

PART 20 Courage & Creativity: The Innovation of Ethics in Science and Engineering

- Amelia Acker, Graduate Student
- Jeff Burke, Faculty, PI*
- Katie Shilton, Graduate Student, PI

* Primary Contact

Overview

'Courage & Creativity: The Innovation of Ethics in Science and Engineering' (C&C) is a multi-media curriculum project that explores the generative role of ethics in scientific and technological innovation. An interdisciplinary team made up of researchers affiliated with CENS, UCLA School of Film and Television, the UCLA Department of Information Studies, and Eyes of the World Media Group is creating two short-form documentaries, curriculum supplements, and a web portal to encourage STEM students to thoughtfully integrate their personal values and ethical motivations into science and engineering careers. The project illustrates cases in which ethical challenges, and choices fostered innovation in science research and engineering.

Our approach to the Courage & Creativity project comes out of our experience building in-situ education approaches for considering ethics in the development of emerging technologies. Ethics education currently struggles to portray the complexities of ethics embedded within scientific practice. Often, ethics in science and engineering education are seen and taught as punitive, full of constraints and regulations. However, constraints (such as don't cheat, don't falsify data) are only one function that ethics have in science and engineering. Our experience working directly with engineers on a previous EESE project, Ethics in Personal Mobile & Participatory Sensing, demonstrated that another role for ethics in STEM education is a focus on the creative and generative force that social values play in contributing to the development of new knowledge.

Approach

This project addresses the contradiction between ethically-driven constraints and innovation by building and disseminating new understandings of how ethical inquiry in science and engineering has been an essential catalyst for new discoveries. It contributes new research on the work of formal and informal ethical inquiry in generating innovation in science and engineering. Based on this research, we are developing an educational website with curricular materials and case studies illustrated using original video and multimedia content. This material, including interviews, location footage, and motion graphics, will bring an STS perspective to infrastructure for undergraduate and graduate STEM ethics training.

The project focuses upon social values such as equity, fairness, openness and sharing in both segments to illustrate how people's ethical frameworks influence their creativity in science and engineering. Students who engage with the video and multimedia content will be encouraged to critically evaluate dominant perspectives of ethics in science, and contribute to a deliberative critique of the disciplinary, cultural, and institutional forces that shape innovation in science.

Deliverables

Two short documentaries will use interviews with innovators mixed with cultural imagery and location footage of the process of scientific creativity to demonstrate the concrete, but seldom discussed, links between personal and community values and creativity. The documentaries explore how what people believe influences their creativity and impacts the work they do. The stories re-envision ethics as a source of inspiration instead of a set of binding constraints.

In addition to the two documentary segments, larger sections of the source materials and curricular materials will be made available online through an interactive website to invite dialogue and further exploration on the topics discussed. The final products will not only be usable in classrooms, but engaging enough to disseminate virally on Facebook and YouTube, or be incorporated into longer documentaries or television and radio segments. We hope they will be widely shared, remixed, and refined upon.

Framing and Case Studies

Conceptual Framework

Within each segment and curricula materials, the project strives to highlight social values such as equity, fairness, openness and sharing in both segments to illustrate how people's ethical frameworks influence their creativity in science and engineering. Students who engage with the video and multimedia content will be encouraged to critically

evaluate dominant perspectives of ethics in science, and contribute to a deliberative critique of the disciplinary, cultural, and institutional forces that shape innovation in science.

DTC Consumer Testing

The first case study looks at recent innovations in personal genomics and direct-to-consumer genetic testing. It considers values of equity and accessibility embedded in the field by such diverse influences as the dark histories of eugenics, the imagined futures of science fiction; ethical debates about the role of humans in nature; legislative decisions such as the 2008 Genetic Information Non-Discrimination Act (2008).

It examines how values reflected in these events support entrepreneurship and transform new understandings of civil rights, personal identity and the law. The documentary in turn explores how these social influences foster personal perspectives and beliefs among scientists, engineers, and entrepreneurs, and the way these perspectives form an important foundation for the innovation ecosystem. By focusing on the individuals behind advances in genomics, we show viewers how and why our subjects do science and engineering, and how creativity from ethics influences their work.

Open Source Movements

For the second documentary, we will explore the ethics of openness at the center of the open source software movement, and the ways this openness has changed not only technology development, but even fields as diverse as music, robotics, literature, and gaming. We trace the story of how ethos of openness and sharing fostered creative “hacks” of copyright law, and how these novel licenses for sharing influenced diverse open source movements. What began as a method to create better software took on moral dimensions as supporters adopted arguments for freedom, autonomy, and alternative understandings of intellectual property.

Current Work and Future Directions

Currently, we are in the initial production development of the first documentary segment on personal genomics. In March of 2011 we begin subject outreach and research on the second segment that will feature the ethics of openness in creative commons licensing and open source software (OSS). Presently we are in the design and development stages of compiling additional curricular materials.

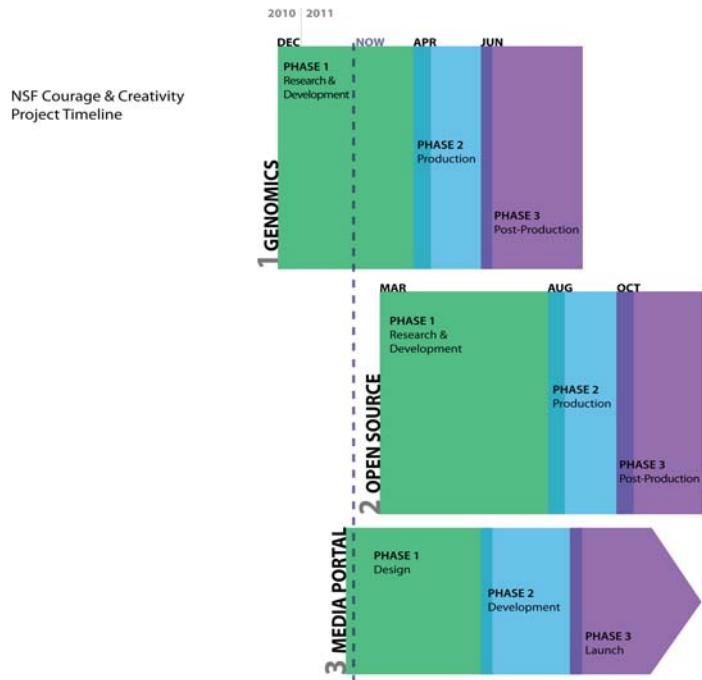


Figure 1. Timeline for Courage & Creativity project, 2010-2011.