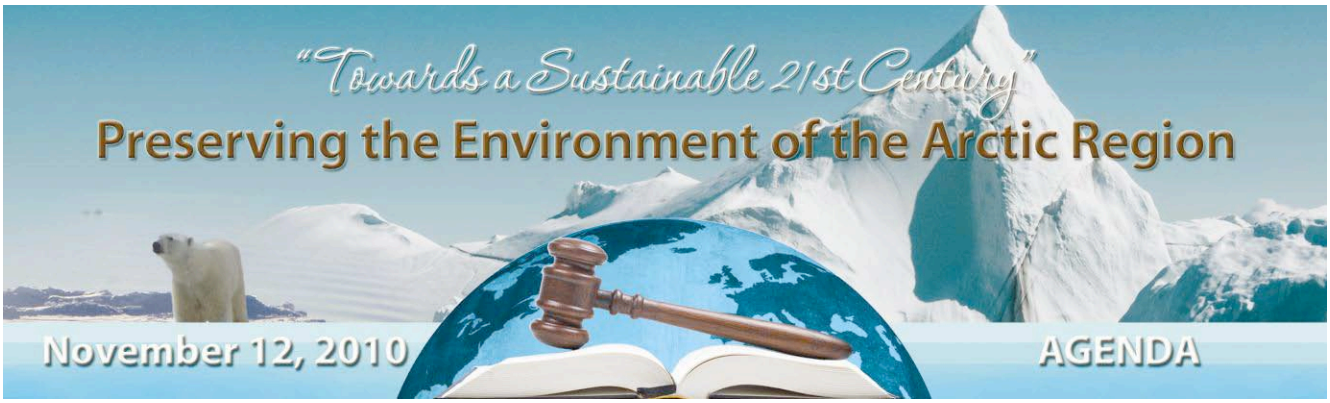

Updated October 29, 2010

"The politics of the Arctic are no longer the politics of the people, but they are the politics of oil."
Eben Hopson-Inuit Circumpolar Council

On November 12, 2010 is the seventh conference in the "Toward a Sustainable 21st Century" series. It will be held at the Arnold and Mabel Beckman Center of the National Academies of Sciences and Engineering. The series itself is an initiative of a foundation of global reach and a research university to do together more than they can do separately on significant unsolved problems of global society. This seventh conference in the series is on the topic of "Preserving the Environment of the Arctic Region."

9:00-9:05 a.m. – WELCOME
Dean Erwin Chemerinsky
School of Law, University of California, Irvine

Professor Michael Robinson-Dorn
School of Law, University of California, Irvine

9:05-9:30 a.m. - INTRODUCTION TO THE ARCTIC REGION AND ITS CHALLENGES
Shaun MacGillivray, MacGillivray Freeman Films
The program for the morning is intended to introduce the Beckman Center audience to the background and concern for the environment of the Arctic region and to provide an introduction to current sovereignty, security, governance and key environmental challenges. The conference will begin with an excerpt from an IMAX film called "To the Arctic" (a MacGillivray Freeman Films project) which will be released in 2011. It presents a breathtaking Arctic with a walrus kissing the IMAX camera and at least 5,000 Porcupine Caribou (out of a population of 125,000) making their migration to their calving spot in the Arctic National Wildlife Refuge. Even a Blu-ray version of the IMAX footage is compelling.

9:30-10:00 a.m. - THE ROLE OF LAW & GOVERNANCE IN PRESERVING THE ARCTIC ENVIRONMENT
Professor Michael Byers from the University of British Columbia is a noted expert on the political landscape of the Arctic region. His new book, "Who Owns the Arctic?" has been published very recently. He will introduce the background of current challenges which will determine the future of the Arctic. The following is a bio sketch of Professor Byers.

> Michael Byers holds the Canada Research Chair in Global Politics and International Law. Prior to 2004, he was a Professor of Law and Director of Canadian Studies at Duke University; from 1996-1999, he was a Research Fellow at Jesus College, Oxford University. Dr. Byers' work focuses on the interaction of international law and politics, particularly with respect to human rights, international organizations, the use of

military force, the Arctic region, and Canada-United States relations. He has published six books, dozens of academic papers and more than 100 op-ed articles in international newspapers, the Globe and Mail, National Post, Toronto Star and Ottawa Citizen.

10:00 a.m.- 10:45 a.m. - LITIGATION ON BEHALF OF ENVIRONMENTAL PROTETCTION IN THE ARCTIC AND THE GULF

Jim Ayers of Alaska Strategies and Michael LeVine and Geoff Shester from Oceana will compare and contrast the legal and scientific frameworks of the Exxon Valdez spill and the Gulf of Mexico disaster.

Jim Ayers is founder and President of Alaska Strategies, a conservation consulting firm providing advice to national conservation organizations and government entities. Formerly Vice President of Oceana, he managed and oversaw all aspects of Oceana's Arctic and Pacific programs. Oceana's major accomplishments include creating a precautionary federal Arctic Fisheries Management Plan and influencing Outer Continental Shelf drilling protections and permit withdrawals. Prior to his work with Oceana, he served as Chief of Staff to Alaska Governor Tony Knowles, during which tenure he convened an "ocean and watershed" cabinet to develop strategies to protect the ocean. His victories include passage of state legislation barring ocean dumping by cruise ships—the first such legislation in the US. Ayers also served as Executive Director for the *Exxon Valdez* Oil Spill Trustee Council where he led development and implementation of the comprehensive restoration plan that guided expenditure of the $900 million civil settlement with Exxon in the area impacted by the oil spill. Ayers' executive responsibilities included management and distribution of the trust settlement. Ayers led negotiations for, purchase, and designation hundreds of thousands acres of protected habitat, and led development of an ecosystem-based management and restoration plan. Ayers' extensive experience in the public and private sectors includes appointments as Deputy Commissioner of the Alaska Department of Fish and Game, Director of the Alaska Marine Highway System, Director of Legislative Relations for the Governor of Alaska, and Coordinator of the Alaska Coastal Management Program.

Michael LeVine is Oceana's Pacific Senior Counsel. Prior to joining Oceana, Mr. LeVine worked for the Juneau office of Earthjustice and represented conservation groups, Alaska Native entities, and local communities in successful litigation related to on- and offshore oil leasing and exploration; transportation, timber management, and aerial spraying of pesticides. He has B.S., with distinction, in Civil and Environmental Engineering from Cornell University; a Juris Doctor, with high honors, from Duke Law School; and a Master of Environmental Management from the Nicholas School of the Environment at Duke. Mr. LeVine provides legal expertise and experience on issues in Alaska and along the Pacific coast, including oil and gas activities, industrial fishing, and marine mammals. He works to bridge the gap between science, law, and policy in an effort to bring comprehensive, science-based management and stewardship to decisions about the Pacific and Arctic large marine ecosystems.

Dr. Geoff Shester is the California Program Director for the international conservation organization Oceana, based in their Monterey Office. After completing his undergraduate degree at the University of California, Santa Cruz, he worked for the Exxon Valdez Restoration Office in Anchorage, Alaska and served as a Conservation Coordinator for Oceana's Juneau office, where he helped protect deep sea coral habitats from bottom trawling from California to the Bering Sea. He earned his doctorate in the Stanford University Interdisciplinary Graduate Program in Environment and Resources, studying the interplay between marine ecology and the economics of fisheries. Before returning to Oceana, he served for two years as the senior science manager for the Monterey Bay Aquarium's influential Seafood Watch Program.

Coffee Break – 10:45-11:00 a.m.

Introduction, Professor Alejandro Camacho
School of Law, University of California, Irvine

11:00 a.m. – 11:30 p.m. THE ARCTIC COUNCIL AS A BOUNDARY ORGANIZATION
Paula Kankaanpää
This presentation will examine the Arctic Council as a boundary organization that facilitates the transfer of usable knowledge between science and policy to promote sustainable development and environmental protection in the Arctic. What does the Arctic Council produce and how may participation of different knowledge groups impact its processes and efficiency? Prof. Paula Kankaanpää has been the Director the Arctic Centre of the University of Lapland in Finland since 2000, where she acted as a Vice-Rector in 2006-09. She is also the chair of the Advisory Board of the Finnish Meteorological Institute and she chaired the International Arctic Science Committee Regional Board in 2000-02. Dr. Kankaanpää has long experience on science and policy as she has worked for the Arctic Environmental Protection Strategy, the Arctic Council, the Barents Council and Antarctic co-operation in Finnish Ministry of the Environment since the beginning of the 1990s. She led the project on Environmental Impact Assessment Guidelines of the Arctic Council in the mid 1990s, and she served for a year as the Deputy Executive Secretary at the Conservation of Arctic Flora and Fauna of the Arctic Council in Iceland in 1999. She is a geographer by formal training and made her Ph.D. dissertation as a sea ice research scientist at the Finnish Institute for Marine Research. Currently she is a Fellow at the Dartmouth College Dickey Centre until August 2010 when she will return to the Arctic Centre.

11:30 p.m.-12:45 p.m.
INDIGENOUS PEOPLES AND THE IMPORTANCE OF TRADITIONAL KNOWLEDGE INSIGHTS
Professor Helen Ingram is moderating a panel to focus on traditional knowledge insights and the difficult future Indigenous peoples are facing with the lost of sea ice and with winter storms destroying villages on the coast. Indigenous peoples of the Arctic are also negatively affected by persistent organic pollutants.

Moderator: Helen Ingram is Research Fellow at the Southwest Center, University of Arizona, and Professor Emerita at the University of California, Irvine. She is the author or editor of many books, including *Reflections on Water: New Approaches to Transboundary Conflicts and Cooperation* (MIT Press, 2001) and *Water, Place and Equity* (MIT Press, 2008).

Gabriel Nirlungayuk
Director of Wildlife, Nunavut Tunngavik, Inc.
Gabriel Nirlungayuk is the Director of Wildlife for Nunavut Tunngavik Inc. He lives in Rankin Inlet, Nunavut. Gabriel is an Inuit, born in Pelly Bay now known as Kugaaruk. His ancestors are the Netsilikmeot Inuit. The Netsilikmeot Inuit did not have contact with the outside world until the early 1900s. Gabriel grew up hunting and living off the land learning his skills from his father and grandfather and uncles. He has close working relationships with regional wildlife organizations, hunters and trappers. In 2005, he was appointed to sit on the Aboriginal Traditional Knowledge Sub-Committee. His experience includes working with the Polar Bear Technical Committee, the North Atlantic Marine Mammal Council, the Joint Canada Greenland Beluga, the Narwhal Council and the Polar Bear Specialist Group.

Steve Kakfwi
Stephen Kakfwi is a forceful leader on behalf of the rights of Indigenous peoples and of the Canadian environment. In the 1970s the Mackenzie Valley Pipeline was proposed. Kakfwi identified the danger this proposal posed to his community's homeland, and fought tirelessly against the proposal. In 1983, Kakfwi ran for the position of President of the Dena Nation and won. As President of the Dene Nation, Kakfwi established both the Northwest Territories Dene Cultural Institute and Indigenous Survival International. He also aided in land rights efforts and helped to develop a framework for land claim negotiations. In 1987, Kakfwi was elected to the Legislative Assembly of the Northwest Territories, representing the constituency of Sahtu, covering 254,000 square kilometers in area. During his sixteen year tenure in the Legislative Assembly, ending in 2003, Kakfwi played key roles in initiatives ranging from economic development by encouraging the creation of diamond cutting and polishing industries in close proximity to local diamond mines, to his promotion of Aboriginal rights, especially during his term as Premier of the Northwest Territories from 2000 to 2003. His sixteen-year tenure in the cabinet of the Northwest Territories is the longest in the Territories' history. Kakfwi continues to play an active role in the development of the Northwest Territories through his advisory position to WWF Canada.

Aileen A. Espíritu "The Impact of Industrial Oil and Gas Development on Arctic Indigenous Peoples”

Aileen A. Espíritu is Director of The Barents Institute in Kirkenes, Norway with overall responsibility for the Institute's academic as well as the administrative operations focusing on the cross-border research and studies, transnational relations, Northern politics, and regional development. Her doctoral dissertation examined the impact of oil and gas development on indigenous peoples in Northwest Siberia, and analyzed the industrialization (Sovietisation) of their culture, economies, and way of life. Espíritu has also done research on the environmental problems and quality of life of the Sakha people living in the diamond mining regions of the Sakha Republic, Russia. She has recently completed research on the political participation of indigenous women and men in Northwest Siberia since the 1930s and is in the process of writing a monograph on this topic. In her current research she is particularly focusing on border identities, border crossings, and life on the borderlands of Europe especially in an expanded European Union. She is also has ongoing research on quality of life in the Arctic regions; Identity politics in indigenous and non-indigenous Northern communities; gendered political participation among indigenous peoples of the Circumpolar North; the impact of industrialization and post-industrialization on small towns in the High North; and the politics of environmental management and energy security in Russia.

12:45 p.m.-1:30 p.m. - Lunch

1:30 p.m. – 4:45 p.m. SCIENCE AND THE FUTURE OF THE ARCTIC REGION

Moderator: Professor Lisa Grant Ludwig, Program in Public Health, University of California, Irvine

Professor Lisa Grant Ludwig is Associate Director of the California Institute for Hazards Research and a member of the Geologic Hazards and Disasters Research Group. She approaches natural hazards and disasters from a geologic perspective with a major emphasis on earthquakes as a major threat to public health globally and locally in California. After earning a B.S. from Stanford University in Applied Environmental Earth Sciences, Professor Grant earned two Master of Science degrees in Environmental Engineering and Science and Geology and a Ph.D. in Geology with Geophysics, all from the California Institute of Technology.

PETROLEUM RESOURCE POTENTIAL OF THE ARCTIC REGION

The USGS conducted the Circum-Arctic Resource Appraisal, which was a geologically based estimate of the uncertainty surrounding yet to be found oil and gas north of the Arctic Circle. The study concluded that about 13% of the world's undiscovered oil (44 to 157 billion barrels) and 30% of the world's undiscovered gas (770 to 2990 trillion cubic feet) may be found there, most of it offshore and under less than 500 meters of water. On an energy equivalent basis, natural gas is three times more abundant than oil and is largely concentrated in Russian territory. Offshore Alaska is thought to be the most prospective area in the Arctic for oil. Oil resources could dramatically impact the interests of the Arctic countries, but probably will not significantly shift the global distribution of production. Most of the resources are estimated to be in areas of settled territorial claims rather than subject to the UN Convention on the Law of the Sea.

Donald L. Gautier is a geologist with the Energy Resources Program of the United States Geological Survey. Born in Los Angeles, he holds a Ph.D. in Geology from the University of Colorado and worked for Mobil Oil Corporation before joining the USGS in 1977. He is author of more than 200 publications, many concerning evaluation of petroleum resources. Gautier leads the USGS World Energy Project and was the principal investigator for the recently completed Circum-Arctic Resource Appraisal.

THE CONTINENTAL SHELF OF THE ARCTIC OCEAN

There is a scientific/political fight going on in the Arctic to extend the continental shelf from 200 nautical miles to 350 nautical miles for the five countries which have coastline on the Arctic Ocean. The forum for this political/scientific fight is the Commission on the Limits of the Continental Shelf established by Article 76 of the UN Convention on the Law of the Sea. Using new technology there is a consortium characterizing the continental shelf, which is led by Professor Larry Mayer from the University of New Hampshire.

Larry Mayer has a broad-based background in marine geology and geophysics that is reflected in his association with both the Ocean Engineering and Earth Science Departments at the University of New Hampshire. He graduated magna cum laude with an Honors degree in Geology from the University of Rhode Island in 1973 and received a Ph.D. from the Scripps Institution of Oceanography in Marine Geophysics in 1979. At Scripps he worked with the Marine Physical Laboratory's Deep-Tow Geophysical package, but applied this sophisticated acoustic sensor to problems of the history of climate. After being selected as an astronaut candidate finalist for NASA's first class of mission specialists, he went on to be a Post-Doctoral Fellow at the School of Oceanography at the University of Rhode Island where he worked on problems of deep-sea sediment transport and the paleoceanography of the equatorial Pacific. He became an Assistant Professor in the Dept. of Oceanography at Dalhousie University and in 1991 moved to the University of New Brunswick to take up the Natural Sciences & Engineering Research Council of Canada Industrial Research Chair in Ocean Mapping. In 2000 he became the founding director of the Center for Coastal and Ocean Mapping at the University of New Hampshire and the co-director of the Joint Hydrographic Center sponsored by the National Oceanic & Atmospheric Administration and the University of New Hampshire.

DEVELOPING ARCTIC SEABED: RUSSIAN AND INTERNATIONAL APPROACHES

At present, Arctic offshore exploration and development requires balancing the interests of oil companies struggling with increased market volatility with the interests of sovereign states, which weigh the positive implications of field development against its inherent (including notably environmental) risks. Each Arctic country seems to have its own approach for dealing with the problem. This uncertain situation poses unique challenges for Russia, which has just begun to move offshore -- pursuing its goals of unlocking its Arctic resource potential, while also reinforcing government control, shrinking the offshore technology gap, and affirming its position as a leading Arctic nation and global petroleum supplier.

Andrey K. Krivorotov is Secretary of the Board and Head of Division of Shtokman Development AG, a Russian-French-Norwegian JV set up to develop the huge Shtokman gas and condensate field in the Russian Arctic. In 1987-97, he worked in the Russian public service (including a two year-long diplomatic mission to Spitsbergen, Norway). Since 1997, he has held several positions in the oil & gas business and related industry journalism, while also teaching the Norwegian language and international trade at Moscow State Institute of International Relations (MGIMO). He is the author of over 50 publications, which are devoted to the Norwegian economy, and issues of relevance for the economics and policies of the oil & gas industry in the Arctic North, Russia and FSU. In 2004, he received a Ph.D. in international economics, defending a thesis entitled 'The Role of Government in Enhancing International Competitiveness of Subnational Regions: Case Study Norwegian Policy in the High North'.

SCIENTIFIC CERTAINTY AND UNCERTAINTY ABOUT THE FUTURE OF THE ARCTIC

There is immense scientific difference of opinion about the future of the Arctic climate. Different scientists have projected that sea ice will be gone in the summer as early as 2013 while others predict it will be ice free by 2050. Professor Donald Blake of the Department of Chemistry at the University of California, Irvine is speaking about atmospheric gases in the Arctic in order to provide a context for understanding the immense scientific differences of opinion.

For decades, UCI chemistry professor Donald Blake, M.S. '80, Ph.D. '84 has been admired for his work with Nobel laureate F. Sherwood Rowland on air pollution, global warming and climate change. Recently, Blake found an extraordinary new benefit of his research: the noninvasive diagnosis of life-threatening diseases such as cystic fibrosis. Professor Blake studies atmospheric gases that can affect urban air quality, climate change and stratospheric ozone depletion. Part of his research focuses on highly polluted cities throughout the world where he has found unexpected sources of urban pollution, such as emissions of liquefied petroleum gas from home fuel tanks.

Isabella Velicogna, from the Department of Earth System Science of the University of California, Irvine, is talking about her research on the melting of the Greenland ice sheet. Greenland/Denmark stand to gain immensely from the melting of the sheet in terms of undiscovered oil and gas.

Professor Isabella Velicogna's research program is centered on space-based climate measurements with particular attention to cryospheric and high latitude regional studies. She is interested in studying processes

of global change using various remote sensing techniques, as well as lithospheric properties and loading processes on geological timescales. The research work combines satellite remote sensing techniques, ground observations and numerical modeling to determine how the Greenland and Antarctica ice sheets and the high latitude regions respond to climate warming. Both the ice sheets and the Arctic are very sensitive to climate change. The advent of satellites has provided Velicogna and her collaborators with the ability to observe those regions with unprecedent spatial and temporal accuracy. One of the focuses of her research is to develop methods for joint estimation of, or inversion for, different components of the water cycle including its atmospheric and cryospheric components. Velicogna uses data gathered by a pair of NASA satellites to measure subtle variations in Earth's mass and gravitational pull. "Since 2002, ice sheets in Greenland and Antarctica have decreased at a rate faster than expected," she says. "As ice sheets become smaller, fresh water flows into the ocean and raises the sea level. "From almost 300 miles above, the satellites snap a "big picture" view of mass redistribution. "Remote areas like Antarctica are very difficult to monitor up close," Velicogna points out. Isabella Velicogna with researcher Eric Rignot of UCI and NASA's Jet Propulsion Laboratory, along with Michele Koppes of the University of British Columbia, measured the undersea melting rates of four glaciers in central West Greenland in the summer of 2008. They deployed oceanographic equipment in glacial fjords, sampling the water at various depths to measure ocean currents, temperature and salinity, as well as the depth of fjords. Glaciers in West Greenland are melting 100 times more rapidly at their end points beneath the ocean than they are at their surfaces, according to a UC Irvine/NASA study which was published in Nature Geoscience.

4:45 p.m.-5:30 p.m. COMMENTARY ON THE FUTURE ARCTIC REGION

Introduction; Professor Joseph F.C. DiMento
School of Law and Planning, Policy, and Design; University of California, Irvine

The purpose of this concluding program is to provide the audience with an analysis of the impact of oil and gas development on the climate of the Arctic and on the rest of the planet, and on challenges associated with creating a variable governance and regime structure to preserve the future of the Arctic region.

Oran Young
Professor of Institutional & International Governance and Environmental Institutions
University of California, Santa Barbara
Oran Young is a professor at the Bren School of Environmental Science & Management at the University of California, Santa Barbara. Specializing in the analysis of environmental institutions with particular reference to international regimes, Dr. Young also serves as Co-director of the Program on Governance for Sustainable Development at the Bren School. Dr. Young served for six years as Founding Chair of the Committee on the Human Dimensions of Global Change of the National Academy of Sciences and chaired the Scientific Steering Committee of the international project on the Institutional Dimensions of Global Environmental Change (IDGEC). He currently chairs the Scientific Committee of the International Human Dimensions Programme on Global Environmental Change. An expert on Arctic issues, Dr. Young also chairs the Steering Committee of the Arctic Governance Project. Past service includes vice-presidency of the International Arctic Science Committee, Chair of the Board of Governors of the University of the Arctic, and Co-chair of the Arctic Human Development Report. The author of more than 20 books, his most recent title is *Institutional Dynamics: Emergent Patterns in International Environmental Governance* (2010).

5:30 p.m.-6:15 p.m. Reception