

FOCAL SYMPOSIA

Interpreting Climate Change

*13 March 2008
3:15-7:00 p.m.
Hörsaal 8, UZA 2
Pharmaziezentrum
Althanstrasse 9, Wien IX.*

***Kristin D. Shrader-Frechette** University of Notre Dame, USA*

***Leonard A. Smith** London School of Economics, UK*

***Nico Stehr** Zeppelin University, Friedrichshafen, Germany*

***Michael Thompson** University of Bergen, Norway*

Program

*Konrad Lorenz Institute for Evolution and Cognition Research
and
Department of Theoretical Biology, University of Vienna*

Interpreting Climate Change

Climate change refers to variations in the Earth's climate on many different time scales — from decades to millions of years. This seminar deals, among other things, with the possible *causes* of such variations. "Climate change" is often used in a restricted sense to denote a significant change — such as a change having important economic, social, or environmental *effects* — in the mean values of a meteorological element (in particular temperature or amount of precipitation), where the means are taken over periods of the order of a decade or longer. In the most general sense, climate change encompasses “all forms of climatic inconstancy (that is, any differences between long-term statistics of the meteorological elements calculated for different periods but relating to the same area) regardless of their statistical nature or physical causes” (Arctic Climatology and Meteorology Primer) [1]. Climate change may result from changes in solar activity, long-period changes in the Earth's orbital elements (eccentricity, obliquity of the ecliptic, precession of equinoxes), natural internal processes of the climate system, or — the factor that, obviously, most often catches people's imagination — *anthropogenic forcing*, such as increasing atmospheric concentrations of carbon dioxide and other greenhouse gases.

Even if some actors continue to stubbornly deny it [2], the very sophisticated climate models that have been developed in the last twenty years “justifiably provide an additional strand in the argument that anthropogenic climate change is a critical global problem” (STAINFORTH et al. 2007: 2145) [3]. Whenever such models are used to develop policy, however, *uncertainties* of all kinds emerge that may seem to make the task insurmountable (cf. our Summer 2004 seminar, “Living Dangerously: Coping with Risk and Uncertainty in Complex Biological Systems”). Where to derive confidence from? Three of the eminent speakers in this seminar (SMITH, STEHR, and THOMPSON) will deal with uncertainty and risk as related to climate change and scientific and political strategies to cope with it (and, as STEHR emphasizes, *adapt to* it) from a number of (inter)disciplinary perspectives, whereas SHRADER-FRECHETTE will investigate the question what energy techniques best address climate change.

Notes

1. National Snow and Ice Data Center, Boulder, CO, USA;
http://nsidc.org/arcticmet/glossary/climate_change.html

2. Thus, for Vaclav KLAUS, the President of the Czech Republic, global warming is but a “myth”; see, e.g., <http://motls.blogspot.com/2007/02/vclav-klaus-about-ipcc-panel.html>

3. STAINFORTH DA, ALLEN MR, TREDGER ER, SMITH LA (2007) Confidence, uncertainty and decision-support relevance in climate predictions. *Philosophical Transactions of the Royal Society A* 365: 2145-2161.

Werner Callebaut
Scientific Manager

Gerd B. Müller
Chairman

Interpreting Climate Change

Schedule

- 3:15 p.m. *Opening*
Gerd B. Müller, Chairman, KLI
- 3:20 p.m. *Welcome Address*
Heinz W. Engl, Vice Rector, University of Vienna
- 3:25 p.m. *Contrasting the Diversity of Our Models with the Uncertainty in Our Future*
Leonard A. Smith
- 3:55 p.m. *Adaptation to Climate Change*
Nico Stehr
- 4:25 p.m. *Too Much Carbon Dioxide and Not Enough Clumsiness*
Michael Thompson
- 4:55 p.m. *Nuclear Theology and Climate Change: Why IPCC (and Other Arguments) Err in Proposing Nuclear Power to Address Climate Change*
Kristin D. Shrader-Frechette
- 5:25 p.m. Coffee break
- 5:45 p.m. *Round table discussion among the speakers*
Werner Callebaut, Moderator
- 6:15 p.m. *Open discussion*

Leonard Smith

Centre for the Analysis of Time Series

London School of Economics and Political Science

<http://www.lse.ac.uk/collections/cats/Lennypage.htm>

Contrasting the Diversity of Our Models with the Uncertainty in Our Future

Abstract

Climate scientists face the dual challenge of improving their models while simultaneously communicating insights and uncertainties of future climate change. The inconvenient truth evident from observed climate change over the last one hundred years must be confronted in the face of an inconvenient ignorance of what the future will hold. While evidence for global warming stands independent of our ability to model the planet in detail, our ability to foresee key decision-relevant events over the current century does depend on our being able to model the details realistically. Many decisions cannot be postponed, but how is a decision maker to know if today's "best available information" is any more relevant to quantitative decision support than the 1970s' "best available information"? There is no question climate models are improving, but more relevant questions are: On what space and time scales do we currently have quantitative decision-relevant information? Is this information best captured in and communicated via probability distributions or by some other means? What strategy might climate scientists adopt in advancing the science if the aim is to rapidly improve decision support and insight into the future? These questions are addressed in the larger context of modeling nonlinear dynamical systems. Nontrivial challenges, ranging from open questions at the heart of mathematics and the philosophy of science to the human process of real-world decision making, are noted. In order to see through our models we must respect their limitations, especially as they decrease in the coming decades.

Biographical note

Professor Lenny SMITH is Director of the Centre for the Analysis of Time Series (CATS). He was raised in Florida, receiving his Bachelors degree in "Physics Mathematics and Computer Science" from the University of Florida and his MA, MPhil and PhD in Physics from Columbia University (USA). Since 1992 he has been a Senior Research Fellow (mathematics) at Pembroke College Oxford, working in the Oxford Centre for Industrial and Applied Mathematics (OCIAM). He became a Professor of Statistics (Research), at the London School of Economics (LSE) in October 2004. His research interests focus on dynamical systems and predictability, with examples ranging from mathematical systems and laboratory experiments to weather and climate, each of which are discussed in his recently published book, *A Very Short Introduction to Chaos* (OUP, 2007). Two successful projects, DIME (Direct and Inverse Modelling in End-to-End Environmental Estimation) and REMIND (Real-time Modelling of Nonlinear Data-streams), were funded under the UK EPSRC Maths Faraday program, and a current project NAPSTER (Nonlinear Analysis and Prediction Statistics from Time Series and Ensemble forecast Realizations) is a UK NERC Knowledge Transfer grant. Professor SMITH was active in the formation of strategy for THORPEX (he was co-author of the Socio-Economic Impacts Chapter) and the original experimental design(s) of climateprediction.net. He was awarded the Royal Meteorological Society's Fitzroy Prize in recognition of his contributions to mathematically-coherent, user-relevant developments in meteorology.

Nico Stehr

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http://www.zeppelin-university.de/frameblast_eng.php?url=/english/departments/stehr.php

Adaptation to Climate Change

Abstract

Historically, adaptation to climatic dangers and precautions in the face of climatic risks are normal modes of behavior, which we all practice in one way or another. This practice is motivated by our perception of what is “normal” — a perception that often fails, however, to conform to the extent of the actual risks. On the assumption that nature — if not in its totality, then at least within limits — is practically controllable, deviations from this normal state of affairs are interpreted as proof that nature is changing, and as the effect of culpable behavior (mainly) on the part of others. This behavior must be overcome, and we too are ready to make our own small contributions. The alternative reaction, which is to infer that the present risk has been underestimated, and so to invest more in the strategy of precaution, is much more seldom chosen.

These attitudes and modes of behavior can also currently be observed in the realm of public policy, with respect to reactions to anthropogenic climate change. In the foreground, we see both excessive public punishments for the “skeptics” of explanations for the current climate changes, and repeated assurances, not unlike a prayer wheel, that all this will nonetheless be turned to the good: the catastrophe can be averted, as long as we all just work hard enough at it. Only peripherally, if at all, is it mentioned that the climate change of human origin in the coming decades can only be reduced, but not avoided. What exact form the required adaptive and precautionary measures might take is discussed publicly as seldom as the question of the national and international distribution of the burdens, or the question of social decision-making mechanisms for managing the climatic consequences.

As long as the question of precautions is not seriously discussed in the public arena, despite research efforts that go largely ignored; as long as the present natural climatic dangers are dismissed as being under control, and the potential future growing risks are instrumentalized above all as a warning regarding the disastrous consequences of prevailing social practice; and as long as the question of climate is largely degraded to a means to an end, as an urgent call to reduce the emission of greenhouse gases, or understood as motivation to lead an ethical, more environment-friendly life, it is apparent that no practical answers to the immediate dangers of climate change will be found.

Biographical note

Nico STEHR is Karl Mannheim Professor of Cultural Studies at Zeppelin University, Friedrichshafen, Germany. His research interests center on the transformation of modern societies into knowledge societies and associated developments in different social institutions of modern society, e.g., science, politics, the economy, and globalization. Among his recent books in English are *Governing Modern Societies* (with Richard ERICSON; University of Toronto Press, 2000); *The Fragility of Modern Societies: Knowledge and Risk in the Information Age* (Sage, 2001); *Knowledge and Economic Conduct: The Social Foundations of the Modern Economy* (University of Toronto Press, 2002); *The Governance of Knowledge* (Transaction Books, 2004), *Biotechnology: Between Commerce and Civil Society* (Transaction Books, 2004); *Knowledge Politics: Governing the Consequences of Science and Technology* (Paradigm Publishers, 2005), *Knowledge* (with Reiner GRUNDMANN; Routledge, 2005), *Moral Markets* (Paradigm Publishers, 2008), and *Who Owns Knowledge: Knowledge and the Law* (with Bernd WEILER; Transaction Books, 2008).

Michael Thompson

Stein Rokkan Centre

University of Bergen

<http://www.martininstitute.ox.ac.uk/JMI/People/fellows/Thompson+Michael.htm>

<http://www.iiasa.ac.at/cgi-bin/iferfinger?proj:ins>

Too Much Carbon Dioxide and Not Enough Clumsiness

Abstract

The theory of plural rationality offers an approach for understanding, and making the most of, the disputes that characterize "wicked problems" such as climate change. Wicked problems entail "contradictory certainties," as is evident in the three long-running "policy stories" that define the contested terrain of climate change, each deriving from a diagnosis of the problem that cannot be reconciled with either of the others: the profligacy diagnosis ("Too much consumption, especially in the North"), the population diagnosis ("Too many people, especially in the South") and the prices diagnosis ("Misguided interference with the market has led to the environment being treated as a free good"). Indeed, these three diagnoses are so contradictory that each one's problem is largely constituted by the solutions that are being urged by the other two: frugality in the profligacy diagnosis, fewer people in the population diagnosis, and "get the prices right" in the prices diagnosis. A self-organizing and inherently disequilibrating system, in other words, with dynamics very similar to those that often underlie ecosystems (which helps explain why the theory of plural rationality has its origin in both social anthropology and theoretical ecology).

Common sense suggests that two of these diagnoses must be wrong, and the precepts of policy analysis confirm that response: first ensure a single and agreed definition of the problem; second, be careful always to draw a clear distinction between facts and values; third, cast it all in terms of a single metric (dollars, as in cost-benefit analysis; or lives, as in risk-benefit analysis; or misery, as in quality-adjusted life-years; and so on); and fourth, optimize so as to determine the best policy. Solutions such as these are certainly elegant, but that elegance comes at an unwelcome cost: the loss of all the wisdom and experience that is inherent in the discarded diagnoses and their adherents, and the undermining of pluralist democracy that is entailed in the "closed hegemony" where just one "voice" drowns out the others.

What we need therefore, and what we most emphatically do not have at present with climate change, are "clumsy solutions": institutional arrangements in which each of these three voices is (1) heard and (2) responded to by the others; a messy, argumentative, noisy but ultimately constructive engagement in which (and this is the counter-intuitive bit) those who are gathered around each of the three contending and contradictory certainties

get more of what they want (and less of what they do not want) than they would have got if they had managed to achieve hegemony and "go it alone."

Biographical note

Michael THOMPSON is Professor in the Department of Comparative Politics, University of Bergen, Norway, and a Senior Researcher at the University of Bergen's Stein Rokkan Centre for Social Research. At the International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria, he is affiliated with the Risk and Vulnerability Program. He is also a Fellow at the James Martin Institute for Science and Civilization, University of Oxford.

Originally a professional soldier (he studied at the Royal Military College of Science, Shrivenham, UK, 1960-61), Dr. THOMPSON studied anthropology at University College London (BSc, 1965; PhD, 1976) and social anthropology at Corpus Christi College, Oxford (BLitt, 1968) while also following a career as a Himalayan mountaineer.

His early research on how something second-hand becomes an antique (*Rubbish Theory: The Creation and Destruction of Value*; OUP, 1979), led to work on the "energy tribes" in various western think tanks, on risk, on deforestation and sustainable development (*Uncertainty on a Himalayan Scale*, with W. WARBURTON and T. HATLEY, orig. London, Ethnographica, 1987, revised ed. Kathmandu, Himal, 1996), on household product development (in Unilever), on global climate change, on technology and democracy, and on what might be called "the even newer Institutionalism" (e.g., *Cultural Theory*, co-authored with Richard ELLIS and Aaron WILDAVSKY (Westview, 1990). Another major book by Dr. THOMPSON (with M. SCHWARTZ) is *Divided We Stand: Redefining Politics, Technology and Social Choice* (Harvester-Wheatshead and U. of Pennsylvania Press, 1990).

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Nuclear Theology and Climate Change: Why IPCC (and Other Arguments) Err in Proposing Nuclear Power to Address Climate Change

Abstract

What energy technologies best address climate change? Besides renewables and carbon sequestration, the 2007 IPCC, the 2007 Berry, the 2006 Moore, the 2005 Gethmann-Heinloth, the 2005 Holton, the 2004 University of Chicago, the 2003 MIT, and other assessments claim that several of four considerations (need, ready implementation, economics, and safety) argue for addressing climate change partly through nuclear-fission expansion. Apart from considerations of ethics and sustainability, how plausible are these arguments – on logical, scientific, and metascientific grounds?

The paper shows these four pro-nuclear arguments are more “nuclear theology” than empirical science:

- (1) The need argument illicitly “trims data” on nuclear greenhouse emissions and commits fallacies of composition.
- (2) The implementation argument relies on the fallacy of special pleading (using inconsistent comparative criteria to evaluate energy alternatives) and the engineering fallacy (considering only physical-technical obstacles to implementation).
- (3) The economics argument commits fallacies of composition, trims data regarding nuclear costs, and relies on claims that are incoherent, given current investment and insurance policy/practice.
- (4) The safety argument falls victim to a *reductio ad absurdum*, to a classic dilemma, to the engineering fallacy, and to claims rejected by prestigious pro-nuclear scientists.

The paper closes with brief analyses of nuclear alternatives, e.g., wind, solar, combined-cycle natural gas, cogeneration, and fuel cells.

Biographical note

Kristin SHRADER-FRECHETTE is O'Neill Family Endowed Professor in the Department of Philosophy and the Department of Biological Sciences at the University of Notre Dame. Previously she held professorships at the University of California and the University of Florida. Dr. SHRADER-FRECHETTE studied physics and holds an undergraduate degree in mathematics, a PhD in philosophy of science, and three post-docs: in biology, economics, and hydrogeology. Most of her research is on quantitative risk assessment, radiobiology, and science-related ethics. The US National Science Foundation has continuously funded her research for 25 years. Dr. SHRADER-FRECHETTE has published more than 350 articles in journals such as *Philosophy of Science*, *Synthese*, *Science*, *BioScience*, *Health Physics*, *Conservation Biology*, *The Quarterly Review of Biology*, *Trends in Ecology and Evolution*, *Ethics*, and *The Journal of Philosophy*. Some of her 15 books are *Nuclear Power and Public Policy: Social and Ethical Problems with Fission Technology* (Kluwer, 1980, 1983); *Four Methodological Assumptions in Cost-Benefit Analysis* (National Technical Information Service, 1983); *Science Policy, Ethics, and Economic Methodology: Some Problems with Technology Assessment and Environmental-Impact Analysis* (Kluwer, 1984); *Risk Analysis and Scientific Method: Methodological and Ethical Problems with Evaluating Societal Hazards* (Kluwer, 1985); *Risk and Rationality* (U. of California Press, 1991); *Burying Uncertainty: Risk and the Case Against Geological Disposal of Nuclear Waste* (U. of California Press, 1993); *Method in Ecology: Strategies for Conservation Problems* (with E. D. McCoy; Cambridge UP, 1993); *The Ethics of Scientific Research* (Rowman and Littlefield, 1994); *Environmental Justice: Creating Equality, Reclaiming Democracy* (Oxford UP, 2002), and *Taking Action, Saving Lives: Our Duties to Protect Environmental and Public Health* (Oxford UP, 2007). Her books and articles have been translated into Chinese, Czech, Dutch, French, German, Hungarian, Italian, Japanese, Korean, Norwegian, Russian, and Spanish.

In 2004, Dr. SHRADER-FRECHETTE became only the third American to win the World Technology Award in Ethics. Until 2002, she served as Associate Editor of *BioScience*. She is currently Editor-in-Chief of the Oxford University Press monograph series on Environmental Ethics and Science Policy and a member of the US Environmental Protection Agency Science Advisory Board. She also serves on the editorial boards of 18 professional journals. She is a Past-President of three professional groups: the Society for Philosophy and Technology, the Risk Assessment and Policy Association, and the International Society for Environmental Ethics. Dr. SHRADER-FRECHETTE has been invited to address the National Academies of Science in three different countries and has served as an advisor to numerous governments and international organizations, including the United Nations, the World Health Organization, the US National Academy of Sciences, the US Department of Energy, and the US Agency for Toxic Substances and Disease Registry.

Location and time

The seminar is held in **Hörsaal 8, Pharmaziezentrum, UZA 2**, Althanstrasse 9, Wien IX., on **Thursday 13 March, 3:15-7:00 p.m.**

A follow-up discussion with the speakers takes place at the Konrad Lorenz Institute for Evolution and Cognition Research (**KLI**), Adolf-Lorenz-Gasse 2, 3422 Altenberg, **the next day, 4:15-6:00 p.m.**

The KLI can easily be reached by train: The S40 (in the direction of Tulln) leaves Wien Franz-Josefs-Bahnhof at **3.02** and **3.32** p.m. The ride to Greifenstein/Altenberg takes 28 minutes. Upon leaving the station, take a right turn and walk for about 8 minutes until you reach a wooden chapel. At that crossing, the KLI, which is located in the Lorenz mansion, can be seen across the street.

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