Case Studies in Science and Technology

This course is an updated version of my Fall 2017 course on how science and technology can go wrong. This year we will use the case study method to discuss scientific and engineering failures and analyze the causes of such failures. Over the course of the course we will examine particular cases and attempt to develop criteria for what counts as scientific validity and engineering success.

Scientific validity today is often called into question for legitimate reasons and illegitimate reasons. There is the problem of political control of science, the popularity of pseudoscience, examples of bad science in the scientific community itself, and the psychological problems of confirmatory bias and ignoring contradictory evidence. Topics include cold fusion as bad science, the Tacoma Narrows Bridge disaster as an engineering failure, Tesla and his vision for unlimited cheap power transmitted through the air and earth at great distances, Lysenkoism in Soviet agriculture as political control, and Velikovsky and catastrophism as a "poster boy" for pseudoscience. There will be selected readings for each of the topics as part of the class notes package. For in depth readings, participants are encouraged to select one of the topics and assist in the discussions. I will hand out a bibliography for those who wish to delve deeper into one or more specific topics and can lend my copies of those books (or you can obtain them for yourself).

There will be approximately a one-hour lecture on each of the topics to fill in the ideas, background and narrative of the person (persons) who were the most significant participants in these events. We will then have discussions using the case study format to analyze and generalize if possible, lessons from these examples. We will also spend time discussing the problem of overgeneralization. To some extent we will rely on the results of studies in the philosophy of science and the criteria for engineering reliability.

Leader: Stuart Kurtz, whose current interests are in philosophy of science and time, has had a career in both science and engineering, and as a researcher in industry.

Thursdays: 1:00 p.m. to 3:00 p.m., 8 weeks: September 27 through November 15

Location: PSRC