Science and Values

Spring 2018

Instructor: Monica Solomon
Time: MWF 1.00-1.50pm
Location: Leavey Library 3Y
Email: solo183@usc.edu **Office Phone:** TBA **Office Hours:** TBA

Course description

In the movie Jurassic Park (1993), one of the characters, Ian Malcolm, makes a passing observation to the leader of the scientific community in the park: "Your scientists were so preoccupied with whether they could, they didn't stop to think if they should." Malcom's observation is primarily about a lack of ethical deliberation or of a reflective attitude towards the aims, methods, and larger purpose of scientific research. Depictions of scientific communities in popular culture raise broader and important questions: Could Malcom's observation, perhaps, be said about the science as part of our world, not just about the one depicted in a movie? How did the vision and aims of science change during its history? What do philosophy of science, ethics, and history reveal about the current practice of science? What is the relevance of science to human individual pursuits and how do our individual choices matter?

This course is designed to enhance and deepen your understanding of science and its embedding in society, from a humanistic perspective. We will focus on core questions involving the vision and the aim of science, we will develop an informed view of the practice of science and its relevance to our lives, and learn to disentangle several types of reasons and arguments invoked both in scientific research and in writings about science. Finally, we will begin to address issues in the ethics of emerging technologies. In particular, here are some of the questions that we will address:

- What are values? • What roles do values play in scientific inquiry? • What sort of enterprise is the current science? • What is scientific knowledge? • What are the relations between science and politics, society and technology? • What can humanities teach us about science? • How do we recognize ethical decisions in science? • What kinds of insight do philosophy and history bring on emerging technologies? • How do we write responsibly and in an engaged manner about science and technology?

Course goals

We have two sets of objectives. First, you will learn to think critically and evaluate scientific research as a practice of human expression, a form of inquiry that is not isolated from the ethical and moral concerns that govern our lives. To this end, we will discuss the diversity and complexity of scientific research, always with an eye towards

the ethical questions found therein. You will gain familiarity with a large selection of textual resources (from historical original texts, scientific articles, popularization pieces, to court decisions, policy texts, science journalism and biographies). This course focuses your attention on the argumentative and conceptual structure of those texts and will provide you with the opportunity to tease those out from your readings. The underlying structure is one based on case studies.

The second goal is to develop and practice writing with clarity and precision about topics or questions that matter to you. That is, the writing assignments will ask you to treat of examples in scientific research that you find most interesting or relevant. On the one hand, you will practice your writing in assigned reflection papers, which are generally of shorter length. On the other hand, the final project is a significant piece of writing of which you will take ownership: you will be responsible for finding a topic or question that matter to *you*, build an annotated bibliography, draft a significant piece of writing that provides a well-argued, thoughtful, and engaging approach, and revise it in light of received feedback.

Assignments will include brief reflection papers, a mid-term exam, a final exam, a final paper which must be revised at least once in light of the feedback and comments that you will receive from me and your peers.

- The readings for each week amount to 40-50 pages. You will be asked to focus on certain topics (around 20pages). You are required to have them done at the beginning of the week.
- Reflection papers (two double-spaced pages): You choose one of the main claims or questions addressed in the weekly readings, present the evidence brought forward for it, and present an objection or ask further questions. They are due every couple of weeks.
- Mid-term exam: A combination of arguments, short logic exercises, explanation of key terms, and two essay-like questions. All the questions will refer only to examples from the readings and our discussions in class.
- Research bibliography: By February 1st, every student will submit a topic for research: a specific event in the history of science, a controversy, a new technology sector, etc. We will meet individually to discuss your choice. By March 1st, you would have drafted the research bibliography which would put you in an excellent position to start working on your final paper.
- Final paper: An eight- to ten-page double-spaced piece of crafted writing developed in stages. You will focus on a key ethical point, issue, question, or debate. You are strongly encouraged to discuss anything related to this paper with your peers, but the writing must be your own. (You will, of course, learn to acknowledge their contribution.) We will share drafts and offer constructive feedback on them.

There are no science pre-requisites for this course. You are encouraged, however, to follow and develop your own curiosity and interests as they pertain to our course topics.

Most importantly, you are asked to learn how to reason about, assess implications of and write responsibly about things you don't master with full confidence.

Grading Scheme:

Reflection papers: 20%
Mid-term exam: 20%
Research bibliography: 20%
Final paper: 30%
Participation and Conference Presentation: 10%

> We will discuss how participation is assessed during our first meeting. A note on participation: In this course, you will gain confidence and grow to take ownership over your intellectual endeavors. Participation *is required* and it takes many forms. Speaking up in class is only one of them. Supporting the contributions of your peers and offering helpful feedback are more important for our purposes, especially if you have an introverted nature.

Common Standards for All Course Papers:

During our first meeting, I will provide you with a guiding rubric.

Required Reading:

The readings assigned for each class are required. The main books for this course are:

- Kevin C. Elliott, 2017, *A Tapestry of Values. An Introduction to Values in Science*, Oxford University Press.
- Vallor, S., 2016, *Technology and the Virtues*, Oxford University Press.
- Jahren, H., Folger, T., 2017 (eds.), *The Best American Science and Nature Writing 2017*, Mariner Books.

Additional readings for each week will be posted on our course website.

Week-By-Week Schedule

Week 1: What Is This Thing Called Science? Logic and arguments. Writing guides.

Week 2: An Introduction to Values in Science. (Elliott 2017, Ch. 1)
Francis Bacon, *The New Atlantis*. (selections)
Thomas Kuhn, *The Structure of Scientific Revolutions.* (selections)

Week 3: What Should We Study? (Elliott 2017, Ch. 2)
P. Basken, 2014, "NSF-backed Scientists Raise Alarm over Congressional Inquiry", *Chronicle of Higher Education*.
D. Greenberg, 1967, *The Politics of Pure Science* (selections)

Week 4: How Should We Study It? (Elliott 2017, Ch. 3)
Case study: Questions in medical research and Big Pharma.

Week 5: What Are We Trying To Accomplish? (Elliott 2017, Ch. 4)
Case study: Climate Modelling. Geoengineering.

- Movie watch: Jurassic Park (1993)

Week 6: What If We Are Uncertain? (Elliott 2017, Ch. 5)
Case study: Uncertainty and climate science.

- Midterm exam.

Week 7: How Should We Talk About It? (Elliott 2017, Ch. 6)
Case study: Terminology in Biology and Social Sciences. Racial Categories.

Week 8: How Can We Engage with These Value? (Elliott 2017, Ch. 7)

Week 9: Vallor, 2016, Ch 1-2: Foundations for a Technomoral Virtue Ethic.

Week 10: Emerging Technologies. Bioengineering, Genetics and Genomics.

- Mukherjee, S., 2016, *The Gene. An Intimate History*, Selections: "Post Genome: The Future of the Future," "Genetic Diagnosis: "Previvors"", Scribner: NY.

Week 11: Emerging Technologies. Robots. Artificial Intelligence.

- Vallor, Ch. 9, Robots at War and at Home.
- Derek Thompson, "A World Without Work", The Atlantic, 2017.
- How to Stop a Robot From Turning Evil (video), 2017

Week 12: Big Data. New Social Media.

- Mayer-Schönberger, V., Cukier, K., 2014, *Big Data: A Revolution that Will Transform How We Live, Work, and Think*, Eamon Dolan/Mariner Books, Selections.
- Vallor, Ch 7, New Social Media and the Technomoral Virtues.

For one of the weeks 9, 10, 11, or 12: We will have an invited speaker from one of the technology sectors.

Week 13: Jahren, 2017, Best American Nature and Science Writing 2017 (selections)

Week 14: Jahren, 2017, Best American Nature and Science Writing 2017 (selections)

Final Papers Due.

Week 15: May 1st, Undergraduate Mini-Conference: students present their final papers. Planning to connect it to the Levan Institute for Humanities and Ethics for a broader audience.

Academic Integrity - The USC Dornsife is committed to upholding the University's academic integrity code. The University presumes that you are familiar with its standards and policies; should you be found to have committed a violation, ignorance of these standards and policies will not be accepted as an excuse. You should be familiar with the following resources:
* "Trojan Integrity" https://dornsife.usc.edu/assets/sites/903/docs/Trojan_Integrity_-_Guide_to_Avoiding_Plagiarism.pdf
* "USC Libraries Tutorials" https://libraries.usc.edu/research/reference-tutorials
* The "2017-8 SCampus" (the student handbook) contains the university's Student Conduct Code and other student-related policies.
https://policy.usc.edu/student/scampus/

Late & Unfinished Work – Students must complete all assignments in order to earn a grade in the course. Any material turned in late will be reduced one letter grade per calendar day late.

Special Assistance - Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure that the letter is delivered as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m. - 5:00 p.m., Monday through Friday and can be reached at (213) 740-0776.