Online Ethics Center
FOR ENGINEERING AND SCIENCE

# The Strategic Defense Initiative

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## Description

The Strategic Defense Initiative provides a context for exploring the ethical issues that arise when scientific research has a direct bearing on public policy. Students are asked to consider three different documents that were circulated during the first few years of the SDI program. A brief guide for the discussion facilitator highlights some key ethical issues.

## Body

The Strategic Defense Initiative resulted from a 1983 speech given by President Ronald Reagan in which he called for the development of a defensive shield that would make nuclear weapons “impotent and obsolete."Goodwin, Irwin. Senators and Scientists Object to SDI Costs and Uncertainties. Physics Today 38, 7, 55 (1985); doi: 10.1063/1.2814630. This proposal was made in the midst of a Cold War between the United States and the Soviet Union that continued to foster a nuclear arms race despite the existence of several arms control treaties.

The goal of this initiative, SDI as it came to be known, was quite ambitious, since at the time both countries had tens of thousands of nuclear warheads. While the

warheads would not all be used during a first strike, to make a first strike “impotent” would likely require intercepting thousands of warheads with 100% reliability. Even one warhead landing on target would be devastating.

Funding for SDI research ramped up quickly and involved a wide range of research tracks, including improved missile and warhead detection systems, new approaches to shooting down missiles and warheads, and development of new computer systems and related software to control targeting systems. Research took place in national labs (such as Lawrence Livermore), in industry, and at academic institutions. As research got under way, however, there was growing concern that the original goal of an impenetrable defensive shield was not feasible with existing technology or with technology anticipated to be available in the near term. During the early years of SDI, however, the stated goal remained unchanged: making nuclear weapons impotent and obsolete.

Consider the following three documents:

### *I. The Pledge of Non-Participation*

This was a petition developed jointly by faculty at Cornell University and the University of Illinois at Urbana-Champaign and circulated nationally among faculty in physical science, computer science, and engineering departments. It was signed by several thousand faculty, junior researchers, and graduate students. The complete text of the petition was as follows:Gronlund, Lisabeth. A Status report on the boycott of Star Wars research by academic scientists and engineers. Released May 13, 1986. Digitized by the University of California November 23, 2010.

> We, the undersigned science and engineering faculty, believe that the Strategic Defense Initiative (SDI) program (commonly known as Star Wars) is ill-conceived and dangerous. Anti-ballistic missile defense of sufficient reliability to defend the population of the United States against a Soviet attack is not technically feasible. A system of more limited capability will only serve to escalate the nuclear arms race by encouraging the development of both additional offensive overkill and an all-out competition in anti-ballistic missile weapons. The program will jeopardize existing arms control agreements and make arms control negotiation even

more difficult than it is at present. The program is a step toward the type of weapons and strategy likely to trigger a nuclear holocaust. For these reasons, we believe that the SDI program represents, not an advance toward genuine security, but rather a major step backwards.

The likelihood that SDI funding will restrict academic freedom and blur the distinction between classified and unclassified research is greater than for other sources of funding. The structure of SDI research programs makes it likely that groups doing only unclassified research will be part of a Research Consortium and will therefore work closely with other universities and industries doing *classified* research. SDI officials openly concede that any successful unclassified project may *become* classified. Moreover, the potentially sensitive nature of the research may invoke legal restrictions required by the Export Administration Act.

Participation in SDI by individual researchers would lend their institution's name to a program of dubious scientific validity, and give legitimacy to this program at a time when the involvement of prestigious research institutions is being sought to increase Congressional support. Researchers who oppose the SDI program yet choose to participate in it should therefore recognize that their participation would contribute to the political acceptance of SDI.

Accordingly, as working scientists and engineers, we pledge neither to solicit nor accept SDI funds, and encourage others to join us in this refusal. We hope together to persuade the public and Congress not to support this deeply misguided and dangerous program.

*II. SDI Seminar Statement*

The Global Foundation sponsored a two-day seminar on SDI, November 9-10, 1985, in Washington, DC. Some attendees, a mixture of scientists and nonscientists, signed a statement, excerpts of which appear below (it appears to be difficult to find a record of the full text):Sweet, William. Some Physicists Speak Out in Favor of Star Wars Research. Physics Today 39, 1, 79 (1986); doi: 10.1063/1.2814850.

> We accept the concept of a strategic defense against nuclear missiles. We, therefore, support research to establish the feasibility of such a strategic defense….
>
> Defense, if sufficiently effective, could reduce the likelihood of a nuclear attack directed against strategic missiles and against cities and populations….
>
> We find defense morally preferable to the current strategy of naked offensive confrontation….
>
> The danger of the offensive standoff grows as increasing missile accuracy makes possible precise strikes against retaliatory forces, as nations other that the two superpowers acquire nuclear arms and as the possibility of an accidental launch increases. In our view, a successful defensive system could contribute greatly to nuclear stability.

*III. A Proposal for a Statement by the APS*

In a Letter to the Editor to *Physics Today*, a member of the American Physical Society proposed that the APS adopt the following statement:Orear, Jay. APS and SDI. Physics Today 39, 3, 148 (1986); https://doi.org/10.1063/1.2814948.

> The Council of the APS feels it has the responsibility to warn the public and officials of our government that no amount of effort and cost could provide a nuclear weapon defense of population so efficient and reliable that it would make nuclear weapons obsolete; at least not as long as the Soviet Union stays in the arms race. Furthermore, anyone who claims the possibility of such an invincible shield against all forms of delivery, whether he knows it or not, is engaging in a scientific hoax which could ultimately lose the US taxpayer over a trillion dollars.

For each of the above three statements, consider under what conditions, if any, it would be appropriate for a scientist or engineer to sign on to the statement. You do not need to dig into the technical history of SDI, but rather you should frame your discussion along the lines of, “If I was confident that the following information about SDI was correct, then it would/would not be appropriate to add my support to this statement.” Ground your discussion in *present day* codes of conduct and ethical

standards in your or other relevant disciplines. That is, the point of this activity is not to judge the actions of scientists in the 1980s, but rather to explore how to apply current standards to realistic, complex issues.

# Instructor Notes:

This case study would be appropriate for a fifty-minute, discussion oriented class session.

While some discussion of whether or not SDI was feasible will inevitably occur during the course of the discussion, if that becomes the focus of the discussion, then the point of this case study will have been missed. Questions you could ask to promote a study of the underlying issues of scientific ethics include:

1. How would you characterize the level of certainty you would need to have about relevant factual information before you could, as a scientist, sign one of these statements? Some students will likely need to be reminded that going into a research program, one does not generally know what the outcome will be, so requiring absolute certainty about the expected products of SDI research is too high a standard.
2. Would it be ethical for any scientist or engineer so inclined to sign one of these statements, or should only scientists with expertise in military research be allowed to sign?
3. What parts of your disciplinary codes of conduct would be relevant in addressing ethical issues raised by this case?
4. Should there be a sharp dividing line between scientists offering scientific advice versus them offering policy or political advice? If so, do any of these petitions blur that distinction?

*The case study author's perspective on some of the issues raised by the above case study:* One issue that arises in this case study is level of expertise. At what point can you say you are knowledgeable enough about a situation to publicly take a position on it? Demanding an individual be an expert in the area may be too high a standard. Science is a community activity, and as such we often rely on the expertise of others to form conclusions. For instance, almost all physicists have used the numerical

value of the charge of an electron to more precision than they have personally measured. Part of our training as scientists is learning how to identify reliable sources of information and acting on those sources. At the same time, on matters of importance, whether in research or public policy, we generally try to explore multiple information sources when possible, rather than relying on one source.

If a scientist were to lend their support to one of the above statements, it would be appropriate to expect at a minimum that the scientist had read several papers and/or attended several seminars delivered by individuals who can reasonably be expected to have expertise in the field. Moreover, it would be reasonable to expect that scientist to have considered multiple perspectives on the issue before arriving at a reasoned conclusion about the underlying scientific issues.

If a scientist or engineer comes to a conclusion about an issue such as the one presented in this case study, is it a matter of choice whether they publically support a statement that correctly represents their position, or is it an obligation to do so? Most professional codes of conduct in the sciences and in engineering include expectations regarding protecting the public health and welfare and about communicating with the public on matters where technical expertise may be helpful. One might argue, for instance, that speaking out on either side of the SDI debate falls under the requirement found in engineering codes that, “Engineers shall hold paramount the safety, health and welfare of the public in the performance of their professional duties."American Society of Mechanical Engineers Code of Ethics (2012). Fundamental Canon 1. http://ethics.iit.edu/ecodes/node/6147. On the other hand, while safety, health and welfare are central to engineering codes, one might argue that for most engineers at the time, the SDI program was outside the realm of their “professional duties”. Lastly, speaking out on an issue is subject to the constraint found elsewhere in such codes that you only speak out in areas where you have the appropriate level of competency.

Another consideration is the importance of making a distinction between primarily political opinions and primarily scientific opinions. It may not be possible to draw a sharp line of distinction between the two, but to the extent that the distinction becomes eroded, the public at large may lose faith in technical advice offered by scientists. This type of debate also occurred during the Manhattan Project. As the first nuclear weapons came closer to reality, some scientists and engineers involved with the program argued that since they understood the weapons best, they should play a role in advising on when and how they should be used. Others, however,

argued their role was to develop the science and engineering — elected officials should deliberate issues related to use of the technology.

## Rights



## Resource Type

Case Study / Scenario

## Topics

Communicating Science and Engineering
Controversies
Military and Defense Research
Public Health and Safety
Responsible Innovation
Safety

## Discipline(s)

Aerospace Engineering
Applied Mathematics
Computer Engineering
Computer Sciences
Computer, Math, and Physical Sciences
Engineering
Physics