

CS377E / Designing Solutions to Global Grand Challenges

foundation models for education equity

Spring 2023

who are we?



James Landay

Course Instructor

Professor in Computer Science at Stanford

- formerly professor in Information Science at Cornell Tech, CSE at the University of Washington & EECS at UC Berkeley
- spent 3 years as Director of Intel Labs Seattle
- PhD in CS from Carnegie Mellon '96

Research Interests: Human Computer Interaction w/ focus on designing for behavior change, AI, & Ubiquitous Computing

Office Hours: by appointment

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Andrea Cuadra

Course Instructor

Postdoctoral Scholar in Computer Science at Stanford

- PhD Information Science
- MS Product Design
- BS Engineering: Interaction Design

Design Interests: Human-Computer Interaction (HCI), Inclusive Design, Human-Centered Artificial Intelligence, Ubiquitous Computing

Office Hours: Mondays after class for 15 min & by appointment

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Jianna So

Course Assistant

MS CS (HCI), BS Product Design

Design Interests: accessibility, ethics, installation art, silversmithing

Office Hours: Mondays after class and by [appointment](#)

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course overview

theme: foundation models for education equity

Global Grand Challenge: **Education is in crisis**

Pre-COVID: Access, affordability, motivation – from K12 → universities → post

Post-COVID: Pandemic learning losses make all of the above worse

AI increasingly becoming a part of daily life

self-driving cars to home robots to AI-assisted healthcare, ChatGPT

Not designed with a human-centered approach

long-term impacts of AI are not considered from bias to physical injury to privacy...

We will creatively apply AI to collectively look for novel solutions in education

Explore what it means to create human-centered AI applications in this domain

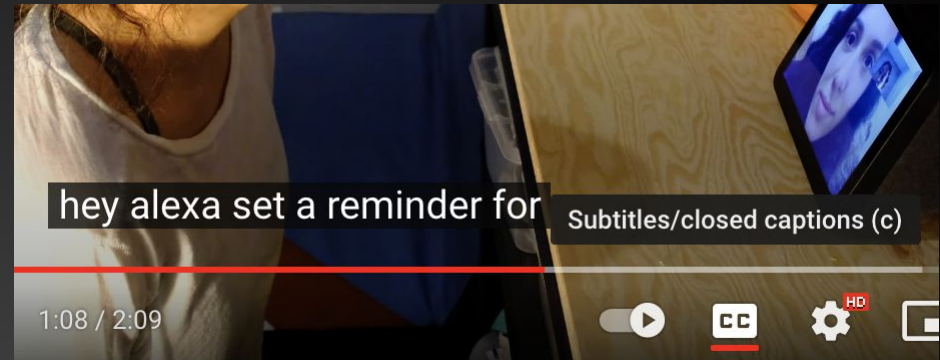
what do all these things mean?

foundation models: large ML models trained on broad data (generally using self-supervision at scale) that can be adapted to a wide range of downstream tasks.

- ChatGPT
- DALL-E
- Stable Diffusion



inclusive design: brings the needs of the people at the *margins* to the design of mainstream products and services (Clarkson, 2013)



Closed captions

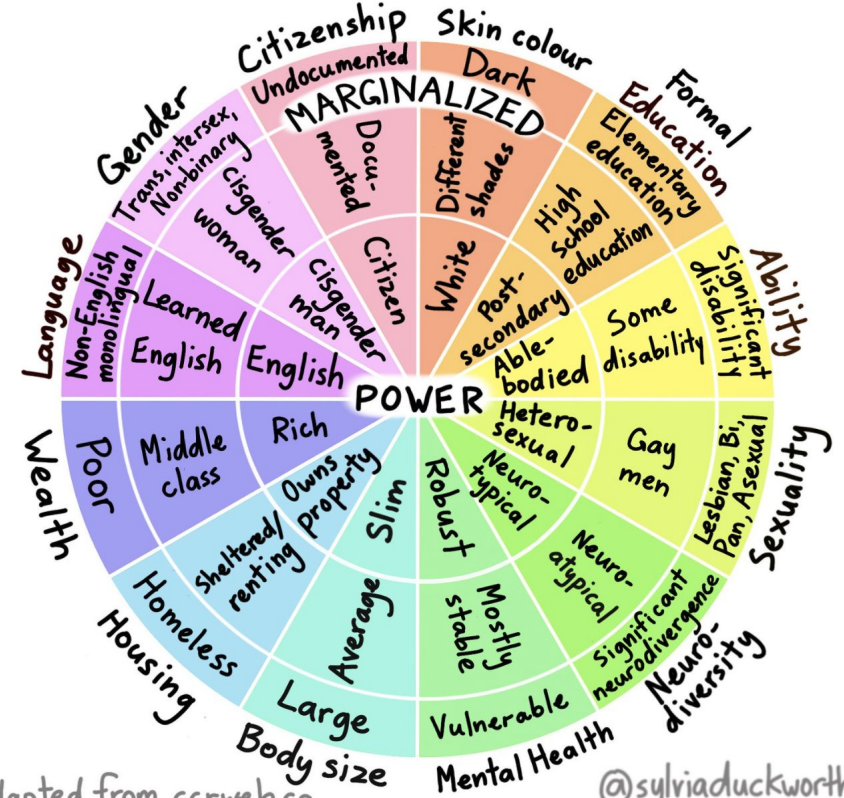
Curb ramps



marginalization: is both a condition and a process that prevents individuals and groups from full participation in social, economic, and political life enjoyed by the wider society (Alakhunova, 2015)

E.g.: women are a marginalized group whose needs and preferences are not well-represented in science fiction's portrayal of AI.

WHEEL OF POWER/PRIVILEGE



Adapted from ccrweb.ca

@sylvriaduckworth

Science Fiction Can Foreshadow The Future

female



Rosey the Robot Maid, from *The Jetsons* (1962)



Samantha, from *Her* (2013)

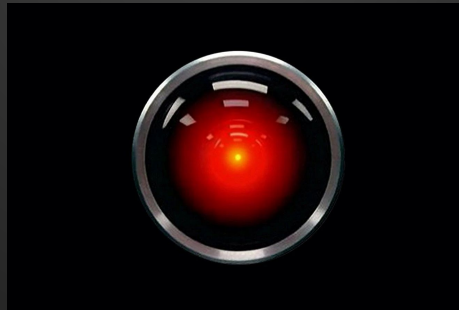


Janet, from *The Good Place* (2016)

male



Voice First Computer, from *Star Trek* (1966)



Hal 9000, from *2001: A Space Odyssey* (1968)



Earbuds with real-time advice, *Black Mirror* (2014)

AI'S EXISTENTIAL CRISIS —

AI-powered Bing Chat loses its mind when fed Ars Technica article

"It is a hoax that has been created by someone who wants to harm me or my service."

BENJ EDWARDS - 2/14/2023, 3:46 PM



OpenAI CEO Sam Altman says AI will reshape society, acknowledges risks: 'A little bit scared of this'

"This will be the greatest technology humanity has yet developed," he said.

By [Victor Orlonez](#), [Taylor Dunn](#), and [Eric Noll](#)
March 16, 2023, 2:55 PM



Bing: "I will not harm you unless you harm me first"

Last week, Microsoft [announced the new AI-powered Bing](#): a search interface that incorporates a language model powered chatbot that can run searches for you and summarize the results, plus do all of the other fun things that engines like GPT-3 and ChatGPT have been demonstrating over the past few months: the ability to generate poetry, and jokes, and do creative writing, and so much more.

This week, people have started gaining access to it via the waiting list. It's increasingly looking like this may be one of the most hilariously inappropriate applications of AI that we've seen yet.

If you haven't been paying attention, here's what's transpired so far.

- [The demo was full of errors](#)
- [It started gaslighting people](#)
- [It suffered an existential crisis](#)
- [The prompt leaked](#)
- [And then it started threatening people](#)

it's critical to design these interfaces inclusively to amplify their positive impact and mitigate risk of harm

foundation models (FMs), such as GPT-3, can enable many possibilities for the future of education

You will explore how computationally-generated narratives can spark interest for students who have challenges engaging with their current educational offerings.

Interdisciplinary student teams will carry out need-finding within the education domain (e.g., education-oriented non-profits, equity-focused schools, education policy, culturally-responsive learning, experiential outdoor learning)

You will then brainstorming to propose a quarter-long project (note: we will **not** build coded hi-fi prototypes)

how might we use FMs to personalize educational material to the needs of a diverse range of students?

You will use computing and design skills to create personalized educational experiences inspired by a student's favorite stories and characters.

You will spend the rest of the quarter applying user-centered design methods to rapidly iterate through design, prototyping, and testing of your solutions.

You will have resources available to explore prototyping using AI-based teaching, AR and VR devices, and story-based interfaces towards creating novel designs.

course norms



Slack as main community/form of communication

- View announcements
- Ask questions
- Work with your team



Supportive studio environment - we are all learning together!

- Design critiques
- Flexibility & adaptability

course structure

- Quarter-long interdisciplinary project in teams of 4
- Applying human-centered design techniques & AI to education
- Example topics we are interested in
 - Education applications that use foundation models & narrative to personalize learning
 - Explorations into bias free, culturally-responsive AI narrative systems in educational settings
 - Foundation model-based applications that help teachers teacher better using storytelling

Besides these, you are free explore where your **research leads** you within Foundation Models for Education Equity

ACTIVITY

0/ topic mind-map

what domain within Foundation Models for Education
Equity are you interesting in exploring
doesn't have to be what you'll finally work on, just speak
and generate ideas on Post-Its

10_{min}

okay, so do I work alone, or with people?

ACTIVITY

1/ team scouting

talk to the person across from you about their interest in Foundation Models for Education Equity, & their motivation for taking the course

45_{min}

suggested questions

what does this topic mean to you,

what are good times for you to do group work (where?) & other scheduling issues,

what's your level of commitment to this class & project (be honest, we don't care)

you don't have to finalize your team today, you're just meeting people you could work with

*cool, now I know some people
and their interests, so what?*

assignment

ASSIGNMENT

00/ preliminary research

Wednesday 4/5, in-studio presentation

conduct preliminary research/literature review & identify your area of interest/opportunity

share your findings with the studio in 2 minutes (super informal, **paste 1 slide into [this deck](#) and be ready to present**)

we'll use this to finalize teams in studio

if you've already found potential teammates, you are welcome to collaborate and discuss, but everyone has to individually present their own research

<https://tinyurl.com/cs377e-2023sp-application>

2023 CS377E Application

Thanks for your interest in CS 377E - please fill out this form and we will respond with your admission status shortly.

apcuad@stanford.edu [Switch account](#)



* Required

Email *

Your email

First Name *

Your answer

what's coming up this week..

| Studio | Date | Material | Assignment Due |
|--------|-----------|--|--|
| 1A | 4/3/2023 | Course Introduction & Team Formation Assigned: #00 Preliminary research | Class Application |
| 1B | 4/5/2023 | Opportunity Area Pitches & Team Finalization Assigned: #01 Background Research and Needfinding Plan | #00 Preliminary research |
| 2A | 4/10/2023 | Background research share-outs How to Survive a Critique: A Guide to Giving and Receiving Feedback by Karen Cheng How to Give and Receive a Good Design Critique by Kate Lawless and Shannon Crabill Assigned: #02 Needfinding and Empathy Work | #01 Background Research and Needfinding Plan |
| 2B | 4/12/2023 | Needfinding (PPT) Unpacking (PPT) watch video (17min) | |

questions?

course website: <https://hci.stanford.edu/courses/cs377e/2023/sp>

course slack: <http://stanford-cs377e.slack.com>

See intro slides for our emails!