

FACEBOOK



 Meta

Cybersecurity and the
Metaverse

Jack J Mc Cauley Founder
Oculus VR



ABOUT ME

- Professor of Engineering at UC Berkeley
- Co-founder of Oculus and Former Chief Engineer, Oculus VR, sold to Facebook for \$3.2B US
- Inventor of Scrolling Mouse
- Innovator in Residence, Jacobs Institute at UC Berkeley
- Key Developer and Inventor – Guitar Hero Video Game series
- 35 Years in Video Game Engineering
- Math and Science Research Institute Board Member
- Advisor on Drug Policy at RAND Corporation
- University of California Trustee
- Asia Society Board Member
- President – Jack J. McCauley Foundation





DRONE BLASTER!

- Removes military and commercial drones



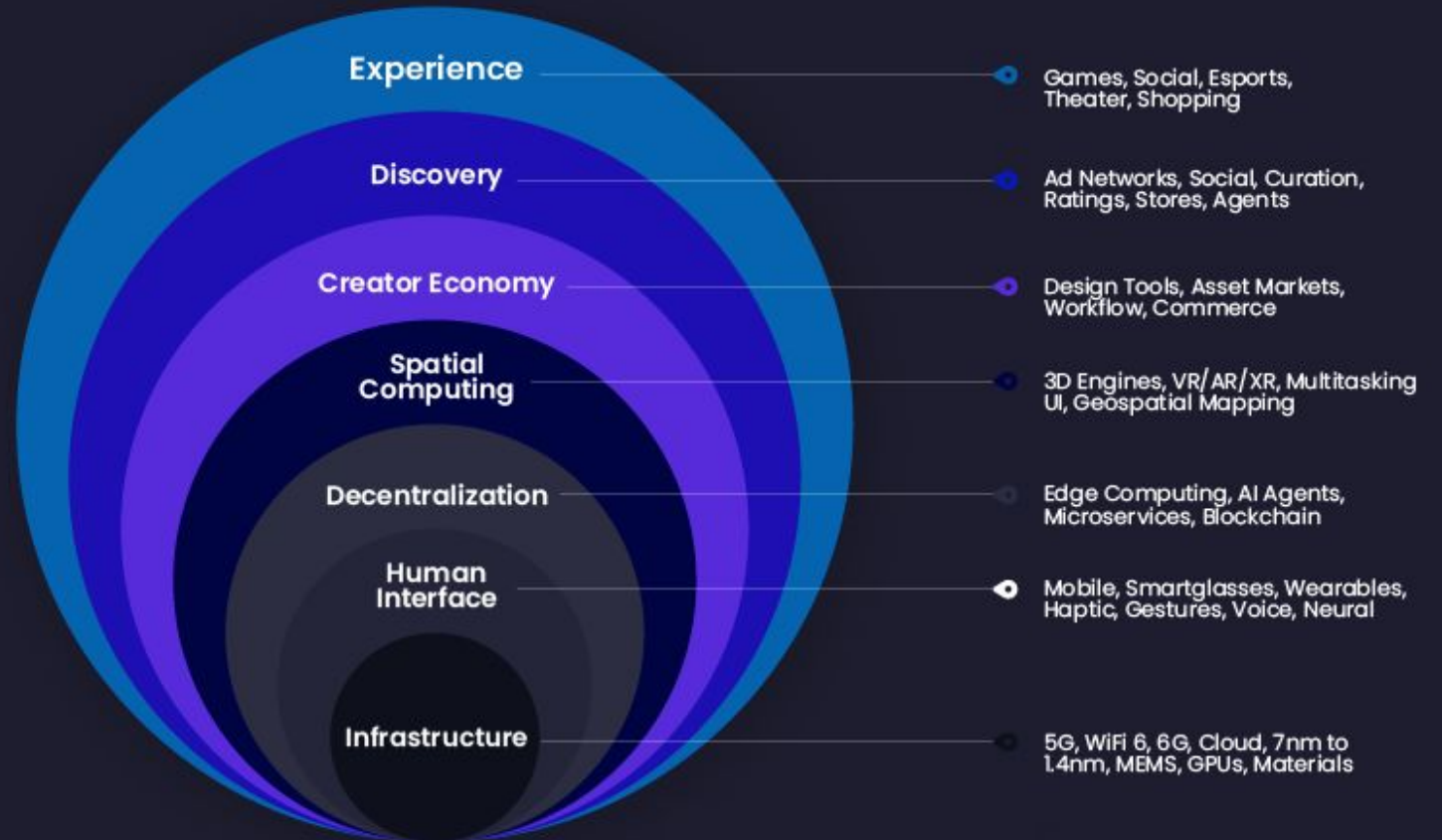


What is the Metaverse?

- **A virtual world wherein you can live, thrive and exist**
- **Free of life's problems, you can have everything you want**
- **There are many inhibitors though**
- **Many challenges ahead for Meta AKA Facebook**

Technical hurdles abound...

The Seven Layers of the Metaverse






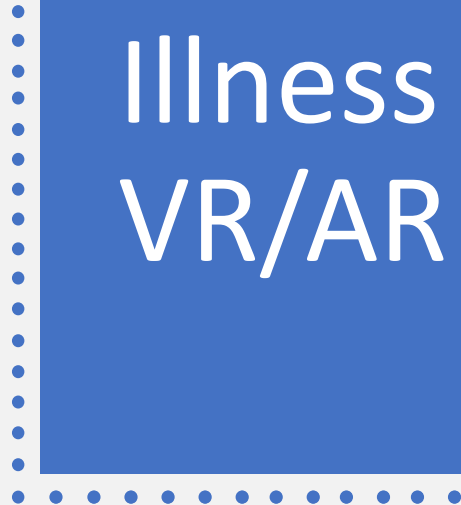
#1 HACKING TOOL

- This is the tool that can hack the Metaverse





The Biggest problem! Vestibular Illness and VR/AR



- Vestibulo/Ocular reflex two ganglions control eye movement, very primitive system.
- Eyes, ears very closely coupled together for moderating unconscious movement and regulating balance and coordination.
- Sensory system has an expectation about what will happen, a look-ahead which is learned from experience (the baby learning to walk.)
- There are more than five senses, four sense organs located in the ear for maintaining balance.
- Perturbation of the vestibular system coupled with miscues on the expectation system are the leading causes of simulator (motion) sickness.
- There is a new term here, which I call the Scaling Effect, which has to do with improper modeling and internal geometry of the video artifacts much like a snorkeling trip.
- Lastly, improper audio modeling - phase delays which are use for pointing the head. Very hard problem because of reflections and echo so the audio must be modeled including the sounds bouncing around the virtual space.

WiFi and Mobile Wireless

Many security holes in WiFi some improvements with WPA3

WPA2 completely vulnerable to Cyber attacks

LTE and Mobile Radio somewhat more secure

5G Mobile Vulnerable at the tower to data and content theft

Your Privacy!

A program called “WireShark” can snoop WiFi based cameras inside your home

Makes you vulnerable – celebrities pay attention!

You need to use a Linux laptop to do this type of attack – cracks the WPA passcode.

You need to protect yourself!

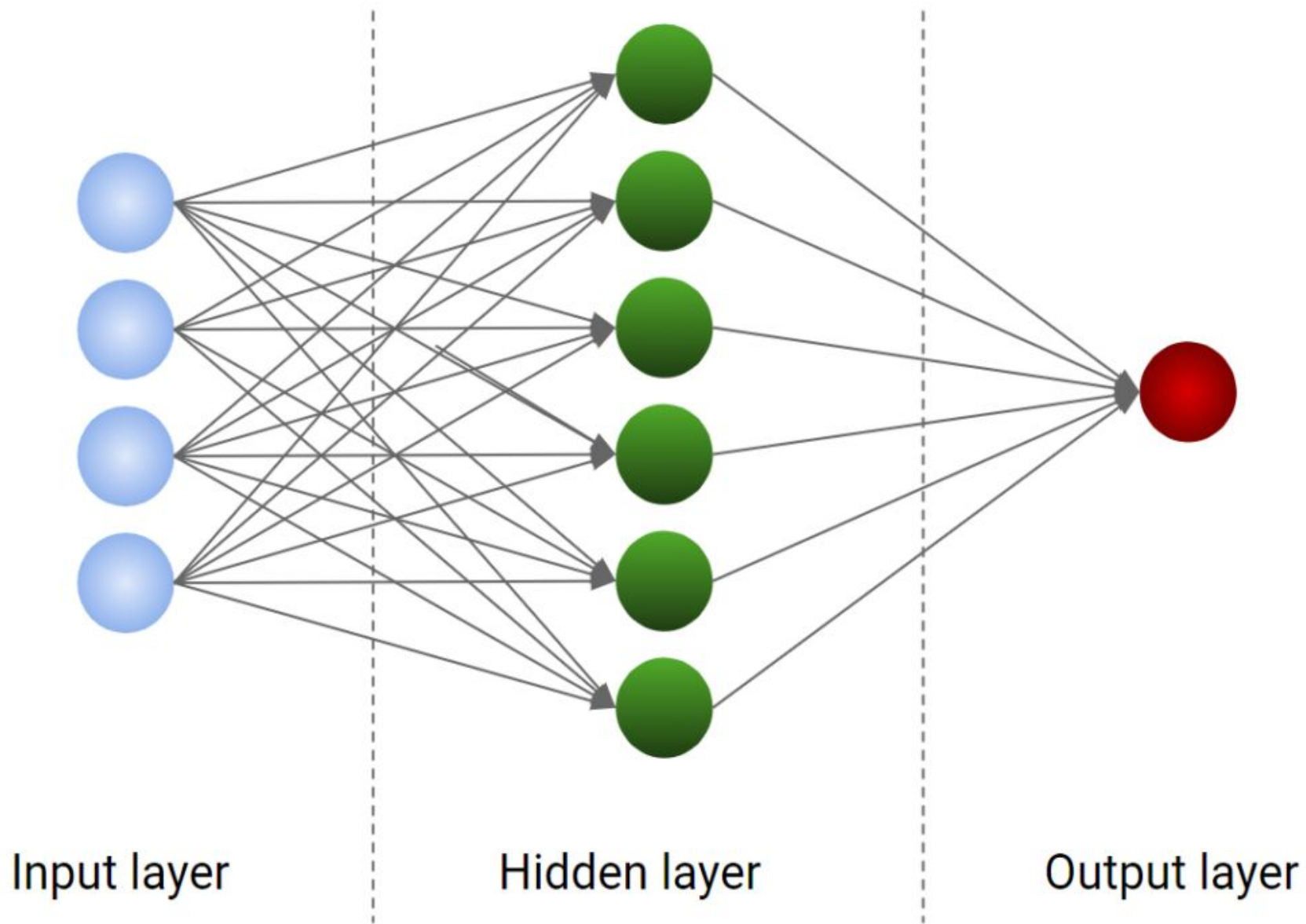
How AI can
thwart
Cyberattacks

Need to add intelligence
to the APs

Also needed to add to last
mile infrastructure AI

How it will work – pattern
recognition!

Neural Networks

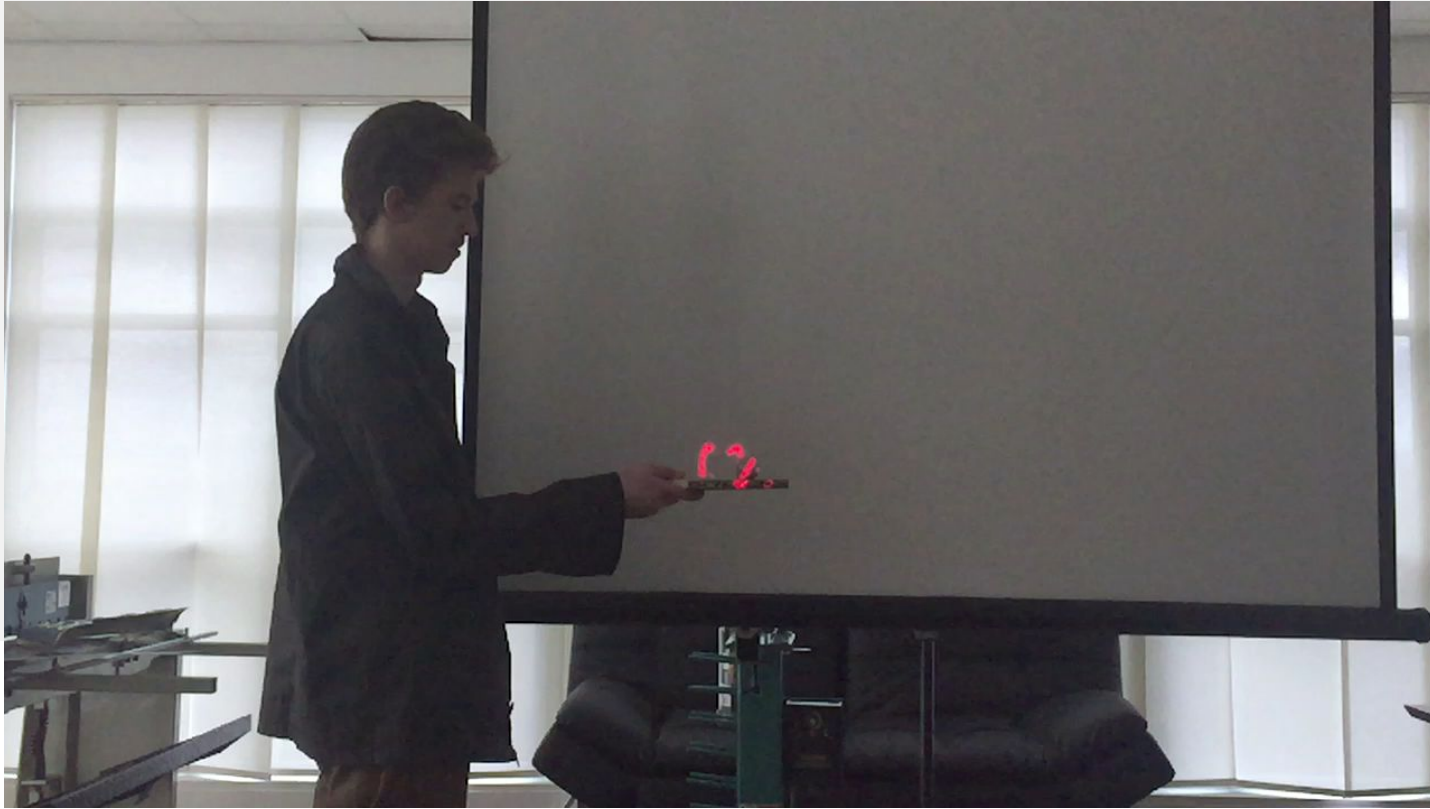


Advantage:
Neural
Networks

Instantly reloadable
with training data

Learns attack modes,
habituating

Well known, can run
on an ARM processor



MEMS Mirror Servo



Thank You from UC BERKELEY!

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