror those issues at the global level. They are outlined for the Western Hemisphere in Table I. The numbers were derived from basic demographic and economic tabulations in UNDP’s *Human Development Report 2000*.⁷ Major progress would be made toward equability in the scenario for “*prosperous and sustainable development*” as compared to the “*business as usual*” scenario in Table I, even though equality is not achieved. GNP/cap would grow seven-fold in the thirty-four countries in Latin America and the Caribbean while nearly doubling in Canada and United States. As a result, the economy in the Western Hemisphere would expand about four-fold in each scenario. The capacity of

Western Hemisphere ecosystems to support this much growth remains to be determined by preparing a suite of scenarios for several modes of growth in GNP/cap and then acquiring a deepened understanding of the capacity of American ecosystems to support those modes. The potential power of scenarios such as those outlined here rests on the new capability to set and achieve demographic and economic goals that is placed in the hands of society by expanding knowledge and by the emerging technologies that make its distribution possible.

A regional approach is very much in the spirit of a recent report by the National Research Council that urged new “partnerships” of disciplines and institutions to develop “Regionally focused environmental research and assessments ...to complement global scale research and transform its advances into usable information for decision making at all spatial scales.”¹⁴

 TABLE I. A scenario for the Western Hemisphere. A comparison between (a) Canada and the United States and (b) 34 countries in Latin America and Caribbean.

	<u>Canada & USA</u>	<u>34 LA & Carib</u>
	<u>1998</u>	
Pop. (10 ⁶)	305	498
GNP/cap (\$)	28,000	3,830
GNP (10 ¹² \$)	8.5	1.9
	<u>2050 (business as usual)</u>	
Pop. (10 ⁶)	490 (+ 0.9%/yr)*	980 (+ 1.3%/yr)*
GNP/cap (\$)	71,000 (+1.8%/yr)**	10,300 (+1.9%/yr)**
GNP (10 ¹² \$)	35	10
	<u>2050 (prosperous and equitable development)</u>	
Pop(10 ⁶).	385 (0.45%/yr)*	700(+0.65%/yr)
GNP/cap (\$)	52,000 (+1.2%/yr)**	28,000(+3.8%/yr)***
GNP (10 ¹² \$)	20	20

* UNDP estimated growth rate, 1998 to 2015

** actual growth rate, 1990 to 1998

* one half the UNDP estimated growth rate, 1998 to 2015

** two thirds of the actual growth rate, 1990 to 1998

*** twice the actual growth rate, 1990 to 1998

That report followed the milestone NRC document, *Our Common Journey*¹⁵ that, in turn, traced its origins back to the 1987 report by the World Commission on Environment and Development, *Our Common Future*,¹⁶ that set the stage¹⁷ for the 1992 Earth Summit¹⁸ in Brazil, and the knowledge initiative of the World Bank¹⁹ *Our Common Future* stimulated

a meeting of national and international academies of science in Tokyo in 2000 (www.interacademies.net).

III. The Planning Workshop – Topics and Participation.

In the context of the discussion above, a strategy for the Western Hemisphere should address eight topical areas. The planning workshop will focus primarily on the first four areas. Intensive and extensive use of networks and communications technologies (distance learning for education and *collaboratories*²⁰ for research) is anticipated in all areas. Subsequent workshops are expected to address the other four areas. The eight are:

- Education -- development of human capital is the *sine qua non* of a knowledge-based economy. But education should be interpreted in terms of life-long learning. Potentially powerful new communications technologies are opening the way to act on this interpretation. More than deployment of a new technology will be required (www.adece.edu; www.laspau.edu). Integration across disciplines and an understanding of the role of knowledge in social and economic development will be necessary.
- Health and resilience of natural ecosystems – described as “enormously challenging”⁵ this topic will require developments of indicators of the pressures, extent, and output of agricultural, coastal, forest, freshwater, and grassland ecosystems (www.ma-secretariat.org).
- Eco-efficiency in the production and consumption of goods and services in order to alleviate the impact of further economic growth on American ecosystems. The literature is extensive.²¹ (also see: www.bcsdla.org)
- Exploration of environmentally benign sources of energy to power economic growth. The accumulation of greenhouse gases in the atmosphere is emerging as a regional and global issue.²⁴
- Extension of national income accounts in order include environmental impacts²² and patterns of consumption.²³
- Intellectual property right demand attention in a knowledge-based economy.²⁶
- Delivery of health care is entering an era of profound change in which integration with the sciences²⁶ and sharing of new knowledge and practices (<http://intrah.org>) are increasingly important.
- Local community networks need to be fostered to ensure a societal response (e.g.: www.ena.org).

In each topical area, interaction will be cultivated with organizations and programs in these and related areas.

The planning workshop will bring together individuals and institutions that include, for example, AAAS, the American Distance Education Consortium, AGU, Business Council for Sustainable Development in Latin America, the Harvard affiliated exchange program (LASPAU), Inter American Institute for Global Change Research, Monterrey’s ITESM, NYAS, Pacific Northwest Laboratories, Phi Beta Kappa, and Sigma Xi’s Packard

Foundation supported program for outreach in Latin America. These institutions all increasing involved in creating networks. The workshop objectives are plans to address the four topics listed in the preceding paragraph and initiate action.

A core group of institutions will work with Sigma Xi.

The group includes, but is not restricted, to:

- AAAS, <http://aaas.org> (Richard Getzinger);
- American Distance Education Consortium, www.adec.edu (Janet Poley);
- American Geophysical Union, www.agu.org (Fred Spilhaus);
- Business Council for Sustainable Development-Latin America, www.bcsdla.org (Sylvia Pinal);
- **Inter-American Institute for Global Change Research**, www.iai.int (Armando Rabuffetti);
- Intrah (health-care delivery at Univ. of North Carolina), <http://intrah.org> (James Lea);
- LASPAU (Harvard affiliated academic exchange), www.laspau.edu (Ned Strong);
- Miami University (Otis Brown);
- New York Academy of Sciences, www.nyas.org (Rodney Nichols);
- Pacific Northwest National Laboratory, www.pnl.gov (Chester Cooper, Ray Bair);
- Phi Beta Kappa, www.pbk.edu (Douglas Foard);
- START www.start.org (Roland Fuchs);
- Univ. of Maryland, www.umd.edu (Thomas Fretz); and
- Florida International Univ., Miami, Hemispheric Center for Environmental Technologies, www.hcet.fiu.edu/ (Gustavo Roig and M. Ali Ebadian)
- Mexico's UNAM (www.unam.mx) and CITEDES (Centro de Investigación de Tecnologías Limpias y Desarrollo Sustentable (*Clean Technologies and Sustainable Development Res. Ctr.*)) (Eugenia Olguín)

Contact has been established with:

- Inter-American Development Bank, www.iadb.org (Danilo Piaggese) that organized a seminar on *Information Technology for Efficient, Equitable and Sustainable Development* at the Annual Meeting of the Board of Governors in March 2000;
- Organization of American States, www.iacd.oas.org (Ronald Scheman),
- The World Bank, www.worldbank.org (Vinod Thomas),
- The Economic Commission for Latin America and the Caribbean, www.eclac.cl (Jorge Katz) that prepared a paper on *Latin American and the Caribbean in the transition to a knowledge-based society: An agenda for public policy* for the Regional Meeting on Information Technology for Development in Florianopolis, Santa Catarina, Brazil in June 2000; and
- Government-University-Industry Research Roundtable at the National Academy of Sciences.

Discussions have been carried on with the Business Council for Sustainable Development - Latin American, www.bcsdla.org (Sylvia Pinal) in connection with their initiative in *Eco-Efficiency*; the Center for Knowledge Systems, ITESM (Francisco J. Carillo); MIT's Global Systems for Sustainable Development, <http://gssd.mit.edu> (Nazli Choucri); and the

Millennium Ecosystems Assessment, www.ma-secretariat.org (Valeria Thompson); as well as with other individuals and institutions in the Caribbean and Latin America countries, and North America.

Dr. Tom Malone, a former President of Sigma Xi, Dr. Janet Poley, President, American Distance Education Consortium, and Professor of Economics, Dr. Gary Yohe, Professor of Economics at Wesleyan University, with the Assistance of Dr. Emir Jose Macari, will jointly coordinate the planning conference.

Senior WHKP advisors include J. Brademas (NYU), G. Bugliarello, (Polytechnic U.), R. Connor, (Nat'l. Hum. Ctr.), J. Figueres (Costa Rica), F. K. Hare (Canada). H. Sandvold (Norway), and E. Wilson (Harvard).

Further Outlook

A Summit of the Americas has been taking place since 1956. It was there that the Inter-American Development Bank was first proposed and began to take shape. The future of these meetings was seen as a major step for relations within the Hemisphere. The second Summit took place in Uruguay in 1967, but unfortunately the resolutions from that meeting never came to fruition and it took 27 years before the next Summit would be arranged. The United States hosted a meeting in 1994. The 2001 Summit of the Americas will take place in Quebec, Canada from April 20-22. Topics include *Education, Science and Technology* under the heading of *Learning and Culture*. It seems desirable for the partnership philosophy of the WHKP initiative to be incorporated into discussions at future Summits of the Americas.

As one of the deliverables from this workshop, we propose to develop an Executive Summary that might become a contribution that would initiate a series of white papers that would embrace all of the topical areas outlined above. In addition, a set of white papers will be developed for each of the eight topical areas. Substantive articles can be submitted to *The American Scientist* that will summarize this workshop and white papers that might follow.

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BUDGET FOR
 PLANNING WORKSHOP -
 3 FULL DAYS – IN MIAMI

Hotel		
	(3 nights, 20 persons, @ \$150 + 14.5% Tax)	\$10,305
	Ground transportation. (20 persons @ \$40 each)	800
Per diem		
	20 persons, 3 days, @ \$35/day	2,100
Air Fare (restricted non-deduc)		
	USA 6 persons @ \$600	3,600
	LA12@\$1,000	12,000
	Can 2 @ \$800	1,600
Total		\$17,200
PI travel		3,000
Preparatory Costs		
	Preparatory photocopy and mailing	2,000
	Postage and Fed Express	2,000
	Telephone	2,000
Personnel		
	Technical and editorial	20,000
	Office Support (Sigma Xi)	3,000
	On-site meeting coordinator	6,000
Final Report (printing)		8,000
Overhead (off-site meeting - \$75 per person X 20 persons)		1,500
Contingency		5,000
	TOTAL	\$82,905

PROFILES OF PRINCIPAL INVESTIGATORS

Dr. Tom Malone is University Distinguished Scholar Emeritus at North Carolina State. A member of the National Academy of Sciences, he was elected Foreign Secretary in 1978. He has also chaired the Academy's Geophysics Research Board and its Board on Atmospheric Physics and Climate.

He left a tenured faculty appointment at MIT in 1955 to join The Travelers Insurance Companies where he went on to become Senior Vice President and Director of Research. While on leave from MIT between 1949 and 1951, Malone edited the 1300 page *Compendium of Meteorology* that set the stage for meteorological research in the second half of the 20th century. He returned to academia in 1970 as Professor of Physics and then Dean of the Graduate School at the University of Connecticut. A past national president of Sigma Xi, The Scientific Research Society, he was named Founding Director of the Sigma Xi Center in North Carolina's Research Triangle Park in 1992. He has also served as national president of the American Meteorological Society and the American Geophysical Union

Tom was Secretary General of the Committee on Atmospheric Sciences of the International Council of Scientific Unions (ICSU) that, in a series of reports from 1965 to 1967, proposed the Global Atmospheric Research Program (GARP). He was a co-convenor of ICSU's 1984 conference in Ottawa that led to the International Geosphere Biosphere Program (IGBP). Founding Secretary General of ICSU's Scientific Committee on Problems of the Environment, he has been a Vice President of ICSU and was its Treasurer from 1978 to 1984. He chaired the U. S. National Commission for UNESCO from 1965 to 1967. He was awarded the International Meteorological Organization Prize in 1984 for "scientific eminence and a record of work done in the field of international meteorological organizations." His international work has also been recognized by an international award from the AAAS in 1994 and by an international jury of twelve scientists from eight countries that selected him for the 1991 St. Francis of Assisi Prize for the Environment.

Among his recent publications are:

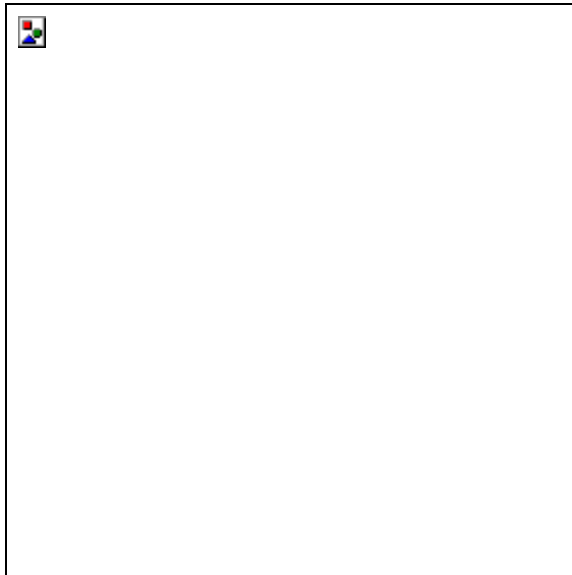
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Dr. Janet K. Poley, President ADEC



Biography:

Janet Poley became CEO and President of the American Distance Education Consortium (ADEC) in 1994. She develops collaborative distance education initiatives with 58 land grant university members working nationally and internationally. In 2000 she received the [Charles Wedemeyer Award](#) for Outstanding Practitioner in Distance Education. She currently serves as principal investigator on a National Science Foundation Grant for Advanced Networking, the USDA Agricultural Telecommunications Program, and several U.S. Department of Commerce grants. She is a member of the Academic Policy Council for the new eArmyU, the Academic Advisory Council for Norman Borlaug University (NBU), and the Editorial Board for the American Journal of Distance Education. She serves as ADEC liaison to the National Association of State Universities and Land Grant Colleges (NASULGC) Commission on Information Technology, is a member of the Penn State Advisory Board to the World Campus Initiative, and teaches in their annual Distance Education Leadership Institute. She is a member of the Great Plains Network Advisory Committee. She served former Governor of Nebraska and now Senator Ben Nelson on his advisory committee on the Western Governors University.

She has been involved in training, technical assistance, program design and evaluation in more than 25 countries in Asia, Africa and Europe. In 1994, she was recognized as one of the 100 outstanding information technology leaders in government, business and academia by Federal Computer Week. From 1988 to 1994, she was Director/Deputy Administrator for Communication, Information and Technology (CIT) of the Extension Service, U.S. Department of Agriculture (USDA). Prior to 1988, she held a number of positions in international development and training within USDA. She served as Program Manager for the USAID funded Training for Rural Development projects, living in Tanzania from 1980 to 1986. In recognition of her international contributions, Poley received the U.S. Congress' Excalibur Award and USDA's International Honor Award. She received the USDA Administrator's Award of Excellence in 1991 and the Secretary of Agriculture's Award for Workplace Diversity in 1992.

From 1966 to 1975, she was a faculty and member at the University of Nebraska-Lincoln. She currently holds full professor rank at the University of Nebraska-Lincoln in the School of Journalism and also in the Departments of Family and Consumer Science and Agricultural

Leadership, Education and Communication. She holds three degrees from the University of Nebraska-Lincoln: a Ph.D. in Education, M.S. in Nutrition and B.S. in Journalism and Home Economics.

Publications:

Poley, J.K. (In progress, 2000) Contributing chapter in book titled Leadership and Management in Open and Flexible Learning, commissioned by Kogan Page Open Learning Series, London, Donald E. Hanna and Colin Latchem, Editors.

Poley, J.K. "Building a knowledge marketplace: best practices to create learning value in cyberspace." The Nonprofit Handbook, Second Edition, Management 2000 Supplement. Tracy D. Connors, Editor. New York: John Wiley & Sons, Inc.

Poley, J.K. "Leadership in the age of knowledge," Higher Education in an Era of Digital Competition: Choices and Challenges, Atwood Publications, Madison, WI, Donald E. Hanna, Editor, pp 165-181, 2000

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Poley, J.K. (in press, 2000) "The future for distance education: binoculars, bifocals and rearview mirrors." Essay for Transitions into the 21st Century, University of Georgia.

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Education

1970B.A. University of Pennsylvania, Mathematics
1971M.A. State University of New York at Stony Brook, Mathematics
1974M.Phil. Yale University, Economics
1975Ph.D. Yale University, Economics

Current Position

Professor of Economics, Wesleyan University

Five Recent Publications

“Risk and Uncertainties, Analysis and Evaluation: Lessons for Adaptation and Integration” (with Hadi Dowlatabadi) proceedings of the International Workshop on Adaptation to Climate Variability and Change, San Jose, Costa Rica, March 29-April 1, 1998 and *Mitigation and Adaptation Strategies for Global Change*, **4**: 319-329, 1999.

“Spanning ‘Not Implausible’ Futures to Assess Relative Vulnerability to Climate Change and Climate Variability”(with Mark Jacobsen and Taras Gapotchenko), *Global Environmental Change*, 1999 and presented at the Third Open Meeting of the International Human Dimension Programme in Kanagawa, Japan, June 24-26, 1999.

“Assessing the Role of Adaptation in Evaluating Vulnerability to Climate Change”, *Climatic Change* **46**: 371-390, 2000.

“Adaptation and the Guardrail Approach to Tolerable Climate Change” (with Ferenc Toth), *Climatic Change* **45**: 103-128, 2000.

“Economic Sustainability, Indicators and Climate Change” (with Richard Moss) in *Proceedings of the IPCC Expert Meeting on Development, Equity, and Sustainability*, Colombo, Sri Lanka, April 27-29, World Meteorological Organization and the Intergovernmental Panel on Climate Change, 1999.

Five Related Publications

“Planning for Sea-level Rise and Shore Protection under Climate Uncertainty (with James Neumann for Resources for the Future), *Climatic Change*, 1997 and *Climate Change and Water Resources Planning Criteria*, K. Frederick, D. Major and E Stakhiv (eds.), Kluwer Academic Publishers, Dordrecht, 1997.

“The Who-how of Adaptation: towards more realistic impact assessments” (with Hadi Dowlatabadi), *Global Environmental Change*, in press, 2001 (also presented at OECD Meeting on Climate Change, Paris, France, June 15, 1999).

“Integrated Assessment of Climate Change – the Next Generation of Questions” in *Climate Impact Research: Why, How and When?*, Berlin Brandenburg Academy of Sciences and the German Academy of Natural Scientists, Akademie Verlag Press, Berlin, 2000.

“Mitigative Capacity – The Mirror Image of Adaptive Capacity on the Emissions Side”, *Climatic Change*, *Climatic Change* **49**: (3), 2001.

“Constructing ‘Not Implausible’ Climate and Economic Scenarios for Egypt” (with Kenneth Strzpeck, David Yates, Richard Tol and Nicholas Mader), *Integrated Assessment*, forthcoming.

Other Related Professional Activities:

Rappateur, Task Group 12-Synthesis, Second World Climate Conference, Geneva, Switzerland, November 1990.

Coordinator, International Workshop on the Natural Resource and Economic Implications of Global Climate Change, Interlaken, Switzerland, November 1990.

Invited participant, 18th and 19th General Assemblies of the International Social Science Council (ISSC), and corresponding Scientific Symposium on the Human Dimensions of Global Environmental Change, Palma, Spain (November, 1990) and Paris, France (December, 1992); also invited participant in and organizer of the 3rd Scientific Symposium on the Human Dimensions of Global Environmental Change, Geneva, Switzerland, September 1995.

Member, Steering Committee and Executive Committee for the Human Dimensions of Global Environmental Change Research (IHDP), International Social Science Council, 1993 - 1994.

Working Group Chair, Energy Production and Consumption, the Human Dimensions Programme of the ISSC, 1993 - 1995.

Lead Author on Chapters 2, 18 and 19 of the Report of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change.

Lead Author on Chapter 1 of the Report of Working Group III to the Third Assessment Report of the Intergovernmental Panel on Climate Change.

DR. EMIR JOSE MACARI

Professor Emir Jose Macari is the Chairman of the Department of Civil and Environmental Engineering and the Bingham C. Stewart Distinguished Professor of Engineering at Louisiana State University. Prior to this he was Associate Professor of Geosystems Engineering at Georgia Institute of Technology where he also held a joint appointment with the School of Public Policy. In 1990-1993 Dr. Macari was Assistant and Associate Professor and Director of the Civil Infrastructure Research Center at the University of Puerto Rico at Mayaguez. In 1992, Dr. Macari was awarded the Presidential Faculty Fellowship. In 1994 he contributed to the drafting of President Clinton's science policy document "Science in the National Interest". Dr. Macari organized two major hemispherical meetings dealing with environmental issues in the Americas. As a result of these meetings, Dr. Macari edited two books published by the American Society of Civil Engineers; "Geo-Environmental Issues Facing the Americas" and "Environmental Quality, Innovative Technologies and Sustainable Economic Development - A NAFTA Perspective". Dr. Macari is a member of Sigma Xi's International Committee and the Strategic Planning Committee, Board Member in the Society for the Advancement of Latinos and Native Americans in Science, Editorial Board Member of ASCE Journal of Geotechnical and Geo-Environmental Engineering.

His current research interests are in the area of experimental and computational geomechanics. His latest research efforts have been in the mechanical characterization of unsaturated soils, assessment of rain-induced landslides of natural slopes, dynamic characterization of weathered residual soils, constitutive modeling of granular materials and the development of a virtual reality geotechnical engineering laboratory.

Dr. Macari received a Ph. D. degree from the University of Colorado at Boulder where he worked on the Mechanical Behavior of Granular Materials at Low Effective Stress States and Under Reduced Gravity Environments. Follow-up experiments titled "Mechanics of Granular Materials (MGM) Experiment flew aboard Space Shuttle; STS-79 in September 1996 and STS-89 in January 1998.

HONORS AND AWARDS

- **Presidential Faculty Fellow NSF/White House**, 1992-1998, "In recognition of your demonstrated excellence and continued promise both in scientific and engineering research and in teaching future generations of students to extend and apply human knowledge," May, 1992
- **Distinguished Professor of Civil Engineering**, In recognition of his excellent academic performance as an Associate Professor and Researcher," University of Puerto Rico, 1990-1993
- **EPSCoR Scholarly Productivity Award**, "In Recognition of his Contribution to the Development of Scientific Research in Puerto Rico," University of Puerto Rico, June, 1992
- **NASA/ASEE Research Fellow**, Marshall Space Flight Center, Alabama (1990 and 1991)
- Recipient of **NASA Educational Training Grant**; Ph.D. Dissertation Fellowship (1987-1989)

PUBLISHED BOOKS OR BOOK CHAPTERS

- Macari, E.J. and Ortíz-Gómez, C.H., "Impermeable Barrier Liners in Containment Type Landfills", Chapter in "*Environmental Biotechnology and Cleaner Bioprocesses*," Eds. Olguin, E., Sanchez, G., and Hernandez, E., Taylor & Francis Group, Ltd., London, England, pp. 55-61.
- Macari, E.J. and Saunders, F.M., Eds., "*Environmental Quality, Innovative Technologies, and Sustainable Economic Development - A NAFTA Perspective*," ASCE Environmental Division Special Technical Publication, Proceedings of NSF, DOE, CONACyT, and NSERC Sponsored Conference, Mexico City, Mexico, p. 143, 1997.
- Macari, E.J., Frost, J.D., Pumarada, L., Eds., "*Geo-Environmental Issues Facing the Americas*," ASCE Geotechnical Special Technical Publication # 47, Proceedings of the NSF/PRIDCO Sponsored Workshop, Mayagüez, Puerto Rico, p. 201, 1995.