Welcome! To help the professor learn everyone’s name, quickly, and to facilitate review papers, please sit in the same spot for every class.

Place of Office Hours: Malloy 211 (sign-up sheet available on office door); phone 1-2647

Professor's Office Hours: Tuesday, 2-3:15; Wednesday, 2-3:15. other days listed on door; plus other times, by appointment, per sign-up sheet on door. If listed times won’t work, see note on office door.

Questions: At beginning of each class, the professor asks for questions. At this time, be sure to ask questions about assignments, research, procedures, or content of prior lectures. For government-research, scientific-journal, journal-database questions for your paper assignments, see professional ND (research or govt.-doc) librarians.

Contact Information: Please see Dr. Shrader-Frechette during her office hours or after class. For appointments, please sign the sheet on her office door. If none of these appointment times will work, please follow directions on the office door and phone Dr. S-F at 1-2647 to let her know when you are available at 8 am Tuesday or Wednesday. Dr. Shrader-Frechette receives about 100 emails daily, many handled by her assistant. Unfortunately, this high email-volume means she cannot quickly answer student emails. She wants to see everyone, so please do not hesitate to see her or to call. For emergency/sickness contact, use her phone at 1-2647. Be sure to sign up for appointment or contact Dr. Shrader-Frechette about a week ahead of time, as she often is out of town weekly (doing science – advising work in Washington, DC – or pro-bono public-health work). Often she cannot quickly see those who do not make appointments in advance.

This course will (1) introduce students to classic readings in philosophy of science (by Carnap, Cranor, Hempel, Kitcher, Kuhn, Laudan, Longino, Machamer, Mayo, Schaffner, Scriven, Woodward, and others, and (2) provide an overview and analysis of different accounts of scientific explanation (e.g., deductive-nomological, mechanistic, unificationist, counterfactualist, etc.) It also will (3) investigate the role of epistemic and ethical values in contemporary science – and now these values affect both scientific method and science-based policy. Finally, the course will (4) show how misuse of scientific method – and ignoring classic philosophy-of-science insights – causes flawed science and flawed science-based, public policy. Case studies will come from contemporary public-policy disputes in biology, epidemiology, hydrogeology, and toxicology. These case studies will assess the validity of scientific methods used to assess theory choice in science, esp. theory choices about climatic change, pollution-induced deaths, species losses, and nuclear accidents. The main course work will be students’ continually revising a short course paper, whose topic is chosen by the student. This will enable the eventual paper, after 3-4 revisions-with-comments, to be in near-publishable form. Students will also do very short comments on the papers of others. For information, see syllabi at www.nd.edu/~ksharder/courses/
Course Goals
1. to introduce students to a basic overview of the classic texts in philosophy of science
2. to show students that typical mistakes in philosophy of science, epistemology, and logic underlie much flawed science that is misused (often by special interests) so as to support questionable public policy
3. to develop students’ logical, argumentative, and analytic skills
4. to help students learn to write a short, publishable paper – through repeated revisions

Class Readings
3. classic philosophy of science articles, supplied by prof. in e-form, by Carnap, Cranor, Feyerabend, Harman, Hempel, Jasanoff, Kitcher, Kuhn, Laudan, Lipton, Longino, Machamer, Mayo, Schaffner, Scriven, Shrader-Frechette, Woodward, and others.

(no tests or quizzes, but 18 pages of analytic writing, plus 9 pages of revisions)

Class Assignments
1. one-page BS (bad-science) paper, due at class 3
2. one-page FCA (first-class-analysis) paper for topic in classes 5-6, due class 4
3. one-page SCA (second-class-analysis) paper for topic in classes 9-12, due class 5
4. one-page RP (review papers) of 6 assignments (2,3,5,6,7,8 for student on left) each of which is due on the same day as the respective main paper is due

5. one-page FAO (four-argument outline) paper, due class 7
6. one-page revision of paper 5, FAO-REV (4-argument outline-revised) paper, due class 8
7. eight-page FP or final paper, double spaced, based on paper 6, due class 10
8. eight-page revision of paper 7, FP-REV, final-paper revision, double spaced, due class 12

Assignments 5-8 above are directed at writing a near-publishable paper by the end of the course, and these four assignments (all versions of the final paper) are 50 percent of the course grade.

All assignments must be single spaced, except assignments 7-8, which must be double spaced.
There will be no tests or quizzes unless most of class members repeatedly fail to do assigned reading.

Basis for Grades
Assignment 1: 10 percent
Assignments 2-3: 10 percent
Assignment 4: 10 percent
Classroom Analysis: 20 percent
Assignment 5: 10 percent
Assignment 6: 10 percent
Assignment 7: 10 percent
Assignment 8: 20 percent
Format for 1-Page (Only) Assignment, Paper RP (Review Paper):

6 one-page review papers (RP), of assignments 2-3, 5-8, of persons on your immediate left, are due at class on same day as the person’s papers are due. Bring copy for professor (and for everyone in class) of review papers of assignments 2-3, 5-8. Each of these 6 papers must have at least 6 numbered sentences (3 positive, 3 constructive criticism), with blank lines between points, assessing the paper. Use the 5 criteria. Separate sentences/points should be numbered. Each sentence must be of the form: “A is B because C.” Each sentence should list a precise argument or reference being evaluated. Sample positive sentence: “Mary Smith’s argument 3 is more convincing because it effectively answers a prominent objection to her thesis, namely that the consensus of journal articles does not agree with her position.” Sample constructive-criticism sentence: “Joe Brown’s second argument is weak because, although Joe seems possibly correct to argue that his grandmother’s breast cancer occurred because of her taking menopausal hormones, Joe does not systematically eliminate other likely causes of her cancer, such as family history or genetics.” Mention specific arguments and claims of author, and make no general statements about the paper. Avoid hasty generalizations, such as “Joe’s paper is good because. . . .” Have someone else read paper, to check for problems of logic, clarity, or grammar. No later than 48 hours prior to class beginning, people whose papers are being evaluated should give professor hard copy in 211 Malloy box and should send professor and their evaluator final email copies of their papers. In email subject line, put: “Paper for PS.” If authors do not send paper to professor and evaluators in time, authors will lose 20 points. Always check the grammar sheet, given by professor, before you turn in your paper. Format: at center top of paper R, put: “Review of Joe Smith Paper.” Skip 2 lines, and at far left, put your own name, followed by: “PH Class.” Class-analysis grade will depend partly on how well you present RP in class. Be sure to bring extra copy of RP paper to class, so that you can present it. Develop each RP point completely and precisely, and give full reasons for each point. Students who forget extra copies of RP papers will lose 5 points.

ABOUT THE PROFESSOR

Kristin Shrader-Frechette has degrees in mathematics and in philosophy of science and has done 3 post-docs, one in hydrogeology, one in economics, and one in population biology/community ecology. Author of 380 professional papers and 15 books, her work has been translated into 13 languages and has appeared in science journals such as Science, BioScience, Health Physics and Quarterly Review of Biology, as well as in philosophy journals such as Ethics, Philosophy of Science, and Journal of Philosophy. Her latest book is Taking Action, Saving Lives, and Climate Change and Nuclear Power will soon appear. Shrader-Frechette has addressed the national academies of science in 3 nations and advised various foreign and US governments, the UN, and the WHO on science-related issues, e.g., quantitative risk assessment. Shrader-Frechette just finished 2 terms on the US EPA Science Advisory Board. She also has served on many committees and boards of the US National Academy of Sciences, the UN, the WHO, and the International Commission on Radiological Protection. Her research has been funded continuously by NSF since 1982. She is Past President of the Risk Assessment and Policy Association and the International Society for Environmental Ethics. See her website at www.nd.edu/~kshrader.
2008 Sample Assignment P (Personal-Impact Paper)

Mildred House and Multiple Myeloma [name victim and give the disease]

1. What Happened to the Family Member or Friend [give lots of personal-interest details] My mother, Mildred House was a vibrant, loving, outspoken, petite mother and wife. Earning her university degree after her three eldest children, she was a former PTA President, newspaper columnist, a lifelong civil-rights activist, and Kentucky’s first white member of the National Association for the Advancement of Colored People (NAACP). Once her three youngest children were in school, she taught English is the poorest, largely-minority, public high school in Louisville, Kentucky. An avid tennis player, swimmer, and cook, she was best known for her love of children. Whenever children at the local orphanage were having a difficult time, their caregivers would call her to take them in, until they were able to adjust. In this way, Mildred became mother to four additional children, besides her six biological children. Known for throwing large, noisy parties, full of dancing and singing, she loved having guests from three or more generations. Her death at age 44 from multiple myeloma (MM), bone cancer, was likely caused by overexposure to medical x-rays.

2. What May Have Caused What Happened: At least 6 reasons suggest that my mother likely died of MM because of unnecessary x-rays. Because she was a tiny woman, during each of 6 pregnancies, beginning in her twenties, her obstetrician x-rayed her pelvis to see if the child’s head could pass through the birth canal.

2.1. MM tends to be a disease of blacks, men, those older than age 65, and those exposed to ionizing radiation or petrochemical pollutants (Perrotta et al. 2008); my mother fits none of these risk factors except for the radiation exposures.

2.2. MM is very well documented as being caused by workers’ exposures to repeated doses of ionizing radiation – which has no safe dose and whose effects are cumulative and additive (NRC 2006) – and by soldiers’ exposures to nuclear-weapons test fallout (Muirhead 2004), and my mother’s doses appear to be of the same levels as those of workers and soldiers (Nussbaum et al 1990).

2.3. MM is a relatively rare cancer, occurring in only about 1 percent of all cancers (Ashcroft 2003), and the rarity also suggests there must be something unusual – like repeated radiation exposures when she was in her twenties (see 2.1), that contributed to it.

2.4. Because there is no family history of cancer, including MM – and my mother was a healthy, well educated, highly athletic woman who never worked outside the home except for teaching several years – diet, lifestyle, and workplace likely did not contribute to MM (see 2.1).

2.5. The MM appeared first in her pelvis, precisely where she was X-rayed repeatedly; given 2.1 and 2.2, this exposure increased the likelihood of radiation-related cancer, like MM.

2.6. The MM appeared about 20 years after her first pelvic X-ray exposure, consistent with MM’s latency period (Muirhead 2004).

3. Bibliography


1. What Happened to the Family Member or Friend: My grandmother was diagnosed with Alzheimer’s disease (AD) five years ago at the age of 76. Her AD has progressed since diagnosis. She now has moderate or mid-stage AD (stage 5 out of 7).

2. What May Have Caused What Happened: At least six reasons suggest that my grandmother’s AD is related to occupational pesticide exposure as a florist.

First, there is strong evidence that vascular risk factors such as heart disease, stroke, diabetes and smoking are risk factors for AD (Luchsinger et al. 2005). My grandmother, however, fits none of these factors.

Second, there is evidence that a history of dementia in siblings and/or parents is also a risk factor for AD (Brown 2005). Yet there is no family history of dementia, neurological disease or AD in my grandmother’s family.

Third, numerous studies have found that environmental factors are also risk factors for AD (Gatz et al. 2005; Brown 2005; Landrigan et al. 2005). Because my grandmother is otherwise healthy and because her AD does not appear to be genetic, it follows that my grandmother might have developed AD because of environmental causes.

Fourth, links have been established between cumulative exposures to pesticides and the development of neurological diseases, particularly Parkinson’s disease and AD (Baldi 2003).

Fifth, in 1979, 350 million cut flowers were imported into the United States for use in florist shops. These flowers were imported with strict regulations on pests and plant diseases, but without regulations on pesticides. As a result, imported flowers often underwent heavy pesticide applications prior to shipment. Many of these pesticides were fat-soluble and could be absorbed through the skin. My grandmother, working as a florist from 1965-1982, handled many imported flowers and could have been exposed to exceptional levels of pesticides. (Morse et al. 1979).

Sixth, recently, specific pesticides (organophosphates and carbamates) have been closely linked with AD (Brown 2005). In 1979 (again when my grandmother was working as a florist) ten florists were found to have organophosphate poisoning due to occupational exposure to organophosphate pesticides (Morse et al. 1979). This suggests that many florists at that time, including my grandmother, were not only exposed to pesticides but to organophosphates in particular. As a florist for seventeen years, my grandmother was likely exposed to cumulative levels of organophosphates that could have reasonably contributed to her AD.

3. Bibliography


Thesis: Chapter 9 of How Are We to Live? discusses the nature of ethics, dismisses several theories of ethics, and supports some ethical principles that (Singer says) lead to universal concern for others. There are at least 5 reasons to suggest Singer’s positive account lacks sufficient evidence and that his dismissal of other theories is unwarranted.

1. Singer discusses the possibility that ethics is gendered and hypothesizes that “the predominance of women in environmental and animal movements therefore suggests a greater readiness to work for larger goals and not just to help oneself or one’s own kind” (179) because they have adopted more of an ethics of universal concern, or “care-ethic.” However, one study suggests the care-ethic was not significantly higher in female participants who volunteered than in those who did not (Karniol et al 2003). Partly because Singer may erroneously identify behavior and concern, he insufficiently documents the claim that the nature of ethics has a gender component.

2. Singer claims, as R.M. Hare does, that ethics must be “universalizable,” that we should be “prepared to prescribe them independently of the role that we occupy” (174), taking the needs and desires of all other beings into account. However, Olson and Svensson (2003) show Hare used the term “universalizable” in only one sense: situations with identical properties merit identical moral judgments. Singer may misinterpret Hare and thus have little Hare support that moral judgments must take into account desires and needs of other beings.

3. On page 172, Singer claims that Christianity creates overwhelming guilt and causes the abandonment of ethics in some people because of unnecessary tension between self-interest and ethics when Christians emphasize “the denial of harmless bodily pleasures, especially sexual pleasures.” Yet the philosopher, St. Augustine, argues in his Confessions that sexual pleasures can often be harmful, in that they “overcast [one’s] heart so that [one] is unable to discern pure affection from unholy desires” (Second Book, ch.2). Singer does not address the possibility that moral rules of sexual purity protect people from some harm, such as blinding one’s reason, and he may therefore be unwarranted in dismissing the Christian emphasis on moral rules concerning sexuality.

4. Singer claims the Buddhist tradition is “a failure in social terms” (190) because in Japan, the ‘first precept’ of Buddhism is not upheld: sentient beings are used as food. However, when Singer judges Buddhism, he is assessing Japanese adherence to Theravada Buddhism, though the Buddhism that was introduced into Japan was a less-strict, less-purification-oriented Mahayana Buddhism (Burtt 1982). In applying the standards of one form of Buddhism to another, Singer may unfairly reject Buddhist ethics.

5. Singer refutes the Kantian concept of morality by showing that horrific Nazi acts (e.g. acts of Adolph Eichmann) were merely a consequence of blindly adhering to duties for their own sake (184). However, Claudia Koonz studied the Nazi motivation for genocide and concluded in her book, The Nazi Conscience, that the Holocaust was a result of extreme racism that developed into violence, as German society saw the ethnic majority as morally righteous and denounced corrupting outsiders (Koonz 2005). Given other explanations for the Holocaust, it may be unfair for Singer to dismiss Kantian duty, based on Eichmann’s claim of duty.


Sample 2004 Paper: Should the US pay for screening/treating all citizens for thyroid disease, since above-ground US nuclear-weapons testing has caused some of this disease?

**Thesis:** At least 6 ethical reasons suggest the US should, at least, pay for thyroid screening/treatment for all females who were ages 1-18 any time between 1953-1962, the time of the 200+ above-ground nuclear weapons' tests, because the US likely is responsible for their ailments.

1. Because thyroid ailments of females who fit these criteria are, more likely than not, caused by US tests (ACERER 1998); the government knew the harm the tests would cause and suppressed it (ACERER 1998, p. 10); and people bear responsibility for their harm (Beauchamp and Childress 1993, pp. 387-388), government should pay for this screening/treatment.

2. Because the government lied, violating citizens' rights to know about the effects of the tests (Shrader-Frechette 2004), and because such lies increase duties of compensation to victims (Beauchamp and Childress 1993, pp. 307-316), the government should pay for screening/treatment for those in this group.

3. Because government delayed releasing the NCI (1997) fallout report for more than 10 years (Hoffman 1998, pp. 421-439), causing fallout victims to be outside the 6-year statute of limitations, so that citizens were deprived of their due-process rights, government should pay to screen/treat this group (Shrader-Frechette 2004).

4. The objection, that the expense of screening/treatment prohibits it (IOM/NAS 1998, p. ES-3), fails because government could screen only those females roughly 45-55 years old, since government bears greatest responsibility for these ailments (Beauchamp and Childress 1993, pp. 343-344), and this group needs the most protection.

5. The objection, that screening/treatment has minimal benefits since thyroid disease is rarely fatal (IOM/NAS 1998), fails because thyroid disease can induce devastating depression, for example, and those without health insurance deserve equal treatment (Beauchamp and Childress 1993, pp. 257-274).

6. The objection, that screening would cause greater harm – false alarm in healthy citizens (IOM/NAS 1998), is ethically flawed in ignoring rights to know and to compensation, and it falsely assumes the IOM has the right to make paternalistic decisions, even when people have been treated unfairly (Mill 1910).

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Advisory Committee for Energy-Related Epidemiologic Research (ACERER), HHS 1998. **Resolution with Regard to Exposures of the American People to Fallout from the Nevada Test Site.** Washington, DC, ACERER.


MIT’s Mark Dowie has charged that New York Times Science writer, Gina Kolata, has a pro-corporate / anti-public health bias, as revealed in her stories on breast implants. Who is right?

**Thesis:** In at least five New York Times articles concerning silicone breast implants, Gina Kolata either ignores or minimizes corporate misconduct or serious public-health concerns, supporting Mark Dowie’s charge that Kolata is biased.

1. Gina Kolata’s September 18, 1995 New York Times article states that silicone-breast-implant manufacturers “agreed to a class action settlement for women who had implants” because they were “faced with a growing number of lawsuits.” But Kolata did not mention that the manufacturers were losing such lawsuits because juries were finding (i) that silicone-breast implants were causing the serious illnesses and injuries alleged and (ii) that some implant manufacturers had affirmatively concealed the adverse results of animal testing (Dow Chemical Co. v. Mahlum).

2. Gina Kolata’s September 18, 1995 New York Times article states that “recent studies have found no link between the implants and serious diseases . . . and many doctors believe they are safe.” But Kolata did not mention numerous authorities and studies finding (i) that silicone is toxic in both animals and man (Busch 1994); (ii) that women with silicone-breast implants are at higher risk of developing cancer from killer-cell suppression (Campbell 1994); and (iii) that autoantibodies linked to autoimmune symptoms were found in 5%-30% of women with silicone-breast implants (Bridges 1993).

3. Gina Kolata’s October 11, 2003 New York Times article states that implant manufacturers were “forced” to compensate women “who the implant makers argued were never sickened by the devices in the first place.” But Kolata does not mention the hundreds of women with breast implants who reported symptoms of chronic fatigue (77%), cognitive dysfunction (65%), severe joint pain (56%), dry mouth (53%), dry eye (50%), hair loss (40%), and difficulty in swallowing (35%) post-implant surgery (Solomon G 1994).

4. Gina Kolata’s October 19, 2003 New York Times article states that “most of the [F.D.A. Advisory Panel’s] scientists agree that implants have not been linked to a risk of systemic diseases like cancer, lupus or chronic fatigue, or neurological problems.” But Kolata does not cite the many studies showing that silicone-associated symptoms go away when the silicone implants are removed (Robinson 1995 and Cuellar 1995).

5. Gina Kolata’s January 9, 2004 New York Times article mentions an Institute of Medicine report that found “no conclusive evidence linking the implants to serious diseases;” but Kolata mentions neither many other reports to the contrary, nor the Institute of Medicine’s finding of “relatively high frequency of local complications that are unique to women with silicone implants” (IOM 1999).

**Bibliography**


Dow Chemical Co. v. Mahlum, 114 Nevada Advance Opinion No. 155.


Sample 2004 paper: Were US citizens harmed by exposure to iodine from US nuclear weapons tests?

Thesis: At least 6 reasons suggest many US citizens, especially children, were harmed by the nuclear tests.

1. Many US children were harmed – especially women now about 45-55 old and those who drank milk from backyard cows/goats – because such doses induce thyroid disease; many received lethal radiation doses, above 160 rads (IOM 1998, p. 42); 3.5 million US children received doses 50 times above annual background; and all doses are risky (US Congress 1998, pp. 421-439).

2. Although the National Academy of Sciences (IOM 1998) and National Cancer Institute (NCI 1997) minimize fallout-caused cancers, they underestimate them because they calculated only average risk from fallout, ignored the higher risks to children and to the medically sensitive 25 % of the population, ignored all non-cancer thyroid diseases/ deaths, and all effects not caused by I-131 (NCI 1999, pp. B-8 through B-29; Shrader-Frechette 2004).


4. Although objectors claim that I-131 fallout likely caused only several hundred thousand additional cancers, even IOM (1998, p. ES-2) says I-131 doses were “too uncertain” to be used in estimating risk (IOM 1998, p. ES-2); as a result, the I-131 risks are at best uncertain, not low.

5. Objectors say fallout had no obvious effects, but this ignores statistically significant increases in childhood leukemias and other cancers (US Congress 1998) and the fact that test-era radiation-risk estimates have been shown to be massive underestimates (Abbott and Barker 1996).


# PHILOSOPHY OF SCIENCE AND PUBLIC POLICY
## OUTLINE OF LECTURES, ASSIGNMENTS, AND DISCUSSIONS

<table>
<thead>
<tr>
<th>Monday 8-23-10</th>
<th>1</th>
<th>From Carnap and Hempel to Feyerabend: Alternative Accounts of Scientific Explanation</th>
</tr>
</thead>
</table>
|                | 1.1 Lecture-Discussion | 1 Introduction to course; course overview  
|                |                        | 2 "Big picture" lecture on the scientific-explanation continuum  
|                |                        | 3 KS-F on climate change, data trimming, and *Rolling Stone*  
|                |                        | 4 KSF on ATSDR and the death of toddler Emily Pearson |
|                | 1.2 Student Analysis   | Discuss topics above during classroom exchanges. |

<table>
<thead>
<tr>
<th>Monday 8-30-10</th>
<th>2</th>
<th>The Logical-versus-Historical-School Debate in Philosophy of Science and Its Separatist Consequences for Public Policy</th>
</tr>
</thead>
</table>
|                | 2.1 Lecture-Discussion | 1 Students choose FCA,SCA paper topics (3 ea); due today  
|                |                        | 2 Read Hempel-Oppenheim, “Studies in the Logic of Explanation,” from *Philosophy of Science* (40pp)  
|                |                        | 3 Read Feyerabend article (8pp)  
|                |                        | 4 Read McGarity-Wagner, *Bending Science*, 1-59  
|                |                        | (total reading: 107 pp., 59 of which are easy) |
|                | 2.2 Student Analysis   | Discuss and analyze readings above during classroom exchanges. |

<table>
<thead>
<tr>
<th>Monday 9-6-10</th>
<th>3</th>
<th>Scientific Consensus and Popper’s Falsificationism: The Case of Climate Change Science</th>
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<tr>
<td></td>
<td>BS PAPER DUE:</td>
<td>e.g., try climate change critics, evolution critics, false-negative results in cancer studies; Dan Kahan on risk perception in <em>Nature</em>, 2010; or Fred Singer in <em>American Thinker</em>, 2010, on climate change, etc.</td>
</tr>
</tbody>
</table>
|                | 3.1 Lecture-Discussion | 1 Read Popper (5 pp)  
|                |                        | 2 Read Oreskes (30 pp)  
|                |                        | 3 Read Michaels, *Doubt*, ix-44, 92-211  
|                |                        | (total reading: 99 pp., 64 of which are easy) |
|                | 3.2 Student-Analysis | Students present BS papers; class will discuss/analyze first half of student BS papers. |
| Monday 9-13-10 | 4 | **Laudan, Schaffner, and the Historical School in Philosophy of Science:**
Comparativist Accounts of Scientific Explanation |
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<tr>
<td>FCA AND RP PAPERS DUE</td>
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<tr>
<td>4.1 Lecture-Discussion</td>
<td>1</td>
<td>KS-F on theory comparison, necessary, but often flawed, as in risk comparisons; fallacy of false analogy</td>
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<td>2</td>
<td>Read Schaffner, “Theory Structure in the Biomedical Sciences,” from J of Medicine and Philosophy (40pp)</td>
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<td>3</td>
<td>Read Laudan, “How about Bust?” from Philosophy of Science (10 pp)</td>
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<td>4</td>
<td>Read KSF on comparativist philosophy of science (Laudan) from Philosophy of Science (11pp)</td>
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<td>(total pages to read = 61, none of which are easy)</td>
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<tr>
<td>4.2 Student Analysis</td>
<td>Students present BS papers; class will discuss/analyze second half of student BS papers.</td>
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| Monday 9-20-10 | 5 | **Carnap to Kitcher, Kuhn, Longino, and Scriven, to Latour**
Alternative Accounts of Values in Science |
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<tr>
<td>SCA AND RP PAPERS DUE</td>
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<tr>
<td>5.1 Lecture and Discussion</td>
<td>1</td>
<td>KS-F will do “big picture” lecture on values in science.</td>
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<td></td>
<td>2</td>
<td>Read Carnap in Minn. Studies in Philosophy of Science (38 pp)</td>
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<tr>
<td></td>
<td>3</td>
<td>Read Longino, “Beyond Bad Science,” STHV, 1983 (10 pp)</td>
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<td>4</td>
<td>Read Scriven on value judgments (28 pp)</td>
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<td></td>
<td>5</td>
<td>Read Kuhn, ch. 13 of Essential Tension (13 pp)</td>
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<td>(total pages to read = 89, 23 of which are easy)</td>
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<tr>
<td>5.2 Student Analysis</td>
<td>Pro Carnap ____________________ Con Carnap ____________________</td>
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<td></td>
<td>Pro Kuhn ____________________ Con Kuhn ____________________</td>
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<tr>
<th>Monday 9-27-10</th>
<th>6</th>
<th><strong>Epistemic or Methodological Value Judgments in Science And Their Public-Policy Consequences</strong></th>
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<tbody>
<tr>
<td>6.1 Lecture-Discussion</td>
<td>1</td>
<td>KS-F overview of methodological value judgments, esp. in Stats</td>
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<tr>
<td></td>
<td>2</td>
<td>Read Mayo on sociological &amp; metascientific explanation (30pp)</td>
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<tr>
<td></td>
<td>3</td>
<td>Read McGarity-Wagner, Bending Science, 60-228</td>
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<td>(total pages to read = 198, of which 168 are easy)</td>
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<tr>
<td>6.2 Student Analysis</td>
<td>Pro McGarity-Wagner__________________ Con M-G__________________</td>
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<td></td>
<td>Pro Mayo ____________________ Con Mayo ____________________</td>
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<td>Monday 10-4-10</td>
<td>7</td>
<td>Epistemic or Methodological Value Judgments in Science: The Case of Biochemical Hormesis, The Case of Community Ecology</td>
</tr>
<tr>
<td>Monday 10-11-10</td>
<td></td>
<td>Watch Trade Secrets &amp; A Plague on Our Children videos (library floor 2) instead of 10-11-10 class; turn in video sheets at next class (see prof’s website, under class materials, for video sheets).</td>
</tr>
<tr>
<td>Monday 10-18-10</td>
<td></td>
<td>FALL BREAK</td>
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<td>Monday 10-25-10</td>
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<td>Public-Policy Consequences of Ignoring Methodological Value Judgments in Science</td>
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<td>Monday 11-1-10</td>
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<td>From Machamer and Kitcher to Harman, Lipton, and Schaffner: Alternative Accounts of Causal Evidence and Theory Choice</td>
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<td>11-8-10</td>
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<td>Scientific Certainty and Woodward’s Account of Causal Decision-making: Evidence for Harm from Environmental Pollutants</td>
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Monday 11-29-10  13  Solutions to Policy Mistakes Based on Flawed Philosophy of Science

13.1 Lecture-Discussion
1. Read McGarity-Wagner, *Bending Science*, 229-end (70pp.)
2. Read Michaels, *Doubt*, 232-265 (33pp.)
3. KS-F on professional duties of civic, scientific activism (total pp. to read = 103, all easy)
4. Read first 2/3 of final, revised student papers.

13.2 Student Analysis
Students give powerpoint presentation of third and fourth FP-REV papers, and class and reviewers will analyze them.

Monday 12-6-10  14  Finish Presentation of Student Papers

Read remaining student papers (FP-REV) – and be ready to analyze each in class.

Students give powerpoint presentation of remaining FP-REV papers.

Possible Paper Topics (Not an Exhaustive List)

**Epistemic Topics (Not Exhaustive):**

What methodological value judgments are made by those who find flaws in climate predictions and therefore claim that climate change is scientifically uncertain?

Are the subjective probabilities, used in the IPCC report to assess 5 classes of climate change, scientifically defensible?

What methodological value judgments underpin claims about minimum viable populations, and thus claims about possible future species losses?

What methodological value judgments do critics of evolution and critics of climate change share, when they reject both scientific views?

Is there a scientific basis for asserting racial or sexual differences in intelligence? Explain/adjudicate the controversy.

Is the weakening of US pesticide standards for children from 1996 to 2006, scientifically defensible? On what epistemic and methodological value judgments, in the relevant science, does this weakening rely?

From a purely scientific point of view, is homosexuality “natural” in the non-human animal kingdom? Explain/adjudicate the controversy.

Do critics in the climategate debate misrepresent the nature and significance of scientific anomaly?

Use Woodward’s counterfactual causal method to evaluate critics of climate change.

Use Laudan’s comparative theory assessment to evaluate critics of climate change.
Do studies of UCLA epidemiologists, who deny oil-drilling Amazon harm, misrepresent scientific certainty? How? With what consequences?

What rules for type-I and type-I analysis should be followed in assessing climate change?

What rules for type-I and type-I analysis should be followed in assessing cancer risks?

What rules for type-I and type-I analysis should be followed in assessing biochemical hormesis?

What rules for type-I and type-I analysis should be followed in assessing possible species losses?

**Ethics Topics (not Exhaustive)**

Is the 1995 scientific-experimentation rule, that allows experiments on civilians without their knowledge and consent, provided an independent committee has agreed, ethically defensible?

Is the 1995 scientific-experimentation rule, that allows secret experiments, esp. biowarfare experiments, provided an independent committee has agreed, ethically defensible?

Should scientific tests of pharmaceutical effectiveness and safety continue to be done by drug companies, or should they be done by an independent government agency, but funded by the companies?

**SAMPLE PAPERS THAT PROVIDE MODELS FOR YOUR OWN FINAL, PUBLISHABLE PAPER**

1 **Sample Papers That Use Philosophy of Science Analysis to Assess Competing, Policy-Relevant Scientific Claims**


KSF paper on Woodward’s account of causal inference, and nuclear energy, from class 10 of this course

2 **Sample Papers That Use Philosophy of Science Analysis to Show That a Scientific Claim Is False**

Oreskes paper on climate change from class 3 of this course


KS-F paper from *Modern Energy Review*, 2009, on her website website at www.nd.edu/~kshrader/pubs/

KSF paper *Human and Experimental Toxicology*, 2008, on her website at www.nd.edu/~kshrader/pubs/
3 Papers That Use Philosophy of Science Analysis to Show That a Methodological Value Judgment is False

Carl Cranor papers on risk assessment from class 11 of this course.


Deborah Mayo paper on risk assessment from class 6 of this course.

KSF paper on animal studies from Environmental Justice, 2008, on her website website at www.nd.edu/~kshrader/pubs/

KSF paper on relative risk from Biological Theory, 2007, on her website website at www.nd.edu/~kshrader/pubs/

4 Papers/Books that Use Scientific Analysis and Cases to Make New Claims about Philosophy of Science

Kenneth Schaffner, Discovery and Explanation in Biology and Medicine, University of Chicago Press, 1994.

Deborah Mayo, Error and the Growth of Experimental Knowledge, University of Chicago Press,

KSF and McCoy paper on case studies from Philosophy of Science, 1994, on her website at www.nd.edu/~kshrader/pubs/

KSF paper on Laudan and the Florida panther, from Perspectives on Science, from class 4 of this course.