

LMC 4318 TN / 6215 LY: AI and Science Fiction

Instructors:

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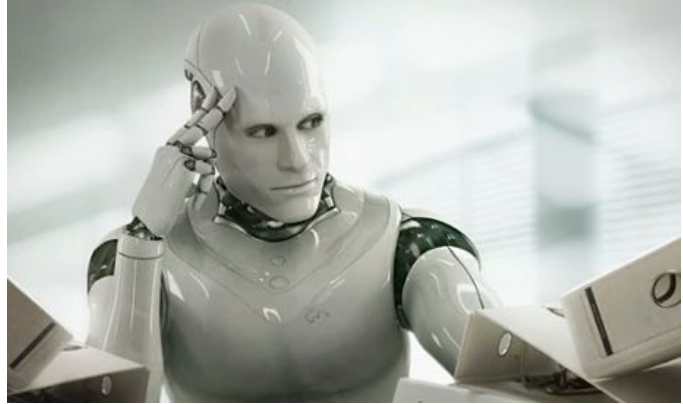
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Lisa Yaszek

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Office hours W 11-12 & by appt.



Class meetings: MW 12:05-1:25 (Skiles 343)

This syllabus is a living document subject to change during the term.

Course Description

The goal of this course is to introduce students to artificial intelligence (AI) research as it is represented in both science and science fiction (SF). Over the course of the semester, we will work together to untangle the strange and sometimes estranging relations between these two fields as they anticipate, extrapolate from, and critically re-interpret one another. After briefly reviewing the history of AI and SF, we will explore in greater depth four key topics in AI research and storytelling: believable behavior, consciousness, machine learning, and ethics and AI. We will conclude by considering the impact of AI research on contemporary thinking about transhumanism, an international cultural and intellectual movement that imagines a future where we will use advanced technologies including AI to enhance and even transform human capabilities. Our study of AI and SF will include engagement with philosophical, scientific, and aesthetic texts as well as a series of live and skype-based lectures by AI and SF professionals.

Undergraduate Learning Objectives

Upon completing this class, students will be able to:

- Recognize the complex circulation of ideas between philosophical, scientific, and aesthetic texts about AI.
- Analyze both scientific and aesthetic texts as forms of cultural expression that change over time and across media.
- Apply a variety of social, political, and philosophical theories to SF texts.
- Apply the grammar of SF and the critical insights of SF theory to scientific and philosophical texts.

- Demonstrate how SF can be a powerful metaphor for examining and revealing our scientific and cultural biases, expectations, and potential.

Graduate Learning Objectives

- Demonstrate the ability to analyze and critically evaluate existing digital media artifacts, services, and environments using formal knowledge, and to explain and defend one's critical evaluation.
- Demonstrate the ability to devise, design, create, and assess prototypical digital media artifacts, services, or environments and to contextualize them within recognized traditions of practice.
- Can summarize their work orally and in written form using formal terminology
- Can compare, critique, and appraise digital media artifacts, services, and environments using formal terminology

Attendance & Participation

Class attendance and participation is mandatory. Participation in class discussion is imperative because it allows you to explore the readings, computing concepts, and projects collaboratively, and in the process, discover meanings and issues that you probably would not discover on your own. Participation in class also challenges you to continuously question, refine, and articulate your own ideas and interpretations.

In addition, much of this class is based in discussion and critiques, which require full participation and cannot be replicated outside of class. Extensive teaching and learning occur through discussion and critiques. Thus, your attendance and participation is an important and required aspect of this class.

Materials

Copies of most of the materials for readings and assignments will be made available online [here](#), on reserve in the Georgia Tech Library, and/or in the Experimental Games Lab, as noted on your reading schedule.

To buy:

- Isaac Asimov, *I, Robot* (required)
- Jeff Prucher, *Brave New Words: The Oxford Dictionary of Science Fiction* (optional)
- [The Encyclopedia of Science Fiction](#) (online)

Information for Students with Disabilities

Please notify the instructor if you have any disabilities with which you need special assistance or

consideration. The campus disability assistance program can be contacted through ADAPTS: <http://www.adapts.gatech.edu>.

Honor Code Statement

Students are expected to adhere to the Georgia Tech Honor Code: <http://honor.gatech.edu>.

Assignments

All students are responsible for the assigned readings, attending critiques & presentations, and individual project assignments. Students will be responsible for choosing to do 2 out of 3 projects for the course as a midterm project and a final project. The projects to choose from are: 1) a piece of fiction (games / film / novella / short story / screenplay) grounded in a technical area of AI research; 2) a written analysis of an AI field of research grounded in a published fictional example; and 3) a software-based implementation of a fictional AI agent.

Graduate students will have an additional set of 8-12 self-selected readings - half from the literary world and the other from AI research articles. These readings will be used to inform their midterm and final projects.

The grading scale for students will be:

- A: 90-100. This student demonstrates a thorough understanding and skilled use of class concepts and terminology. Moreover, s/he uses class concepts and terminology in such a way that s/he teaches us something new about the subject at hand.
- B: 80-89. This student demonstrates a solid understanding of and ability to use class concepts and terminology. However, s/he may demonstrate the need to learn more about some aspect of the subject at hand or may need to continue practicing pulling together key concepts and ideas.
- C: 70-79. This student generally grasps the key concepts and terminology of this class, but cannot yet use them consistently to provide in-depth analysis of class materials.
- D: 60-69. This student fails to understand or use class concepts and terminology much if at all in class or projects. S/he may also fail to provide accurate or in-depth analyses of the topic at hand or texts associated with it.
- F: 0-59. This student demonstrates a complete lack of understanding about the subject at hand. S/he may also fail to complete major assignments in an appropriate and/or timely manner.

If you complete all of the requirements for the assignments reasonably well, you should expect to earn a B. In order to earn an A, you must complete and go “above and beyond” all of the requirements and your work must be exceptional across multiple grading factors.

Absence from more than three classes will result in the loss of 1-letter grade for the course.

Tardiness for more than four classes will result in the loss of 1-letter grade for the course.

Course Schedule

AI is not magic. Sci-Fi is not fantasy.

8/17

Topic: Course Introduction

8/19

Topic: What is Sci-Fi? What is AI?

Readings: Russell & Norvig, pp. 1-29, 34-62 ; Murray Leinster, "A Logic Named Joe" (1943, in our class folder as text, and/or you can listen at

<https://www.youtube.com/watch?v=acRvBn3cNSE>); Holli Mintzer, "Tomorrow is Waiting" (2011) <<http://www.strangehorizons.com/2011/20111121/tomorrow-f.shtml>>

Optional Reading: Jeff Prucher, *Brave New Words*: "artificial intelligence," "science fiction," "sci fi" and "SF"

8/24

Topic: Search

Readings: Russell & Norvig, Ch. 3.

Topic: The History of AI in Sci-Fi and Computing: 1816-1960

8/26

SF readings: Edward Page Mitchell, "The Ablest Man in the World" (1879); Francis Flagg, "The Mentanicals" (1934); Albert Compton Friborg, "Careless Love" (1954)

AI readings: Buchanan, "A (Very) Brief History of Artificial Intelligence" (2005);

SF Media: Karel Capek, *R.U.R.* (Rossum's Universal Robots) (1920, listen at

https://www.youtube.com/watch?v=EeOSlC_yvk0 or read the script at <http://www.gutenberg.org/ebooks/13083>)

Optional Reading: Jeff Prucher, *Brave New Words*: "pulp science fiction," golden age," "bug eyed monster," "robot"

Topic: The History of AI in Sci-Fi and Computing: 1960-present

8/31 SF readings: David Gerrold, "The White Rabbit" (1969); Eileen Gunn, "Computer Friendly" (1989); Ian M. Banks, "The State of the Art" (1991, please note: I've included the pdf of the whole book. You ONLY need to read the short story by this name); Sharianne Lewitt, "A Real Girl" (2000)

SF Media: Stanley Kubrick, *2001: A Space Odyssey* (1968); Brian Sheesley, "Love and Rocket" (*Futurama*, 2002)

Optional Reading: Jeff Prucher, *Brave New Words*: "New Wave," "cyberpunk," "singularity," "cyborg," "posthuman"

Optional SF Media: Harlan Ellison, "I Have No Mouth, and I Must Scream." Read pdf file in our folder or listen to Ellison read it at <https://www.youtube.com/watch?v=Vgc5PDtlii8!>

9/2

Discussion:

- The overlap of Sci Fi and AI historically
 - How to do a literature review + a main topic.
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9/7

Labor Day

Believable Behavior.

9/9

Topic: Natural Language

AI Readings: CCSI, *An Introduction to Natural Language Processing* (2006); Ferrucci, "An Introduction to 'This is Watson'" (2012)

9/14

Topic: Constructing a conversational agent.

AI Readings: [AIML](#) install and overview

Media: Douglas Adams, *Starship Titanic* (1998, on EGL computers)

9/16

Topic: Believability

AI Readings: Magerko "Measuring Dramatic Believability"; Loyall Ch. 1 & 2, "Believable Agents: Building Interactive Personalities"

SF Readings: Asimov, *I, Robot*, "Introduction" through "Reason"

Media: *Interstellar* (2014)

9/21

Topic: Emotion

AI Readings: Bates "The Role of Emotions in Believable Agents"; Marsella, "[Computationally Modeling Human Emotion](#)" (2014)

Media: *Bicentennial Man* (1999)

9/23

SF Reading: Jy Yang, "Patterns of a Murmuration, in a Billion Points of Data"
http://clarkesworldmagazine.com/yang_09_14/

Media: *Her* (2013)

Consciousness Explained.

9/28

Topic: Dualism & the Nature of the Self

AI Readings: Turing, "Computing Machinery and Intelligence"; Searle, "Minds, Brains, and Programs" [Descartes' "Brain in a Vat"](#)

SF Reading: Catherynne M. Valente, "Silently, and Very Fast"
http://clarkesworldmagazine.com/valente_10_11/

Media: *The Matrix* (1999)

9/30

Project critiques

10/5

Project critiques

10/7

Guest Speaker: [Warren Spector](#)

10/12

Fall break

10/14

Consciousness continued:

SF Readings: Isaac Asimov, *I, Robot*: “Catch that Rabbit!,” “Liar!” and “Little Lost Robot”; Zach Barnett, “A Senseless Conversation” (2011);

<https://sites.google.com/site/asenselessconversation/>

Media: *A.I.* (2001); *Ex Machina* (2014)

MIDTERM PROJECT DUE

Machine Learning.

10/19

Topic: Genetic Algorithms

AI Readings: Russell & Norvig, Ch. 4

SF Readings: *Diaspora*

Media: *War Games* (1983), *Galactic Arms Race* (on EGL computers)

10/21

SF Readings: Isaac Asimov, *I, Robot*: “Escape!,” “Evidence” and “The Evitable Conflict”

Media: Alex Proyas, *I, Robot* (2004)

10/26

Topic: Neural Networks

AI Readings: Russell & Norvig, Ch. 18

10/28

Topic: Data, the android

Guest lecturer: [Dr. Gillian Smith](#)

11/2

SF Reading: Catherynne M. Valente, “Silently, and Very Fast”

http://clarkesworldmagazine.com/valente_10_11/

Ethics and AI

11/4

Topic: The Future of AI Debate

Arkin, "[Warfighting Robots Could Reduce Civilian Casualties, So Calling For a Ban Now is Premature](#)" (2015); [Elon Musk interview](#) (2015); [Hawking AMA](#) (2015); [AI Open Letter](#) (2015); "[Humans, Not Robots, Are the Real Reason AI is Scary](#)", (2015); "[I Spent my Weekend at Google.](#)", (2015)

11/9 SF reading: Ted Chiang, "The Lifecycle of Software Objects"

http://subterraneanpress.com/magazine/fall_2010/fiction_the_lifecycle_of_software_objects_by_ted_chiang

Media: Neill Blomkamp, *Chappie* (2015)

11/11

Topic: TBD

11/16

Project critiques

11/18

Project critiques

11/23

Thanksgiving is no time for classes. It is time for individual work on projects.

11/25

Thanksgiving is no time for classes. It is time for individual work on projects.

Transhumanism

11/30 SF viewing and reading: Ray Kurzweil TBA; Rudy Rucker's TED talk on transhumanism: <https://www.youtube.com/watch?v=ifddXYCPCYU>; Pat Cadigan, "Pretty Boy Crossover" (1986, in our class folder); Greg Egan, "Closer" (1995, http://www.eidolon.net/old_site/issue_09/09_closr.htm); Elizabeth Bear, "The Inevitable Heat Death of the Universe" (2006, http://scalzi.com/subterranean_issue_4.pdf).

Optional Reading: Jeff Prucher, *Brave New Words*: “cyborg,” “posthumanism” and “transhumanism”

12/2 Class wrap-up: come to class ready to discuss three things you learned in class this semester (and how they relate to the rest of your education at Tech).
