Robotics & Society
34:816:640:01 / 16:332:640:01

Wednesdays 1:00 pm to 4:10 pm
Professor Clinton Andrews
Fall 2023
Civic Square Building, Room CSB 170
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Class Canvas Site: https://rutgers.instructure.com/courses/251651

This course will examine the interplay of robotics technology and society. A sequence of foundational discussions will provide both technical and social science students with core skills for effective cross-disciplinary exploration. The course will examine the interaction between social and technical systems to consider how new and existing technologies affect and are affected by society and policy, as well as giving students an understanding of the ethics, values, unintended consequences, and social implications of robotic technologies.

This is an interdisciplinary course, drawing on instructors, theory, and empirical work from, the social sciences, public policy, engineering, and natural sciences to introduce those with a robotics background to social science theory and methods and, for those with a social science and/or policy or planning background, a greater understanding of the technology world through course work with students from those disciplines and projects that deepen their technical knowledge. Students will critically examine recent technological advances in robotics with respect to whether, and how they meet social needs, and to learn about the social processes that shape technology artifacts and systems. They will focus on applications in which humans and robots closely interact. The module on research methods will provide students a critical understanding of the strengths and weaknesses of different methods and provide them the tools to be discerning consumers of research.

Syllabus topics include: implications of robotics for public policy (how policy develops in new areas to balance support for innovation and protecting the public interests); emerging robotics technologies that can impact society; broader workforce impact assessment; legal and ethical dilemmas; social dimensions of technology development; human-robot interaction in the context of smart spaces, buildings and settlements; social bias in design; and the interaction between technological and social systems.

Overall learning objectives for this course are for students to be able to:

1. Understand the big picture: what robotics will look like at scale in specific application domains, what ideas this suggests about the relationship between robots and society, and consequences for humans.
2. Understand the dynamics of social systems, organizations, and policy that affect the development and design of technology, with particular attention to robotics (e.g., what applications are funded and/or developed? What design choices are viewed as optimal?).

3. Understand social science methods for evaluating technology designs, and evaluating social implications. How will individual human users respond? How will society respond? What insights emerge as we shift from a microscopic to a macroscopic perspective?

4. Define and analyze a robotics problem from an interdisciplinary perspective: what are the social, values, and/or ethical choices embedded in the design or application? What are the robotics solutions that provide social benefits? And what are the tradeoffs involved in the critical design choices?

**Prerequisite or corequisite:** This course is open to graduate students who have taken a basic statistics course equivalent to Basic Quantitative Methods (34:816:515) or have equivalent training in descriptive and inferential statistics.

**Robotics Research Community:** This course is part of a National Science Foundation Research Traineeship (NRT) program, though the course is open to, and welcomes students from all disciplines. The purpose of the NRT is to create a new vehicle for graduate training and convergence research that integrates the technology domains of robotics with social and behavioral sciences, including psychology, cognitive science and urban planning and policy. Faculty participating in this course are collaborating in the NRT program; for more information on the NRT: [https://robotics.rutgers.edu/](https://robotics.rutgers.edu/)

**Textbook & Materials:** Canvas is the website hosting the course and the readings/video/podcasts. There is no required textbook. Weekly readings are available on Canvas. Assignments should be submitted through Canvas.

**Basis for Grades:** Students working individually will carry out the practicum portion of the class session. For this, each week, students should prepare short (300 word) critical write-ups discussing articles, data sets, and other items they have found that relate to the topic of the day, and they offer comments to one other student (13 x 4% = 52% of course grade). Each week, three students will sign up to make short (5-minute) Powerpoint presentations in class instead of a writeup. In some weeks, an in-class exercise will substitute for the writeup.


Each weekly module (class session) is divided into two parts: lecture and guided discussion on major concepts led by the instructor; and a practicum during which students immerse themselves in the relevant methods, contexts, and applications, and critically discuss them. The goal is to ensure that knowledge acquisition and critical reflection go hand in hand.


Academic Integrity

Rutgers’ academic integrity policy will be strictly enforced in this course. Failure to comply with this policy can result in severe sanctions up to and including expulsion from the University. See the full text at http://nbacademicintegrity.rutgers.edu/home/academic-integrity-policy/. The following excerpt serves as a reminder that the student must: properly acknowledge and cite all use of the ideas, results, or words of others; properly acknowledge all contributors to a given piece of work; make sure that all work submitted as his or her own in a course or other academic activity is produced without the aid of unsanctioned materials or unsanctioned collaboration; obtain all data or results by ethical means and report them accurately without suppressing any results inconsistent with his or her interpretation or conclusions; and treat all other students in an ethical manner, respecting their integrity and right to pursue their educational goals without interference. This requires that a student neither facilitate academic dishonesty by others nor obstruct their academic progress; and uphold the canons of the ethical or professional code of the profession for which he or she is preparing.

Use of AI such as ChatGPT is fully permitted, but you must cite the tool, share the prompts used when querying the AI, and be able to explain any work that you submit.

Emergency Remote Participation

This is an in-person seminar class. If Rutgers declares a weather or other emergency, the class will pivot to the use of the Zoom video platform as needed. Zoom links will be accessible through the Canvas course management portal for this class.
## Schedule of Classes

<table>
<thead>
<tr>
<th>WEEK</th>
<th>DATE</th>
<th>TOPIC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Part I  Background</strong></td>
</tr>
<tr>
<td>1</td>
<td>Sep. 6</td>
<td>Introduction and Overview</td>
</tr>
<tr>
<td>2</td>
<td>Sep. 13</td>
<td>Technology Assessment</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Part II  Social &amp; Behavioral Science Perspectives on Robotics</strong></td>
</tr>
<tr>
<td>3</td>
<td>Sep. 20</td>
<td>Human cognition and decisions (psychology &amp; cognitive science)</td>
</tr>
<tr>
<td></td>
<td>Sep. 22</td>
<td>Rutgers Robotics Workshop!</td>
</tr>
<tr>
<td>4</td>
<td>Sep. 27</td>
<td>Systemic impacts of emerging technologies (economics &amp; politics)</td>
</tr>
<tr>
<td>5</td>
<td>Oct. 4</td>
<td>Engineering as a social practice (sociology &amp; anthropology)</td>
</tr>
<tr>
<td>6</td>
<td>Oct. 11</td>
<td>Ethics, Law &amp; Public Policy</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Part III  Social Science Research Methods for Robotics</strong></td>
</tr>
<tr>
<td>7</td>
<td>Oct. 18</td>
<td>Observing</td>
</tr>
<tr>
<td>8</td>
<td>Oct. 25</td>
<td>Asking</td>
</tr>
<tr>
<td>9</td>
<td>Nov. 1</td>
<td>Interpreting Evidence</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Part IV  Applications of Robotics</strong></td>
</tr>
<tr>
<td>10</td>
<td>Nov. 8</td>
<td>Robotics at Home</td>
</tr>
<tr>
<td>11</td>
<td>Nov. 15</td>
<td>Robotics at Work</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Thanksgiving Break – No Class</td>
</tr>
<tr>
<td>12</td>
<td>Nov. 29</td>
<td>Robotics in the Built Environment</td>
</tr>
<tr>
<td>13</td>
<td>Dec. 6</td>
<td>Robotic Solutions to Large-scale Social Concerns</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Part V  Student Projects</strong></td>
</tr>
<tr>
<td>14</td>
<td>Dec. 13</td>
<td>Final Student Presentations</td>
</tr>
</tbody>
</table>
Schedule of Topics, Readings, and Assignments

Part I  Background

September 6  Introduction and overview, social dimensions of technology

Motivation: technological development is disruptive in good and bad ways that we need to better understand.

Perspective: we apply a broad social and behavioral science perspective to robotics, and although there are no technical prerequisites, students will draw on their relevant background in course assignments and discussions.

Approach: instructor will provide a brief overview lecture each week, then students will actively discuss the day’s topic. It is meant to be highly participatory, a seminar rather than lecture format.

Topic: Social dimensions of technology. This week is an introduction to social theories that examine technology as artifacts as shaped by social, organizational, and political factors. Innovation as a social process is considered through an historical overview and case studies. We discuss whether, or to what extent, technology is “socially constructed” as compared to an objective optimization of a solution to a given problem. The concept of “systems” as applied to engineering problems and social problems is considered.

Objectives:

• Identify and critically discuss the major theoretical framings for social dimensions of robotics

• Access and understand the uses of key platforms used for researching robotics and society

• Appreciate the range of application areas and the importance of contextual considerations

Practicum: Create (free) account on GitHub and complete human subjects training. Go to https://github.com/join?source=prompt-code and create an account which allows you to post, borrow, and collaborate on software and scripts.

Complete the online CITI training for human-subjects researchers. This training session raises important legal and ethical considerations regarding privacy rights, the allocation of risk to research subjects, and your duties as an informatics researcher. Begin the training at https://orra.rutgers.edu/citi. Upon successful completion of the training, email a copy of your certification letter to the instructor.

Required Readings:


Recommended Readings:

None
Much of the potential impact of robotics on human society lies in the future, hence there is great interest today in trying to anticipate consequences of widespread robot use. Any future-oriented inquiry rests on some worldview: are we technophiles, technophobes, hands-off, or hands-on, in one famous formulation? We consider approaches to forward-looking technology evaluation emphasizing the developer’s perspective (market assessment, technology roadmap) and the public policy perspective (technology assessment). We learn how the practice of technology assessment has evolved to include a broad range of stakeholders and methods. We examine the strengths and weaknesses of alternative approaches to anticipating especially the unanticipated adverse consequences of widespread robotics deployments. Assessment techniques introduced here will be applied and refined throughout the remainder of the course.

Objectives:

• Become familiar with technology assessment tools used by developers
• Become familiar with technology assessment used to inform public policy
• Critically discuss the challenges of trying to anticipate unintended consequences

Practicum: Prior to this week’s class, critically read a technology assessment you find interesting from one of the repositories listed below. Prepare one Powerpoint slide summarizing the target technology, assessment method, and key finding(s). Post the slide to the Discussions section of the course canvas site by 12 noon on Wednesday 9/13 (the day of class). Do not choose an assessment already chosen by another student. Present your findings briefly to the class.

U.S. Congressional Office of Technology Assessment archive at https://ota.fas.org/.

U.K. Parliamentary Office of Science and Technology catalog at https://post.parliament.uk/research/.


Required Readings:


Recommended Readings:
Part II  Social and Behavioral Science Perspectives on Robotics

September 20  The human side of human-robot interaction [Guest Lecture by Jacob Feldman]

Humans are computational agents, like robots, though they make decisions in specifically human ways. Drawing on psychology and cognitive science, how can we model and predict human behavior? How can we use those models to better understand human-robot interaction? Also, humans are social agents. How can human social interaction be understood from a computational point of view? And how can we use this understanding to inform the design of robots? Can robots be made "social" in the same way humans are?

Dr. Jacob Feldman, Professor of Cognitive Science, will guest lecture. Bio at https://ruccs.rutgers.edu/jacob

Objectives:

- Learn how to approach tasks of modeling and predicting human behavior
- Consider how to use these models to better predict human-robot interactions
- Critically discuss whether robots can be made to be social agents

Practicum: Due by 12 noon on the day of class. There are three parts. First, each student should find an article or report about psychological aspects of human-robot interactions. Prepare a short (300 words) critical discussion of the article and post it in the Discussion section of the course Canvas site. Don’t choose an article that another student has already chosen. Second, each student should offer several sentences of thoughtful comments on one other student’s example. Don’t comment on an example that has already received comments. Third, three student volunteers should each present their discussion in a short (5-minute) Powerpoint presentation in class instead of doing a Discussion writeup. Presenters should post their Powerpoints in the Discussion area to allow easy downloading during class.
Required Reading:


Recommended Readings:
None

**September 22 (Friday) Rutgers Robotics Workshop**

The workshop is held annually as part of the NSF National Research Traineeship SOCRATES (Socially Cognizant Robotics for a Technology Enhanced Society) at Rutgers. This annual robotics workshop is held for faculty, students, and industry representatives. The workshop will have both internal and external speakers as well as a poster session for students to present their robotics research. The workshop panels will discuss robots in the age of ChatGPT as well as new robot technologies and the social impact. Please join us in person at the Civic Square Building (33 Livingston Ave, New Brunswick, NJ). Please register via the following form below.

Registration Form:

Robotics Workshop Agenda:
8:30 - 9:00 Check - in
9:00 - 9:30 Introduction
9:30 - 10:30 Plenary Speaker, Ronald Arkin, Georgia Tech
Civilized Collaboration: Ethical architectures for enforcing legal requirements and mediating social norms in human-robot Interaction
10:30 - 10:45 Poster Spotlight Talks
10:45 - 11:30 Coffee break & Poster Session
11:30 - 12:30 Panel: Robots in the age of ChatGPT
12:30 - 1:30 Networking Lunch
1:30 - 2:30 Panel: New Robot Technologies and the Social Impact
2:30 - 3:15 Student Talks (NRT fellows/trainees)
3:15 - 4:00 Optional: Walk over to the CS Robotics Lab on 1 Spring Street for demo

For more information, visit [https://robotics.rutgers.edu/#workshop](https://robotics.rutgers.edu/#workshop)
Written reflection due by September 26, 2023. Attend the Rutgers Robotics Workshop. Prepare a short (300 words) reflection on the experience and post it in the Discussion section of the course Canvas site. Also, offer several sentences of thoughtful comments on one other student’s reflection. Don’t comment on a reflection that has already received comments.

September 27  What are the economic and political impacts of emerging robotics technologies?

Technological changes can disrupt the economic and political systems that we use to allocate resources and set societal priorities. Automation, or the replacement of human labor with technological capital in work processes, disrupts relationships between employers and employees and changes the mix of activities within the economic system. The prospect of mass unemployment or under-employment disrupts politics, encourages political activities by economic winners and losers, and invites public policy interventions. The focus this week is on robot use in work and the various predictions of displacement considered in light of the history of past predictions and the empirical assessment of employment projections. For technology assessment, this topic raises questions about how confidently we can predict economic system consequences of robotic innovations.

Objectives:

- Assess the evidence regarding job losses associated with automation
- Explain how economic and political systems function
- Discuss how well we can predict future consequences of robotic innovations

Practicum: Due by 12 noon on the day of class. There are three parts. First, each student should find an article or report about labor market implications of robotics. Prepare a short (300 words) critical discussion of the article and post it in the Discussion section of the course Canvas site. Don’t choose an article that another student has already chosen. Second, each student should offer several sentences of thoughtful comments on one other student’s example. Don’t comment on an example that has already received comments. Third, three student volunteers should each present their discussion in a short (5-minute) Powerpoint presentation in class instead of doing a Discussion writeup. Presenters should post their Powerpoints in the Discussion area to allow easy downloading during class.

Homework: Due today is a one page proposal for your final class project. Upload it to Canvas.

Required Reading:


Recommended Readings:

October 4 How engineering practices shape the social impacts of robots

In this week, students will adopt perspectives from gender studies, sociology and anthropology to consider the ways in which technology can reflect implicit biases and social dynamics that may unintended and/or unacknowledged by the technologists. Topics include implicit gender biases (e.g., why are Alexa and Siri gender-typed as women?), the normative assumptions in design—design for the “average”—that lead to artifacts inaccessible to many and suboptimal to most; and other topics examining the ways in which human and societal relations and biases are reflected in technology design. For technology assessment, this topic highlights unintended social consequences.

Objectives:
• Discuss the extent to which technology embodies social norms and cultural stereotypes
• Identify assumptions used during the design process that can have social consequences
• Consider how to reduce bias during the design process

Practicum: Due by 12 noon on the day of class. There are three parts. First, each student should find an article or report about social, gender studies, or anthropological aspects of human-robot interactions. Prepare a short (300 words) critical discussion of the article and post it in the Discussion section of the course Canvas site. Don’t choose an article that another student has already chosen. Second, each student should offer several sentences of thoughtful comments on one other student’s example. Don’t comment on an example that has already received comments. Third, three student volunteers should each present their discussion in a short (5-minute) Powerpoint presentation in class instead of
doing a Discussion writeup. Presenters should post their Powerpoints in the Discussion area to allow easy downloading during class.

Required Reading:


Recommended Reading:


October 11 Doing the right thing (ethics, values, law, and public policy)

Ethics, values, law, and public policy are explored through case studies to consider the role of the technologist in decisions about ethical, value, legal, and policy issues. How do technologists identify, consider, and make decisions about these issues? What is the role of the technology designer in making these decisions? What are the consequences? When do ethical considerations become policy considerations? This topic highlights the potentially divergent views that different stakeholders involved in technology assessment have regarding robotics deployments.

Objectives:

- Identify key ethical, legal, and policy issues associated with robotics
- Distinguish among ethical, legal, and policy issues and frameworks
- Describe how ethical, legal, and policy dimensions relate to one another

Practicum: Due by 12 noon on the day of class. There are three parts. First, each student should find an article or report about an ethical, legal, or policy issue associated with robotics. Prepare a short (300 words) critical discussion of the article and post it in the Discussion section of the course Canvas site. Don’t choose an article that another student has already chosen. Second, each student should offer several sentences of thoughtful comments on one other student’s example. Don’t comment on an example that has already received comments. Third, three student volunteers should each present their discussion in a short (5-minute) Powerpoint presentation in class instead of doing a Discussion writeup. Presenters should post their Powerpoints in the Discussion area to allow easy downloading during class.

Required Readings:


**Recommended Reading:**


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**Part III  Social Science Research Methods for Robotics**

**October 18  Observing: behavioral patterns & traces, sensors & computer vision**

[Guest Lecture by Kristin Dana]

This part of the course provides an overview of different research methods, the interpretation of research results, and a critical assessment of findings from experimental research and statistical inference. Students will learn to be informed consumers of research results as well as learn the strengths and weaknesses of different methods to help them identify appropriate methods for obtaining information needed in their professional work. These methods are particularly helpful for fine-tuning robotics designs and identifying surprising human responses that warrant consideration during technology assessment. This week will focus on observational research methods that span direct observation by a researcher taking notes, indirect observation of behavioral traces left behind by people, and remote observation using sensors and computer vision techniques.

Dr. Kristin Dana, Professor of Electrical and Computer Engineering, will guest lecture. Bio at https://www.ece.rutgers.edu/Dana
Objectives:

- Identify several methods for performing research on human-robot interactions
- Understand the challenges in performing and interpreting observational research
- Explain how to match the research method to problem being studied

Practicum: Due by 12 noon on the day of class. There are three parts. First, each student should find an article or report summarizing an observational study that you find interesting. Prepare a short (300 words) critical discussion of the article and post it in the Discussion section of the course Canvas site. Don’t choose an article that another student has already chosen. Second, each student should offer several sentences of thoughtful comments on one other student’s example. Don’t comment on an example that has already received comments. Third, three student volunteers should each present their discussion in a short (5-minute) Powerpoint presentation in class instead of doing a Discussion writeup. Presenters should post their Powerpoints in the Discussion area to allow easy downloading during class.

Required Readings:


Recommended Reading:

October 25  Asking: interviews, focus groups, surveys

Observational techniques are useful for documenting “what” people do when interacting with robots but not “why” they behave as they do. Thus there is value in asking people about their behavior. Interviews are guided one-on-one conversations that can reveal much about why people behave in certain ways. Focus groups are guided multi-person conversations that allow the researcher to learn not only about individual opinions but also from interactions among participants. Surveys provide a basis for quantifying attitudes, beliefs, and opinions expressed by large numbers of people using standardized questionnaires.
Objectives:

- Learn how to prepare for and conduct interviews
- Understand how to design, carry out, and report on focus groups
- Appreciate how to design good survey questions that elicit useful information from respondents

Practicum: This work will take place in class. Working in groups of three students, conduct and document an interview. One student will be the interviewee, a second will be the interviewer, and the third will be the recorder. The topic of the interview should be “How did you get interested in robotics?” Prepare a list of questions to be asked, record the interview on your phone or on Zoom, transcribe the interview into written text using a tool of your choice (e.g., on Apple iOS turn on Enable Dictation in Settings\General\Keyboard or ask Siri to “transcribe my voice memo” or “convert my voice memo to text.” On Android turn on Live Transcribe.). Edit the transcript for clarity and accuracy. Upload the final transcript to Canvas/Assignments.

Homework: Due today is a bibliography of readings you are doing for your final class project. Upload it to Canvas.

Required Readings:


Recommended Reading:

October 30 (Monday)  Special Lecture: Cybernetic Aesthetics: Modernist Networks of Information and Data [Dr. Heather Love, Univ. of Waterloo]

Cybernetic Aesthetics draws from cybernetics theory and terminology to interpret the communication structures and reading strategies that modernist texts cultivate. In doing so, Heather A. Love shows how cybernetic approaches to communication emerged long before World War II; they flourished in the literature of modernism’s most innovative authors. This book engages a range of literary authors, including Ezra Pound, John Dos Passos, Gertrude Stein, Virginia Woolf, and James Joyce, and cybernetics theorists, such as Norbert Wiener, Claude Shannon, Ross Ashby, Silvan Tomkins, Margaret Mead, Gregory Bateson, and Mary Catherine Bateson. Through comparative analysis, Love uncovers cybernetics’ relevance to modernism and articulates modernism’s role in shaping the cultural conditions that produced not merely technological cybernetics but also the more diffuse notion of cybernetic thinking that still exerts its influence today.

Extra Credit Discussion: Attend the special lecture. Prepare a short (300 words) reflection on the experience and post it in the Discussion section of the course Canvas site.

November 1  Interpretation: Making sense of mixed evidence

Students will learn to be informed consumers of research results as well as learn the strengths and weaknesses of different methods, along with assessing published research. These methods support quantitative modeling of economic and other social systems as they respond to disruptive technologies that are being assessed.

Objectives:

• Identify key features of quantitative and qualitative data on human behavior
• Discuss differences among exploratory, explanatory, and mixed research strategies
• Explain how to be a critical consumer of data reported by others

Practicum: Due by 12 noon on the day of class. There are three parts. First, each student should find an article or report summarizing a mixed-methods study that you find interesting. Prepare a short (300 words) critical discussion of the article and post it in the Discussion section of the course Canvas site. Don’t choose an article that another student has already chosen. Second, each student should offer several sentences of thoughtful comments on one other student’s example. Don’t comment on an example that has already received comments. Third, three student volunteers should each present their discussion in a short (5-minute) Powerpoint presentation in class instead of doing a Discussion writeup. Presenters should post their Powerpoints in the Discussion area to allow easy downloading during class.

Required Reading:


Recommended Reading:


Part IV Application Areas

November 8 Robotics at Home: as complements to activities of daily living (chores, comfort, entertainment, health, safety, assistance) [Guest Lecture by Dunbar Birnie].

This week focuses on “Robotics for Everyday Living,” examining robot use for tasks such as Strength and Mobility Assistance (e.g., to open doors, carry packages and navigate through crowds), the integration of socially cognizant robots (embodiment and control) that can infer user needs (cognitive modeling), interact via language (language and dialogue), see and interpret their surroundings (visual learning). Technology assessments of everyday robotics applications will reveal disruptions to social practices and unintended consequences associated with how humans respond to robotic assistance. A guest speaker will discuss how research and technology are commercialized and implications for technology assessment.

Dr. Dunbar Birnie, Professor of Materials Science and Engineering, will guest lecture. Bio at https://mse.rutgers.edu/fac/dunbar-birnie

Objectives:
• Understand the social practice theory framework for analyzing habitual behavior
• Identify emerging applications of robotics to activities of daily living
• Critically discuss how humans might respond to these robotics applications
Practicum: Due by 12 noon on the day of class. There are three parts. First, each student should find an article or report summarizing a study everyday applications of robotics that you find interesting. Prepare a short (300 words) critical discussion of the article and post it in the Discussion section of the course Canvas site. Don’t choose an article that another student has already chosen. Second, each student should offer several sentences of thoughtful comments on one other student’s example. Don’t comment on an example that has already received comments. Third, three student volunteers should each present their discussion in a short (5-minute) Powerpoint presentation in class instead of doing a Discussion writeup. Presenters should post their Powerpoints in the Discussion area to allow easy downloading during class.

Required Readings:

Recommended Readings:
November 15 Robotics at Work [Guest Lecture by Hal Salzman]
The use of robots in the workplace is a primary market for this technology. Dr. Hal Salzman, Professor of Planning and Public Policy, will guest lecture. Bio at https://bloustein.rutgers.edu/salzman/

Objectives:
- Identify major applications of robotics in private and public enterprises
- Understand approaches for assessing the commercial suitability of robotics applications
- Critically discuss the potential policy responses to widespread robotics deployments

Practicum: Due by 12 noon on the day of class. There are three parts. First, each student should find an article or report summarizing an application of robotics in the workplace that you find interesting. Prepare a short (300 words) critical discussion of the article and post it in the Discussion section of the course Canvas site. Don’t choose an article that another student has already chosen. Second, each student should offer several sentences of thoughtful comments on one other student’s example. Don’t comment on an example that has already received comments. Third, three student volunteers should each present
their discussion in a short (5-minute) Powerpoint presentation in class instead of doing a Discussion writeup. Presenters should post their Powerpoints in the Discussion area to allow easy downloading during class.

**Required Readings:**


**Recommended Reading:**


**November 29**  
**Robots in the built environment (smart buildings, smart cities, autonomous passenger vehicles, smart transit, autonomous freight vehicles).**

Embedded technology in buildings and in transportation are the focus this week. How are robotic technologies being used to transform the built environment in different domains, from homes to offices to transportation? How will we optimize and make tradeoffs between human needs and preferences and the optimization of and by technology? Technology assessment for these applications will focus on how disruptive technologies become embedded and thereby transform the context of everyday life.

**Objectives:**

- Identify how elements of the built environment are incorporating sensors, actuators, and autonomous intelligence.
- Discuss how this might affect human autonomy and dignity
- Consider the implications for design of buildings and transportation systems

**Practicum:** Due by 12 noon on the day of class. There are three parts. First, each student should find an article or report summarizing an application of robotics in the built environment that you find interesting. Prepare a short (300 words) critical discussion of
the article and post it in the Discussion section of the course Canvas site. Don’t choose an article that another student has already chosen. Second, each student should offer several sentences of thoughtful comments on one other student’s example. Don’t comment on an example that has already received comments. Third, three student volunteers should each present their discussion in a short (5-minute) Powerpoint presentation in class instead of doing a Discussion writeup. Presenters should post their Powerpoints in the Discussion area to allow easy downloading during class.

**Homework:** Due today is a preliminary data analysis and first draft paper for your final class project.

**Required Readings:**


*Smart Buildings*


*Smart Transportation*


**Recommended Reading:**

December 6 Robotic solutions to large-scale social concerns (climate change, war, famine, mass extinction events, pandemics). [Guest Lecture by Kostas Bekris]

Use of robots at a society-wide and global scales are considered across a range of domains, from bioengineering of climate to in warfare. This week integrates course topics from the semester, of technology design to ethical considerations and social impacts. It provides an opportunity to revisit and improve the technology assessment framework that we have developed over the semester.
Dr. Kostas Bekris, Professor of Computer Science, will guest lecture. Bio at https://www.cs.rutgers.edu/people/professors/details/kostas-bekris

Objectives:

• Identify ways in which large-scale robotic deployments might differ from niche applications
• Discuss the ethical implications for those deploying these robots
• Comment on potential unintended consequences of large-scale robotics deployments

Practicum: Due by 12 noon on the day of class. There are three parts. First, each student should find an article or report summarizing a study of robotics applications to large-scale societal issues such as climate change, epidemics, or warfare that you find interesting. Prepare a short (300 words) critical discussion of the article and post it in the Discussion section of the course Canvas site. Don’t choose an article that another student has already chosen. Second, each student should offer several sentences of thoughtful comments on one other student’s example. Don’t comment on an example that has already received comments. Third, three student volunteers should each present their discussion in a short (5-minute) Powerpoint presentation in class instead of doing a Discussion writeup. Presenters should post their Powerpoints in the Discussion area to allow easy downloading during class.

Required Readings:


Recommended Reading:


Part VI  Student Projects

December 13  Final Student Presentations
Present results of student projects in class; solicit feedback

Objectives:

- Clearly present your research
- Learn about other socially cognizant robotics research from fellow students
- Provide constructive feedback to other students on their research

Each student should prepare a short (2-3 slides max) Powerpoint presentation about their project, upload it to Canvas, present it briefly (5 minutes max) to the class, and use the feedback received to improve their final paper.

Final paper due at 11:59 pm on Monday, December 18th via Canvas/Assignments