

## Cryosphere, Instability, Sea Level Rise

The Ice and snow in the climate system is reacting to global warming and the changes of the ice and snow cover strongly feeds back into the climate system. The glaciers, ice caps and glaciers are retreating and as a consequence sea level is rising. The predicted global warming during the next 100 years will reach levels where several of the ice masses will cross the threshold for being stable and disappear. Permafrost is under strong retreat which causes major infrastructure problems and also releases greenhouse gasses into the atmosphere. Sea ice is changing and the sea ice in the northern polar ocean has retreated in the last few years and might totally disintegrate during the next decade. The decrease of the cryosphere will cause sea level to rise but good future predictions calls for more improved models starting with an understanding of the processes that leads to the increase of discharge of ice especially from the ice streams in the ice sheets.

We invite you to submit abstracts to the IARU Climate Congress, session 1 on Cryosphere, Instability, Sea Level Rise that relates to the subjects described above.

### Prof. Dorthe Dahl-Jensen

Dorthe Dahl-Jensen is Prof. in Ice Physics at the Niels Bohr Institute, University of Copenhagen. She heads the Centre of Excellence for Ice and Climate with the focus to use ice core data to improve our understanding of the past, the present and the future climate. In addition she heads the International Polar Year deep drilling program NEEM on the Greenland Ice Sheet with participation of researchers from 14 nations. The research of Dorthe Dahl-Jensen includes reconstruction of climate records from ice cores and borehole data and construction of ice flow models to date ice cores. The history and evolution of the Greenland Ice Sheet especially in the previous warm interglacial is the present focus of her research. Dorthe Dahl-Jensen is lead author of the chapter "The Greenland Ice Sheet in a Changing Climate" of the Arctic Council AMAP report "Climate Change and the Cryosphere: Snow, Water, Ice and Permafrost in the Arctic" under preparation. She is chairman for the Danish IPY Committee, cluster leader of the IPY cluster "Stability of the Greenland ice sheet" and member of the Danish Climate Commission.



### Dr. Konrad Steffen

Dr. Konrad Steffen is the Director of the Cooperative Institute for Research in Environmental Sciences (CIRES) at the University of Colorado, Boulder. He studies the climate and cryosphere interaction in polar and alpine regions using ground and satellite measurements, as well as climate system modeling. For many summers, Dr. Konrad Steffen and his team of scientists have worked on the Greenland ice sheet and found alarming results such as the rapid increase in melt area and mass loss of the Greenland ice sheet. He has led field expeditions to the Greenland ice sheet and other Arctic and Antarctic regions for the past 34 years to measure the climate variability and dynamic response of ice masses under a warming climate. He has had an active involvement in sensitivity studies of large ice sheets and the assessment of global sea level change. His work is responsible for a large part of the instrumentation that monitors changing conditions on the Greenland ice sheet. Dr. Steffen currently serves on a number of advising committees, including WMO/WCRP, NASA, NOAA and others. Dr. Steffen has been a Fellow of CIRES since 1991 and is a Prof. in the Department of Geography where he teaches climatology and remote sensing courses.



## Global/Regional Climate State in 2030

As the inevitability of future warming becomes accepted, interest in adapting to climate change, particularly over the next few decades, has increased. This requires accurate regional climate predictions on a particularly difficult timescale, when the influence of initial conditions has faded, but the climate change signal is still weak. In this session, we would like to discuss and review predictions of climate change and impacts on multiannual to decadal timescales, and prospects for future improvement.

### Prof. Masahide Kimoto

Masahide Kimoto is Prof. and Deputy Director of the Center for Climate System Research (CCSR), University of Tokyo, Japan.

He received a PhD in Atmospheric Sciences in 1989 from the University of California at Los Angeles. He joined Japan Meteorological Agency in 1980 after graduation from Kyoto University and moved to CCSR, Univ of Tokyo, in 1994. His research interest is climate variability and climate modeling. He has recently been engaged himself with climate projection experiments using the Earth Simulator. Presently he acts as a principal investigator of Japanese CLIMATE2030 project which attempts at making the near-term projections with a climate model initialized by observed data. He received Meteorological Society of Japan Award in 2004.



### Prof. John Mitchell

John Mitchell is Director of Climate Science at the MetOffice and a visiting Prof. at the University of Reading.

He received a PhD in Theoretical Physics in 1973 from The Queen's University, Belfast. He joined Meteorological Office and in 1978, took charge of the Climate Change group in what is now the MetOffice's Hadley Centre for Climate Prediction and Research. His main speciality is the study of the climatic effects of increases in greenhouse gases and related pollutants. He has been a lead author in the three of the IPCC Working Group I Assessments. He has shared the Norbert Gerbier-Mumm Prize twice and been awarded the Hans Oeschger medal of the European Geophysical Union. He is a Fellow of the Royal Society.



## Changes in Ocean Circulation Related to Regional Climate

The ocean controls many aspects of the Earth System response to rising atmospheric greenhouse gas concentrations. At regional and ocean basin scales, the patterns of sea-level, ocean salinity, surface temperature, uptake and release of carbon dioxide, ocean ventilation and over-turning circulation all show evidence of change on a variety of time scales. This session explores the evidence in the ocean circulation and property observations for climate signals and the future projections of ocean change and impact at regional and global scales.

### Prof. Nathan Bindoff

Nathan Bindoff is Prof. of Physical Oceanography at the University of Tasmania, and CSIRO Marine Research Laboratories, Director of the Tasmanian Partnership for Advanced Computing and Project Leader of the Antarctic Cooperative Research Centre's Modelling Program.

Nathan is a physical oceanographer, specialising in ocean climate and the earth's climate system. He was the coordinating lead author for the ocean chapter in the Inter-Governmental Panel on Climate Change (IPCC) Fourth Assessment Report. Nathan and colleagues documented some of the first evidence for changes in the climate change signals in the Indian, North Pacific, South Pacific and Southern Ocean's and shown some of the first evidence of changes in the Earth's hydrological cycle.

He established the programs and experiments that determined the total production of Adelie Land Bottom Water formation and its contribution to Antarctic Bottom Water Formation, contributed to the development of some of the largest and highest resolution model simulations of the oceans including eddy and mean flow interactions, and has been deeply involved in oceanographic data and data management as the chairman of the Data Products Committee for the World Ocean Circulation Experiment and the International Polar Year. In his spare time he has lead 9 Oceanographic voyages on the Aurora Australis in the Southern Ocean.

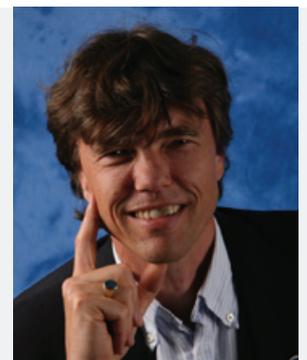
His current interests are primarily in understanding how the changing ocean can be used to infer changes in atmosphere, and separately the interactions of the Antarctic Circumpolar Current and its eddies.



### Prof. Dr. Martin Visbeck

Prof. Visbeck received his PhD from Kiel University in Physical Oceanography on research about deep ocean convection in 1993. During a postdoctoral fellowship at MIT his research interest focused on the interaction between ocean eddies and deep convection regions and their respective heat and density transports. As a Research Scientist at LDEO and Associate Prof. at Columbia University, New York, his interest shifted to more general aspects of the ocean's role in the climate system including work on the North Atlantic Oscillation and Deep Water formation off Antarctica. Since October 2004 he holds the chair in Physical Oceanography and is the deputy director of the Leibniz Institute for Marine Sciences at the University in Kiel, Germany.

His current research is concerned with ocean and climate variability and change with particular emphasis on the circulation of the Subpolar North Atlantic, climate-biogeochemical interactions in the tropical ocean, observations of ocean circulation and mixing using modern robotic platforms including profiling floats and gliders, and development of ocean observatories for long-term observations in the water column. He has served on several national and international committees. He is Speaker of the Kiel Cluster of Excellence 'The Future Ocean'.



## Vulnerability in Carbon Sinks

Since the industrial revolution, the natural cycles of carbon dioxide (CO<sub>2</sub>), methane and other greenhouse gases have been strongly unbalanced by human activities. For CO<sub>2</sub>, this has led to carbon sinks in land and ocean systems which together absorb more than half of anthropogenic emissions, representing a massive discount on anthropogenic forcing of climate. However, there is no assurance that carbon sinks will continue to provide this discount in future: both land and ocean carbon sinks are changing under multiple influences, including the effects of warming, precipitation changes, land use change and disturbance in land systems, and physical, chemical and biological changes in oceans.

This session will explore the feedbacks between the carbon cycle, climate and human activities, to evaluate the effects of climate and other human-induced changes (such as land use change) on the natural sources and sinks of major carbon-based greenhouse gases. The session will review evidence for recent changes in CO<sub>2</sub> sinks in both oceans and land, examine and rank the mechanisms behind these changes, and evaluate the likelihood of future vulnerabilities of the earth system to further gradual or sudden changes. The session will also consider vulnerabilities associated with methane through possible major additional sources, including methane hydrates, permafrost and peatlands.

### Prof. Dr. Nicolas Gruber

Prof. Dr. Nicolas Gruber is full Prof. of environmental physics at the Federal Institute of Technology (ETH) Zürich, Switzerland. His main research interest is the study of biogeochemical cycles from regional to global scales and from timescales of months to millennia with a particular focus on the carbon cycle and its interaction with Earth's climate system. His goal is to better understand the physical, chemical and biological processes that control this cycle and to be able to make predictions for the future. Particular research questions include the determination of the oceanic and terrestrial sources and sinks of CO<sub>2</sub>, the assessment of the impact of past and future climate change on the global carbon cycle, and the role of regional processes for the global climate system. He has been a contributing author to two chapters of the latest assessment report by IPCC and has co-authored a textbook on "Ocean Biogeochemical Dynamics"



### Dr. Michael Raupach

Dr Michael Raupach is a Chief Research Scientist in CSIRO Marine and Atmospheric Research, Canberra, Australia. He is a co-chair of the Global Carbon Project of the Earth System Science Partnership. His active research interests include global and continental carbon and water cycles, carbon-climate-human interactions, land-air interactions, micrometeorology, the fluid mechanics of turbulent flows, particle transport and soil erosion by wind. He is a Fellow of the Australian Academy of Technological Sciences and Engineering.



## Developing a Spectrum of Models to Describe the Earth System

Modelling is one of the most important tools for assessing potential future climate change and climate impact. Strong efforts have been made to improve individual models of various degrees of complexity to describe the natural Earth system or to integrate models of human activity into climate system models.

In this session we would like to discuss and to review efforts to construct a spectrum of Earth system models in which models of different complexity are used simultaneously and complementarily. Examples include the seamless, or unified, modelling of the natural Earth system from decades to Milankovich scales and modelling integrated assessment. Hence contributions from natural, social and political science are welcome.

### Prof. Dr. Martin Claussen

Martin Claussen holds a chair in Meteorology and is director at the Max Planck Institute for Meteorology in Hamburg, Germany. Martin has pioneered research on global scale atmosphere-land cover interaction by using climate system models of various degree of complexity. In particular, he has been exploring the dynamics of the Sahara in past, present, and future climates. Martin is member of several national and international academies of sciences, and he was awarded the Milutin Milankovich Medal of the European Geosciences Union.

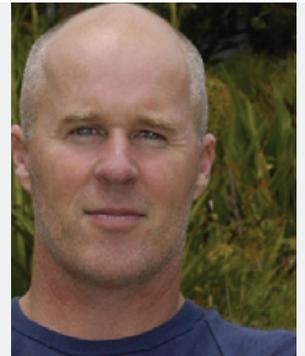


## Tipping Elements in the Earth System

The global climate system is highly complex and non-linear, with abrupt change a common feature of past climate records. While most climate projections focus on the smooth, predictable aspects of climate change, it is highly likely that key thresholds for large scale, non-linear change, or “tipping points”, will be encountered over the coming decades. Critical uncertainties include the amount of forcing required to pass particular tipping points and the severity of the resulting impacts. In this session we invite contributions on the nature, proximity and predictability of tipping points in the Earth’s climate system. These may include: abrupt change in the ocean’s thermohaline circulation and sea-ice cover, irreversible shrinkage of major ice sheets, rapid shifts in atmospheric systems, and abrupt shifts in some terrestrial and marine ecosystems.

### Prof. Matthew England

Prof. Matthew England is co-Director of the UNSW Climate Change Research Centre (CCRC) and an Australian Research Council (ARC) Federation Fellow. England is a former Fulbright Scholar and CSIRO Flagship Fellow, and winner of various national Academy and Society Awards, including the Royal Society of Victoria Research Medal, 2007; the Sherman Eureka Prize for Environmental Research, 2006; the 2005 Priestley Medal and the Australian Academy of Science Frederick White Prize, 2004. Prof. England coordinated and led the 2007 Bali Climate Declaration by Scientists; a major international statement by the scientific community that specifies the reductions in greenhouse gas emissions required to minimise the risk of dangerous human-induced climate change ([www.climate.unsw.edu.au/bali](http://www.climate.unsw.edu.au/bali)). England is co-chair of the CLIVAR Southern Ocean panel and a member of the CLIVAR Working Group on Ocean Model Development. He was a contributing author and reviewer of the Intergovernmental Panel on Climate Change (IPCC) Second and Third Assessment Reports. England is an expert in the ocean’s role in regional climate variability and global climate change.



### Prof. Tim Lenton

Tim Lenton is Prof. of Earth System Science at the University of East Anglia. His research focuses on understanding the behaviour of the Earth as a whole system, especially through the development and use of Earth system models. He is particularly interested in how life has reshaped the planet in the past, through a series of major transitions in Earth history, and what lessons we can draw from this as we proceed to reshape the planet now. His recent work on the tipping elements in the climate system ([doi:10.1073/pnas.0705414105](https://doi.org/10.1073/pnas.0705414105)) provides an impetus for this session. Tim was awarded a Philip Leverhulme Prize in 2004, a European Geosciences Union Outstanding Young Scientist Award 2006, the British Association Charles Lyell Award Lecture 2006, and the Geological Society of London William Smith Fund 2008.



## Informing the Future by Understanding the Past

The past can play a tremendously important role in helping us understand future climate change. This session will invite reports on the latest reconstructions, from data and from modelling, of periods of past climate change that can provide important lessons about the nature, links and causes of climate change at the continental and global scales (e.g. Eemian, Holocene Climatic Optimum) and/or human responses to variability (past civilizations or cultures). Contributions are invited from any part of the globe and dealing with any aspect of climate change and/or archaeological response.

### Dr. Bette Otto-Bliesner

Bette Otto-Bliesner is a Senior Scientist in Climate Change Research at the National Center for Atmospheric Research in Boulder, Colorado. Bette uses models of the Earth's climate system along with proxy data to investigate past climate change across a wide range of time scales. Her research works to identify the mechanisms and quantify the feedbacks that regulate the climate responses in the past, with particular interest on how this informs the future. In 2005-2007, she worked as a lead author on the IPCC report "Climate Change 2007: The Physical Science Basis."



### Prof. Chris Turney

Chris Turney holds a chair in Physical Geography at the University of Exeter and is the author of *Ice, Mud and Blood: Lessons from Climates Past* (<http://us.macmillan.com/icemudandblood>). Chris researches and teaches on the past and what it means for the future. He did the radiocarbon dating on the 'Hobbit' fossil of Flores, Indonesia that hit the headlines worldwide in 2004. In 2007, Chris was awarded The Sir Nicholas Shackleton Medal for outstanding young Quaternary scientist for his pioneering research into past climate change and dating the past.



## Earth System Feedbacks and Carbon Sequestration

The global carbon cycle and global climate are linked through many, often non-linear, processes and feedbacks. Interventions in the carbon cycle of terrestrial, aquatic and marine ecosystems – with an aim to increase ecosystem carbon stocks ('carbon sequestration') – though changes in resource use and management, are being explored for mitigating increases in atmospheric CO<sub>2</sub> concentrations. This session will examine the feedbacks, both positive and negative, between ecosystem interventions to sequester carbon and the earth system, including climate. Questions include: what are the potential magnitudes and methods of intervention in the global C cycle? what are potential impacts of these activities on climate forcing, e.g., albedo, hydrological cycles, fire, ocean processes; ; what are the impacts of other climate drivers on the potential for greenhouse gas abatement through carbon sequestration?; how might significant sequestration efforts impact emissions of other greenhouse gases?

### Prof. Keith Paustian

Keith Paustian is a Prof. in the Department of Soil and Crop Sciences and a Senior Research Scientist at the Natural Resources Ecology Laboratory at Colorado State University. His research focuses on climate change, land use and management, and greenhouse gases. Work in his research group includes the assessment of soil greenhouse gas (GHG) emissions and carbon sequestration for the US national inventory and developing accounting tools for farmers and ranchers to estimate field-level GHG emissions. He and colleagues have developed models for estimating GHG inventories in developing countries, models now being applied in 11 countries in Latin America, Africa and Asia. Other research areas include assessment of climate change impacts on agriculture, land use-based GHG mitigation strategies, evaluation of environmental impacts of agricultural bioenergy production, soil organic matter dynamics, and agroecosystem ecology. He was a coordinating lead author on the Intergovernmental Panel on Climate Change (IPCC) work group on national greenhouse gas inventory methods. He currently serves on the US Carbon Cycle Science Steering Group, the Chicago Climate Exchange science advisory board and the Soil Science Society of America Greenhouse Gas Working Group.



### Prof. Scott Denning

Scott Denning is Monfort Prof. of Atmospheric Science at Colorado State University. He studies the contemporary global carbon cycle by using numerical models to estimate sources and sinks of atmospheric CO<sub>2</sub> from observations of atmospheric trace gases and satellite imagery. His research group has studied land-atmosphere exchanges using data collected during field experiments in forests, grasslands, and croplands on several continents, and using satellite imagery at the global scale. He is a former Editor of the Journal of Climate, and served as founding Chair of the Science Steering Group for the North American Carbon Program. He also serves as Director of Education and Diversity at the Center for Multiscale Modeling of Atmospheric Processes.



## Detection and Attribution: State of Play in 2009

Global warming is “unequivocal” and “has likely had a discernible influence at the global scale” (IPCC AR4, 2007). However, the detection and attribution story was then incomplete due to ‘Key Uncertainties’ listed by IPCC as including: (i) notable lack of geographic balance in data on observed changes {WGI SPM; WGII 1.3, SPM}; (ii) changes in extreme events {WGI 3.8, SPM}; and (iii) effects of climate changes on human and natural systems.{WGII 1.3}. This session is timely because since the production of the IPCC Fourth Assessment Report there have been remarkable leaps in observations, analyses and interpretation in all aspects of these missing pieces of the climate change jigsaw.

### Prof. Ann Henderson-Sellers

Until 2007, the Director of the United Nations’ World Climate Research Programme <http://wcrp.wmo.int> (WCRP), Ann Henderson-Sellers is an international leader in climate science. She has championed the scientific need for action to mitigate and adapt to climate change for over 35 years. Ann is an ISI “most highly cited” author of over 500 publications, including 14 books (<http://hcr3.isiknowledge.com/>), an elected Fellow of Australia’s Academy of Technological Sciences and Engineering and was awarded the Centenary Medal of Australia for Service to Australian Society in Meteorology in 2003. Prof. Henderson-Sellers now holds an Australian Research Council Prof.ial Fellowship in Climate Risk at Macquarie University [www.research.mq.edu.au/excellence/climate\\_risk\\_team](http://www.research.mq.edu.au/excellence/climate_risk_team) .



## Equity between sectors and individuals within countries

Equity concerns in the climate policy debate have typically focused on international concerns, particularly the historical North/South divide. However, inequality within countries is as pervasive as inequality between countries, and it has important implications for the fairness and practicality of addressing climate change. One obvious dimension is the accurate assessment of responsibility and capacity of countries for the sake of assessing international burden-sharing proposals. Another is the distribution of the burden within countries, e.g., whether carbon taxes or permit-trading systems are progressive or regressive, or whether investment in adaptation reaches most vulnerable. Sectoral issues are also a concern, such as how workers and firms in high-emitting industries should be treated as emissions are curtailed, and the nature of a “just transition”. In this session we invite papers and posters that address any of these topics of equity within countries.

### Dr. Paul Baer

Paul Baer is an interdisciplinary scholar specializing in climate change and climate policy, with a focus on issues of equity and uncertainty. He holds a PhD from the Energy and Resources Group at UC Berkeley, and is currently a post-doctoral scholar at the Woods Institute for the Environment at Stanford University as well as Research Director of EcoEquity. Among his recent works are “High Stakes: Designing Emissions Pathways to Reduce the Risk of Dangerous Climate Change” (2006) and “The Right to Development in a Climate Constrained World: The Greenhouse Development Rights Framework” (2007, with Sivan Kartha and Tom Athanasiou).



### Dr. Sivan Kartha

Dr. Kartha is a Senior Scientist at the Stockholm Environment Institute and director of its Climate & Energy Program. His recent research and publications focus on equity and efficiency in the formation of an international climate regime, and more broadly on policy analyses and energy technology assessment relating to climate change and sustainable development. A major area of Dr. Kartha’s research regards global instruments for responding to climate change, such as carbon trading, and equitable architectures in which such instruments could be embedded. He also works on technological options for addressing climate change, with a special focus on the environmental and socioeconomic impacts of advanced biomass energy technologies and supply in developing countries. Dr. Kartha has worked with policy makers, private sector actors, foundations, and civil society organizations throughout the world. He has provided technical input to the UNFCCC Secretariat and other UN bodies, various World Bank groups, and several international research collaborations.

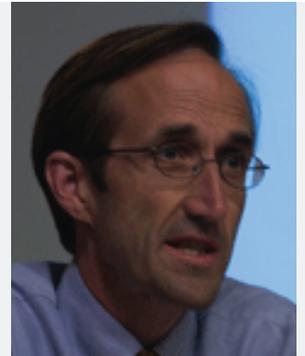


## Climate Change: Equity Between Nations and Regions

This session includes two broad themes. First, we need characterizations of the inequities involved in adapting to climate change, such as regional imbalances in adaptive capacity, adaptation in the context of national and colonial histories, and the ethics of imposing the adaptation burden in an already unequal world. The session will also reflect upon opportunities and barriers that might either enhance or frustrate efforts aimed at equity between nations and regions in climate change endeavours.

### Prof. Timmons Roberts

Timmons Roberts is Chancellor Prof. of Sociology at the College of William and Mary, USA. He spent 2006-2007 at Oxford's Environmental Change Institute as a James Martin 21st Century Prof.. His current research focuses on foreign aid and climate change, especially how adaptation and mitigation (and compensation) might be paid for. His latest books are "A Climate of Injustice: Global Inequality, North-South Politics, and Climate Policy" (MIT Press, 2007) and "Greening Aid? Understanding the Environmental Impact of Development Assistance" (Oxford University Press, 2008).



### Prof. Coleen Vogel

Coleen Vogel is the current BMW Chair of Sustainability at Wits University. She was previously the one of the vice chairs of the Land Use and Cover Programme of the IGBP/IHDP and was recently the Chair of the IHDP (International Human Dimensions Programme on Global Environmental Change). She currently leads the REVAMP research group at Wits which focuses on science thinking and Rethinking on Vulnerability, Adaptation, Mitigation Planning with a southern African focus.



## Equity in Time: Past, Present and Future Emitters and Victims

What should we do about climate change? This is an ethical question because it involves resolving conflicts of interests between emitters and victims in the past, present and the future. The projected impacts of climate change throughout the 21st century raise the major ethical challenge that those who contributed least to the problem will bear the brunt of its consequences.

Some economic analyses of climate change seek to avoid these issues by focussing solely on efficiency, and applying market discount rates to impacts on future generations. Other economic analyses, such as the Stern Review, develop policy recommendations based on an explicit utilitarian perspective. While it is tractable, utilitarianism has important drawbacks and it is far from the only available moral philosophy. How should we proceed when different people make different ethical judgements? This question is significant because it affects the level of ambition and the approach to burden-sharing of a post-2012 agreement and the political will of many nations to participate in the process.

### Dr. Cameron Hepburn

Dr Cameron Hepburn is a Research Fellow in Economics at New College and the Smith School of Enterprise and the Environment at the University of Oxford. His research focuses on climate change policy, ethics and design of emissions trading schemes. He was educated in Law and Chemical Engineering at Melbourne University, and gained his Doctorate in Economics from Oxford University (as a Rhodes Scholar). Cameron is actively involved in public policy in the UK as a member of the DEFRA Academic Panel, and he wrote two background research papers to the Stern Review on the Economics of Climate Change, along with contributions for the OECD and the United Nations. He has also co-founded two companies active in the green arena: Climate Bridge Ltd, a company reducing emissions in China and India, and Vivid Economics, London-based consultancy specialising in environmental and climate change related economic analysis, with clients from business and government around the world. Cameron has been interviewed on the Today Programme on BBC Radio 4, Analysis, More or less, and the World Business Review on the BBC World Service. His work has been highlighted in broadsheets such as the Financial Times and the Economist.



### Dr. Carlos Nobre

Carlos A Nobre, received his Engineer degree in Electronics Engineering at the Aeronautics Institute of Technology (ITA), Brazil, and his Ph.D.

in Meteorology at the Massachusetts Institute of Technology (MIT), USA.

Currently he is a Senior Scientist with the Brazilian National Space Research Institute (INPE) and in charge of the newly-established Centre for Earth System Science. He is the scientific coordinator of the São Paulo State Science Foundation's Research Programme on Global Climate Change. He is also the executive secretary of the Federal Government Climate Change Research Network (Rede CLIMA). He held the position of Director of INPE's Centre for Weather Forecasting and Climate Studies from 1991 to 2003 and was Program Scientist for the Large Scale Biosphere-Atmosphere Experiment (LBA) from 1996 to 2002. He is the chair of the Scientific Committee of the International Geosphere-Biosphere Programme (2006-2011). He chaired the Committee on Interdisciplinary Post-Graduate Courses of CAPES (Education Ministry) from 2005 to 2007.

He has participated in the IPCC Assessments of 1990, 2001 and 2007 and on the Special Report on Land Use, Land Cover Change and Forestry (2000). He is a member of the Brazilian Academy of Sciences and of the Academy of Sciences of the Developing Nations (TWAS). His scientific interests encompass biosphere-atmosphere interactions, climate change modeling and Amazonian interdisciplinary studies. He has published over 130 scientific articles, books and book chapters, which have been cited over 3000 times in the scientific literature.



## Equity between Humans and the Rest of Nature.

As human population increases, demands on land for agriculture and increasingly for cropland biofuels result in the conversion of natural lands with high native biodiversity to managed agricultural lands of lower diversity and often dominated by exotic species. Thus, when biofuels are used to replace fossil fuels for energy, there is a positive impact on the Earth's climate, but a potential negative impact on its species diversity. This session will explore ethical questions of the role and rights of humans versus other animals and plants on planet Earth and the relative costs and benefits of increasing human domination of the land surface at the expense of natural ecosystems.

### Prof. Dale Jamiesen

Dale Jamieson is Director of Environmental Studies at New York University, where he is also Prof. of Environmental Studies and Philosophy, and Affiliated Prof. of Law. He is the author of *Ethics and the Environment: An Introduction* (Cambridge, 2008), and *Morality's Progress: Essays on Humans, Other Animals, and the Rest of Nature* (Oxford, 2002). He is also the editor or co-editor of seven books, the author of nearly one hundred articles and book chapters, and the co-author of a major report to the US Environmental Protection Agency on Cultural Barriers to Behavioral Change. Dr. Jamieson is currently writing a book on the moral and political challenges of climate change, a topic on which he has worked for more than twenty-five years.



### Dr. William H. Schlesinger

On 1 June 2007, William H. Schlesinger was named President of the Cary Institute of Ecosystem Studies, a private ecological research institute on the grounds of the Cary Arboretum in Millbrook, NY. He assumed this position after 27 years on the faculty of Duke University. Completing his A.B. at Dartmouth (1972), and Ph.D. at Cornell (1976), he moved to Duke in 1980, where he retired in spring 2007 as Dean of the Nicholas School of the Environment and Earth Sciences and as James B. Duke Prof. of Biogeochemistry.

He is the author or coauthor of over 180 scientific papers on subjects of environmental chemistry and global change and the widely-adopted textbook *Biogeochemistry: An analysis of global change* (Academic Press, 2nd ed. 1997). He was among the first to quantify the amount of carbon held in soil organic matter globally, providing subsequent estimates of the role of soils and human impacts on forests and soils in global climate change.

He was elected a member of The National Academy of Sciences in 2003, and was President of the Ecological Society of America for 2003-2004. He is also a fellow in the American Academy of Arts and Sciences, the American Geophysical Union, and the Soil Science Society of America.



## Differential Effects of Climate Change on Human Health and Well-Being.

This session will review, via examples drawn widely from around the world, the range and nature of risks to human health from climate change – including the future projection of risks under scenarios of climate change. The significance of these risks will be discussed in relation to an understanding of environmental life-support processes and sustainability. While that understanding is an important stimulus to early effective mitigation, there is now a further need for research and policy focus on understanding risk differentials between and within populations and regions, and to then develop and evaluate adaptive strategies, appropriately targeted, that can lessen unavoidable risks to health from current and pending climate change. The role of national governments and international agencies will be explored. The challenge for the health sector at large, including the need to engage in a broader collaboration across other sectors, will be discussed.

### Dr. Roberto Bertollini

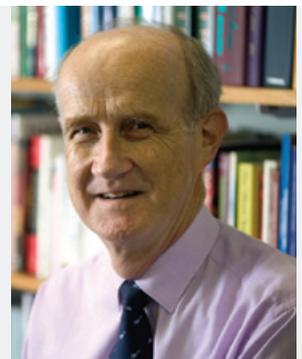
Roberto Bertollini holds a degree in medicine and a postgraduate degree in pediatrics, as well as a Master in Public Health. He is Coordinator of the Evidence and Policy for Environment and Health unit at the WHO Department of Public Health and Environment in Geneva with the special task to develop the WHO global policy and response to the health impacts of climate change. He was previously technical Director at the WHO Regional Office for Europe, 2000-2007. His main professional interests concern the environmental influences on health, with special reference to the effects of emerging threats such as climate change as well as the use of epidemiology for public health policy development and evaluation of public health programmes and practices.



During the years he has been involved in the development and progress of the environmental health agenda in Europe and led the organization of major scientific and political events including Ministerial Conferences, such as the one on Environment and Health, held in Budapest in June 2004.

### Prof. Anthony J McMichael

Tony McMichael, medical graduate and epidemiologist, holds a national Research Fellowship at the Australian National University, Canberra. He was previously Prof. of Epidemiology at the London School of Hygiene and Tropical Medicine, 1994-2001. His primary research focus is on environmental influences on health and disease (infectious and non-infectious). He has been an international pioneer in research on the health risks of climate change. During 1993-2007 he played a central role in the scientific assessment of health impacts for the UN's Intergovernmental Panel on Climate Change (IPCC). His books include *Human Frontiers, Environments and Disease: Past Patterns, Uncertain Futures* (Cambridge University Press 2001) and *Climate Change and Human Health: Risks and Responses* (WHO, 2003).



## Avoiding Land-Cover Change to Reduce Carbon Emissions

Land use changes through forest clearance and/or agricultural conversion can release significant amounts of carbon into the atmosphere. However, in many circumstances agriculture more generally, and forests in particular, can also act to sequester and store carbon. Much of the variation in carbon dynamics can therefore be attributed to anthropogenic impacts of land use. Region specific management, policy, and monitoring strategies are needed to moderate and/or control change in land use to achieve policy goals of controlling carbon-emissions. This session invites presentations on observational and/or modeling research that may influence change in land use management technique and policy focused toward reducing carbon emissions

### Prof. Mark Ashton

Mark Ashton is the Morris K. Jesup Prof. of Silviculture and Forest Ecology and the Director of School Forests at the School of Forestry and Environmental Studies, Yale University. He conducts research on the biological and physical processes governing the regeneration of natural forests and on the creation of their agroforestry analogs. His long-term research compares growth, adaptation, and plasticity within and among close assemblages of tree species that have evolved within differing forest climates. Findings from these studies have theoretical implications for understanding the maintenance of forested ecosystems and the adaptability of forests to change in climate. The results of his research have been applied to the development and testing of techniques for land rehabilitation and for the sustainable management of native forests for a variety of ecosystem services including carbon sequestration and storage. He is the author of over 100 peer review papers and seven books.



### Prof. Liping Zhou

Liping Zhou is Cheung Kong Prof. of Physical Geography in the Department of Geography at Peking University, China. He is deputy chairman of the academic committee of the Ministry of Education Key Laboratory for Earth Surface Processes. His research has been mainly on long-term environmental change in loess regions of northern mid-latitude. He has recently become interested in the history of human impact on landscape in China, particularly the effect of rice cultivation in ancient China on the emission of methane in the past. Part of his current research includes the evaluation of the impact of land use change on carbon dynamics in grassland of northern China by means of carbon isotopes. He is responsible for the accelerator mass spectrometry facility of Peking University. He holds a PhD in Quaternary Science from University of Cambridge and a BSc in Geography from Peking University.

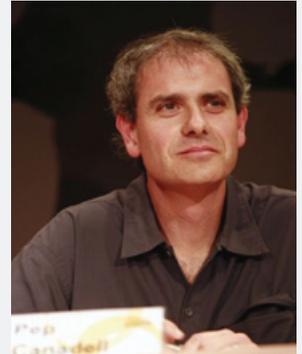


## Integrating Economic Models and the Dynamics of the Carbon Sinks

Contributions are invited on socio-economic evaluations of biospheric carbon sinks with the purpose to assess the potential and cost of reduce net greenhouse gas emissions. All biospheric carbon sinks are considered including forestry, agriculture, bioenergy, Reduced Emissions from Deforestation and Degradation (REDD), black carbon sequestration, and others. The focus can be on individual sectors (eg, forestry) or integrated multi-sectorial approaches (eg, integrative assessment). Economic evaluations and approaches considering ways to account for trade-offs and synergies as they relate to sustainable pathways are encouraged.

### Dr. Pep Canadell

Pep Canadell is the executive director of the Global Carbon Project, a project of the Earth System Science Partnership, based at the Commonwealth Scientific and Industrial Research Organization in Australia. His work involves internationally coordinated research on i) regional and global carbon budgets; ii) vulnerability of carbon stocks and process to changes in climate and land use, iii) climate mitigation strategies to stabilize atmospheric carbon dioxide, particularly biospheric-based ones such as forestry, agriculture, bioenergy, and reduced emissions from deforestation and degradation.



## Carbon Capture and Storage: Technology, Economy, Social Attitudes

Fossil fuel will be a major energy source for many decades to come. Mitigating climate change by reducing the emission of CO<sub>2</sub> due to our energy consumption therefore requires further development and implementation of CCS technology. In this session an update will be presented of the Special Report of IPCC – published in 2005 - about the status of knowledge regarding the technical, environmental, economic and social dimensions of CCS. We plan to discuss: new developments in CO<sub>2</sub> capture, the escalation of costs in recent years and the outlook for cost reductions, environmental impacts of CCS, safety risks of CO<sub>2</sub> storage, the availability of storage sites, infrastructural development needs for the deployment of CCS, public acceptance of CCS, legal and institutional issues, options to improve the performance of CCS, as well as policies and approaches to address major obstacles for CCS deployment.

### Prof. Wim C. Turkenburg

Wim C. Turkenburg (1947) is professor and head of the Department of Science, Technology and Society (STS) and scientific director of the Copernicus Institute for Sustainable Development and Innovation, Utrecht University, The Netherlands.

He is also board member of the Energy research Centre of the Netherlands (ECN), vice-chair of the Netherlands research programme on CO<sub>2</sub> Capture, Transport and Storage (CATO), chairman of the Platform Communication on Climate Change (PCCC), member of the Executive Committee of the Global Energy Assessment (GEA), and chairman of the Programme Committee of the 10th International Conference on Greenhouse Gas Control Technologies (GHGT-10, September 2012).

Earlier he served on e.g. the UN Committee on Energy and Natural Resources for Development (UN-CENRD), the General Energy Council of the Netherlands, the Council on Housing, Physical Planning and Environment of the Netherlands, the editorial board of the World Energy Assessment, the Organizing Committee of the First International Conference on Carbon Dioxide Removal (ICCD-1, 1992), and working groups of IPCC and the World Energy Council. In 1992 he was part-time professor at the Free University of Brussels (Belgium) in the field of Environmental Sciences.

Wim Turkenburg studied physics, mathematics, and astronomy at Leiden University (NL) and the University of Amsterdam (NL), and received his Ph.D. degree in 1976, based on surface science research executed at the FOM Institute for Atomic and Molecular Physics (AMOLF) in Amsterdam. He published several hundreds of articles, reports and papers on energy technology assessment, energy systems analysis, energy and sustainable development, climate change and CO<sub>2</sub>-emission reduction, energy efficiency improvement, renewable energy (solar-PV, wind and biomass energy), Carbon Capture and Storage (CCS), and environmental risk management.

In the field of CCS he received in 1996 the Greenman Award.



## Potentials and Limitations of Biofuels

This session invites papers discussing the LCA, system analyses, environmental impacts and problems encountered so far for the production of various biofuels involving bioethanol, biogas, BDF and wood pellets. Also, novel systems, processes and technologies are welcomed.

### Prof. Akiyoshi Sakoda

Akiyoshi Sakoda is a Prof. at Institute of Industrial Science, University of Tokyo. His areas of specialization include Chemical Systems Engineering (especially, adsorptive separation engineering and environmental and chemical engineering). He is currently focusing on researches in the areas of fundamentals and applications of adsorption, physicochemical water treatments, and sustainable biomass utilization systems and their key technologies. Regarding the sustainable and effective utilization of biomass resources especially in Japan, he has proposed a 'Japan-specific Biomass Refinery (Biorefinery)' system several years ago, where local biomass resources are utilized as the resources for local materials and local energy. Since then, he has been developing its key technologies, designing and demonstrating a couple of typical 'Biomass Towns' in Japan and promoting cooperative researches in Asian countries and regions.



### Prof. Claus Felby

Prof. Claus Felby has worked with biomass and biotechnology for more than 15 years both within private industry and academia. He has extensive knowledge on the structure and processing of biomass and has coordinated and managed national and international projects within the area. His current research group has been part of some of the technical and scientific breakthroughs bringing lignocellulosic ethanol close to a commercial reality. An important aspect of his current research is the linking of a sustainable biomass supply and the bioenergy conversion technologies. Currently he is heading the Fuel for Life strategic research area on bioenergy at the Faculty of Life Sciences, University of Copenhagen.

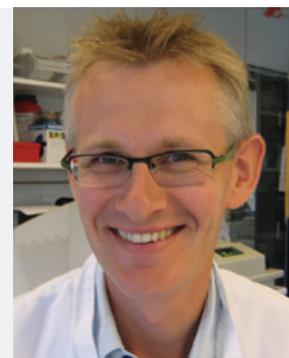


### Science Manager Anders Viksø-Nielsen

Anders Viksø-Nielsen is Science Manager in Novozymes Biofuels R&D. Anders has a background in biochemistry and enzymology with a PhD degree in plant biochemistry from University of Copenhagen (the former Royal Veterinary and Agricultural University of Denmark) with research in starch biosynthesis and genetically engineering of plants to function as green factories.

Anders joined Novozymes in 2001 where he focused on developing new enzymes for the starch and 1st generation bioethanol industry. He is inventor of several patents on the so-called raw starch hydrolysis process for bioethanol production – a process which saves a considerable amount of energy compared to the traditional ethanol process. This process is now in operation at approximately one fourth of US bioethanol plants.

Currently Anders is a project leader one of the biomass to ethanol projects – more specifically a project on enzymatic hydrolysis of hemicellulose to fermentable sugars.



## Renewable Energies – How Far Can They Take Us?

In this session we invite discussion of the extent to which energy needs across sectors, including transport, can be covered by renewable energies in years 2020, 2050 and 2100. Discussions can include integrated systems as well as individual technologies, and indicate current state of the art, projections and challenges.

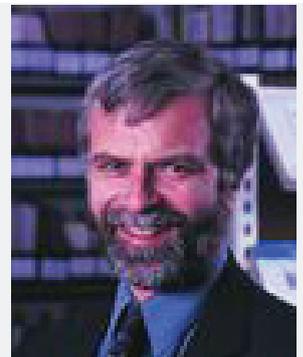
### Director Henrik Bindslev

Henrik Bindslev is Director of Risø National Laboratory for Sustainable Energy at the Technical University of Denmark. Risø has particular scope for creating impact on society by influencing the supply and consumption of energy to support sustainable development and by developing health-related technology to increase quality of life. Henrik Bindslev holds a Dr. Phil. in Plasma Physics from Oxford University and an MSc in Engineering Science from the Technical University of Denmark.



### Prof. Jim Skea

Prof. Jim Skea is Research Director at the UK Energy Research Centre. He is also a founding member of the Committee on Climate Change. His main research interests are: energy/environmental policies; sustainable development; climate change; environmental regulation and technical change; and business and environment issues more generally. Jim Skea holds a Ph.D. in Energy Research from University of Cambridge and a BSc in Mathematical Physics from University of Edinburgh.



## Enhancing Energy Conservation and Efficiency

Satisfying energy service demands through less energy input (i.e. through conservation or improved efficiency) has been widely established as one of the largest potential contributors to meeting climate stabilization targets in the short- to mid-term. Beyond reducing GHG emissions, improved efficiency can also contribute to a wide variety of sustainable development-related goals, including poverty alleviation, social welfare, health, indoor and outdoor air quality and energy security and competitiveness. However, progress in this area has been incremental as compared to the magnitude of the change that is required and is possible. The session will explore novel options (technological and non-technological, as well as policies) that can catalise leapfrogging or major progress in energy efficiency and conservation worldwide. Beyond discussing individual energy-using devices, the session will also explore new frontiers in systemic and lifecycle approaches and focus on the provision of energy services rather than just fuels, such as through urban design, transport systems, and integrated building design principles.

### Prof. Diana Ürge-Vorsatz

Diana Ürge-Vorsatz is a Prof. and Director of the Center for Climate Change and Sustainable Energy Policy (3CSEP) at the Central European University (CEU) in Budapest. She has conducted her Ph.D. studies at the University of California (Berkeley and Los Angeles), and holds an MS in Physics from the Eotvos University in Budapest, Hungary.

She acted as a Coordinating Lead Author for the Fourth Assessment Report of the IPCC for the chapter "Climate Change Mitigation in Buildings", served on the United Nation's Scientific Expert Group on Climate Change, and is presently leading the buildings-related work in the Global Energy Assessment to be published in 2010. Beyond having published widely in scholarly journals and book sections, she is serving as the associate editor of the Springer journal "Energy Efficiency", where she is presently co-editing a special issue on the relationship between efficiency and climate change. She has worked on and directed several international research projects for organisations including the European Commission, the European Parliament, the Global Environment Facility, United Nation's Environment Programme, the World Energy Council, Climate Strategies and the World Bank. Dr. Urge-Vorsatz was awarded the Hungarian Republic's Presidential Award in 2008.



## Session 21

Chair Prof. Jiahua Pan

### Integrated Energy Mixes from a Socio-Economic and Environmental Perspective

There are a variety of alternative approaches to reducing carbon emissions via market based mechanisms that raise the price of carbon. It is inevitable that the global policy approach will evolve by linking national systems over time in a cooperative multilateral framework. This session will explore the strengths and weaknesses (environmental, economic and political) of alternative approaches to developing national emission trading systems that may either cap emissions in a traditional cap and trade policy, that provide no annual cap such as tax base approaches or frameworks that combines long term goals with short term price stability provided by the Hybrid approaches. This session will also explore the problems (environmental, economic and political) in linking the variety of possible emission trading systems and tax approaches together to develop a coherent and sustainable global framework.

#### Prof. Jiahua Pan

Jiahua Pan is currently deputy director of the Research Centre for Urban & Env. Studies and Prof. of economics at the Graduate School of the Chinese Academy of Social Sciences. He holds a PhD in economics from Cambridge University in 1992 and an MSc in Ecology from Beijing University of Forestry. Previous experiences include advisor on environment and development in UNDP Beijing office and Lead author of the IPCC Working Group III 3rd and 4th Assessment Report on Mitigation. He serves as a Member of China National Expert Panel on Climate Change and Vice president of the Chinese Society of Ecological Economists. He is the chief architect for basic need/ carbon budget approach. His recent publications are found in Science, Global Environmental Change, and the Financial Times.



## Session 22

Chair Prof. Joyeeta Gupta

### Transforming Institutions to Managing a Carbon Constrained World

This session will focus on how institutions (norms, principles, rules and instruments) deal with the mitigation side of climate change. Institutions tend to be conservative, changing slowly to deal with social problems. However, with problems such as climate change, institutions will have to evolve rapidly to address the problem of climate change. This session will present papers that cover the entire spectrum of climate institutions from local through to global level.

#### Prof. Joyeeta Gupta

Joyeeta Gupta is Prof. of climate change law and policy at the Vrije Universiteit Amsterdam and of water law and policy at the UNESCO-IHE Institute for Water Education in Delft. She is editor-in-chief of International Environmental Agreements: Politics, Law and Economics and is on the editorial board of journals like Carbon and Law Review, International Journal on Sustainable Development, Environmental Science and Policy, and International Community Law Review. She was lead author in the Intergovernmental Panel on Climate Change which recently shared the 2007 Nobel Peace Prize with Al Gore and of the Millennium Ecosystem Assessment which won the Zayed Second Prize. She has published extensively on climate change. She is on the scientific steering committees of many different international programmes including the Global Water Systems Project. She has published several books on climate change including Gupta, J. (1997). The Climate Change Convention and Developing Countries - From Conflict to Consensus?, Environment and Policy Series, Kluwer Academic Publishers, Dordrecht; and Gupta, J. (2001). Our Simmering Planet: What to do About Global Warming, Zed Publishers, London. Edited books include Faure, M., J. Gupta and A. Nentjes (eds.) (2003), Climate Change and the Kyoto Protocol: The Role of Institutions and Instruments to Control Global Change, Edward Elgar Publishers, Cheltenham Glos; Van Ierland, E., J. Gupta and M. Kok (eds.) (2003). Issues in International Climate Policy: Theory and Policy, Edward Elgar Publishers, Cheltenham Glos; Gupta, J. and M. Grubb (eds.) (2000), Climate Change and European Leadership: A Sustainable Role for Europe, Environment and Policy Series, Kluwer Academic Publishers, Dordrecht.



## Integrating National and International Approaches to Carbon Pricing Strategies : Developing a Global Framework

There are a variety of alternative approaches to reducing carbon emissions via market based mechanisms that raise the price of carbon. It is inevitable that the global policy approach will evolve by linking national systems over time in a cooperative multilateral framework. This session will explore the strengths and weaknesses (environmental, economic and political) of alternative approaches to developing national emission trading systems that may either cap emissions in a traditional cap and trade policy, that provide no annual cap such as tax base approaches or frameworks that combines long term goals with short term price stability provided by the Hybrid approaches. This session will also explore the problems (environmental, economic and political) in linking the variety of possible emission trading systems and tax approaches together to develop a coherent and sustainable global framework.

### Prof. Warwick J McKibbin

Warwick McKibbin is Prof. and Director of the Centre for Applied Macroeconomic Analysis in the ANU College of Business and Economics and Adjunct Prof. in the Australian Centre for Economic Research in Health at the Australian National University. He is also a Prof.ial Fellow at the Lowy Institute for International Policy in Sydney; a non-resident Senior Fellow at the Brookings Institution in Washington D.C., and President of McKibbin Software Group. He is a member of the Board of the Reserve Bank of Australia and is a member of the Australian Prime Minister's Science, Engineering and Innovation Council. He recently served as a member of the Australian Prime Minister's Taskforce on Uranium Mining Processing and Nuclear Energy in Australia. Prof McKibbin received his B.Com (Honours 1) and University Medal from University of NSW (1980) and his AM (1984) and a PhD (1986) from Harvard University. He is a Fellow of the Australian Academy of Social Sciences and was awarded the Centenary medal in 2003 "For Service to Australian Society through Economic Policy and Tertiary Education".



## The Role of Agriculture in Mitigating Climate Change

Agriculture is responsible for 18-31 % of global greenhouse gas emissions. There are many gases involved, including CO<sub>2</sub>, methane and nitrous oxide, at the emissions stem from many sources, including fossil fuel use, fertiliser production, nitrogen cycling in manures and soil, enteric fermentation, rice paddies, peatland management and conversion of virgin land to agriculture. There is an equally wide range of mitigation measures covering all aspects of the agricultural production, including livestock, grasslands, manure handling and arable crop production. Contributions are invited from any part of the world covering both greenhouse gas emissions from agriculture and their mitigation.

### Prof. Jørgen E. Olesen

Jørgen E. Olesen holds a research Prof.ship in adaptation and mitigation to climate change in agriculture at Faculty of Agricultural Sciences, University of Aarhus. He was involved in initiating Danish research on agrometeorology. He has lead several interdisciplinary projects, including projects on integrated wheat production, application of remote sensing and GIS in agriculture, development of a whole-farm simulation model, and several projects on organic farming, reduced tillage and climate change and greenhouse gas emissions. He has participated in several national and international committees on climate change impacts in agriculture and reduction of greenhouse gas emissions from agriculture. He is also a member of the Intergovernmental Panel on Climate Change, who received the Nobel Peace Price in 2007.



### Prof. Pete Smith

Pete Smith is the Royal Society Wolfson Prof. of Soils and Global Change at the Institute of Biological and Environmental Sciences, School of Biological Sciences at the University of Aberdeen (Scotland, UK). He has served as Convening Lead Author, Lead Author and Author for the Intergovernmental Panel on Climate Change since 1996 and was the Convening Lead Author of the Agricultural Greenhouse Gas Mitigation chapter of the IPCC Fourth Assessment Report (Working Group III). He has coordinated and participated in many national and international projects on soils, climate change, greenhouse gases, mitigation and impacts and ecosystem modelling.



## Session 25

Chair Director General Frances Seymour

### The Role of Forests in Climate Change Mitigation

The purpose of this session is to highlight the policy implications of research findings related to the role of forests in the mitigation of greenhouse gas emissions. Papers presented at the session will focus on two sets of challenges: (1) What are the key barriers to bringing Reducing Emissions from Deforestation and forest Degradation (REDD) into the global climate protection regime – such as defining baselines and monitoring systems, creating financial mechanisms, and controlling international leakage – and how can they be overcome? (2) What are the most important opportunities and risks to be managed in the national implementation of REDD strategies – including those related to weak institutional capacity, unclear rights to forest carbon, and opportunities for co-benefits related to poverty reduction and biodiversity conservation? For both sets of challenges, what approaches to regime design and program formulation and implementation are likely to be most effective, efficient, and equitable?

#### Director General Frances Seymour

Frances Seymour has been the Director General of the Center for International Forestry Research (CIFOR) since August 2006. At CIFOR, she has provided leadership to a new strategy for the organization, which includes two (out of six) research domains focused on the role of forests in climate change mitigation and adaptation. Prior to her service at CIFOR, Ms. Seymour served as founding Director of the Institutions and Governance Program at World Resources Institute, and has held positions at the World Wildlife Fund in Washington, DC and at the Ford Foundation in Indonesia. Ms. Seymour's own research interests have focused on barriers to mainstreaming environmental sustainability objectives into development finance, and the intersection of environmental and human rights objectives.



## Session 26

Chair Jacquie Burgess

### Beyond Technology: Changing The Ways We Live?

The focus of this session is to discuss how climate change mitigation may be achieved through behavioural change, with a view to fostering the transition towards more 'climate-friendly' individuals and societies, learning from international experiences. Psychological, sociological, communication, cultural and ethical perspectives on climate change are welcomed, to help explore ways to encourage long lasting engagement with climate change, resulting in successful shifts to low carbon behaviours. Key questions include: How can we learn from other behaviour change contexts with a view to mitigating climate change? To what extent can bottom-up community initiatives be scaled up to achieve a more pervasive behavioural change? What strategies for changing energy behaviours are effective, under what circumstances and with which audiences? What efforts have been made to change behaviour in relation to both mitigation and adaptation? How do individuals engage with low-carbon technologies?

#### Prof. Jacquie Burgess

Jacquie Burgess is Prof. of Environmental Risk and Head of the School of Environmental Sciences, University of East Anglia, UK, home for the Climatic Research Unit (CRU) and the Tyndall Centre for Climate Change Research. She is Deputy Chair of the Economic and Social Research Council's Strategic Research Board, and a member of the International Advisory Committee of the Potsdam Institute for Climate Impact Research. Jacquie's research interests include the production, circulation and consumption of environmental discourses; the development of participatory environmental decision-making mechanisms in complex science-policy issues; and action research evaluating interventions to promote more pro-environmental behaviours in homes and in workplaces. Much of her work on behaviour change has been carried out in partnership with the UK branch of the international charity Global Action Plan. Jacquie joined the Board of Trustees in 1996, becoming Chair of GAP-UK, 2000-2006.



## Low Carbon Science, Technology Policies

What breakthroughs in low-carbon, sustainable energy systems are possible? What key breakthroughs, and synergies between basic research, systems integration, and policy tools are both possible and practical in local, national, regional and in the global community to dramatically reduce greenhouse gas emissions? This session will have an equal focus on the science and policy of 'big cuts and big advances' in climate friendly energy systems, and will feature work in both developed and developing nations, and on rural and urban priorities and opportunities.

### Prof. Daniel M. Kammen

Daniel M. Kammen is the Class of 1935 Distinguished Prof. of Energy at the University of California, Berkeley, where he holds appointments in the Energy and Resources Group, the Goldman School of Public Policy, and the department of Nuclear Engineering. Kammen is the founding director of the Renewable and Appropriate Energy Laboratory (RAEL). Kammen is also the Co-Director of the Berkeley Institute of the Environment. Daniel Kammen is a coordinating lead author for the Intergovernmental Panel on Climate Change (IPCC), which won the Nobel Peace Prize in 2007. In 1998 he was elected a Permanent Fellow of the African Academy of Sciences. In 2007, Kammen received the Distinguished Citizen Award from the Commonwealth Club of California. His research is focused on the science and policy of low-carbon energy systems.



## Climate Change and Air Pollution: The Role of non-CO<sub>2</sub> Atmospheric Pollutants (CH<sub>4</sub>, Halocarbons, N<sub>2</sub>O, Ozone, Aerosols) in Climate Stabilization.

The aim of this session is to illuminate the role of air pollution as a global climate forcing and to place climate-related impacts of air pollution in the context of its other human health and environmental impacts: Methane, halocarbons, nitrous oxide, ozone and aerosols. Recognizing the success that was achieved in avoiding increased greenhouse climate forcing from chlorofluorocarbon substitutes, as a result of open communication, we hope that communication of information from this workshop can help achieve climate and health benefits.

Discussions about potential actions to reduce global warming have focused on carbon dioxide (CO<sub>2</sub>). This is appropriate, because it is the largest single human-made climate forcing now and it is expected to become the dominant forcing over the next century. However, the sum of other human-made forcings that cause warming is comparable to the forcing by CO<sub>2</sub>. Indeed, it has been suggested that climate forcings associated with air pollution, specifically tropospheric ozone (O<sub>3</sub>), black carbon (BC) aerosols, and methane (CH<sub>4</sub>) together represent a greater climate forcing than the forcing by CO<sub>2</sub>. A strong case can be made that the non-CO<sub>2</sub> climate forcings deserve greater attention than they have received.

Policy makers, if they wish to influence the course of 21st century climate substantially, must consider ways to reduce the growth of both CO<sub>2</sub> and non-CO<sub>2</sub> climate forcings. Much of the non-CO<sub>2</sub> climate forcing is associated with true air pollution, which has large effects on human health and the environment. Thus policy makers will need to consider the global warming problem in a larger context with multiple issues.

Policy makers can address these issues effectively only if they have quantitative composition-specific information about both the climate forcings and the health and environmental impacts of different atmospheric constituents. At present the magnitude and efficacies of many of these air pollution climate forcings are not well quantified.

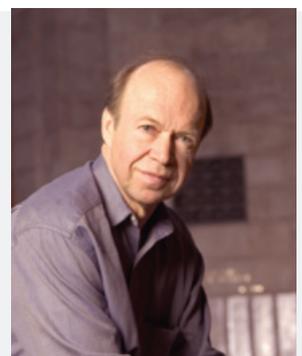
### Prof. Ole John Nielsen

Ole John Nielsen has been a Prof. of atmospheric chemistry at the University of Copenhagen for 9 years and is the director of Copenhagen Center for Atmospheric Research. Previously he has been employed at Risoe National Research Center and Ford Motor Company. He is the co-author of 200 peer-reviewed papers. His focus area is atmospheric degradation of alternative CFCs and atmospheric degradation of halogenated compounds in general.



### Prof. James Hansen

James Hansen is director of the NASA Goddard Institute for Space Studies in New York City. He was trained in physics and astronomy in the space science program of Dr. James Van Allen at the University of Iowa. Dr. Hansen is best known for testimony on climate change to Congress in the 1980s that helped raise broad awareness of the global warming issue. He was elected to the National Academy of Sciences in 1995 and has received awards including the World Wildlife Federation's Conservation Medal from the Duke of Edinburgh. He was designated by Time Magazine as one of the world's 100 most influential people in 2006. Dr. Hansen disputes the contention, of fossil fuel interests and their government supporters, that it is god-given fact that all fossil fuels must be burned, and he outlines actions needed to stabilize climate, and steps that the public can take to influence government and industry policies.



## Climate Change and Water Systems

"The 4th Assessment Report of the IPCC sends a clear message: "if mitigation is about energy, adaptation is about land and water". The projected impacts of climate change will hit first and foremost through the water cycle. Significant changes in rainfall patterns and intensities, and increased evaporation and water temperatures, will affect all water dependent sectors, in particular agriculture and energy, and increased climate variability will lead to more serious floods and longer droughts. In coastal areas these changes combine with sea level rise, making the coastal cities, the mega deltas of the World, and the small island states 'hot spots' for climate change impacts. All regions of the World will be affected, but the poor people in the developing countries will face the most serious consequences.

In the absence of reliable climate data in most parts of the World these changes pose serious challenges to adaptation. The session "Climate Change and Water Systems" will address the current state of the art in providing the scientific basis for planning and implementing adaptation measures to address climate change and increased variability.

### Prof. Torkil Jønych Clausen

Prof. Torkil Jønych-Clausen is currently Managing Director of DHI Water Policy, a company in the DHI Group. He is Senior Adviser to the Global Water Partnership (GWP), Adjunct Prof. at the Technical University of Denmark, and Chair of the Danish Water Forum. He serves on a number of national and international committees and boards, including Chair of the Advisory and Management Committees of the WMO Flood Management Programme, and Board Member of European Water Partners.

Prof. Jønych-Clausen received the King Hassan II Great World Water Prize, awarded by the Government of Morocco and the World Water Council, at the Fourth World Water Forum in Mexico 2006.

Previously he has been the first Chair of the GWP Technical Committee (1996-2003), Managing Director of the Danish Water Quality Institute, Counsellor and Senior Technical Adviser in the Danish Ministry of Foreign Affairs/Danida and Head of the Hydrology Department of DHI.

Prof. Jønych-Clausen has degrees in hydrology (MSc) and water resources (PhD), and he has for 35 years worked in these fields in more than 40 countries world-wide, including multi-year residences in Africa, Asia and the US.



### Prof. Maria Carmen Lemos

Maria Carmen Lemos is an Associate Prof. of Natural Resources and Environment at the University of Michigan, Ann Arbor and Senior Policy Scholar at the Udall Center for the Study of Public Policy at the University of Arizona. She currently serves as the vice-Chair of Scientific Advisory Board for the InterAmerican Institute for the Study of Climate Change (IAI) and as member of the Committee on Strategic Advice on the U.S. Climate Change Science Program, National Research Council, US. She has MSc and PhD degrees in Political Science from the Massachusetts Institute of Technology, MIT. During 2006-2007 she was a James Martin 21st Century School Fellow at the Environmental Change Institute at Oxford University. Her research focuses on public policymaking in Latin America and the U.S., especially related to the human dimensions of global change, the co-production of science and policy, and the role of technoscientific knowledge in environmental governance and in building adaptive capacity, especially of water systems, to climate variability and change. Recent publications include papers on Climatic Change, Ecology & Society, Global Environmental Change and the Annual Review of Natural Resources and Environment. She is a contributing author to Intergovernmental Panel on Climate Change (IPCC) and the US Climate Change Science Program Synthesis Reports. Maria Carmen is originally from Brazil where she still carries out most of her research.

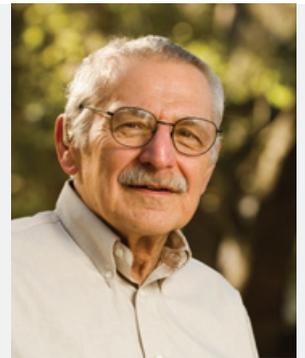


## Impacts of Climate Change on Ecosystem Services

The impacts of global warming on biotic systems are already in evidence and the predictions are that as the climate continues to be altered we will see increasingly dramatic reconfigurations of the earth's ecosystems and their functioning, and hence their capacity to deliver ecosystem services. Ecosystem services are the end of a delivery system that flows starting from the diversity of organisms, their abundances, characteristics and configurations. These in turn, along with the physical environment, determine the nature and tempo of ecosystem processes, or their functioning, which ultimately controls the delivery of ecosystem services. In this symposium session we examine these linkages with a focus on a variety of crucial services extending from how climate change will affect biodiversity directly and subsequently to how provisioning services such as water supply and fisheries will be affected. We then look at two important regulating services that ecosystems provide: climate regulation and disease regulation and conclude with a view of how changes in the delivery of cultural will be altered and how these may expect to entrain societal responses to these changes.

### Prof. Harold A. Mooney

Harold A. Mooney holds the Paul S. Achilles Prof.ship in Environmental Biology at Stanford University. He is currently engaged in research on the impacts of global change on terrestrial ecosystems, especially on productivity and biodiversity, and is also examining those factors that promote the invasions of non-indigenous plant species as well as on the global impact of animal production systems, both extensive and intensive. Mooney recently served as Secretary General of the International Council for Science (ICSU) and as the Scientific Panel co-Chair for the Millennium Ecosystem Assessment. At present he chairs the Scientific Committee for Diversitas, an international program for biodiversity research. He is a member of the U.S. National Academy of Sciences



## Biodiversity: Enhancement of Resilience or Facilitating Transformation?

Recognising that individual species will respond differentially to climate change in the context of other drivers of change, in this session we would like to focus particularly on (i) how whole ecosystems will change in terms of their biodiversity; (ii) when it makes more sense to enhance system resilience or promote system transformation; and (iii) what practical policy and management measures and changes are required to best enable biodiversity to respond to climate change.

### Prof. Paul Leadley

Prof. Paul Leadley is Prof. and Director of the Laboratory of Ecology Systematics and Evolution at Université Paris-Sud 11. He is a co-chair of the bioDISCOVERY core project of DIVERSITAS (an international program of biodiversity research).

### Dr. Mark Stafford-Smith

Dr Mark Stafford Smith is Science Director of CSIRO's Climate Adaptation National Research Flagship, and a vice-chair of the Science Committee of the International Geosphere-Biosphere Programme. He is a systems ecologist with special interest in policy and management issues around arid environments, and a long interest in how climate change interacts with these concerns. He has recently contributed to a Strategic Assessment of the Vulnerability of Australia's Biodiversity to Climate Change for the Australian Government.



## Economic Costs of Adapting and not Adapting to Climate Change

Economic systems will change in response to climate change, and in many instances the response can be shaped through policies and public and private investment decisions. Investing in adaptation measures carries costs, as will wearing the impacts of climate change. Decisions about adaptation in the economic sphere will depend on differential estimates of costs, given assessments of climate change risks through time, and assessments of how other parts of the economy might be affected and react. This session presents case studies and modelling on the costs of adapting and not adapting. It also offers a forum for conceptual contributions on the possibilities and limitations of economic analysis to guide adaptation decisions.

### Dr Frank Jotzo

Dr Frank Jotzo is a Research Fellow at the Australian National University, and runs the climate change theme under Australia's Environmental Economics Research Hub. He was economic adviser to the Garnaut Climate Change Review, which in 2008 made recommendations on climate policy to the Australian government. Frank has worked on economic mechanisms and policy design for mitigation since the inception of the Kyoto Protocol, especially in the international context of the Asia-Pacific region. His recent research interests include economic system responses to climate change.



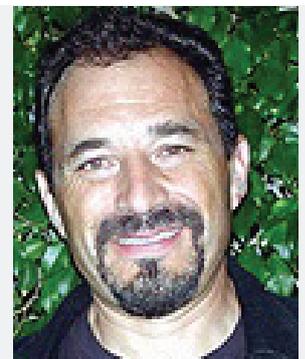
## Adaptation to Climate Change in Urban Areas

The bidirectional interactions between urban areas and climate change have fostered an impressive array of responses during recent years. A review of those responses shows diverse local initiatives in cities of industrialized countries, while only a few cities in poor countries have paid attention to climate change. Urban responses to climate change focus often on mitigation and only a few cities have developed adaptive actions. Understanding the characteristics, extent, dynamics, and sustainability of those responses is necessary in assisting local urban communities to better address the challenges created by climate change. Many of those responses are fragmented and have not considered the interaction between adaptation to climate change and current challenges of urban growth, the potential conflict between mitigation and adaptation actions in urban areas, the consequences of adaptation on equity and opportunities for sustainability, or the negative consequences of such on other sectors. Well-intended fragmented actions create often only partial solution to complex problems such as adapting to climate change. Better understanding and improving current and future responses to climate change will prevent future problems and strengthen the operation of urban areas and the livelihoods of their inhabitants in the short and long-term. Climate change is not only an environmental problem; it is a major challenge for development. The wide ramification of its consequences in urban areas also provide an opportunity to search for new way of understanding and conceptualizing local urban growth according to the new demands and conditions in the 21st century.

This session seeks to contribute to the design and implementation of adaptation to climate change in urban areas. The session seeks to attract oral presentations and posts addressing a broad range of issues: methodological and conceptual challenges in adaptation, the results of specific adaptive actions, social, economic, technical, and political challenges and opportunities in the design and implementation of adaptation, the relationship between vulnerability and adaptation to climate change and current urban problems, strategies to bridge the science and policy/practice behind adaptation, institutional challenges to promote, strengthen, and improve adaptation, and equity concerns in adaptation to climate change. The session invites scholars from poor and rich countries and seeks to extract insights and conclusions useful to decision-makers, the scientific community, the business sector, and local urban practitioners.

### Prof. Roberto Sanchez Rodriguez

Roberto Sanchez Rodriguez completed his BA from the National Autonomous University of Mexico (UNAM) and his PhD in Urban and Regional Planning from the University of Dortmund, Germany. He has taught at universities in Mexico, France, and the U.S. He is currently a Prof. at the Department of Environmental Sciences of the University of California, Riverside, and director of the University of California Institute for Mexico and the U.S. (UC MEXUS). His interests are in the inter-linkages between environment and development, sustainability, and global environmental change where he focuses on the vulnerability and adaptation of urban areas to climate change. He was a Vice-Chair of the Scientific Committee of the International Human Dimensions Program of Global Environmental Change (IHDP) and he is currently a Co-Chair of the IHDP core project on Urbanization and Global Environmental Change.



## Adapting Human Land Use to Climate Change

Human land use is a major driving force of global change. 50% of the Earth surface is transformed by and almost all land has been affected in some way by human action. Climate variability alters land-use practices differently in different parts of the world, highlighting differences and interconnections in regional and local vulnerability and resilience.

Preparing for impacts of climate change must be based on insight in the complex interaction between land use and climate variability. This encompasses a scientific understanding of the process of land-use change in the face of climate change, the impacts of different land-use decisions, and the ways that decisions are affected by a changing climate and increasing climate variability. This session invites contributions that examine historic, current, and future land use changes, its drivers, feedbacks to climate, and its environmental, social, and economic consequences.

### Prof. Anette Reenberg

Anette Reenberg has a scientific background in the geographical sciences. Her research addresses issues related to natural resource management strategies in rural landscapes, specifically human-environment interaction and sustainability in Sahelian land use systems, including adaptation to climate change. The focus is on land-use and land cover systems viewed in an interdisciplinary perspective, i.e. relating land use dynamics to their larger scale contexts of biophysical, cultural, socio-economic, institutional or demographic nature. Most recently she has been appointed as chair of the scientific steering committee of The Global Land Project, a joint research agenda under IHDP (International Human Dimension Programme) and IGBP (International Geosphere Biosphere Programme), and is leading the GLP international project office based at the University of Copenhagen.



## Adapting Coastal Zone and Marine Resources to Climate Change

The session covers:

1. Scenarios for changes in water temperature, sea level, storm surges, cyclone/typhoons and river discharges for specific low lying areas.
2. The analysis of effects of such changes on a) marine resources, b) coastal zone (natural) habitats and on c) human use of the coastal zone. The latter includes urban areas and infrastructures, agriculture, recreation etc. It covers themes such as coastal zone management and planning, coastal protection and salinisation.
3. Adaptation options regarding the scenarios and effects mentioned under 1) and 2). It covers the range of options as described in the IPCC reports under the heading of Coastal Zones. The session covers adaptation options in the physical environment as well as in the institutional environment

### Prof. Pier Vellinga

#### Present Position

Prof. in Climate Sciences and Water Safety and Programme Director Climate Change at Wageningen University and Research Centre (0,8 fte) and Prof. in Environmental Sciences and Global Change and Director at the Climate Centre at the Vrije Universiteit Amsterdam (0,2 fte) .

#### Summary of curriculum vitae

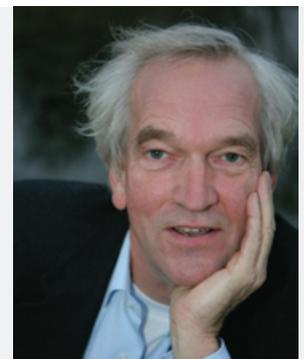
Pier Vellinga received his MSc. in Civil Engineering from Delft University in 1976. His study period included one year of Cultural Anthropology studies in the USA, facilitated by a Fulbright scholarship and one year of work in Africa, as a development cooperation trainee in a port project in Tanga, Tanzania.

In 1976 he joined Delft Hydraulics, the Netherlands. In 1986 he received his PhD for his research on Beach and Dune Erosion During Storm.

In 1988 he changed jobs, from Delft Hydraulics to the Netherlands Ministry of Housing, Physical Planning and the Environment. In a newly created position he was advisor to the Minister on the issue of Climate Change and the development of international CO<sub>2</sub> policies. In this role he was key negotiator during the Netherlands EU-presidency. In 1989 he became one of the co-founders and first bureau members of the Intergovernmental Panel on Climate Change (IPCC). In 1991 he moved to the Vrije Universiteit to be Prof. in Environmental Sciences and Global Change and to take up the role of director of the Institute for Environmental Studies (IVM). In the period from 1995 through 1998 he combined this work with a part-time position at the World Bank as Chairman of the Scientific and Technical Advisory Panel (STAP) of the Global Environment Facility (GEF, of the World Bank, UNDP and UNEP).

In September 2001, he was appointed for a five year period as Dean of the Faculty of Earth and Life Sciences to implement the merger between the faculty of Biology, the faculty of Earth Sciences and the Institute for Environmental Studies. Simultaneously he was appointed as Vice Rector of the University. His term as Dean of Faculty and Vice Rector of the University has ended in 2006.

In March 2007 Pier Vellinga joined Wageningen University and Research Centre to coordinate and stimulate climate change research programmes such as Climate Changes Spatial Planning (Klimaat voor Ruimte). In 2008 he became scientific director and chairman of the National Research Programme "Knowledge for Climate". All major climate research institutes in The Netherlands participate in this programme ([www.knowledge\\_for\\_climate.nl](http://www.knowledge_for_climate.nl)).



## Approaches to Measuring and Enhancing Adaptive Capacities

Adaptation to climate change, in practice, is a social and institutional process. This session will explore a diversity of current concepts and experience in understanding the measures of processes and the socio-institutional networks that construct capacity or competence in adaptation processes. This framing of adaptation goes beyond the usual starting point of impacts and vulnerability assessment to look at actor-networks, social learning, institutional change and governance; always with a close connection to climate adaptation practice.

### Dr. Thomas Downing

Dr Thomas Downing is director of the Stockholm Environment Institute's Oxford office and leads development of the weADAPT.org platform on climate adaptation. He is also the MunichRe Foundation chair in social vulnerability at the United Nations University Environment and Human Security Institute in Bonn.



### Dr. Dagmar Schröter

Dr. Dagmar Schröter is visiting research fellow at the George Perkins Marsh Institute, Clark University, USA and works in Umweltbundesamt GmbH, Vienna, Austria.



## Session 37

Chairs Prof. John R. Porter & Prof. Peter Gregory

### Adapting Future Agricultural Production to Climate Change

It is likely that we are already seeing the impacts of climate change on food production, as evidenced by poor yields and rising prices in parts of the globe. Food production forms the basis of food systems that are the largest employer of people on the planet and one of the basic structures of the global society. Even with drastic efforts leading to large reductions in GHG emissions there will be a need for agriculture to adapt to climate change and this session will present some of the adaptive solutions to food production in the face of climate change.

#### Prof. Peter Gregory

Prof. Peter Gregory is Chief Executive and Institute Director of SCRI (the Scottish Crop Research Institute) based near Dundee. He has held this position for just over 3 years, before which he spent most of his professional career at the University of Reading, England with 5 years in Western Australia in the early 1990's. His research has involved studies of root/soil interactions, the use of water and nutrients by crops, and interactions of climate change and food security.



#### Prof. John R Porter

John R Porter is an internationally known scientist in crop ecology and physiology, biological modelling and agro-ecology. In his career he has won three significant international science prizes and has been a member of the Intergovernmental Panel on Climate Change since 1994.



## Session 38

Chair Prof. Niels Elers Koch

### Adapting Forests to Climate Change

Changes in the climatic system significantly affect the world's forests causing changes in the physiology, structure, composition and health of these ecosystems. Key environmental services provided by forests, including their ability to serve as carbon sinks, are also at risk. Increasingly, the multiple social and economic effects of these changes on rural livelihoods and the forest sector are being recognized, too.

By developing suitable responses to adaptation, harmful effects of climate change on forests and trees can be moderated and beneficial opportunities for people and nature can be exploited. This session aims at presenting adaptation strategies, policies and measures for forests to climate change that are based on the best knowledge available.

#### Prof. Niels Elers Koch

Vice President of the International Union of Forest Research Organizations ([www.iufro.org](http://www.iufro.org)) and Director General of the Danish Centre for Forest, Landscape and Planning, University of Copenhagen ([www.sl.life.ku.dk](http://www.sl.life.ku.dk))



## Climate Tools and Information to Support Adaptation

Adaptation to climate change is inevitable. What tools are available that will support adaptation decisions that contribute to sustainable development? What kinds of information are needed in order that adaptation decisions can be made in a timely fashion and in the right place? What kinds of support are needed given the wide range of stakeholders that will be involved in adaptation measures? These are some of the questions that we hope to address in this session. We will discuss the tools and approaches that are available, the available knowledge and the linkages between knowledge and action.

### Dr Jill Jäger

Dr. Jäger received her B.Sc. degree in environmental sciences from the University of East Anglia (UK) in 1971 and was awarded her Ph.D. in geography (climatology) by the University of Colorado (USA) in 1974.

She has worked as a consultant on energy, environment, and climate for numerous national and international organizations and has an extensive publication record. In September 1994 she joined the International Institute for Applied Systems Analysis (IIASA, Laxenburg) as Deputy Director for Programs, where she was responsible for the implementation and coordination of the research program. From October 1996 till May 1998 she was Deputy Director of IIASA. Dr. Jäger was Executive Director of the International Human Dimensions Programme on Global Environmental Change (IHDP) from April 1999 till October 2002. Until recently she was a senior researcher at the Sustainable Europe Research Institute in Vienna, Austria and played a key role in the EU-funded project on Methods and Tools for Integrated Sustainability Assessment.



## Learning from Ongoing Adaptation: A Comparative Study

Consistently designed freshwater adaptation case studies from around the world will be presented, based on projects of the conservation organization WWF. These will include cases from India, China, Mexico, Brazil, the lower Danube basin and Tanzania. This is a rare opportunity to learn from diverse empirical case experiences within a coherent project.

All water management interventions are a form of adaptation. Climate change is being felt most immediately in changes to the hydrological systems with changes in precipitation, temperature and evapotranspiration leading to floods, droughts, and eutrophication events. This session looks at adaptation in the freshwater sector to derive lessons on what motivated societies to change, which factors led to more successful adaptation, and how interventions may best be sustained.

The resulting global lessons derived from a WWF and ANU assessment will be discussed. Comparisons will be sought with lessons drawn from other adaptation research programs. A concluding discussion will seek to identify key lessons to inform adaptation policy development.

Mr. Jamie Pittock

**BSc(Hons), WWF Research Associate, PhD candidate, Fenner School of Environment & Society, Australian National University**

Jamie Pittock trained in zoology and geography at Monash University, Australia.

From 1989-2001 he was employed by a number of non-government groups in Australia, to work on a range of issues for the conservation of nature. In particular, he led WWF advocacy for nature conservation programs, and also new Australian environmental laws, which were enacted in 1999.

Jamie was Director of WWF's Global Freshwater Programme from 2001 to 2007. The Programme promoted establishment and management of freshwater protected areas, sustainable river basin management, and sustainable use of water by agriculture and industry globally. The Programme directed WWF's work for one of WWF's five global priorities.

From July 2007 Jamie has been a WWF Research Associate, undertaking PhD research on river management and climate change based at the Fenner School of Environment & Society at the Australian National University. The research is focussed on the conflicts and synergies between water and climate change policies. Part of this research is looking at lessons from auto-adaptation in six rivers, including in Brazil, Mexico, the Danube, Tanzania, India and China.

Jamie is also the principal of James Pittock Consulting.



## Adaptation to Climate Change in Least Developed Countries – Challenges, Experiences and Ways Forward

Least developed countries (LDC) are predicted to be among the most severely affected from the impacts of climate change. Yet, these countries are often the ones least prepared to cope with and recover from varied impacts of climate change and variability. In addition to their sensitivity to current and predicted climate stresses and shocks, other non-climatic factors all conspire to further reduce their vulnerability and compromise their adaptive capacity.

The Session will focus on achieving the following objectives:

- identify pro-poor adaptation strategies and activities and their suitability in a climate risk environment
- assess relevant scientific data, current local practices and mechanisms that will support capacity building and institutional needs in order to enable adaptation to climate change in LDC.
- improve the understanding of adaptive capacity and requirements to develop adequate and effective adaptation strategies.

The session will present experiences illustrating the need for integrating risk management and mechanisms of knowledge sharing into adaptation policies.

Assessing adaptation activities cannot be done in isolation. Adopting pathways that exclude wider sustainable development strategies may derail hard-won development gains/ may involve risks associated with maladaptation. Embracing a more holistic view can generate great opportunities for partnerships and for achieving a more equitable development.

### Dr. John Christensen

Dr. John Christensen is the Director of the UNEP Risoe Centre, and has been working for the UN Environment Programme for almost 20 years in different capacities. He holds both a M.Sc. and a PhD from the Technical University of Denmark. John has worked extensively on climate issues - at the global level he has been a UN advisor involved in all negotiation meetings under the UN Climate Convention and at the national level he has managed a large number of projects in developing countries in Africa, Asia and Latin America. Currently his main activities are related to supporting the integration of climate change concerns in development planning focusing both on building resilience to climate change and utilizing the emerging carbon finance market. John has been a member of the Bureau of the Intergovernmental Panel on Climate Change (IPCC) and participated as lead author in a number of the IPCC global assessments and special reports.



### Ph.D. Fatima Denton

Fatima Denton is currently leading a team of experts on climate change adaptation. She joined the International Development Research Centre (IDRC) in August 2006 as team leader of the Climate Change Adaptation in Africa Programme (CCAA), an initiative that is jointly funded by IDRC and the UK Department for International Development (DFID). The CCAA programme is essentially a research and capacity development programme aiming to strengthen the capacity of African countries to adapt to climate change in ways that benefit the most vulnerable and building the capabilities of researchers, policy makers and vulnerable communities to better anticipate, plan and adapt to the negative impacts of climate change. Within the CCAA programme, Fatima provides intellectual leadership to a multidisciplinary team and supervises the management of a range of research projects; elaborating research themes and identifying strategies to influence climate policies in Africa.

Prior to joining IDRC, Fatima worked for the UNEP Risoe Centre in Denmark, essentially on climate change adaptation and energy poverty with a view to building institutional and research capacity in Africa vis-à-vis energy policy analyses in relation to renewable energy and entrepreneurial development in both West and East African contexts. Fatima has also worked with the Energy Programme of Enda Tiers Monde in Senegal as Programme Manager and Projects Co-ordinator. During her period with Enda Tiers Monde, her research covered questions on sustainable development, vulnerability and adaptation as well as food security, local governance, water and energy poverty in the Sahel. Fatima has authored several peer reviewed articles on energy poverty, gender and energy and climate change adaptation. Fatima is IPCC lead author. She holds a PhD in Political Science and Development Studies.

## Adaptation and Climate Risk Insurance

The Bali Action Plan calls for "consideration of risk sharing and transfer mechanisms, such as insurance," as a means to address loss and damage in developing countries particularly vulnerable to climate change. The Bali Action Plan strengthens the mandate to consider insurance instruments as set out by Article 4.8 of the UN Framework Convention on Climate Change (UNFCCC) and Article 3.14 of the Kyoto Protocol. Yet if insurance instruments are to be included in the post-2012 adaptation regime negotiations in Copenhagen, the potential role of risk-pooling and risk transfer systems must be firmly established. The Munich Climate Insurance Initiative has made recommendations to climate negotiators about how insurance could fit in the agreement that must be forged by Copenhagen 2009. To further discussion, this session invites contributions which explore insurance models and instruments that might contribute to improved risk management and adaptation to climate change.

### Dr. Koko Warner

Dr. Koko Warner is a founding member and coordinator of the Munich Climate Insurance Initiative (MCII). Her work focuses on how people manage climate shocks and risk, including how they use financial tools including insurance to manage these risks. She has researched catastrophic shocks and macroeconomic impacts of these shocks, and the tradeoffs in ex ante and ex post risk financing systems. Koko is interested in the design of insurance mechanisms for climate adaptation, particularly creating incentives for risk reduction and reducing moral hazard. Her work with MCII explores how insurance mechanisms might be built into the post-2012 adaptation regime, and tradeoffs between efficiency and equity in (climate) risk transfer systems.



Koko works with the private reinsurance and insurance sector, and with international financial institutions and international organizations in projects to explore climate risk insurance solutions. She is also an Academic Officer and the Head of the Environmental Migration, Social Vulnerability, and Climate Adaptation Section at the United Nations University Institute for Environment and Human Security (UNU-EHS) in Bonn, Germany. Before joining UNU, Koko worked at the ETH Zürich (SLF-WSL), and prior to that she was a researcher at IIASA. Warner is an associate at the ETH Zürich Institute for Environmental Decisions. Department. She teaches economics at Webster University, and in the University of Richmond's Emergency Service Management graduate program.

Warner is a former Fulbright Fellow and holds a PhD from the University of Vienna Department of Economics.

## Integrating Climate Change into Global Sustainability.

It is important to remember that in order to safeguard our global environment and ensure sustainability to future generations, we must focus our attention on not only climate change but a wide variety of sustainability issues such as food and water security, conservation of resources, preservation of the natural environment and biological diversity, and seeking holistic solutions that address the full spectrum of the problem. This has become increasingly clear as witnessed by the recent debate surrounding the pros and cons of increased use of biofuels, for example.

In this session, case studies of these tradeoffs will be presented for detailed analysis. The session will also discuss the method to prevent such unintended consequences by looking into sustainability indices for measuring the state of such societies as the low-carbon society, the resource-circulating society, and the nature-harmonious society.

By analyzing the relationships between the indices, the session seeks to explore the most optimal, integrated, and very long term scenarios for putting the entire world encompassing the industrialized nations, the newly industrializing nations, as well as the less developed nations on a sustainable basis, for example, by the year 2050, and to suggest socio-economic and technological changes that are needed to ensure ongoing sustainability around the globe, with comprehensive and panoramic viewpoints.

### Prof. Takeuchi

Dr. Kazuhiko Takeuchi is the Prof. of Graduate School of Agricultural and Life Sciences at the University of Tokyo (Todai).

Educated and trained as a geographer at Todai, his research focuses on creating eco-friendly environments for a harmonious coexistence of man and nature, both on local and global scales. He is keenly interested in the restoration of ecosystem and effective utilization of environmental resources in Japan. Revitalization of traditional rural landscapes locally called Satoyama is one of his major concerns. He also conducts extensive field research on desertification for developing early warning systems in China and Mongolia, on sustainable bioresources management system in Indonesia, and landscape planning in the Asian mega-cities in Thailand and the Philippines. He has also initiated the research project on reconstruction of historic gardens and historic landscape planning in Italy. His most recent research interest lies in the integration of future scenarios for the three societies which constitute a solid base for global sustainability: low carbon society; resource-circulating society; and the society coexisting harmoniously with nature.

At Todai, he is the Deputy Executive Director of the Integrated Research System for Sustainability Science (IR3S), which was launched in 2005 as a research alliance, comprising of eleven Japanese universities/institutes, for establishment of the newly emerging discipline, sustainability science. He is the Editor-in-Chief of the journal "[\\_ Sustainability Science \(http://www.springer.com/west/home?SGWID=4-102-70-144940151-0\)](http://www.springer.com/west/home?SGWID=4-102-70-144940151-0)"

Other recent professional activities include membership on the several councils of Japanese Government, such as Central Environment Council and National Land Council. He also served as a member of the Group of Experts, Committee on Science and Technology, United Nations Convention on Combating Desertification (UNCCD). Prof. Takeuchi has taken his new post as Vice-Rector of the United Nations University since 1 July 2008.



## Filling in the Gaps between IA (Integrated Assessment), GCM (General Circulation Model), Economic and ES (Earth System) Models.

### Prof. Dr. Rik Leemans

Prof. Dr. Rik Leemans (1957) heads the Environmental Systems Analysis group ([www.esa.wur.nl](http://www.esa.wur.nl)) of Wageningen University, directs the WIMEK graduate school and chairs the Earth System Science Partnership ([www.essp.org](http://www.essp.org)). He further contributes to several (inter)national committees concerned with various aspects of global change. He currently leads several multidisciplinary projects to develop integrated assessment models for global biodiversity and local/regional ecosystem vulnerability. He was involved in all assessments of the Intergovernmental Panel on Climate Change (IPCC) and co-chaired the Response Option Working group of the Millennium Ecosystem Assessment.

His early studies at Uppsala University (Sweden) emphasised the successional dynamics and structure of boreal forests. His subsequent research position at the Biosphere Project of the International Institute of Applied System Analyses (IIASA, Austria) focussed on boreal forest models. During the nineties, he was a senior scientist of the Dutch National Institute of Public Health and the Environment (RIVM), where he led the development of integrated IMAGE-2 model. His main research interests concern biodiversity, vegetation structure and dynamics, land-use and cover change, biogeochemical cycles, biodiversity, ecosystem services and sustainable development.

Dr. Leemans has published many papers on a wide range of topics, such as forest dynamics, large-scale vegetation and crop distribution, terrestrial C cycle, Earth system models, biodiversity, integrated assessment tools and, more recently, potential mitigation and adaptation options and strategies for environmental change.



## From Geo-Perturbation to Geo-Management

Accelerating trends in greenhouse gas emissions and atmospheric concentrations, combined with increasing risk of major climate damage in the near term has led some to explore approaches to modify Earth's climate directly with engineering approaches. These proposals typically seek to offset some effects of greenhouse gases by reflecting sunlight to Earth, for example, by placing dust in the stratosphere or whitening clouds or other surfaces. Such proposals are replete with difficult and interesting scientific, technical, political, and social issues. This session will address these issues from a broad range of perspectives.

### Prof. Ken Caldeira

Ken Caldeira is a climate scientist in the Carnegie Institution Department of Global Ecology at Stanford University. He regularly published research results in high-profile scientific journals on a wide range of issues associated with carbon cycle and climate change, including carbon-climate feedbacks, ocean acidification, energy systems, ocean carbon sequestration, biogeochemical cycles, and paleo-climate. He often acts at the interface between scientists and policy makers. For example, he recently represented the Intergovernmental Oceanographic Commission at a London "ocean dumping" Convention meeting on iron fertilization of the ocean. He has testified before the US Congress and briefed members of Congress on several occasions, and has provided technical support as part of the US delegation in climate negotiations. He is an advocate of an internationalized research program to investigate climate engineering proposals. Prior to moving to the Carnegie Institution and Stanford University three years ago, he worked for 12 years at the US Department of Energy's Lawrence Livermore National Laboratory.



## Consequences of Acidification of Land and Ocean

Acidification occurs on both the land and in the oceans as a result of a number of natural and anthropogenic processes. The rate of change in the anthropogenic processes is resulting in large areas of land becoming unproductive. In the oceans the massive and rapid addition of CO<sub>2</sub> is changing their carbonate chemistry so much so that continued burning of fossil fuels at the current rate is likely to have considerable impact on future marine food webs and ecosystems. This session will explore mechanisms for and impacts of acidification on land and in the oceans and consider the linkages between the two, using coupled models, experimental results and observational evidence.

### Dr. Carol Turley

Dr Carol Turley's research has been centred on the ocean's biogeochemical cycles looking at habitats from shallow and deep-sea sediments, estuaries, frontal systems to large enclosed waters. She has researched pelagic-benthic coupling and the role of sediment dwelling organisms on mediating sediment processes and the effect of sediment bound contaminants on biodiversity and biogeochemical processes. In the last 5 years she became interested in ocean acidification and led the Government (DEFRA) review on impact of pH change on the marine environment. She was an author on the OSPAR report on the topic, a member of The Royal Society working group on ocean acidification and was a lead author on the 2007 IPCC report on Climate Change. She is a member of the Executive Board of the EU FP7 funded consortium, European Project on Ocean Acidification (EPOCA) which started in May 2008. The session on acidification at the congress on Climate Change: Global Risks, Challenges and Decisions Copenhagen on 10 – 12 March 2009 is another great opportunity for scientists to get this key issue to the very top of the climate change policy negotiations in UN Conference on Climate Change (COP15) in Copenhagen later in 2009.



### Prof. Mary Scholes

Prof Mary Scholes, a graduate of the University of the Witwatersrand, is currently a full Prof. in the School of Animal, Plant and Environmental Sciences and serves as the Assistant Dean for Postgraduate Studies in the Faculty of Science. Her research activities focus on soil fertility and biogeochemistry in savannas, plantation forests and croplands. Her research activities are covered by an endowment from Sappi (a forestry company), funding is also obtained from THRIP, and the NRF. She serves as the vice- chairperson for the Board of Trustees for the International Centre for Tropical Agriculture (CIAT), an international tropical agricultural research institute based in Cali, Colombia funded by the World Bank. Her research interests in biogeochemistry have resulted in her being elected to four international science steering committees, including serving as the Secretary General for the Scientific Council on Problems in the Environment. These activities involve extensive collaborative research with a number of overseas and local institutes. She serves as the Director of the Wits Institute for the Study of the Environment and coordinates a master's degree in Environmental Science, which is offered across three Faculties (Science, Law and Engineering) at Wits. Her publication record includes authoring 28 book chapters and 80 refereed journal articles. She serves on a number of editorial boards and acts as a reviewer for the NSF, NRF and CHE. Prof Scholes is actively involved in undergraduate and post-graduate teaching and in 1994 and 1995 was awarded the Science Faculty and the Vice-Chancellors Distinguished Lecturers' awards. In 2000, she was awarded the Vice-Chancellors Research Award and in 2002 she was elected as a foreign member of the Swedish Academy of Agriculture and Forestry. In 2004, she was elected as a fellow of the Royal Society of South Africa and a member of the Academy of Science of South Africa. She serves on a range of University committees including Senate and the Graduate Studies Committee. She is currently focusing her attention on postgraduate enrichment activities at Wits.



## Managing Food in a Climate Constrained World Parts I and II

One of the most critical challenges for global well-being is that related to agriculture and food security – how can we increase food production (crops and animals) and ensure food security given the changing food and energy demands of the world, while at the same time reducing the environmental impacts of agriculture. The double challenge is to adapt food systems to climate change, particularly in already vulnerable areas, and to benefit from the positive effects and opportunities of climate change (enhanced CO<sub>2</sub>, changed temperature and rainfall patterns, and carbon trade). This two-part session will explore the interactions between changes in climate and other environmental factors and the food system. It will focus in detail on various regional and global approaches to plan for and optimize food, fuel and fibre production to help increase food security in a climate constrained world.

### Dr. Pamela Matson

Pamela Matson is an interdisciplinary Earth scientist who works to reconcile the needs of people and the planet in the 21st century. Her research addresses a range of environment and sustainability issues, including sustainability of agricultural systems; vulnerability of particular people and places to climate and other changes; the consequences of tropical deforestation on atmosphere, climate and water systems; and the environmental consequences of global change in the nitrogen and carbon cycles. With multi-disciplinary teams of researchers, managers, and decision makers, she has worked to develop agricultural approaches that reduce environmental impacts while maintaining livelihoods and human wellbeing.



Dr. Matson is the author of numerous scientific publications and books, including the National Research Council volume titled "Our Common Journey: A Transition toward Sustainability." A MacArthur Fellow and a Fellow of the National Academy of Sciences as well as the American Academy of Arts and Science, she is the founding co-chair of the National Academies Roundtable on Science and Technology for Sustainability, a past president of the Ecological Society of America, and serves on the Board of the World Wildlife Fund. She has also held leadership roles in the International Geosphere Biosphere Program.

### Prof. Louise O. Fresco

Prof. Louise O. Fresco is University Prof. of the University of Amsterdam (UvA) in the field of the foundations of sustainable development in an international perspective. She is a foreign member of several Scientific Academies and also holds a visiting Prof.ship at the Institute of Earth Sciences at Stanford University. In addition, she is Distinguished Prof. at Wageningen University.

She obtained a PhD in tropical crop science cum laude at Wageningen University (NL) in 1986 and served there as Prof. of Plant Production Systems for tropical areas from 1990 to 1997. As such she was involved in many educational reforms and did extensive fieldwork in Africa and Latin America. She held the honorary Cleveringa Chair at Leiden University (NL) in 2005-2006.

Fresco is a member of the Supervisory Board of Rabobank Nederland. She is a so-called Crown Member of the Social and Economic Council of the Netherlands (SER), the highest advisory body on government policy in the Netherlands. She is also a member of the international Trilateral Commission. Currently, she is a member of the Delta Commission for the study of future plans to deal with sea level rise and climate change.

Since starting her field career with the UN in the 1970s in Papua New Guinea and Zaire/Congo, Fresco has travelled to over sixty countries outside of Europe and North America for professional purposes. Fresco served as Assistant Director-General of the Agriculture Department of the FAO (the UN Food and Agriculture Organization in Rome) until 2006. Previous to holding these positions, she was president of the Advisory Council for Research on Nature and Environment in The Netherlands. She co-founded and chaired the Land Use and Land Cover Change Project (LUCC) of the International Geosphere-Biosphere Program (IGBP). Fresco has published extensively in both scientific journals and in the popular media. She writes a syndicated column and participates in many national and international radio and television programs. She has published seven non-scientific books in Dutch (among which three novels).



## Earth System Governance

The problem of climate change exemplifies a growing paradox in which the demand for governance to address issues involving human-environment interactions is rising but confidence in the conventional means of addressing largescale environmental issues is declining. Scientists have concluded that a 70-80% reduction in greenhouse gas emissions will be necessary between now and 2050 to avoid dangerous anthropogenic interference in the Earth's climate system. But efforts to negotiate a successor to the Kyoto Protocol are likely to reach agreement on much more limited targets and timetables, if they reach agreement at all. Needed to overcome this paradox are innovations on a global scale (e.g. hybrid systems involving both states and nonstate actors, informal networks, restructured market mechanisms) and new approaches to multi-level governance designed to maximize bottom-up pressures as well as to ensure the implementation of global agreements on a number of levels. The aim of this session is to bring new thinking about governance to bear on the problem of climate change and, at the same time, to use the case of climate change to generate new thinking about governance more generally.

### Prof. Young

Dr. Young is a Prof. at the Bren School of Environmental Science & Management at the University of California, Santa Barbara. Specializing in the fields of Institutional and International Governance and Environmental Institutions, Dr. Young also serves as a Co-director of the Program on Governance for Sustainable Development at the Bren School, Director of the Institute of Arctic Studies, and Adjunct Prof. of Political Science at the University of Tromsø in Norway. 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 in the United States. Dr. Young then chaired the Scientific Steering Committee of the international project on the Institutional Dimensions of Global Environmental Change (IDGEC) under the auspices of the International Human Dimensions Programme on Global Environmental Change (IHDP). He presently chairs the IHDP. An expert on governance of the Arctic, Young was vice-president of the International Arctic Science Committee and is currently a leader in the development of a decentralized University of the Arctic. Dr. Young's work as author or co-author of over twenty books and numerous scholarly articles includes, *Governance in World Affairs*; *International Governance: Protecting the Environment in a Stateless Society*; and *International Cooperation: Building Regimes for Natural Resources and the Environment*.



## Director Agus Sari

Agus Sari is Country Director of Indonesia and Policy Coordinator for Southeast Asia at EcoSecurities. Concurrently, he is also a Non-Executive Director of PEACE, a private advisory company on sustainable development, a member of the Advisory Board of Sustainable Development Network, and a member of the Board of EcoEquity, a US environmental NGO. Prior to joining EcoSecurities, he was Executive Director of Pelangi, a prominent environmental think tank based in Jakarta, Indonesia. He also worked with the Lawrence Berkeley National Laboratory, Berkeley; with the Environmental Defense Fund, Washington, DC; the National Environmental Trust, Washington, DC; and the Indonesian Forum for the Environment (WALHI).



He sits on various scientific and business committees, including the Nobel Peace Prize-winning Intergovernmental Panel on Climate Change (IPCC) as Lead Author in Working Groups II (Adaptation) and III (Mitigation). He has followed the climate change issue since late 1980s, and, since 1997, has been a part of the Indonesian delegation to climate change negotiations as an advisor. He served as Chair of the project on the Institutional Dimension of Global Environmental Change (IDGEC), a core project of the Bonn-based International Human Dimension Program on Global Environmental Change (IHDP), for 2 years until 2006.

He also served as a Director of SouthSouthNorth, a Cape Town-based climate and sustainable energy NGO; a member of the Advisory Committee of the Gold Standard, a standard system for high-quality renewable and energy efficiency carbon projects; and a member of the Climate, Community, and Biodiversity (CCBA), a standard system for high-quality land use-based carbon projects. He participated in the development of the WBCSD's Greenhouse Protocol, a corporate protocol to assess carbon footprints, and led the establishment of the National CDM Authority in Indonesia. At COP13/CMP3 in Bali, Indonesia, he served as Advisor to the Presidency of COP13/CMP3.

He taught Environmental Science at the Indonesia Institute of Technology, and Carbon Politics at the Bren School of Environment at the University of California, Santa Barbara. He holds a graduate degree from the Energy and Resources Group, the University of California, Berkeley through a Fulbright Scholarship.

## Session 49

Chair Dr. Chris Hope

### The Role of Integrated Assessment Models in Handling Climate Change.

Integrated Assessment Models (IAMs) use relatively simple equations to capture complex climatic and economic phenomena. This simplification is justified because the results approximate those of the most complex climate simulations, and because all aspects of climate change are subject to profound uncertainty. This session will explore the state of the art in Integrated Assessment Modelling, and outline the opportunities and challenges for IAMs in the future.

#### Dr. Chris Hope

Dr Chris Hope is Reader in Policy Modelling at Judge Business School. He was Lead Author and Review Editor for the Third and Fourth Assessment Reports of the Intergovernmental Panel on Climate Change, which was awarded a half share of the Nobel Peace Prize in 2007. He is an invited member of OFGEM's Environmental Economist panel. He was the specialist advisor to the House of Lords Select Committee on Economic Affairs Inquiry into aspects of the economics of climate change and an advisor on the PAGE model to the Stern review on the Economics of Climate Change. In 2007, he was awarded the Faculty Lifetime Achievement Award from the European Academy of Business in Society and the Aspen Institute.



## Session 50

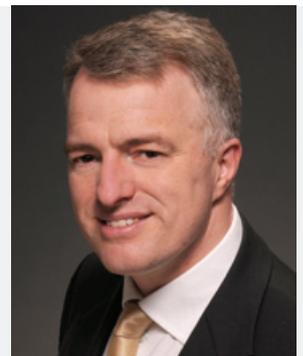
Chair Senior Scientist Detlef Sprinz

### Enabling Long-Term Climate Policy

Climate change is a quintessential long-term policy challenge. Agreeing on and implementing credible long-term climate policies engenders intergenerational, time-inconsistency, distributional and informational problems. The fragmentation of domestic politics and the challenge of long-term international cooperation aggravate this challenge. This session brings together methods, institutional design options, and empirical studies which elucidate the factors which enable or hamper the pursuit of long-term climate policy. Besides scientific research on climate policy, insights from the management of other long-term issues (such as mandatory pension plans, financial crises, accounting methodologies, risk management, public finance, policy forecasting, robust adaptive planning, and from other environmental issues) are encouraged to demonstrate their relevance for managing long-term climate policy.

#### Senior Scientist Detlef F. Sprinz

Detlef F. Sprinz is a Senior Scientist with the Research Domain "Transdisciplinary Concepts & Methods" of the Potsdam Institute for Climate Impact Research (PIK). He has taught international relations, international environmental policy, and social science methodology at the University of Michigan, the University of Potsdam, Germany, as well as in the international joint MA program in International Relations of the Free University Berlin, Humboldt University of Berlin, and the University of Potsdam. His research and publications encompass long-term policy, inter/national institutions & the evaluation of their performance, international environmental policy, and modeling political decisions. He currently serves as guest editor of a special issue on "Long-term Environmental Policy" for Global Environmental Politics. Detlef Sprinz is Vice-Chair of the Scientific Committee of the European Environment Agency, Copenhagen, Denmark; a member of the European Academy, Bad Neuenahr-Ahrweiler, Germany; and serves on the advisory boards of national, European, and international research projects. See [www.sprinz.org](http://www.sprinz.org) for further details.



## Session 51

Please see under session 47

## Session 52

Chair Prof. Kevin Anderson

### Economic Costs of not Mitigating Climate Change

Since the Rio Earth summit in 1992, the rhetoric of climate change mitigation has been matched by the failure to even curtail the rate of growth in global greenhouse gas emissions. Given the unprecedented level of emissions in 2000 and the subsequent high levels of annual growth (typically 3% p.a.), there is now little to no hope of constraining temperature rises to 2°C, and even 4°C demands urgent and radical reductions in emissions. With this as a backdrop, the session will investigate the “Economic Costs of not Mitigating Climate Change” – considering adaptation and damage costs associated with temperature rises from 2°C through to 4°C and beyond.

#### Prof. Kevin Anderson

Prof. Kevin Anderson is research director of the Tyndall Manchester climate change group and manager of the Tyndall Centre’s energy decarbonisation programme. Kevin’s responsibilities extend from supervising discrete research projects through to integrating the group’s broad range of projects to provide an interdisciplinary and systems-level appreciation of energy and climate change.

With its specific remit for policy and stakeholder dialogue, directing Tyndall’s Energy Programme has led to a considerable degree of high-level policy engagement within the UK and EU. Recent policy highlights include: the launch of Tyndall’s report on aviation and the EU Emissions Trading Scheme at the European Parliament; advice to the Scottish Government on the development of their Climate Change Bill; oral and written evidence to three UK Parliamentary Committees scrutinising the UK’s Draft Climate Change Bill; and scientific advice to the London Mayor on the Climate Change Action Plan for London.

Kevin holds a chair in Energy and Climate Change in the School of Mechanical, Aerospace and Civil Engineering at the University of Manchester, and previously spent 12 years as a mechanical engineer, principally in the petrochemical industry.



## Session 53

Chair Dr. Max Boykoff

### Role of Media in Dealing with Climate Change

Mass media serve a vital role in communication processes between science, policy and the public; thus, representations of climate change shape many perceptions and considerations for action. Many complex factors contribute to these interactions. Through participation from both academic researchers and environmental journalists, this session explores the dynamic and highly contested terrain of the role of mass media in contributing to combating climate change.

#### Dr. Maxwell Boykoff

Maxwell Boykoff is currently a Research Fellow in the Environmental Change Institute and a Departmental Lecturer in the School of Geography at the University of Oxford. During the previous two years he was a James Martin 21st Century School Fellow at the University of Oxford. He holds a Ph.D. from the University of California-Santa Cruz and Bachelor of Sciences from Ohio State University. Max has explored the cultural politics of climate change in everyday spaces, as his research has investigated how various non nation-state actors influence climate science, policy and practice. His research includes analyses of media coverage of climate change, how certain discourses influence environmental policy considerations, the role of celebrity endeavors in climate change issues, and links to ethics, environmental justice movements, climate adaptation and public understanding.

Recent publications include peer-reviewed articles in *Geoforum*, *Transactions of the Institute of British Geography*, *Political Geography*, *Environmental Research Letters*, and *Climatic Change*. He has also recently written a related commentary in *Nature Reports Climate Change* as well as a paper for the 2007 United Nations Development Programme Human Development Reports.



## Resources in a Changing Climate: Building Collaboration and Avoiding Conflict

Climate change requires unprecedented cooperation between the North and South, but divisions have been increasing rather than decreasing. This session will examine five factors that affect the prospects of international cooperation.

1. Climate Costs: Will the rising cost of climate change bring countries together or increase conflict and non-cooperation?
2. Stringency of climate targets: Does the current ambiguity and leniency of climate targets enhance or undermine the possibility of international cooperation?
3. Role of development: Notwithstanding the consensus over sustainable development, climate discussions have not focused on development goals or their implications for policy choices. Is this ambiguity necessary to achieve compromise or does it undermine the prospects of cooperation?
4. Menu or recipe: Mitigation action is increasingly driven by the cap and trade approach, which has sidelined other options, including a carbon tax for internalizing externalities, or, more importantly for developing countries, a global investment strategy, supported by finance and technology, which would actively promote climate friendly development pathways. Is the exclusive focus on cap and trade conducive to global cooperation, or would a more ecumenical menu have been more effective.
5. Policy Timing: Would cooperation be enhanced if climate action were "front-loaded" (e.g., a big push on investment in renewables) or gradualist (i.e., easing the policies in gradually)?

### Dr. Tariq Banuri

Tariq Banuri is Senior Fellow at the Stockholm Environment Institute. The focus of his work is "just globalization", namely the synthesis of social justice and global interdependence. He has experience in government, academia, civil society, and the international system. He started his career in the Civil Service of Pakistan, went on to receive a PhD in Economics from Harvard University, joined the United Nations as a Research Fellow at the World Institute for Development Economics Research (WIDER), a model that he adapted in founding the Sustainable Development Policy Institute (SDPI) in Pakistan. He has served on national as well as international forums for policy and research, including as a Coordinating Lead Author of the Nobel Prize winning Inter-governmental Panel on Climate Change (IPCC), member of the Pakistan Environmental Protection Council, member of the board of governors of Pakistan's central bank, member/secretary of the Presidential Committee on Higher Education, chair of the Board of Governors of the International Centre for Trade and Sustainable Development (ICTSD), and founding member of the Great Transition Initiative (GTI).

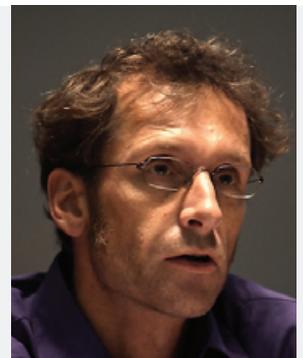


## Human Migration - Geopolitical Conflicts - Climate Security

Among the foreseeable long run consequences for human societies of climate change, migration is one of the more dramatic and a possible key link in further chain reactions. Therefore, the climate-migration nexus has been studied both in its own right and as part of the research agenda 'climate as a security issue'. The latter includes also concern about conflicts over resources, spurred by changing conditions for settlement, agriculture, mining, transportation, diseases and disasters. A first generation of research searching for mechanical causal links between climate change and conflict has been replaced by complex studies of contingencies and interactions. Studies have been made all along the spectrum from 'top-down' perspectives by e.g. US military think tanks and planners on global patterns of conflict to 'bottom-up' field work on local societies, mostly in disadvantaged parts of the world. Still, much work remains to be done both in understanding the interactions between climate, migration, resources and other factors of importance for conflict propensity, and in linking the levels of analysis from the very local to larger geopolitical patterns. This session will include also the more recent, but fast growing work on the meaning and implications of climate being increasingly cast as a 'security issue' (from the UN Security Council to the Nobel Peace Prize Committee). If climate change is 'securitized', i.e. constituted politically as a security issue, what are the pitfalls and promises in relation to action, agreements and adaptation?

### Prof. Ole Wæver

Ole Wæver is Prof. of International Relations in the Department of Political Science, University of Copenhagen, and director of CAST, Centre for Advanced Security Theory. He primarily researches in security theory, regional security analysis and the history and sociology of the disciplines of International Relations and Security/Strategic Studies. Most influential is probably his creation of the theory of 'securitization' (as part of what is known as the Copenhagen School in security studies). With this theory, he is currently analysing mostly securitization in the two fields of religion and climate change. He was elected member in 2007 of the Royal Danish Academy of Sciences and Letters of 1742. His books include (co-authored with Barry Buzan and others) *Identity, Migration and the New Security Agenda in Europe* (Pinter 1993); *Security: A New Framework for Analysis* (Lynne Rienner 1998); *Regions and Powers: The Structure of International Security* (Cambridge University Press 2003) and (co-ed with Arlene B. Tickner) *International Relations Scholarship around the World* (Routledge 2009).



## Cultures, Values and World Perspectives as Factors in Responding to Climate Change

This session addresses climate change from the perspectives of individual and societal values, cultures and worldviews. This session will draw attention to a wide range of issues, including psychological, ethical, and anthropological perspectives on climate change, which are critical to understanding the behavioural and systematic responses that can potentially contribute to both mitigation and adaptation.

We are particularly interested in determining to what extent values, cultures and worldviews interact with other factors, such as those described by the biophysical sciences. We hope to identify contributions from the social sciences and the humanities that significantly enhance understanding of the factors that influence vulnerability and resilience, and that broaden discussions and debates about global risks, challenges, and decisions related to climate change.

Abstracts describing original research into topics relevant to the themes being treated at the Congress are invited.

### Prof. Thomas Heyd

Thomas Heyd, Ph.D., teaches philosophy and environmental studies at the University of Victoria (Canada). He is co-chair of the "Culture, Values and World Perspectives as Factors in Responding to Climate Change" session at the Copenhagen science congress on Climate Change: Global Risks, Challenges and Decisions, 10-12 March, 2009.

He is also organising a Symposium on "Cultural Dimensions of Climate Change" at the XVI International Conference of the Society for Human Ecology, "Integrative Thinking for Complex Futures: Creating Resilience in Human-Nature Systems." September 10 - 13, 2008, Huxley College of the Environment, Western Washington University, Bellingham, Washington State, USA (<http://www.societyforhumanecology.org/>).

His books include *Encountering Nature: Toward an Environmental Culture* (Ashgate Publishing, 2007), *Recognizing the Autonomy of Nature* (Columbia University Press, October 2005), *Environmental Consciousness and Action* (co-author with Wolf Schluchter, German Environment Ministry, 1996), and *Aesthetics and Rock Art* (co-editor with John Clegg, Ashgate, May 2005).

He has written more than 50 articles, including "Environmental Ethics in Latin America," *Environmental Values* (2004); "The Case for Environmental Morality," *Environmental Ethics* (2002); and "Aesthetic Appreciation and the Many Stories About Nature," *British Journal of Aesthetics*, (2001). He also has published in *The Journal of Human Ecology, Knowledge and Policy, Philosophy East and West, Journal of Aesthetic Education, Journal of Aesthetics and Art Criticism, Essays in Philosophy, Journal of the Canadian Society for Aesthetics*.



### Prof. Karen O'Brien

Karen O'Brien is a Prof. of human geography in the Department of Sociology and Human Geography at the University of Oslo, Norway. She is also Chair of the IHDP Project on Global Environmental Change and Human Security (GECHS). She is interested in how global change processes influence human security, as well as in understanding adaptation to climate change as a social process. She is particularly interested in how responses to climate change are influenced by values, worldviews, and beliefs. Her past research has focused on deforestation and climate change in southern Mexico; climate variability and the use of seasonal forecasts in southern Africa; trade liberalization and climate change in India; and climate change adaptation as a social process in Norway. She was a Lead Author of the adaptation chapter for the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report. Her publications include articles in journals such as *Climatic Change, Global Environmental Change, Mitigation and Adaptation Strategies for Global Change, Climate Policy, Ambio*, and the *Annals of the Association of American Geographers*, as well as several books. She has recently published a book with Robin Leichenko on "Environmental Change and Globalization: Double Exposures" (Oxford University Press, 2008).



## National and Regional development of mitigation policies

Climate change is a global challenge and the response must be global, however global response is built up from national and regional contributions. Different actors have specific circumstances, challenges and opportunities for mitigating climate change. This session will give the opportunity to present and examine models and assessments supporting the development of national and regional policies, as well as research directly relevant for the development of climate change policies.

### Dr Katrine Krogh Andersen

Katrine Krogh Andersen holds a PhD in geophysics from the University of Copenhagen. She has carried out research in climate modelling, ice core data analysis and statistics, and participated in Greenland ice core drillings. She is an associate professor at the Niels Bohr Institute, University of Copenhagen, and currently participates in the international climate change negotiations under the UNFCCC as senior advisor in the Danish Ministry of Climate and Energy.

