AMERICAN PHYSICAL SOCIETY

New England Section Newsletter

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Paul H. Carr & Laurence I. Gould, Co-Editors

American Physical Society (APS) and the American Association of Physics Teachers (AAPT)

Spring 2011 Joint Meeting of the New England Sections of the APS and AAPT

Materials: The Foundation of Our Future

Friday and Saturday, April 8 – 9, 2011

University of Massachusetts Lowell

Lowell, MA

Friday: Meeting begins, 1:00 pm, UMass Lowell Inn and Conference Center.
Sessions of invited speakers and contributed posters.
Evening banquet and talk featuring Eric Mazur of Harvard University.

Saturday: Sessions of oral APS and AAPT contributed papers plus invited talks.
American Association of Physics Teachers workshops.
Tours of the UMass Lowell research labs.

Details, including Registration, Abstract, and Housing information, can be found at

http://www.uml.edu/college/arts_sciences/Physics/APS-AAPT/

PREVIOUS MEETING

Brown University Physics Department hosted the

Joint Fall Meeting of the New England Sections of the APS and the AAPT

Nanobiophysics in the 21st Century

October 29th and 30th 2010
Providence, Rhode Island

The 2010 Joint Fall Meeting of the New England Sections of the American Physical Society and the American Association of Physics Teachers (NES APS/AAPT) was hosted by Brown University on October 29th and 30th. The theme of the conference was *Nanobiophysics*.

Plenary sessions highlighted leading research in the manipulation, imaging, and study of biological systems at the nanoscale. Recent insights into the teaching of physics, as well as teaching workshops, were also showcased.

The meeting featured an evening of astronomical observations at the Ladd Observatory after the banquet dinner on Friday evening. Nobel Laureate, Prof. Leon Cooper was the banquet speaker.

Plenary Speakers

Patrick Doyle (MIT)
Naomi Halas (Rice)
Peter Nordlander (Rice)
Mark Reed (Yale)
Rohit Karnik (MIT)
David Pritchard (MIT)

NES APS CONFERENCE REPORTS

Report on the October 2010 Greater Boston Area Statistical Mechanics meeting Brandeis University

(communicated by Harvey Gould, Clark University)

Over 100 people attended the 12th annual Greater Boston Area Statistical Mechanics Meeting on Saturday, October 9, 2010 at Brandeis University. The main goal of these meetings is to offer an informal and supportive environment where people from a variety of departments and institutions can meet and exchange ideas. In addition, our goal is to give students a venue where they can discuss their work with more senior scientists. The format is four invited talks of 25 minutes each (plus five minutes for questions) and contributed talks of about 3 minutes each. Plenty of time is set aside for informal conversations.

The invited speakers for this year's meeting were

• Jeff Gore, MIT, "Cooperation and reversibility in microbial evolution."

• Ginestra Bianconi, Northeastern University, "Bose-Einstein distribution, condensation transition and multiple stationary states in multi-loci evolution of diploid populations."

• Pankaj Mehta, Boston University, "The statistical mechanics of transcription-factor binding site discovery using hidden Markov models."

• L. Mahadevan, Harvard University, "Statistical and continuum mechanics of ribbons and small plates."

The tradition of the meeting is to invite speakers who have recently embarked on their independent research careers, speakers who are new to the Boston area, or more senior people whose research deserves greater recognition among people working in statistical mechanics.

There were 35 contributed talks. For the first time we put a limit on the number of contributed talks and five people were unable to give their talks because they registered too late. All the contributed talks were given on a single laptop computer and contributors were asked to save their talks as pdf files so that the talks would be platform independent. The contributed talks were much better than in the early years of the meeting. The talks covered the broad applications of statistical mechanics with an increasing emphasis on biologically related systems. More information about the meeting, including titles of the contributed talks and previous meetings, can be found at <physics.clarku.edu/gbasm/>.

The number of people attending and the number of contributed talks set a new record. We do not know if scheduling the meeting on Columbus Day weekend contributed to the greater attendance or if the increase is due to the increasing number of graduate students in physics and related areas.

Institutions represented included American Scientist Magazine, Arlington School, BAE Systems, BBN Technologies, Boston College, Boston University, Brandeis University, Carnegie Mellon University, Clark University, Harvard University, Husson University, Jawaharlal Nehru Centre for Advanced Scientific Research, Massachusetts College of Pharmacy, MEARS Technologies, MIT, Mount Holyoke College, Northeastern University, Rensselaer Polytechnic Institute, Saint Anselm College, Tohoku University, UMass Boston, University of Connecticut, Storrs, University of Connecticut Health Care Center, University of Maine, Wesleyan University, and Yale University. There were approximately 51 graduate students, 27 post-docs, 20 faculty members, 2 high school teachers, and 4 people from industry in attendance.

The meeting has been subsidized by the New England Section of the APS for the past 12 years at a cost of approximately $10 per person for bagels, coffee, and lunch (sandwiches). As a result, organizing the meeting has been relatively straightforward. Registration is done using a web-based form.

The meeting is open to anyone, including non-members of the APS and NES, but non-members are encouraged to join both. The NES would like to encourage meetings of this type in the New England area and would welcome requests for financial assistance. The main criteria are that the meeting be open to all, widely announced, and make an effort to involve people who are not necessarily experts in the field. Requests for subsidies for student attendance are particularly welcome.

The organizers of this fall's meeting were Bulbul Chakraborty, Claudio Chamon, Harvey Gould, Michael Hagan, Greg Huber, Bill Klein, and Sidney Redner.

EDITORIALS and LETTERS TO THE EDITORS

Please Note: The content of what follows expresses each writer's considered opinion and should not be construed as representing any official position of any organization, including the Executive Board of the New England Section of the American Physical Society.

The issue of anthropogenic global warming (AGW) is not settled. This can be seen from the Letters below as well as contributions to the debate existing in recent publications of this Newsletter (Fall 2007 through Fall 2010 issues). These can be obtained from the NES APS website http://www.aps.org/units/nes/newsletters/).

Given the importance of the topic, we welcome letters (positive or negative) about these issues or on any other issues. The Newsletter is published twice yearly (Fall and Spring).

Paul Carr and Larry Gould, Co-Editors
NES APS Newsletter

Editorial by Laurence I. Gould

A. The following article (reprinted with the author's permission) is by Ross McKitrick, one of the world's leading thinkers in the area of climate science (his brief bio is below).

CONFLICT RESOLUTION IN CLIMATE SCIENCE: SOME PRELIMINARY THOUGHTS FROM AN OUTSIDER

By Ross R. McKitrick

Prepared for Workshop on "Reconciliation in the Climate Change Debate"
Institute for the Protection and Security of the Citizen, European Commission

Lisbon, Portugal
January 26—28, 2011

1. Introduction

I am an "outsider" to the field of climatology in two respects: by professional training I am an economist, and as regards my research I am in dispute with proponents of some elements of what is commonly called the "consensus" scientific position.[1] With regards to my economics background, I note that economists routinely undertake scientific research on matters of acute political controversy, yet the field remains generally congenial and productive; whereas the policy controversies connected to climate research have resulted in seriously disrupted and damaged collegiality in climatology. Why the difference between the two fields? I suggest attention be paid to two reasons: the habit on the part of climate and meteorological societies to issue "expert statements" on behalf of members, and the role of the IPCC.

2. The Key to Intellectual Freedom in Economics: No Society Statements

I am a member of the American and Canadian Economic Associations. The AEA Constitution commits it to (emphasis added):

> The encouragement of perfect freedom of economic discussion. The Association as such will take no partisan attitude, *nor will it commit its members to any position on practical economic questions*.

Likewise the CEA constitution forbids issuing statements:

> The Association has for its object the advancement of economic knowledge through the encouragement of study and research… and the furtherance of free and informed discussion of economic questions. *The Association as such will not assume a partisan position upon any question of practical politics nor commit its members to any position thereupon.*

Economists believe that freedom of discussion requires a prohibition on our major societies issuing position statements. There is wisdom in this! Individual experts can speak for themselves if they desire. Official "society" statements put words in peoples' mouths, imposing groupthink and conformity and fostering bitterness on the part of those who find themselves with no voice. They silence and marginalize members who disagree with some or all of the statement, demoting them to second-class citizens in their own profession, regardless of their numbers or credibility as scientists.

Official statements replace the slow process of winnowing scientific truth by promoting a political "appeal to authority." It encourages journalists, policymakers, educators and others to rest their case on the "Expert Statement" rather than on the evidence. Consequently, public debate becomes less informative, and more authoritarian.

Climatology will not regain collegiality and freedom of discussion, and will continue to suffer factionalism and alienation, until its scientific societies do as economics societies do and forbid issuing position statements on members' behalf.

3. The Unintended Consequences of the IPCC

The IPCC is not a neutral observer of climate science. It is a massive star that has pulled the entire field into its orbit. Papers are written or not written based on whether they suit the IPCC process. Projects get funded or not, and accepted at journals or not, based on their IPCC prospects. The IPCC recruits Lead Authors who are prominent advocates of its preferred views, and their status as Lead Authors subsequently elevates their credentials so that their views acquire canonical status, reinforcing the impression of universal consensus.

Suppose the International Monetary Fund (IMF) created an economics version of the IPCC, which proceeded to issue an Assessment Report and Summary for Policymakers every five years that was promoted as the consensus view of what "every mainstream economist believes." Suppose further that the IMF was committed to one particular school of economic thought, such as New Keynesianism, that they ensured that all the lead authors of the IMF report were dedicated New Keynesians, and that the report inevitably concluded the New Keynesians are right and their critics are wrong (or do not even exist). And finally, suppose that the IMF report was sponsored and endorsed by government departments who benefited by promotion of New Keynesian ideas, and that major funding agencies and university oversight agencies also began to endorse, support and promulgate the views in the IMF report.

It should be obvious that all of this would, over time, degrade the intellectual climate in the

economics profession. It would do so *even if New Keynesianism is true*—and moreso otherwise. Members of the research community would be forced to respond to the warped incentives created by such a dominant institution by embracing, or at least paying lip service to, New Keynesianism. Over time it would be costlier and costlier to be publicly identified as a critic of New Keynesianism, and as critics became marginalized by political forces the IMF's declaration of a "consensus" would become a self-fulfilling prophecy.

Those who were disposed to support the IMF view would find it easier to get funding and academic posts, and journals would be more receptive to their papers since they would gain prominence by being cited in the IMF Report. Likewise journals would be increasingly reluctant to publish critics since their papers would be marginalized and subject to official denigration. Over time, people who had serious doubts about New Keynesianism would learn to suppress them and leave the field, or accept marginalization and negative career consequences.

All these things are playing out in climatology as the IPCC exerts its force over the profession. For those who find the IPCC unreceptive or hostile to their research the result is bitterness and alienation. When the Inter-Academy Council was asked to review IPCC procedures they found a "near-universal" demand by those they interviewed was for Reviewers to have more authority, especially in ensuring that alternative or dissenting views receive proper consideration (pp. 22-23). The IPCC appears to have ignored this suggestion and others like it. In light of the distortions the IPCC is creating, and its apparent unwillingness to undertake reform, I do not know how this situation can be resolved without shutting down the IPCC altogether.

[1] My publications have argued that land climate data are likely contaminated with non-climatic warm biases, that the hockey stick paleoclimatic reconstruction used unreliable methods and overstated its reconstruction significance, and that climate models are significantly over-predicting warming rates in the tropical troposphere.

Bio: Ross McKitrick is a Professor of Environmental Economics at the University of Guelph in Ontario, Canada. He is also a Senior Fellow of the Fraser Institute in Vancouver B.C., a member of the Academic Advisory Boards of the John Deutsch Institute in Kingston Ontario and the Global Warming Policy Foundation in London, UK. His research areas include modeling the relationship between economic growth and pollution emissions; regulatory mechanism design; and various aspects of the science and policy of global warming. His physical science research has appeared in such peer-reviewed journals as *Journal of Geophysical Research, Geophysical Research Letters, Climate Research, The Journal of Non-Equilibrium Thermodynamics* and *Proceedings of the National Academy of Sciences*. He is the author of the advanced textbook *Economic Analysis of Environmental Policy* (University of Toronto Press, 2010). In 2002 he and Christopher Essex of the University of Western Ontario published the book *Taken By Storm: The Troubled Science, Policy and Politics of Global Warming* which was awarded the $10,000 Donner Prize for Best Book on Canadian Public Policy. Professor McKitrick is widely-cited in Canada and around the world as an expert on global warming and environmental policy issues. He has testified before the US Congress and the Canadian Parliamentary Finance and Environment Committees. In 2006 he was one of 12 experts from around the world asked to brief a panel of the US National Academy of Sciences on paleoclimate reconstruction methodology.

An Annotated Index to Papers and Publications by Ross McKitrick, related to AGW, can be found at: http://rossmckitrick.weebly.com/

B. The AGW Controversy Continues: Critiques of Deviations from the Scientific Method as illustrated through recent manipulations of temperature data in "Hide the Decline" — http://www.realclimategate.org/2011/02/hide-the-decline-2-pictures-for-2000-comments/

Editorial By Paul H. Carr

WHY 400 YEARS to DISCOVER *COUNTLESS* PLANETS?

By Paul H. Carr, Ph. D., AF Research Lab Emeritus, www.MirrorOfNature.org

In 1584, Dominican monk Giordano Bruno envisioned the stars as "countless suns with countless earths, all rotating around their suns." When he found that proceedings were being initiated against him for new ideas such as these, he fled from his native Naples, Italy to Protestant Geneva.

Bruno's search for intellectual freedom led him to France, England, and Germany. Homesick, he accepted a patron's invitation to return to Italy. Their relationship soured shortly thereafter, and Bruno was imprisoned for seven years during his lengthy trial. The Roman Inquisition finally condemned him for heresy; he refused to recant and was burned at the stake in 1600.

In 1995, the Swiss astronomers Michel Mayor and Didier Queloz announced the first discovery of a planet orbiting a star similar to our sun (51 Pegasi). Since then, 500 planets have been found orbiting 421 stars, and the count is increasing*. Why did it take over 400 years for this to happen?

It took a century to discover the law of gravity and three more to advance telescope technology. Galileo (1564-1642) using the telescope, recently invented in Holland, was the first to observe the moons of Jupiter and the phases of Venus. This led him to accept Copernicus' assertion that the sun was the center of our solar system.

Galileo's trial by the Roman Inquisition did not help. Paradoxically, the Inquisition was scientifically correct that Galileo did not have proof positive that the earth was rotating about its own axis as it revolved about the sun. His claim that the two-tides-per-day was "proof" later turned out to be correct, but at the time not enough was known about centrifugal forces. In addition, the stellar parallax expected from the earth's orbit around the sun was not observed. Unlike Bruno, Galileo saved his life by recanting and was placed under house arrest for the rest of his life.

Johannes Kepler (1571- 1630) adopted the heliocentric system, because he could place the five regular solids as spacers between the planetary orbits of the six known planets. The fit matched the known radii of the plants with enough perfection that Kepler was convinced that it was divinely planned. Before Kepler, astronomy was mainly observational. Kepler therefore made a unique contribution in postulating that a magnetic force kept the planets in orbit about the sun.

Kepler was on the right track, but it was Isaac Newton (1642 – 1726) who discovered that the force was gravitational. He realized that the gravitational law of attraction between a terrestrial apple and the earth was the same as that between the celestial moon and the earth. As the moon orbited the earth, the force of gravity caused it to continually "fall towards the earth." In contrast to Greek cosmology, Newton believed that celestial and terrestrial bodies had the same properties, as well as obeying the same laws of motion. The Newtonian synthesis of celestial and

terrestrial motion is one of the great intellectual achievements of all time. Isaac Newton's laws of motion and gravity led to the acceptance of the Copernican system. The massive sun in the center was the source of gravity which kept the planets in orbit.

Newton had no "proof positive" that the earth moved, but his gravitational theory made no sense without a massive, comparatively immobile sun near the gravitational center of the solar system. However, in 1720 Bradley discovered stellar aberration, which does demonstrate the earth's motion. Foucault's pendulum was "proof positive." The plane of oscillation of the pendulum remains fixed with respect to the stars as the earth rotates beneath it. This proof in 1851 was anti-climactic, however, as the Copernican system had already been accepted.

Astronomers attribute the recent surge in planetary discoveries, in part, to technological advances in the last century*. These include:

- --Significant improvements in spectrometers, instruments that separate starlight into its component colors for analysis.
- --Better electronic sensors that record the incoming starlight collected by telescope optics.
- --The development of computer software that can reliably discern fluctuations in starlight and the motion induced by the gravitational pull of unseen companions.

Furthermore, the maturation of these technologies has led to intensified searches and data gathering. Within the next few years, missions such as NASA's Kepler and SIM PlanetQuest are expected to provide firm data on Dominican Giordano Bruno's prediction of the existence of earthlike worlds over 400 years ago.

Scientists are more accepted today. In contrast to Bruno, Dominican monk Francisco Ayala was born in Spain in 1934 and ordained in 1960. The next year he came to the US where he earned a Ph. D. at Columbia University in evolutionary biology. He has been President of Sigma Xi and the American Association for the Advancement of Science and was recently awarded the $1.6M Templeton Prize for progress in spiritual reality. Unlike atheist scientists, Ayala believes that religion and science offer complementary windows on the world.

* http://planetquest.jpl.nasa.gov/index.cfm

Comments by L.I. Gould: There has been much written about issues pertaining to the disciplines of science and religion. See, for example, the two-volume set *Science, Religion, and Society: History, Culture, and Controversy,* edited by Gary Laderman and Arri Eisen; Forward by the Dalai Lama (M.E. Sharpe, NY, Fall 2007). My own contribution — which takes the position that there are certain fundamental irreconcilable differences between the two disciplines — can be found in Volume 1 and is titled "Issues in Science and Religion: A Critical Evaluation"; pp. 81 – 99.

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