



Re-Wiring For Our Future

Dr Michelle Dickinson
Co-Founder, CTO Nanogirl Labs



medickinson

HOW DID YOU GET HERE?



HOW DOES BREAD BECOME TOAST?



HEATING FILAMENTS!



**Push cassette into
box, cartoons
appear!**



Turning ferric
oxide into
pictures



HOW ARE LAPTOPS SO SMALL?



medickinson

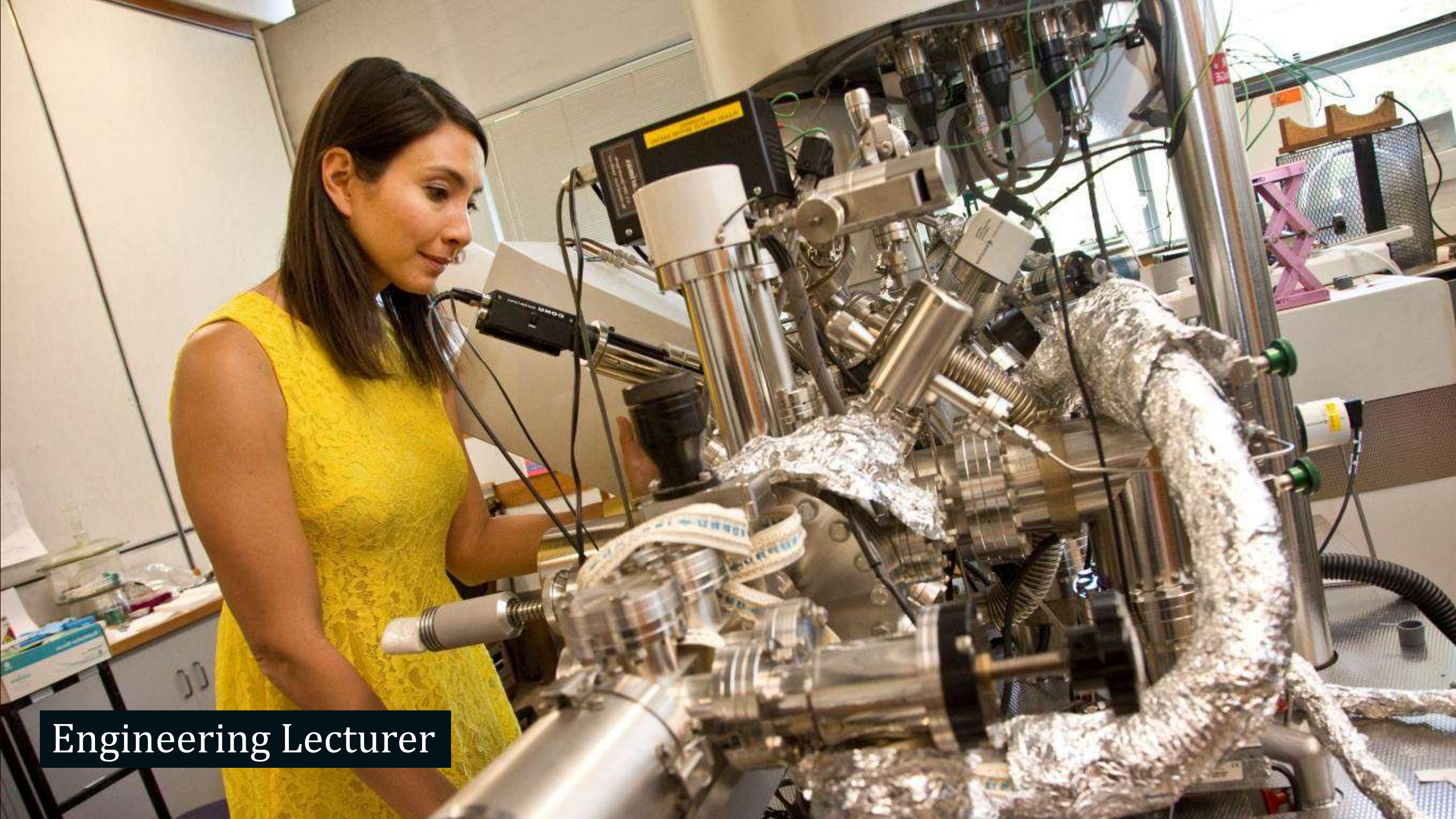




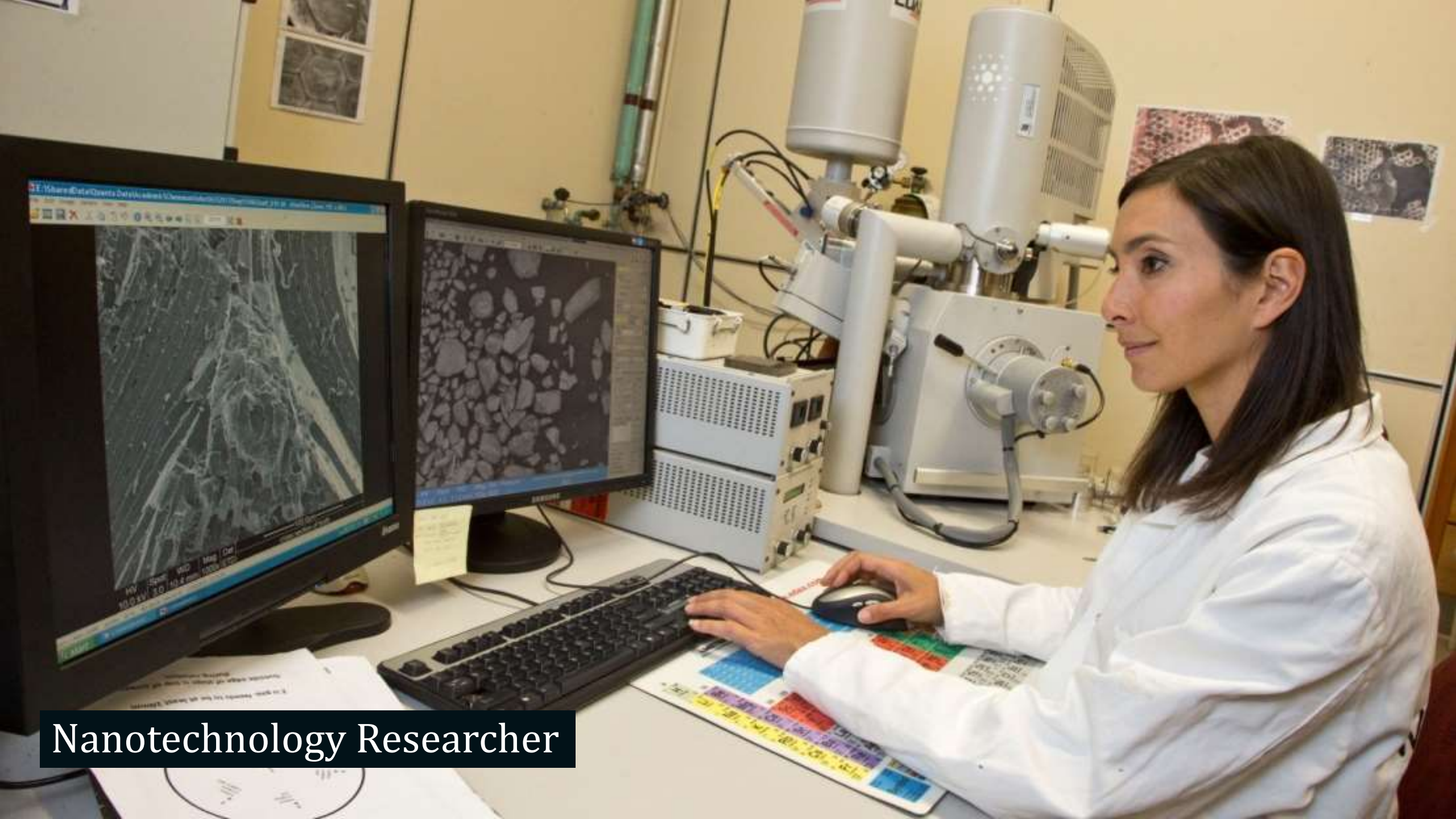
**SOLID
STATE
HARD
DRIVES!**

CURIOSITY AND TINKERING PROVIDE DEEP
LEARNING EXPERIENCES

WHEN THINKING ABOUT EDUCATION WE NEED
TO REMEMBER WHAT LEARNING MEANS TO US



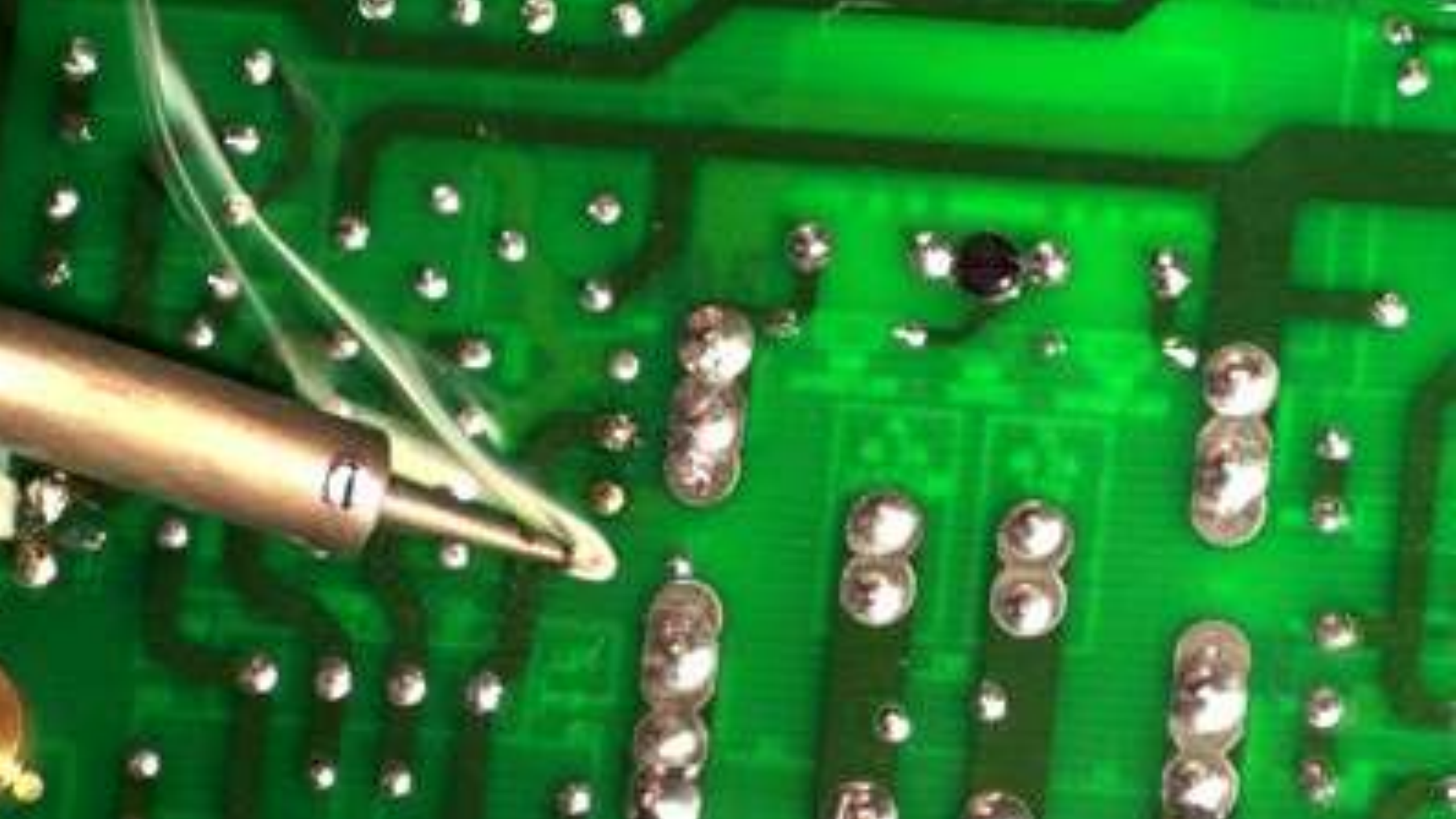
Engineering Lecturer



Nanotechnology Researcher



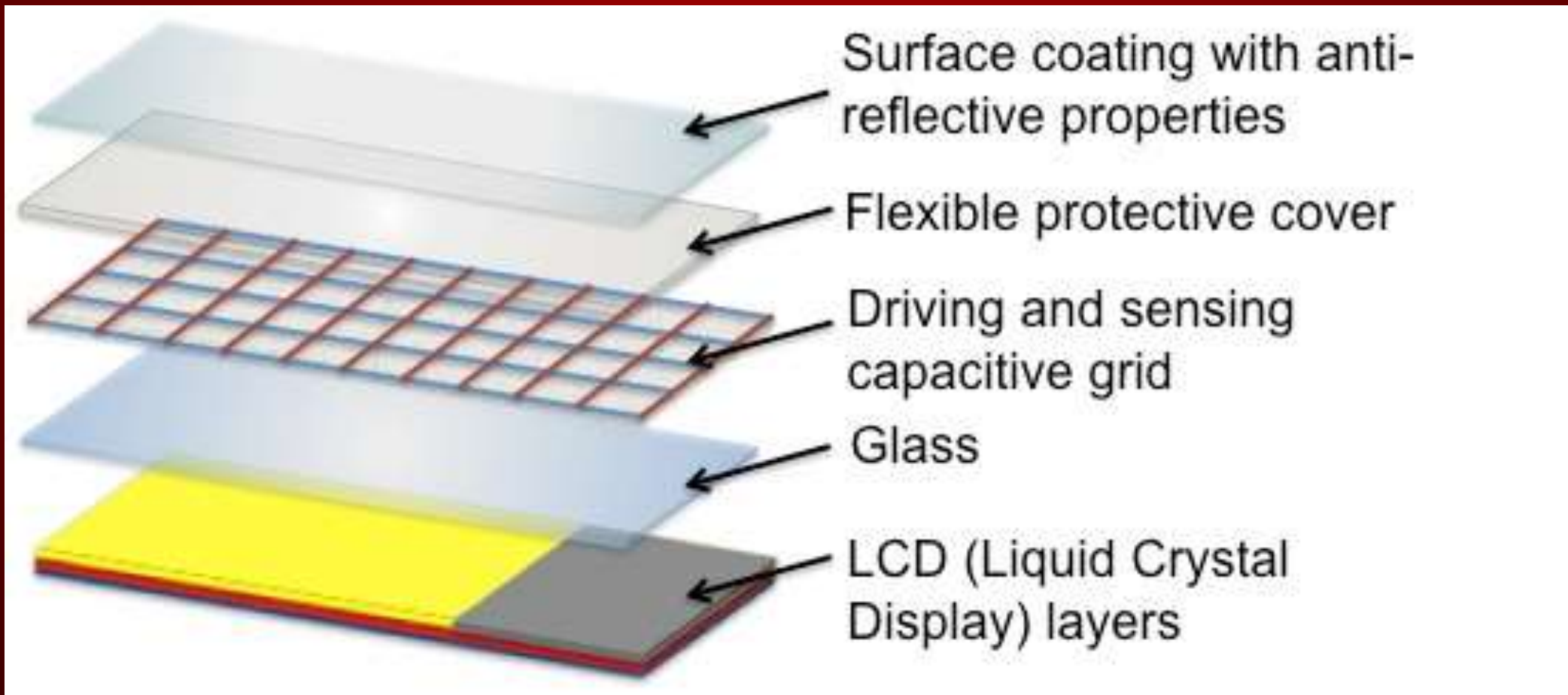






Touchscreens

Use the atoms in your finger to interact with your device



YOU CAN DESIGN THE BEST
TECHNOLOGY IN THE WORLD

BUT YOU CAN'T CONTROL HOW PEOPLE
WILL USE IT



Generalized Griffith-Irwin Concept



Equations (1)-(3) are proved experimentally and now present the linear fracture mechanics of materials (LFM).

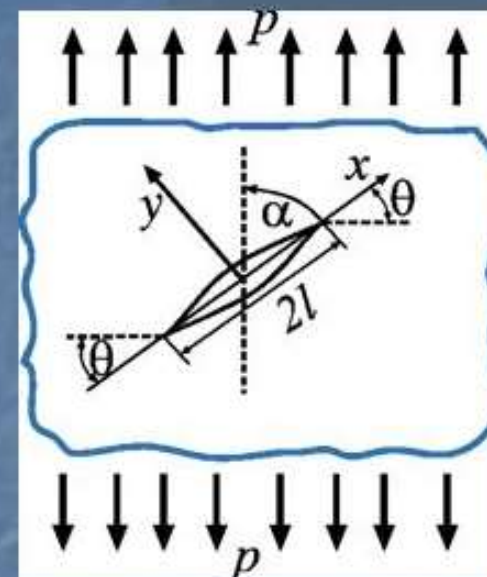
$$K_I(p, l) \neq 0, K_{II}(p, l) \neq 0, K_{III}(p, l) \neq 0$$

Tension of the plate with the arbitrary oriented crack

$$\lim_{r \rightarrow 0} \sqrt{2\pi r} \sigma_{\theta\theta}(\alpha, p_*, r, \theta_*) = K_{Ic},$$

$$\lim_{r \rightarrow 0} \sqrt{2\pi r} \left\{ \frac{\partial \sigma_{\theta\theta}(\alpha, p, r, \theta)}{\partial \theta} \bigg|_{\theta=\theta_*} \right\} = 0,$$

where θ_* is the angle of the initial direction of crack growth



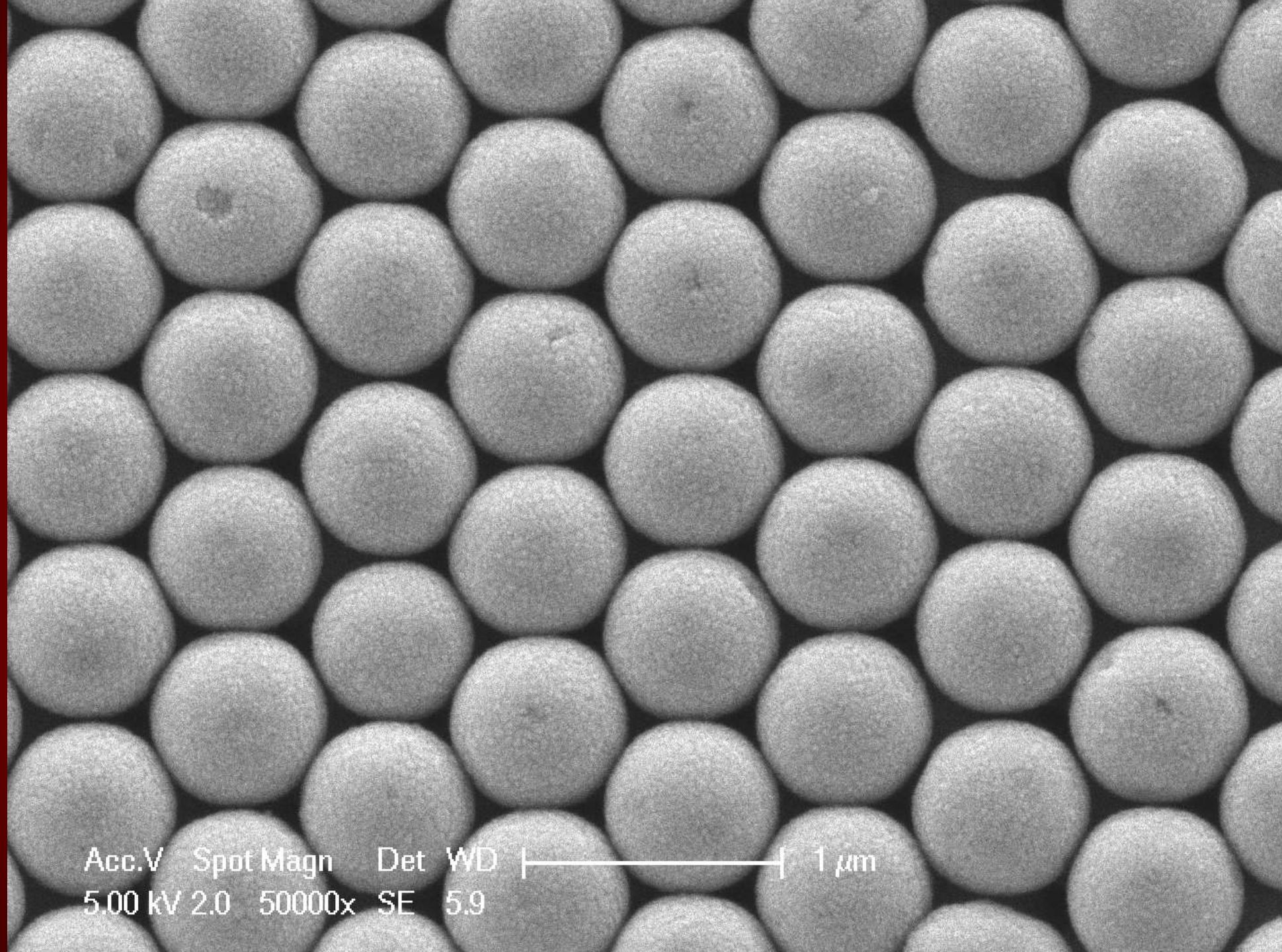
$$\cos^3 \frac{\theta_*}{2} \left[K_{I0}(p_*, \alpha, l) - 3 \operatorname{tg} \frac{\theta_*}{2} K_{II0}(p_*, \alpha, l) \right] = K_{Ic}, \quad (1)$$

$$\theta_* = 2 \operatorname{arctg} \frac{K_{I0} - \sqrt{K_{I0}^2 + 8K_{II0}^2}}{4K_{II0}}, \quad K_{I0} > 0, \quad K_{II0} \neq 0, \quad (2)$$

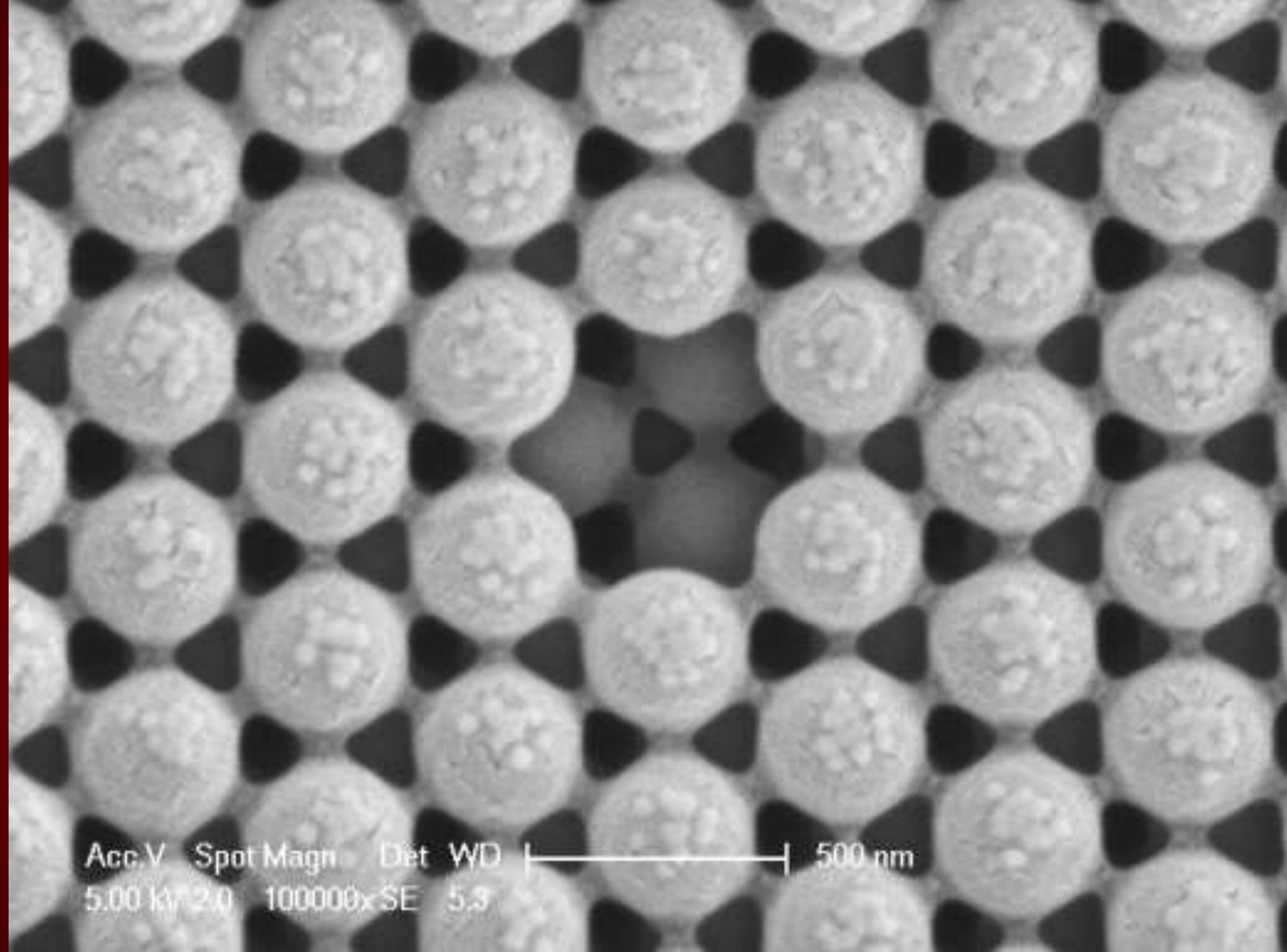
$$K_{I0} = p\sqrt{\pi l} \sin^2 \alpha, \quad K_{II0} = p\sqrt{\pi l} \sin \alpha \cos \alpha \quad (3)$$

Equations (1) and (2) were generalized (O.Ye.Andreikiv et al) for the case $K_{I0} \neq 0, K_{II0} \neq 0, K_{III0} \neq 0$





Acc.V Spot Magn Det WD |-----| 1 μ m
5.00 kV 2.0 50000x SE 5.9



Acc.V Spot Magn Det WD |-----| 500 nm
5.00 kV 2.0 100000x SE 5.3

Generalized Griffith-Irwin Concept



Equations (1)-(3) are proved experimentally and now present the linear fracture mechanics of materials (LFM).

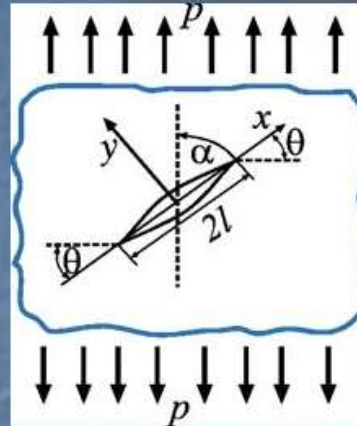
$$K_I(p, l) \neq 0, K_{II}(p, l) \neq 0, K_{III}(p, l) \neq 0$$

Tension of the plate with the arbitrary oriented crack

$$\lim_{r \rightarrow 0} \sqrt{2\pi r} \sigma_{\theta\theta}(\alpha, p_*, r, \theta_*) = K_{I*},$$

$$\lim_{r \rightarrow 0} \sqrt{2\pi r} \left\{ \frac{\partial \sigma_{\theta\theta}(\alpha, p, r, \theta)}{\partial \theta} \bigg|_{\theta=\theta_*} \right\} = 0,$$

where θ_* is the angle of the initial direction of crack growth



$$\cos^3 \frac{\theta_*}{2} \left[K_{I0}(p_*, \alpha, l) - 3 \operatorname{tg} \frac{\theta_*}{2} K_{II0}(p_*, \alpha, l) \right] =$$

$$\theta_* = 2 \operatorname{arctg} \frac{K_{I0} - \sqrt{K_{I0}^2 + 8K_{II0}^2}}{4K_{II0}}, \quad K_{I0} > 0,$$

$$K_{I0} = p\sqrt{\pi l} \sin^2 \alpha, \quad K_{II0} = p\sqrt{\pi l} \sin \alpha \cos \alpha$$

Equations (1) and (2) were generalized (O.Ye.Andreikiv et al) for the case $K_{I0} \neq 0, K_{II0} \neq 0$



THE FUTURE OF TERTIARY EDUCATION

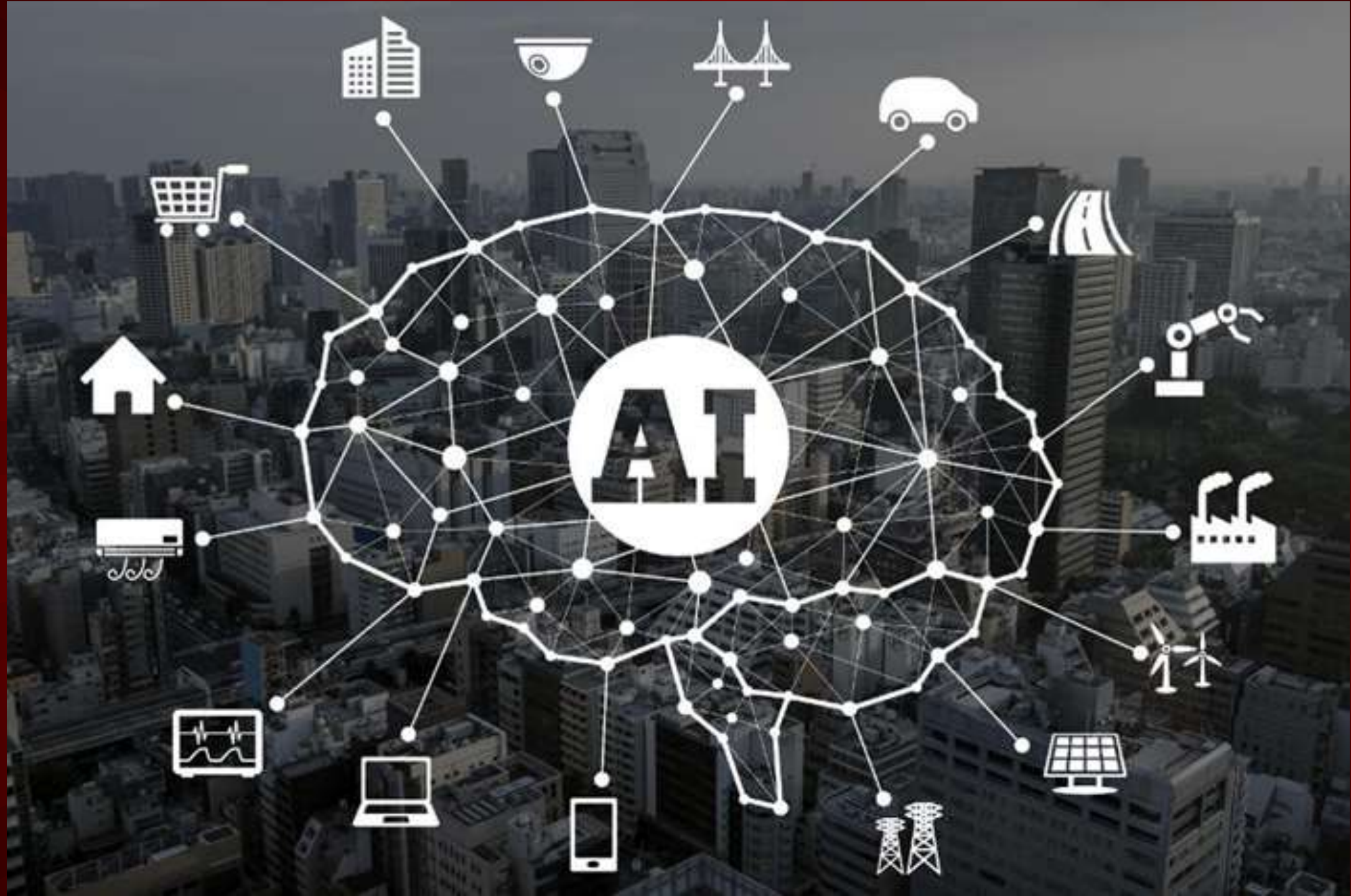


CAN WE CREATE HUMAN EXPERIENCES WITH DIGITAL TECHNOLOGY?

This is not a real person

THE FUTURE OF TECHNOLOGY IN TERTIARY EDUCATION







ROSS

[WHAT IS ROSS?](#)

[EVA](#)

[COVERAGE](#)

[ABOUT](#)

[BLOG](#)

[WHITEPAPER](#)

[LOGIN](#)

[GET STARTED](#)

AI Meets Legal Research

ROSS is an advanced legal research tool that harnesses the power of artificial intelligence to make the research process more efficient.

[GET STARTED](#)

EDITOR'S PICK | 27,774 views | Jun 28, 2018, 11:51am

This AI Just Beat Human Doctors On A Clinical Exam



Parmy Olson Forbes Staff

AI, robotics and the digital transformation of European business.

f

🐦

in



COMPETENCY BASED LEARNING



EXPECTATION OF EVERYTHING AVAILABLE ANYWHERE, ANYTIME



INNOVATE

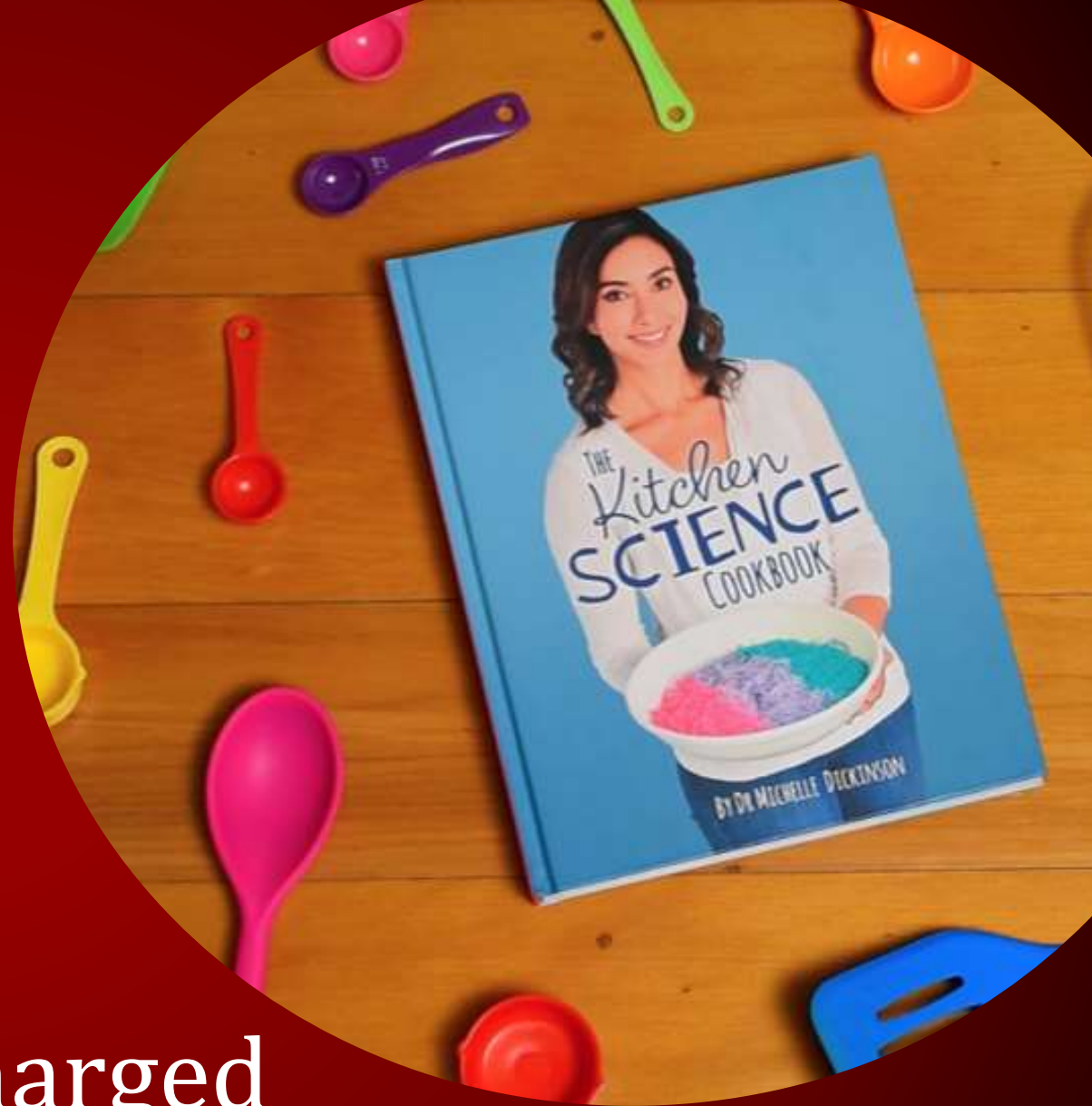




WHAT MAKES
INNOVATIVE
PEOPLE TICK?



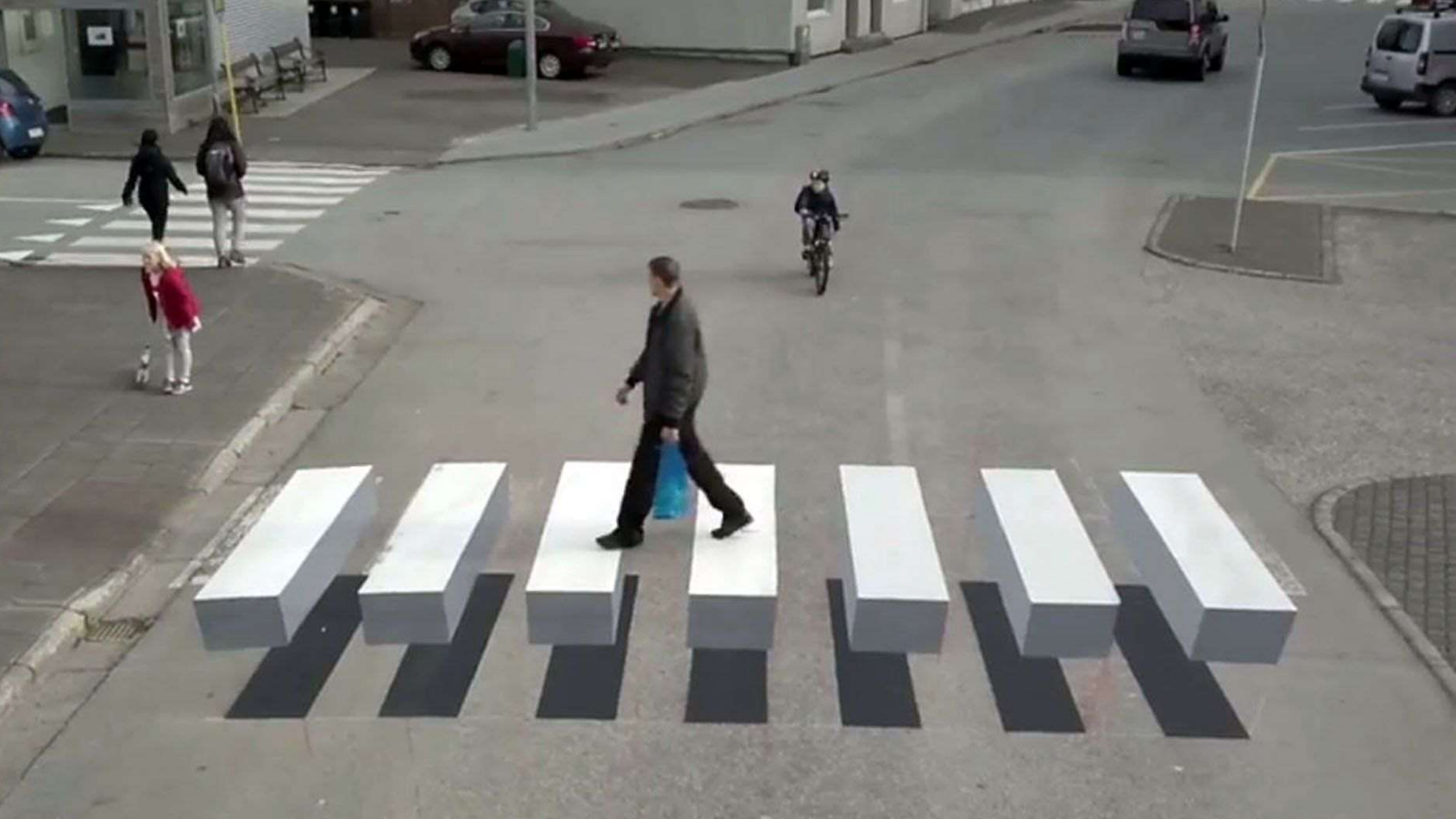
No. 8 Re-charged Kitchen Science Cookbook



Innovators see normal things in a different way







Uber did not kill the taxi business.



Limited access and fare control did.

Netflix did not kill blockbuster.



Ridiculous late fees did.

Apple did not kill the music industry.



Being forced to buy
full-length albums did

**Technology by itself is not the
disruptor.**

**Not being customer centric is the
biggest threat to business.**

WHO IS YOUR CUSTOMER?

WHAT DEVICE DOES YOUR CUSTOMER USE?

Death of screens







Death of touchpads





You can't predict the future



WHAT DOES TERTIARY EDUCATION LOOK LIKE?

Death of Lectures





Death of Labs





Ionic bonding

When a metal atom reacts with a non-metal atom, an ionic bond is formed. This is called an ionic bond.

Atoms react with each other until they have the same number of electrons in their outer shells. This makes them more stable.

What is an ionic bond?

An ionic bond is a bond formed between a metal atom and a non-metal atom. It is formed by the transfer of electrons from the metal atom to the non-metal atom.



The sodium atom has one electron in its outer shell. The chlorine atom has seven electrons in its outer shell.



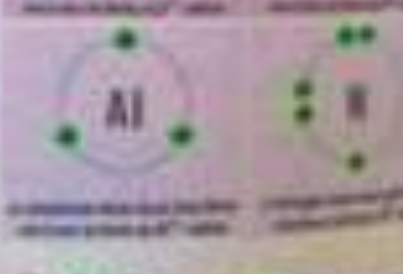
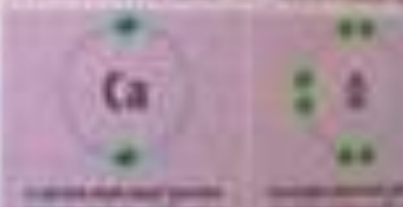
The sodium ion has a full outer shell of eight electrons. The chloride ion has a full outer shell of eight electrons.



The sodium chloride molecule is held together by an ionic bond. The sodium atom has lost its outer electron to the chlorine atom. The sodium ion (Na+) has 10 electrons and the chloride ion (Cl-) has 18 electrons. They are held together by an ionic bond.

Octet rule

The octet rule states that atoms tend to gain, lose or share electrons in order to achieve a full outer shell of eight electrons. This is because a full outer shell of eight electrons is a stable arrangement.



The octet rule states that atoms tend to gain, lose or share electrons in order to achieve a full outer shell of eight electrons. This is because a full outer shell of eight electrons is a stable arrangement.

Target

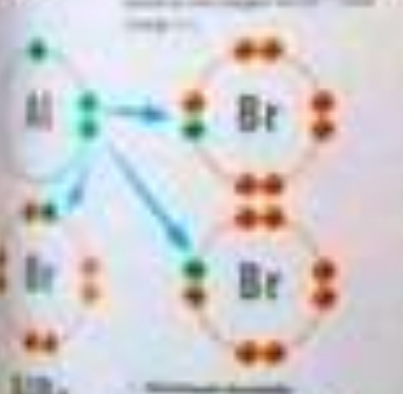
Students should be able to draw the electron shells of atoms and ions, and to explain the formation of ionic bonds.



1. Potassium (K) has 19 electrons. It has two shells full of electrons (2 in the first shell, 8 in the second shell). It has one electron in its third shell.



2. Calcium (Ca) has 20 electrons. It has two shells full of electrons (2 in the first shell, 8 in the second shell). It has two electrons in its third shell.



3. Aluminum (Al) has 13 electrons. It has two shells full of electrons (2 in the first shell, 8 in the second shell). It has three electrons in its third shell.

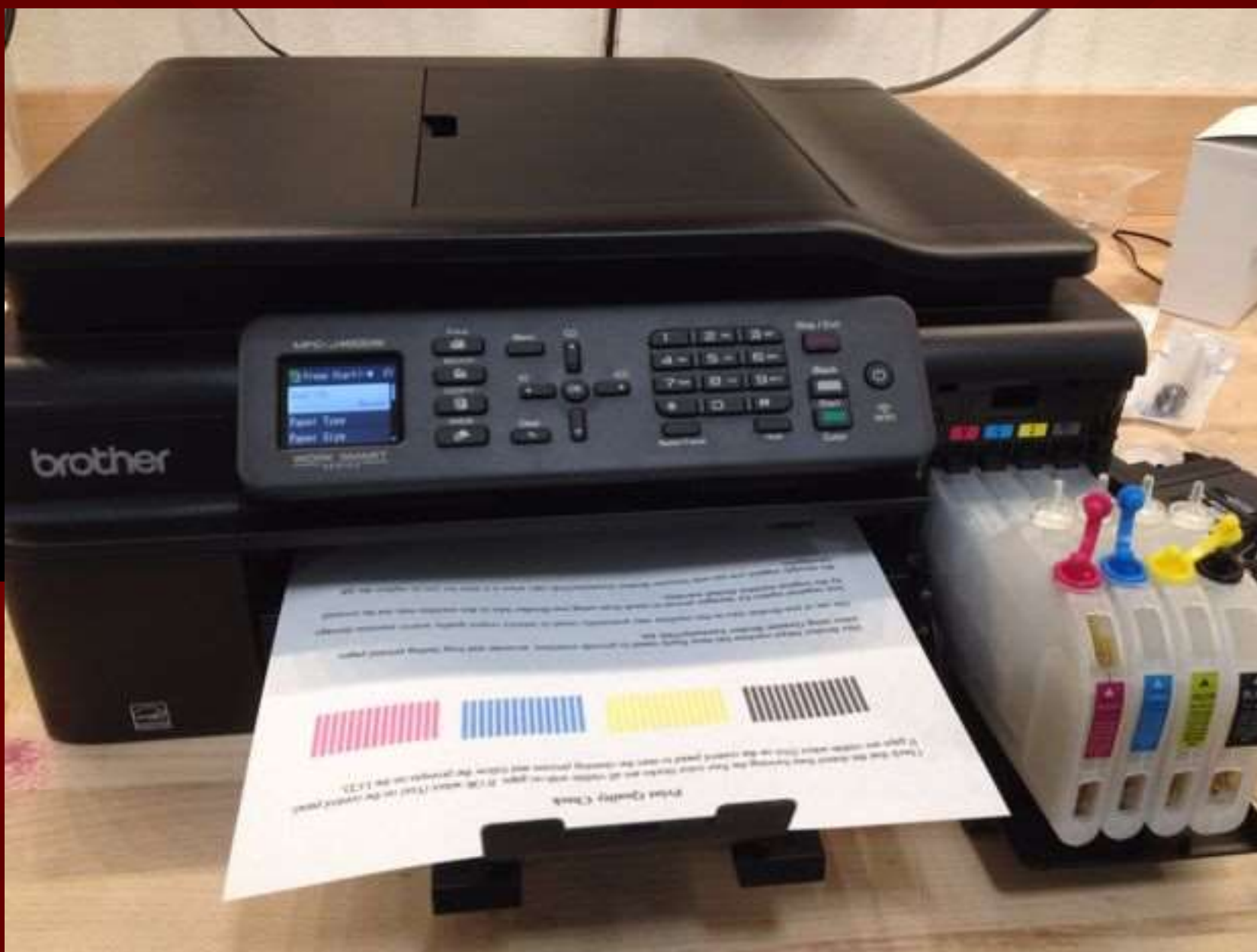
Reactivity

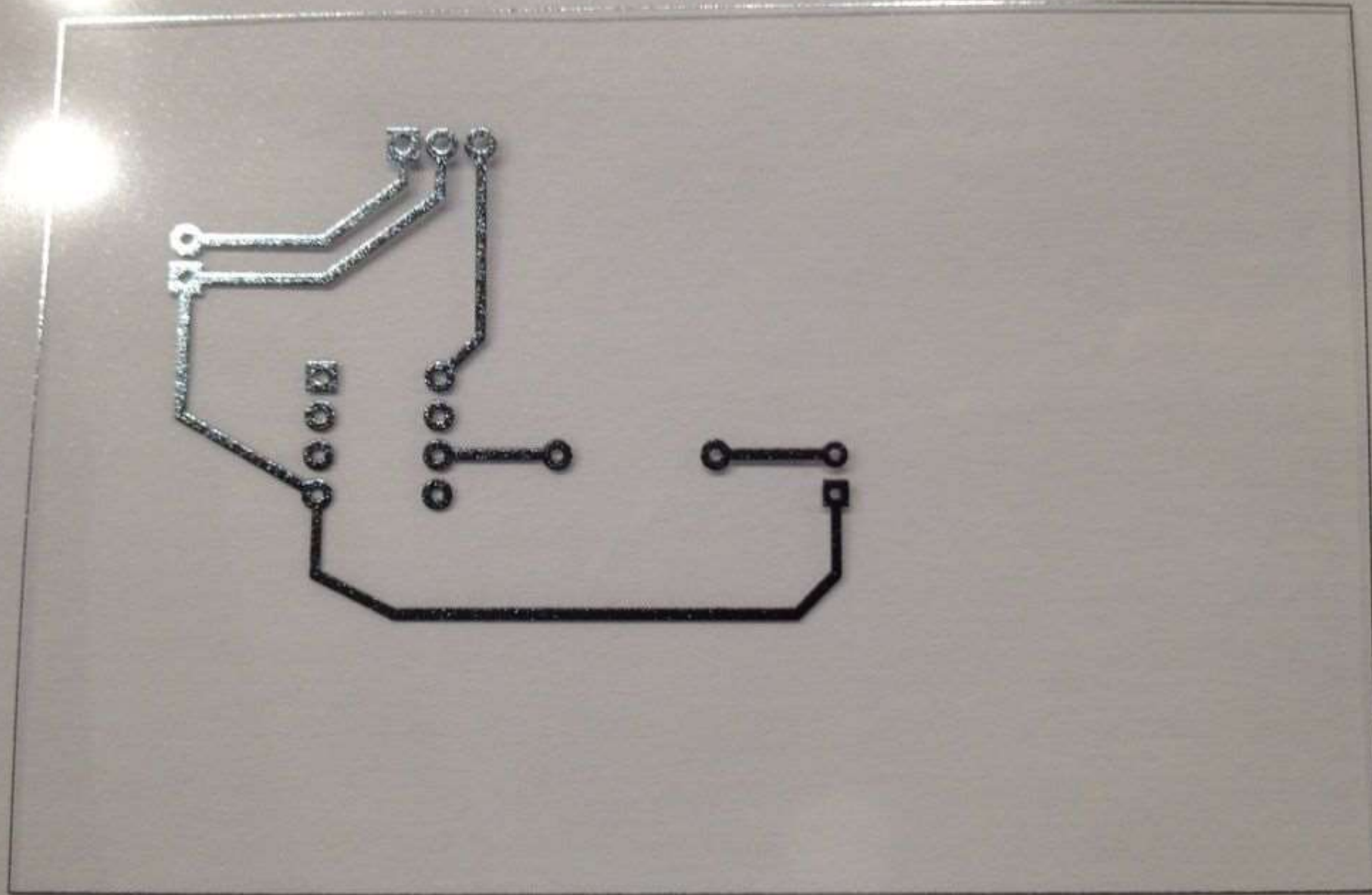
Reactivity is a measure of how easily an atom gains or loses electrons. It is a property of the atom that determines how it will react with other atoms.

1. **Metals**
Metals are elements that are good at losing electrons. They are found on the left side of the periodic table. The further to the left an element is, the more reactive it is. For example, potassium is more reactive than sodium, which is more reactive than calcium.

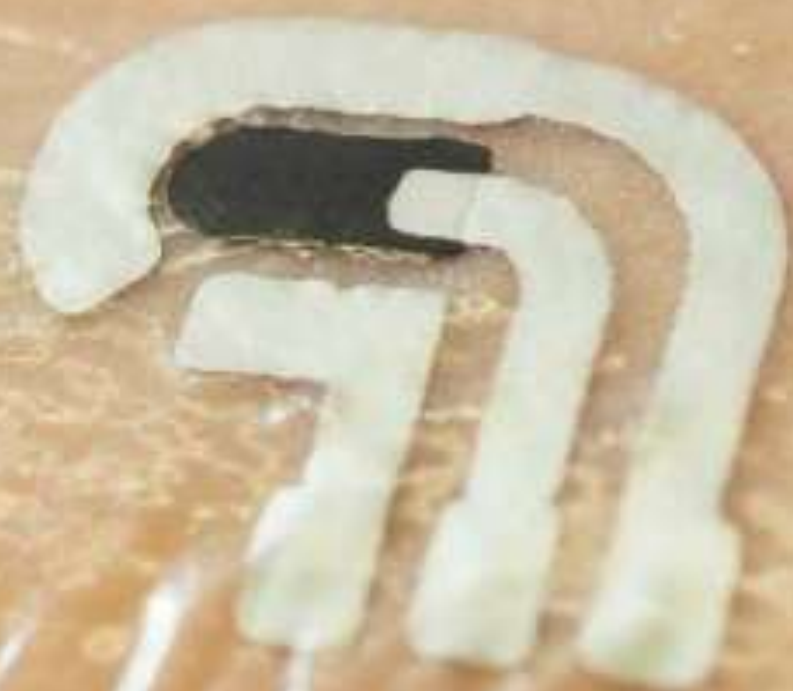


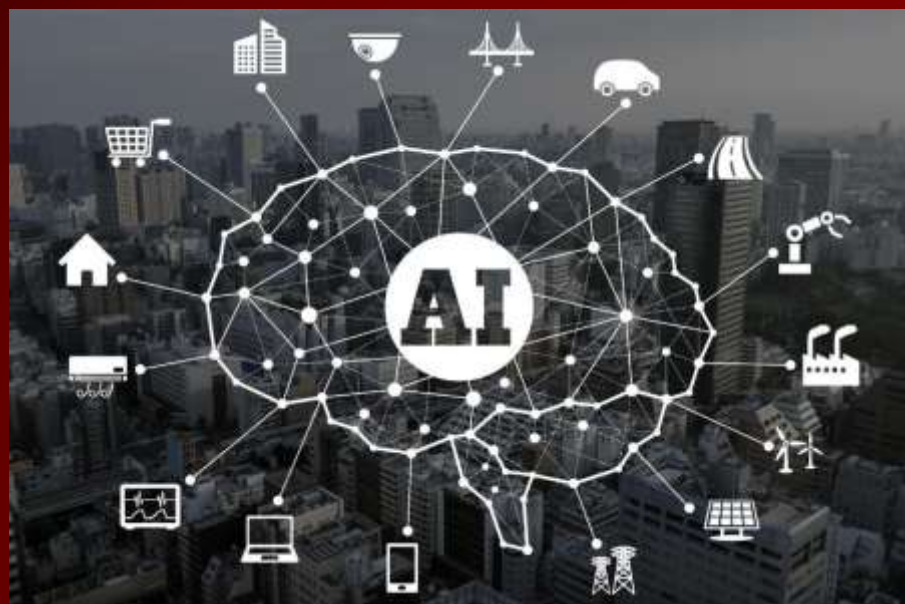












Curtin University in IoT rollout

University combining data visualisation, video analytics, and live face matching technologies



Byron Connolly (CIO)
08 May, 2017 12:36



© Curtin



Curtin University is rolling out 'Internet-of-things (IoT) software and devices that will provide advanced data insights to help with the daily running and usage of its large Perth campus.

The university is using an IoT solution, supplied by Hitachi, to advance its 'smart campus' deployment, which it said improves the student experience and classroom learning, and attracts industry to collaborate on data-driven research.

Curtin University is combining video data with operational data to better understand campus operations and building utilisation, which has become a major part of Curtin's smart campus initiative, said Curtin chief operating officer, Ian Callahan. Curtin has more than 60,000 students and 4,000 staff.

The university is integrating data visualization, video analytics, and live face matching technologies in a single analytics dashboard that provides the real-time knowledge the university needs to make decisions about classes, operations, and future requirements.



Editor's Recommendation



Samsung Galaxy S8 phone: full, in-depth review



Can more tech save Formula One from fan apathy?



When will the IT project madness end?



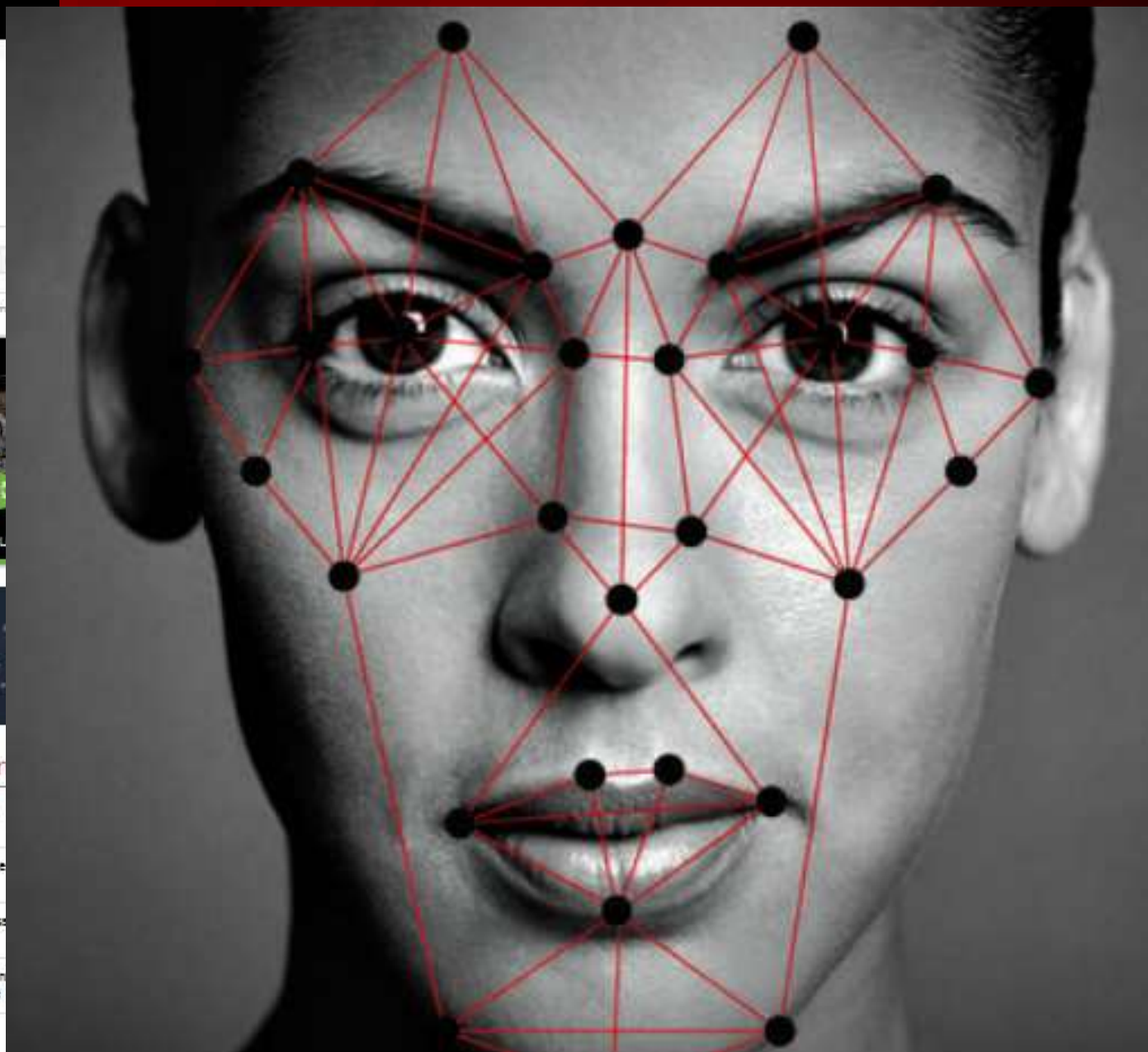
Ridley leads charge on 'intelligent built environments' in digital age

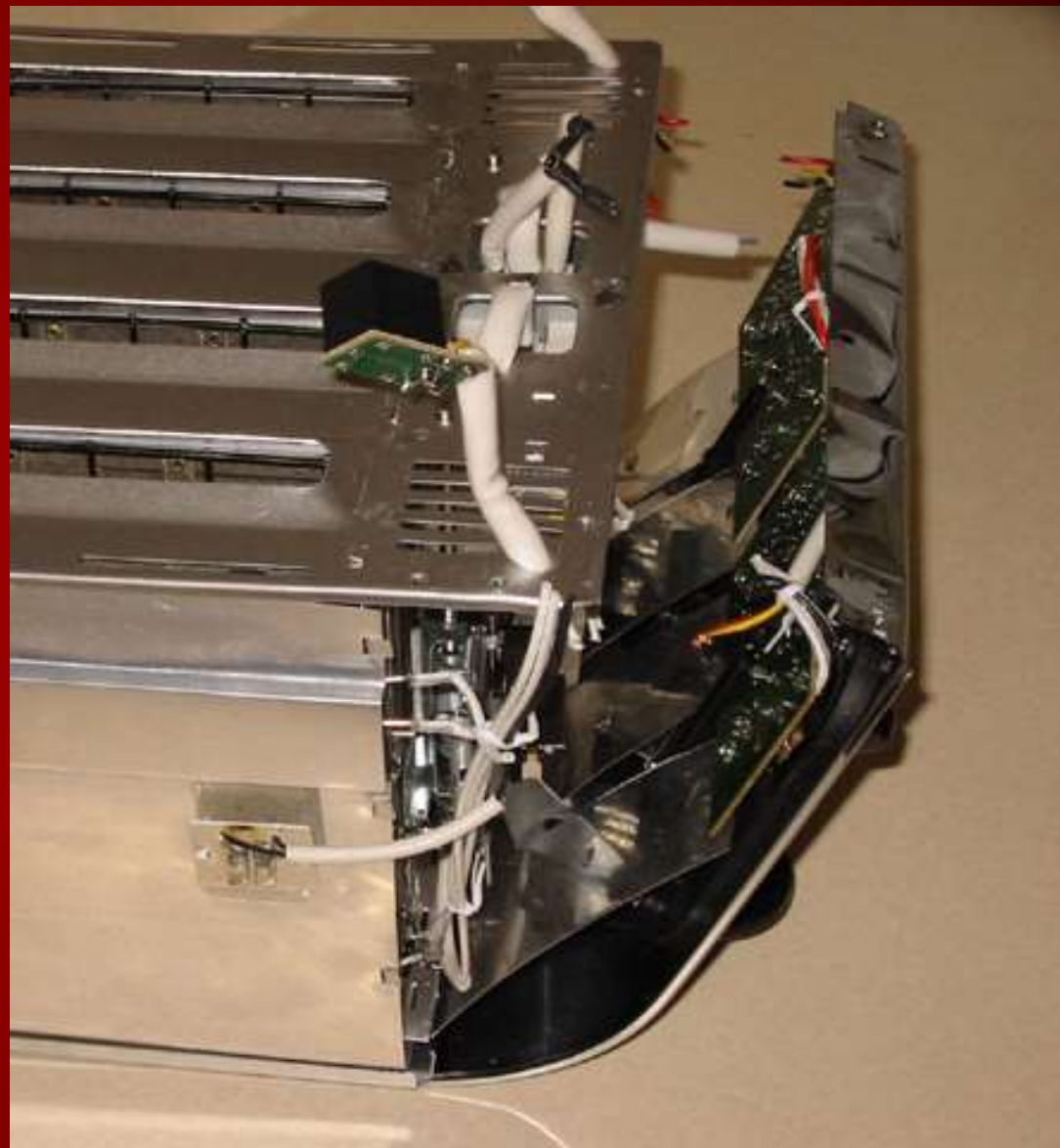


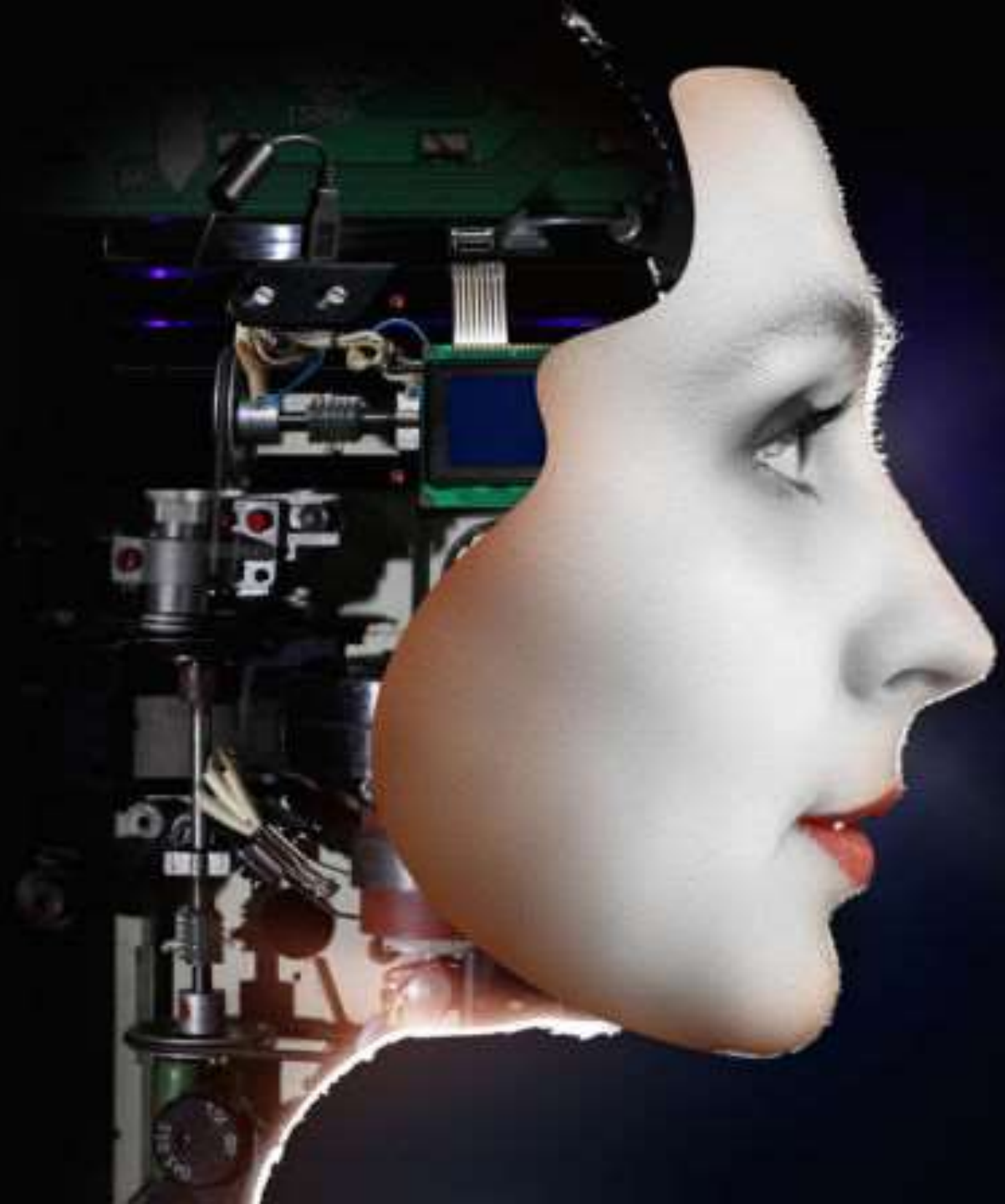
Regaining trust after a digital government failure



Tech dreams come true: Origin's Kelly Ferguson reveals personal journey







Knowledge comes from learning

Wisdom comes from living

Multi-cloud
strategies

WHO IS YOUR CUSTOMER?

Azure backup
and its
adoption

Smart campus
through video,
IoT and AI

CURIOSITY AND TINKERING PROVIDE DEEP
LEARNING EXPERIENCES

KNOWLEDGE COMES FROM LEARNING
WISDOM COMES FROM LIVING

Artificial
Intelligence
for
cybersecurity

GPU enabled
remote
desktops

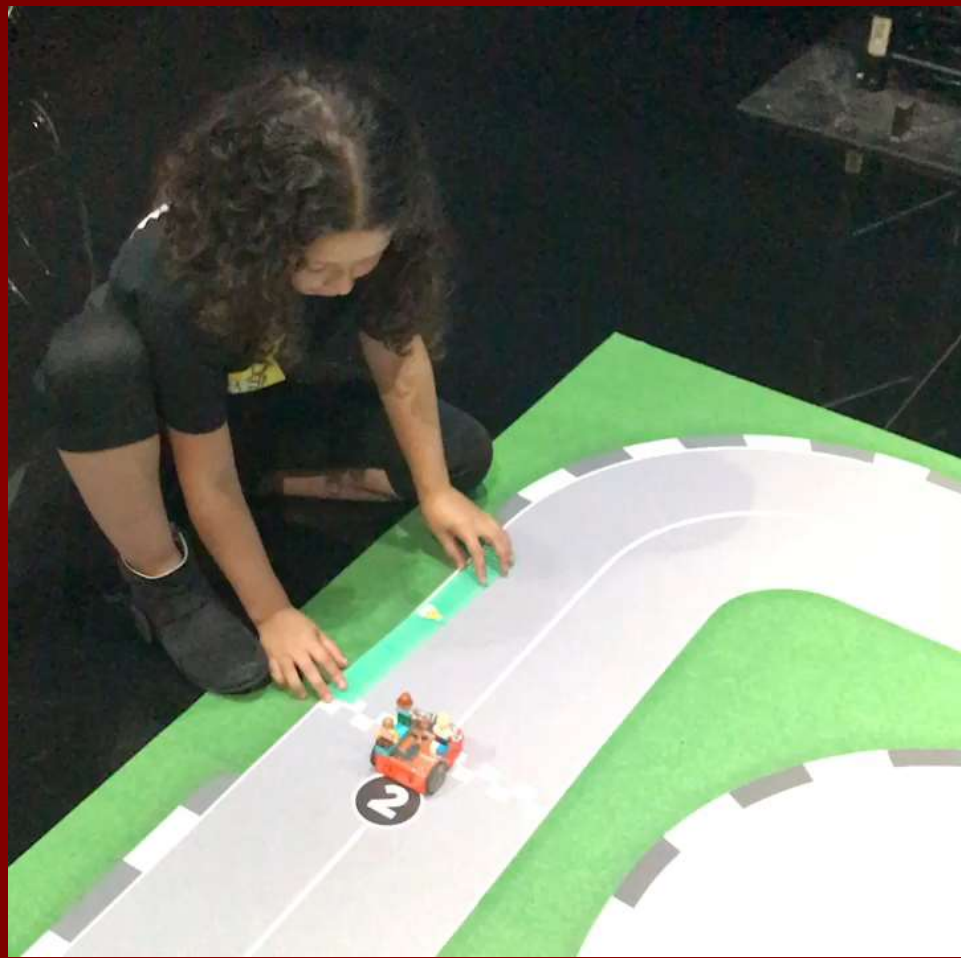
YOU CAN'T CONTROL WHAT OTHER PEOPLE DO
WITH YOUR TECHNOLOGY


Multifactor
Authentication











Re-Wire For Our Future (but don't forget the donut)

Dr Michelle Dickinson
Co-Founder, CTO Nanogirl Labs

 medickinson