Imagining Androids:
The Past (And Future) of Artificial Intelligence

Instructor	Evan Donahue
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Day/Time	Tues/Thurs 1:25-2:40
Location	Smith Warehouse Bay 9, Classroom A290
Office Hours	By Appointment

1 Course Overview

Some experts believe that, in the future, human beings will merge with our machines and become immortal. Others believe the machines will turn on us, and use our atoms to manufacture an incredible quantity of paper clips. Amidst prognostications ranging from the utopian to the apocalyptic, it is easy to forget that a future populated by truly artificially intelligent machines is, as of yet, still more science fiction than science fact.

How, then, do we go about planning for such a future? What are artificial intelligence (AI) experts basing *their* predictions on? Where do any of our ideas about AI come from? Can we perhaps, by understanding the histories of these conversations and the values embedded in them, come to our own conclusions about what the future can–and should–look like?

In this class, we will study the history of AI from 1956 to the present. Our purpose will be to uncover how science, technology, literature, and culture have come together, at various moments, to enable radical visions of the future to take shape. We will discuss how scientific debates arise and get resolved, how cultural values become embedded in technologies, and how science and literature inform one another. By the end of this class, we will know how to evaluate contemporary claims about AI, develop informed opinions about which futures are plausible, and be well positioned to propose new directions in science and technology, policy, and literature.

This class is intended for those with an interest in artificial intelligence. There are no prerequisites. No prior knowledge of AI or computer science is required. This class fulfills the requirements for the ALP and CZ areas of knowledge, and the EI and STS modes of inquiry. It is cross-listed with IS+S, VMS, LIT, ENG, and HIST.

2 Course Objectives

By the end of this course, you will be able to:

- *Recall* important figures, events, and ideas from the history of AI.
- *Explain* how those figures, events, and ideas fit together in time and space, which precede one another, and which coincide.
- *Interpret* how connections between these elements *caused* the history to unfold the way it did.
- *Analyze* and evaluate historical claims about AI in scientific, policy, journalistic, and fictional arenas, and how these historical narratives shape contemporary conversations.
- *Propose* new stories about the history AI to help imagine and guide its future.

3 Structure of the Class

This is a seminar class. There will be weekly readings to be discussed in class. You will be expected to come to class with a copy of the week's readings for discussion, either printed out, or as a file on your computer. Each new set of readings will be introduced by a short historical lecture to provide context. You will be expected to write a short post each week on the class Sakai forum prior to class, and come to class prepared to discuss the week's readings and the contents of your posts. In addition, you will complete a semester-long writing, programming, or other mixed media project, for which deliverables will be due at milestones specified in the Schedule section of the syllabus.

4 Readings

All readings will be made available on the course Sakai in time for their assigned dates as listed on the schedule. There are no additional books to purchase. The instructor reserves the right to alter a given week's readings at any point before they are assigned.

5 Disability Statement

Students with disabilities who believe that they may need accommodations in the class are encouraged to contact the Student Disabilities Access Office at 919.668.1267 or disabilities@aas.duke.edu as soon as possible to better ensure that such accommodations are implemented in a timely fashion.

6 Academic Integrity

Duke University is a community dedicated to scholarship, leadership, and service and to the principles of honesty, fairness, respect, and accountability. Citizens of this community commit to reflect upon and uphold these principles in all academic and non-academic endeavors, and to protect and promote a culture of integrity. To uphold the Duke Community Standard:

- I will not lie, cheat, or steal in my academic endeavors;
- I will conduct myself honorably in all my endeavors; and
- I will act if the Standard is compromised.

7 Preferred Contact

Please do not hesitate to contact the instructor via email (evan.donahue@duke.edu) with any questions or comments. Expect a response within two business days of email delivery.

8 Assignments, Attendance, & Evaluation

Your grade in this class will be a function of three things: attendance and participation in class, weekly readings and accompanying blog posts, and a semester long final project.

8.1 Attendance & Participation (20%)

20% of your final grade will be based on your number of unexcused absences. Medical, athletic, or other official excused absences will not count as unexcused absences. Other reasonable absences (such as for job interviews) may be excused at the instructor's discretion, and will not count as unexcused absences **as long as** arrangements are made with the instructor **prior** to the absence.

Number of Unexcused Absences	Participation Grade
0	A+
1-2	A
3-4	B
5-6	C
7-8	D
9+	F

Computer Use Policy

You may use a computer to take notes, but please close your web browsers and turn off your wireless internet unless instructed otherwise. Checking email during class will result in a recorded absence for the day, and count against your attendance grade.

8.2 Weekly Readings & Blog Responses (20%)

20% of your final grade will be based on the completion of the weekly readings, and of a **250 word** response to a weekly prompt. All of the readings will be available through Sakai. Likewise, blog responses should be posted in the appropriate Sakai forum for that week's readings.

The purpose of the blog posts is to surface issues from the readings of relevance to discussion in the week's classes. As such, replies to other students' posts that build on them or contrast with them are acceptable as your weekly responses, provided they satisfy the minimum length requirement. If you are having trouble coming up with a response, try browsing some of the answers others have already posted for inspiration.

Weekly readings and blog response prompts will typically be released after the last class of the previous week (generally Thursday) and will be **due at 11:59pm of the day before they are to be discussed** (generally Monday at 11:59pm). Vacation schedules may slightly alter this schedule. You will be informed of deviations when necessary.

Blog posts will be graded for completion only, and will not receive individual evaluative grades.

Number of Missed Blog Posts	Reading Response Grade
0	A+
1-2	A
3-4	B
5-6	C
7-8	D
9+	F

8.3 Final Project (60%)

60% of your final grade in this course will be based on the completion of a semester long research and writing project, which will be divided into 5 "milestones" that will be graded separately and used to compute your final score for the overall project. The project may be an academic essay of 5-7 pages in length, but it may also be another type of creative project of comparable scope. Examples may include a science fiction short story, an oral history or ethnography of an AI researcher at Duke or elsewhere, or a software implementation of a historical AI program and accompanying written analysis of its historical significance. Group work is permitted, in which case all members will receive the same grade, regardless of individual contributions. Due to the diversity of projects permitted, individual requirements such as page lengths can be worked out with the instructor on a case by case basis.

Throughout the semester, milestones ranging from proposals, to outlines, to various stages of drafts, up to and including the final, polished version, will be due at dates listed on the schedule.

Like attendance and the reading responses, these milestones will be graded by contract. This means that no individual component, including the final draft, will receive an evaluative score. Instead, if you hand in a draft that meets the requirements for that milestone (which will be outlined at appropriate times throughout the semester), you will receive full credit for it, as well as detailed feedback that pertains to preparing the draft for its next milestone. Drafts that are late will receive no credit. One caveat is that in order to complete a milestone, the instructor must *accept it* as meeting the requirements of that particular milestone. If a draft does not meet its requirements, you may receive a "revise and resubmit." As long as the initial draft was handed in on time, you may revise as many times as is necessary to reach an "accept," at which point you will receive full credit for the milestone.

Number of Milestones Completed	Final Project Grade
5	A+
4	A
3	B
2	D
0-1	F

9 Schedule

9.1 Unit 1: The Science & Philosophy of AI

9.1.1 Week 1 (Aug 28): Introduction

9.1.2 Week 1 (Aug 30): The Turing Test

- Turing, "Computing Machinery and Intelligence"
- **Blog Post Due Aug 29, 11:59pm**

9.1.3 Week 2 (Sept 4 & 6): Cybernetics

- Wiener, "Human Use of Human Beings"
- Ashby, "An Introduction to Cybernetics"
- **Blog Post Due Sept 3, 11:59pm**

9.1.4 Week 3 (Sept 11 & 13): Dartmouth & Institutionalization

- McCarthy, "Programs with Common Sense"
- Klein, "Cybernetics, Automata Studies, and the Dartmouth Conference on Artificial Intelligence"
- **Blog Post Due Sept 10, 11:59pm**

9.1.5 Week 4 (Sept 18 & 20): The Golden Age

- Newell & Simon, "Computer Science as Empirical Inquiry: Symbols and Search"
- Dreyfus, "Alchemy and Artificial Intelligence"
- Hoffman, "Thinking Science with Thinking Machines: the Multiple Realities of Basic and Applied Knowledge in a Research Border Zone"
- **Blog Post Due Sept 17, 11:59pm**

9.2 Unit 2: Military-Industrial AI

9.2.1 Week 5 (Sept 25 & 27): Expert Systems, Startups & Industry

- Collins, "Artificial Experts: Social Knowledge and Intelligent Machines"
- Feigenbaum & Buchanan, "Dendral And Meta-Dendral: Roots Of Knowledge Systems And Expert Systems Applications"
- **Blog Post Due Sept 24, 11:59pm**

9.2.2 Milestone 1 (Sept 28): Project Proposal

9.2.3 Week 6 (Oct 2 & 4): Japan & The 5th Generation Computer Project

- Feigenbaum & McCorduck, "The Fifth Generation: Artificial Intelligence and Japan's Computer Challenge to the World"
- Koizumi, "Technology at a Crossroads: The Fifth Generation Computer Project in Japan"
- Unger, "The Fifth Generation Fallacy: Why Japan Is Betting Its Future On Artificial Intelligence"
- **Blog Post Due Oct 1, 11:59pm**

9.2.4 Oct 9: Fall Break - No Class

9.2.5 Week 7 (Oct 11): AI in the Popular Consciousness

- Garland, "Ex Machina"
- **Blog Post Due Oct 10, 11:59pm**

9.2.6 Week 8 (Oct 16 & 18): The Strategic Computing Initiative

- McDermott, "The Dark Ages of AI: A Panel Discussion at AAAI-84"
- Asprey, "An Interview with Ronald B. Ohlander"
- **Blog Post Due Oct 15, 11:59pm**

9.2.7 Milestone 2 (Oct 19): Outline

9.3 Unit 3: Alternative Theories

9.3.1 Week 9 (Oct 23 & 25): Artificial Life

- Lehman, Clune, and Misevic, "The Surprising Creativity of Digital Evolution: A Collection of Anecdotes from the Evolutionary Computation and Artificial Life Research Communities"
- Helmreich, "Silicon Second Nature: Culturing Artificial Life in a Digital World"
- **Blog Post Due Nov 5, 11:59pm**

9.3.2 Week 10 (Oct 30 & Nov 1): Embodiment

- Agre, "Toward a Critical Technical Practice: Lessons Learned in Trying to Reform AI"
- Short, "Galatea"
- **Blog Post Due Oct 29, 11:59pm**

9.3.3 Week 11 (Nov 6 & 8): Emotion & Gender

- Adam, "Artificial Knowing"
- Picard, "Affective Computing"
- **Blog Post Due Nov 5, 11:59pm**

9.3.4 Milestone 3 (Nov 16): Rough Draft

9.4 Unit 4: Commercial & Contemporary AI

9.4.1 Week 12 (Nov 13 & 15): Robot & Statistical Revolutions

- Brooks, "Intelligence Without Representation"
- Mitchell, "Whether Something Works"
- **Blog Post Due Nov 12, 11:59pm**

9.4.2 Week 13 (Nov 20): Consumer AI

- Jonze, "Her"
- **Blog Post Due Nov 19, 11:59pm**

9.4.3 Nov 22: Thanksgiving - No Class

9.4.4 Week 14 (Nov 27 & 29): Deep Learning & AGI

- Mikolov et al., "A Roadmap Towards Machine Intelligence"
- **Blog Post Due Nov 26, 11:59pm**

9.4.5 Week 15 (Dec 4 & 6): Presentations & Conclusion

9.4.6 Milestone 4 (Dec 7): Revised Draft

9.4.7 Milestone 5 (Dec 15): Final Draft