Today’s Agenda

1. Why we are teaching this course
2. Why are you interested in taking it?
3. Why you *should* take this course
4. What we are going to do together this quarter
Mehran Sahami

- Professor (Teaching) of Computer Science
- Associate Chair for Education, Department of Computer Science
- Spent a decade in tech industry before returning to Stanford
My Motivation

When I worked in industry, I saw two things first hand:

• Many decisions with social consequences result from decisions made in code
  • Rankings of search engine results
  • Recommendations in a social network
  • Objective functions to optimize in machine learning algorithms

• Often, social consequences of these decisions are not considered (or even identified) when the code is written
  • We don’t realize the full implications of our work (e.g., perpetuating biases, creating anti-social behavior, etc.)
  • We only deal with consequences after a problem is spotlighted (e.g., Cambridge Analytica scandal, creation of echo chambers, etc.)
The “New” Physicists

• After the Manhattan Project, many physicists realized the broader impact of their technical work
  • Some became peace activists

• Some have likened the computer scientists of today to the physicists of the mid-20th century

• In both cases, developing more technology does not provide a complete solution
  • Need to understand the interplay of technology, public policy, and societal impact
Unexpected Consequences

- “Waymo Collision Illustrates Why Society Might Eventually Ban Human Driving”
  - Forbes, Nov. 7, 2018

- “Wielding Rocks and Knives, Arizonans Attack Self-Driving Cars”
  - New York Times, Dec. 31, 2018
“Revelations brought to light from whistleblower Frances Haugen, a former data scientist at Facebook, has led to what may be the most threatening scandal in the company's history.

Haugen told Congress that Facebook consistently chose to maximize its growth rather than implement safeguards on its platforms…”

Source: Bobby Allyn, NPR.org, Oct. 5, 2021
https://www.npr.org/2021/10/05/1043377310/facebook-whistleblower-frances-haugen-congress
“Colleges are turning students’ phones into surveillance machines, tracking the locations of hundreds of thousands”
- Washington Post, Dec. 24, 2019

“School and company officials call location monitoring a powerful booster for student success: If they know more about where students are going, they argue, they can intervene before problems arise. But some schools go even further, using systems that calculate personalized ‘risk scores’ based on factors such as whether the student is going to the library enough.

... The students who deviate from those day-to-day campus rhythms are flagged for anomalies, and the company then alerts school officials in case they want to pursue real-world intervention.”
Google and Apple jointly created the Exposure Notifications System out of a shared sense of responsibility to help governments and our global community fight this pandemic through contact tracing.

"Your phone and the phones around you will work in the background to exchange these privacy-preserving random IDs via Bluetooth. You do not need to have the app open for this process to take place."

"The Exposure Notifications System does not collect or use the location from your device."

Source: https://www.google.com/covid19/exposurenotifications/
Rob Reich

- Professor of Political Science
- Director, Center for Ethics and Society
- Co-Director, Center for Philanthropy and Civil Society
- Associate Director, Institute for Human-Centered Artificial Intelligence
My Motivation(s)

- Moral caffeination – awaken to moral complexity of our lives as individuals, professionals, and citizens.
- Ethical ambition
- Stanford says it trains future leaders. Does it? What does 21st Century leadership require?
“The Goliath of totalitarianism will be brought down by the David of the microchip.”

U.S. President Ronald Reagan, 1981-1989
“Imagine if the Internet took hold in China. Imagine how freedom would spread.”
Yuval Noah Harari (2019)

Why Technology Favors Tyranny

Artificial intelligence could erase many practical advantages of democracy, and erode the ideals of liberty and equality. It will further concentrate power among a small elite if we don’t take steps to stop it.
Is Big Tech Rotten?

• “Ms. Brown said a lot of students criticize Facebook and talk about how they would not work there, but ultimately join. “Everyone cares about ethics in tech before they get a contract,” she said.”
What Can We Learn from the Downfall of Theranos?

The health company’s plummet carries valuable lessons for Silicon Valley.

December 17, 2018 | by Sachin Walkar

One of the most epic failures in corporate governance in the annals of American capitalism.
Stanford will investigate its role in the Chinese CRISPR baby debacle

The university wants to learn what ties its faculty members had to He Jiankui, the researcher who created gene-edited humans.

by Antonio Regalado  Feb 7, 2019

Officials at Stanford University have opened an investigation into what several high-profile faculty members knew about a Chinese effort to create gene-edited babies led by a onetime researcher at the California school, He Jiankui.

The investigation, according to people familiar with it, aims to understand what liabilities or risks Stanford may have in connection with the controversial medical experiment, which led last year to the birth of two girls whose genomes had been altered with a molecular tool called CRISPR to render them immune to HIV.

In an e-mail, Stanford confirmed the inquiry. “We have a review under way of the circumstances around Dr. He’s interactions with researchers at the university,” said spokesperson Ernest Miranda.
The Ethical Dilemma Facing Silicon Valley’s Next Generation

Stanford has established itself as the epicenter of computer science, and a farm system for the tech giants. Following major scandals at Facebook, Google, and others, how is the university coming to grips with a world in which many of its students’ dream jobs are now vilified?

Victor Luckerson  Feb 6, 2019, 6:10am EST

At Stanford University’s business school, above the stage where Elizabeth Holmes once regurgitated the myths of Silicon Valley, there now hangs a whistle splattered in blood. More than 500 people have gathered to hear the true story of Theranos, the $9 billion blood-testing company Holmes launched in 2004 as a Stanford dropout with the help of one of the school’s famed chemical engineering professors. But Holmes is not here. Instead, students are learning from Tyler Shultz and Erika Cheung, the young government insiders who were fresh out of college when they alerted agencies that the secretive startup was doctoring lab results and endangering patients. On the projector screen above the two guest speakers, the ominous whistle is paired with the provocative title for the event: “Spilling the Blood of a Silicon Valley Unicorn.”

When Holmes was weaving the elaborate lies that ultimately led to the dissolution of her company, she leaned heavily on tech truisms that treat dogged pursuit of market domination as a virtue. “The minute that you have a backup plan, you’ve admitted that you’re not going to succeed,” she said.

Stanford to step-up teaching of ethics in technology

University that helped spawn Silicon Valley responds to criticism of tech industry

June 3, 2018

Marc Tessier-Lavigne: “We are thinking through the ethics and impact of technological advances.”

The university at the heart of Silicon Valley is to inject ethics into its technology teaching and research amid growing criticism of the excesses of the industry it helped spawn.

The board of Stanford University, one of the world’s richest higher education institutions with an endowment of $27bn, will meet this month to agree funding and a plan to implement the findings of an internal review that recommends a new initiative focused on “ethics, society and technology” and improved access to those on lower incomes.

“We are thinking through the ethics and impact of technological advances,” Marc Tessier-Lavigne, Stanford’s president told the FT in an interview. “We are such important players, we should not be doing it [teaching] and letting society pick up the pieces.”
Computers, Ethics, and Public Policy
Winter 2019 M/W/F 1:30-2:50 PM
Cubberley Auditorium

Course Website: cs181.stanford.edu

<table>
<thead>
<tr>
<th>Professor Rob Reich</th>
<th>Professor Mehran Sahami</th>
<th>Professor Jeremy Weinstein</th>
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Course Description

Our goal is to explore the ethical and social impacts of technological innovation. Stanford has a special responsibility to address these topics in light of its role as a seedbed of Silicon Valley. By integrating perspectives from computer science, philosophy, and social science, the course will provide learning experiences that robustly and holistically examine the impact of technology on humans and societies.

The course will challenge students, whatever their choice of major and whatever their career pathway, to think about their role as enablers and shapers of technological change in society. Instead of accepting a common view that what others do with new technologies is their responsibility, students will explore their responsibilities as innovators, designers, coders, engineers, corporate leaders, policymakers, citizens, and consumers. With every new innovation, students will ask: What am I enabling others to do? What responsibilities does this imply for me as an innovator, a citizen, and a human being?
A new initiative seeks to integrate ethical thinking into computing

Stanford launches an embedded EthiCS program to help students consistently think through the common issues that arise in computer science.

October 9, 2020
By Katharine Miller
Jeremy Weinstein

- Professor of Political Science
- Senior Fellow, FSI and SIEPR
- Director, Stanford Impact Labs
When I served in government, I was struck by two things:

- There is an enormous gulf between those who understand technology and those who have a responsibility for governing a society transformed by technology.

- Debates around the governance of new technologies inevitably surface competing values, but we rarely make these values explicit and think about how to balance or choose among them.
North Korea Cyberattack on Sony

November 24, 2014:
Demands that Sony withdraws its film, The Interview

Policy and cyber experts come together to deliberate on a response
North Korea Cyberattack on Sony

Challenge 1: Understanding what had happened

Challenge 2: Figuring out how to respond
FBI-Apple Encryption Dispute

December 2015 terrorist attack in San Bernardino kills 14 people

FBI seeks access to shooter’s iPhone, Apple refuses to unlock the phone
FBI-Apple Encryption Dispute

U.S. Magistrate Judge rules that Apple must write software to unlock the phone, Apple refuses, and FBI eventually unlocks with help of a third party.

Debate continues about whether technology should include a “backdoor” for law enforcement.
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Your Motivation

Why are you interested in taking this class?

• Think about a moment when you saw/experienced/learned about/anticipated the impacts of a new technology that gave you pause about the costs to society of this technological change.
  • What was the technology?
  • What were your concerns?
  • Do these concerns outweigh the benefits? Why?

• Type up one paragraph sharing your thoughts and submit it now. There is a form to submit your write-up on the class website: https://web.stanford.edu/class/cs182/
Today’s Agenda

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We are experiencing the societal consequences of many new technologies.
These consequences are raising critical questions about how these technologies are designed, and whether and how new technologies should be governed and by whom.
You have a role to play in answering these questions – as an engineer, a corporate executive, a policymaker, a citizen, or simply a user.
The Promise

Technology has been an engine of growth for the United States
Growth & Inequality

The wages of scale
US households, average wage income
Cumulative % change since 1980
- Top 1%
- Fourth quintile
- Middle quintile
- Second quintile
- Lowest quintile

Sources: Congressional Budget Office; The Economist

More in their pockets
Change in income shares and top tax rates
1960-64 to 2005-09, percentage points

Source: “Inequality” by Anthony Atkinson
Facebook’s Struggles

“Making the world more open and connected”
-- Facebook mission statement until revision in 2017

Russian ad campaigns beginning each month
Post analysis of data from the House Intelligence Committee. Data based on campaign start date.

Protecting Your Information
We understand the importance of keeping your data safe.

We have banned the app "This Is Your Digital Life," which one of your friends used Facebook to log into. We did this because the app may have misused some of your Facebook information by sharing it with a company called Cambridge Analytica. In most cases, the information was limited to public profile, Page likes, birthday, and current city.

You can learn more about what happened and how you can remove apps and websites anytime if you no longer want them to have access to your Facebook information.

There is more work to do, but we are committed to confronting abuse and to putting you in control of your privacy.

Get More Information
Uber’s Challenges

“We ignite opportunity by setting the world in motion”
-- Uber mission statement
“We give everyone the power to create and share ideas and information instantly and without barriers.”

-- Twitter mission statement
Raises Difficult Questions

- What are the obligations of a platform to police the content that is posted on it? Does it depend on if the platform is a monopoly or not?
- Who owns the underlying data about the users of internet platforms? Under what conditions can it be shared/sold?
- Are platforms businesses or simply technologies for matching? Should this difference impact how they treat their employees?

And this is just scratching the surface of the difficult questions we now confront...
Pushback from Policymakers
“How do you sustain a business model in which users don’t pay for your service?”

-- Senator Orrin Hatch
Public Concern

Facebook Trailing In Trust
Share in the U.S. trusting the following to obey laws protecting personal information

<table>
<thead>
<tr>
<th>Platform</th>
<th>Trust</th>
<th>Don't know</th>
<th>Don't trust</th>
</tr>
</thead>
<tbody>
<tr>
<td>facebook</td>
<td>41%</td>
<td>16%</td>
<td>48%</td>
</tr>
<tr>
<td>YAHOO!</td>
<td>53%</td>
<td>12%</td>
<td>37%</td>
</tr>
<tr>
<td>Apple</td>
<td>60%</td>
<td>9%</td>
<td>28%</td>
</tr>
<tr>
<td>Microsoft</td>
<td>62%</td>
<td>10%</td>
<td>29%</td>
</tr>
<tr>
<td>Google</td>
<td>66%</td>
<td>10%</td>
<td>24%</td>
</tr>
<tr>
<td>Amazon</td>
<td></td>
<td></td>
<td></td>
</tr>
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</table>

n=2,237 (March 21-23, 2018). May not add up to 100% due to rounding.
Source: Reuters/lipso public opinion poll
## Demand for Regulation

Roughly half the public thinks major tech companies should be regulated more than they are now.

<table>
<thead>
<tr>
<th></th>
<th>Less than</th>
<th>More than</th>
<th>About the same as</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>9%</td>
<td>51%</td>
<td>38%</td>
</tr>
<tr>
<td>Republican/Lean Rep</td>
<td>12%</td>
<td>44%</td>
<td>43%</td>
</tr>
<tr>
<td>Democrat/Lean Dem</td>
<td>7%</td>
<td>57%</td>
<td>35%</td>
</tr>
</tbody>
</table>

Note: Respondents who did not give an answer are not shown.
Source: Survey conducted May 29-June 11, 2018.
"Public Attitudes Toward Technology Companies"

PEW RESEARCH CENTER
The Beginnings of a Change

[Image of gavel and tech company logos]

[Image of Donald Trump]

Section 230, which is a liability shielding gift from the U.S. to "Big Tech" (the only companies in America that have it - corporate welfare!), is a serious threat to our National Security & Election Integrity. Our Country can never be safe & secure if we allow it to stand.....

....Therefore, if the very dangerous & unfair Section 230 is not completely terminated as part of the National Defense Authorization Act (NDAA), I will be forced to unequivocally VETO the Bill when sent to the very beautiful Resolute desk. Take back America NOW. Thank you!
Central Themes

• The impacts of technology are not fixed. They reflect a set of “design” choices. Those design choices encode a set of values.

• The impacts also reflect choices about what policies and regulations society chooses to put in place.

• When competing values are at stake, they must be weighed against one another. Who weighs these values and how? This is a critical question of governance, politics, and power.

• You are a central participant in this drama. Understanding your role(s) and exploring/debating the values you want to see encoded are a modern form of civic duty.
Evolution of Governance

• 1\textsuperscript{st} Generation: Technology was a product of researchers/hackers. They defined the underlying code and architecture.

• 2\textsuperscript{nd} Generation: Technology is generated by the commercial sector. The people inside companies—engineers, product managers, designers, sales people, and executives—set the rules, with limited oversight from government.

• 3\textsuperscript{rd} Generation: Technology becomes an issue of politics, and outcomes reflect a push-and-pull between the companies that make things, the governments that oversee them, and the citizens/users who are affected by them.
Historical Precedent: Internet

Spam with everything
Spam as % of total e-mail

Source: Brightmail

VIRUSES CAN BE SPREAD THROUGH...
- Email
- Social Networks
- Text Messages
- Internet Downloads
Historical Precedent: Internet

**A world of insecurity**

*Worldwide*

Information-security spending

$bn

<table>
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<th>Year</th>
<th>2009*</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14†</th>
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<td>60</td>
<td>70</td>
<td>80</td>
<td>90</td>
<td>100</td>
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Breached records

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<th>13</th>
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<td>100</td>
<td>200</td>
<td>400</td>
<td>600</td>
<td>800</td>
<td>1000</td>
<td>200</td>
</tr>
</tbody>
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Sources: Gartner; Risk Based Security; Ponemon Institute

*Estimate†Forecast
Navigating the Moment

We want you to prepare you for this moment by:

• Exploring technological frontiers that surface difficult trade-offs and require us to grapple with competing values
• Making those competing values explicit and thinking about why we might prioritize some over others
• Investigating the underlying technologies to understand how design choices can produce different outcomes
• Thinking hard about how we should choose the values we want new technologies to encode
• Grappling with the role of regulation and policy in mitigating the potential harms of new technologies
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Expectation Setting

• We are going to ask you to read and write a lot! These will be key ways in which you gain familiarity with the ethical and policy dimensions of new technologies.

• We will encourage you to share your views in lecture and discussion, and you can expect that we will challenge you in an effort to sharpen your views.

• You will leave the class with more questions than answers, because the issues we are tackling do not have a right answer.
The course will focus on five frontiers that (a) you are likely to play a role in shaping over the next decade and (b) where engagement with material from philosophy, social science, and public policy is likely to be helpful.

1. Algorithmic Decision-Making
2. Data Collection, Privacy, and Civil Liberties
3. Artificial Intelligence and Autonomous Systems
4. Power of Private Platforms
5. Technology, Inclusion, and Inequality
Different Lenses

Technologist

Philosopher

Policymaker
Pedagogical Approach

Each unit will have a two-week sequence of lectures, discussions, and assignments

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Week 2</th>
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<tbody>
<tr>
<td>Promise and Perils</td>
<td>Bringing to Life</td>
</tr>
<tr>
<td><em>Intro to topic and competing values at</em></td>
<td><em>Moderated discussion with experts</em></td>
</tr>
<tr>
<td>stake</td>
<td></td>
</tr>
<tr>
<td>Technical Deep Dive</td>
<td>Tensions and Trade-offs</td>
</tr>
<tr>
<td><em>Overview of relevant computer</em></td>
<td><em>Interactive discussion of a case study</em></td>
</tr>
<tr>
<td>science concepts</td>
<td><em>related to the unit (taking place in SECTION)</em></td>
</tr>
<tr>
<td>Rights and Responsibilities</td>
<td>Making Choices</td>
</tr>
<tr>
<td><em>Policy implications and social science</em></td>
<td><em>Designing a product/system/policy in light of competing</em></td>
</tr>
<tr>
<td>research</td>
<td><em>values and trade-offs</em></td>
</tr>
</tbody>
</table>
As part of each unit, we will bring to campus a group of distinguished practitioners with relevant perspectives on the key issues we’ll be discussing.

Speakers will include:
- CEOs of major companies
- Prominent journalists
- Distinguished former politicians
- Leading activists and organizers within tech
- Senior decision-makers at companies, such as Facebook
Each discussion of tensions and trade-offs will be organized around a case study we have developed specially for this course. The narrative case studies are written by professional journalists and include primary source materials for you to review.

Case study discussions will be highly participatory and will take place during your weekly discussion section. Please note the dates of the case study discussions on the syllabus.
Lecture

• Attendance at lectures and sections is mandatory.

• Lectures will be highly participatory. We will ask you questions, invite your questions, encourage you to talk to your neighbors, and think through the critical issues together.

• If you are unable to attend a lecture, please email your teaching assistant to seek access to a recording.
For the first two weeks, we will run the class via zoom.

Given the size of the class, in order to facilitate small group breakouts, CS182 participants will be distributed across three Zoom sessions: Rock, Paper and Scissors.

You will see the same feed in all three of these Zoom sessions (e.g., professors lecturing, slides, students speaking, or guest speakers in conversation).

You can put questions in the chat and these will be shared by a TA with the faculty.
Section

• We have a terrific, interdisciplinary team of teaching assistants from computer science, philosophy, political science, law, and sociology.

• They will meet with you in small groups once a week to discuss critical issues raised in lecture and the readings.

• Section attendance is mandatory and active participation is essential to success in the course.

• You will submit preferences for section times via a form on the CS182 web site (https://web.stanford.edu/class/cs182/). The form will be available until 5pm Sun., Jan. 9th.
• There is an enrollment limit of 120 students for CS182W
  • This limit is set by the Technical Communications Program based on how many WIM students they can support

• When CS182W reached its enrollment limit, a waitlist was activated on Axess

• If any enrolled students drop CS182W, others will be enrolled in the class from the wait list (in the order they signed up)
  • You can add yourself to the CS182W waitlist on Axess if you are not already enrolled and are trying to get into CS182W
  • Note: The waitlist is already pretty long.

• Of course, we strongly encourage you to take the non-WIM version as it has no enrollment cap!
Your Role

• Come to lecture and section having done and digested the readings

• Engage actively in discussion

• Complete the five required assignments
  • Algorithmic Decision-Making (Technical)
  • Privacy (Policy Memo)
  • Autonomous Systems (Essay)
  • Platforms and Social Networks (Technical)
  • Final Reflection Assignment