



**THE OHIO STATE UNIVERSITY**

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# Unlocking the Potential of Artificial Intelligence

Swathi Vallabhajosyula & Hari Subramoni

Central Ohio's One-day Hackathon For High Schoolers

18<sup>th</sup> November '23



<http://icicle.ai>



**ICICLE**  
DEMOCRATIZING AI

AI INSTITUTE FOR  
INTELLIGENT CYBERINFRASTRUCTURE  
WITH COMPUTATIONAL  
LEARNING IN THE ENVIRONMENT (ICICLE)



## Hari Subramoni

Assistant Professor  
The Ohio State University



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Ph.D Student,  
The Ohio State University



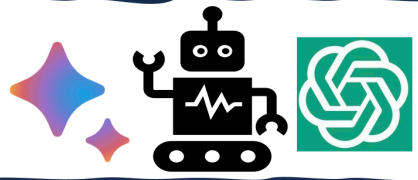
Write an essay on "Alien Invasion"

....

Can you solve for "X"?

Tell me a "Fall" joke.

....



How can AI help farmers with field scouting and detecting crop stress using drones?



How can AI-powered camera traps assist in detecting poachers and alerting park rangers?



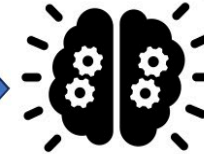
Digital Agriculture



Animal Ecology



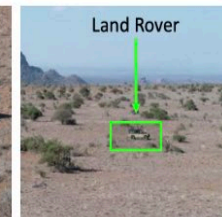
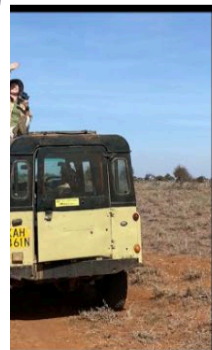
Process data & act



Clouds



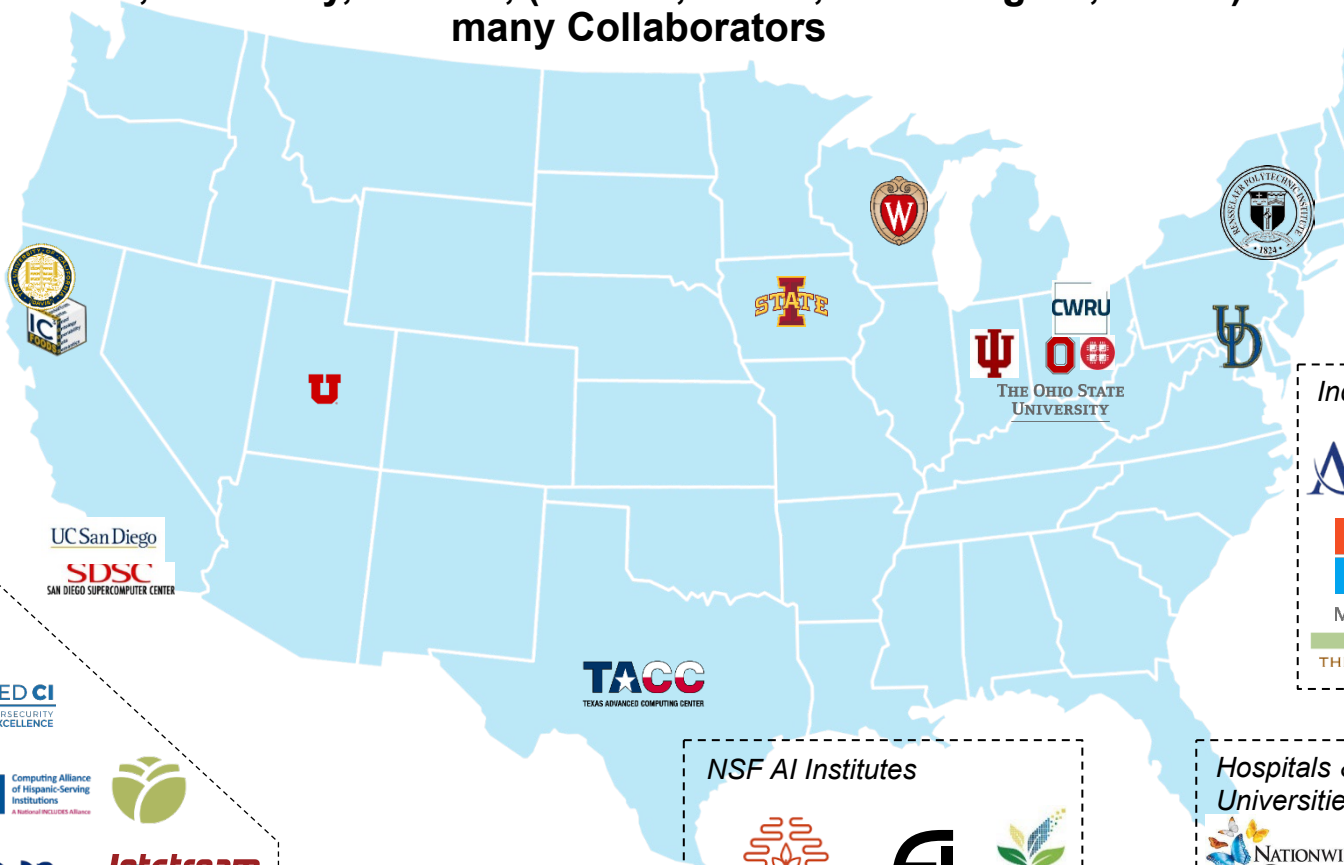
HPC Systems & Data Centers





# Collaboration

Participation:  
14 Organizations, 33 faculty, 41 staff, (58 PhD, 16 MS, 16 undergrad, 6 K-12) students & many Collaborators



**Govt. Agencies & National Labs**

**International**

**Research Institutes**

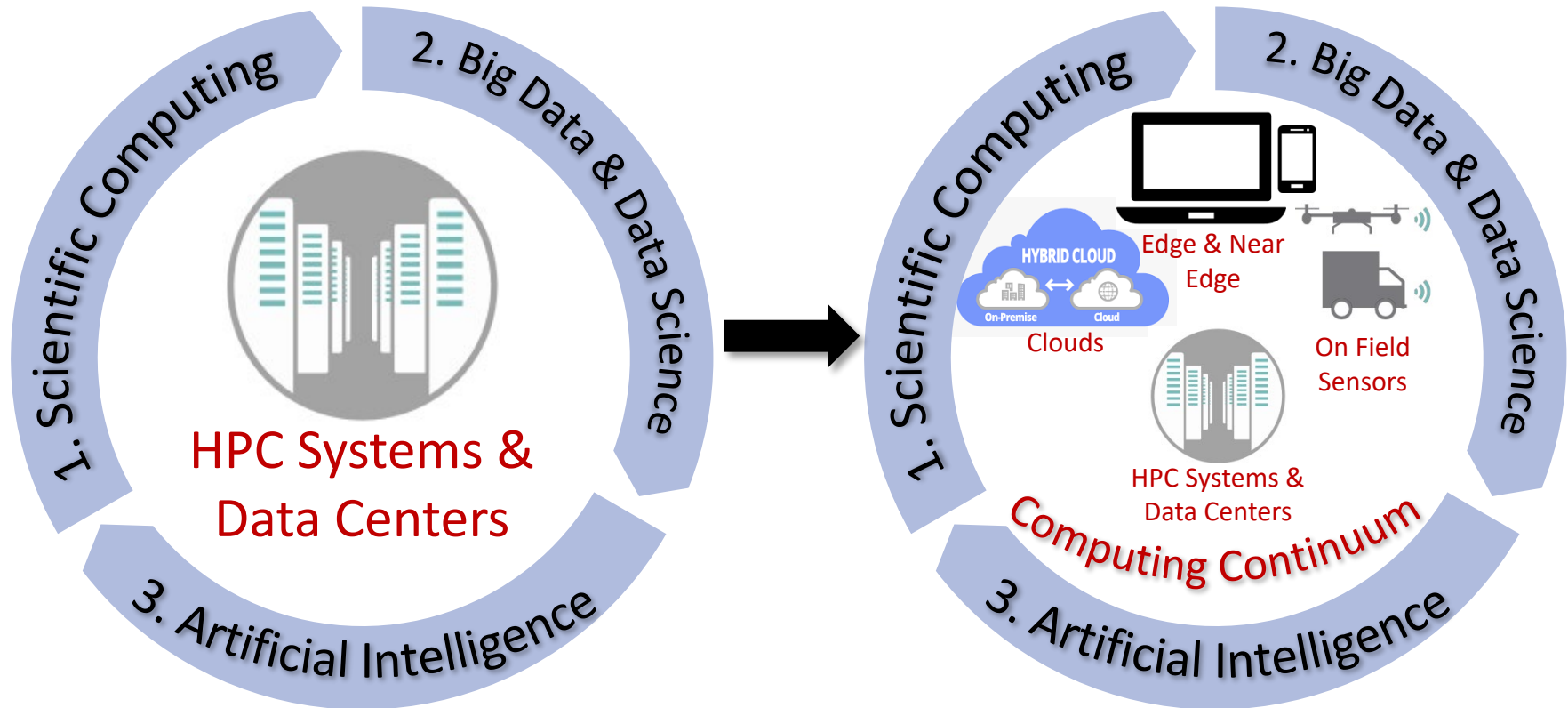
**Industry**

**NSF AI Institutes**

**Hospitals & Universities**



## Emergence of the Computing Continuum





# Societal Challenge (Example #1): Agriculture

## Food security/sustainability in 2050

9.8B people, climate; 0.5x arable land per cap vs 1985

Wide gains in crop management needed (typical yields fall 3X below best practice)

## Sustainable agricultural workforce

The next generation of agriculture professionals will include engineers, computer scientists, data scientists

## Democratization of digital agriculture capabilities

Autonomous unmanned aerial vehicles, self-driving tractors and sprayers, fertilizer and seed recommendations

Big and small farms, staple and specialty crops, underrepresented communities

Privacy and ethical considerations

### What Can we achieve?

- Cyberinfrastructure for fully autonomous aerial systems

- Simplify deployment of unmanned aerial vehicles (UAV) in real fields to capture common crop health conditions

## Aerial Crop Scouting

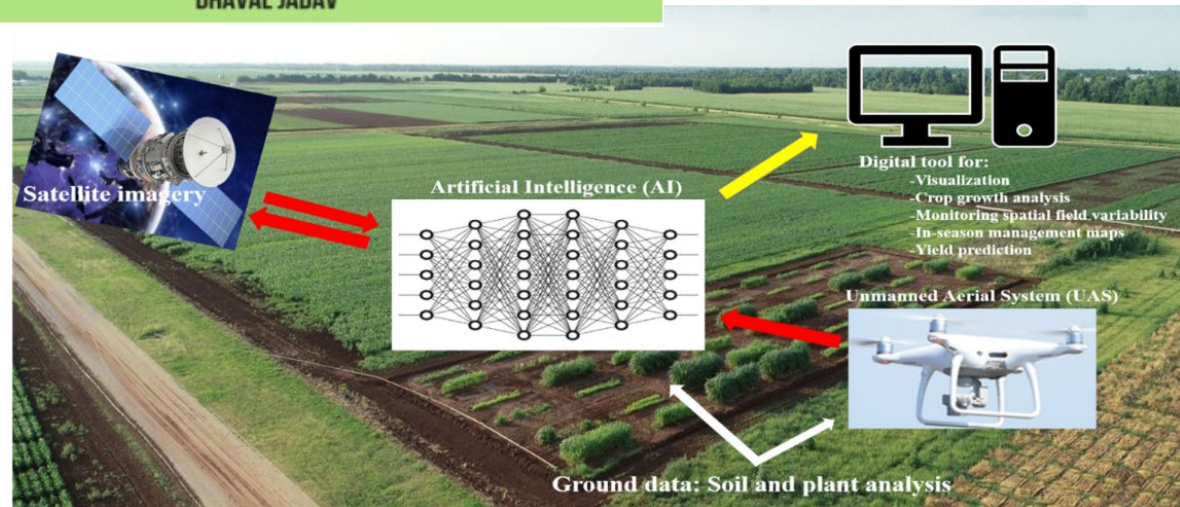




# ARTIFICIAL INTELLIGENCE IN AGRICULTURE

DHAVAL JADAV

## AI-Driven Digital Agriculture





# IN THE COUNTRY

Pause (k)



17:54 / 20:24



HD



Farm Journal Broadcast on AgDay 07/29/22

<https://www.youtube.com/watch?v=Iwnc18d3LZ0> ( from: 18:00)





## Societal Challenge (Example #2): Animal Ecology

**Basic science:** The focus of Animal Ecology is understanding the functioning and behavior of animals individually and in groups *in the context of environment* and evolution.

**Science + translational:**

Monitoring, understanding, and protecting biodiversity of the planet

Monitoring and understanding the impact of changing habitats on animals that live in them

**Translational:** biodiversity conservation and mitigating the impact of climate change





## Demo

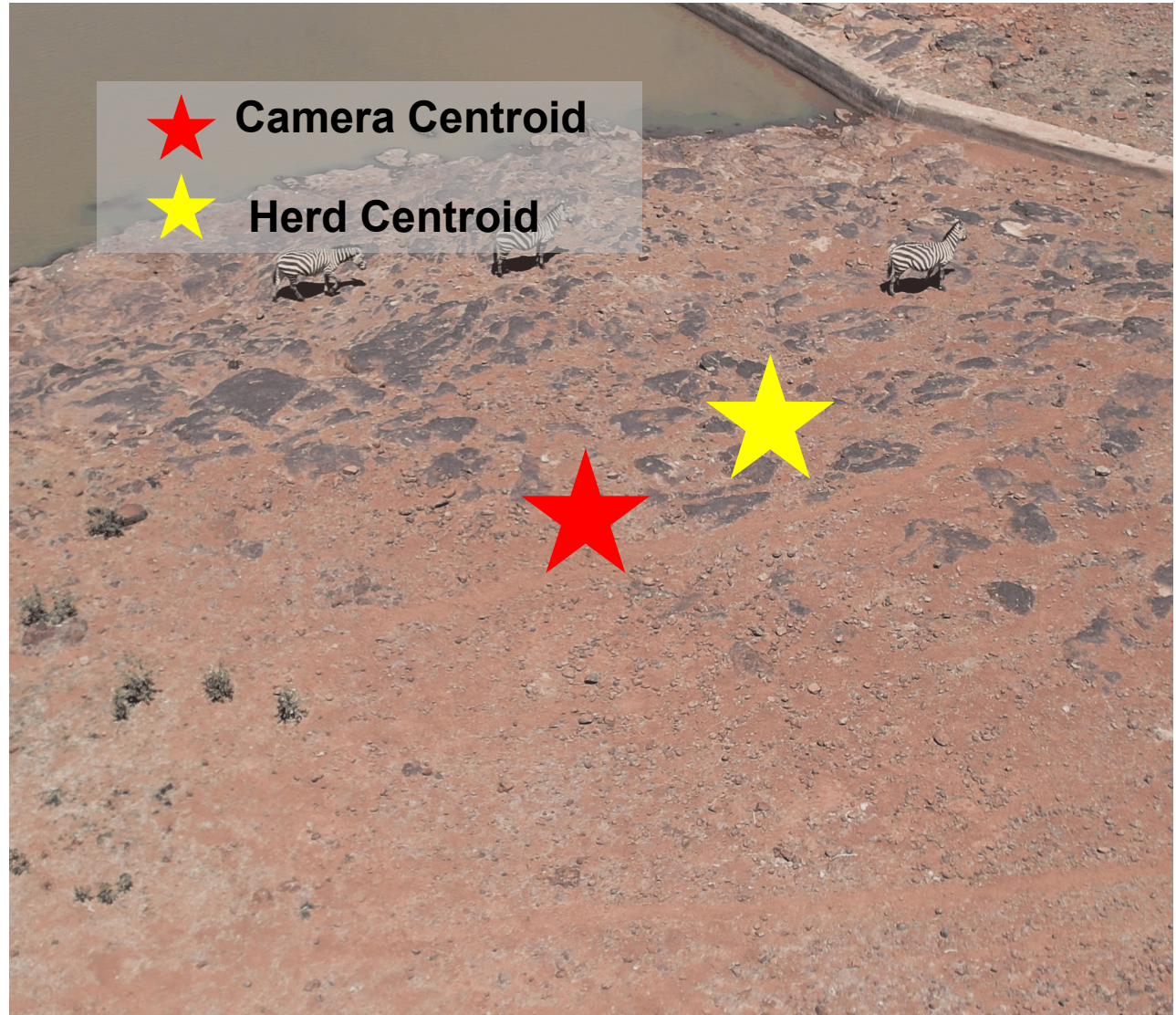
Autonomous navigation  
policy for sUAS

A Framework for Autonomic  
Computing for In Situ  
Imageomics



**Jenna Kline**

Graduate Research  
Assistant, Ph.D. Student





# That ONE Story: Sahil Samar



Software Developer @ San Diego  
Supercomputer Center's REHS program  
and ICICLE  
Del Norte High School

Now: Freshmen @ Georgia Institute of  
Technology  
BSCS, Computer Science

*“Discovering ICICLE through the REHS program, I collaborated with Dr. Mary Thomas on Jupyter Notebooks and developed ICICONSOLE. The experience provided my first exposure to official software testing, release, and conferences. ICICLE paved the way for early career insights, teamwork, and High-Performance Computing exposure, shaping my college internship readiness.”*



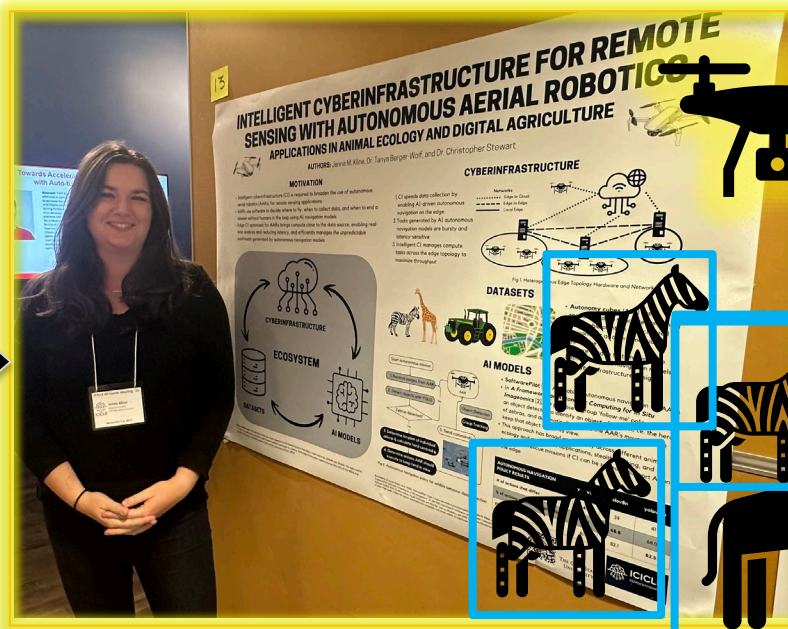
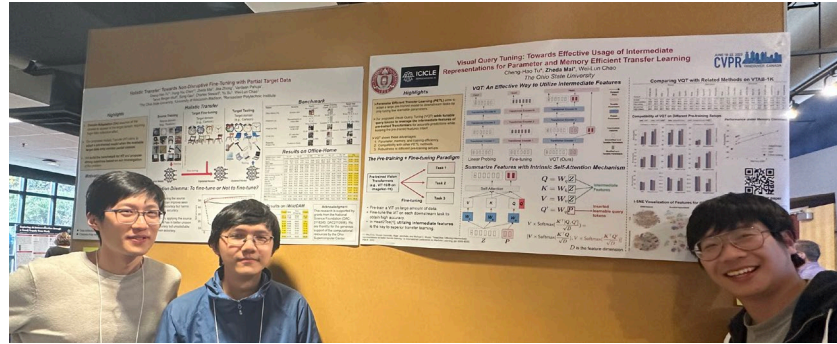
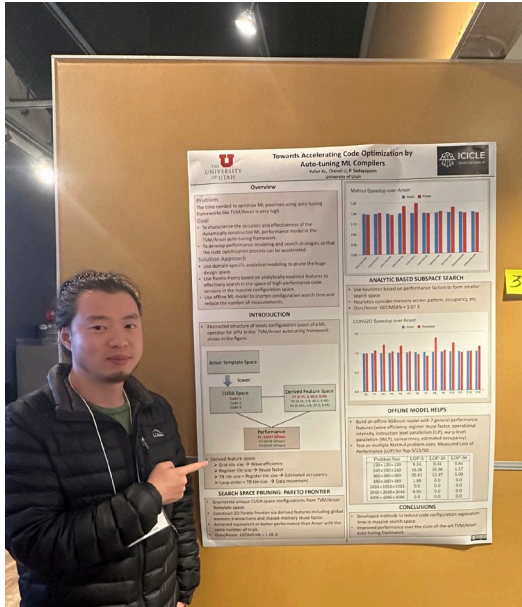
# *That ONE more: NextGens – Students within ICICLE*



ICICLE NextGens (Michael Ray[K-12], Sahil Samar[K-12], Swathi Vallabhajosyula [grad], Pouya Kousha[Grad]) @PEARC23 with Dr. Mary Thomas and Dr. Beth Plale.

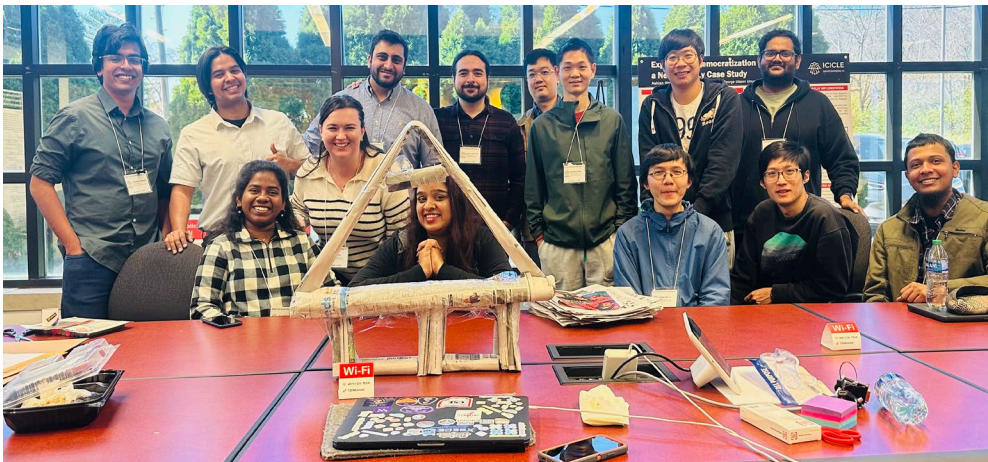


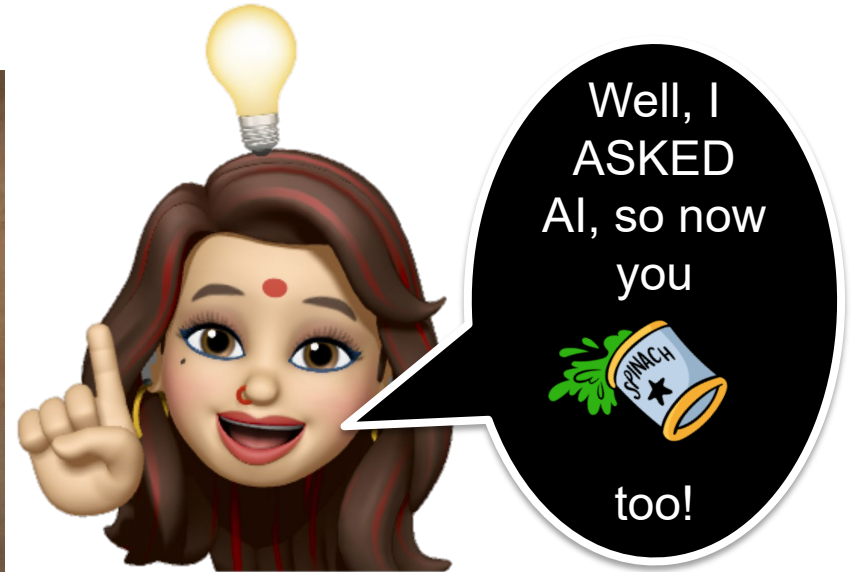
# That ONE more: NextGens – Students within ICICLE



# DEMO

# *That ONE more:* NextGens – Students within ICICLE





<https://www.bing.com/images/feed?form=Z9LH>

<https://firefly.adobe.com/inspire/images>





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DEMOCRATIZING AI

# DEMO TIME!



Steer Low and Enjoy!



Scan the QR code for the website and more



<http://icicle.ai>

<https://icicle.osu.edu/education-and-outreach>

More info in flyers.

