

Special Skills Workshop # 1: Ethics in Engineering Research

Speaker: Dr. Richard A. Miller, Professor, School of Advanced Structures, College of Engineering and Applied Science, University of Cincinnati

Date: June 23, 2011

Time: 9:00 – 9:50 AM

Venue: University of Cincinnati, 615A Old Chemistry

Prepared by:

Ms. Kathryn M. Nafziger, Oak Hills High School, Cincinnati, OH

Ms. Rachel Rice, Hamilton High School, Cincinnati, OH

This workshop was given by Dr. Richard Miller, Professor of Civil Engineering in the School of Advanced Structures of the University of Cincinnati. The workshop took place at the University of Cincinnati on June 23, 2011, from 9:00 AM to 9:50 AM (50 minutes). Dr. Miller earned his Ph.D. in Civil Engineering from Northwestern University in 1989, and has been a professor at the University of Cincinnati since his graduation. Dr. Miller holds the following positions and awards: Faculty Chair, CEAS Master Educator (2010), Prestressed/Precast Concrete Institute Student Education Committee Chair, and Prestressed/Precast Concrete Institute Research and Development Committee Chair. Dr. Miller's research interests include prestressed concrete structures, concrete bridges, concrete materials, large scale structural testing and structural monitoring.



Dr. Miller Speaking (left) and Ethics Seminar in Session (right)

The purpose of this workshop was teaching ethics in engineering research to the RET participants. The topics of the discussion included misconduct and unethical behavior, honesty, objectivity, integrity, bias, carefulness, openness, intellectual property, responsible publication, respect for colleagues and responsible mentoring, social responsibility, competence, nondiscrimination and legality, and human subjects.

The first topics discussed were misconduct and unethical behavior. Dr. Miller presented these concepts as being similar but pointed out where they are not identical. Misconduct was defined as knowingly falsifying data and results or knowingly having a conflict of interest. Unethical behavior is not necessarily misconduct.

The second topic discussed was honesty. Scientists must strive for honesty in all scientific communications. Scientists must honestly report data, results, methods and procedures, and publication status. Dr. Miller described the most important part of honesty is disclosure. He provided the example it is acceptable to eliminate data that is incorrect when the scientist must let people know they have eliminated the data.

Another very important topic discussed was objectivity, though Dr. Miller pointed out that no one is objective. To illustrate this point, he provided the example of Heinrich Schliemann who discovered artifacts from Troy and Crete. Schliemann said, based on his knowledge, the writing was not written in Greek, but later found that it was, just an early form. Though it is not possible to be entirely objective, the important thing is to disclose any personal interests.

The next important topic discussed by Dr. Miller was integrity, which again he related to the concept of disclosure. A researcher must disclose if they have conflict of interest and should have an outside source monitor the work. A researcher must also disclose when they have a bias or personal interest that may affect their objectivity.

In order to obtain ethical work, a researcher must also demonstrate carefulness and openness in their work. A researcher must avoid careless errors and negligence at all times. A researcher must also be open about their work and willing to share their methods and results. Dr. Miller did include a caution that a researcher must be careful to adhere to confidentiality agreements.

Another topic discussed by Dr. Miller was intellectual property. A researcher must honor and cite patents and copyrights. A research must never plagiarize, even if the information is open source.

The next important topic discussed was a researcher must be responsible in their publications. A researcher must not publish in order to advance their research. Dr. Miller explained that the saying, "Publish or Perish" is true at most universities, but a researcher cannot only publish for their career advancement. Another interesting point made by Dr. Miller was a researcher cannot publish the same paper in more than one journal.

The next three topics discussed by Dr. Miller were respect for colleagues, responsible mentoring, and social responsibility. Researchers must treat people fairly. A non-example of responsible mentoring provided was the idea of a professor holding graduation over a graduate student's head for any reason other than incompetence. Researchers must also strive to promote social good and prevent or mitigate harm through research, public education, and advocacy.

The last topic of ethical research was to act in nondiscriminatory manner and be legal when working with human subjects. Prior to implementation of any research project involving human subjects, the research must be approved through the IRB and the IRB followed precisely. Human subjects must be fully informed and have the opportunity to opt out at any time. Researchers must adhere to confidentiality agreements.

The Ethics and Engineering Workshop presented by Dr. Miller taught the RET teachers the ethics in research required to be successful this summer and in the future. Dr. Miller said that most of the topics discussed during the presentation were common sense, but everyone must be educated. Dr. Miller discussed the importance of knowing the rules and asking the rules when they are unclear. Researchers must disclose all information. They must not fudge their data, mislead people, publish for their advancement, or profit from their research.