

# UC San Diego

## Newsletters

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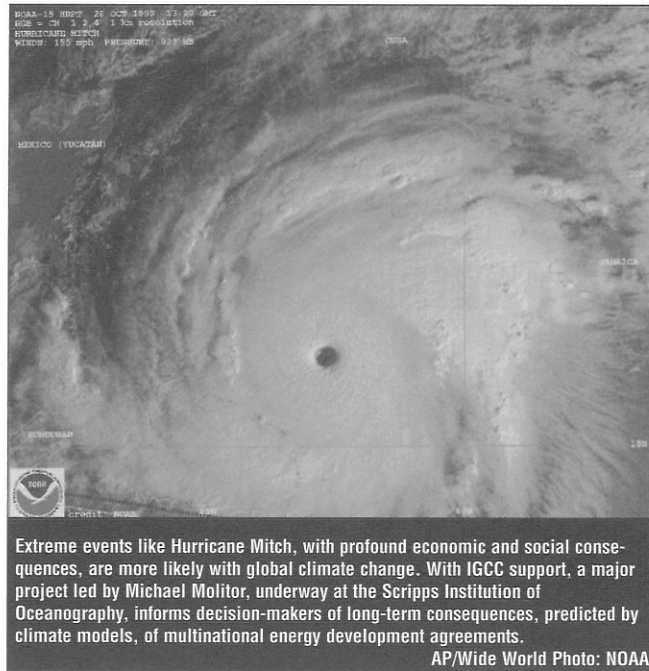
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# Storm Warnings

**I**N 1991, IGCC resolved to address the growing global danger that rich and poor countries will engage in a century-long confrontation driven by attacks (such as tropical deforestation, China's coal-fired industrialization, and auto and industrial "greenhouse gas" emissions) on planetary life support systems. We asked: By what means can nations deal with the inherent policy problems—concerns over international distributive justice, economic costs and competitiveness, intra- and inter-regional migration, and outright interstate conflict—of environmental developments?

Environmental challenges are exceedingly complex. Anyone who hopes to address them must first query the scientific community, but knowing the science alone will not meet them. IGCC resolved to promote mutual interaction among physical scientists, economists, political scientists, and policy analysts. That vision mapped a range of projects now reaching fruition. We previously reported (Fall, 1998) on difficulties posed to environmental protection standards enforcement by economic opening in China. In this issue, we show just how critical are the *right* international standards. After studying atmospheric temperature over a thousand millenia, Jeff Severinghaus, Scripps Institution of Oceanography, concludes that the earth's climate system acts more like a "switch" than a "dial," varying at discrete temperature thresholds. Thus, climate may change abruptly,



Extreme events like Hurricane Mitch, with profound economic and social consequences, are more likely with global climate change. With IGCC support, a major project led by Michael Molitor, underway at the Scripps Institution of Oceanography, informs decision-makers of long-term consequences, predicted by climate models, of multinational energy development agreements.  
 AP/Wide World Photo: NOAA

ly, within a decade—not gradually, over several lifetimes—with continued warming. After modeling a low probability, but high-consequence "temperature threshold" case—the sudden collapse of the North Atlantic ocean currents that control regional weather

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# Negotiating Climate Change

**B**RINGING OBJECTIVE, timely scientific expertise directly to bear in ongoing negotiations, from 2–13 November 1998, IGCC sent a delegation of eminent climate change scientists to the fourth meeting of the Conference of the Parties (COP-4) of the United Nations Framework Convention on Climate Change (UNFCCC), held in Buenos Aires, Argentina. Through three panel presentations on abrupt climate change, carbon sinks, and the science-policy interface, (see, pp. 2, 6, 8) UC scientists

advised UN national delegations, intergovernmental organizations, industry representatives, environmental agencies, and international media about current, relevant implications of recent research.

IGCC was the only academic organization with a substantial presence at the conference, where there were otherwise few scientists. According to Michael Molitor, IGCC Climate Change Program Coordinator, "Our fundamental understanding of the climate system is evolving rapidly. There are some basic scientific

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## Storm Warnings *continued from page 1*

er systems—Stephan Rahmstorf, Potsdam Institute for Climate Impact Research, concurs. IGCC brought the strength of such objective findings to bear on United Nations global climate change negotiations, and sent a delegation of eminent scientists first to the Buenos Aires framework convention (see below), and thereafter to the nation's capitol (see p. 4), to advise high-level officials. Prudent and cost-effective international actions now will buy time (see p. 6), and contribute to problem assessment and amelioration (p. 8).

Energy concerns loom because of both the indirect security impact of fuel burning on climate, and the direct security implications of energy alternatives—as in the Democratic People's Republic of (North) Korea. It is our hope that progress on energy development will open North Korea up to more direct Northeast Asia security discussions. To encourage this, we have partnered with the Nautilus Institute for Security and Sustainable Development to help DPRK representatives join IGCC's online community (see p. 11). ■

## Negotiating Climate Change

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From left, Drs. Stephen Schneider, Robert Shelton, and Ray Weiss, IGCC delegation to the UN global warming conference in Buenos Aires, Argentina, hold a press conference. AP/Wide World Photo: A. Pagni

assumptions that underlie the Kyoto protocol negotiating process that need to be reexamined in light of recent advances." The importance of these latest discoveries was not lost on UN delegates.

Panelists reported that climate change may not be a smooth, gradual phenomenon, but can occur in abrupt jumps. In his study of ice-cores and deep sediments, Jeff Severinghaus found that "there can be abrupt climate change within a period of ten years. This suggests that climate change acts more like a "switch" than a "dial", jumping from one relatively stable state to another." Stefan Rahmstorf supported this "switch" theory. Through computer simulation models of ocean circulation, Rahmstorf found that the warm North Atlantic Gulf Stream current will probably be weakened 20–50% over the next century. If greenhouse gas emissions continue unabated, the North Atlantic circulation may approach a critical threshold at which it would collapse and "shift the climate system into a completely different mode of operation."

In light of these new findings, economic studies and policy recommendations based upon the assumption that there will be gradual increases in temperature over decades may be seriously flawed. While climate models are not yet accurate enough to predict exactly how close we are to dangerous triggers, the more climate is altered, the greater the risk of sudden change. Stephen Schneider urged climate research and policy communities to identify "imaginable surprises," define conditions under which they might occur, and devise strategies to reduce the vulnerability of environmental and social systems to extreme outcomes. Like any other insurance measure, these strategies should hedge against low probability but plausible significant risks.

The second panel focused on possible roles of forests, soils, and oceans in ameliorating affects of carbon-based greenhouse gas emissions. Sandra Brown and

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## UNFCCC COP-4

Buenos Aires • 12–13 November 1998

*Sponsored by*

IGCC • Scripps Institution of Oceanography

### PANELISTS

#### *Abrupt Climate Change*

**Dr. Michael MOLITOR**,  
IGCC Climate Change Program  
Coordinator

**Dr. Stephan RAHMSTORF**,  
Potsdam Inst. for Climate Impact  
Research, Germany

**Prof. Stephen SCHNEIDER**,  
Stanford U., Palo Alto, CA

**Dr. Jeff SEVERINGHAUS**,  
Scripps Inst. of Oceanography,  
UC San Diego

#### *Carbon Cycle and Sinks Enhancement*

**Dr. Sandra BROWN**, Winrock  
International, Arlington, VA

**Prof. Richard CARSON**,  
IGCC Research Director for Int'l  
Environmental Policy

**Dr. Jayant SATHAYE**,  
Lawrence Berkeley National Lab.,  
Berkeley, CA

**Prof. Susan TRUMBORE**,  
UC Irvine

**Dr. Ray WEISS**, Scripps Inst. of  
Oceanography, UC San Diego

#### *Climate Change Science–Policy Interface*

**Prof. Stephen SCHNEIDER**,  
Stanford U., Palo Alto, CA

**Dr. Lisa SHAFFER**, Scripps Inst.  
of Oceanography, UC San Diego

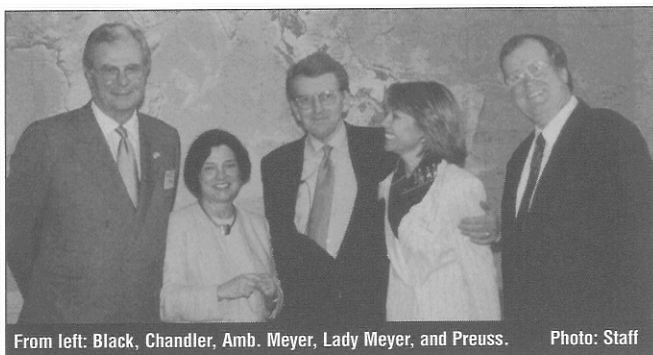
**Dr. Robert SHELTON**, UC Office  
of the President, Oakland, CA

**Dr. Richard SOMERVILLE**,  
Scripps Inst. of Oceanography,  
UC San Diego

**Dr. Mark THIEMENS**, Center for  
Environmental Research and  
Training, UC San Diego

*For abstracts, bios see p. 7*

# IGCC Hosts British Ambassador



From left: Black, Chandler, Amb. Meyer, Lady Meyer, and Preuss. Photo: Staff

**T**HE UNITED STATES and Britain have made it a common practice to join forces to promote peace and security in the international arena. Following efforts to restrain Iraq's chemical, biological and nuclear weapons capabilities, including Royal Navy tests of U.S.-built Tomahawk missiles off the California coast at San Diego, IGCC was invited to host British Ambassador to the United States Sir Christopher Meyer for an interactive discussion on the Atlantic Alliance. Co-sponsored by the UC San Diego Graduate School of International Relations and Pacific Studies, on 15 January 1999 faculty and issue experts from the San Diego area attended the meeting.

The event commenced with opening remarks by Prof. Marsha Chandler, UC San Diego Senior Vice Chancellor of Academic Affairs, and IGCC Director Stephan Haggard. Sir Christopher then addressed participants on the mutually reinforcing British-

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## PARTICIPANTS

### Mr. Bill BLACK

Honorary British Consul,  
San Diego

### Mrs. Carolyn DIMOND

British Consul General,  
Los Angeles

### Mr. Angus MACKAY

Vice Consul, Political, Press  
and Public Affairs

### Sir Christopher MEYER,

KCMG  
British Ambassador to the  
United States

### Lady Catherine MEYER

Mrs. Peggy PREUSS  
Preuss Foundation

### Mr. Peter PREUSS

UC Regent, Preuss Foundation

### UCSD

### Amb. Paul BOEKER

Institute of the Americas

### Prof. Marsha CHANDLER

Senior Vice Chancellor,  
Academic Affairs

### Prof. Philip ROEDER

Department of Political Science

### IGCC

### Ms. Ruth ADAMS

Visiting Scholar

### Mr. Ronald BEE

Development and Public Affairs

### Prof. Richard CARSON

Research Dir. for Int'l  
Environmental Policy

### Ms. Staci DRESHER

### Ms. Susan GREER

### Prof. Stephan HAGGARD

Director

### Dr. Michael MOLITOR

Program Coordinator, Climate  
Change

### Mr. Dan PINKSTON

### Amb. Herbert YORK

Dir. Emeritus

### IRPS

### Mr. Vincent BLOCKER

### Prof. Richard FEINBERG

Dir., APEC Center

### Prof. Andrew MACINTYRE

### Prof. Barry NAUGHTON

### Prof. Phil PARKER

### Mr. Ricardo TAVARES

## — NOTEWORTHY —

U.S. Secretary of State **Warren CHRISTOPHER** visited the center for Global Peace and Conflict Studies (GPACS) at UC Irvine on 16 February. On 25 March 1999, IGCC Washington Research Director **Bruce W. JENTLESON** and IGCC International Advisory Board Chair **Arnold KANTER** were panelists, with former Joint Chiefs of Staff Chairman Gen. John Shalikashvili and security and international studies professor Eliot Cohen, Johns Hopkins U., at the U.S. Department of State *Conference on Diplomacy and the Use of Force*. In April, Jentleson also served as a reviewer for the President's Commission on White House Fellowships. IGCC teaching seminar co-sponsor **Henry SOKOLSKI**, executive director of the Nonproliferation Policy Education Center of Washington, has been appointed to the U.S. Commission to Assess the Organization

of the Federal Government to Combat the Proliferation of Weapons of Mass Destruction.

The U.S. Institute of Peace has awarded IGCC a one-year, \$45,000 grant to continue *Wired for Peace: Virtual Dialogue in Northeast Asia*, run by IGCC Managing Editor **Jennifer R. POURNELLE** (see p. 11). IGCC has also received \$26,000 for the first year of a joint IGCC/California Sea Grant College Fellowship Program in International Marine Policy, lead by IGCC Research Director for International Environmental Policy **Richard CARSON**.

IGCC Director **Stephan HAGGARD** and **Guadalupe GONZALEZ** co-authored "The United States and Mexico: A Pluralistic Security Community" for *Security Communities* (1998, Cambridge University Press). UC Irvine politics and society professor **Russell J. DALTON**

contributed to *Critical Masses*, forthcoming fall 1999 from MIT Press. **Ronnie LIPSCHUTZ**, politics, UC Santa Cruz contributed "From Conflict Resolution to Social Reconciliation" to *Social Justice* 25:4 (1998). IGCC-sponsored *Fences and Neighbors: The Political Geography of Immigration Control* by **Jeannette MONEY**, political science, UC Davis is forthcoming from Cornell U. Press. Former IGCC dissertation fellow **David SONNENFELD** contributed "Logging v. Recycling: Problems of the Industrial Ecology of Pulp Manufacturing in South-East Asia" to *Greener Management International* 22 (Summer 1998). IGCC Development Officer **Ron BEE**'s working paper "Boarding the NATO Train: Enlargement and National Interests" has been published by UC Berkeley CGES, and is forthcoming as an IGCC policy paper. ■

# Capitol Climate

ON 10–11 MAY 1999, invited by U.S. Senator Diane Feinstein (D-CA), the IGCC Climate Change Program held a Capitol Hill briefing attended by staff from twenty Senate offices, one House office, five non-governmental organizations (NGOs), four corporations, and UC government relations representatives. Panelists held a second policy seminar attracting 71 representatives from NGOs and government agencies, including the White House Task Force on Climate Change, at the UC Washington academic center.

Senator Feinstein recognized that the Buenos Aires round of the United Nations Framework Convention on Climate Change signaled a shift from determining what the major industrialized countries had pledged to do in principle, to working out practical details about how greenhouse gas emissions will be reduced in practice. She noted in her invitation that as legislators “consider possible policy options to deal with climate change, it is essential that we have the most current information on the rapidly evolving science in this field.” IGCC’s initiative therefore brought leading climate scientists with “extensive experience in making climate change science accessible to policymakers, and in offering practical analysis of climate change policy alternatives” directly to Washington. Catherine Reich, Senator Feinstein’s legislative assistant for climate change issues, shepherded the Senate briefing.

Project coordinator Dr. Michael Molitor moderated the sessions. Dr. Jeffrey Severinghaus addressed his findings from Greenland ice cores that suggest climate change may occur



From left, Reich, Carson, Bee, Severinghaus, Somerville, Molitor, Thiemans, Trumbore, Hunter, and Kovacs at the U.S. Senate. Photo: M. Campbell

more abruptly than gradually. Dr. Richard Somerville discussed recent developments in climate modeling, suggesting that our ability to predict severe storms, El Niño, and La Niña effects is improving. Dr. Mark Thiemens focused on greenhouse gas emissions from China and India, that evidence clearly shows reach the United States within days. He urged that more attention be paid to non-carbon gases. Prof. Susan Trumbore reviewed evidence surrounding the use of forests and soils to offset industri-

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# Negotiating Climate Change *continued from page 2*

Jayant Sathaye discussed the viability of forest management practices for removing carbon from the atmosphere. Brown assessed various practices for measuring carbon flows and stocks, concluding that their measurement precision and relatively modest cost make forests worthwhile for carbon-offset projects. However, while agreeing that forests represent an important carbon sequestration option, Sathaye pointed out that they are not permanent: natural disturbances or changes in international land use can kill trees and release carbon back into the atmosphere. He suggested that institutions participating in forest carbon-offset projects be prepared to accept carbon “debits” if forests are lost, or to compensate for carbon losses by replanting forests or reducing an equivalent amount of fossil fuel emissions (see *Viewpoints*, p. 8).

Susan Trumbore discussed the role of soils in the carbon-cycle, noting that the decomposition of organic matter makes soil the largest natural source of carbon dioxide, nitrous oxide, and methane released into the atmosphere. Human land modification and agriculture has led to a global net loss of soil carbon, and dramatically increased nitrous oxide and methane emissions. Better management practices can increase soil carbon storage, but to be significant these must cover large areas over a long period of time, while changes can be difficult to

measure. Therefore, including soils in carbon sequestration projects remains controversial.

Ray Weiss stated that oceans currently absorb about one-third of the carbon dioxide produced by all fossil fuel combustion. However, most of the carbon entering the oceans has only penetrated the upper surface layers, and over the next century continued uptake will depend critically on rates of ocean mixing that carries carbon dioxide to greater depths. As these rates are not perfectly known, and may change in response to natural or anthropogenic climate change, significant uncertainty in forecasting oceanic carbon dioxide uptake remains.

In addressing the role of science in climate change policy, Lisa Shaffer noted that long-term, sustained, global scale observations are necessary to detect the impact of human activity and understand Earth as an integrated system. She urged governments to commit necessary resources and develop cooperative strategies to fill gaps in current observing systems. Richard Somerville (see p. 6) discussed the importance of computer simulations that, despite their present uncertainties, already provide policymakers with valuable information. Mark Thiemens stressed that *non-carbon* greenhouse gas research must be undertaken in order to develop the best overall policies for reg-

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# GLOBAL CLIMATE CHANGE: RECENT SCIENCE DEVELOPMENTS

Briefing to the U.S. Congress • Washington, D.C. • 11 May 1999 • Sponsored by Senator Dianne FEINSTEIN

## PARTICIPANTS

### UNIVERSITY OF CALIFORNIA

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**John HAMILTON**, UC Office of Federal Government Relations

**Wendy HUNTER**, SIO

**Denise ILKAY**, UC San Diego

**Monique KOVACS**, IGCC

**Michael MOLITOR**, IGCC Climate Change Program Coordinator

**Lisa SHAFFER**, Director for International Relations, SIO

**Jeffrey SEVERINGHAUS**, SIO

**Richard SOMERVILLE**, SIO

**Mark THIEMENS**, UC San Diego

**Susan TRUMBORE**, UC Irvine

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**Kai ANDERSON**, Congressional Fellow, Office of Senator Joseph I. Lieberman (D-CN)

**Nisha ANTONY**, Office of Senator John D. Rockefeller IV (D-WV)

**Martha BIBBONS**, Office of Senator Charles S. Robb (D-VA)

**Christopher BORDEAUX**, US Dept. of Energy

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**Melodye BRICKER**, Office of Senator Trent Lott (R-MS)

**Rachel Fulcher DAWSON**, Office of Senator Herb Kohl (D-WI)

**Joseph C. HUANG**, US Dept. of Energy

**Senator HERB Kohl** (D-WN)

**Kristen DREUHL**, Office of Senator Dianne Feinstein (D-CA)

**Amy FORD**, Office of Congressman Robert Matsui (D-CA)

**Meredith HUGHES**, Office of Senator Tim Johnson (D-SD)

**Dave HUNTER**, Office of Senator James M. Jeffords (R-VT)

**Brooke JAMISON**, Office of Senator Charles Schumer (D-NY)

**Peter LYONS**, Office of Senator Pete V. Domenici (R-NM)

**Elizabeth MACDONALD**, Office of Senator Blanche Lincoln (D-AK)

**Kathryn MARKS**, Office of Senator John Edwards (D-NC)

**Miles MERCER**, Minority Office of the Senate Commerce Committee

**Lisa MOORE**, Office of Senator Barbara Boxer (D-CA)

**Jonathan NASS**, Office of Senator Susan Collins (R-ME)

**George O'CONNOR**, Office of Senator Larry E. Craig (R-ID)

**Gloria RAPALEE**, NASA/GSFC

**Kathy REICH**, Office of Senator Dianne Feinstein (D-CA)

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**Heather SAWYER**, Office of Senator Jeff Session (R-AB)

**Michael SCHIFFER**, Office of Senator Dianne Feinstein (D-CA)

**Jeremy SYMONS**, Office of Senator Ron Wyden (D-OR)

**Brennan Van DYCKE**, Office of Senator Carl Levin (D-MI)

**Franz WUERFMANNSDOBLER**, Office of Senator Robert C. Byrd (D-WV)

**Art YOON**, Office of Senator John W. Warner (R-VA)

### OTHER

**Mike ANDALAZY**, American Society for Microbiology

**Dan BAKER**, Sierra Club

**Rob CROMARTIE**, National Rural Electric Cooperative Association

**Dean GOELDNER**, American Veterinary Medical Association

**Hiro HASEGAWA**, Tokyo Electric Power

**Hide MASUMOTO**, UN Information Center

**Julie MILLER**, American Association for the Advancement of Science

**Bud PILAND**, McDermott Incorporated

**Jennifer SHIPLEY**, Tokyo Electric Power Company

**Tauna SZYMANSKI**, Andrae, Vick and Associates

**Matthew VARILEK**, University of Glasgow

**Claire Von SCHILLING**, Mazda

## IGCC Hosts British Ambassador

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American relationship, and on Britain's membership in the European Union. The Ambassador estimated that Britain will join the EU's single currency by the year 2003, but declared that Britain's transformed and increasingly positive relationship with the European continent will not trespass intimate ties with the United States.

With no effective, common foreign and security policy procedure in the EU, Ambassador Meyer acknowledges that effective results require the United States as a major partner. Britain will continue to strengthen its traditional alliance with the United States on foreign policy endeavors, whether through NATO or in a joint alliance, as with Iraq in 1998. The event was filmed and aired by UCSD TV. ■

## Capitol Climate *continued from page 4*

al greenhouse gas emissions. Recent science suggests that forests and soils, by themselves, cannot offset the current rate of greenhouse gas emissions, and in certain cases, may even contribute to their increase. (*Participants, above. Related stories, pp. 1, 6, 8.*)

IGCC also directly sponsors social scientific research of significant import when combined with science models. For example, Prof. Barry Naughton, Prof. Richard Carson, Chunghua Rich, and Theresa Garcia continue work reported last issue on *China and its Provinces*. There, rural-to-urban migration accompanying economic modernization will result in huge greenhouse gas emissions. Critical to forecasting these and predicting their consequences are demographic and intra-country emissions statistics and modeling. Prof. Larry Karp, UC Berkeley, is assessing how best to construct coalitions and agreement terms for programs allowing two or more countries to jointly implement emissions reduction measures.

A range of climate change legislation has been introduced in the U.S. Senate, and IGCC anticipates reinforcing the UC scientists-U.S. policymakers climate change issues bridge. As legislation hearings and debates continue, UC scientists will be available to testify and offer advice as needed.

A summary of the recommendations from the briefings will be published as IGCC Policy Brief No. 13. For more information on IGCC's climate change program, full-text publications, potential research partners, and a listing of grants awarded by IGCC to support international environmental policy research, see *IGCC Online* [<http://www-igcc.ucsd.edu>] under "Environment." ■

# Science's Role in Climate Change Policy

Richard C.J. Somerville

feature



Richard C. SOMERVILLE, Scripps Institution of Oceanography, briefs United States Senators and congressional staffers on new discoveries affecting climate change forecasts (see p. 4).  
Photo: M. Campbell

IN THE CURRENT DEBATE over what U.S. policy on the greenhouse effect and climate change should be, it's easy to be confused by all the learned authorities who argue strongly with one another. How is an ordinary citizen to know what to believe about such a complex technical subject, when the scientists themselves seem so far from agreement?

The press conference or the congressional hearing room is not the natural habitat of active researchers. Making grand pronouncements about how the nation or the world ought to behave is an activity not easily reconciled with a scientific temperament. Scientists undergo long years of training and apprenticeship, and they learn harsh lessons about experts often being wrong. They also endure the thorough scrutiny of peer review throughout their research careers. These experiences make them cautious in their public utterances and reluctant to venture beyond the realm of their own expertise. Many a journalist has found it frustrating to endure the precisely worded caveats that scientists insist upon when interviewed.

There are exceptions. A few notably vocal people with scientific backgrounds fervently urge or oppose actions, such as those of the current administration to reduce the rate at which this country emits gases that contribute to the greenhouse effect. Of course, these advocates are fully entitled to speak out (the Bill of Rights applies to scientists, too). But they ought not cloak themselves in the white coat of scientific objectivity and technical expertise when they step outside the lab and promote one policy or another. At that point, large doses of strongly held political convictions and personal values are invariably mixed together with science.

In these circumstances, science itself often plays a very small role. In fact, some of the noisiest scientists in the climate debate are some of the least qualified to speak about climate. They tend to be exceptionally self-confident. If they were more modest, they might freely admit that their degrees are in fields far from the subject, or that they do not actually carry out climate research themselves, or that their publications do not appear in the peer-reviewed research literature, or that their

funding comes from special interest groups, or other factors affecting their scientific credentials and credibility. Such candor would help the rest of us judge whether we were listening to genuine scientific expertise or to the personal opinions of somebody who happens to have a Ph.D.

Yet, good science can often provide the needed foundation to undergird good policy. Unless scientists provide a clear and comprehensive understanding of climate, how is the policy maker to judge whether serious climate change due to human activity is a bleak certainty or a remote possibility or something in between? When weighing choices with potentially serious economic and societal consequences, political leaders deserve the results of the best relevant research, presented intelligibly and neutrally. And scientists, whose research is often supported by tax dollars, ought to provide helpful input to policy makers who need it.

As it happens, environmental science today is well enough advanced to be highly useful to policy makers, although it is far from being able to answer all the questions put to it. We know that in many ways people are beginning to rival Mother Nature as factors causing global environmental change. The main underlying reasons are the rapid increase in human population, the chemicals we dump into the environment, and the ways we use energy, which we mainly obtain from coal and oil and natural gas. People cause air pollution and acid rain. People cause the ozone hole. People are adding to the natural greenhouse affect. These are demonstrable facts, not in dispute among reputable scientists.

The increased greenhouse effect due to human activities will eventually cause climate change, although we still have much more research to do in order to say authoritatively how quickly the change will arrive and what forms it will take.

The popular phrase "global warming" is deceptive. The most important aspects of climate change are likely to be neither global nor confined to warming. They may involve changes in the normal patterns of storms and precipitation, for example, or they may affect specific climate phenomena such as the Indian monsoon or El Niño. (Incidentally, nobody knows for sure whether the just-past El Niño event is connected in any way to long-term climate change.) We ought not to trivialize climate change by asking only whether doubling atmospheric carbon dioxide levels will produce an average warming of two or four or eight degrees Fahrenheit. Climate is complex. It is much more than just averages. It is, in fact, the sum total of weather.

Meanwhile, we are dealing with what engineers call a signal-to-noise problem. Climate varies naturally. That's the noise. Human activities currently may be affecting that variability. That's the signal. Detecting the fingerprint of that signal in the noisy observational record is a tricky problem of current research.

Many scientists think the signal is already beginning to be discernable. Others prefer to wait for less ambiguous evidence

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## Science's Role in Climate Change Policy *continued from page 6*

before stating that they recognize the human fingerprint. These differences among experts are a normal sign of an active area of research. Policy makers, however, must make decisions despite these uncertainties. And everything we know about the issue tells us that the longer we wait to do something about it, the more serious the climatic consequences are likely to be.

One course which has found many supporters is to begin taking prudent and low-cost effective actions now, in order to buy time while the scientists learn more about how the climate works and how we are affecting it.

A series of international conferences and agreements, starting with the Earth Summit in Rio de Janeiro in 1992, has moved many of the nations of the world in the direction of treaties to limit emissions of carbon dioxide and other gases which contribute to the greenhouse effect. Next came a major international meeting at Kyoto, Japan in late 1997. Nations went with widely divergent views on what actions were needed, on what timetable, by whom, to reduce emissions of carbon dioxide and other greenhouse gasses. Their task was to find concrete ways to reconcile the goal of safeguarding the climate with the political and economic realities of a world of sovereign nation states. The guidelines fashioned in Kyoto were based upon the best science of the day. But research moves on. In Buenos Aires (see p. 1), new science was vital for updating negotiators who otherwise might have expended effort badly to fashion concrete policies based upon outmoded assumptions (see p. 8).

The successful interjection of common bases in fact show that it is a mistake to think that business and environment have to be

on opposite sides of this issue. Acting rationally about environmental problems need not hurt the economy. Many thoughtful people advocate "win-win" (or "no regrets") solutions that would make sense even if climate change were not a serious concern.

For example, if you buy a more fuel-efficient car, you not only help slow climate change, but you reduce dependence on foreign oil, make less smog and keep money in your pocket. Governments can help encourage such actions in many ways.

***Prudent and cost effective actions now will buy time while scientists learn more about climate and how we are affecting it.***

**Richard C. J. SOMERVILLE** is professor of meteorology at the Climate Research Division, Scripps Institution of Oceanography, UC San Diego. He is an expert on global climate change and a specialist in computer modeling

of the climate system. His research interests include theoretical dynamical meteorology, particularly climate modeling, numerical weather prediction, and computational geophysical fluid dynamics. Currently, Somerville is researching the development of mathematical models of large-scale atmospheric circulation and air-sea interactions, and theoretical studies of the predictability of climate. Somerville received his Ph.D. in meteorology from New York University in 1966. He has lectured extensively on climate change and his research results have been published in more than one hundred technical papers. He is the author of *The Forging Air: Understanding Environmental Change*. (Berkeley: UC Press, 1996).

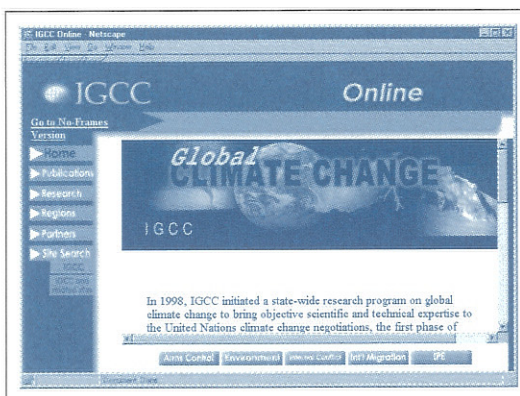
*This article was abridged and updated from an opinion-editorial published Sunday, 9 November 1997 on the Opinion Insight page of the San Diego Union Tribune.*

## Negotiating Climate Change

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ulating emissions. For example, nitrous oxide is 200 times more pernicious a greenhouse agent than carbon dioxide. Yet, while its rising concentration since the start of the industrial age indicates an anthropogenic source, nearly 30% of its origins remain unidentified.

In summing up, Stephen Schneider pointed out that in media portrayals of climate change discussions, special interests have frequently ignored or twisted science to serve their own purposes. He urged convention delegates not to be sidetracked by such misleading debates, but instead to ask experts the right questions: "What can happen? What are the odds? How do you know?" Armed with credible information, they can better proceed with meaningful negotiation. ■



Abstracts of scientific presentations made by IGCC's delegation to the fourth meeting of the conference of parties (COP-4) of the United

Nations Framework Convention on Climate Change (UNFCCC), along with full presenter bios, are available via IGCC Online at <<http://www-igcc.ucsd.edu/igcc2/environment/climatechange/climatechange1.html>>



# International Cooperation and Climate Change

## International Climate Change Assessment

Charles Kennel and Lisa Shaffer

**T**HE FOURTH CONFERENCE of the Parties to the United Nations Framework Convention on Climate Change received and accepted a "Report on the Adequacy of the Global Observing Systems" that states:

What is urgently needed now is a commitment by nations to provide global coverage for the key variables, to halt and reverse the degradation of existing observing systems, and to exchange information more effectively. Specific improvements are needed in atmospheric, oceanic, and terrestrial systems....A positive response to this challenge would significantly advance the implementation of an effective observing system for climate and support the objectives of the Framework Convention on Climate Change.

Good policy is built on sound science. The greater the scientific understanding and confidence, and the broader the international base of that understanding, the better informed policy decisions can be. It was the scientific discovery of a hole in the Earth's protective stratospheric ozone layer that led to implementation of the Montreal Protocol to phase out use of ozone-depleting chemicals. The indisputable record of increasing levels of carbon dioxide and other greenhouse gases attracted the attention of policy-makers in the process that has produced the Kyoto Protocol and related efforts under the United Nations Framework Convention on Climate Change.

Science provides tools to measure the environment and changes that occur over time. It provides methodologies, units of measure, and techniques. Science can also provide tools for predicting future scenarios based on various assumptions and uncertainties, to allow evaluation of different policy options against a backdrop of naturally occurring changes.

Science makes progress through open publication of data, methodology, and results. Other scientists are able to repeat the same analysis and to use alternate methods to

*continued page 9*

## International Climate Change Amelioration

Jayant Sathaye

**R**ECOGNIZING DIFFERING responsibilities and capabilities among countries, the 1992 United Nations Framework Convention on Climate Change (UNFCCC) stressed using technology transfer to mitigate the effects of global climate change. It specifically requires signatories to promote and cooperate in developing, applying, and diffusing technologies, practices, and processes that control, reduce, or prevent anthropogenic emissions of greenhouse gases. The Kyoto Protocol further encourages transferring publicly owned, and supporting private sector efforts to transfer

environmentally sound, technologies.

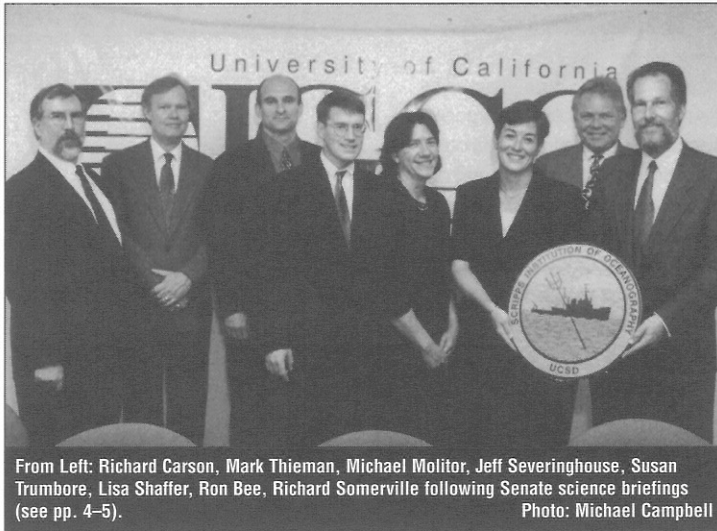
The Subsidiary Body for Scientific and Technological Advice at the November 1998 Buenos Aires COP4 meeting placed special emphasis on capacity building and consultative processes, raising several substantive issues that form the basis for future deliberations.

Obligations for such transfer derive from the substantial differences in historical emissions between industrialized and developing countries that continue to contribute to climate change today. While most past pollution originated in countries already industrial-

ized, most future emissions growth will come from the developing world. Reducing these will require advanced technologies that the developed world is in a position to supply. However, many barriers slow this process:

- Lack of information on availability, characteristics, costs, and benefits of emerging environmentally sound technologies.
- High transaction costs of obtaining information, negotiating, contracting and enforcing contracts.
- Insufficient capabilities to handle all stages of the transfer process.
- Lack of capital access to manufacture, purchase, and install new technologies, especially for smaller firms.
- Low conventional energy prices, resulting in negative incentives to adopt energy saving measures and renewable energy technologies.
- Lack of codes, standards, and frameworks for evaluating relevant technologies.
- Lack of supporting legal institutions.

*continued page 9*



From Left: Richard Carson, Mark Thieman, Michael Molitor, Jeff Severinghouse, Susan Trumbore, Lisa Shaffer, Ron Bee, Richard Somerville following Senate science briefings (see pp. 4-5). Photo: Michael Campbell

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## International Climate Change Assessment *continued from page 8*

challenge the conclusions. Controversies are resolved through replication and informed debate. An essential ingredient in providing governments around the world with confidence in the policy decisions they make is having the international scientific community fully engaged in the process, as they are through the Intergovernmental Panel on Climate Change.

And the only way for the international scientific community to make progress in understanding the Earth and its climate system is to ensure that there is a long-term strategy for acquiring and sharing key global data needed to understand the land, ocean, atmosphere, cryosphere, and the process by which they interact. The Integrated Global Observing Strategy (IGOS), is a partnership involving intergovernmental and nongovernmental organizations that sponsor global climate, ocean, and terrestrial observing systems, along with scientific research programs and space agencies. IGOS will enhance observing systems and ensure the long-term continuity of key measurements, in support of an increasing range of applications for understanding global processes. Scripps Institution of Oceanography at UC San Diego is one of several oceanographic institutions forming a new Partnership for Observation of the Global Oceans (POGO) to

***The only way for the international scientific community to make progress in understanding the Earth and its climate system is to ensure that there is a long-term strategy for acquiring and sharing key global data.***

represent entities that collect ocean observations. POGO anticipates joining the IGOS partnership soon.

Achieving the needed capability for long-term global observations will require governments to make and sustain investments and to expand already significant and growing

international cooperation for the common good. Coming out of Buenos Aires, to the end of reducing scientific uncertainties relating to the causes, effects, magnitude and timing of climate change, governments have pledged capacity-building support to developing countries so that they may participate in such systematic observational networks; facilitate access to, disseminate, and support international information services; and transfer environmentally sound tech-

nologies and know-how. Data and scientific results from these observing systems must be easily available to all potential users. Better data will enable better science. Better science will enable better policy. Better policy will improve prospects for sustainable development. ■

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**Dr. Charles KENNEL** is director of, and **Dr. Lisa SHAFFER** is director of international relations for, the Scripps Institution of Oceanography, UC San Diego.

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## International Climate Change Amelioration *continued from page 8*

- Multilateral development banks' and regional organizations' risk aversion to projects implemented in transitional economies.
- High tariffs and/or quantity controls that limit technology access.

In the 1990s, as government funding has slowed, the private sector has been active in funding new technologies and energy efficiency. More hybrid practices, that combine strengths of government-, private sector-, and community-driven technology transfer pathways, are needed to engage stakeholders with roles differing by sector, region, country, and circumstance.

Governments can pursue many activities to enhance technology transfer along private or community-driven pathways, including:

- Providing information to enhance technology access and monitor the transfer process.
- Building research and development infrastructure.
- Building human and institutional capacity.
- Creating an appropriate enabling environment for private sector investment and community activities.
- Providing mechanisms for technology transfer and enhancing the role of the UNFCCC financial mechanism.
- Generic actions to remove barriers and enhance technology transfer.

The UNFCCC includes the concept of emissions reduction sharing, called joint implementation (JI), in which an investor country provides financial support for greenhouse gas emissions

reductions projects in a recipient country, and in exchange receives credits. At the 1995 Berlin meeting of FCCC, participants agreed on a pilot phase for testing JI-type projects, known as activities implemented jointly (AIJ).

A recent review of AIJ projects suggests that almost half were on improving energy efficiency in Eastern Europe and countries of the Former Soviet Union. The Swedish government sponsored most of these, since they benefited Nordic countries by reducing acid rain. About fifteen involved forestry and agriculture sector mitigation options that will provide sustainable ways to manage tree farms and conduct logging, provide monetary benefits to local communities, and promote ecotourism. Others include technologies to improve energy efficiency in district heating, lighting, and air conditioning systems. Capacity-building components are embedded into project designs to improve power generation and develop renewable energy sources including bioelectricity. In most cases these projects will result in transferring both hardware and knowledge as host country developers and communities learn to use the new systems. ■

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**Dr. Jayant SATHAYE** is a senior staff scientist and group leader in international energy studies at Lawrence Berkeley National Laboratory, where he researches energy demand and supply and greenhouse gas emissions in developing countries. He is published widely in major energy journals.

# Eighth NEACD (Moscow) Plenary

**T**HE EIGHTH PLENARY of the Northeast Asia Cooperation Dialogue (NEACD) met 11–12 November 1998 in Moscow to discuss nuclear testing in South Asia, the Asian financial crisis, and the Democratic People's Republic of (North) Korea's (DPRK) unannounced missile/satellite launch (*participants, p.12*).

The DPRK launch generated animated discussion about theater and ballistic missile defense (BMD) systems. Much controversy centers on the question of whether missile defense systems are purely “defensive” in nature. Proponents assert that theater missile defense deters the threat of missile attack and thus increases security. Opponents counter that such defense systems are destabilizing, because they may provide a first-strike capability upon deployment; are prohibitively expensive and therefore unavailable to all parties; or are technically impractical.

The five delegations (China, Japan, Republic of (South) Korea, Russia, United States) each made presentations, and separate sessions were held on the role of NEACD in the Asian security architecture, confidence-building on the Korean Peninsula, the security significance of the Asian financial crisis, IGCC's *Wired for Peace* project, and Defense Information Sharing (DIS).

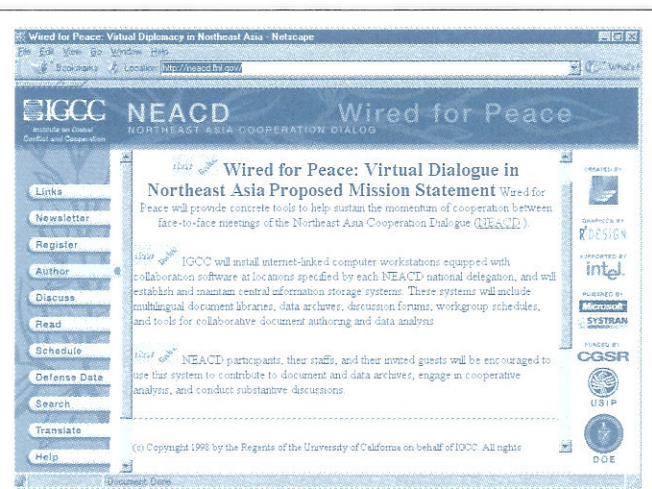
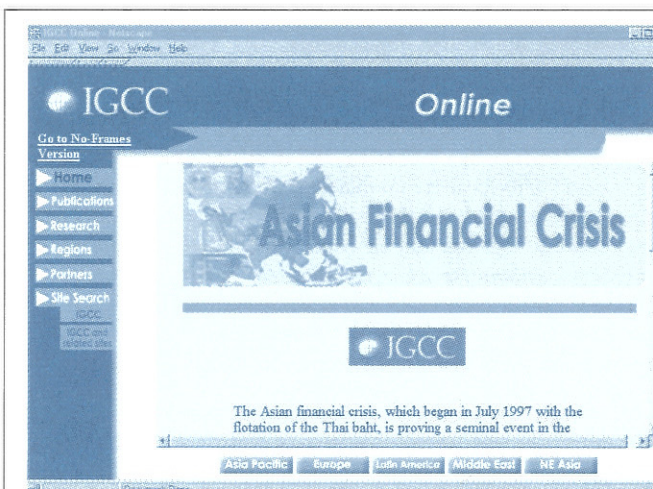
Scholars from the United States, China, and Japan gave papers on the evolution of security multilateralism in the region that clarified NEACD's role in regional security architecture. Discussants emphasized that DPRK participation was a necessary condition for any regional multilateral institution to successfully manage security issues. However, there is no consensus on how best to encourage DPRK participation in multilateral forums.

The session on confidence-building measures covered the ongoing Four-Party Talks (China, the Koreas, and the United States) that aim to replace the Korean War Armistice with a peace treaty; recent developments within the Korean Peninsula Energy Development Organization (KEDO); and policy changes since the election of President Kim Dae Jung in South Korea. Since Kim's inauguration in February 1998, Seoul has separated economics from politics in its relations with the North, and has encouraged other countries to improve relations with Pyongyang. This policy reversal has attracted South-to-North investment and spawned joint venture projects with the hope of giving Pyongyang a stake in regional stability.

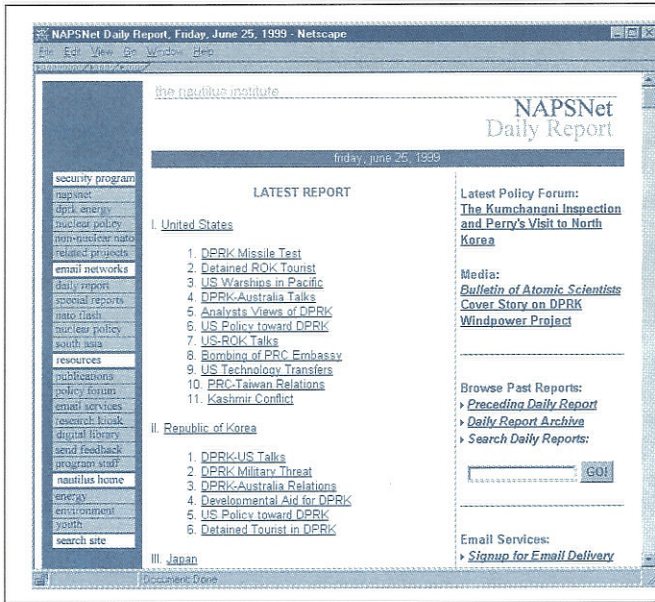
IGCC Director Prof. Stephan Haggard and Prof. Ding Kuisong gave presentations on the security significance of the Asian financial crisis. Its severity has led

to lower national defense budgets, which may be interpreted as having reduced arms race threats. In the short term, countries have been more domestically concerned with restoring financial stability than with military modernization. While in theory the crisis could produce political upheaval and concomitant security uncertainties—including in extreme cases deterioration in military command and control—it fortunately has not approached this level in Northeast Asia. The consensus was that the financial crisis has had little effect on regional security dynamics. (*See IGCC Online under “Regions—Asia Pacific—Asian Financial Crisis”*)

Jennifer Pournelle of IGCC and Pamela Harris of Lawrence Livermore National Laboratories made an on-line presentation of IGCC's *Wired for Peace* project <<http://neacd.llnl.gov/>>, designed to support the NEACD with an Internet-based infrastructure (*Fall 98 Newsletter sidebar*). The Defense Information Sharing session addressed issues of transparency, reviewed defense white papers, and encouraged the Chinese and Russian Defense Ministries to produce their very first versions. The next DIS meeting, addressing force modernization and continuing missile defense discussion, will be held in fall 1999. ■



Prof. Stephan Haggard edits IGCC Online's Asian Financial Crisis working paper series, with contributions from UC faculty. IGCC's *Wired for Peace* intranet will support the NEACD with online libraries, collaborative authoring, scheduling, discussion, data sets, juried links, multilingual search, and translation to and from participant languages.



**IGCC has partnered with the Nautilus Institute of Security and Sustainable Development, publishers of the Northeast Asia-Pacific Security Network (NAPSNET) Daily Report, to help Democratic People's Republic of (North) Korea representatives join IGCC's online community.**

Nautilus sponsored the first energy study tour of the United States for a DPRK delegation in December 1997. The following year a Nautilus team traveled to the village of Unhari to help DPRK technicians set up a wind power generation system. With the full cooperation of DPRK government officials, during their stay Nautilus worked with DPRK researchers to carry out an extensive survey to estimate the area's energy supply and usage. The wind power project provided a clean source of energy for the village.

At the April workshop specialists discussed DPRK rural electrification, household and agricultural energy use, and non-conventional energy, with an aim to plan an expanded rural energy survey in the DPRK based on the Nautilus Institute's experience in Unhari, and identify other rural energy cooperative projects for the United States and DPRK.

The study tours and windmill projects have both provided a template for cooperating with the DPRK in issue-specific areas. This should be beneficial for other IGCC projects designed to engage the DPRK, and may become even more useful if there is political change in Pyongyang, or if the United States relaxes economic sanctions.

For more information contact Dan Pinkston <dpinkston@ucsd.edu> or the Nautilus Institute <<http://www.nautilus.org>> or email <[nautilus@nautilus.org](mailto:nautilus@nautilus.org)>. ■

## North Korean Energy Workshop

**I**N COOPERATION with the Nautilus Institute for Security and Sustainable Development and the UC Berkeley Energy and Resources Group, on 14–16 April 1999 IGCC co-sponsored a workshop on energy usage in the Democratic People's Republic of Korea (DPRK). The workshop, attended by scholars and engineers from both the United States and North Korea, included seminars in Berkeley, tours of power facilities in California, and briefings from the U.S. Departments of State and Energy.

The DPRK experienced turbulent times in the 1990s, suffering several years of economic contraction, a change in political leadership, natural disasters, and shortages of food and energy. While it has remained one of the world's most autarkic and isolated countries, economic difficulties, particularly food and energy shortages, have created an opportunity to engage the DPRK and begin a process of integrating the country with the international community.

## Wired for Peace Update

**T**HE RUSSIAN ACADEMY of Sciences Institute of Far Eastern Affairs (IFES) has taken the lead in W4P implementation. In April IGCC's Vladimir Oboronko, a doctoral candidate in sociology at UC San Diego, provided key IFES representatives in Moscow with an initial hands-on orientation. IFES technicians then completed planned infrastructure upgrades in anticipation of equipment arrival in July, 1999. In August, Oboronko will return to Moscow to assist with the Russian W4P launch.

IGCC recently concluded a key agreement with The Nautilus Institute (*see above*) that aims to enable DPRK UN representatives to join the W4P process. W4P has provided Nautilus with an Intel server

and workstation used to produce the online Northeast Asia-Pacific Security Network (NAPSNET). In exchange, Nautilus will train DPRK UN representatives in New York to use the system, and provide them lower-end workstations legal under U.S. export laws.

The Russian pilot has made clear that multilingual capacity will be key to the project's success, and project manager Jennifer Pournelle has directed purchase or development of Chinese-, Japanese-, Korean-, and Russian-language versions of computer operating systems, W4P software, and multi-lingual search and machine text translation. Prototypes of these are expected in late summer.

Supported by grants and gifts from the

Intel Corporation, Microsoft, and the United States Institute of Peace, in collaboration with Lawrence Livermore National Laboratory's Center for Global Security Research, *Wired for Peace: Virtual Dialogue in Northeast Asia (W4P)* will test whether internet technologies can improve regional transparency, forge intra-regional working relationships, improve meeting efficiency, and keep alternative lines of communication open during crises. The Swiss Federal Institute of Technology International Relations and Security Network, Systran S. A., the Stockholm International Peace Research Institute, and Columbia International Affairs Online have partnered to provide components of the W4P online services. (*See Fall 98 Newsletter*) ■

# NORTHEAST ASIA COOPERATION DIALOGUE VIII

Moscow, Russia • 11–12 November 1998

Sponsored by the UC Institute on Global Conflict and Cooperation (IGCC)  
and the United States Department of Energy (DOE)

Hosted by the Institute of Far Eastern Studies (IFES), Russian Academy of Sciences

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## North Korea Energy, Security, and Environment Workshop

Berkeley, California • 14–16 April 1999

Sponsored by IGCC, the Nautilus Institute for Security and Sustainable Development, and the UC Berkeley Energy and Resources Group

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# Migration at the New Millenium

**O**N 24 MARCH 1999, Prof. Philip Martin, professor of agricultural and resource economics at UC Davis, presented his latest research on *Germany and the United States:*



Susan Martin

Photo: M. Campbell

*Searching for 21st Century Migration Policies*, an update to his 1998 study for the American Institute for Contemporary German Studies called "Germany: Reluctant Land of Immigration." Dr. Susan Martin of the Institute for the Study of International Migration, Georgetown University provided commentary.

As the percentage of foreign residents continues to rise in both Germany and the United States, there is an increasing dissatisfaction with current immigration and integration policies in both countries. Immigration and integration were second only to unemployment among the domestic issues debated in the 1998 German elec-

tions. They remain contentious issues in both U.S. national politics, and regionally in states such as California, which approved Propositions 187 (illegal immigration) in 1994 and 227 (bilingual edu-

cation) in 1998. Following a defeat in state elections, in February 1999 the German government dropped its month-old proposal to offer dual nationality to foreign residents to better integrate them into society. The bitter and highly partisan debate triggered by dual nationality has diverted attention from the larger need to develop immigration and integration policies for the 21st century consistent with demographic, economic, political, and community trends. The United States faces similar debates over durable immigration and integration policies. Prof.

Martin addressed the similarities and differences in the political dynamics of both countries, the United States' and Germany's policy proposals, and the degree to which U.S. and German migration policies remain ad hoc and politically-driven, rather than longer-



Philip Martin

Photo: M. Campbell

term and strategic in nature. Seminar presentations were published as IGCC Policy Paper No. 50, *Germany and the US: Searching for 21st Century Migration Policies* (see p. 16). ■

## IGCC DC PLACES GRADUATE INTERNS

**IGCC's Washington Center has successfully placed UC graduate interns in the D.C. area for summer, 1999. Awardees are:**

**Carlos Oscar ARTETA**, UC Berkeley, Ph.D., Economics  
*The Banking and Currency Crisis in Developing Countries*  
Development Research Group, World Bank

**Crystal Whaiku CHANG**, UC San Diego, MPIA, Grad. School of Int'l Relations and Pacific Stud.  
*Asia-Pacific and International Development*  
The Asia Foundation

**Brian J. EGAN**, UC Berkeley, J.D., Boalt School of Law  
*International Law and Development in Africa;*  
Department of Legal Affairs, Overseas Private Investment Corporation

**Rahel KASSAHUN**, UC Riverside, Ph.D., Economics  
*Poverty Reduction in Sub-Saharan Africa: The Consequences of Civil War on Civilian Infrastructure and Foreign Investment in Ethiopia*  
Economic Management and Social Policy Group, Africa Region, World Bank

**France NGUYEN**, UC Los Angeles, MPH, Public Health  
*International Health Policy and Asian American Society*  
Women, Health, and Development and Public Policy and Health Programs of the Health and Human Development Division, Pan American Health Organization (PAHO).

Nguyen has also won a travel grant from the UC Los Angeles Latin America Studies Center to travel with her PAHO supervisor to meetings with the Ministry of Health in El Salvador.

**Allyson WEST**, UC Berkeley, M.A., Asian Studies  
*NGOs in South Asia: Women's Rights*  
Asia Division, Human Rights Watch

For more information on IGCC in Washington DC, and its programs, see IGCC Online under "UCDC," or contact Monique Kovacs, IGCC International Affaris Program Coordinator, at (202) 296-8183, Fax (202) 296-8224 or email <mkovacs@ucsd.edu>.

# GERMANY AND THE UNITED STATES: SEARCHING FOR 21ST CENTURY MIGRATION POLICIES

IGCC Washington Center • 24 March 1999

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## THE FUTURE OF EUROPE

Washington D.C. • 12-13 April 1999

IGCC/MacArthur Scholars in Regional Relations Research Seminar

Sponsored by IGCC and the John D. and Catherine T. MacArthur Foundation

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## The Future of Europe

**T**O CULMINATE the four year IGCC-MacArthur dissertation Scholars program in regional relations and international environmental policy, IGCC brought four 1998-99 Scholars to the UC Washington D.C. Center 12-13 April 1999 for *The Future of Europe*, a seminar based on their work. The war in Yugoslavia, exodus of refugees from Kosovo, and introduction of a single cur-



Steven Weber

rency among the European Union nations emphasize the continuing impact of that region in international affairs.

Rachel Cichowski, Politics and Society, UC Irvine examined the relationship between the European Court of Justice and national and transnational social movements in European integration. Keith Darden, Political Science, UC Berkeley, discussed regional order construction and breakdown among nations of the Commonwealth of Independent States since 1990. Nicolas Jabko, Political Science, UC Berkeley, researched the advent of the European Single Market and Monetary Union since the mid-1980's. Lorelei Moosbrugger, Political Science, UC San Diego is becoming expert in the agrochemical policymaking in Europe. Professor Steven Weber, Political Science, UC Berkeley served as the group's mentor for the year. (See <<http://www-igcc.ucsd.edu/igcc2/campus/Mac98-99.html>>.)

The seminar created another bridge between west coast academics and east coast policymakers, affording students experience in presenting their research before policy analysts from national agencies, private institutes, and universities (*participants*, p. 14). In turn, participants had a unique opportunity to interact with junior UC scholars. "Academia has a lot to offer the policy

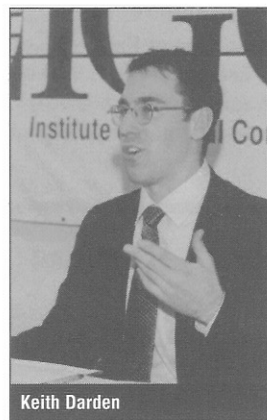
community, and we in academia have a lot to gain as well," said IGCC Washington Research Director Professor Bruce Jentleson, who also directs the UC Davis Washington Center, during a keynote dinner speech. "The way academics formulate research questions can be quite useful in

policy analysis. Also, the way we draw lessons and develop our research methodology can provide valuable approaches to policy development." Jentleson has successfully worked in both worlds, as a tenured faculty member of the University of California, a member of the Policy Planning staff at the United States Department of State, and currently as a foreign policy advisor to Vice President Al Gore.

Students benefited from representatives' briefings detailing EU-U.S. trade disagreements, NATO and EU expansion, and other key Washington DC. policy concerns at the Delegation of the European Commission, the Center for Strategic and International Studies (CSIS), and the State Department. As Europe defines its future, IGCC will host more forums to inform the research of junior scholars working on international issues with policy input from both sides of the Atlantic. For copies of the seminar papers contact IGCC Campus Programs Coordinator Bettina Halvorsen, <[bhalvorsen@ucsd.edu](mailto:bhalvorsen@ucsd.edu)>. ■



Lorelei Moosbrugger



Keith Darden

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### Books

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David A. Lake and Robert Powell, eds.  
Princeton University Press, 248 pp., 1999,  
ISBN 069102698X (hardcover)/  
0691026971 (paper)

**IGCC Policy Briefs** ISSN 1089-8352  
*Climate Change Science*. IGCC PB 12.  
Jeff Severinghouse, Susan Trumbore,  
Mark Thiemens, Richard C.J. Somerville

**IGCC Policy Papers** ISSN 1088-2081  
*Security Multilateralism in Asia: Views  
from the United States and Japan*  
Daniel A. Pinkston, ed. IGCC-PP No. 51,  
50 pp., June 1999. ISBN 0-934637-67-9

*Germany and the United States:  
Searching for 21st Century Migration  
Policies*  
Philip L. Martin. IGCC-PP No. 50, 20 pp.,  
April 1999. ISBN 0-934637-66-0

*The Military Balance in the Middle East:  
an Executive Summary*  
Anthony H. Cordesman. IGCC-PP 49, 128  
pp., March 1999. ISBN 0-934637-65-2

*Mapping the Mozambican Hinterland:  
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