Physics 205 - Introduction to Research in Physics

Physics 205 Lectures - Winter Quarter 2014

1/6 Joel Primack – Physics as a Profession

1/13 Michael Dine – Interpreting LHC Physics
Howard Haber – Theory/Phenomenology of the Terascale
Bruce Schumm & Jason Nielsen – ILC & LHC

1/27 Sriram Shastry – Supercomductors, Magnets, Thermoelectics
Sasha Sher – Imaging of Neural Function and Structure
Sue Carter - Renewable Energy Systems

2/3 David Smith - X-ray Astronomy and Geophysics
Steve Ritz – Fermi γ-ray Space Telescope & LSST
David Williams – VHigh Energy Gamma Ray Astrophysics

2/10 Tesla Jeltema – Observational Cosmology and Particle Astro
Robert Johnson - Proton Computed Tomography Project
Joshua Deutsch – Biophysics & Condensed Matter Theory

2/24 Bud Bridges – Crystal Structure and Macroscopic Properties
David Belanger - Phase Transitions & Magnetism in $LaCoO_3$
Art Ramirez – Strongly Correlated Matter

3/3 Stefano Profumo – Dark Matter and Baryogenesis
Tom Banks – Holographic Space-Time
Anthony Aguirre - Testing Theories of the Super-Early Universe?

3/10 **Joel Primack – Physics Ethics**
Research Proposals Due

Physics 205 Research Proposals

Each research proposal should say what physics question you want to answer, what method(s) you propose to use, what information and resources (e.g., experimental apparatus, computational capability, and funding) you expect to need, how long you expect this project to take, and other relevant information including why you are especially interested in this project and what you might want to do next if the project succeeds.

In preparing your research proposals, you should meet with a relevant faculty member to get advice on the topic and the questions in the previous paragraph, and also to help you choose a subject that the faculty member is willing to supervise – and possibly even provide financial support. The PhD is a research degree. Preparing the Physics 205 proposals should help you learn how to think more clearly about potential research projects, and help you begin to do research here at UCSC on a topic that interests you.

Your two research proposals are due at the last meeting of Physics 205, Monday March 10 (please also cc a copy to the faculty members with whom you discussed each proposal).

Fraud, Scandal, Ethics, and Politics -- and How to Have a Happy Career in Physics

Joel Primack
Physics Department, UCSC

Science is a social enterprise: scientists replicate and extend earlier research, collaborate with others, communicate their work to others, review and critique the results of their peers, train and supervise associates and students, and otherwise engage in the life of the scientific community and the larger society. Ethical behavior is expected but not always found. Two well-publicized cases of data fabrication in physics in 2002 prompted the American Physical Society to revise its Ethical Guidelines for Professional Conduct. I served on the subcommittee of the APS Panel on Public Affairs (POPA) that developed the new guidelines. Then in 2004, many junior members of the APS were surveyed via the Web, and almost half responded. A clear majority felt that APS ethics statements should be broadened to include treatment of subordinates, especially graduate students and postdocs. This talk will discuss the responsibilities of coauthors, collaborators, and peer reviewers, norms for public policy work, conflict of interest issues, and treatment of subordinates, illustrated by relevant examples.

Ten Commandments for Scientists

Don't lie.

Don't steal from other scientists.

Don't misuse the referee process to impede scientific progress.

Don't allow important scientific information to be concealed from people who need to know it.

Don't try to psych out Nature. If there are several possibilities, work them all out.

Do take responsibility for your scientific contributions.

Do give proper credit to collaborators and students.

Do serve your scientific and academic colleagues, professional societies, and governments, train and mentor students, and give responsible and wise advice.

Do always guess the answer before you calculate, to train your intuition.

Do take science seriously, but don't take yourself too seriously.

PHYSICS TODAY November 2002

Investigation Finds that One Lucent Physicist Engaged in Scientific Misconduct

A stunned physics community is asking whether coauthors, institutions, or referees should have caught the misdeeds at an earlier stage.

The New York Times
nytimes.com

June 15, 2004

Researcher Loses Ph.D. Over Discredited Papers

By KENNETH CHANG

UCSC Science Writing Alumnus

A German university has revoked the doctoral degree of the former Bell Labs scientist who claimed a series of research breakthroughs, then was fired two years ago when it was discovered that he had manipulated data and fabricated results.

The physicist, J. Hendrik Schön, 33, did not commit misconduct in his doctoral research at the University of Konstanz, an investigation there found last year. But on Friday, the university said it had a legal right to rescind a degree when the recipient behaved "unworthily" of it.

"That was interpreted here in the context of science," said Dr. Wolfgang Dieterich, chairman of the physics department at Konstanz. The department began its review last summer, Dr. Dieterich said, and arrived at its decision to revoke Mr. Schön's degree a week and a half ago. Mr. Schön has returned to Germany, and efforts to find him for comment were unsuccessful.

Mr. Schön, a research scientist at Bell Labs, Lucent Technologies' research arm in Murray Hill, N.J., was an author or co-author of more than 70 scientific papers on an array of supposed discoveries, like new superconductors and tiny, molecular-scale transistors. The transistors appeared particularly exciting because they seemed to work the same way current silicon transistors do, suggesting that the technology could be straightforwardly transferred to computer chips.

Others were unable to reproduce any of the findings. Then, in May 2002, outside scientists discovered nearly identical graphs in several of Mr. Schön's papers, even though they supposedly represented different data from different experiments.

Four months later, an investigatory panel led by Dr. Malcolm R. Beasley, a professor of applied physics at Stanford, found that Mr. Schön had manipulated or fabricated data in 17 papers. The panel cleared Mr. Schön's collaborators of knowledge of the fraud, though it suggested that Dr. Bertram Batlogg, one of Mr. Schön's early supervisors, should have kept closer watch. Bell Labs fired Mr. Schön and the discredited papers were withdrawn.

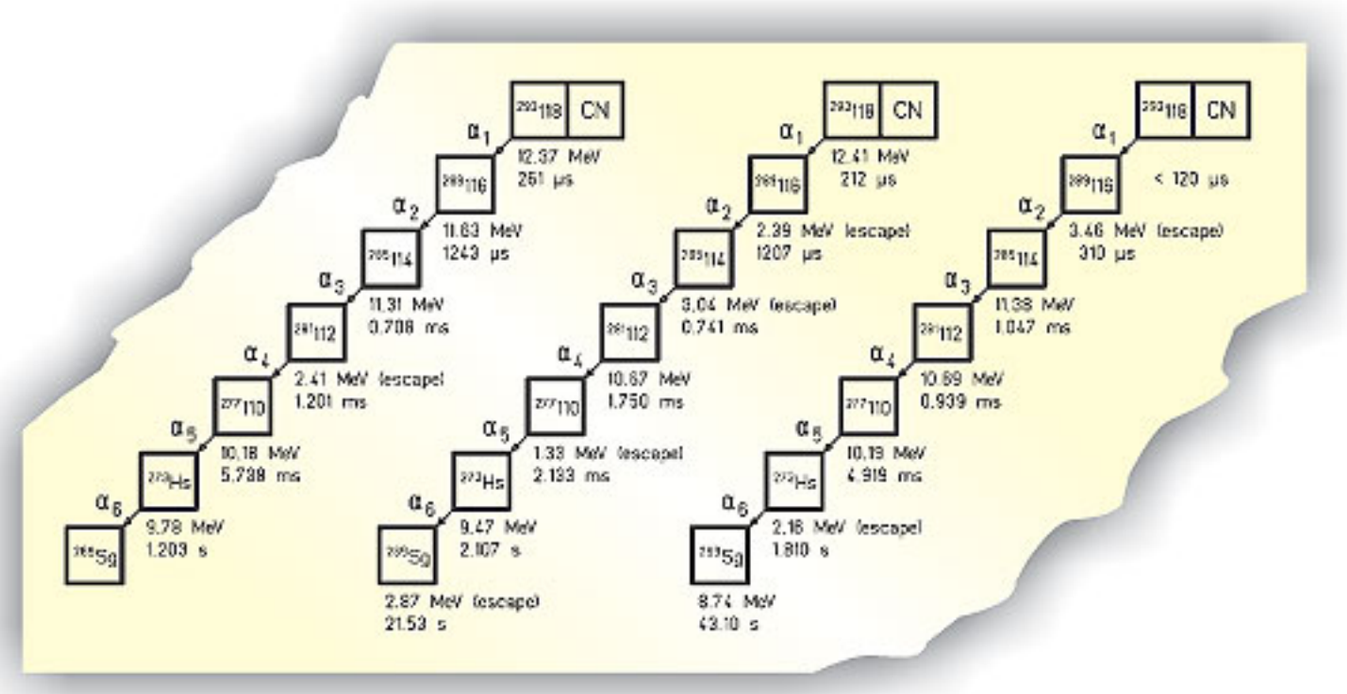
Lawrence Berkeley Lab Concludes that Evidence of Element 118 Was a Fabrication

(from Physics Today, September 2002)

Finding superheavy element 118 would have been a giant step in the quest for the conjectured island of nuclear stability. But now the claimed discovery is thought to have been part of a pattern of deception by one physicist that goes back to 1994. Three summers ago, much attention was paid to a search for new superheavy nuclei at the Lawrence Berkeley National Laboratory's 88-inch cyclotron. In June 1999, the LBNL heavy-element search team announced the discovery of elements 116 and 118. In recent weeks, that experiment has once again become the focus of much attention--but now, alas, for a sadder reason. At a meeting of LBNL employees in June of this year, director Charles Shank announced that the laboratory had recently disciplined one of the members of the team [Victor Ninov] for "scientific misconduct." A yearlong internal investigation had convinced the laboratory's directorate that the evidence for the creation of element 118 and its decay sequence through element 116 in the 1999 experiment had, in fact, been surreptitiously fabricated by one of the experimenters.

The Berkeley team's 1999 paper claimed to have found three atoms of element 118 in 10 days of running. The reported evidence, reproduced in figure 2, was the observation of 17 of the 18 alphas from the three decay chains from $^{293}118$ down to $^{269}106$ (seaborgium).

These three neat alpha-decay sequences, so impressive when they were first reported, are now exhibit A against Ninov. The LBNL formal investigation committee has concluded that these sequences were largely fabricated by him. And Ninov's coauthors sadly agree. "After all this digging, we now know how and when he did it," says BGS team leader Kenneth Gregorich. "But we've given up trying to figure out why."



Decay chains of three ions of element 118, as reported in 1999 by a group at the Berkeley 88-inch cyclotron. The $^{293}118$ nuclei (labeled CN for compound nucleus) decay in six successive alpha-decay steps down to seaborgium-269. Times and energies are given for the 17 alphas allegedly seen. (For the unseen first alpha of one chain, only an upper time limit is given.) These data are now believed to have been largely fabricated.

The New York Times
nytimes.com

October 15, 2002

At Lawrence Berkeley, Physicists Say a Colleague Took Them for a Ride

By GEORGE JOHNSON

It's often said that the greatest thrill in science is to be first to observe a new phenomenon of nature. For nuclear physicists that means being present at the creation of an element, glimpsing for an instant a new kind of matter.

But science's most painful experience is having to withdraw a claim of discovery -- because of an honest mistake or, far worse, deliberate fakery.

For an exhilarating few months in 1999, a team at Lawrence Berkeley National Laboratory's nuclear science division thought it had done something many believed impossible, synthesizing the heaviest atom yet, called element 118. They could barely believe it themselves.

A paper announcing the result was published in Physical Review Letters, the most prestigious journal in the field, and heralded in news reports throughout the world. Experimenters boldly talked of pushing further, to element 119, maybe even as far as element 126.

Then, thread by thread, the discovery unraveled. The paper was retracted, an investigation begun. By the time it was over this summer, one scientist had been fired (over his outraged objections) because of accusations of fraud, the others reprimanded (unjustly, they insist) for not being vigilant enough. And members of the lab -- once the lair of Glenn T. Seaborg, the premier nuclear scientist of his day -- were left trying to figure out how this could have happened, and how to ensure that it never would happen again.

"It's good that Seaborg died before this, because he would have been one of the co-authors," said Albert Ghiorso, a veteran Berkeley researcher, who holds the Guinness world record for discovering elements. "This would have just about killed him."

The New York Times
nytimes.com

November 19, 2002

After Two Scandals, Physics Group Expands Ethics Guidelines

By DENNIS OVERBYE

Jarred by scandals at two prestigious physics laboratories, the council of the American Physical Society, which represents the nation's 40,000 physicists, issued a set of revised and expanded ethical guidelines for researchers last week.

Scientific misconduct "diminishes the vital trust that scientists have in each other" and undermines public confidence, the council said. It called for more ethics training in science and urged all research institutions to adopt procedures based on the Federal Policy on Research Misconduct that the Office of Science and Technology Policy issued in 2000 and applies to all federal agencies and the research they support.

The physicists' group issued ethical guidelines in 1987 and 1991, said Dr. James Tsang, an I.B.M. physicist who heads a panel on public affairs, but the members were unclear on what to do about scientific misconduct. "We needed to point out what good practice was in handling allegations of misconduct," he said. The federal policy, he added, has many specifics.

The old guidelines regarding authorship of scientific papers, Dr. Tsang added, mostly addressed papers by a single author. But as science has grown more complicated, the number of people involved in a project and writing the paper on it has mushroomed. The new guidelines are meant to clarify co-authors' roles and duties.

Acknowledging that in a big project no one is an expert on every aspect, the new policy calls for treading a narrow line between blind trust in colleagues and absolute suspicion. "All collaborators bear some degree of responsibility for any paper they author," the guidelines state.

"While not all co-authors may be familiar with all aspects of the research presented in their paper," the guidelines continue, "all collaboration should have in place an appropriate process for reviewing and ensuring the accuracy of the reported results, and all co-authors should be aware of this process."

http://www.aps.org/policy/statements/02_2.cfm

Ethics & Values

02.2 APS GUIDELINES FOR PROFESSIONAL CONDUCT

(Adopted by Council on November 10, 2002)

(Original version adopted by Council on 3 November 1991.)

The Constitution of the American Physical Society states that the objective of the Society shall be the advancement and diffusion of the knowledge of physics. It is the purpose of this statement to advance that objective by presenting ethical guidelines for Society members.

Each physicist is a citizen of the community of science. Each shares responsibility for the welfare of this community. Science is best advanced when there is mutual trust, based upon honest behavior, throughout the community. Acts of deception, or any other acts that deliberately compromise the advancement of science, are unacceptable. Honesty must be regarded as the cornerstone of ethics in science. Professional integrity in the formulation, conduct, and reporting of physics activities reflects not only on the reputations of individual physicists and their organizations, but also on the image and credibility of the physics profession as perceived by scientific colleagues, government and the public. It is important that the tradition of ethical behavior be carefully maintained and transmitted with enthusiasm to future generations.

This document includes supplementary guidelines on:

- Responsibilities of Coauthors and Collaborators
- Research Results
- References in Publications

See also:

- Ethics Case Studies
- Statement on Treatment of Subordinates
- Report from the Task Force on Ethics Education

from APS GUIDELINES FOR PROFESSIONAL CONDUCT

Research Results

The results of research should be recorded and maintained in a form that allows analysis and review. Research data should be immediately available to scientific collaborators. Following publication, the data should be retained for a reasonable period in order to be available promptly and completely to responsible scientists. Exceptions may be appropriate in certain circumstances in order to preserve privacy, to assure patent protection, or for similar reasons.

Fabrication of data or selective reporting of data with the intent to mislead or deceive is an egregious departure from the expected norms of scientific conduct, as is the theft of data or research results from others.

Publication and Authorship Practices

Authorship should be limited to those who have made a significant contribution to the concept, design, execution or interpretation of the research study. All those who have made significant contributions should be offered the opportunity to be listed as authors. Other individuals who have contributed to the study should be acknowledged, but not identified as authors. The sources of financial support for the project should be disclosed.

Plagiarism constitutes unethical scientific behavior and is never acceptable. Proper acknowledgment of the work of others used in a research project must always be given. Further, it is the obligation of each author to provide prompt retractions or corrections of errors in published works.

Physics Plagiarism Alert

Recent news, February 7 2003: This week, we learned from the media that an enquiry commission has submitted its report on the charges of plagiarism that are the focus of this website.

The report confirms that plagiarism has taken place. The commission specifically found the Vice-Chancellor of Kumaon University, Prof. B.S. Rajput, guilty of plagiarism. Here is one of the media reports:

Indian Express, February 4, 2003

Subsequently it was announced that Prof. Rajput has resigned as Vice-Chancellor of Kumaon University:

The Hindu, February 7, 2003

THE CHRONICLE OF HIGHER EDUCATION

News Blog

Higher-education news from around the Web

September 6, 2007

Turkish Professors Uncover Plagiarism in Papers Posted on Physics Server

Dozens of academic papers containing apparently plagiarized work have been removed by moderators from arXiv, the popular preprint server where many physicists post their work before publication, *Nature* (subscription required) is reporting. According to the article, 67 papers by 15 physicists at four Turkish universities were pulled after an examination of their content revealed that they "plagiarize the works of others or contain inappropriate levels of overlap with earlier articles."

Science 23 September 2005: News of the Week

SCIENTIFIC ETHICS:

Discovery of Pluto Contender Contested in Planetary Court

Richard A. Kerr

When a group of astronomers announced back in July that it had discovered a distant, icy body rivaling Pluto in size, the claim seemed exciting enough. But now it has become entangled in charges of unethical behavior.

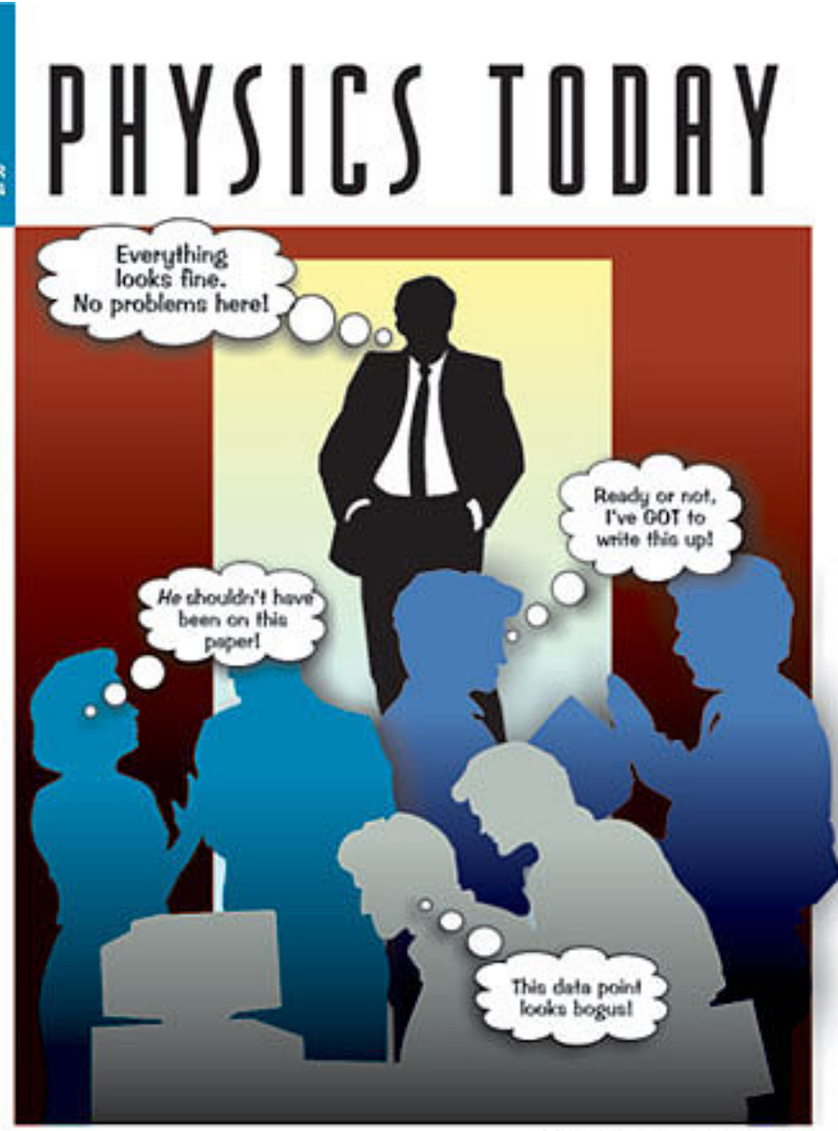
Did Spanish Astronomers Use Google To Discover "Santa"?

from the *finding-windmills* dept

Last month, the discovery of a large Trans-Neptunian object (TNO) was reportedly **hastened** by a hacker. It turns out now that **the "hacker" might actually have been Spanish astronomer Jose-Luis Ortiz, who announced the discovery of 2003 EL61, dubbed "Santa"**, in July. Caltech's Michael Brown had found the object months prior, but was waiting to announce it until after he had published a paper. After reviewing access logs on his website, Michael Brown noticed requests originating from the Spanish astronomers' computers. Now, there is a public brawl emerging over who rightfully "discovered" the object, as well as some ethical accusations over whether or not the Spaniards accessed (and properly attributed) the Caltech data. If the accusations do prove true, it's ridiculous that a bona fide astronomer would try and pull such a farce; even Don Quixote would have come up with a more believable tale.

PHYSICS TODAY November 2004, page 42

Ethics and the Welfare of the Physics Profession



Speaking out on ethics

Responding to a survey by an APS task force on ethics, younger members of the physics community have raised significant concerns about the treatment of subordinates and about other ethical issues.

Kate Kirby and Frances A. Houle

By far the highest response rate and the most extensive and heart–felt answers to the open–ended survey questions came from the junior members of APS—that is, physicists within the first three years after getting the PhD. Clearly, issues of ethics and professional conduct find strong resonance in that group of young physicists.

Many of their open–ended responses described the unethical treatment of subordinates in research as a very serious problem:

abuse of graduate students by advisers.

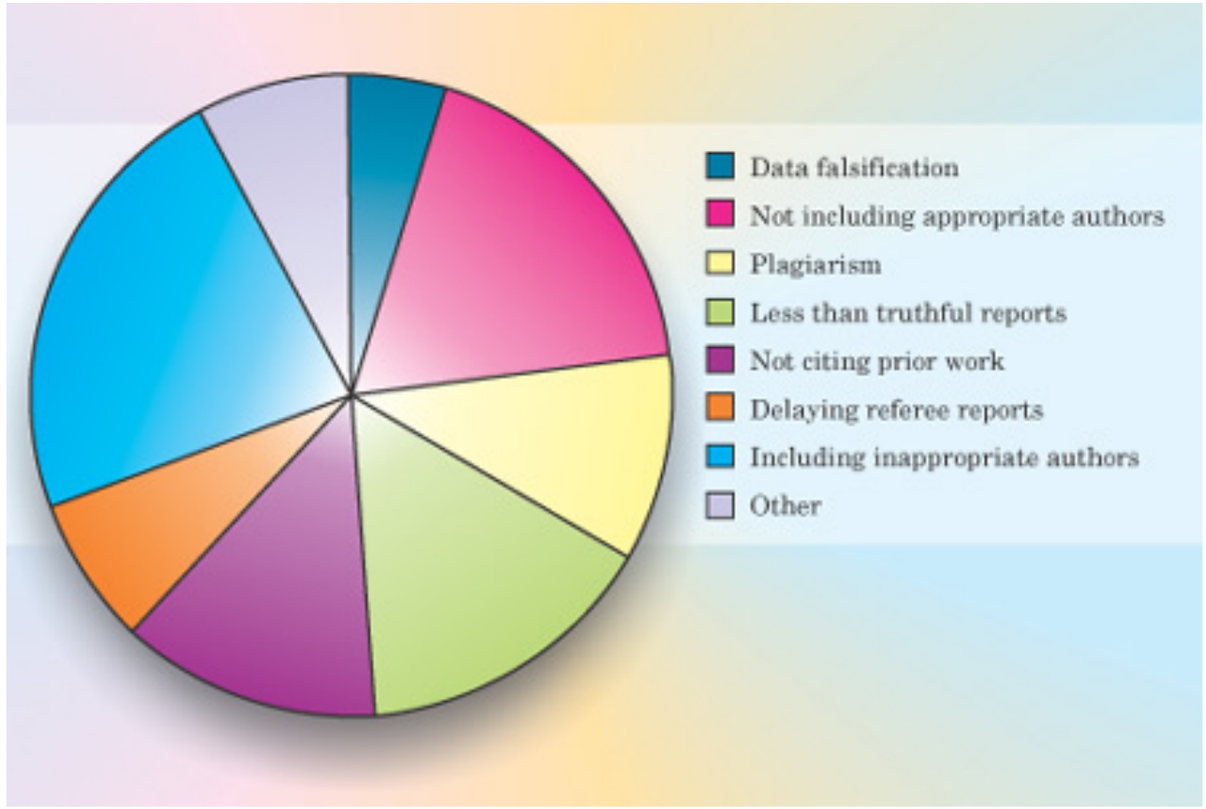
slavery of graduate students. Professors threaten to not write letters of recommendation unless graduate students stay in their group to produce more data.

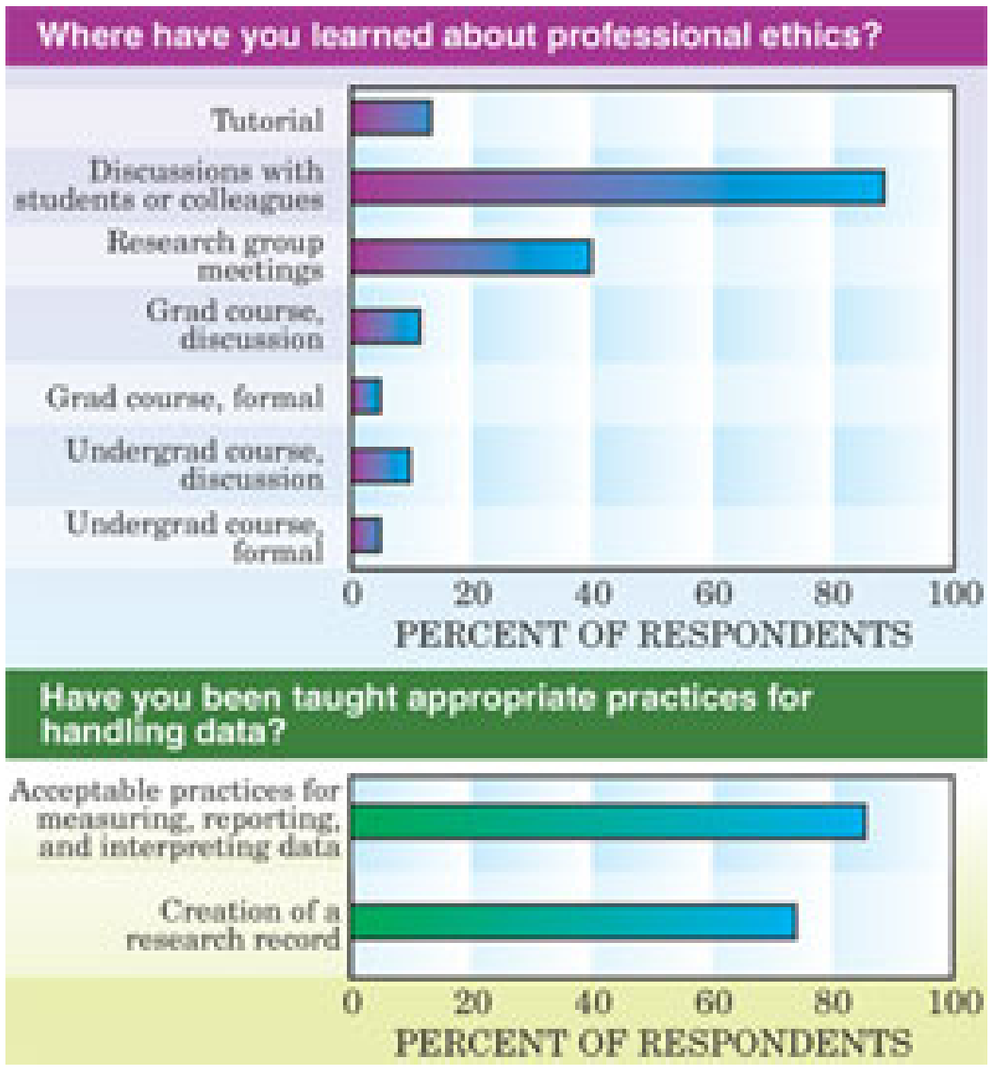
Too often students are treated as labor instead of [as] students and progress towards finishing [their degree] relegated to secondary importance.

Treatment of 'subordinates' is appalling—students and postdocs are merely vehicles for publication. There are no checks on abuse—and reporting of any abuse usually results in the end of a subordinate's career—even if the complaint is correct and justified.

Junior members expressed concerns over not giving students credit for research by leaving their names off published papers. They also wrote of supervisors imposing grueling hours on their graduate students and sometimes pressuring them to do unethical things such as overlooking data that did not conform to expectations.

When APS junior members were asked if they had ever observed or had personal knowledge of ethical violations while they were graduate students or postdocs, fully 39% of those responding to the survey said yes. The top seven offenses they cited are shown in figure 1. In contrast to the high response rate among junior members, only a quarter of physics department chairs responded to the survey they were sent. And of those chairs who did respond, only about 10% indicated instances of ethics violations involving students or faculty in their departments within the last 10 years.





Two areas of clear concern to junior members deserve focus and debate by the entire physics community. One is the matter of coauthorship. The second area of concern is the emergence, over the past 15 years, of a "research system [that] stimulates continuously the competition in fashionable subjects in search of spectacular results," as one survey respondent wrote. Many junior members echoed one respondent's suggestion that "there is enormous pressure to do quality work in a short period of time" that is difficult or impossible to live up to. Young physicists, the lifeblood of our field, are calling for more attention to ethics questions. They are pointing out behaviors and practices that seriously compromise work in physics.

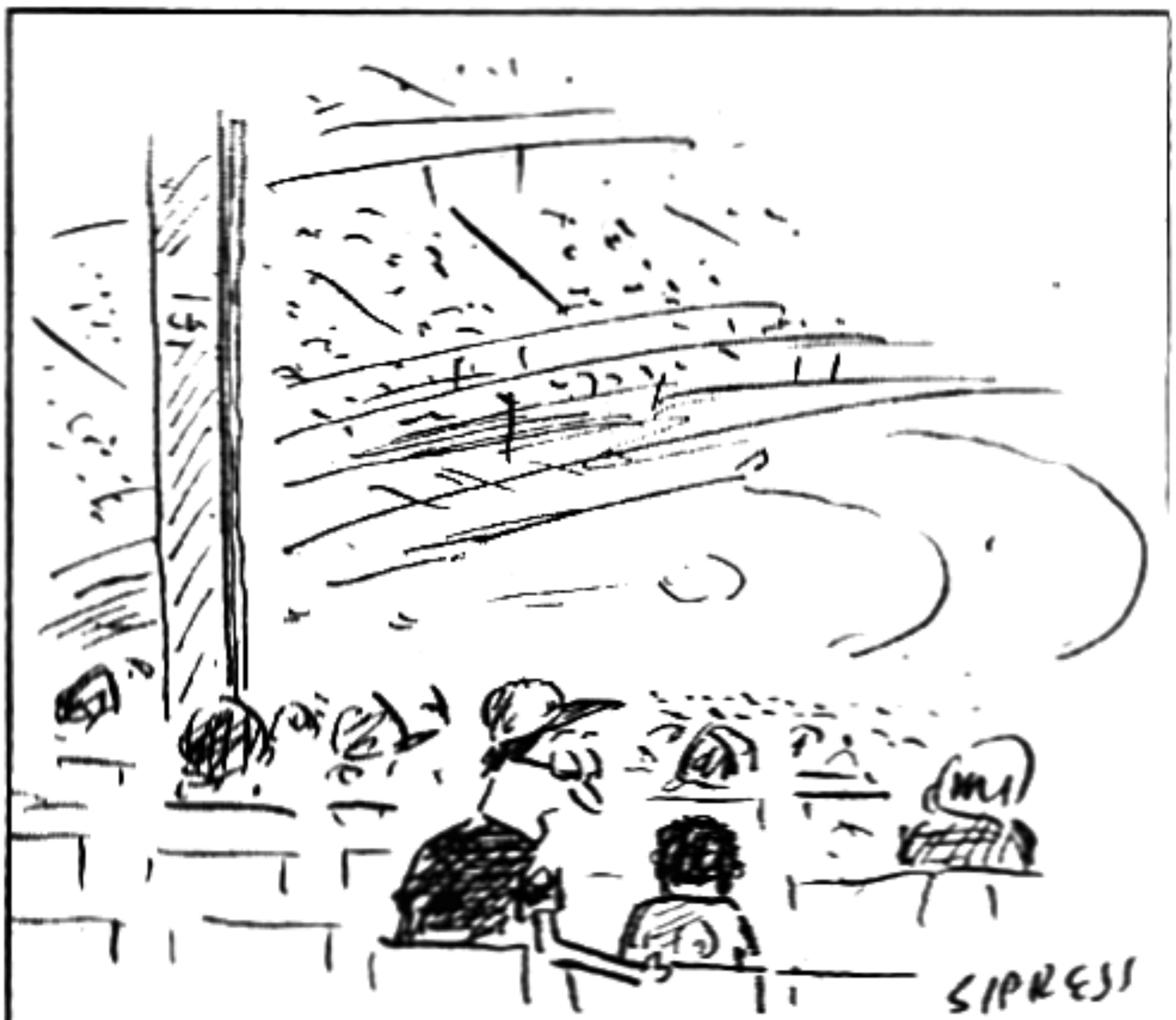
Improper claims of credit: an example

George Smoot was the leader of the COBE Differential Microwave Radiometer (DMR) experiment, which discovered the fluctuations in the cosmic background radiation. He deserved to share the 2006 Nobel Prize for this discovery. However, he angered his colleagues by

- having LBL issue a press release claiming credit, after signing an agreement that only NASA would issue COBE press releases
- claiming credit in his book with Keay Davidson, *Wrinkles in Time* (1994), for scientific achievements of younger colleagues.

One consequence: Smoot was excluded from the WMAP team. But he is a collaborator on the Planck microwave anisotropy satellite.

While I was writing my *Physics Today* review of Smoot's book, I was asked by a *Physics Today* editor to contact Rainier Weiss, the chair of the COBE Science Team. He, Ned Wright, and David Wilkinson told me about Smoot's misdeeds, and I mentioned one such instance in my review (Physics Today, Sept. 1994, pp. 90-91).



"On the one hand, he's a cheater. On the other hand, he's the star of our team. This is what is known as a moral dilemma."

Ten Commandments for Scientists

Don't lie.

Don't steal from other scientists.

Don't misuse the referee process to impede scientific progress.

Don't allow important scientific information to be concealed from people who need to know it.

Don't try to psych out Nature. If there are several possibilities, work them all out.

Do take responsibility for your scientific contributions.

Do give proper credit to collaborators and students.

Do serve your scientific and academic colleagues, professional societies, and governments, train and mentor students, and give responsible and wise advice.

Do always guess the answer before you calculate, to train your intuition.

Do take science seriously, but don't take yourself too seriously.

Supplementary Guidelines on Responsibilities of Coauthors and Collaborators
(Adopted by Council on November 10, 2002)

All collaborators share some degree of responsibility for any paper they coauthor. Some coauthors have responsibility for the entire paper as an accurate, verifiable, report of the research. These include, for example, coauthors who are accountable for the integrity of the critical data reported in the paper, carry out the analysis, write the manuscript, present major findings at conferences, or provide scientific leadership for junior colleagues.

Coauthors who make specific, limited, contributions to a paper are responsible for them, but may have only limited responsibility for other results. While not all coauthors may be familiar with all aspects of the research presented in their paper, all collaborations should have in place an appropriate process for reviewing and ensuring the accuracy and validity of the reported results, and all coauthors should be aware of this process.

Every coauthor should have the opportunity to review the manuscript before its submission. All coauthors have an obligation to provide prompt retractions or correction of errors in published works. Any individual unwilling or unable to accept appropriate responsibility for a paper should not be a coauthor.

Supplementary Guideline on References in Publications
(Adopted by Council, 30 April 2004)

Authors have an obligation to their colleagues and the physics community to include a set of references that communicates the precedents, sources, and context of the reported work. Proper referencing gives credit to those whose research has informed or led to the work in question, helps to avoid duplication of effort, and increases the value of a paper by guiding the reader to related materials. It is the responsibility of authors to have surveyed prior work in the area and to include relevant references.

Proper and complete referencing is an essential part of any physics research publication. Deliberate omission of a pertinent author or reference is unethical and unacceptable.

Peer Review

Peer review provides advice concerning research proposals, the publication of research results and career advancement of colleagues. It is an essential component of the scientific process.

Peer review can serve its intended function only if the members of the scientific community are prepared to provide thorough, fair and objective evaluations based on requisite expertise. Although peer review can be difficult and time-consuming, scientists have an obligation to participate in the process.

Privileged information or ideas that are obtained through peer review must be kept confidential and not used for competitive gain.

TREATMENT OF SUBORDINATES
(Adopted by Council on April 30, 2004)

Subordinates should be treated with respect and with concern for their well-being. Supervisors have the responsibility to facilitate the research, educational, and professional development of subordinates, to provide a safe, supportive working environment and fair compensation, and to promote the timely advance of graduate students and young researchers to the next stage of career development. In addition, supervisors should ensure that subordinates know how to appeal decisions without fear of retribution.

Contributions of subordinates should be properly acknowledged in publications, presentations, and performance appraisals. In particular, subordinates who have made significant contributions to the concept, design, execution, or interpretation of a research study should be afforded the opportunity of authorship of resulting publications, consistent with APS Guidelines for Professional Conduct.

Supervisors and/or other senior scientists should not be listed on papers of subordinates unless they have also contributed significantly to the concept, design, execution or interpretation of the research study.

Mentoring of students, postdoctoral researchers, and employees with respect to intellectual development, professional and ethical standards, and career guidance, is a core responsibility for supervisors. Periodic communication of constructive performance appraisals is essential.

These guidelines apply equally for subordinates in permanent positions and for those in temporary or visiting positions.

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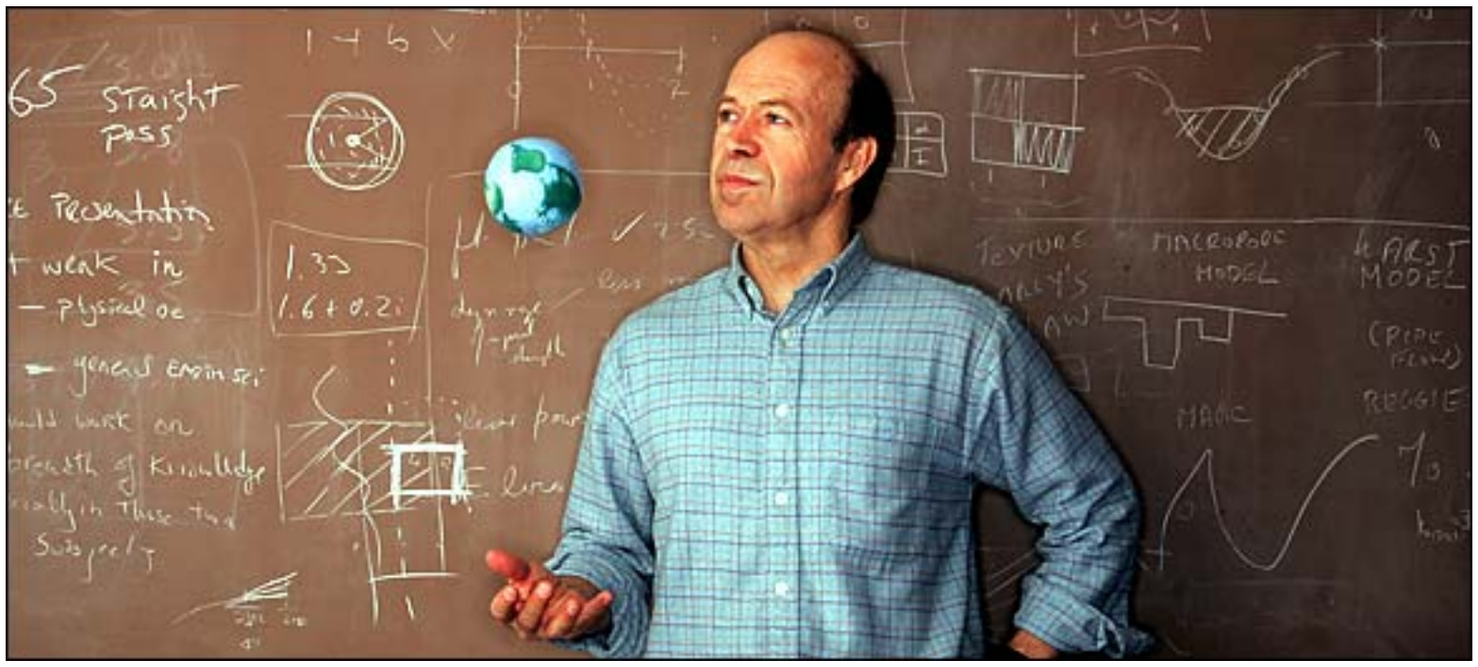
The New York Times
nytimes.com
January 29, 2006
By ANDREW C. REVKIN

Climate Expert Says NASA Tried to Silence Him



The top climate scientist at NASA says the Bush administration has tried to stop him from speaking out since he gave a lecture last month calling for prompt reductions in emissions of greenhouse gases linked to global warming.

The scientist, James E. Hansen, longtime director of the agency's Goddard Institute for Space Studies, said in an interview that officials at NASA headquarters had ordered the public affairs staff to review his coming lectures, papers, postings on the Goddard Web site and requests for interviews from journalists.

Dr. Hansen said he would ignore the restrictions. "They feel their job is to be this censor of information going out to the public," he said.

"Communicating with the public seems to be essential," he said, "because public concern is probably the only thing capable of overcoming the special interests that have obfuscated the topic."

Dr. Hansen, 63, a physicist who joined the space agency in 1967, directs efforts to simulate the global climate on computers at the Goddard Institute in Morningside Heights in Manhattan. ... In 2001, Dr. Hansen was invited twice to brief Vice President Dick Cheney and other cabinet members on climate change. White House officials were interested in his findings showing that cleaning up soot, which also warms the atmosphere, was an effective and far easier first step than curbing carbon dioxide. He fell out of favor with the White House in 2004 after giving a speech at the University of Iowa before the presidential election, in which he complained that government climate scientists were being muzzled and said he planned to vote for Senator John Kerry.

But Dr. Hansen said that nothing in 30 years equaled the push made since early December to keep him from publicly discussing what he says are clear-cut dangers from further delay in curbing carbon dioxide.

In several interviews with The New York Times in recent days, Dr. Hansen said it would be irresponsible not to speak out, particularly because NASA's mission statement includes the phrase "to understand and protect our home planet."

NASA Mission Statement 2011: *Drive advances in science, technology, and exploration to enhance knowledge, education, innovation, economic vitality, and stewardship of the Earth.*

The New York Times
nytimes.com

July 22, 2006

NASA's Goals Delete Mention of Home Planet

By ANDREW C. REVKIN

From 2002 until this year, NASA's mission statement, prominently featured in its budget and planning documents, read: "To understand and protect our home planet; to explore the universe and search for life; to inspire the next generation of explorers ... as only NASA can."

In early February, the statement was quietly altered, with the phrase "to understand and protect our home planet" deleted. In this year's budget and planning documents, the agency's mission is "to pioneer the future in space exploration, scientific discovery and aeronautics research."

David E. Steitz, a spokesman for the National Aeronautics and Space Administration, said the aim was to square the statement with President Bush's goal of pursuing human spaceflight to the Moon and Mars.

But the change comes as an unwelcome surprise to many NASA scientists, who say the "understand and protect" phrase was not merely window dressing but actively influenced the shaping and execution of research priorities. Without it, these scientists say, there will be far less incentive to pursue projects to improve understanding of terrestrial problems like climate change caused by greenhouse gas emissions.

A 24-year-old public affairs officer at NASA named George Deutsch served as censor on Jim Hanson. Deutsch told his colleagues that his job was to "make the president look good." He resigned in disgrace when it was discovered that he had never even graduated from college dispite listing a degree from Texas A&M on his resume. -- from Seth Shulman, *Undermining Science* (University of California Press, 2006), p. 26.

Science: Scientists and Bush administration at odds

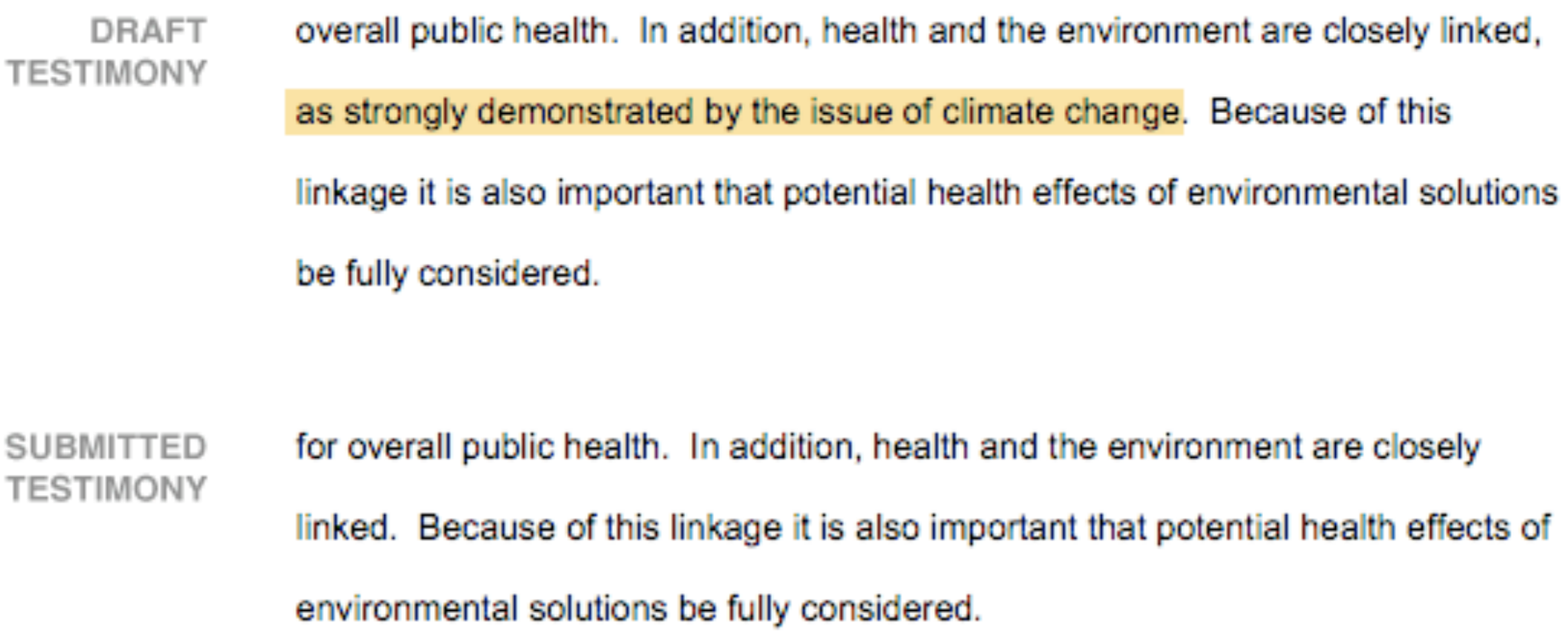
By Thomas Hayden
Posted 6/30/05

Science and politics have always been at odds to some extent, but the relationship between the scientific community and the Bush administration has been particularly contentious. Disputes over issues such as funding, the appointment of scientific advisers, and data interpretation have been raging for years, but a handful of recent developments suggests that hopes for rapprochement during the president's second term are already a thing of the past.

The battle between scientists and the Bush administration first came to a head in early 2004 when the environmental advocacy group Union of Concerned Scientists launched a petition drive aimed at publicizing perceived abuses in the administration's use and oversight of science. To date, more than 6,000 scientists—including 49 Nobel laureates and 154 members of the U.S. National Academies of Science—have signed the UCS statement ["Restoring Scientific Integrity in Policymaking"]. They charge, among other things, that the Bush administration has manipulated scientific advisory committees, altered and suppressed reports by government scientists, and misrepresented scientific knowledge in contentious areas such as global warming, air pollution, and reproductive health.

Earlier this month, the New York Times reported that a White House official repeatedly edited federal climate reports to exaggerate the degree of uncertainty about global warming. On Tuesday, the UCS released a survey of fisheries scientists at the National Oceanic and Atmospheric Administration. Echoing an earlier survey of National Fish and Wildlife Service scientists, the new UCS survey found generally low morale and complaints that administrators, political appointees, and members of Congress had inappropriately manipulated scientific findings at the agency. Responding to the earlier NFWS survey, White House science adviser John Marburger said that he takes the concerns seriously, but "I don't see anything in the responses . . . that would suggest that there's something really broken. As far as I'm concerned," Marburger told U.S. News, "the administration is treating science the way administrations have always treated science.”

White House Cuts to Climate Testimony Raise Questions



By ANDREW C. REVKIN
New York Times October 25, 2007

The White House made deep cuts in written testimony given to a Senate committee this week by the director of the Centers for Disease Control and Prevention on health risks posed by global warming, but she agreed today with administration officials who said that the cuts were part of a normal review process and not aimed at minimizing the issue.

The cuts, done by the Office of Management and Budget last week, halved the 12-page draft testimony submitted by Dr. Gerberding prior to her testimony before the committee.

Scientific Integrity

Overview

An unprecedented level of political interference threatens the integrity of government science. Because policy makers depend on impartial research to make informed decisions, we are mobilizing scientists and citizens alike to push for reforms that will protect our health, safety, and environment.

What's New

Congress Improves FDA Drug Approval Process

Congress has given final approval to the Food and Drug Administration Revitalization Act, which will hold the FDA more accountable for the drugs it approves. A year ago, when UCS surveyed nearly 1,000 FDA scientists, 20 percent reported that they had been asked by their supervisors to provide the public, the news media, and government officials "incomplete, inaccurate or misleading information."

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In this Section

Take Action

Actions for Scientists

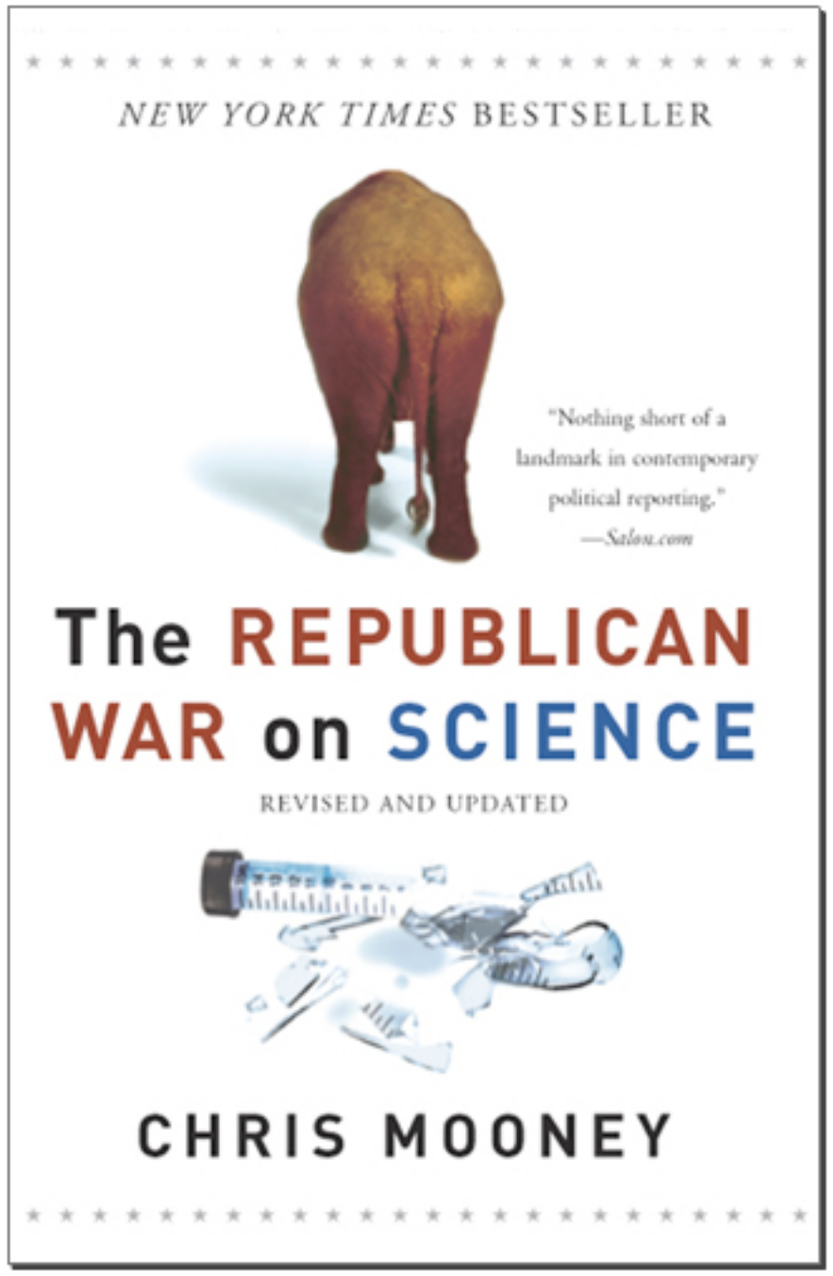
Sign the scientist sign-on statement:
Join more than 12,000 of your scientist colleagues opposed to the misuse of government science.

Actions for Non-Scientists

Citizens' call to action:
Encourage our nation's policy makers to preserve the core values of science and science-based decision making.

Sign up for our online action networks or electronic newsletters. Enter your email address for a list of options.

your email Sign Up



"[Mooney] is a talented and energetic young Washington correspondent for Seed, an excellent and relatively new popular-science magazine. In writing a book about science-policy-making in America today, Mooney has bravely tackled a gigantic and complex topic."
—The Washington Post

"[Mooney's] book is a well-researched, closely argued and amply referenced indictment of the right wing's assault on science and scientists."
—Scientific American

"Nothing short of a landmark in contemporary political reporting…"
—Salon.com

"A careful reading of this well-researched and richly referenced work should remove any doubt that, at the highest levels of government, ideology is being advanced in the name of science, at great disservice to the American people."
—Neal Lane, Former Science Advisor to President Clinton and former Director, National Science Foundation

"Chris Mooney's examination of the right-wing assault on science is masterful. THE REPUBLICAN WAR ON SCIENCE is a must-read for those concerned about both protecting America's heritage of free scientific inquiry and maintaining our global competitive advantage."
—Rush Holt, U.S. Representative from New Jersey

"If left unchallenged, the Bush administration's deliberate misrepresentation and frequent outright disregard of science advisory processes will have serious consequences for the nation's economy, health and security. Chris Mooney has opened a window to reveal the extent of the anti-science bias in government policy making."
—Paul Berg, Nobel Laureate in Chemistry

"Chris Mooney doesn't beat around the bush in his well-documented roasting of those who would make a mockery of the processes and results of science. Read it and weep over the loss of reason among our leaders."
—John H. Gibbons, former director of the Federal Office of Energy Conservation, former director of the Congressional Office of Technology Assessment, and former Science Advisor to President Clinton

Ten Commandments for Scientists

Don't lie.

Don't steal from other scientists.

Don't misuse the referee process to impede scientific progress.

Don't allow important scientific information to be concealed from people who need to know it.

Don't try to psych out Nature. If there are several possibilities, work them all out.

Do take responsibility for your scientific contributions.

Do give proper credit to collaborators and students.

Do serve your scientific and academic colleagues, professional societies, and governments, train and mentor students, and give responsible and wise advice.

Do always guess the answer before you calculate, to train your intuition.

Do take science seriously, but don't take yourself too seriously.

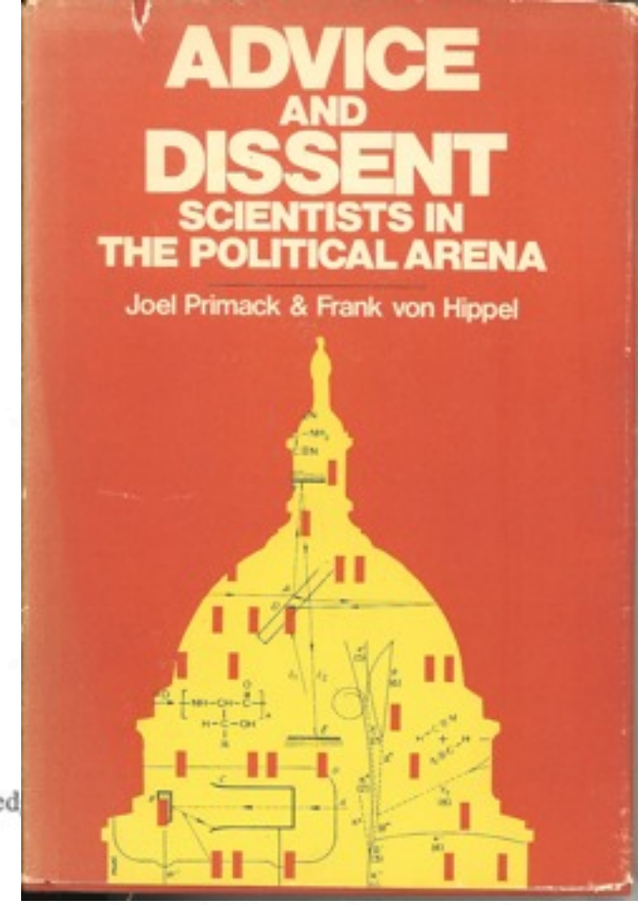
Science Advice to Governments

Science advice has been regarded as essential for government officials responsible for science and technology. Its functions include

- Identifying the choices and their consequences
- Delaying decisions
- Bypassing channels
- Preventing surprises
- Insulating the resulting policies from attack

The case studies of many examples of science advice in Primack and von Hippel, *Advice and Dissent: Scientists in the Political Arena* (1974) led us to conclude that in practice science advice mainly tells officials how to do better things that they have already decided to do. Scientists who have succeeded in changing government policies have usually done so by appealing to the public or through litigation in the courts.

We wrote our book during the Nixon administration, and we thought things were pretty bad. Reagan and G.W. Bush have been much worse.



"Confidential advice," write the authors, "can too easily be ignored. But when a scientist effectively takes his concerns to the public, and these concerns relate to a clear danger to the public health and welfare, then government officials must listen." By revealing both the failures and successes of scientists in the political arena, Primack and von Hippel have taken us a step closer to the day when science will work for the people — not against them.

JOEL PRIMACK is Assistant Professor of Physics at the University of California at Santa Cruz.

FRANK VON HIPPEL is a research scientist at the Center for Environmental Studies at Princeton University.

Science and Technology Advice to Congress

For many years, the Executive Branch had far more expertise in science and technology issues than Congress. Two things changed that:

• The Congressional Science and Technology Fellowship Program, established in 1973, has funded more than 3000 scientists to work for a year in offices of Representatives and Senators or Congressional committees. Most of the more than 200 PhD scientists on Congressional staffs are former Congressional Science and Technology Fellows.

• The Office of Technology Assessment (1974-1995).

At present, Congress is again not very well advised on critical science and technology issues. But in the first Obama administration, the Secretary of Energy (a Cabinet-level position) was a Nobel Prize winner in Physics, Steve Chu. He was just succeeded by Dr. Ernest Moniz, a nuclear physicist from MIT. Obama's Science Advisor is Dr. John Holdren, an expert on environmental and strategic issues.

Science & Public Policy

AAAS Science & Technology Policy Fellowships

PROGRAM SUMMARY: The AAAS Congressional Science and Engineering Fellows® program is operated as a cooperative effort of approximately 30 national scientific and engineering societies that provide an opportunity for accomplished scientists and engineers with public policy interests to learn about and contribute to the policy-making processes in Congress.
Congressional Fellows spend one year serving on the staffs of Members of Congress or congressional committees, working as special assistants in legislative and policy areas that would benefit from scientific and engineering input.

The program includes an orientation on congressional and executive branch operations and a year-long seminar series on issues involving science, technology and public policy, as well as monthly career enhancement workshops.

"During my time in Congress, I have benefited from the counsel of nearly a dozen American Association for the Advancement of Science Fellows. Having a Congressional Science Fellow is always a great benefit to my office, or any other office. But the benefits continue long after their fellowships end. During their short stays on Capitol Hill, these scientists gain experience and hone skills that allow them to be more effective advocates in the world of public policy."

-- Sen. Harry Reid (D-NV)

The deadline for all programs is 20 December of each year.

http://fellowships.aaas.org/02_Areas/02_Congressional.shtml

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References on Scientific Integrity

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Integrity in Scientific Research: Creating an Environment That Promotes Responsible Conduct (National Academy Press, 2004). Online: http://www.nap.edu/catalog.php?record_id=10430#toc

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American Physical Society Guidelines for Professional Conduct www.aps.org/policy/statements/02_2.cfm

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Union of Concerned Scientists, *Scientific Integrity* project and reports
http://www.ucsusa.org/scientific_integrity/

SINGAPORE STATEMENT ON RESEARCH INTEGRITY

PRINCIPLES

Honesty in all aspects of research. **Accountability** in the conduct of research. **Professional courtesy and fairness** in working with others. **Good stewardship of research** on behalf of others.

RESPONSIBILITIES

1. **Integrity**: Researchers should take responsibility for the trustworthiness of their research.
2. **Adherence to Regulations**: Researchers should be aware of and adhere to regulations and policies related to research.
3. **Research Methods**: Researchers should employ appropriate research methods, base conclusions on critical analysis of the evidence and report findings and interpretations fully and objectively.
4. **Research Records**: Researchers should keep clear, accurate records of all research in ways that will allow verification and replication of their work by others.
5. **Research Findings**: Researchers should share data and findings openly and promptly, as soon as they have had an opportunity to establish priority and ownership claims.
6. **Authorship**: Researchers should take responsibility for their contributions to all publications, funding applications, reports and other representations of their research. Lists of authors should include all those and only those who meet applicable authorship criteria.
7. **Publication Acknowledgement**: Researchers should acknowledge in publications the names and roles of those who made significant contributions to the research, including writers, funders, sponsors, and others, but do not meet authorship criteria.
8. **Peer Review**: Researchers should provide fair, prompt and rigorous evaluations and respect confidentiality when reviewing others' work.
9. **Conflict of Interest**: Researchers should disclose financial and other conflicts of interest that could compromise the trustworthiness of their work in research proposals, publications and public communications as well as in all review activities.
10. **Public Communication**: Researchers should limit professional comments to their recognized expertise when engaged in public discussions about the application and importance of research findings and clearly distinguish professional comments from opinions based on personal views.
11. **Reporting Irresponsible Research Practices**: Researchers should report to the appropriate authorities any suspected research misconduct, including fabrication, falsification or plagiarism, and other irresponsible research practices that undermine the trustworthiness of research, such as carelessness, improperly listing authors, failing to report conflicting data, or the use of misleading analytical methods.
12. **Responding to Irresponsible Research Practices**: Research institutions, as well as journals, professional organizations and agencies that have commitments to research, should have procedures for responding to allegations of misconduct and other irresponsible research practices and for protecting those who report such behavior in good faith. When misconduct or other irresponsible research practice is confirmed, appropriate actions should be taken promptly, including correcting the research record.
13. **Research Environments**: Research institutions should create and sustain environments that encourage integrity through education, clear policies, and reasonable standards for advancement, while fostering work environments that support research integrity.
14. **Societal Considerations**: Researchers and research institutions should recognize that they have an ethical obligation to weigh societal benefits against risks inherent in their work.

2nd World Conference on Research Integrity, 21-24 July 2010, in Singapore

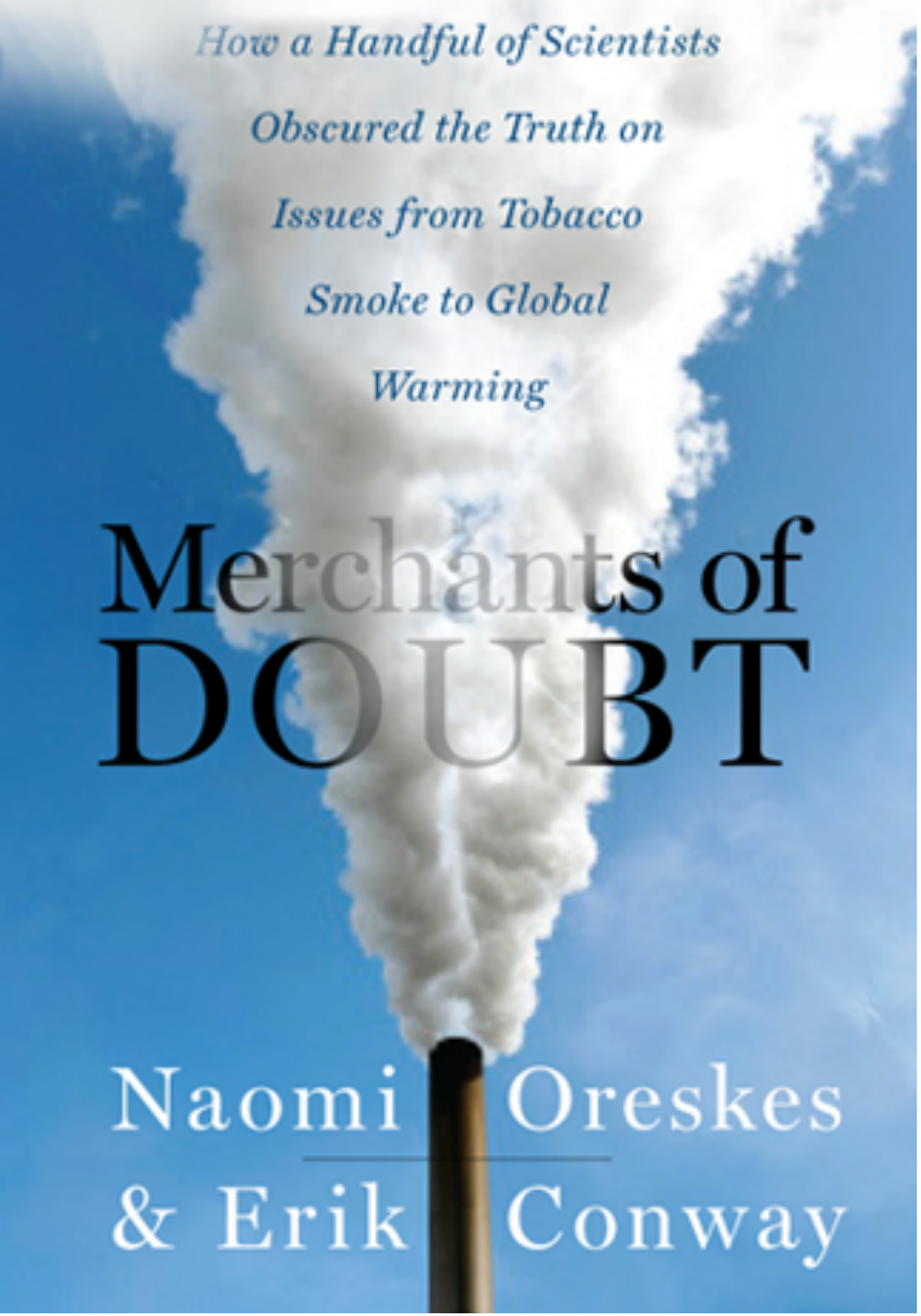
On Being a Scientist: Third Edition (2009)
Committee on Science, Engineering, and Public Policy, National Academy of Sciences, National Academy of Engineering, and Institute of Medicine

Free download at http://www.nap.edu/catalog.php?record_id=12192

Also at http://physics.ucsc.edu/~joel/Phys205

The scientific enterprise is built on a foundation of trust. Society trusts that scientific research results are an honest and accurate reflection of a researcher's work. Researchers equally trust that their colleagues have gathered data carefully, have used appropriate analytic and statistical techniques, have reported their results accurately, and have treated the work of other researchers with respect. When this trust is misplaced and the professional standards of science are violated, researchers are not just personally affronted—they feel that the base of their profession has been undermined. This would impact the relationship between science and society.

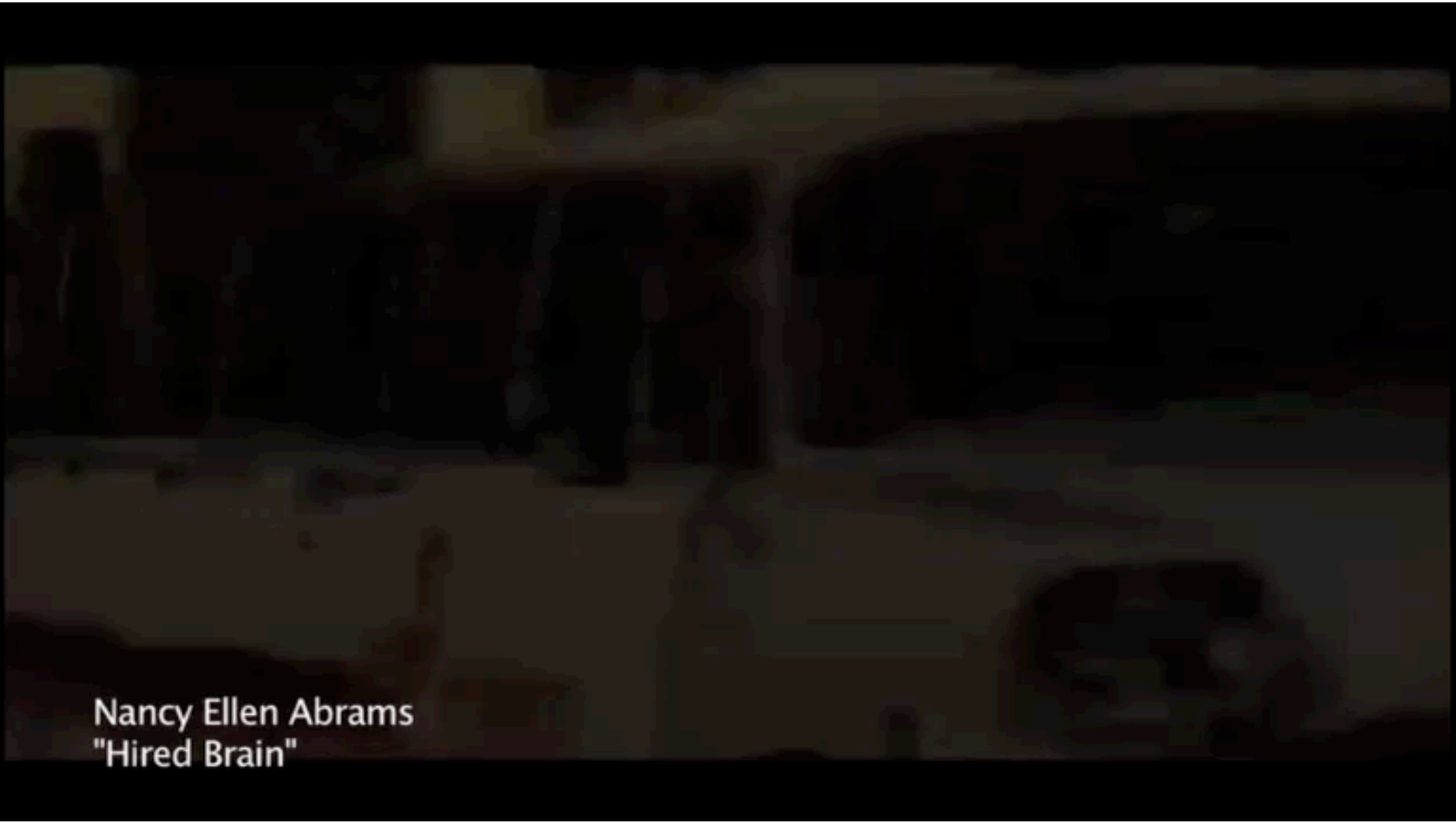
On Being a Scientist: A Guide to Responsible Conduct in Research presents an overview of the professional standards of science and explains why adherence to those standards is essential for continued scientific progress. In accordance with the previous editions published in 1989 and 1995, this guide provides an overview of professional standards in research. It further aims to highlight particular challenges the science community faces in the early 21st century. While directed primarily toward graduate students, postdocs, and junior faculty in an academic setting, this guide is useful for scientists at all stages in their education and careers, including those working for industry and government. Thus, the term "scientist" in the title and the text applies very broadly and includes all researchers engaged in the pursuit of new knowledge through investigations that apply scientific methods.



In *Merchants of Doubt*, historians Naomi Oreskes and Erik Conway explain how a loose–knit group of high-level scientists, with extensive political connections, ran effective campaigns to mislead the public and deny well-established scientific knowledge over four decades. In seven compelling chapters addressing tobacco, acid rain, the ozone hole, global warming, and DDT, Oreskes and Conway roll back the rug on this dark corner of the American scientific community, showing how the ideology of free market fundamentalism, aided by a too-compliant media, has skewed public understanding of some of the most pressing issues of our era.

"Because it is so thorough in disclosing how major policy decisions have been delayed or distorted, *Merchants of Doubt* deserves a wide readership. It is tempting to require that all those engaged in the business of conveying scientific information to the general public should read it."—***Science***

Two of the worst culprits were Physicists Fred Seitz and S. Fred Singer. After being president of the National Academy of Science, and starting while he headed Rockefeller University, Seitz distributed $45 million of R. J. Reynolds tobacco money to cancer researchers who testified that it was uncertain whether cigarettes cause cancer. After being chief scientist of President Reagan's Department of Transportation, Fred Singer joined Seitz in raising doubt about acid rain, ozone, and other topics including climate change. Both were associated with the George C. Marshall Institute, a right-wing think tank created to defend Reagan's "star wars" system.


Nancy Ellen Abrams
"Hired Brain"