

# **Systemic Racism & Future-Ready Technologies**

How to ensure educational technology  
does not contribute to techno-racism

**Dr. Camille Rutherford**  
Brock University

# Techno-Racism

“Techno-racism describes a phenomenon in which the racism experienced by people of color is encoded in the technical systems used in our everyday lives”

~ [Mutale Nkonde](#),  
[AI For the People](#), a nonprofit that educates Black communities about artificial intelligence and social justice.

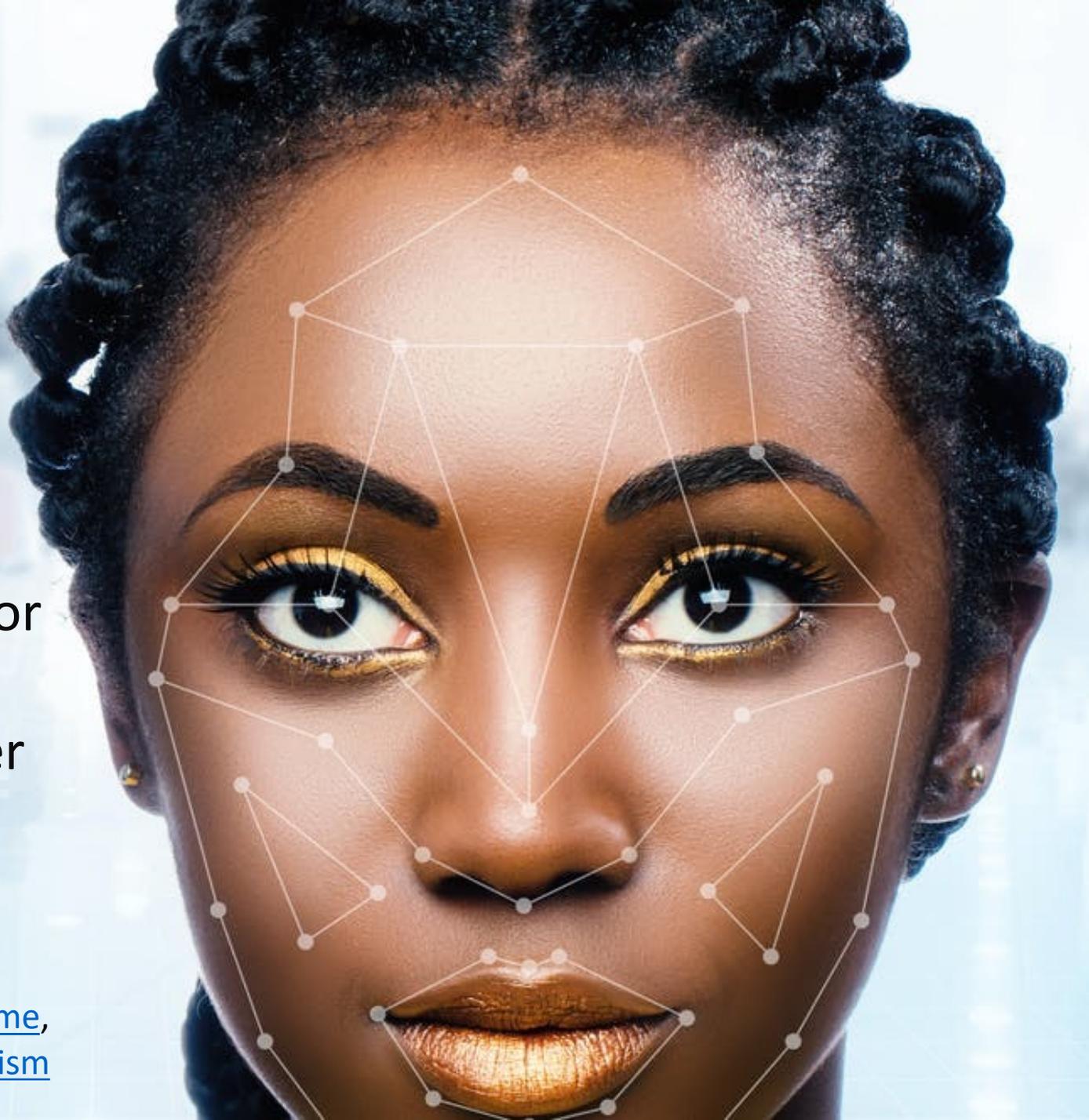


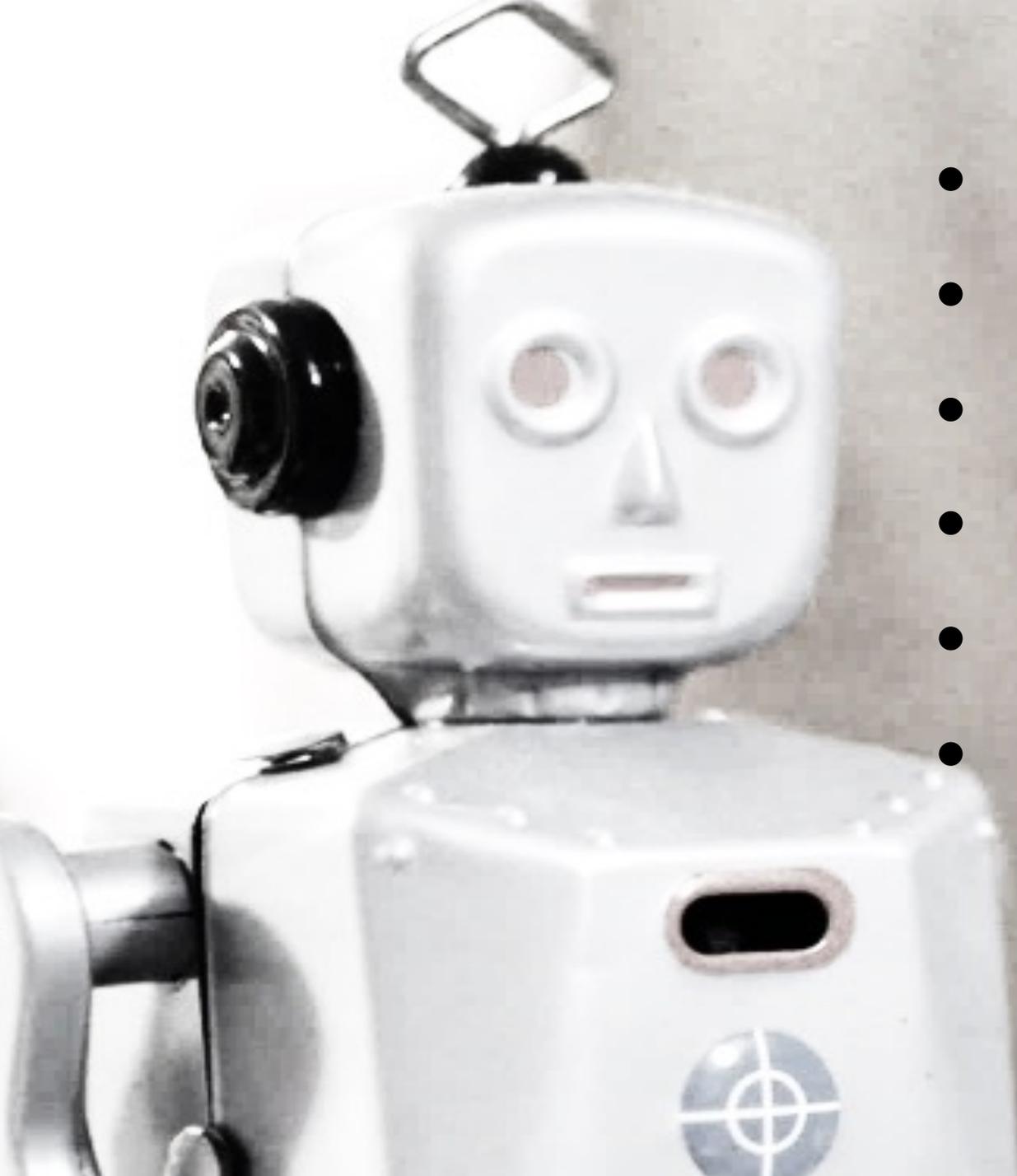
# Techno-Racism

“Even when tech developers and users do not intend for tech to discriminate, it often does so anyway. Technology is not neutral or objective. It is fundamentally shaped by the racial, ethnic, gender and other inequalities prevalent in society, and typically makes these inequalities worse.”

~ [Dr. Tendayi Achiume](#),

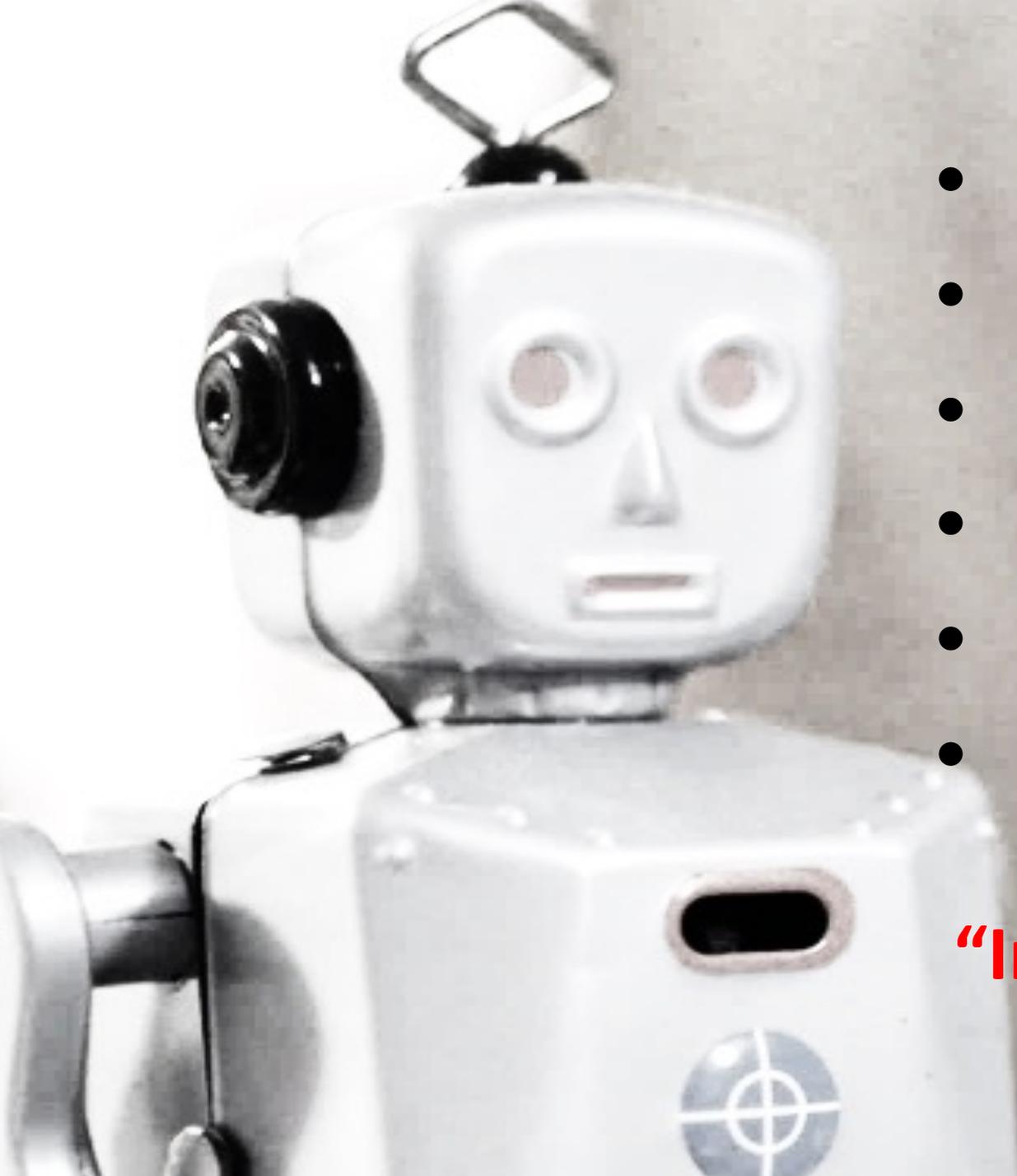
[UN Special Rapporteur on contemporary forms of racism](#)





# Agenda

- VR /AR/360 video
- Blockchain
- Predictive Analytics
- IoT (Internet of Things)
- AI (Artificial Intelligence)
- Bots



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**“Information is power only if you know what to do with it.”**

~ Unknown

**What are the implications of this technology for your work?**

Who profits from the use of this tool?

Is this tool accessible & inclusive?

Strengths?

Weaknesses?

How much bandwidth is required?

Who created this tool? Was the development process inclusive?

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Benefits?

Challenges?



**Virtual Reality - VR**



**Augmented Reality - AR**



**Mixed Reality**



**360 Video**



**Virtual Reality - VR**



**Augmented Reality - AR**



**Mixed Reality**



**360 Video**





"The less diversity there is in a workplace environment, the more likely major design flaws will be present that only affect people of color."

[Rochester Institute of Technology \(2019\). Bigotry Encoded: Racial Bias in Technology](#)





## [Google VR Field Trips](#)

UBC  
MET

# Anti-Asian Racism Education through Virtual Reality

## UBC MET: Anti-Asian Racism: Roots, Im...

Google Earth, Google Expedition, Google Cardboard to explore Asian culture, heritage, and peoples

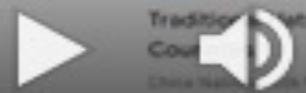
Watch later

Share



MORE VIDEOS

Full screen (f)



57:30 / 1:24:33



YouTube



Google VR Expedition: Asian Pacific American Cultures – [Dr. Cary Wu](#)

2022-01-20 17:02:43



**Stanford University – VR Empathy Lab**  
**[Becoming Homeless Experiments](#)**



Stanford University – [Virtual Human Interaction Lab](#)



**Virtual Reality - VR**



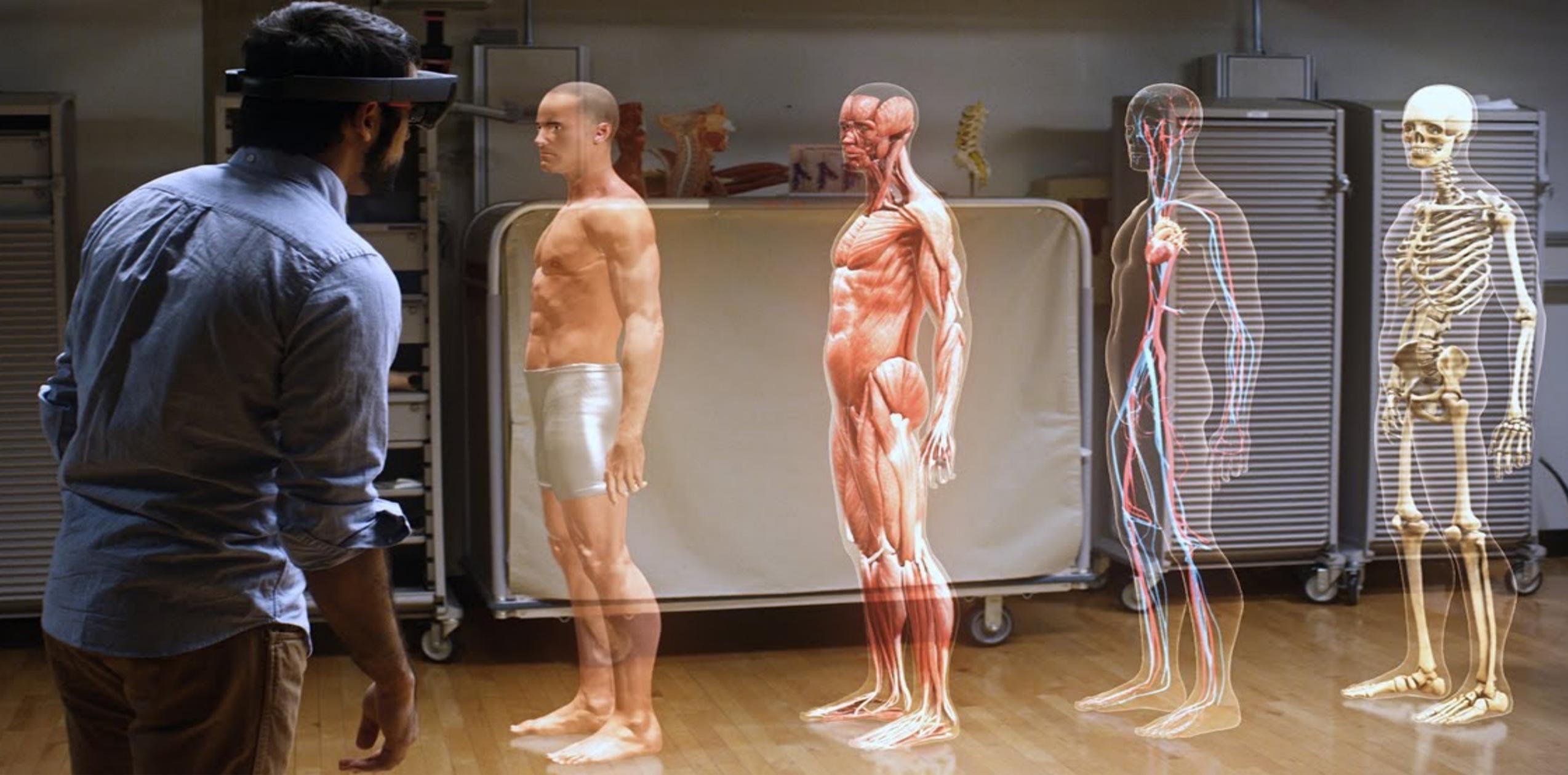
**Augmented Reality - AR**



**Mixed Reality**



**360 Video**



**Microsoft HoloLens: Transforming Medical Education - Human Anatomy**



## Microsoft HoloLens: Mixed Reality in the Workplace



## Microsoft HoloLens: [Remote Assist](#)



## Military AR Use



**Virtual Reality - VR**



**Augmented Reality - AR**



**Mixed Reality**



**360 Video**







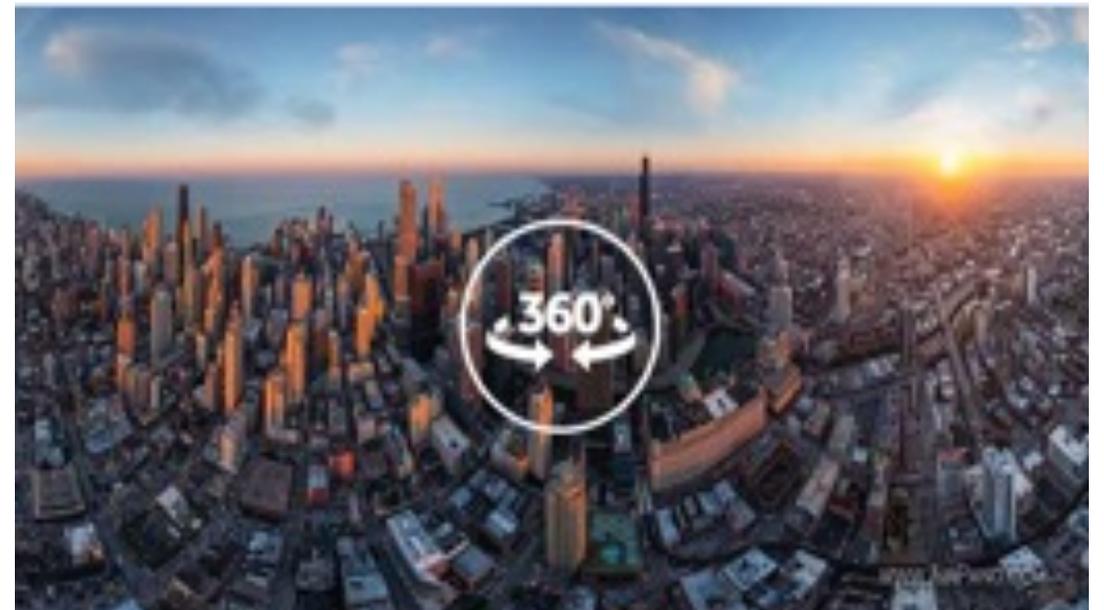
**Virtual Reality - VR**



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**Mixed Reality**



**360 Video**

The New York Times Magazine

# THE DISPLACED



[New York Times: The Displaced](#)



**New York Times: The Displaced – [360 video](#)**



[Heart Valve Operation: 360 video](#)

# VR, AR, 360 in the Classroom: Benefits & Challenges

Immersive  
Active  
Simulates Real Life

Isolating  
Costly Equipment  
Motion Sickness



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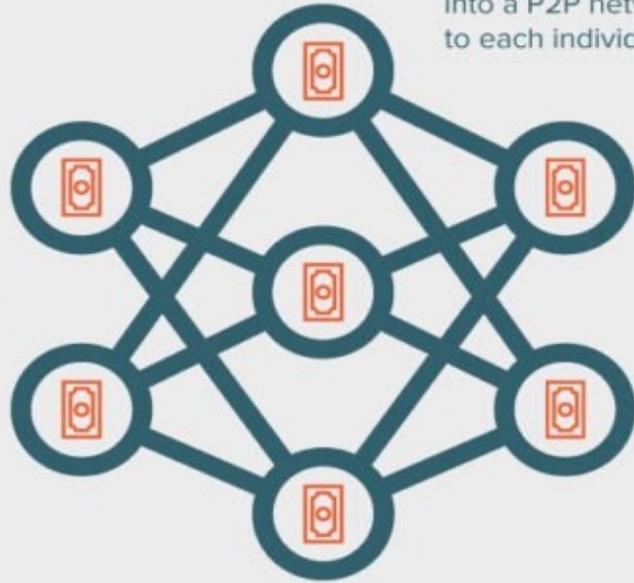
Benefits?

Challenges?



# HOW DOES BLOCKCHAIN WORK?

One party requests a transaction.



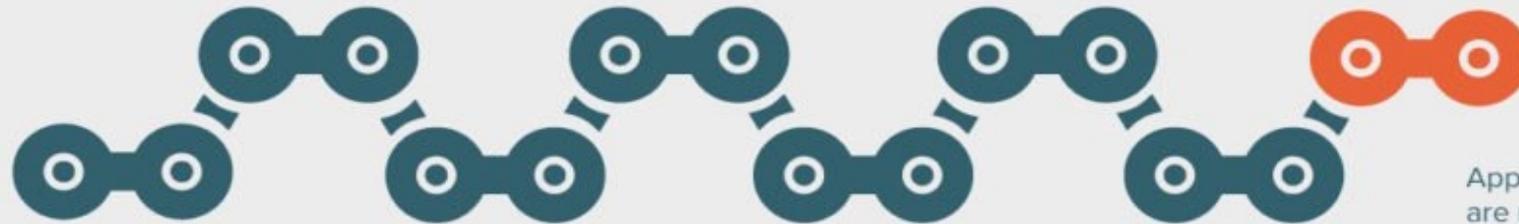
Requested transactions are funneled into a P2P network and broadcast to each individual computer (or node).



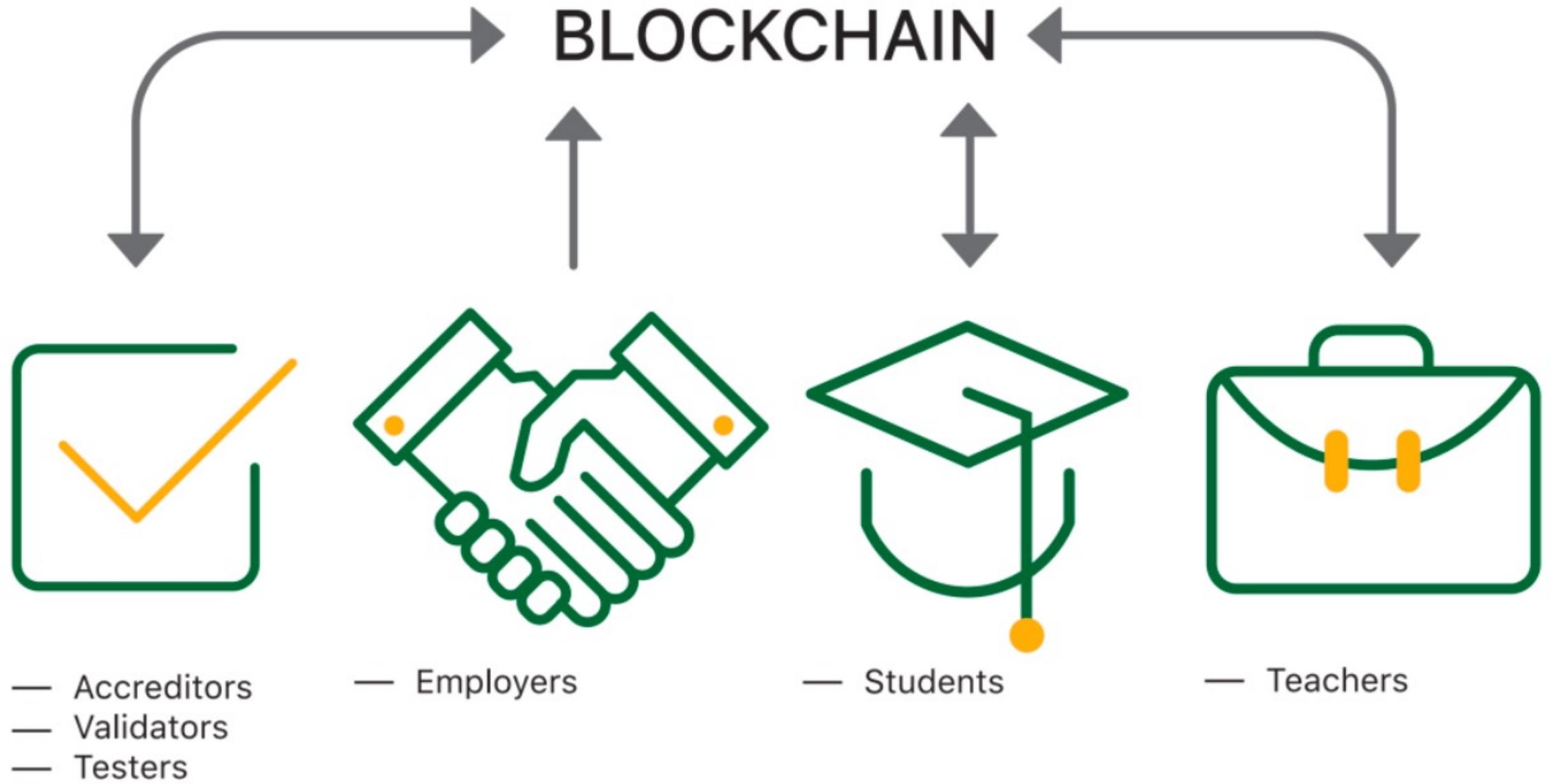
Individual nodes receive the request and validate the transaction using an algorithm.



Once the block is added to an existing chain, transactions are complete and permanent.



Approved transactions are represented as blocks and added to a public ledger.

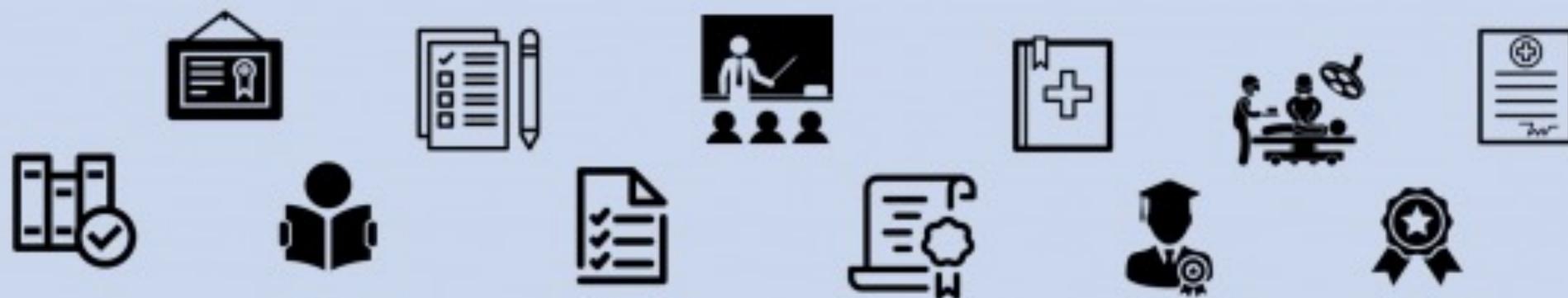


## [Blockchain in Education](#)

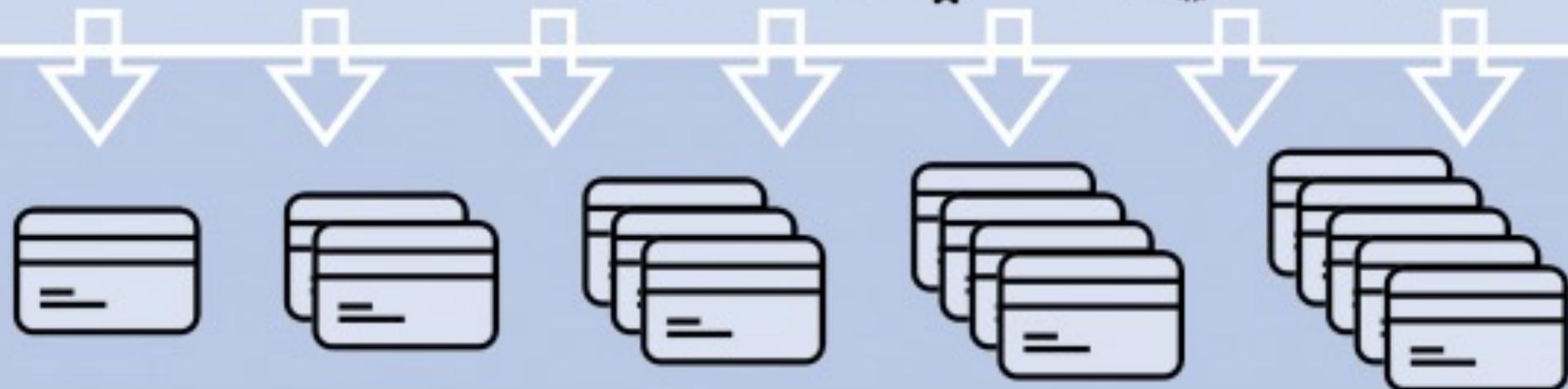
## Educational Journey



## Educational Milestones



## Education Credentials Blockchain





In partnership with Ethiopia's [Ministry of Education](#), will create a blockchain-based digital identity for 5 million students and teachers. This is the biggest blockchain deployment anywhere in the world. Using [Cardano](#) with [Atala PRISM](#), this technology will create a national attainment recording system; to verify grades, monitor school performance, and boost nationwide education.



[A 2018 report from LongHash found that 14.5 percent of staff in blockchain startups were women across all staff positions](#)

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**IoT = Internet of Things**







[The Internet of Things for Education: A New Actor on the Stage](#)



# ELIOT

EDUCATORS' & LEARNERS' INTERNET OF THINGS

[Educause: The Internet of Things for Educators and Learners](#)

# COVID Surveillance





*Joy Buolamwini*

## [TED Talk: How I'm fighting bias in algorithms](#)

Joy Buolamwini, the poet of code, is a graduate researcher at the Massachusetts Institute of Technology who researches algorithmic bias in computer vision systems. She founded the [Algorithmic Justice League](#) to create a world with more ethical and inclusive technology. Her [TED Talk on algorithmic bias](#) has more than one million views. Her [MIT thesis](#) methodology uncovered large racial and gender bias in AI services from companies like [Microsoft](#), [IBM](#) and [Amazon](#). Her research has been covered in over 40 countries, and she has championed the need for algorithmic justice at the World Economic Forum and the United Nations.

*Certain AI programmes for facial analysis display gender and racial bias, demonstrating low errors for determining the gender of lighter-skinned men but high errors in determining gender for darker-skinned women. ([Buolamwini & Gebru, 2018](#)).*



# Facial Recognition Bias

[ACLU \(2020\). How is Face Recognition Surveillance Technology Racist?](#)

[Harvard University \(2020\). Racial Discrimination in Face Recognition Technology](#)



# Facial Recognition Bias

UBC MET (2022). [Pervasive Racism and the 2SLGBTQIA+ Community](#)

Forbes (2020). [New Research Reveals Facial Recognition Software Misclassifies Transgender, Non-Binary People](#)



[\*New York Times. \(2015\)  
Online Test-Takers Feel Anti-Cheating Software's Uneasy Glare\*](#)

[\*MIT Technology Review \(2020\). Software that monitors students during tests perpetuates inequality and violates their privacy\*](#)

[\*Vice \(2021\) Proctorio Is Using Racist Algorithms to Detect Faces\*](#)

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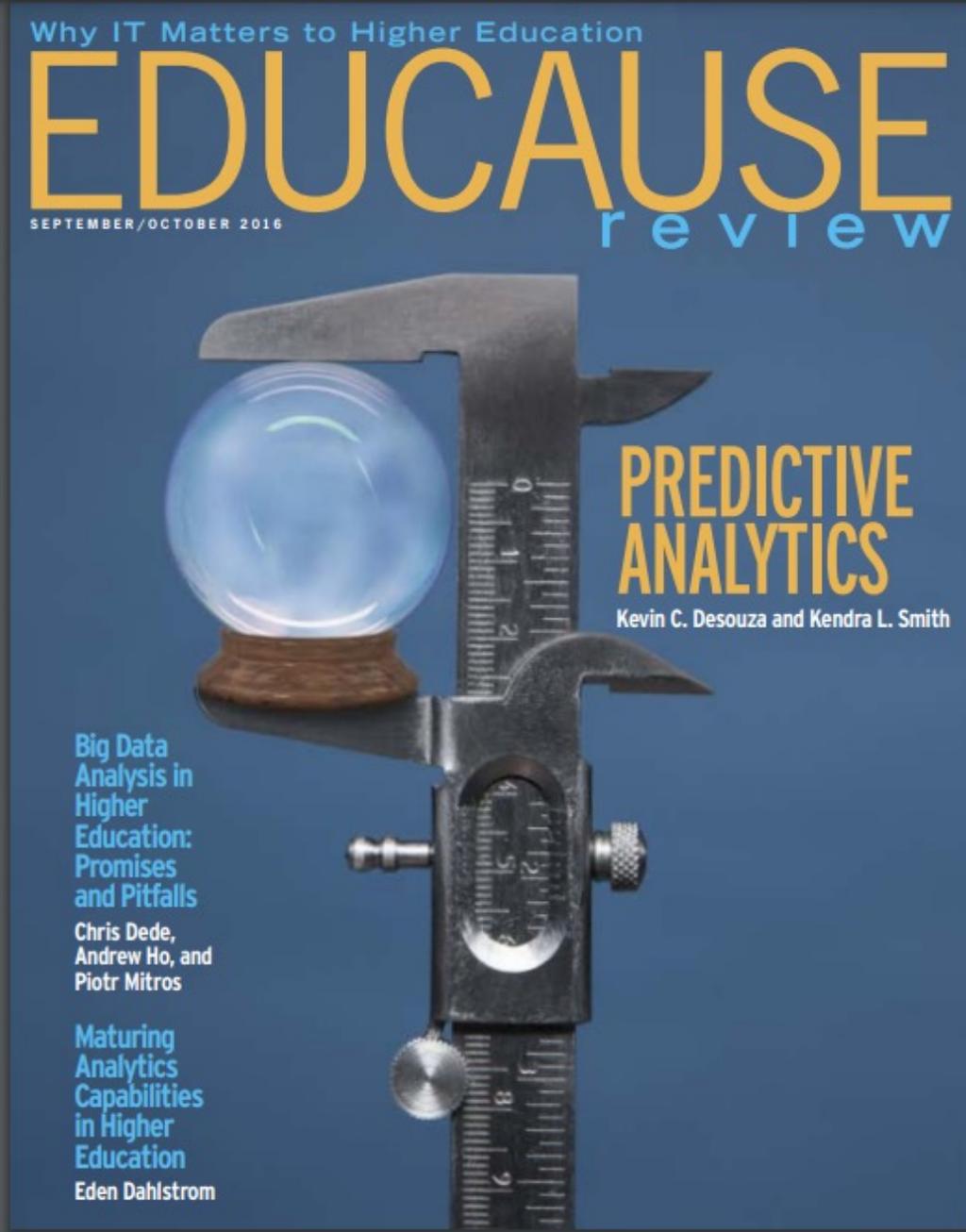
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# IoT + Predictive Analytics



## IBM Predictive Analytics for Education: Empower your institution to make the best decision every time

*Predictive analytics bridges the gap between data analysis, predictive insights and improved outcomes, empowering educators and administrators to be smarter about leveraging data to improve the student lifecycle and reach institutional objectives.*

- *Who are the applicants that will be successful at your institution and what is the probability that they will matriculate?*
- *Which students are at risk of not advancing to the next level and what interventions are most likely to help each student get back on track?*
- *What is our projected enrollment for the next five years, and do we have the capacity to support future growth?*
- *What programs should be implemented to ensure student and institutional success?*



**BEST  
COLLEGES**

**U.S. News** & WORLD REPORT

**RANKINGS**

**#2 MOST  
INNOVATIVE  
UNIVERSITY**

**#3 COMMITMENT TO  
UNDERGRADUATE  
TEACHING**

*We proved students from all backgrounds can succeed at the same levels.*

*Georgia State is a national model for student success. Over the past decade, the university has **increased our graduation rate by 23 points**. We're **graduating 2,800 more students a year** than just five years ago and we've reduced the time to degree by half a semester, saving students \$18 million a year. We've **eliminated achievement gaps based on race, ethnicity or income**.*

[GSU Student Success Centre](#)



Colleges are using big data to track students in an effort to boost graduation rates, but it comes at a cost

*Critics question if predictive analytics at college invades privacy and reinforces racial inequities ([Hechinger Report, 2019](#)).*

- *Many students didn't know Georgia State was using predictive analytics to measure their risk of dropping out.*
- *The algorithms can unintentionally target black and Latino students because they're hunting for patterns of dropping out of college, such as low grades and missed assignments. Black and Latino students might have more of these dings in their records than white students. And they could disproportionately be flagged as high risk.*
- *At the University of Arizona, a professor looked back at the ID card swipes of first-year students when they were new on campus. The ID records included when students entered classroom buildings, returned to the dorm at night, checked out library books or bought a coffee. A machine learning algorithm detected patterns of social engagement on campus and matched them to those who dropped out. The professor could predict with 85 to 90 percent accuracy who would drop out based on their first few weeks of activity on campus.*
- *Predictive analytics in higher education has grown into a **\$500 million market** with more than 30 for-profit companies selling tools to colleges*



## Dutch scandal serves as a warning for Europe over risks of using algorithms

The Dutch tax authority ruined thousands of lives after using an algorithm to spot suspected benefits fraud — and critics say there is little stopping it from happening again.

Authorities penalized families over a mere suspicion of fraud based on the system's risk indicators. Tens of thousands of families — often with lower incomes or belonging to ethnic minorities — were pushed into poverty because of exorbitant debts to the tax agency. Some victims committed suicide. More than a thousand children were taken into foster care.

An audit showed that the tax authorities focused on people with “a non-Western appearance,” while having Turkish or Moroccan nationality was a particular focus. Being on the blacklist also led to a higher risk score in the child care benefits system.

<https://www.politico.eu/article/dutch-scandal-serves-as-a-warning-for-europe-over-risks-of-using-algorithms/>

# Residential Schools & Inter-generational Trauma



**INDOCTRINATION**

**STRIP IDENTITY**

**SAVAGENESS**

**INFERIORITY**

**NON HUMAN BEINGS ....**

**WHAT WERE WE TAUGHT IN SCHOOL?**

**TAKE THE INDIAN OUT OF THE INDIAN**

Importance of learning and leading with compassion!

**JUSTICE MURRAY SINCLAIR**  
**Ph.D “why didn’t I know this”?**

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# Artificial Intelligence & Bots

[Forbes \(2017\). Everything You Need To Know About Sophia, The World's First Robot Citizen](#)

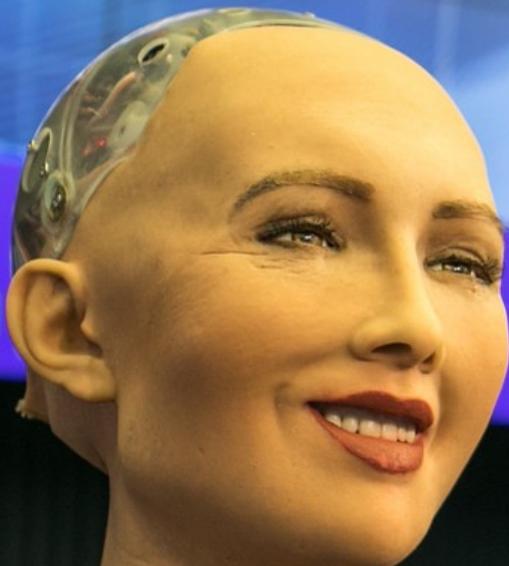


# AI for GOOD GLOBAL SUMMIT

Hosted at IIU in Geneva  
7-9 June 2017

>>

>> Enhancing





**AI for Learning**

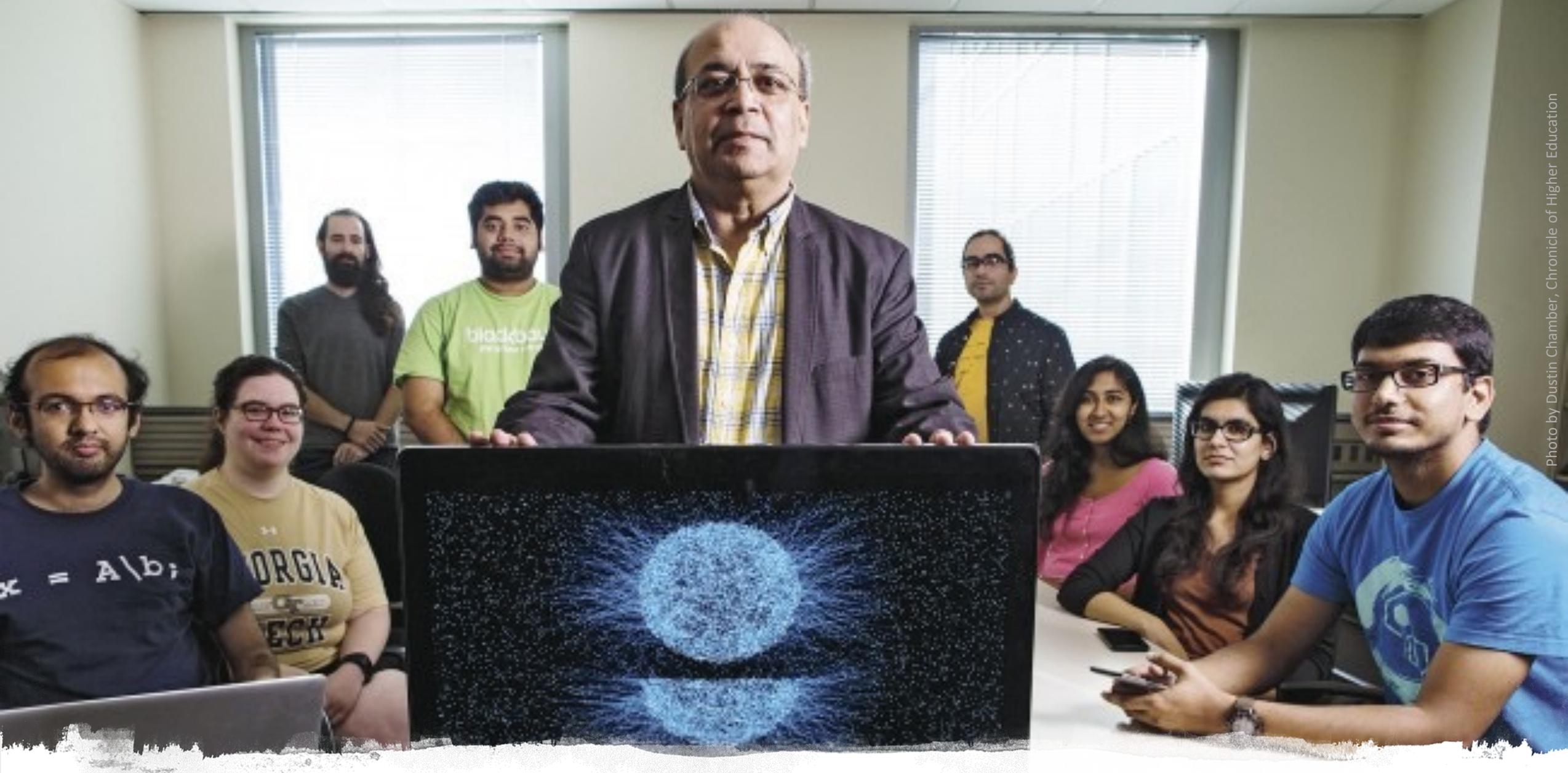
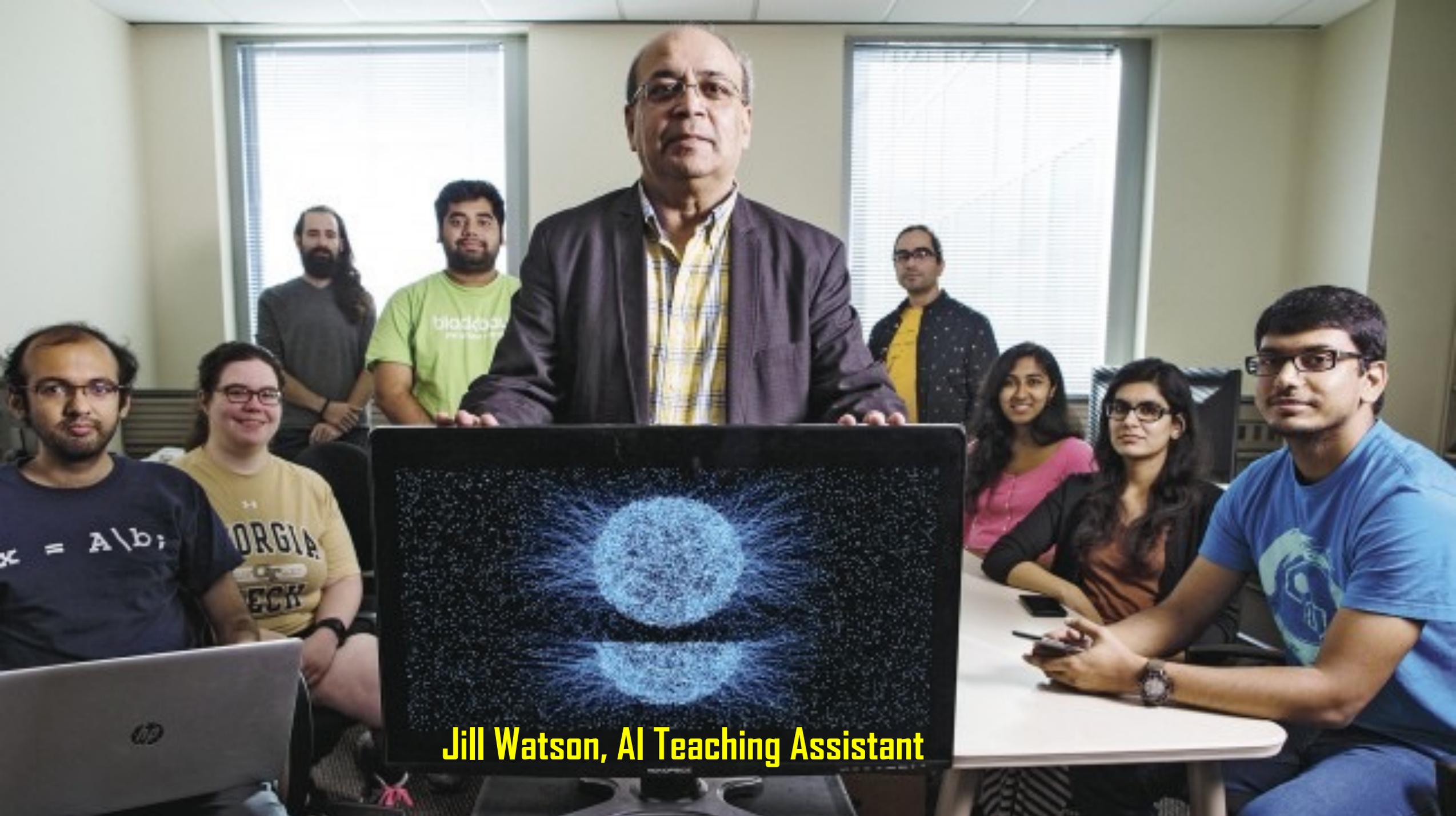
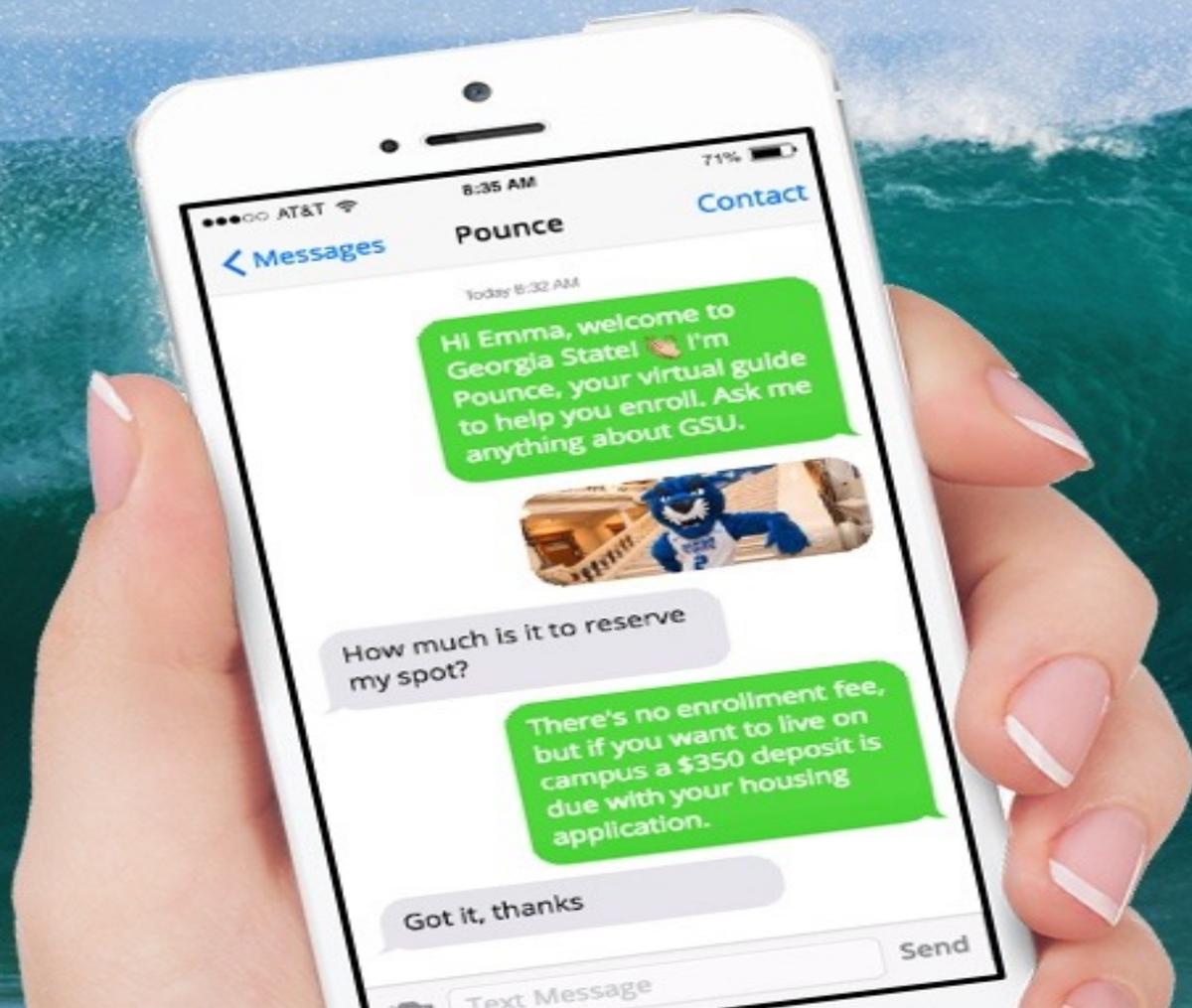


Photo by Dustin Chamber, Chronicle of Higher Education

Georgia Tech Professor, Dr. Ashok Goel with his [teaching assistants](#)



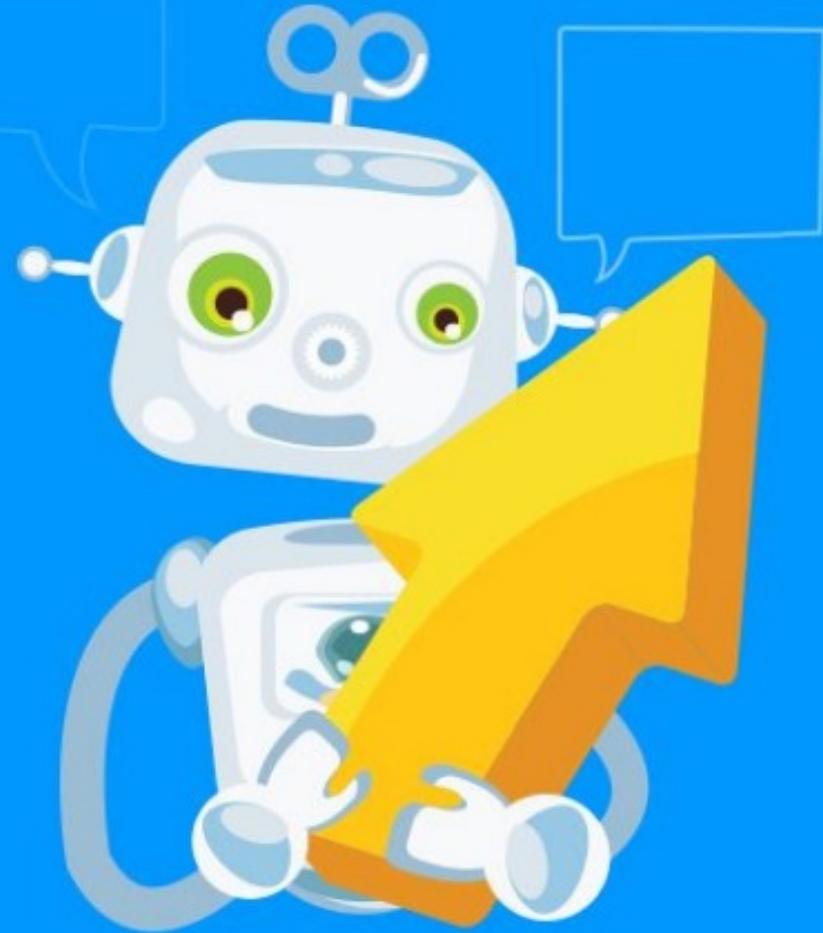
**Jill Watson, AI Teaching Assistant**



## GSU Chatbot

Research involving a Georgia State University course using a chatbot to keep students connected showed improved grades and retention rates.

# How To Make A Chatbot From Scratch?



<https://medium.com/hackernoon/how-to-make-a-chatbot-from-scratch-fc3d95243b03>

**WARNING**

**How To Make  
A Chatbot From  
Scratch?**



**Garbage in  
Garbage OUT**



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# Can technology be racist?

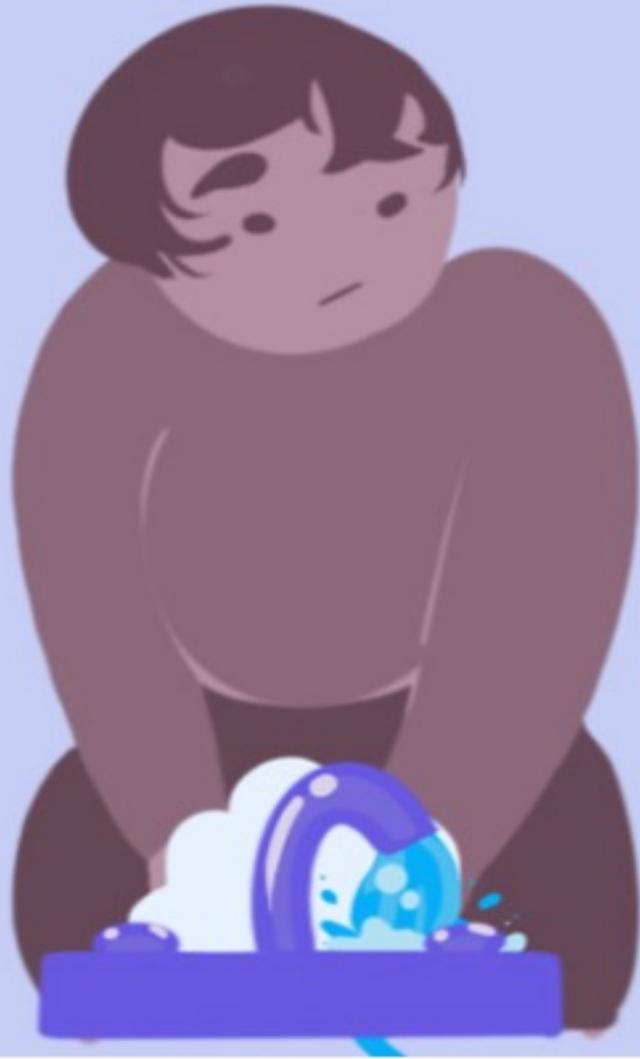


illustration by Aria Dines

[Rochester Institute of Technology \(2019\). Bigotry Encoded: Racial Bias in Technology](#)

**Can technology  
be racist?  
Absolutely, if we  
allow it to be.**

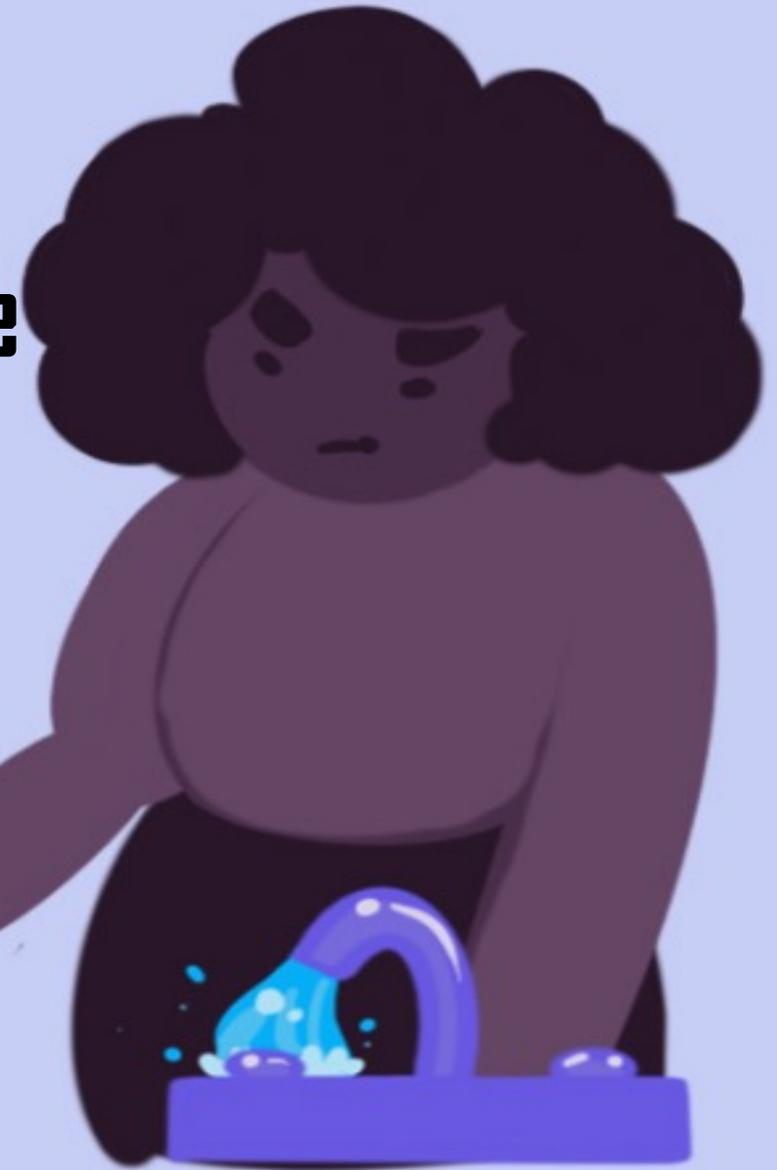
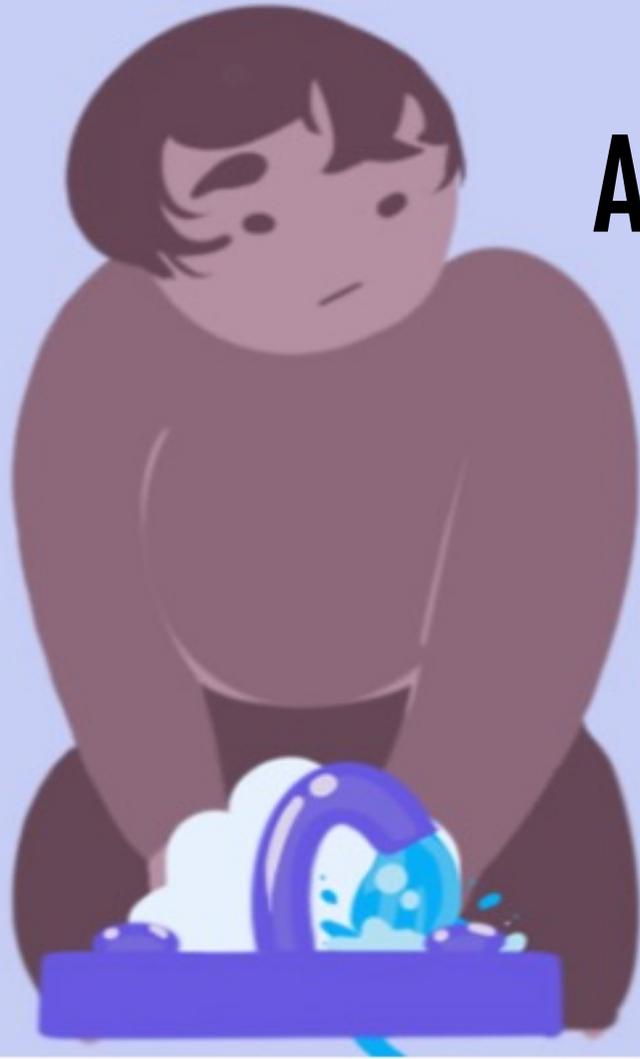


illustration by Aria Dines

[Rochester Institute of Technology \(2019\). Bigotry Encoded: Racial Bias in Technology](#)

12-16-21

# The metaverse is shaping up to be a racist hellscape. It doesn't have to be that way

Ensuring that the next iteration of the internet is inclusive and works for everyone will require that people from marginalized communities take the lead in shaping it.





# Behind Racism: Challenging the Way We Think

The Behind Racism exhibition and its tour are presented by:



Canadian  
Race Relations  
Foundation

Fondation  
canadienne des  
relations raciales

## Challenging the way we think

Developed in partnership with the Canadian Race Relations Foundation (CRRF), Behind Racism: Challenging the Way We Think is a new exhibition that explores the mental processes that contribute to racism and discrimination. It shows how the processes that can help us think and act quickly can lead to dangerous biases against people who are different from us. This show challenges visitors to acknowledge the role these processes play in their own lives while exploring some of Canada's history and its connection to present-day racism and inequities.

With help from interactive components, visitors will learn about the science of cognition and perception, including how interference, bias, blindspots and other mental processes can help—or hinder—our ability to understand the world around us.

This exhibition asks visitors to consider: What if we could better understand the mental processes that lead to inequity? Could we unearth the roots of racism in ourselves, alter our own behaviours and effect greater change across our communities and institutions?

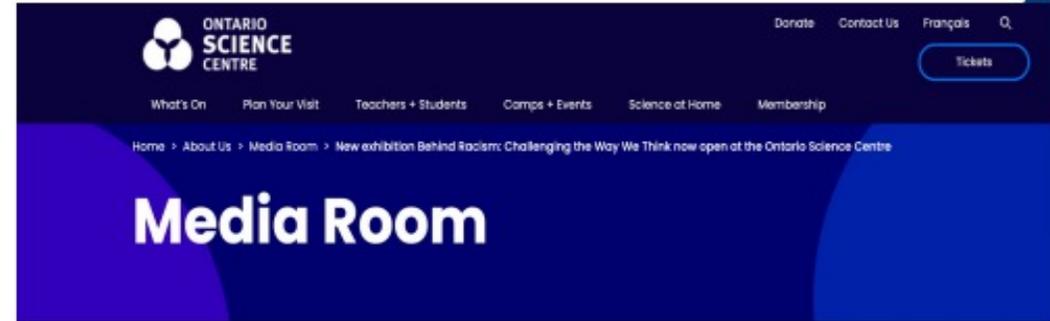
## Confronting racism in Canada

Behind Racism: Challenging the Way We Think also looks closely at the real-life effects of bias, discrimination and exclusion in Canada.

It features individual accounts from people who have experienced unfair treatment and discrimination in their everyday lives. This exhibition also showcases powerful statistics that demonstrate how systemic racism continues to harm Indigenous communities, Black communities and other racialized groups.

This exhibition aims to help visitors challenge bias, prejudice and racism in their daily lives. It encourages a renewed focus on working together—whatever our backgrounds—and celebrating our differences.

The exhibition and its tour are presented by the Canadian Race Relations Foundation with the generous support of the Government of Canada and in partnership with Mosaic Institute, the Ontario Science Centre and the Canadian Museum for Human Rights.



[← Go back to Media Room](#)

## New exhibition Behind Racism: Challenging the Way We Think now open at the Ontario Science Centre

February 23, 2022

Developed in partnership with the Canadian Race Relations Foundation, informative and interactive exhibition explores racism in Canada and breaks down the mental processes that contribute to discrimination

**TORONTO (February 23, 2022)** – If you could better understand how your brain processes information that can lead to bias and racism, could it impact your behaviour and result in positive change? Designed and fabricated by the Ontario Science Centre in partnership with the Canadian Race Relations Foundation (CRRF), [Behind Racism: Challenging the Way We Think](#) shows how the mental processes that help us think and act quickly can lead to racism and discrimination. Debuting at the Ontario Science Centre, this compelling exhibition examines racism in Canada and encourages visitors to recognize bias, challenge discrimination and appreciate our differences. Behind Racism: Challenging the Way We Think is now open and runs until April 24, 2022.

"The Ontario Science Centre is committed to creating and amplifying work that champions inclusion and anti-racism, which is why we're proud to partner with Canadian Race Relations Foundation on the development of this powerful and thought-provoking exhibition," said Paul Kortenaar, CEO, Ontario Science Centre. "We believe *Behind Racism: Challenging the Way We Think* will spark important conversations that can result in meaningful change."



# Are You Future Ready?

“Information is power only if you know  
what to do with it.”