

# A Curriculum Unit Exploring Gender and Technology through Science Fiction for an Interdisciplinary Honors Seminar on Culture

## Introduction

Science fiction as a genre provides us with unique reflections on culture. Unlike other genres, which may reflect certain aspects of culture or provide critical interpretations, science fiction can extrapolate existing social or technological conditions and take them to their logical or extreme next steps in order to portray visions of the future. While some science fiction stories provide cautionary tales and social criticism, others serve to highlight the perceived positive aspects of society. In addition to science fiction novels, films and television due to their highly visual nature and popular appeal are useful artifacts for cultural interpretation, giving opportunity for insights into gender and technology relationships.

In this curriculum unit, students will explore and experiment with notions of gender as related to technology using popular science fiction as an interpretive lens and a reflection of popular consciousness.

### We will look at the relationship of gender and technology from two perspectives:

- Gender in relation to technology development and direction
- Implications of assigning gender-based characteristics to technology (specifically Artificial Intelligences)

### We will focus on the following science fiction resources:

- Novel, *The Left Hand of Darkness* (1969) by Ursula Le Guin
- Terminator franchise including, *The Terminator* (1984), *Terminator 2* (1991) by John Cameron and the television show *Terminator: The Sarah Connor Chronicles* (2008 – 2009)
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## Part 1 - The Impact of Gender on Technology Development

*The Left Hand of Darkness*

by Ursula Le Guin

### Outcomes for Part 1

- Students will identify and describe the impact of gender in technology development through the consideration of a gender-balanced society presented in *The Left Hand of Darkness* and a discussion of Mary Kirk's notion of a "partnership future."
- Students will research an influential real-world technology, paying particular attention to women's roles in the development and use of the technology. They will also attempt to identify the extent to which the technology may have been "genderified" based on intended purposes and patterns of use.

In Part 1, we explore what a gender-balanced technology might look like if gender and sexuality were neutral. In the *Left Hand of Darkness*, Ursula Le Guin gives us the opportunity to explore technology in a gender-balanced society, providing a contrast that may help us understand the role of gender and sexuality in our technological development, particularly the male dominance of technology innovation through the industrial military complex (Werskey, 2007).

The novel, written in 1969, is steeped in the context of the growing Sexual Revolution and Women's Movements of the 1960s, and while issues that were at the forefront at that time are not the same as the women's issues of today, the novel still raises relevant questions about gender differences in society. Le Guin, herself, describes the purpose of this novel as "consciousness raising."

"While some science fiction extrapolates on a certain aspect of society and takes it to a logical extreme, other works ask "what if" questions, allowing us to explore aspects of ourselves in ways that are good for "consciousness building." –Ursula LeGuin from the introduction to *The Left Hand of Darkness*

### ***In-Class Discussion***

After students read *The Left Hand of Darkness* the instructor will lead a discussion regarding Gethenian culture, Gethenian politics and Gethenian technology development. In regards to Gethenian culture the class will discuss the notion of progress as less important to presence. Aspects in Gethenian culture should be raised, for example; on Gethen there is no rape or war, but there is still murder, torture, and slavery. Also, students will explore cultural and political differences in a society with no gender differences.

Technology development on Gethen should be a major focus of discussion. Le Guin described Gethenian technology as advanced (e.g. Gethenians have simple telephones, radios and plastic factories). A particularly interesting example is in regard to vehicles on Gethen. Sledges (Gethenian "cars") are built not to exceed 25mph, and while they could build faster cars, but choose not to. LeGuin is critical of the fast-pace of 1960s America and offers her philosophy of "presence"; presence, rather than progress, is what really matters.

LeGuin hails the Gethenian's slowness as a more natural and humane way to live. In her essay "Is Gender Necessary?" she explains that the Gethenians, "do not rape their world. They have developed a high technology, heavy industry ... but they have done so very slowly, absorbing their technology rather than letting it overwhelm them." Their progress represents not only sensitivity to their ecology but also a balance between male and female traits: aggressiveness and pushing forward, on one hand, and patience, on the other. This theme of yin –yang (opposing ideas, each containing its opposite) is repeated throughout the novel.

The instructor should ask students to respond to the following quote from the character, Genly Ai:

“In most societies it (gender) determines one’s expectations, activities, outlook, ethics, manners– almost everything.....It’s extremely hard to separate the innate differences from the learned ones. Even where women participate equally with men in the society, they still after all do all the childbearing, and so most of the child rearing.”

**The following questions will be discussed:**

- How has our culture changed since the sixties when *The Left Hand of Darkness* was written? Do women participate equally with men in society? Where have women made advances? Discuss current gender stereotypes.
- How might Gethenian technology be influenced by lack of sexuality in their general interaction (Somers state)? Or their gender-balanced nature?
- How might cycles in human sexual lives affect productivity and/or creativity in our world?
- How do gender differences and sexual tensions drive technological advancements in our world?
  - Purposes (what would it be used for?)
  - Character (what interfaces and design reflect gender?)
  - Use of resources (how about sustainability?)
  - Fragility (or durability?)
  - Social efficiency (optimal distribution of resources in society, i.e. fairness?)

As a group students will identify advanced technological developments in the last 20 years and identify its purpose, character, use of resources, fragility, and social efficiency.

***Writing Assignment***

Students will select a new and influential technology from the real world and research its impact on society. Students will identify any women who may have contributed in the development of the technology and explore usage patterns by gender. Students will also discuss whether the technology may be considered a gendered technology (intrinsically male or female) and why.

***Assessment***

See discussion and writing rubrics below.

## **Part II –Implications of anthropomorphizing gender-based characteristics to technology (specifically Artificial Intelligences) Terminators: Humans, Machines and Cyborgs**

### ***Outcomes***

As outcomes of this unit, students will:

- learn about current developments in robotics and artificial intelligence
- be introduced to Kurzweil’s notion of the “singularity”
- critically analyze Isaac Asimov’s Three Laws of Robotics
- create a moral and ethical code for future super intelligent A.I.s

Many popular science fiction narratives revolve around an Artificial Intelligence (A.I.) that exceeds human intelligence. *The Terminator* is just one of many example of an A.I. that “get’s smart.” (Other examples include: Battlestar Galactica, The Matrix, 2001 A Space Odyssey, War Games, etc.) In this unit, we will explore the implications of ascribing gender based characteristics to artificial intelligence and look at what ethical code is essential for AI’s to demonstrate social responsibility.

### **Students will watch:**

The Terminator (1984) and The Terminator 2 (1991) by John Cameron and scenes from *Terminator: The Sarah Connor Chronicles* (2008 – 2009) the television series.

### **Students will read:**

*Terminator meets Commander Data: Cyborg Identity in the New World Order* by Paul N. Edwards

### ***In class discussion/Lecture***

To set the real-world context of this unit, the instructor will read the following description from the homepage of MIT’s Computer Science and Artificial Intelligence Laboratory (CSAIL), the largest interdepartmental lab at MIT with over 800 members, more than 90 principle investigators and approximately 500 students.

“...(CSAIL) studies this vast, compelling field in an effort to unlock the secrets of human intelligence, extend the functional capabilities of machines, and explore human/machine interactions. We apply that knowledge with a long-term lens to engineer innovative solutions with global impact.”

The instructor will also introduce the concept of the Singularity. Author and futurist Ray Kurzweil has made several technology predictions that have come true. <http://www.techi.com/2011/01/ray->

[kurzweils-tech-predictions-have-been-eerily-accurate/](#). In addition, Ray Kurzweil has predicted in the next 20 years the development of smarter-than-human intelligence. Unlike humans, the A.I.s will have the ability to improve themselves by rewriting their own code, causing them to continue to develop at an exponential rate. In addition, author

Students will view the following links of recent technology development and direction.

- Akiba Robot (2006) [http://www.robots-dreams.com/2006/11/realistic\\_andro.html](http://www.robots-dreams.com/2006/11/realistic_andro.html). This realistic android was created to appear as a real human. Great attention was paid to body movements to mimic real women.
- Toyota's violin playing robot (2008) <http://www.youtube.com/watch?v=EzjkBwZtxp4&feature=related>. This robot was created to be a health care worker for assisting the elderly. Toyota featured the robot playing the violin in order to show case it's precision.
- Human-Robot Jazz Improvisation - Shimon (2009) <http://www.youtube.com/watch?v=CTxCE0JYftM> Created at Georgia Institute of Technology, this robot can listen to music, analyze its structure and improvise with other musicians. Shimon despite having four arms is described as remarkably human with a steel head that bobs with the music and can acknowledge other people when they are close by.
- Watson (2010) <http://www.youtube.com/watch?v=SyXHF3PyyWo&feature=fvst>; <http://www-03.ibm.com/innovation/us/watson/what-is-watson/index.html> Watson is a computer system created by IBM to understand natural language.
- Affective Computing [http://www.nytimes.com/2010/09/19/magazine/19Essays-tutors-t.html?\\_r=1](http://www.nytimes.com/2010/09/19/magazine/19Essays-tutors-t.html?_r=1) - Rosalind Picard from MIT started a branch of computer science known as affective computing. Her research has focused on the importance that recognizing human emotions has to relationships between people, and the possible recognition of emotion by robots. Her work has led to the development of computerized tutors and assistive technologies for people with autism.
- Kevin Warwick University of Reading 2010 <http://www.youtube.com/watch?v=VCYrW-G9Y6I> [http://blog.ted.com/2009/06/15/world\\_science\\_f\\_1/](http://blog.ted.com/2009/06/15/world_science_f_1/) Kevin Warwick successfully implanted an electronic device into his arm in order to link his nervous system directly to a computer. This procedure enabled him to research this technology for further research with disabled people.
- Social Robots (2011) [http://www.sciencenews.org/view/feature/id/68685/title/Meet\\_the\\_Growbots](http://www.sciencenews.org/view/feature/id/68685/title/Meet_the_Growbots) A new approach in AI programming, making robots into social learners.

To bring in the notion of gender, students will read and react to the following two quotations regarding two feminist views of technology:

“Feminists have often assumed the role of opponent of technology, a role that seems to have developed out of the equation between women and nature prevalent in Western society.” – SF Author, Ruth Nestvold

“... my cyborg myth is about transgressed boundaries, potent fusions, and dangerous possibilities which progressive people might explore as one part of needed political work ...most American socialists and feminists see deepened dualisms of mind and body, animal and machine, idealism and materialism in the social practices, symbolic formulations, and physical artifacts associated with 'high technology' and scientific culture.” - Cultural Theorist, Donna Haraway

One feminist view has been to see a dichotomy between nature and technology, denying technology as masculine and destructive. Recent criticisms have challenged this dualism to see possibilities for gender-balanced technologies, specifically communications technologies such as the internet and virtual worlds (Nestvold), and the merging of human and transhuman (cyborg) identities (Haraway).

Across the Terminator films, as in all good fiction, characters grow and evolve, and in *The Terminator*, the character Sarah Connor changes from an immature and care-free woman to a focused, hardened soldier. But, the human character's growth is matched by the development of the eponymous character. In *The Terminator*, the Terminator itself evolves between the first and second film to move from destroyer of humanity to the protector of young John Connor in the second film (Edwards, 1997).

Sarah Connor (Terminator) - Madonna figure

- Mother of John Connor, savior of humanity
- Takes on “hard and cold” characteristics as she evolves
- Throughout Terminator series, humans are observed to become less human, and machines become more human

Note to Instructor – The following ideas from the Edwards article should surface during the discussion.

- When the first Terminator movie was made there were the highest rates of divorce and single motherhood in history.
- Starting in the mid-1970s, women had become increasingly important as soldiers, filling 10 to 13 percent of all US military jobs by 1985, and with serious proposals to increase the ratio to fifty percent in the Air Force (since physical strength is not a factor in high-tech jobs like flying jet fighters, and since women are supposedly able to handle higher G-stresses than men and thus to stay conscious longer during power turns).
- The film finds its model for the future of womanhood in the armed forces.

In *Terminator 2: Judgment Day* a converted Terminator model is sent back to protect John Connor from a more updated model. Terminator completes the Connor “nuclear family.”

Students should respond to the following quotation:

*‘...men like you built the hydrogen bomb. Men like you thought it up. You think you're so creative. You don't know what it's like to really create something--to create a life, feel it growing inside you. All you know how to create is death... and destruction...’ As she builds to a crescendo of male-blaming rage, John interrupts her. “Mom! We need to be a little more constructive here.” In the name of pragmatics, he effectively silences the feminist critique of both male science and the gendered institution of war.’*

Edwards, P. (1997) *Terminator meets Commander Data: Cyborg Identity in the New World Order*

Is John commenting that we need a partnership with technology?

In the Terminator television series, *The Sarah Connor Chronicles*, a young “female” Terminator model is taken in by Sarah Connor to protect John Connor from aggressive “male” Terminators. Cameron becomes a sister to John Connor and at times there is real affection, and at times sexual tension, but also the continual fear that Cameron will revert to her programmed destructive nature.

As Terminators take on traditional family and gender roles they start to evolve human emotions. One of the most frightening things about a Terminator is when it incorrectly mimics human emotions... or is this simply part of learning humanity? In this context, students will watch and react to the following videos:

[Terminator Cameron in Counseling Session](#) In this clip Cameron recounts an interaction with a student and her body language completely changes as she becomes the other student, however she does not apply this knowledge of reacting emotionally to her own interaction with the counselor.

[Terminator Cameron Ballet Dancing](#) In this clip Derek Reese is terrified that Cameron has learned human emotion through dance. By contrast, the narrator suggests if the Cyborgs can create art they will be more like us and less threatening because they then may have the ability to reason and feel.

### ***In-Class Discussion Questions***

- What would our relationship be to a super intelligent A.I.? If an artificial intelligence is to be initially based on the model of a human mind, what would be the influence of ascribing gender characteristics? For example, why might Watson have been programmed with a male voice? Why was the Akiba robot given female physical characteristics?

### ***Reading Assignment***

For the next class, students will read Chapter 19 “Asimov’s Three Laws of Robotics” and Chapter 20 “The Age of the Virtuous Machines” in *Beyond AI* by J. Storrs Hall, PhD

1. A robot may not injure a human being or, through inaction, allow a human being to come to harm.
2. A robot must obey any orders given to it by human beings, except where such orders would conflict with the First Law.
3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

### ***In Class Discussion Questions:***

- Based on the Hall chapter, why wouldn’t Asimov’s Three Laws of Robotics work with real A.I.s?
- What values should future A.I.s be programmed to have in order to make them productive and in harmonious with human societies?
- How does assigning gender to an A.I.s effect how it is perceived and interacted with?

### ***Written Assignment***

- Design a moral and ethical model for a future super-intelligent A.I. What ethics or moral codes would you program into an Artificial Intelligence to ensure peaceful coexistence and mutually beneficial relationships?

## Assessment

### Discussion Rubric

Student discussion will be assessed on the following rubric. Adapted from

<http://shs.westport.k12.ct.us/jwb/Rubrics/DiscRub.htm>

	<b>5 Exceeds</b>	<b>4 Meets</b>	<b>3 Partially meets</b>	<b>2 Does not fully meet</b>	<b>1 Does not meet</b>
<b>Quality of Comments</b>	Timely and appropriate comments, thoughtful and reflective, responds respectfully to other student's remarks, provokes questions and comments from the group	Volunteers comments, most are appropriate and reflect some thoughtfulness, leads to other questions or remarks from student and/or others	Volunteers comments but lacks depth, may or may not lead to other questions from students	Struggles but participates, occasionally offers a comment when directly questioned, may simply restate questions or points previously raised, may add nothing new to the discussion or provoke no responses or question	Does not participate and/or only makes negative or disruptive remarks, comments are inappropriate or off topic
<b>Resource/Document Reference</b>	Clear reference to text being discussed and connects to it to other text or reference points from previous readings and discussions	Has done the reading with some thoroughness, may lack some detail or critical insight	Has done the reading; lacks thoroughness of understanding or insight	Has not read the entire text and cannot sustain any reference to it in the course of discussion	Unable to refer to text for evidence or support of remarks
<b>Active Listening</b>	Posture, demeanor and behavior clearly demonstrate respect and attentiveness to others	Listens to others most of the time, does not stay focused on other's comments (too busy formulating own) or loses continuity of discussion. Shows consistency in responding to the comments of others	Listens to others some of the time, does not stay focused on other's comments (too busy formulating own) or loses continuity of discussion. Shows some consistency in responding to the comments of others	Drifts in and out of discussion, listening to some remarks while clearly missing or ignoring others	Disrespectful of others when they are speaking; behavior indicates total non-involvement with group or discussion

## Writing Assignment Rubric

	<b>5</b> <b>Exceeds</b>	<b>4</b> <b>Meets</b>	<b>3</b> <b>Partially meets</b>	<b>2</b> <b>Does not fully meet</b>	<b>1</b> <b>Does not meet</b>
<b>Content/Ideas</b>	Writing is confident and clearly focused. It holds the reader's attention. Relevant details enrich writing.	Writing is purposeful and focused. Contains some details	Writes related quality paragraphs, with little or no details.	Writing does not clearly communicate knowledge. The reader is left with questions.	Writing is extremely limited in communicating knowledge, with no central theme.
<b>Organization</b>	Writing includes a strong, beginning, middle, and end with clear transitions and a focused closure.	Writing includes a strong beginning, middle and end, with some transitions and good closure.	Uses correct writing format. Incorporates a coherent closure.	Writing is confused and loosely organized. Transitions are weak and closure is ineffective.	Writing is disorganized and underdeveloped with very weak transitions and closure.

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