



# CSCI 15: AN INTRODUCTION TO THE MODERN INTERNET

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Lecture 8b: Crowdsourcing and Human Computation

# THE WISDOM OF THE CROWD

- [https://www.youtube.com/watch?list=PL11E70446D4EC2C65&v=iOucwX7Z1HU&feature=emb\\_logo](https://www.youtube.com/watch?list=PL11E70446D4EC2C65&v=iOucwX7Z1HU&feature=emb_logo)
- When can we use this?
- How can we use this?

# HUMAN EXPERTS ARE VERY GOOD AT VERY HARD PROBLEMS

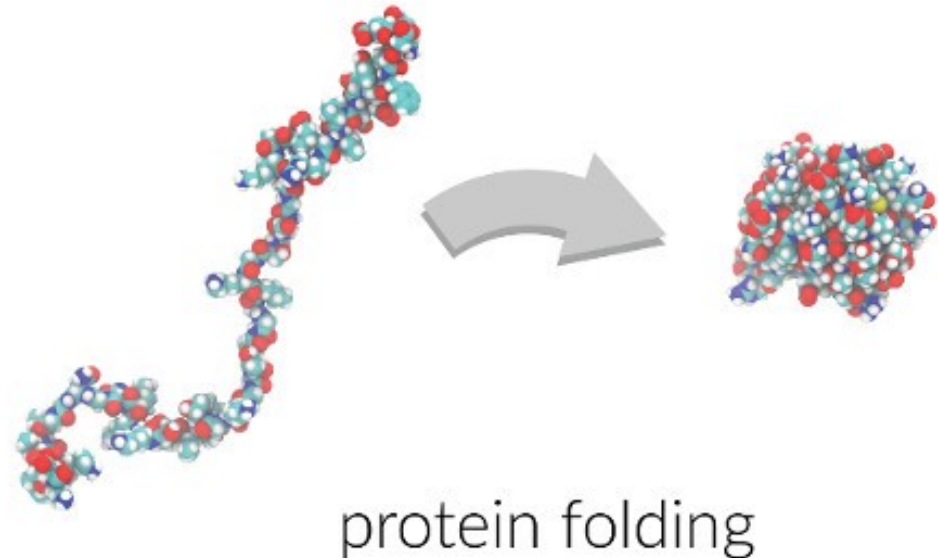


# IDEA

- Games with a purpose
- Have people play difficult games that solve important problems

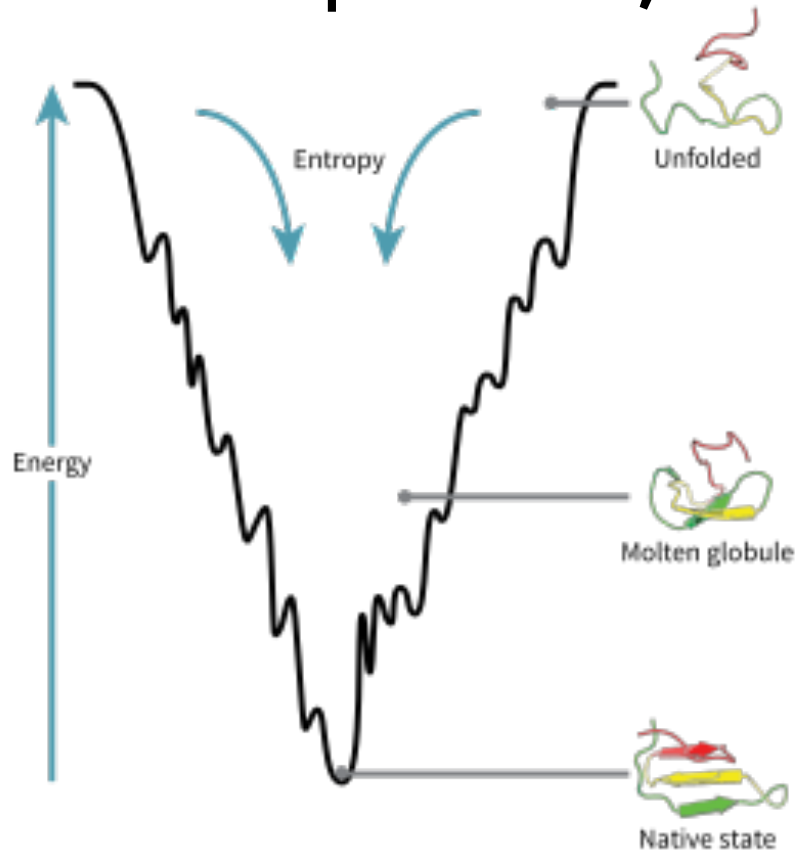
# FOLDIT

- Problem: given the makeup of a protein, how does it fold?
  - Shape determines function
  - Massively important to biology



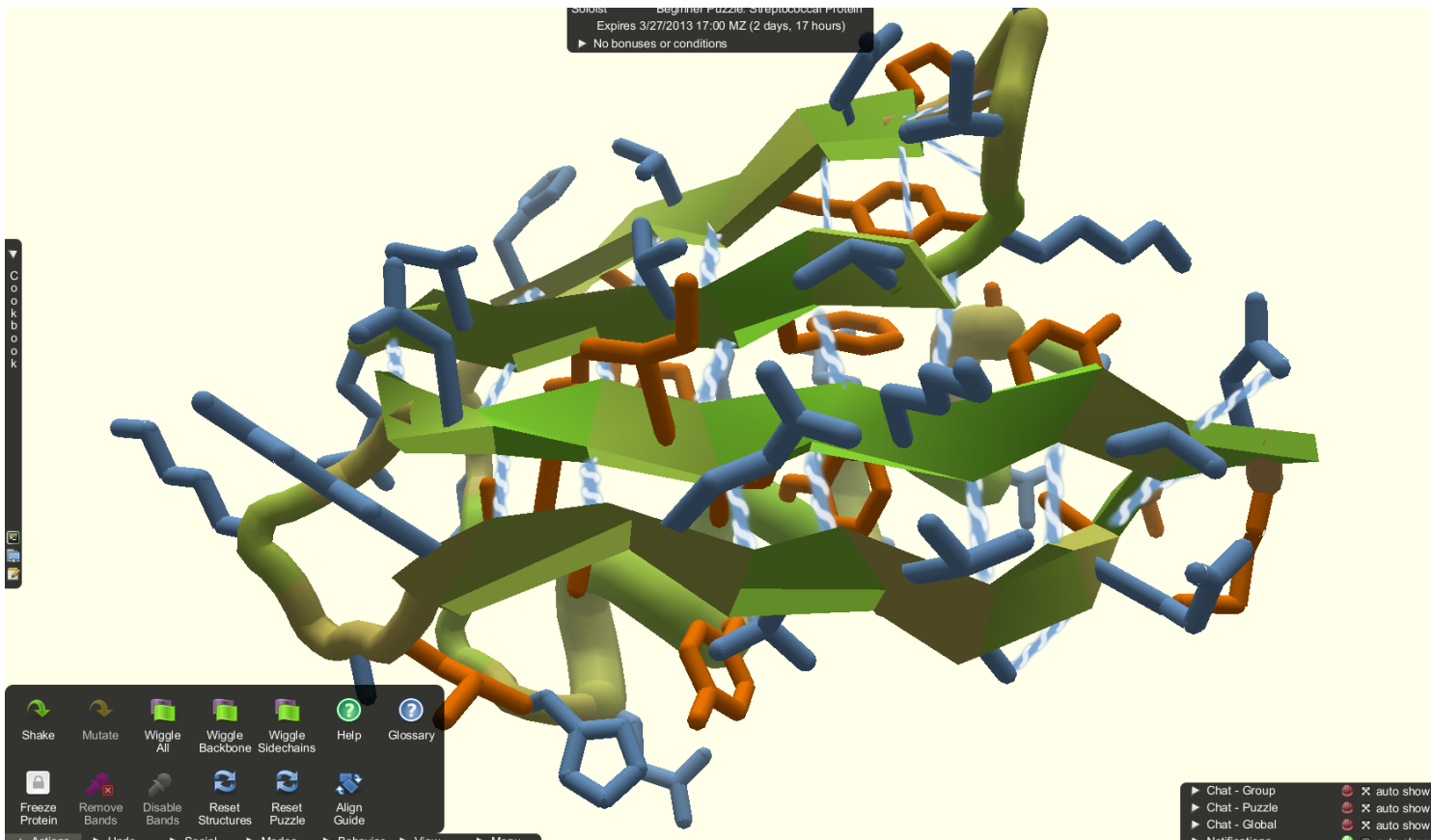
# PROTEIN FOLDING

- Hard problem, but we know when we get it right



5	3			7				
6			1	9	5			
	9	8					6	
8				6				3
4			8		3			1
7				2				6
	6					2	8	
			4	1	9			5
				8			7	9

5	3	4	6	7	8	9	1	2
6	7	2	1	9	5	3	4	8
1	9	8	3	4	2	5	6	7
8	5	9	7	6	1	4	2	3
4	2	6	8	5	3	7	9	1
7	1	3	9	2	4	8	5	6
9	6	1	5	3	7	2	8	4
2	8	7	4	1	9	6	3	5
3	4	5	2	8	6	1	7	9



FOLDIT

- Protein folding game
- Score based on quality of solution!

# FOLDIT: SUCCESS

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TECH

## Foldit Gamers Solve Riddle of HIV Enzyme within 3 Weeks

The online game poses protein-folding puzzles, and participants provided insights recently that solved the structure of an enzyme involved in reproduction of HIV

By Michael J. Coren, Fast Company on September 20, 2011



When video gamers armed with the world's most powerful supercomputers take on science and its most vexing riddles, who wins? Sometimes, it's the gamers.

Humans retain an edge over computers when complex problems require intuition and leaps of insight rather than brute calculation. Savvy programmers and researchers at the University of Washington have tapped into this human "supercomputer" with Foldit, an online game that poses complex puzzles about how proteins fold, one of the hardest and most expensive problems in biology today

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THE SCIENCES

Foldit Online Protein Puzzle

May 5, 2011

TECH

Protein Computer Games: Me Fold Pretty One Day

October 14, 2008 — Jeffrey M. Perkel

HEALTH



# ZOONIVERSE

- Massive portal with many projects
- People can contribute their time/analysis
- Also can contribute computation

# ZOONIVERSE



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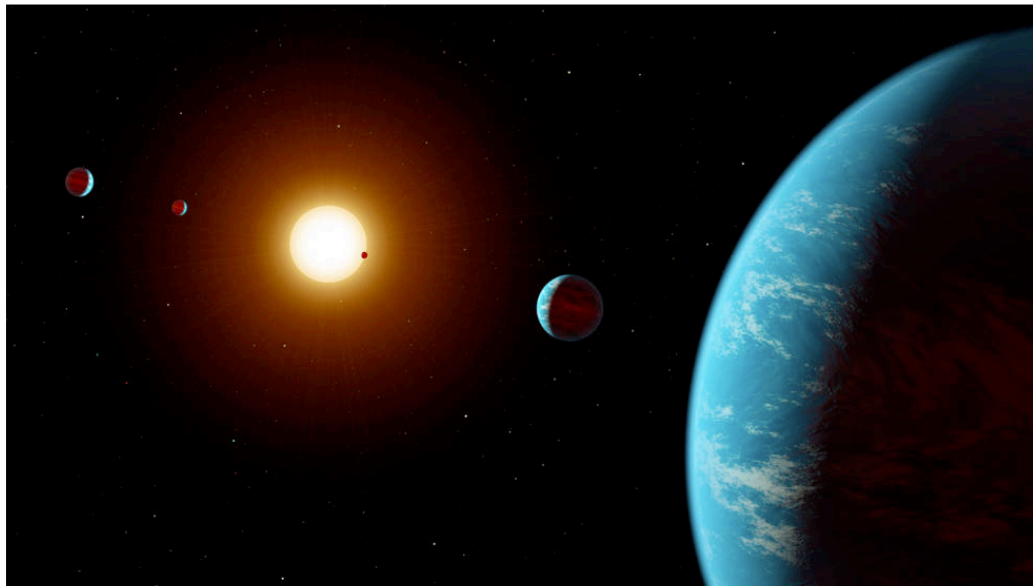
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Kepler and K2

Jan. 11, 2018

## Multi-planet System Found Through Crowdsourcing



This artist concept shows K2-138, the first multi-planet system discovered by citizen scientists.  
Credits: NASA/JPL-Caltech  
[Full image and caption](#)

A system of at least five exoplanets has been discovered by citizen scientists through a project called Exoplanet Explorers, part of the online platform

Forbes

Billionaires | Innovation | Leadership | Money | Business | Small Business

1,558 views | Jul 20, 2019, 06:34am

## You (Yes, You) Can Help Scientists Identify Wildlife In South Sudan



Christine Ro Contributor @ Science

I write about science and international development (broadly defined).

TWEET THIS

like Tinder with a dash of biological education

- Citizen science is more popular than ever before. The idea of couch-bound folks and others contributing to labor-intensive science projects is appealing to science enthusiasts and cash-strapped

QUARTZ

CLOUD COMPUTING

## British scientists have turned to crowdsourcing to better understand climate change

By Adam Rasmi • April 26, 2019



# HARNESSING HUMAN COMPUTATION



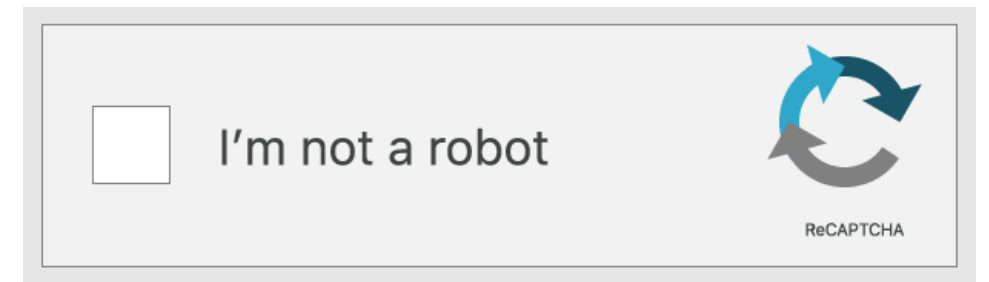
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# CAPTCHA: RECENT DEVELOPMENTS

- Why do you see this less often?



- How does this one work?



# CAPTCHA: RECENT DEVELOPMENT

- What's this for?
- Why humans?

Select all squares with street signs.

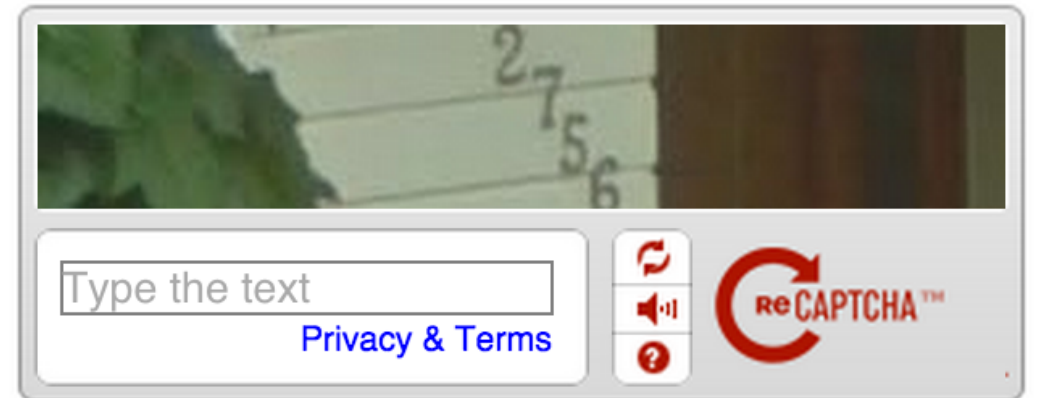
If there are none, click skip.



SKIP

# CAPTCHA: RECENT DEVELOPMENTS

- What's this for?
- Why humans?



# DUOLINGO?

- It's been 10 years
- 300 million users, 35 languages from English alone
- Success?

# DUOLINGO: CROWDSOURCING

- Translating the internet didn't work out
  - Why?
- More traditional business model
  - Pay for more advanced app
  - Ads



# DUOLINGO: EFFECTIVENESS?

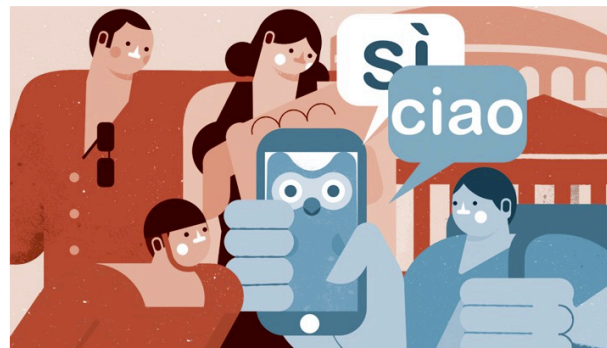
- In short: controversial

TECHNOLOGY

## How to Almost Learn Italian

Language apps like Duolingo are addictive—but not particularly effective.

DAVID H. FREEDMAN DECEMBER 2018 ISSUE



TIAGO GALO

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How Learning a Foreign Language Reignited My Imagination

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The App That Reminds You You're Going to Die

BIANCA BOSKER



LATE ONE CHILLY evening last September, I excused myself from a small group huddled around a campfire to peck at and mumble into my phone.

No way was a camping trip going to make me miss my Italian lesson.

# MECHANICAL TURK

- <https://www.youtube.com/watch?v=Pjm1uYbuyk4>
- Problems with this idea?
- When is it effective?

# PETE BUTTIGIEG'S CAMPAIGN USED NOTORIOUSLY LOW-PAYING GIG-WORK PLATFORM FOR POLLING

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Ryan Grim, Akela Lacy

January 16 2020, 10:17 a.m.

**THE PRESIDENTIAL CAMPAIGN** of former South Bend, Indiana, Mayor Pete Buttigieg spent [\\$20,000](#) over the summer hiring gig workers through the platform Amazon Mechanical Turk, or MTurk, one of the most controversial actors in the gig-working space. Studies have found gig workers at the company are paid far below minimum wage, even though many on the platform work full-time.

The Buttigieg campaign contracted with MTurk for “polling” in August and September, according to Federal Election Commission [records](#). MTurk allows a job requester to post the type of task they want completed and a price they’ll pay for it (the site allows payments as low as 1 cent). It is unclear from the FEC records how much the campaign paid per survey. A campaign spokesperson said they took steps to ensure participants were paid above the minimum wage for surveys that lasted 2-3 minutes, but would not specify how much the participants were paid.

The campaign’s use of an exploitative platform like MTurk is in sharp contrast with the way Buttigieg has cast himself as a pro-worker candidate. He has been outspoken about the need for labor protections for those in

# WHEN IS HUMAN COMPUTATION EFFECTIVE?

- Wisdom of the crowd
- Tasks that require cleverness
- When the “answer” is a human answer

Not always positive:

- When you don't want to pay much

29TH JANUARY 2019 1:28PM

SOCIAL MEDIA AND ONLINE

# MIT study finds crowdsourcing effective in fighting fake news



With a study published in Science last year revealing that false stories are 70% more likely to be retweeted on Twitter than true ones, fake news, and its rapid distribution via social media, is an ever-growing problem for news outlets.

After being widely criticised for their role in the spread of [fake news](#), some social media outlets are looking for solutions to tackle the problem. However, current methods for fighting misinformation have not been very effective.

Solutions such as partnering with fact-checkers isn't scalable because they can't keep up with the rapid creation of false stories (although some companies are trialing the use of AI for this purpose) and putting warnings on content found to be false can be counterproductive, because it makes misleading stories that didn't

Ellen Daniel

Ellen is a Verdict staff writer and reporter. You can reach her at [ellen.daniel@verdict.co.uk](mailto:ellen.daniel@verdict.co.uk)



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