



## OPENING REMARKS

### Dawn Song

Professor, Department of Electrical Engineering and  
Computer Science, and Co-Director, Center for  
Responsible, Decentralized Intelligence  
*University of California, Berkeley*



So thank you again for joining us.



## OPENING REMARKS

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# Many Risks & Open Challenges for Responsible AI



- Who controls AI?
  - centralized vs. decentralized control; open vs. closed source
- Trustworthiness
  - Robustness
    - Adversarial robustness
    - Out-of-distribution robustness
    - Test-time attacks vs. training-time attacks
  - Privacy
  - Fairness
  - Toxicity
  - Stereotype
  - Machine ethics
- AI Safety
  - Misuse/abuse of AI
  - Super intelligence

Hi! Everyone thanks a lot for being here

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And the deployment. However, at the same time there are

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so many risks and challenges.

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trustworth AI, including robustness, privacy, fairness.

# Future of Responsible AI with Decentralization & Democratization

Verizon Event ...

- Can we build a full decentralized, open-source stack for AI/ML:
  - Open-source decentralized AI/ML infrastructure for training and inference, with provenance, integrity, privacy guarantees
  - Open-source models and tooling
  - Personalized AI with privacy and trustworthiness
  - Decentralized, cooperative AI with incentives and social welfare
  - Democratic, decentralized process for AI governance & alignment

has many challenges, including how we can mitigate the  
misuse and abuse of AI.

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And superintelligence, and so on.

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And there are many open questions towards.

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Have, including, for example, can we build a open source



# Open Challenges

- Is this technically feasible?
  - Is it possible to close the gap btw open source & closed source models?
  - Is it possible to scale decentralized training to large scale models?
  - Is it possible to build autonomous cooperative, decentralized agents?
- How to design proper incentive to maximize societal benefits?
- Can such an open source, decentralized system lead to more misuse/abuse? Is this at odds with AI safety guarantees?
- What are the different alternatives and possibilities that should be considered?

finally enabling a democratic, decentralized process.



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And align.



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To achieve this goal. There are many open challenges.



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feasible? Is it actually possible to close a gap



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between open source and close models?



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# Spark the Initial Conversation & Cross Pollinate btw Diverse



- AI & ML
- Security & Privacy
- Game theory & Economics
- Decentralization technology
- ...

also what are the different alternatives and possibilities.

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That should be considered.

# Spark the Initial Conversation & Cross Pollinate btw Diverse



- AI & ML
- Security & Privacy
- Game theory & Economics
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- ...

Conversations.

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# Spark the Initial Conversation & Cross Pollinate btw Diverse Domains



- AI & ML
- Security & Privacy
- Game theory & Economics
- Decentralization technology
- ...

And cross pollinates between diverse domains

# Summit Agenda

Berkeley

Center for  
Decentraliz

Verizon Event ...



- Session I: Open Source AI
- Session II: Foundations of Decentralized AI (I)
- Lunch: Worldcoin Orb Demo
- Session III: Foundations of Decentralized AI (II)
- Session IV: Research Spotlight
- Break
- Session V: DeAI in the Field: Data, Infrastructure and Agents
- Session VI: Future of Decentralized AI and Innovators Showcase
- Worldcoin Orb Demo, including secure and privacy, game theory and economics poster session

Full Agenda



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14

WiFi: Register to use the Cornell-Visitor network.

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Full Agenda



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As Justin mentioned, the same has received over

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summit has a really exciting program. With a number of

Full Agenda



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  - Worldcoin Orb Demo, Reception <sup>and</sup> Researcher Poster session
- trying to discuss and explore many of the questions that I



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# Berkeley Center on Responsible Decentralized Intelligence (RDI)



**Mission:** Advance the science and technology of decentralization & decentralized intelligence, to make it universally accessible and empowering a responsible digital economy.

Campus-wide, multi-disciplinary: EECS/School of Engineering, Haas Business School, Law School



<https://rdi.berkeley.edu/>



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Berkeley Engineering



Berkeley Law



also the poster session.

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Center for Responsible,  
Decentralized Intelligence



Verizon Event ...

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Campus-wide, Multidisciplinary Innovation Center

With RDI, UC Berkeley continues to build upon its strong foundation and leadership in these areas, as recently recognized:

- #1 university overall in the US
- #1 computer science graduate program



[rdi.berkeley.edu](http://rdi.berkeley.edu)

Berkeley Engineering



The centralization.

Berkeley Law  
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## Three Pillars of the Berkeley RDI

Research



Education



Community &  
Entrepreneurship



And AI, and.



## Three Pillars of the Berkeley RDI

Research



Education



Community &  
Entrepreneurship



And intelligence in and in general.



## Three Pillars of the Berkeley RDI

Research



Education



Community &  
Entrepreneurship



# Berkeley

Center for Responsible,  
Decentralized Intelligence

## Core & Affiliated Faculty



**Dawn Song**  
Security & Privacy,  
Blockchain, ML

### Co-Directors



**Christine Parlour**  
Finance, DeFi

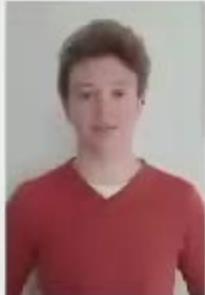
### Co-Directors



**Shafi Goldwasser**  
Turing Award winner  
in Cryptography



**Sanjam Garg**  
Cryptography



**Natacha Crooks**  
Decentralized  
Systems, Privacy



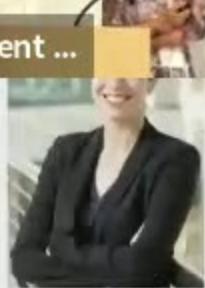
**Raluca Ada Popa**  
Security & Privacy  
Programming Systems,  
Formal Verification



**Sanjit Seshia**  
Programming Systems,  
Formal Verification



**Koushik Sen**  
Programming  
Languages



**Rebecca Wexler**  
Law



**Trevor Darrell**  
ML, Decentralized Data  
Science, Metaverse



**Joseph Hellerstein**  
Databases,  
Distributed Computing



**Joseph Gonzalez**  
Data Science,  
ML systems



**Terrence Hendershott**  
Finance, Banking



**Paul Gertler**  
Economics



**Toy Stuart**  
Finance



**Frank Partnoy**  
Law



**Ce Zhang**  
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Affiliate Faculty, ETH Zurich, Affiliate Faculty, UIUC,  
ML & Decentralized  
Data Science



**Jiantao Jiao**  
ML, Blockchain,  
Decentralized Data Science



**Community and entrepreneurship.**  
Affiliate Faculty, NYU;  
Tokenomics and DeFi,  
Data Analytics



Affiliate Faculty, UCL  
Blockchain, DeFi



Affiliate Faculty, Texas A&M  
Applied Crypto

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Affiliate Faculty, ETH Zurich, Affiliate Faculty, UIUC,  
ML & Decentralized  
Data Science



Verizon Event ...

## Interdisciplinary Research

- **Campus-wide, Multidisciplinary Innovation Center**
  - Faculty in EECS, Hass Business School, Law School, etc.
  - Graduate and undergrad students across campus
  - **15 RDI Frontier Research Fellow**
- Sample RDI Research Thrusts
  - AI Safety
  - Open Source Decentralization and AI

Has many?



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Faculty across the campus.



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And the center focuses on interdisciplinary research.



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this year the center has supported 15 frontier research  
fellows across campus.

# Sample Research Project: Decentralized GPU Cloud Serving Large Language Models

Xiaoyuan Liu, Tianneng Shi, Zhongjing Wei, Elden Ren, Linyu Wu, Zhe Ye, Dawn Song



## Motivation

- Shortage on centralized GPU supply and huge demand in using GPU
- A lot of idle GPUs from private clouds / individuals

NVIDIA's AI GPU Shortage Could Last Till 2025 Due To Supply Constraints, Says TSMC

Muhammad Zubair • Sep 8, 2023 12:00 PM EDT

1262

## Goal

- Build unified platform to manage decentralized computation resource
- Efficiently serve inference requests with idle GPU nodes worldwide
- Distribute incentives to GPU owners: mining to serve requests

## Current Performance Results

- Decentralized Llama-2-70b inference on 8 consumer-grade GPUs, achieving human-reading-level inference speed, supporting interactive LLM apps

And the center has

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And the center has many different research, including in

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Verizon Event ...

## RDI Sample Research Thrusts

**DeFi, ZKP, Metaverse/NFT, Scalability,  
Decentralization & AI**

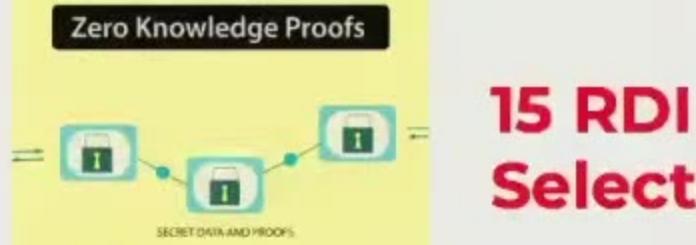
### Orion: Zero Knowledge Proof with Linear Prover Time

2022 | Tiancheng Xie · Yupeng Zhang · Dawn Song | [Link to Paper](#) | published in CRYPTO 2022

Zero-knowledge proof is a powerful cryptographic primitive that has found various applications in the real world. However, existing schemes with succinct proof size suffer from a high overhead on the proof generation time that is super-linear in the size of the statement represented as an arithmetic circuit, limiting their efficiency and scalability in practice. In this paper, we present Orion, a new zero-knowledge argument system that achieves  $O(N)$  prover time of field operations and hash functions and  $O(\log^2 N)$  proof size.

[Read Paper](#)

[View Repo](#)



## 15 RDI Frontier Research Fellows Selected in January 2024

[rdi.berkeley.edu/research/](http://rdi.berkeley.edu/research/)  
**20+ papers published in 2 years**

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### MetaData: Exploring the Unprecedented Privacy Risks of the Metaverse

2022 | Vivek Nair · Gonzalo Munilla Garrido · Dawn Song | <https://doi.org/10.48550/arXiv.2207.13176>

Thirty study participants playtested an innocent-looking "escape room" game in virtual reality (VR). Behind the scenes, an adversarial program had accurately inferred over 25 personal data attributes, from anthropometrics like height and wingspan to demographics like age and gender, within just a few minutes of gameplay. In this work, we illustrate how VR attackers can covertly ascertain dozens of personal data attributes from seemingly-anonymous users of popular metaverse applications...

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[Metaverse Research](#)

[Learn More](#)

[Read Paper](#)

[View Repo](#)



MOOC, Fall 2022

## Education: MOOCs & Cutting-Edge Topics

- **Decentralized Finance MOOC - since Fall 2021**

- First DeFi MOOC (leading multi-university collaboration) in F21 for **400+ Berkeley students & 10K+ globally**
- **180K+ lecture views**
- First university course in DeFi, interdisciplinary across CS & Finance
- Has been offered for 3 years
- <https://defi-learning.org/f22>

- To sign up for the course, please fill in [this form](#).
- For more information about the course, please also join [defi-mooc-f22@googlegroups.com](mailto:defi-mooc-f22@googlegroups.com). And stay tuned!
- For general course content related questions, please join our [discord](#).

#### Instructors



Dan Boneh

Stanford



Arthur Gervais

Imperial College London



Andrew Miller

UIUC



Christine ParLOUR

UC Berkeley



Dawn Song

UC Berkeley

- **Entrepreneurship in Web3 MOOC - Fall 2022**

- **First university entrepreneurship course for Web3**
- **1600 students online & 150 Berkeley students** <https://web3.startups.org>

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UNIVERSITY OF CALIFORNIA

### Entrepreneurship In Web3

MOOC, Fall 2022

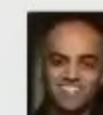
To sign up for the course, please fill in [this form](#).  
For more information about the course, please visit <https://web3.startups.org> and stay tuned.

#### Instructors



Maryam Salehi

Professor of Business



Venkat Venkateswaran

Visiting Faculty, Berkeley

Berkeley  
UNIVERSITY OF CALIFORNIA

### Decentralized Systems

CS294/194-196: Special Topics on Science and Technology of Decentralization and Decentralized Intelligence

#### Instructors



Arash Dabir

Associate Professor



Jennifer Davis

Associate Professor

Berkeley  
UNIVERSITY OF CALIFORNIA

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the space in the area of the



## Education: MOOCs & Cutting-Edge Topics

- **Decentralized Finance MOOC - since Fall 2021**

- First DeFi MOOC (leading multi-university collaboration) in F21 for **400+ Berkeley students & 10K+ globally**
- **180K+ lecture views**
- First university course in DeFi, interdisciplinary across CS & Finance
- Has been offered for 3 years
- <https://defi-learning.org/f22>

- **Entrepreneurship in Web3 MOOC - Fall 2022**

- **First university entrepreneurship course for Web3**
- **1600 students online & 150 Berkeley students** <https://web3.startups.org>

- **Decentralized Systems - Fall 2022**

the space in the area of the centralization, decentralization and AI and many other areas.

- To sign up for the course, please fill in [this form](#).
- For more information about the course, please also join [defi-mooc-f22@googlegroups.com](mailto:defi-mooc-f22@googlegroups.com). And stay tuned!
- For general course content related questions, please join our [discord](#).

#### Instructors



Dan Boneh

Stanford



Arthur Gervais  
Imperial College London



Andrew Miller  
UIUC



Christine Parlour  
UC Berkeley



Dawn Song  
UC Berkeley

Berkeley  
UNIVERSITY OF CALIFORNIA

### Entrepreneurship In Web3

MOOC, Fall 2022

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#### Instructors:



Tatjana Gacic  
UC Berkeley



Farshad Farzaneh  
UC Berkeley

Berkeley  
UNIVERSITY OF CALIFORNIA

### Decentralized Systems

CS294/194-196: Special Topics on Science and Technology of Decentralization and Decentralized Intelligence

#### Instructors:



Suman Chanda  
UC Berkeley



Jennifer Davis  
UC Berkeley

**Berkeley**  
UNIVERSITY OF CALIFORNIA

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## Education: MOOCs & Cutting-Edge Topics

- Zero Knowledge Proofs MOOC - Spring 2023
  - Shafi Goldwasser's (Turing award winner)  
**Lecture on Intro & History of ZKP has 36K+ views!**
  - **MOOC 3K+ enrolled & 100K+ views** of lectures & hackathon speakers
  - Included a **ZKP Hackathon - 600 participants from 60+ countries**, 150 teams registered, 31 winning teams across 5 tracks and varying categories
- RDI Certificate
  - **For all students at Berkeley - RDI Certificate in Decentralization & Web3 Technology Innovations**

Courses

### Zero Knowledge Proofs

MOOC, Spring 2023

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- Add to your calendar
- For general course content related questions, please join our discord.
- Check Spam / Promotions to ensure MOOC emails are not missed.

#### Instructors



Dan Boneh



Shafi Goldwasser



Dawn Song



Justin Thaler



Yuqing Zhang

Stanford  
UC Berkeley  
UC Berkeley  
Massachusetts  
University  
of California

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Courses on mediating edge topics

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- Check Spam / Promotions to ensure MOOC emails are not missed.

#### Instructors



Dan Boneh

Stanford



Shafi Goldwasser

UC Berkeley



Dawn Song

UC Berkeley



Justin Thaler

Georgetown University



Yupeng Zhang

Texas A&M University

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Courses on mediating edge topics including for

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#### Instructors



Dan Boneh

Stanford



Shafi Goldwasser

UC Berkeley



Dawn Song

UC Berkeley



Justin Thaler

Georgetown University  
Computer Science Department



Yupeng Zhang

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### Education: MOOCs & Cutting-Edge Topics

- **Responsible GenAI and Decentralized Intelligence - Fall 2023**
  - Foundations of LLMs, infrastructure, tooling, and best practices for building. Explores the risks and challenges, towards a responsible and democratized and decentralized future with AI.
  - ~200 Berkeley student enrolled
- **Understanding LLMs: Foundations & Safety - Spring 2024**
  - Foundations of LLMs, study methods for better understanding LLMs, discuss scaling laws and emergence, and explore the risks and challenges with these technologies and how we can build towards safe and beneficial AI
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- **LLM Agents - Coming Fall 2024**
  - Foundations of LLMs, essential LLM abilities required for task automation, as well as infrastructures for agent development, etc. More info [here](#)

#### CS294/194-196: Responsible GenAI

- Students interested in the course should sign up for the waitlist; if the class is full, please fill in the signup form if and only if you can neither enroll in the class nor join the waitlist, and we will try to get back to you as soon as we can.
- For general course content related questions, please join our edstem.
- Do not email the course staff or TAs. For private matters, post a private question on edstem and make sure it is visible to all teaching staff.

#### Course Staff



Prof. Dawa Songa



Prof. Michael Zillman

UC Berkeley

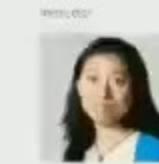
UC Berkeley

#### CS 194/294-267 Understanding Large Language Models: Foundations and Safety

Spring 2024

- Do not email the course staff. For private matters, post a private question on edstem and make sure it is visible to all teaching staff.
- Prospective: Prospective students should have taken CS 183/282A Deep Neural Networks (or its equivalent) and had some hands-on experience with deep learning.
- Prerequisite: Students must first be enrolling in the course through CalCentral. This includes CS 194-267 (or undergraduate equivalent), 547-18, and the class average of CS 194-267 must be greater than or equal to 3.4/4.0. Please join the waitlist if the course is full. Please fill in the enrollment petition form if you are on or closer to the waitlist, so we know if your petition is approved.

#### Course Staff



Jennifer DeRose



Dan Mennillo



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### Education: MOOCs & Cutting-Edge Topics

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CS294/194-196: Responsible GenAI

Berk

Verizon Event ...

- \* Students interested in the course should first try enrolling in the course through CalCentral. The class number for CS194-196 is 32397. The class number for CS294-196 is 32398. Please join the waitlist if the class is full. Please fill in the signup form if and only if you can neither enroll in the class nor join the waitlist, and we will try to get back to you as soon as we can.
- \* For general course content related questions, please join our edstem.
- \* Do not email the course staff or TAs. For private matters, post a private question on edstem and make sure it is visible to all teaching staff.

Course Staff



Prof. Dawn Song

J.C. Berkeley



Prof. Matej Lazarus

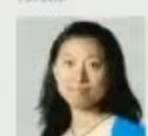
U.C. Berkeley

### CS 194/294-267 Understanding Large Language Models: Foundations and Safety

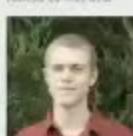
Spring 2024

- \* Do not email the course staff. For private matters, post a private question on edstem and make sure it is visible to all teaching staff.
- \* Prospective: Prospective students should have taken CS 183/282A Deep Neural Networks or its equivalent(s) and had some hands-on experience with deep learning.
- \* Prospective students should first try enrolling in the course through CalCentral. The class number for CS 194-267 (for undergraduate students) is 34198 and the class number of CS 294-267 (for graduate students) is 34167. Please join the waitlist if the course is full. Please fill in the [enrollment petition form](#) if you are on or cannot join the waitlist. We will reach out to you if your petition is approved.

Course Staff



Dawn Song



Dan Hendrycks

Berkeley  
UNIVERSITY OF CALIFORNIA

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### Education: MOOCs & Cutting-Edge Topics

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CS294/194-196: Responsible GenAI



Verizon Event ...

- Students interested in the course should email Prof. Dawn Song. The class number for CS194-196 is 32397. You will receive an email from the waitlist if the class is full. Please fill in the signup form if and only if you can neither enroll in the class nor join the waitlist, and we will try to get back to you as soon as we can.
- For general course content related questions, please join our edstem.
- Do not email the course staff or TAs. For private matters, post a private question on edstem and make sure it is visible to all teaching staff.

Course Staff



Prof. Dawn Song

UC Berkeley



Prof. Matei Zaharia

UC Berkeley

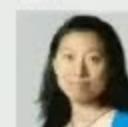
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Spring 2024

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- Prospective students should first try enrolling in the course through CalCentral. The class number for CS 194-267 (for undergraduate students) is 34188 and the class number of CS 294-267 (for graduate students) is 34167. Please join the waitlist if the course is full. Please fill in the enrollment petition form if you are on or cannot join the waitlist. We will reach out to you if your petition is approved.

Course Staff

Instructor



Dawn Song

(Guest) Co-Instructor



Dan Hendrycks

Berkeley  
UNIVERSITY OF CALIFORNIA

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### Education: MOOCs & Cutting-Edge Topics

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CS294/194-196: Responsible GenAI



Verizon Event ...

- \* Students interested in the course should email [cs294-196@berkeley.edu](mailto:cs294-196@berkeley.edu). The class number for CS294-196 is 32337. You can join the waitlist if the class is full. Please fill in the signup form if and only if you can neither enroll in the class nor join the waitlist, and we will try to get back to you as soon as we can.
- \* For general course content related questions, please join our [edstem](#).
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Course Staff



Prof. Dawn Song

UC Berkeley



Prof. Matei Zaharia

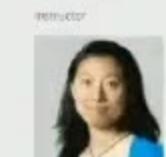
UC Berkeley

### CS 194/294-267 Understanding Large Language Models: Foundations and Safety

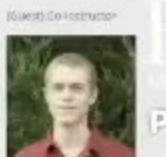
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Course Staff



Dawn Song



Dan Hendrycks



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## Entrepreneurship - A World-leading Berkeley Xcelerator

- Launched in January 2019
- 110 global teams in 7 cohorts, with follow-on funding over \$650M+
- Talent pipeline for teams; opportunities for students
- Non-dilutive - part of our academic mission
- Creates an ecosystem connected with the industry's leading innovators & projects
  - Network of 1K+ blockchain builders from around the world
- [Xcelerator.berkeley.edu](http://Xcelerator.berkeley.edu)



Teams, participating worldwide.



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So please stay tuned.



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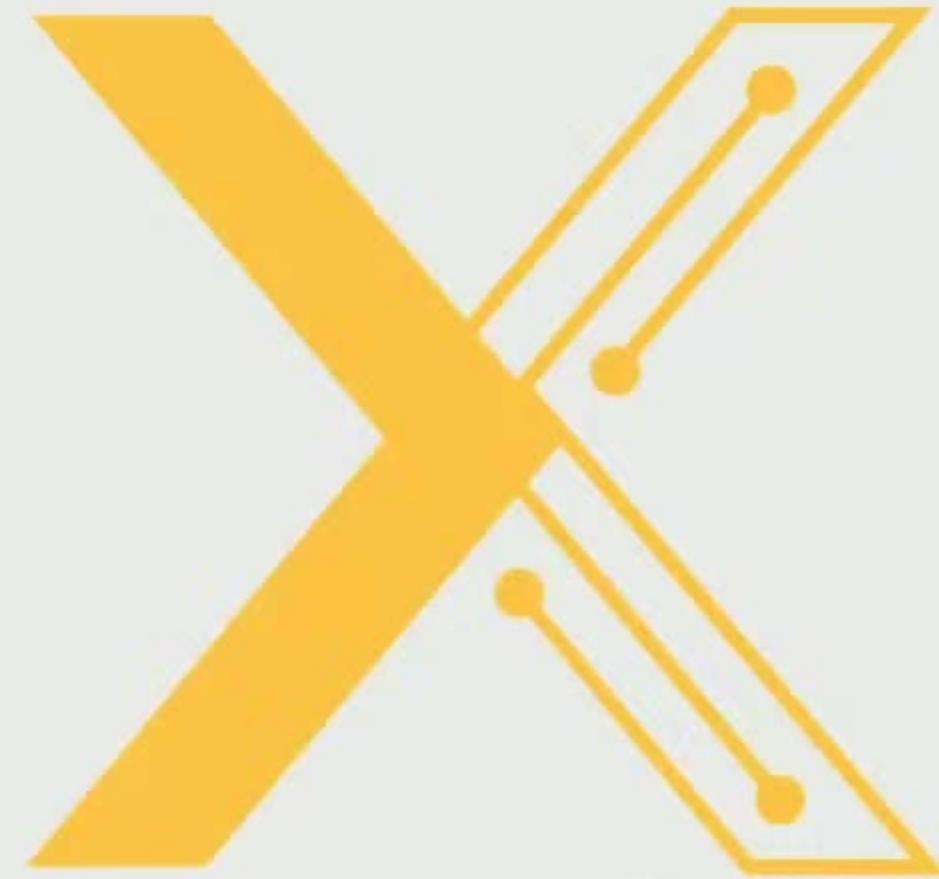


for the center is entrepreneurship and community.



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Justin I mentioned. So she's actually the funding director.



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Accelerator on campus. That's actually help

# Summit Agenda

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- Session I: Open Source AI
- Session II: Foundations of Decentralized AI (I)
- Lunch: Worldcoin Orb Demo
- Session III: Foundations of Decentralized AI (II)
- Session IV: Research Spotlight
- Break
- Session V: DeAI in the Field: Data, Infrastructure and Agents
- Session VI: Future of Decentralized AI and Innovators Showcase
- Worldcoin Orb Demo, Reception and Researcher Poster session

Full Agenda



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26

WiFi: Register to use the Cornell-Visitor network.

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is an associate professor at Cornell Tech, and a researcher

with [huggingface](#).

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So please join me in welcoming Sasha.



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Full Agenda



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## Summit Agenda

Berkeley

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  - Lunch: Worldcoin Orb Demo
  - Session III: Foundations of DeAI (II) **Sasha Rush**
  - Session IV: Research Spotlight [youtube.com/@srush\\_nlp](https://youtube.com/@srush_nlp)
  - Break
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- So please join me in welcoming Sasha.
- rdi.berkeley.edu
- Hosted By Berkeley Center for Responsible Computing and Intelligence
- Summit on Responsible Decentralized Intelligence  
Future of Decentralization and AI Innovators  
August 6, 2024, New York City
- WiFi: Register to use the Cornell-Visitor network.

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Verizon Event ...

# LMs Inside Out

Sasha Rush

[youtube.com/@srush\\_nlp](https://youtube.com/@srush_nlp)



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