

Supplementary Documentation: Ethics and Training for Responsible Conduct of Research Component – Physics Department

The opportunity to include an ethics component in our program at Hope College is a natural fit given the religious background and character of the college. While ethics and religion are clearly two different ideas, there is already a strong expectation of ethical behavior from students and faculty alike. However, even though the local culture strongly expects such behavior, seminars and discussions to directly address questions of ethics provide additional emphasis that such questions must be considered in the practice of science and engineering.

We propose to continue a format that has been successful in our two most recent summers. We will invite a faculty member from outside the department with the expertise and experience in ethical issues in science and technology to engage the students in a discussion of ethics and ethical behavior in scientific and engineering endeavors. Mark Pearson is an associate professor of Mathematics at Hope College. His background includes an M.A. from the University of Chicago Divinity School as well as a PhD in mathematics from Northwestern University. He directs the Hope College membership in the North American Mobility Project, a Canadian, Mexican and American consortium of post-secondary institutions established to promote collaborative research on ethics in science and science policy. He has agreed to facilitate a series of discussions on the topic of ethics in scientific research.

The seminar, which will be in its third year in 2010, is conducted in workshop fashion with the students evaluating and creating case studies. The workshop is conducted in two hours over two days. On the first day the students discuss fictional case studies from the American Physical Society (available at <http://www.aps.org/programs/education/ethics/index.cfm>) as well as real case studies involving famous experiments such as data handling in Milliken's oil drop experiment and appropriate colleague credits in Watson's and Crick's DNA crystallography. The final part of the first day's session, students from the same academic (e.g. physics, engineering, computer science) field form teams and create their own fictional, but plausible, scenario with an ethical dilemma.

The students are asked to look up their own professional society's code of professional ethics and bring this document with them to the second day of the workshop. The scenario's that were composed during the first day are provided to a second group in the same academic field for analysis. This second group then presents the scenario to a third group, which functions as an ethics review board. The scenario is reviewed within the context of the professional code of ethics that the students brought with them.

The seminar format will accommodate substantial discussion by students and faculty in small groups, guided by questions from one or more practical case studies. The ethics component will be evaluated as an integral part of general project evaluation. This will include a question on the project evaluation form in which students evaluate the ethics component on a numerical scale as well as with open-ended comments. In the past five

years of REU, previous students have responded favorably to the ethics component.

This component of the site grant will reinforce the idea that ethical behavior is expected and define what ethical behavior is. This will benefit both our students and faculty, and also those students from outside the institution. An additional benefit will come from jointly hosting this discussion series with summer research participants in other departments. We have found that a joint ethics workshop was beneficial by providing a broad perspective from a diverse group of students.

The budget for this component (included under external consultants G3) totals \$3,000 for the three year period of the grant and there is no additional overhead or administrative charge.