DR. BIRD: I too would like to thank the organizers for inviting me to participate in this workshop. I expect this to be both a thought-provoking and productive event. I am pleased that this discussion of ethics in international collaborations is situated in the program between "Cultural Differences and Nuances" and "Research Integrity and Responsible Conduct of Research" (which I think of as the professional ethics of researchers) because this interface is the focus of my talk.

The ethical issues that I want to talk about are not especially associated with human subject research or any particular area of research. Although I am going to highlight engineering ethics, the particular points that I will raise are quite generalizable to science, technology and engineering research more generally. I am drawing on the work of Eugene Schlossberger (1997) and of C. E. Harris (1998) and will reiterate some of the points that they have made with respect to engineering ethics. Their ideas can be extended to science and technology collaborations more broadly. Also, as Barbara indicated, I am going to raise some issues with respect to what international trainees are telling us.

Schlossberger points out that beyond issues of competence, engineers are responsible for considering the foreseeable impacts of technology, including the long-term effects of social change that are associated with a particular project. The kinds of impacts that he has in mind are things like economic change, safety considerations, environmental impacts and cultural disruption that is associated with displacing traditional ways of life.

As an example, Schlossberger cites engineers building a dam. In particular, he is concerned about what happens when an engineering firm works with the government to

site a dam. The location is fine -- a perfectly sound dam can be built there, but what are the impacts of doing so? The purpose of building the dam as far as the government is concerned, is to move the agriculture of the area from subsistence farming to cash crop farming. The question is not whether a dam can be built nor whether the engineers are competent. The safety of the dam that could be built at that site is not a problem, the concern comes from the implications of locating it there.

One issue is the major economic changes in the transition from a subsistence crop, where people are feeding themselves, to cash crop farming where the resulting economy will be dependent upon the global market for that particular cash crop, in Schlossberger's particular example, coffee. Farmers who are used to growing food to feed their families, will be growing coffee beans to serve the world. It is hoped that the profits will cover the costs of corn to feed the farmers and their families and somehow feed all of the people who have been displaced because of the dam that has filled in where their villages used to be.

In addition to the economic impacts, there are safety concerns. Associated with farming the new cash crop is the use of products, for example, some pesticides that are banned in the US, but not banned and therefore used abroad in order to assure that the cash crop is as large as possible and the financial output from the crop is as high as it can be. Other examples of products banned in the US but sold abroad are out-dated drugs, that is, drugs that are past their "use by" date and not marketable in this country, but are acceptable in other countries.

Additional safety concerns are associated with products that are safe as used in the US, but not safe when used under local conditions. Examples are pesticides that are dispersed in the US by plane but are dispersed by hand in a less-developed nation. Another example is baby formula that might be fine when used with the water in the US, but might not be so fine for babies where water quality is questionable. The point is that there are safety concerns potentially associated with the building of this dam.

There are also environmental impacts associated with the dam and the change in primary crop: runoff from rain or irrigation will contain pesticides and/or fertilizers and will add them to the environment having a further impact on the land. Lastly, there is the cultural disruption caused by displacing a traditional way of life. Subsistence farming is interwoven with family life, religious holidays and other aspects of living close to the land. These are affected dramatically when it is no longer the basis of the local economy.

Although the negotiation is actually between the engineering firm and the government of the country that has asked the engineering firm to design and build a dam, according to Schlossberger, the issues that the individual engineers themselves need to consider are the larger impacts and the ethical implications of the project. These are very large problems but engineers can push to have these issues recognized and for plans to address them.

This is consistent with an elaboration of what many may recognize as the Paramountcy Requirement or the Paramountcy Clause that is essentially universal among engineering codes of ethics. Indeed the engineering community has been way ahead of

most in science and technology in thinking about and developing a code of ethics to guide the actions of the members of the field. Harris cites the National Society of Professional Engineers in stating that "engineers should hold paramount, the safety, health and welfare of the public in the performance of their professional duties." (Harris 1998 - p. 321) This extends to the public no matter where the work is carried out.

Michael Davis (1991) and Ed Harris have identified the public relevant to the Paramountcy Principle as "any person or group vulnerable to the effects of the tasks through lack of political or financial power, information, technical training or time for deliberation." (Harris 1998 - p.322) Basically, anyone who is not able to adequately understand what is involved, or in any case, not able to choose not to be affected, is a "public" that engineers, as a group and as individuals, need to take into consideration. Put another way, one can ask (1) whether those who bear the risk actually receive the benefits; (2) whether those who bear the risk do so voluntarily; and (3) whether those who bear the risk are aware of the full extent of the risks that they are bearing, that is, whether they are fully informed in their choices.

Individuals affected by Schlossberger's hypothetical dam are in a particular region, in a particular economy, and may not be in a position to speak up for their own concerns. Decisions are being made for them. Engineers must work with the government, the industry, and whatever other powers-that-be and depend on them to make decisions that fairly represent the individuals who are actually being put at risk and bearing the costs.

For international collaborations, the primary ethical concern is to be aware of the potential for exploitation and explicitly avoid it. At the same time, the potential trap is paternalism because deciding on the welfare of others, that is, deciding what is better for someone else, *invites* paternalism, especially when collaborations involve groups with different economic conditions and different cultural values, and where the power differential is substantial. The challenge is to achieve a partnership between and among different collaborators. While it is not always easy to define the different relevant groups, identifying those bearing the burdens and those reaping the benefits are important first steps.

The many post-doctoral trainees and graduate students in the US who are themselves foreign nationals are potentially a valuable resource because they are often aware of differences in values and style between the US and their own homelands. They may be able to help develop strategies for identifying differing cultural values and associated concerns across collaborations.

As an example, the Children's Hospital of Philadelphia surveyed their many post-doctoral trainees who are foreign nationals (Alexander and Williams 2004). Respondents frequently pointed to the competitive, corporate feel of US laboratories as compared to an emphasis on collaboration and an informal, sharing atmosphere of laboratory and research settings abroad. Further, trainees said that they had "some difficulty reconciling their interest in science and the advancement of humankind with the need for restrictions in sharing [related to] tech transfer, limitations on collaborations, the politics of funding (especially in hot fields), and the hassles of

negotiating system hierarchies." (Alexander and Williams 2004 - p.10) Indeed from my own experience I can say that these concerns are voiced by many students, not only foreign nationals.

In addition, among these Children's Hospital trainees, "the topics of intellectual property and data ownership ... stimulated lively discussion about the tension between science and commerce, and about the potential for infringement of academic freedoms. There was also concern about the exportation of Western values to international collaborators: would it be forced, and could or should it be resisted by non-Western or third world countries? Questions of global responsibility in a global research environment were [also] raised." (Alexander and Williams 2004 - p.13)

While at MIT I taught students in the Health Science and Technology Program many of whom were graduate students from other countries. They were sensitive to the issue that while their fine education in the development of high-tech devices (e.g., auditory and optical implants) would serve a small, fairly privileged population, often they had been motivated to get an education and to attend an institution like MIT in order to improve the lot of individuals in their homelands. There needs are different: those who had lost limbs to stray landmines need help to improve their mobility on muddy paths, and villages that lack electricity need refrigerated units to store medicines and vaccines.

The students themselves were cognizant of the disconnect between what they were experiencing in their education and their own personal educational goals. In that sense, collaborations in science and technology can be a double-edged sword. In addition, it is

often the case in high-tech, high-energy institutions and laboratories that there is a tendency to "push the envelope" and take every advantage. Those who are concerned get lost in the dust unless they speak up. However it is difficult to stand against the tide given the substantial power differential between trainees and laboratory heads of the lab who set the standards that create the research environment.

As we think about how to explicitly address the ethical issues that arise in collaboration, especially international collaborations, we need to be careful about *how* we think about them. It is worthwhile to develop policies that deal directly with issues and problems that have gone unrecognized or unacknowledged. At the same time, the policies all too often result in checked boxes and settling for the minimum. Further, we too frequently focus on compliance and those responsible for compliance are often unable to articulate the goal of the policy, the "Big picture", or why the policy exists in the first place. Greg Koskey, former head of the Office for Human Research Protections (OHRP), would speak of the need for "a culture of conscience, rather than a culture of compliance." Our challenge is to convey that message and create a culture of conscience. Thank you.

References

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