



**UK Electronics
Skills Foundation**

**Semiconductor Talent Award
Induction Event
IET Birmingham 3rd Sept 2026**

Whilst we
wait to
begin, here
is a puzzle.

**This lock has a 3-digit code.
Can you crack it
using only these hints?**



⑦ ⑨ ③

One number is correct
and in the right place

⑦ ② ⑤

One number is correct
but in the wrong place

③ ① ⑦

Two numbers are correct
but in the wrong place

⑧ ④ ⑨

Nothing is correct

⑧ ⑨ ①

One number is correct
but in the wrong place

Agenda. What's coming up this afternoon?

- Welcome, Introductions & Housekeeping
- Semiconductors and the UK
- University – Studying and research.
- Break. Meet some Engineers/Networking with semiconductor companies.
- Hear from industry speaker.
- Information about the Award and plans for the programme this year.
- Any questions & Feedback.
- Group Photo

Congratulations and well done!



- Achieving successful exam results
- Acceptance on University course
- Being a recipient of the Semiconductor Talent Award.
 - One of 400 students across the UK.





PRINCESS ROYAL
TRAINING AWARD
2025

Tackling the Skills Challenge in the UK's Electronics Industry



Connecting the most
capable students from
top universities with
leading employers



University



**UK Electronics
Skills Foundation**



Industry

Skills advocacy on
behalf of the
Electronics Industry

Encouraging more
young people to
study Electronics



School



Founded in 2010, the UKESF is the only STEM organisation in the UK solely focused on Electronics and semiconductors. We are a multi award winning charity, and our purpose is to provide opportunities to young people and to encourage them to pursue study and careers in the industry.

Technology is the future

Technology depends on Electronics & Semiconductors



**UK Electronics
Skills Foundation**



Advanced transport systems



Medicine and healthcare



Smart Agriculture



Internet of things



Net Zero



Virtual reality

And so much more!

2007 – the year of the Smart Phone



On January 9, 2007, Steve Jobs announced the iPhone at the Macworld convention. He said that the first iPhone would be released later that year. On June 29, 2007, the world's first Smart Phone was released.

iPhone 14 - Processor and Transistors



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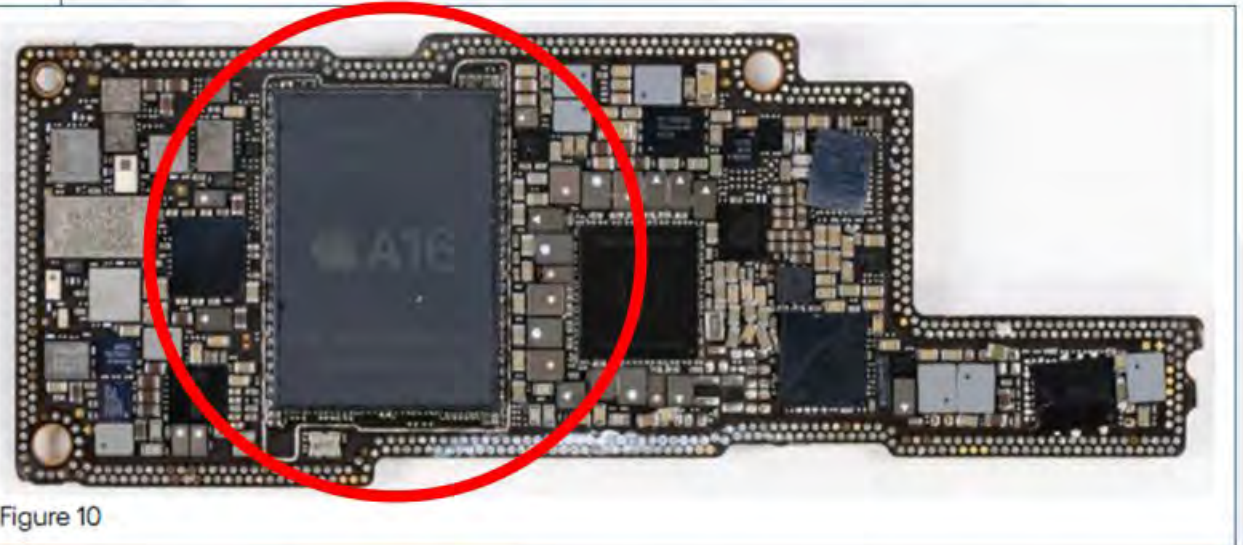
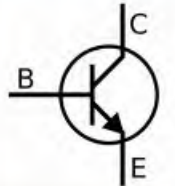


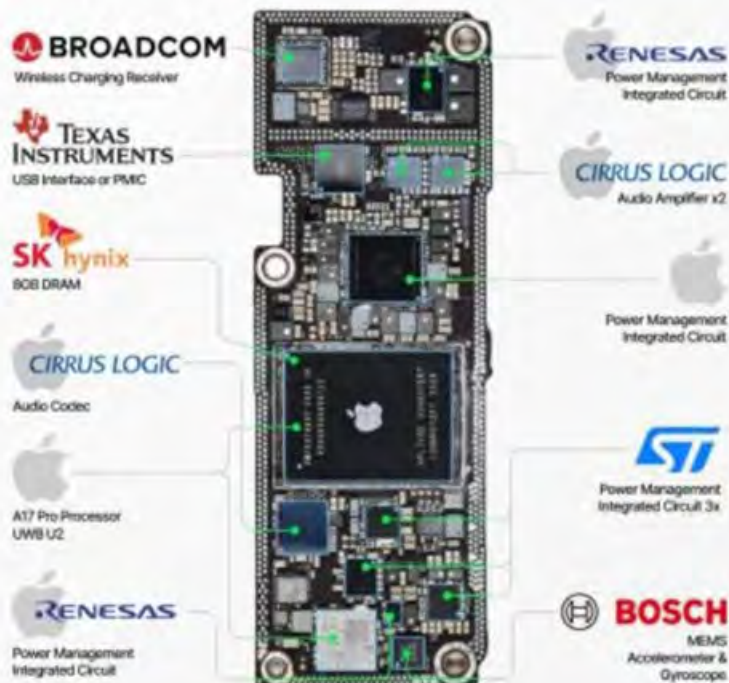
Figure 10

iPhone 15 – Semiconductor Suppliers



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Logic Board



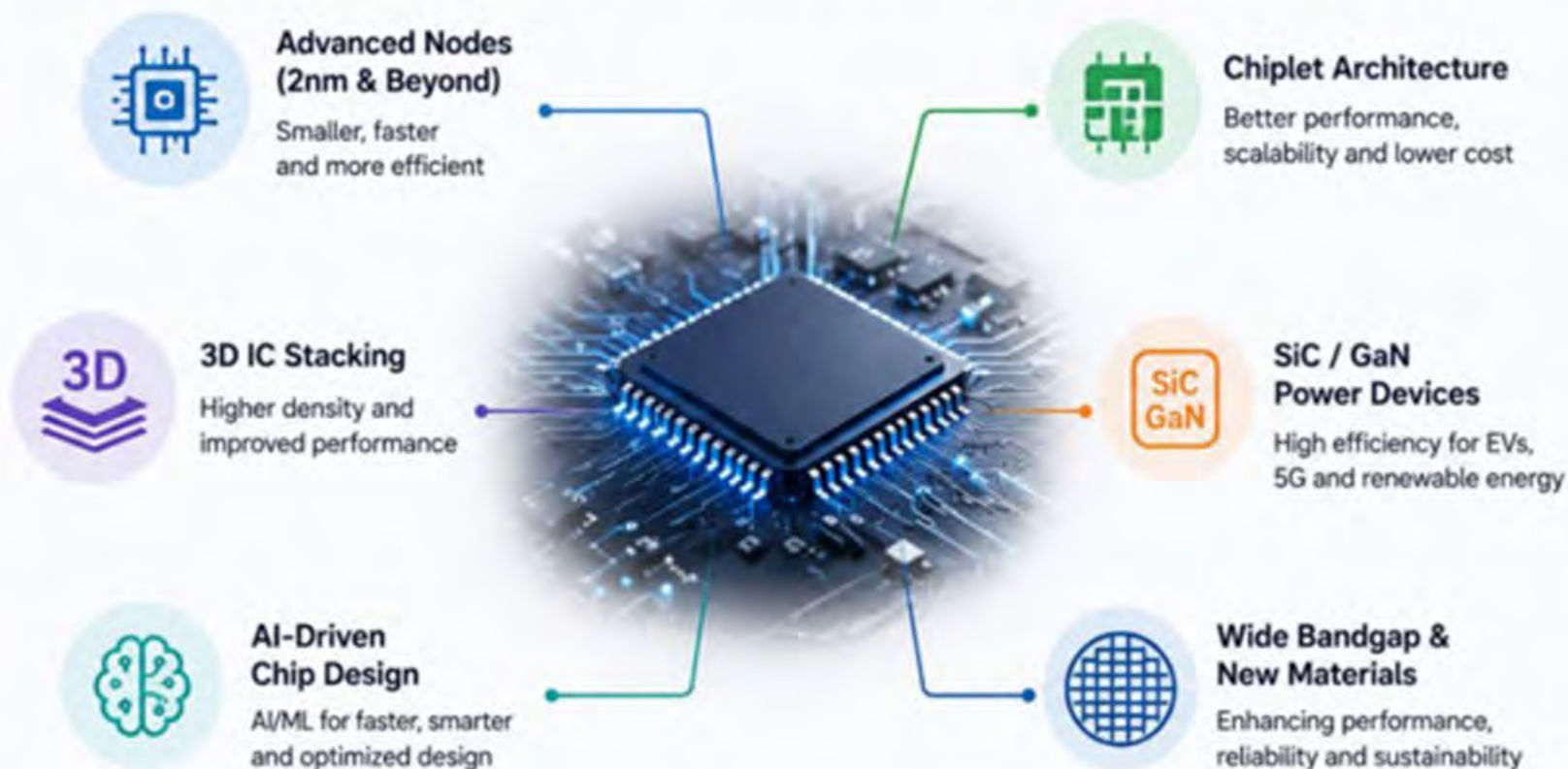
Memory Board



Radio Frequency Board



Latest Trends in Semiconductor Technology (2026)



Smaller. Smarter. Faster. More Efficient.
Driving the future of technology.



**UK Electronics
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Semiconductor Talent Award 2026



**UK Electronics
Skills Foundation**



"This Award has been phenomenal, and has made a huge difference in my first year at University. Beyond financial support, the exposure to the industry and professional development opportunities have provided me with a clearer pathway into the electronics/semiconductor industry."

Semiconductor Talent Award-holder 2025

The Semiconductor Talent Award 2026 is a Government funded initiative to address underrepresentation and improve social mobility in the UK Semiconductor Industry, to ensure that more capable and motivated students have the opportunity to enter this exciting and growing field.

For 2026/27, a total of 400 awards will be made, 300 to individuals starting an Electrical and Electronic Engineering (EEE) degree (or a closely related subject) and a further 100 Awards to individuals starting Computer Science, Materials Science or Physics degrees. To be eligible, you must be studying at a UKESF Partner University starting in September/October 2026. Read our [Application Guide](#) for the full eligibility criteria.



**Funded by
UK Government**





UK Electronics
Skills Foundation

The Rt Hon Kanishka Narayan MP

Minister for Artificial Intelligence



Department for
Business, Innovation,
Science and Trade





UK Minister for AI
Kanishka Narayan MP



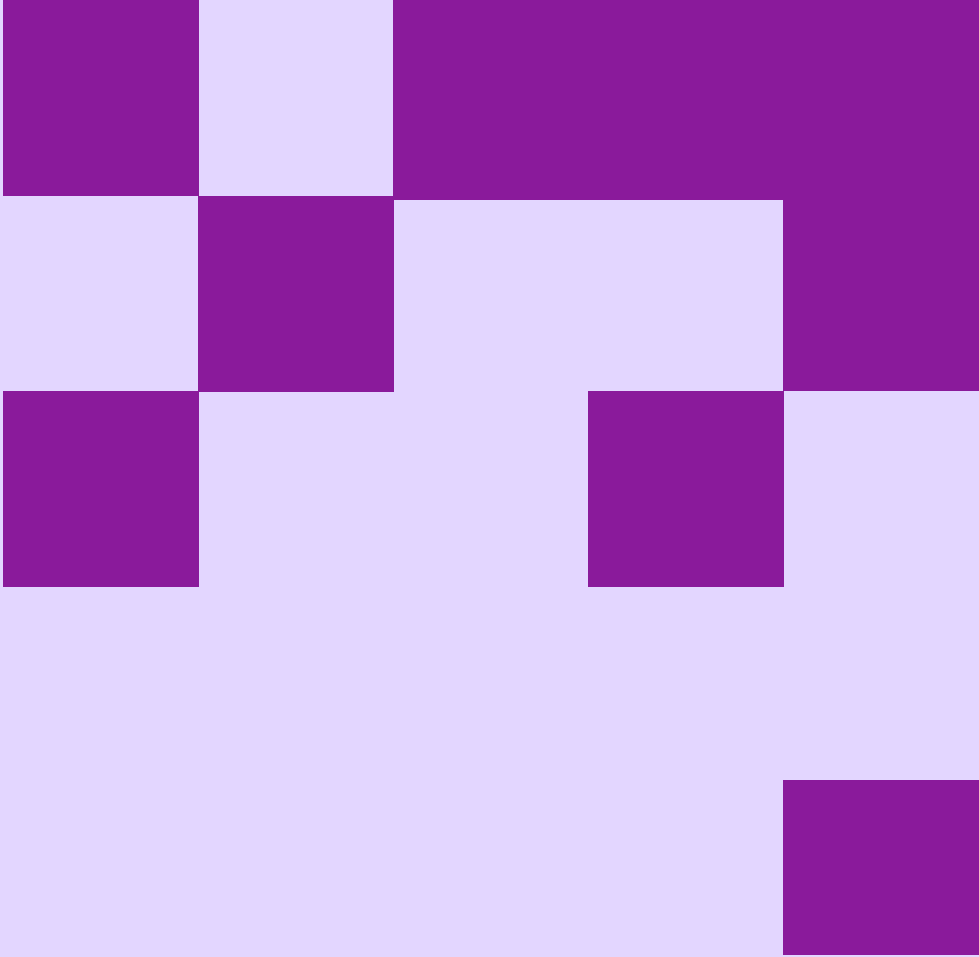
UK Electronics
Skills Foundation

Jan Taylor
UKRI/Innovate UK



UK Research
and Innovation

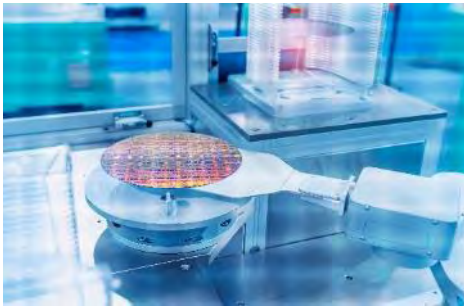




Innovate UK – Semiconductors 2026

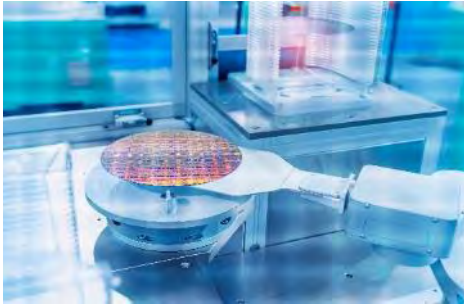
Mr. Jan Taylor
Innovation Lead - Semiconductors

Dr. Jessica Dobson
KTM Emerging Technologies



Outline

- **Intro**
- UKRI, Innovate UK and EPSRC
- UK Semiconductor Landscape
- Summary



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Who are Innovate UK and EPSRC within UKRI?

- We are the UK's Research & Innovation agency
- A key delivery body of HMG's R&I policies and strategies
- We support academic research and business-led innovation in all sectors, technologies and UK regions

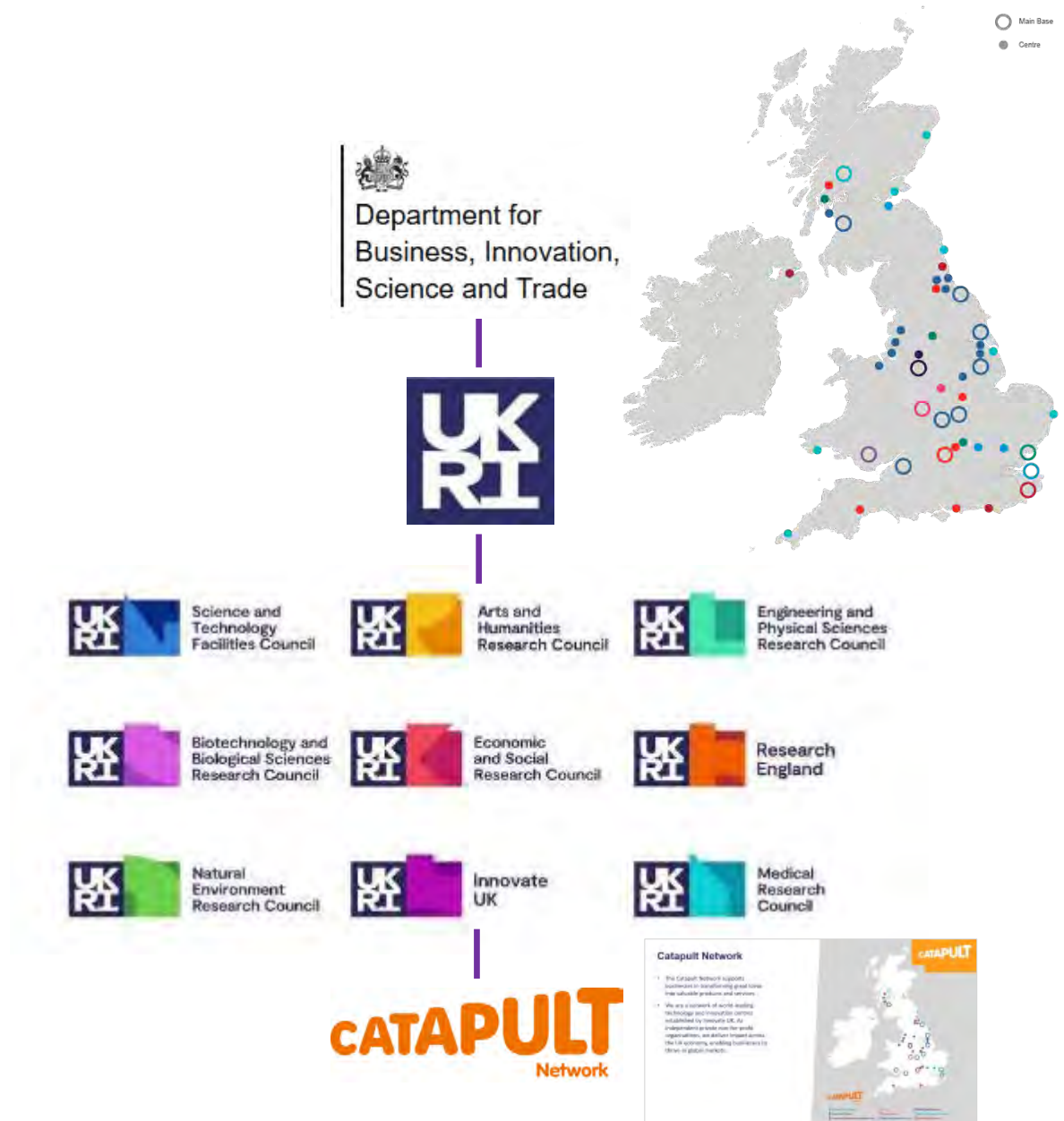
Innovate UK mission

To help UK businesses grow through the development and commercialisation of new products, processes, and services, supported by an outstanding innovation ecosystem that is agile, inclusive, and easy to navigate



EPSRC mission

To support new ideas and transformative technologies which are the foundations of innovations that improve our economy, environment and society, by investing in world-leading research and skills



OUR VISION AND MISSION

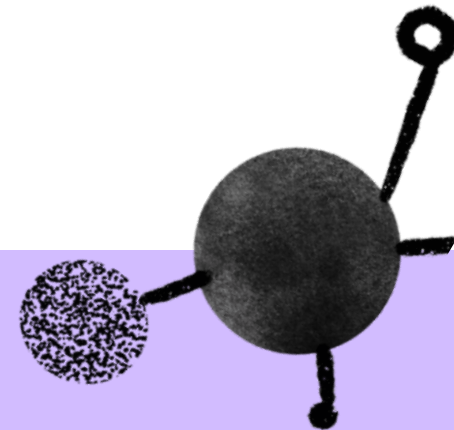
OUR VISION

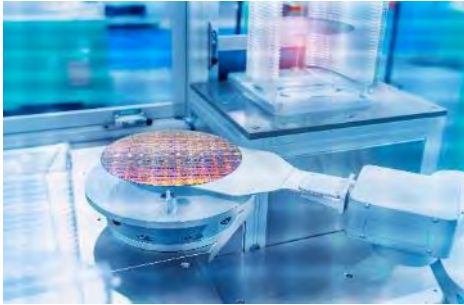
Our vision is for a UK where breakthrough ideas become industry giants.

OUR MISSION

Our mission is to accelerate business innovation for the nation.

We will help breakthrough technologies become scalable businesses – turning innovation into commercial and economic growth.





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UK Semiconductor Sectoral Analysis

- Dedicated companies generated an estimated £10.6bn in revenue, £7.5bn in GVA and directly employed approximately 16,350 people in 2025 - up 7%, 9% and 9% respectively since the baseline study.
- The sector is estimated to support up to ~32,550 jobs across the economy.
- Average GVA per employee among dedicated semiconductor companies is estimated to be approximately £460k.
- Dedicated companies employ an estimated 15,000 people in the UK. UK headquartered companies account for more than 60% of this total
- There is evidence of greater government support for the sector since the publication of the National Semiconductor Strategy, at both national and regional levels, spanning R&D, skills and use of public finance institutions
- Future revenue scenarios suggest that dedicated UK semiconductor revenues could be between £13bn and £17bn by 2030. The difference in semiconductor revenues over the six years to 2030 under the low and constant (high) growth scenarios is estimated to be £13.5bn



UK Modern Industrial Strategy - Digital and Technologies

The **UK's Modern Industrial Strategy** backs 8 Sectors (*aka IS-8*)

- Advanced Manufacturing
- Clean Energy Industries,
- Creative Industries,
- Defence,
- Digital and Technologies,
- Life Sciences
- Financial Services
- Professional & Business Services

Digital and Technologies Sector Plan emphasises the importance of semiconductors as one of the “frontier technologies”, along with

- *Advanced Connectivity Technologies*
- *AI*
- *Cyber Security*
- *Engineering Biology*
- *Quantum Technologies*
- *Semiconductors*

Collection

The UK's Modern Industrial Strategy 2025

Policy papers, Sector Plans and documents in support of the UK's Modern Industrial Strategy.

Policy paper

Sector Plans

Updated 8 September 2025

DIGITAL AND TECHNOLOGIES

Sector Plan

Application Areas aligned to IS-6*

		Medical	Automotive	Aviation	Maritime	Space	Nuclear	Energy	Electrification	Comms	Cryogenic	Chemical	Robotics
	Advanced Manufacturing												
	Clean Energy												
	Creative Industries												
	Defence												
	Life Sciences												
	Digital and Technologies AI, ACT, EB, SC, QT, Cyber												

*IS-6 is the subset of IS-8 without “Financial Services” and “Professional & Business Services”, which IUK are targeting directly

Semiconductors are a UK wide sector creating high value jobs and growth

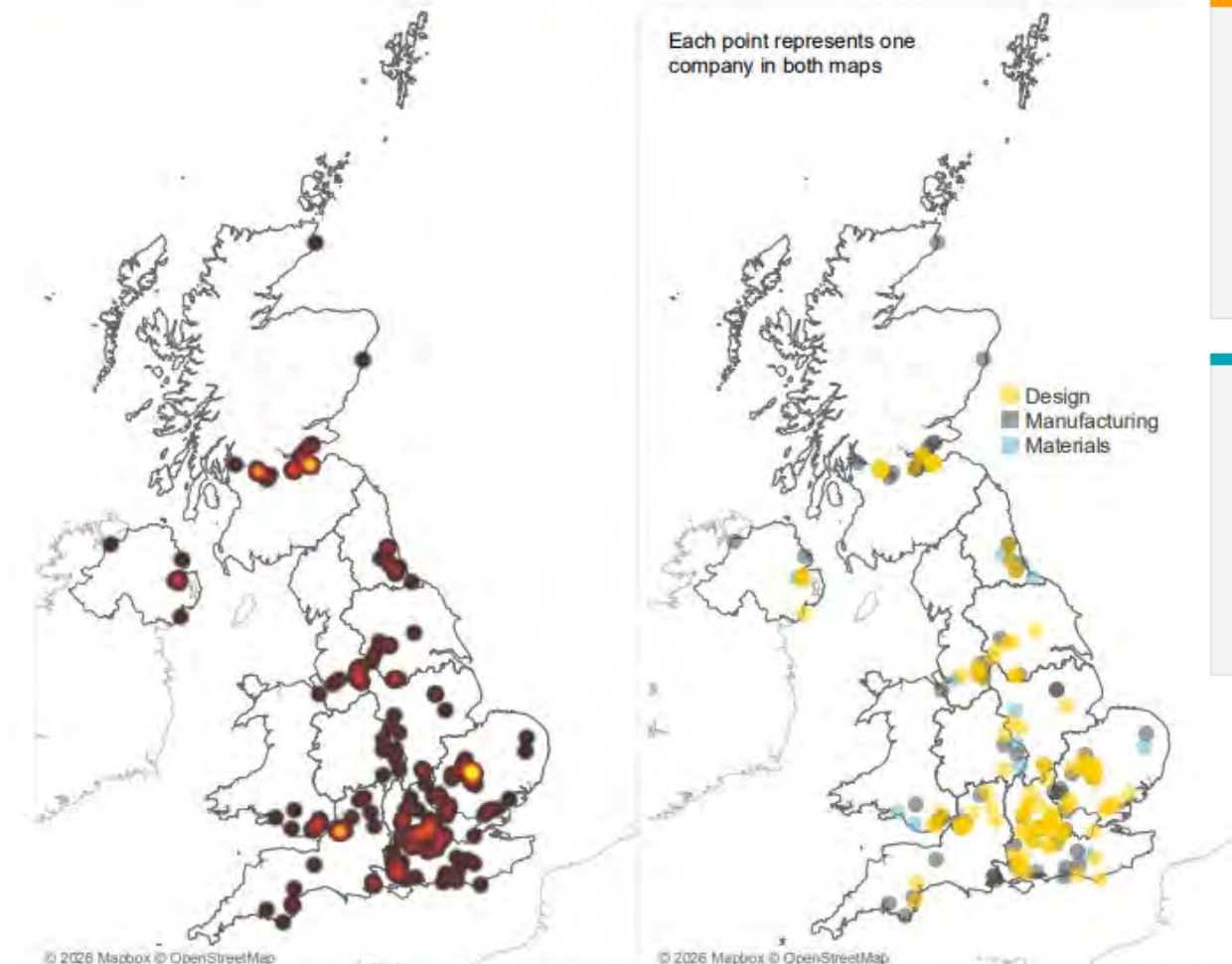
Cross-UK spread with clusters of activity present in all four nations

Design clusters in and around London, particularly in Cambridge. Other clusters near Bristol and Southampton

Main manufacturing clusters are in Scotland, Wales and the North East.

However, there is significant design activity in Scotland, and manufacturing in Cambridge.

FIGURE 3.6 – UK SEMICONDUCTOR CLUSTERS (DEDICATED COMPANIES)



HIGH-VALUE JOBS

£52,000

Average semiconductor fab salary in South Wales

60% higher than the UK average

FUTURE GROWTH OPPORTUNITY

~8% a year

Forecast average growth in the UK sector, every year to 2030

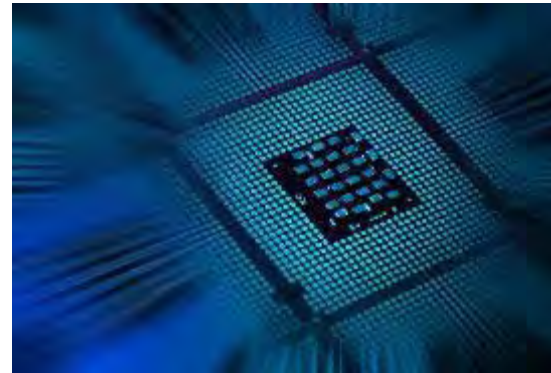
Compounding – growth that builds year on year

What are the UK Strengths?



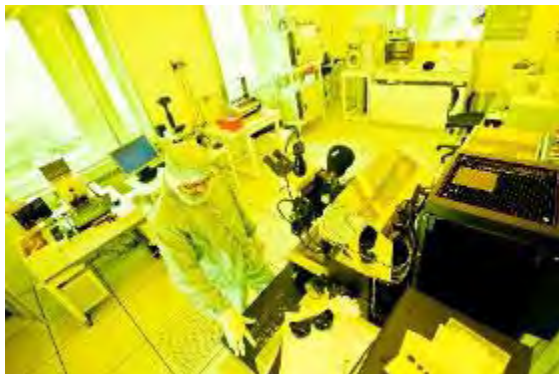
Research Strengths

- Photonics / photonic systems integration
- Integrated circuit design
- Compound semiconductors
- Embedded security, on chip
- Polymer electronic materials
- New and advanced materials



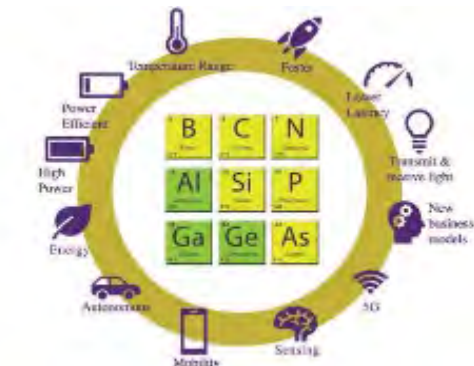
Semiconductor Design/IP

- Over 100 semiconductor design/IP companies,
- Global companies in IP, AI, SoCs, IoT, graphics
- World leading chip-design sector with clusters including Cambridge, Bristol and Edinburgh



Compound, Advanced Materials, Advanced Packaging

- Strengths across the UK, including South Wales, Scotland, NE England, Cambridge, SW England
- World leading advanced materials companies
- uWBG – GaN, SiC, Ga₂O₃
- Photonics, PICs, Co-Packaging
- Heterogeneous/Hybrid



World Leading home-grown companies

Across the UK, the sector spans long-standing firms alongside newer startups, and some 92% of dedicated semiconductor companies qualify as SMEs.



Founded: 1990
HQ: Cambridge
Valuation: \$270B*

The UK's most significant semiconductor company and largest technology company. Its technology is used in almost all modern smartphones, and in AI data centres, including Nvidia products. It is majority owned by Japan's Softbank Group and listed on the US stock exchange.

Startups



Founded: 2022
HQ: London
Valuation: ~£1bn

Innovative startup working on AI inference chips, raised \$220m in their Series B fund-raising round this year. They have redesigned the chip architecture to increase the speed of AI inference.



Founded: 2024
HQ: London
Valuation: ~£3bn

Innovative startup working on AI inference chips, raised over \$500m this year. They use photonics to increase the speed of AI inference.

Scale-ups



Founded: 2010
HQ: Cambridge
Valuation: £500m

Advanced material flexible IC manufacture
Makes innovative, low-cost, sustainably produced flexible chips for smart packaging.



Founded: 2018
HQ: Cambridge
Valuation: Unclear

First company in the world to mass produce graphene-based electronic devices using standard semiconductor processes.

Established



Founded: 1977
HQ: Leeds
Valuation: £570m

Designer and manufacturer of high-performance Radio-frequency (RF) solutions for Aerospace and Defence industry, including SpaceX.



Founded: 1988
HQ: Cardiff
Valuation: £650m

Compound semiconductor wafer manufacture
Founder and anchor of South Wales Cluster.
Expanding and growing due to the AI boom.

Home to important international companies

The UK also hosts significant international companies, especially in manufacturing. Dedicated, UK headquartered companies are typically smaller than their international counterparts.

81% of UK headquartered companies are either micro or small, compared to 54% of internationally headquartered UK entities.



APPLE – CAMBRIDGE

Multinational technology company, who have a significant semiconductor design presence in the UK, centred in Cambridge.



VISHAY INTERTECHNOLOGIES – South Wales

Global manufacturer of electronic components that are used in a wide range of modern technology, including automotive, medical, aerospace and computing. They have one of the largest facilities in the UK in South Wales.



KLA – South Wales

One of the largest manufacturers of semiconductor manufacturing equipment in the world, with a significant presence in South Wales.



NEXPERIA – Manchester

A global company with components utilised across the automotive sector, they have a significant manufacturing footprint just outside Manchester.



SEAGATE – Northern Ireland

Seagate's Derry fab is the most advanced and largest UK fab, and produces a third of the world's lasers for hard drives.

Delivering the Plan: £1.1bn+ across four pillars

Innovation

- Expanded ARIA Scaling Inference Lab testbed to commercialise novel AI hardware
- AI Hardware Innovation Programme providing R&D support to AI hardware companies

Skills and Talent

- New Centre for Doctoral Training in Chip Design, plus bursaries, schools outreach and teaching fellowships
- 500 additional PhD students supported through TechFirst

Investment

- Deeptech venture fund led by Playground Global, backed by up to £150m from the British Business Bank
- £500m support for AI hardware companies through the Sovereign AI fund, prioritising compute

Procurement

- £750m heterogeneous AIRR supercomputer integrating multiple chip types
- £400m for specialised AI hardware, including a £150m Advance Market Commitment for inference chips

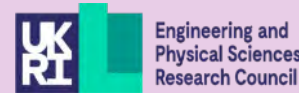
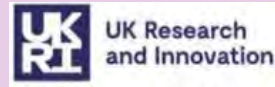
AI – (“...the AI Hardware Action Plan..... and it’s not all compute”)

- “AI hardware should be understood as **the chips and semiconductor technologies that underpin AI, required to enable capability across data centre, edge and embodied AI systems.**”
 - Compute
 - Photonic interconnects and data movement -
 - Sensing
 - Power and energy systems
- “The UK has **differentiated strengths** within industry and academia across a range of AI **enabling semiconductor technology areas**”
 - **Leading materials science and specialist manufacturing**
 - A **world-leading research base** with a long history in computer science, electronic and photonic engineering, and quantum computing.



UK Semiconductors - it's a wide ecosystem.....

Government



Trade



Missions & Outcomes

ECOSYSTEM & ADVOCACY

We will have a more
connected and visible
UK innovation
ecosystem

STRATEGY & ROADMAP

We will have an aligned
strategy including a
long-term roadmap
guiding investment

SCALE-UP

We will have
accelerated the scale-
up and growth of UK
semiconductor
companies

INTERNATIONAL

We will have stronger
global partnerships and
greater inward
investment

WORKFORCE

We will have developed
the skilled workforce
the sector needs

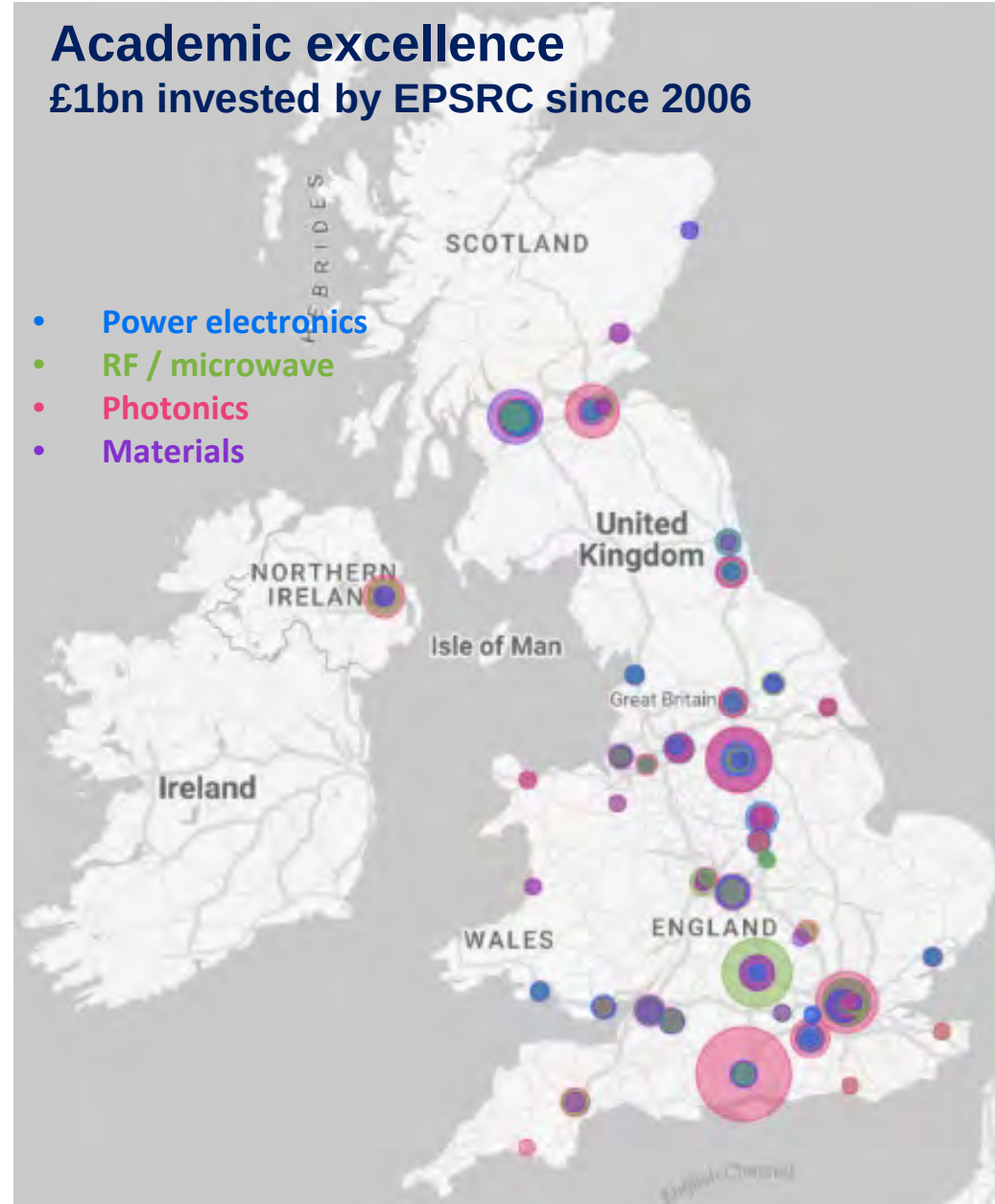
Semiconductor research & innovation capabilities

- [Future Photonics Hub](#)
- [National Epitaxy Facility](#)
- [Future Compound Semiconductor Manufacturing Hub](#)
- [Royce Institute](#) - Advanced Materials
- [REWIRE IKC](#) - Wideband Gap Semiconductors
- [C-PIC IKC](#) - Silicon Photonics
- [CHIMES IKC](#) – Heterogeneous Integration
- [NEUROWARE IKC](#) - Neuromorphic computing hardware
- [NMIS](#), [ANZIC](#), [NASPIC](#) - Manf, NZ, AdvPack
- [eFutures](#) - Academic Network for electronics



Academic excellence
£1bn invested by EPSRC since 2006

- Power electronics
- RF / microwave
- Photonics
- Materials



Innovate UK Competitions

- Smart Electronic Systems – Components
 - ~£10M
 - Collaborative R&D for novel components for integration into systems
 - In project setup phase, projects going live this month
- ACT and Semiconductors – Investor Partnerships
 - ~£15M
 - Semiconductors for AI hardware, Technologies for ACT and Semiconductor applications in ACT
 - Opportunity was opened for applications on Tuesday
- National Materials Innovation Programme
 - Various opportunities relevant to materials that underpin semiconductor devices and packaging

Recent(ish) - UK Government News

Policy paper

National semiconductor strategy

Published 19 May 2023

Corporate report

UK Space Agency Corporate Plan 2025-26

Published 13 October 2025

Collection

The UK's Modern Industrial Strategy 2025

Policy papers, Sector Plans and documents in support of the UK's Modern Industrial Strategy.

techUK news and views 17 Mar 2026

UK Government announces up to £2 billion for quantum technologies

Policy paper

Advanced Manufacturing Sector Plan

The plan to increase investment and growth in Advanced Manufacturing, as part of the UK's Modern Industrial Strategy.

Policy paper

Creative Industries Sector Plan

This Plan will ensure that the UK is the number one destination worldwide for investment in creativity and innovation and aims to significantly increase investment by 2035.

Policy paper

Clean Energy Industries Sector Plan

The UK's plan to create investment, growth, and good jobs in clean energy industries, as part of the UK's Modern Industrial Strategy.

Policy paper

Defence Industrial Strategy 2025: Making Defence an Engine for Growth

The defence sector plan of the UK's Modern Industrial Strategy.

Policy paper

Life Sciences Sector Plan

The Life Sciences Sector Plan sets out a vision and an action plan to drive growth, innovation, and better health outcomes.

Policy paper

Digital and Technologies Sector Plan

The UK's Plan to drive growth in the digital and technologies sector and unlock growth in the technologies of the future as part of the UK's Modern Industrial Strategy.



Innovate
UK

Recent - UK Government(ish) News

Area of investment and support

National Materials Innovation Programme

The National Materials Innovation Programme (NMIP) aims to establish a nationally coordinated approach to the UK advanced materials sector, driving the translation and adoption of materials across key industrial sectors.

techUK news and views 17 Mar 2026

UK Government announces up to £2 billion for quantum technologies

Correspondence

CST advice on growth and global leadership in photonics

Published 9 March 2026

Compound Semiconductor Applications Catapult to transition to Semiconductor Catapult, as part of the AI hardware plan

Press release

UK-Japan Frontier Technology Partnership

UK-Japan Frontier Technology Partnership.

Policy paper

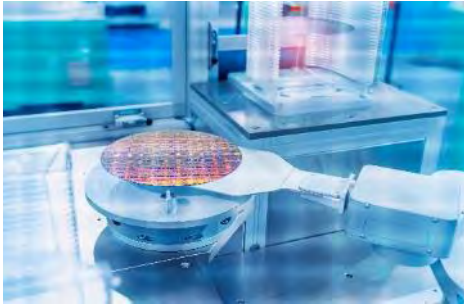
UK AI Hardware Plan

Published 8 June 2026



Outline

- Intro
- IUK Prospectus
- UK Semiconductor Landscape
- Global Semiconductors Landscape
- **Summary**



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Technology Summary

- **Technical Convergence:** High value applications are developing quickly especially at the convergence of critical technologies – AI, Quantum, Telco, Photonics, etc.....
- **Co-Design is Mandatory:** Successful deployment requires the simultaneous development of advanced WBG/UWBG crystal growth and thermo-mechanically matched packaging solutions;
- **Geopolitical and Infrastructure Imperative:** Developing sovereign capability in harsh-environment electronics directly de-risks the UK's energy, defence, and utility grids from external supply shocks, shifting the UK from a technology importer to a critical global exporter of high-reliability components.
- **Commercialisation Pathway:** Immediate R&D priorities should focus on materials developments, packaging processes and standardising metrology to accelerate the transition of lab to market with fully qualified industrial applications.
- **Advanced semiconductor packaging** is evolving into a **system-level technology platform**, integrating materials science, electromagnetics, and thermal engineering to enable **resilient, high-performance electronics in the most demanding environments.**

■ **THANK YOU**
■ Any questions?



UK Electronics
Skills Foundation

Dr Matthew Smith
University of Bristol



UK Electronic Skills Foundation **Semiconductor Talent Award** Birmingham, September 2026

Dr. Matt Smith

CDTR, School of Physics, University of Bristol

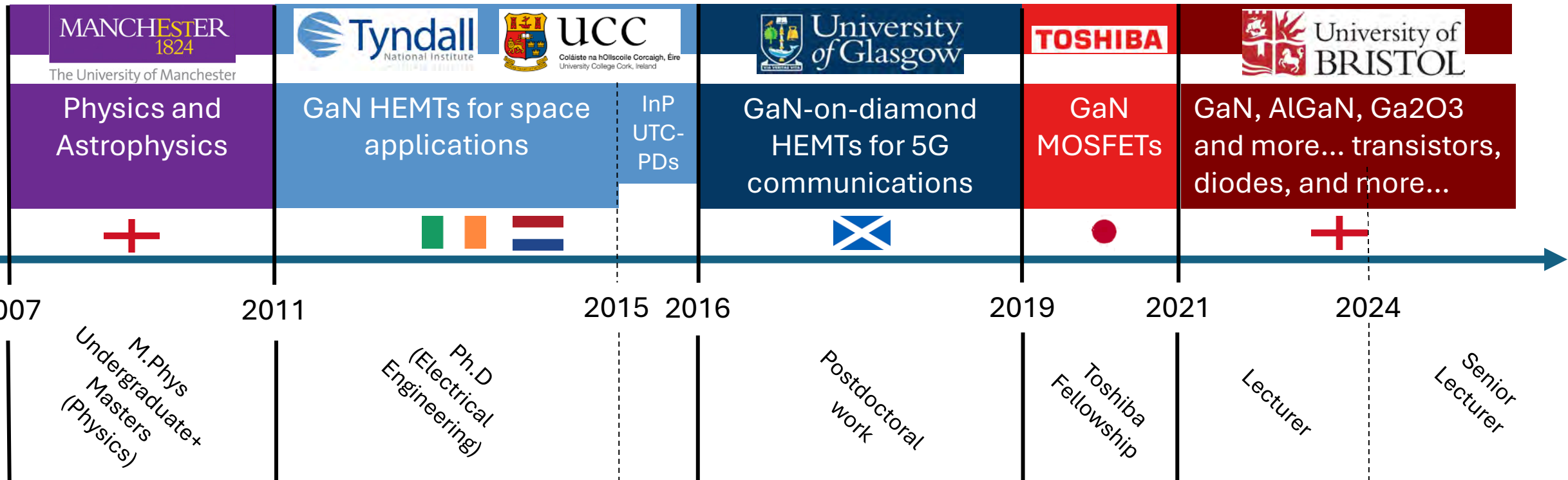
matt.smith@bristol.ac.uk

My career journey

Research into semiconductors for:
Space applications

5G

Power grids, electric vehicles etc.

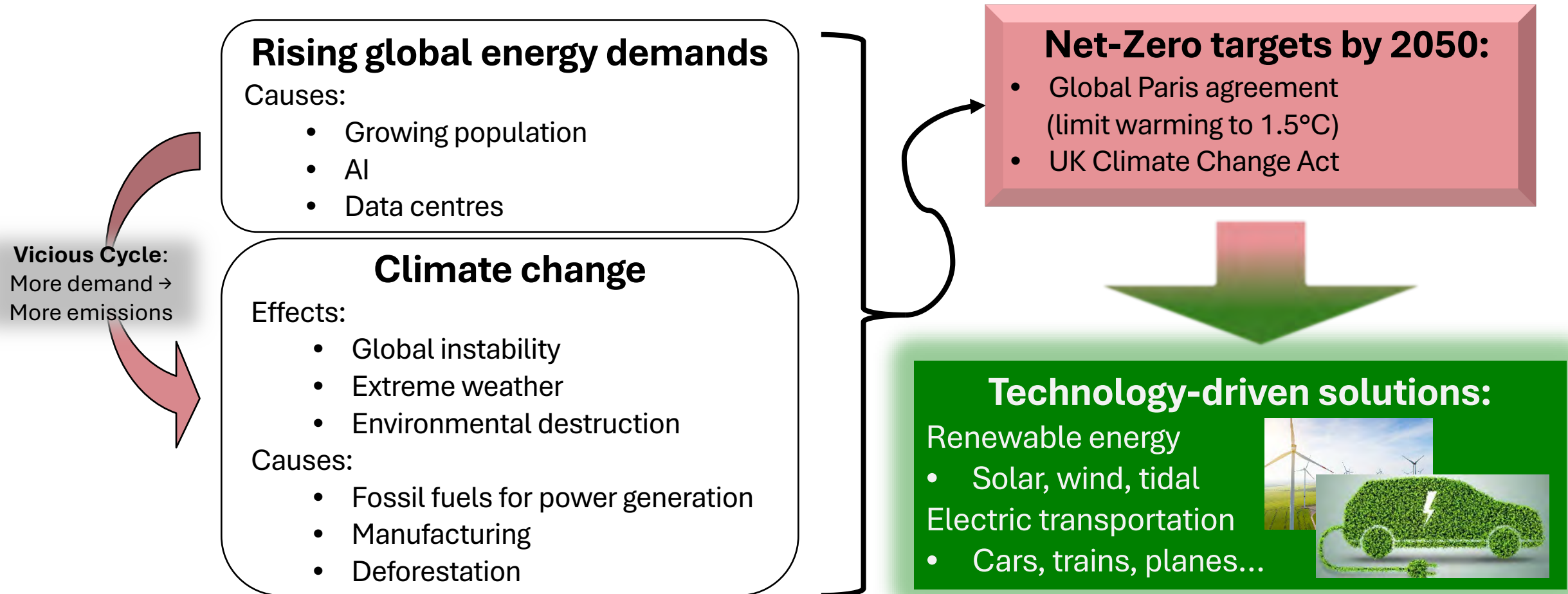


+ conferences & workshops around the UK & internationally



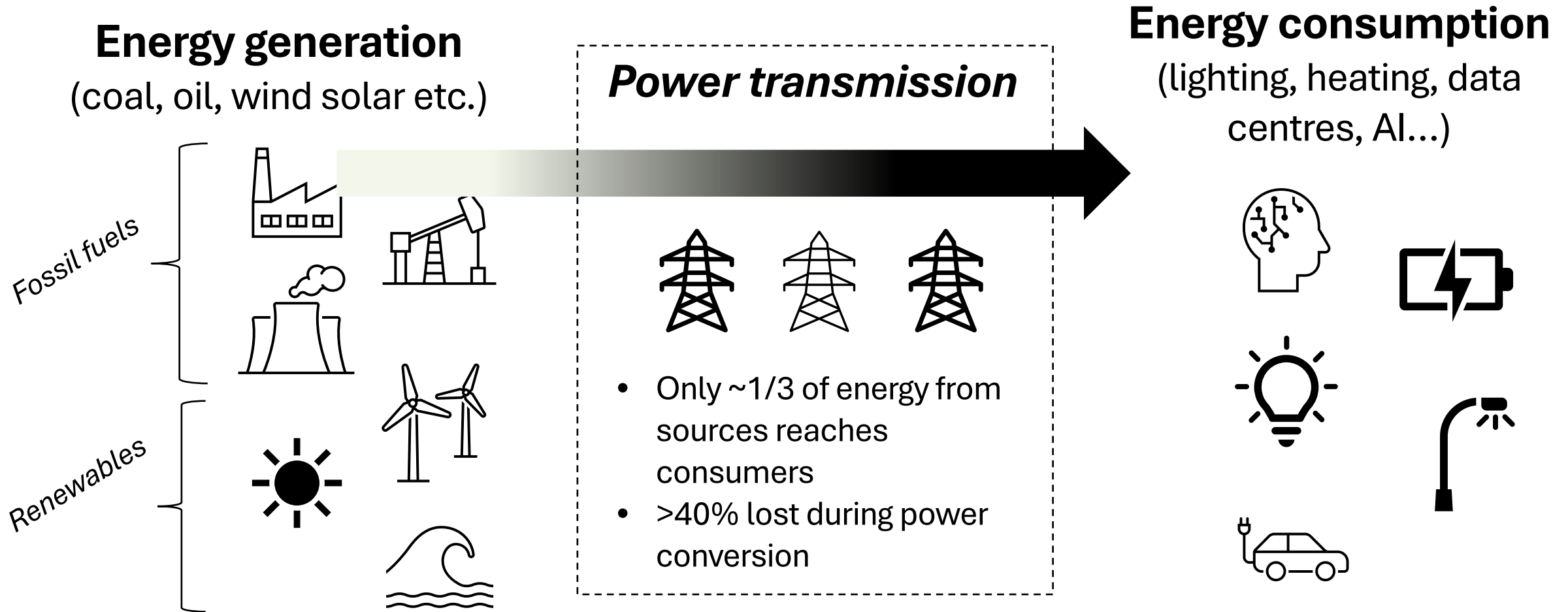
Motivation for researching power semiconductors

Snapshot in 2026: The defining issues of our time



Motivation for researching power semiconductors:

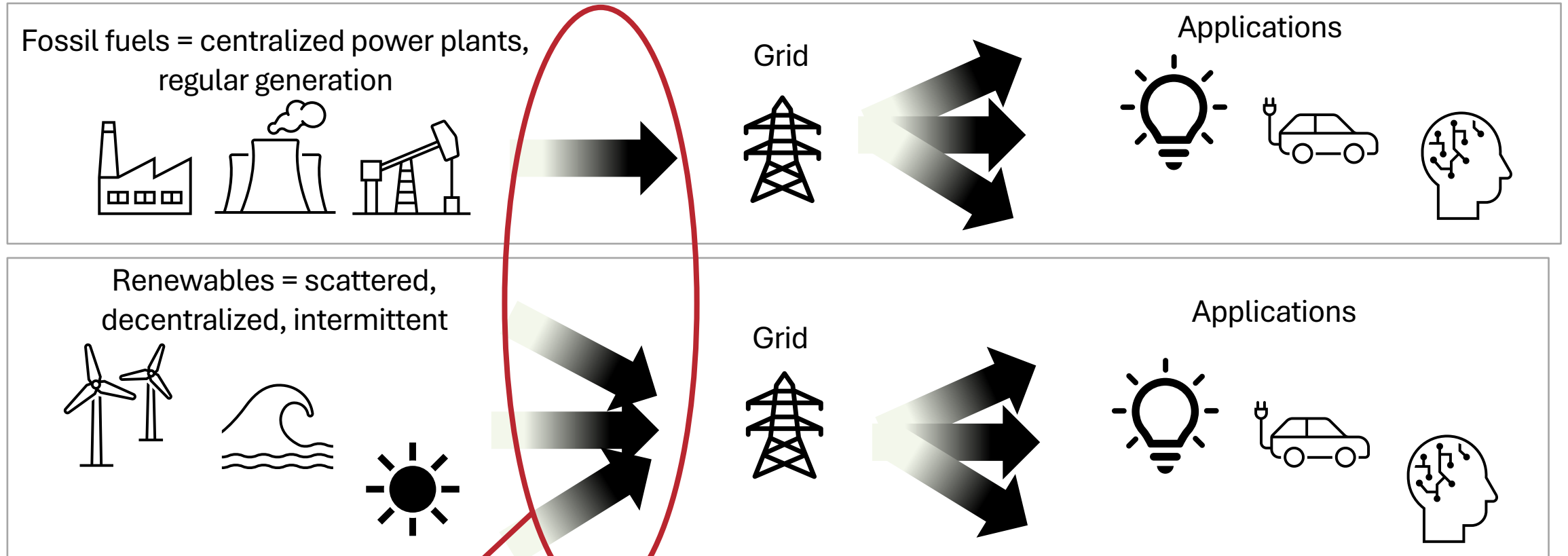
Power grid efficiency



Motivation for researching power semiconductors:

Power grid efficiency

Changes in the way energy is generated...



...means changes in the way it is distributed

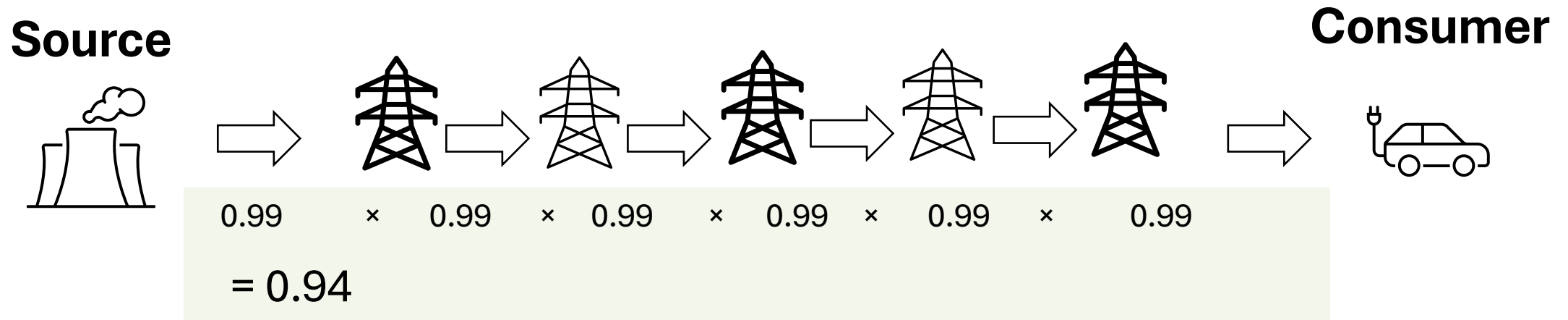
New infrastructure required!

Motivation for researching power semiconductors:

Existing silicon-based solutions

Electrical power needs to be converted to different voltages during transfer from source to consumer

- Existing silicon-based convertors can be up to **95% efficient!**



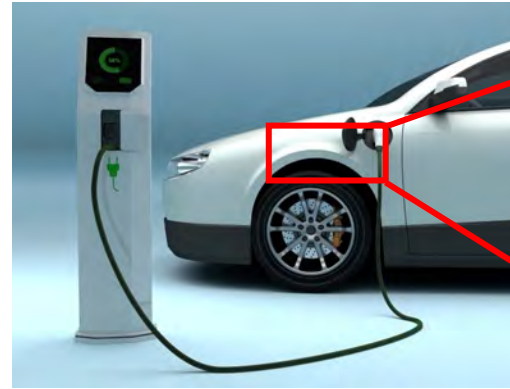
- ... but 5% adds up
- Wide bandgap semiconductors* can improve this to > 99%

Motivation for researching power semiconductors:

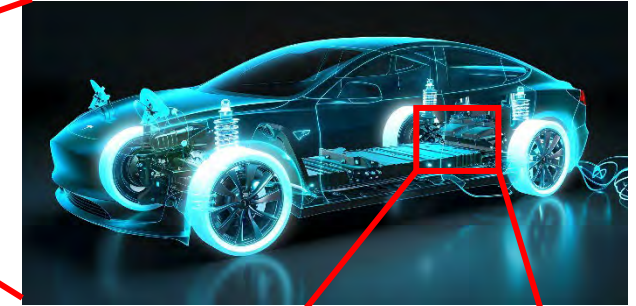
Electric vehicles

- Large, inefficient mechanical components are being replaced by efficient power conversion circuits
- Circuits consist of power devices, so device efficiency is fundamental!

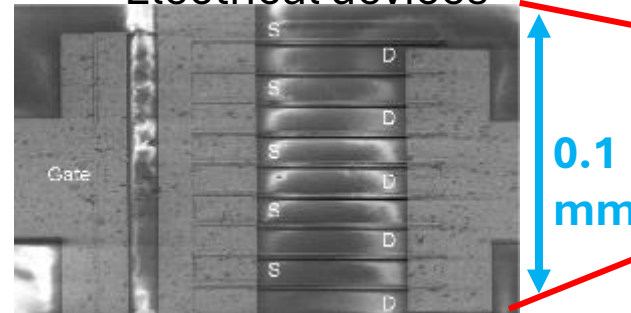
Example application: electric vehicle



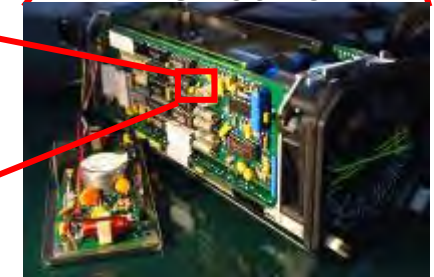
Powertrain



Electrical devices



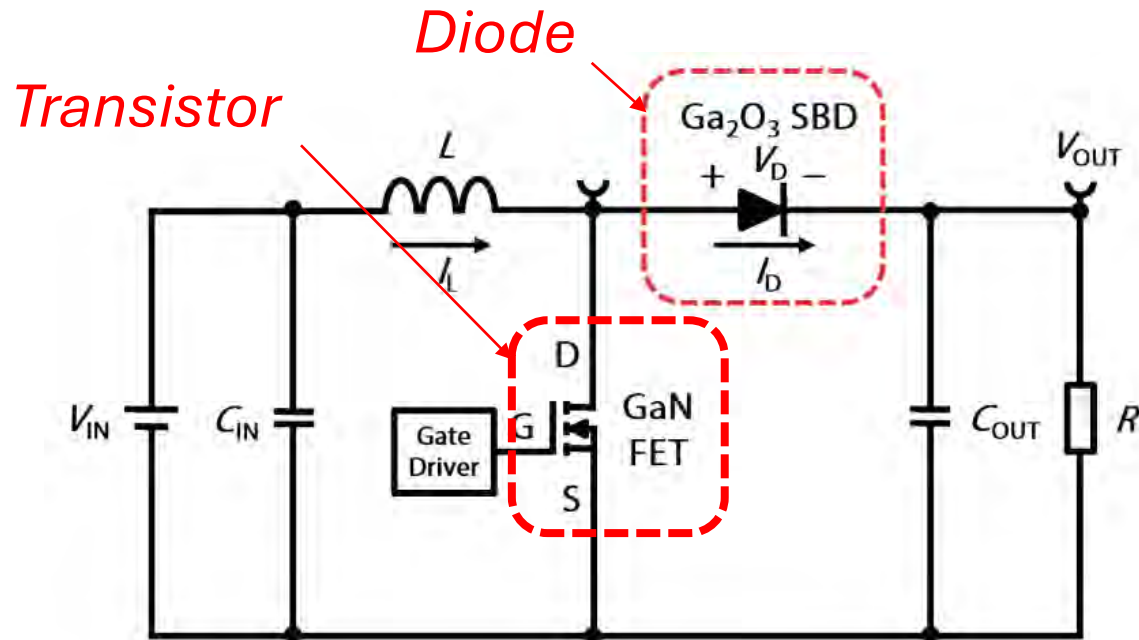
Circuits



Other applications: renewable energy generation, smart power grids, heavy industry...

Power devices applications: e.g. DC-DC converter

Switch-mode power converter circuits are used to convert input voltage (e.g. from mains) to an output voltage (e.g. laptop power supply) with very high efficiency



Power devices form the main active components of buck, boost and buck/boost converters

What properties of a **power device** are desirable for a power switching circuit?

- Compromise between the breakdown voltage and on-resistance (needs to be rated for high voltage as it sees a summation of the supply voltage and the inductor voltage)

Guo et al., 2023 <https://doi.org/10.1088/1674-4926/44/7/072805>

The ideal power device (it doesn't exist)

A power device (e.g. a transistor) controls the flow of electrical energy.

→ It can be turned **on** or **off**

An ideal power device should will have the following properties:

On-state:

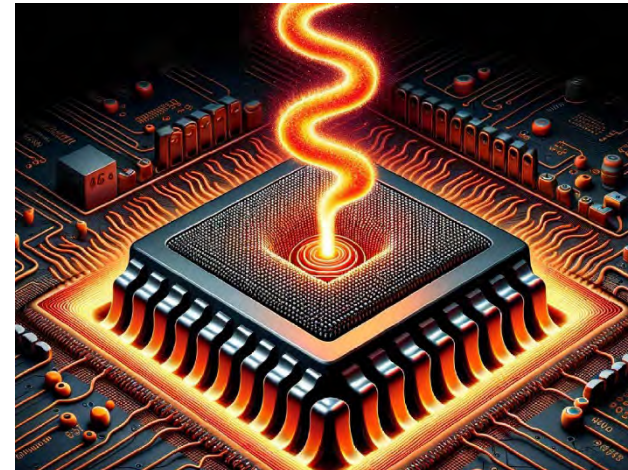
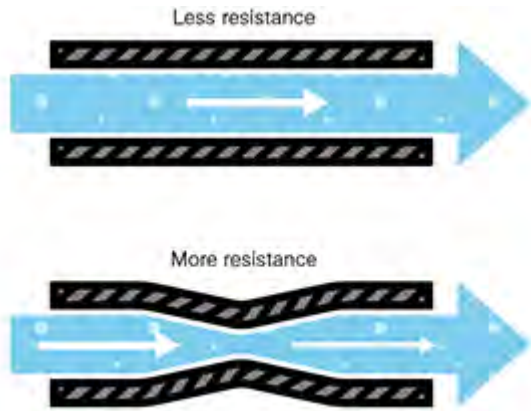
- Zero resistance, i.e. 100% efficient

Off-state:

- Infinite resistance
- Infinite blocking capability

General:

- Small area/volume
- Doesn't heat up
- Fast, efficient switching



Existing power devices (mostly silicon-based)

Most existing commercial power devices use **silicon** as the semiconducting material.

This has advantages: cheap, abundant, well understood, easy to work with....

There have been huge advancements over the decades, with innovative device concepts, structures, material growth techniques, fabrication methods....

However, there is a **fundamental limit**, and state-of-the-art silicon-based devices are still:

On-state:

- High resistance, so low efficiency

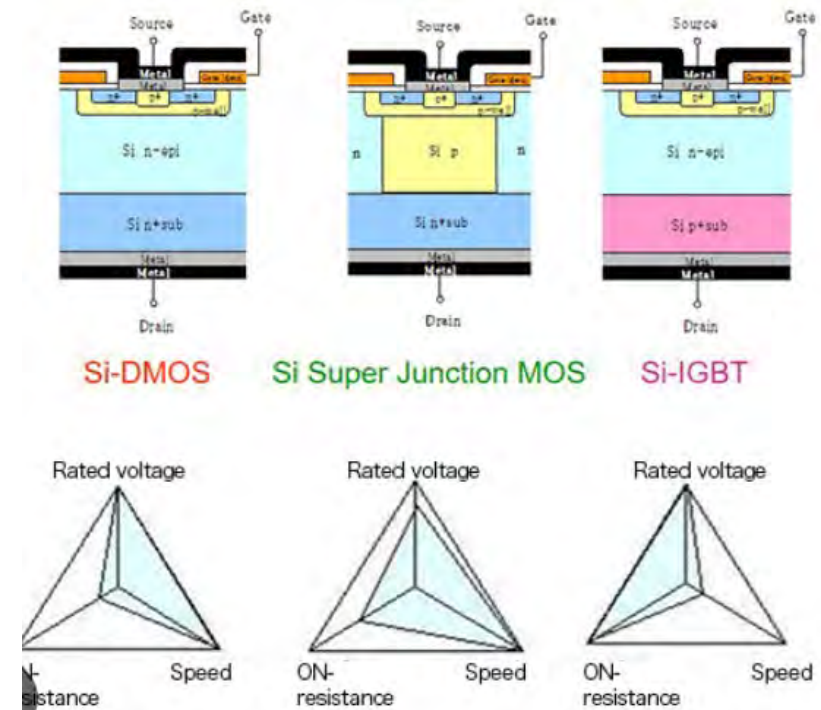
Off-state:

- Low blocking voltage
- High leakage current

General:

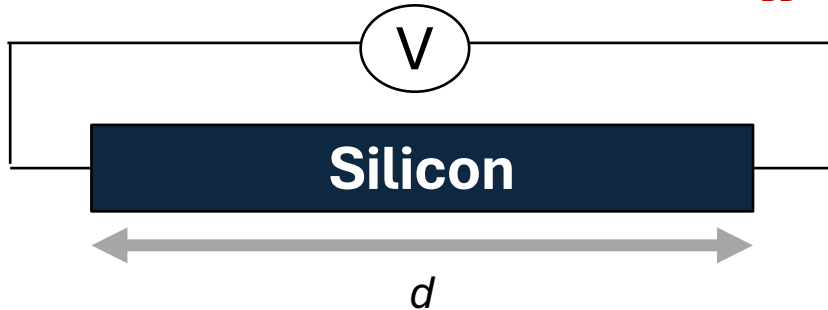
- Large area
- Gets hot

How can power electronic device efficiency be improved beyond the fundamental limits of silicon?



What makes a good power electronic material?

- Device specification typically defined by the **application voltage** (100 V, 600 V, 10kV...)
- Semiconductor devices should be able to withstand this voltage in the off-state without experiencing ‘breakdown’ (= lose ability to control the device)
 - Device breakdown voltage, V_{BD} , is determined by its **critical field**, E_{crit} , and **dimensions**, d :

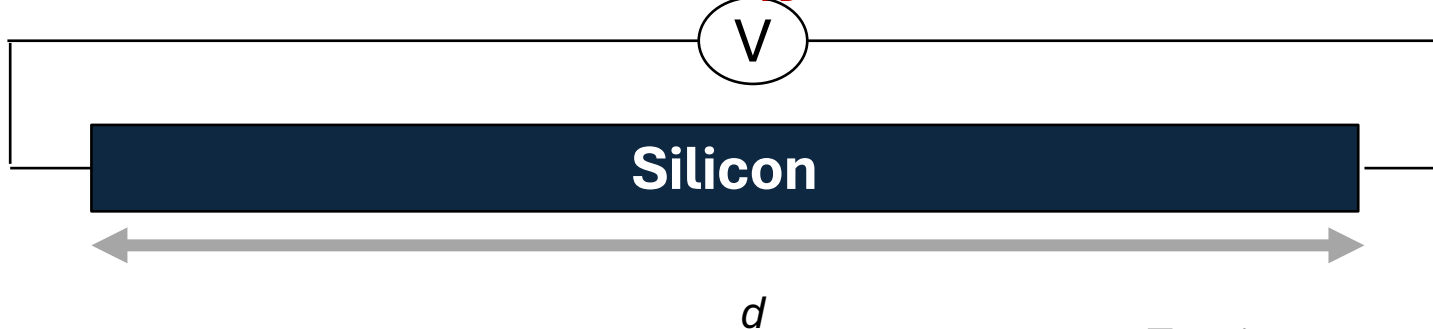


$$V_{BD} = E_{crit} \times d$$

- E_{crit} is a property of the material ($E_{crit}^{Si} \sim 0.1 \text{ MV/cm}$)
- So, to increase V_{BD} we need to use more material...

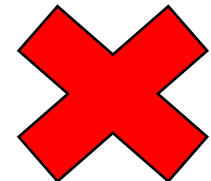
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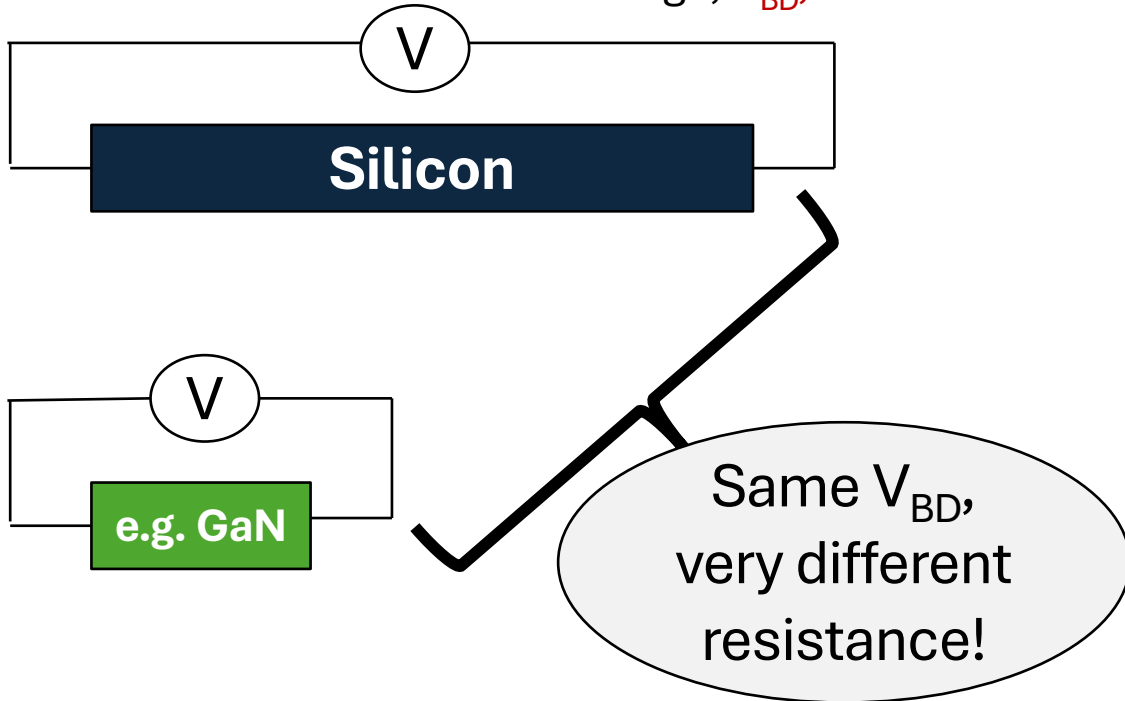
- E_{crit} is a property of the material ($E_{crit}^{Si} \sim 0.1$ MV/cm)
- So, to increase V_{BD} we need to use more material...
- This increases the resistance, so reduces efficiency...
→ Device heats up, wastes energy!



Can we improve off-state blocking voltage, V_{BD} , without also decreasing the efficiency in on-state?

What makes a good power electronic material?

- Device specification typically defined by the application voltage (100 V, 600 V, 10kV...)
- Semiconductor devices should be able to withstand this voltage in the off-state without experiencing 'breakdown' (= lose ability to control the device)
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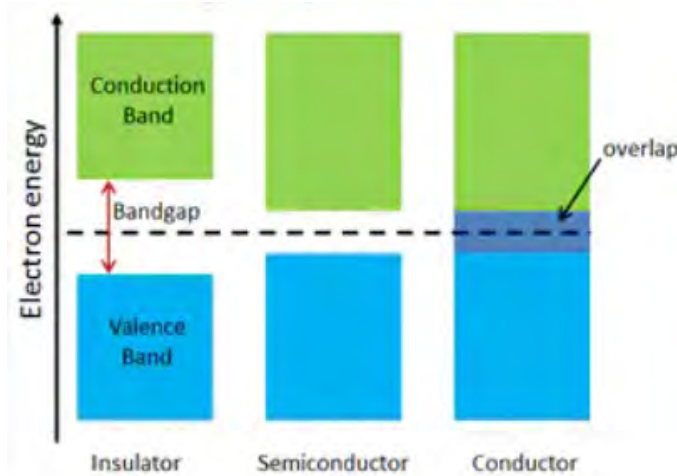
$$V_{BD} = E_{crit} \times d$$

- We can use materials with higher E_{crit} to achieve the same high breakdown voltage with less material:
 - Lower resistance, higher efficiency, less energy wasted as heat

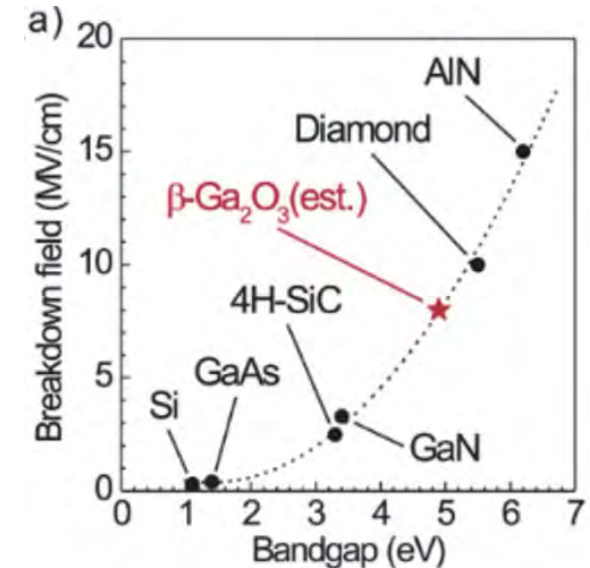


Wide and ultrawide bandgap semiconductors

E_{crit} of a semiconductor depends on its electronic **bandgap**

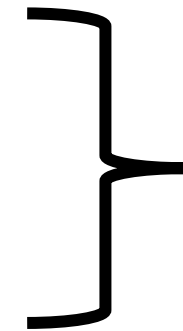


B	C	N	O
Al	Si	Ph	S
Ga	Ge	As	Se
In	Sn	Sb	Te
Tl	Pb	Bi	Po



Beyond E_{crit} , other important material factors include:

- Carrier transport properties (mobility, saturation velocity)
 - Thermal properties
 - Manufacturability/scalability
- + many more!



Figures of merit, e.g.

Baliga FOM =

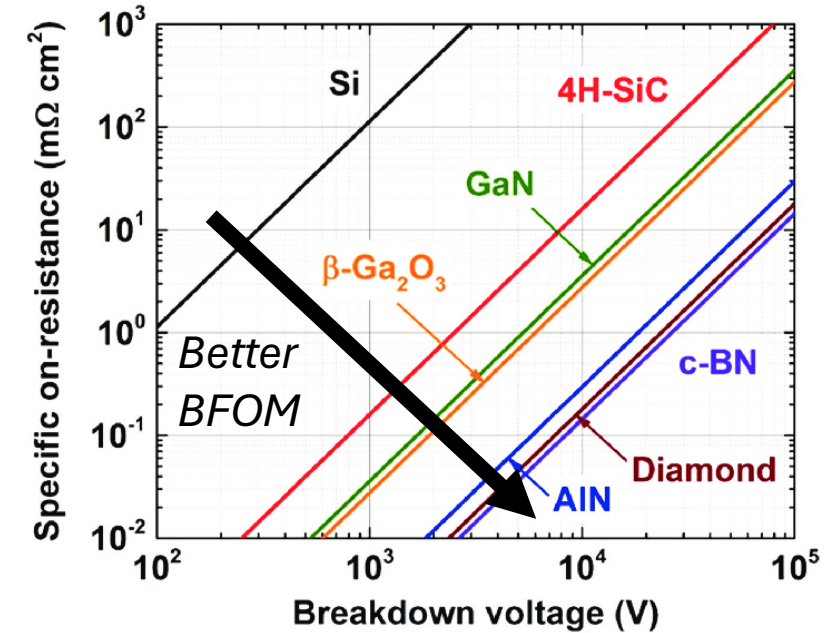
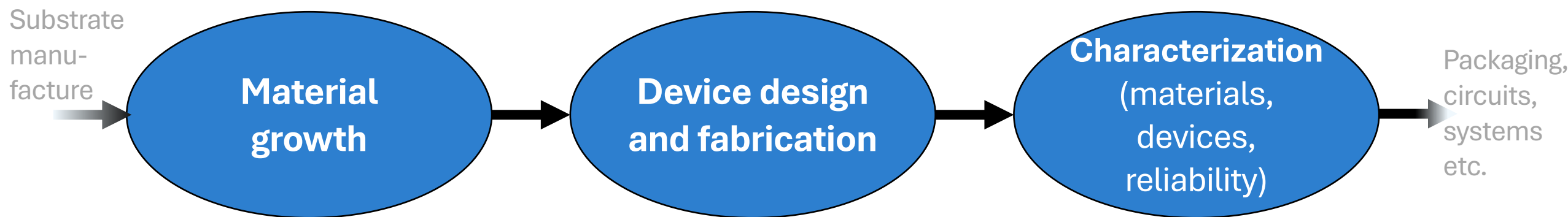
$$\text{BFOM} = \epsilon_s \cdot \mu \cdot E_g^3$$

CDTR: From materials to devices

We work on a range of wide and ultrawide materials and devices in the CDTR, including:

- GaN
- AlGaN, AlN
- (Al)Ga₂O₃
- Diamond

What we do:



CDTR: From materials to devices

We work on a range of wide and ultrawide materials and devices in the CDTR, including:

- GaN
- AlGaN, AlN
- (Al)Ga₂O₃
- Diamond

What we do:

Substrate
manu-
facture

**Material
growth**

- New materials
- New structures
- New techniques
- Heterogeneous integration

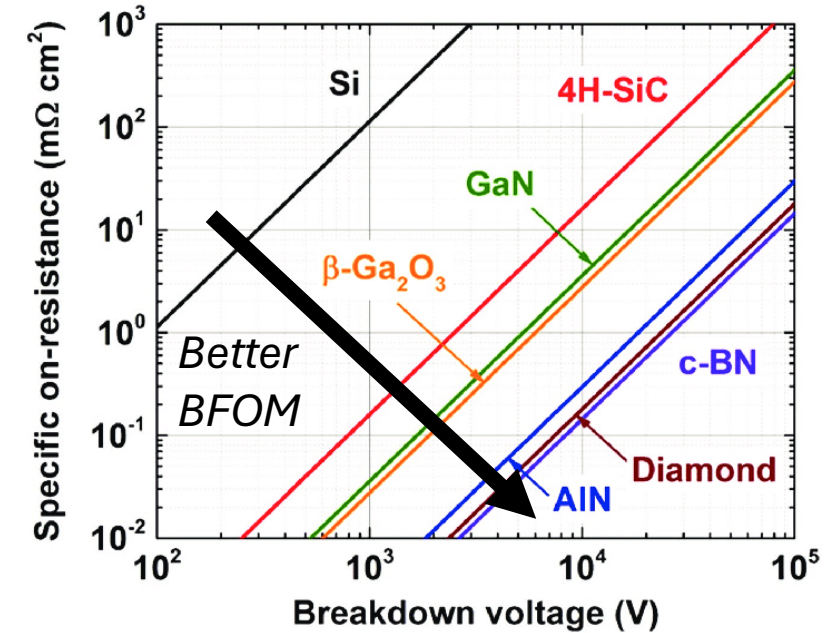
**Device design
and fabrication**

- Transistors
- Diodes
- Convertors

Characterization
(materials,
devices,
reliability)

- New techniques
- New regimes/
conditions

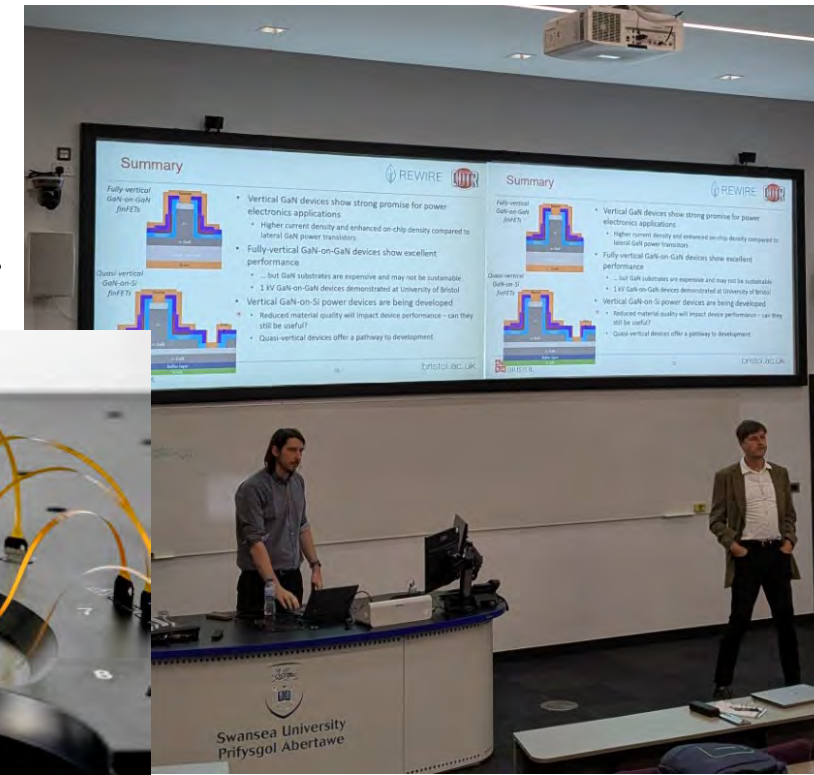
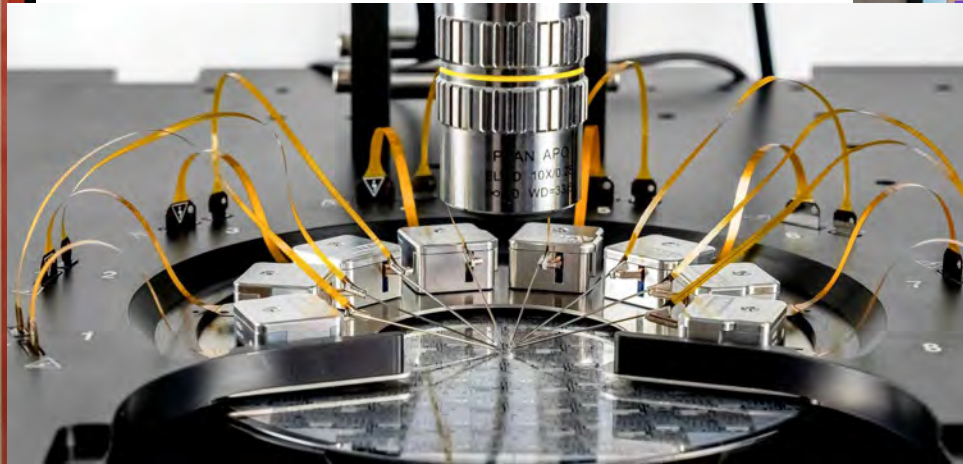
Packaging,
circuits,
systems
etc.





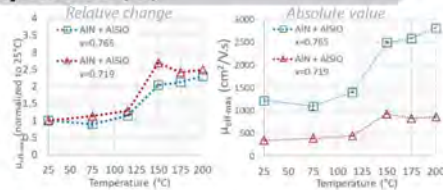
What we do all day...

- Make, measure, analyze
- Present, discuss, publish!

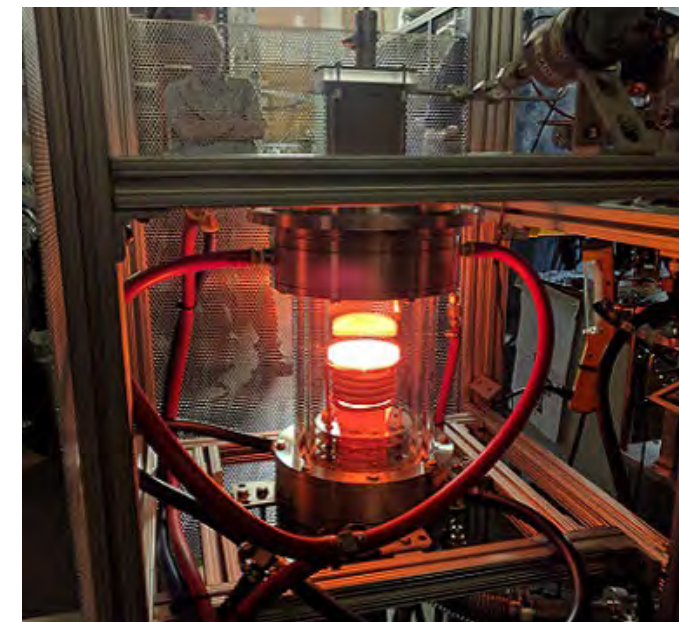
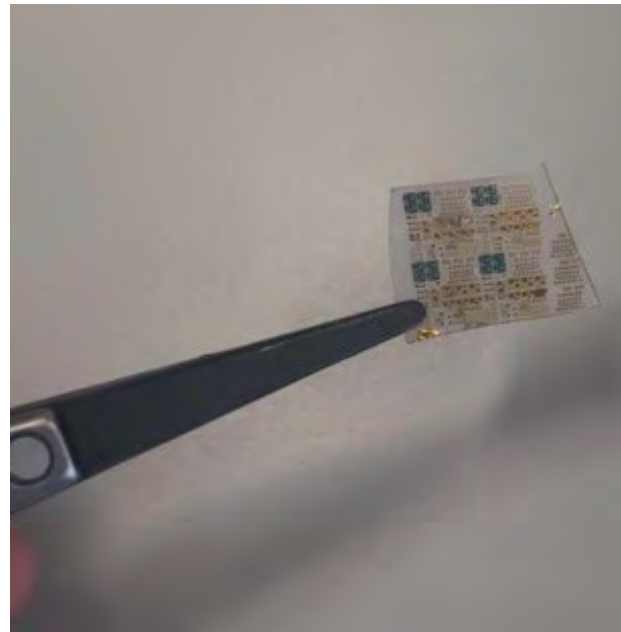
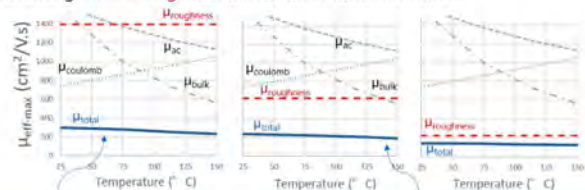


$\mu_{\text{eff-max}}$ against temperature (iii)

Relative increase in mobility with temperature is associated with a reduction in channel depth



Although additional factors contribute to the absolute value i.e. increasing **surface roughness** with all other factors constant



Tips for a successful EEE Degree

Foundational Skills

- Master the maths: embrace calculus and advanced mathematics, they are the bedrock of EEE
- Practice a lot: don't just solve problems, understand the underlying concepts. Repetition helps to develop problem-solving muscles.
- Use your teachers: attend office hours to clarify difficult concepts, and build relationships with your professors. Use digital course tools to your advantage!

Personal Resilience

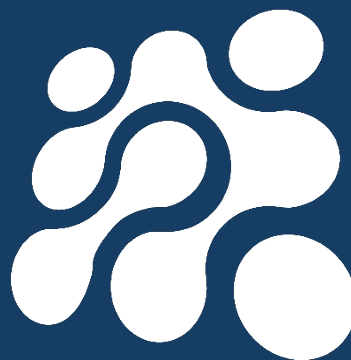
- Prioritize wellbeing: pace yourself to avoid burnout. Find a sustainable work, sleep, and exercise schedule. Avoid all-nighters!
- Stay humble: engineering is challenging. Overcoming "impostor syndrome" is part of the journey. Keep persevering!

Hands-On Experience

- Build your own: use kits like Arduino and Raspberry Pi to apply theory and practice troubleshooting
- Learn your tools: master programming languages (C++, Python) and design software (CAD, circuit simulation)
- Embrace failure: your designs won't always work. Debugging and iterating are the fastest ways to learn.
- Document everything: keep a detailed lab notebook for all your projects. Find what works best for you!

Professional Growth

- Join clubs: get hands-on experience and network with peers in technical societies (e.g., robotics)
- Find internships: gain real-world experience early in your degree
- Build your network: connect with peers, seniors, and industry professionals on LinkedIn
- Develop soft skills: work on communication, teamwork, and project management



**UK Electronics
Skills Foundation**

Refreshments & Networking



**UK Electronics
Skills Foundation**



arm

cādence®



Collins Aerospace

covnetics

CATAPULT
Compound Semiconductor Applications

DCA



FRAZER-NASH
CONSULTANCY
— A KBR COMPANY —

infineon

MICROCHIP

PARAGRAF



Rolls-Royce



**Science and
Technology
Facilities Council**



**Innovate
UK**



**University of
BRISTOL**

Tips for having valuable conversations this afternoon

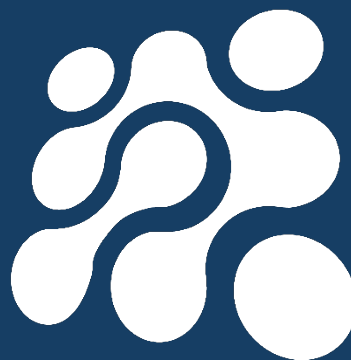
- Know that everyone here is in a similar situation
- Not sure where to start? Conversation starting questions:
 - What inspired you to apply for the Award?
 - What are you most excited to learn about this year?
- If you see someone looking lost, invite them to join in your conversation
- Make the most of employer conversations:
 - Ask about their products.
 - Ask about their work opportunities and graduate schemes





**UK Electronics
Skills Foundation**

Break



**UK Electronics
Skills Foundation**

Welcome back



UK Electronics
Skills Foundation

Diana Oloeru
ARM

The ARM logo, consisting of the word "arm" in a white, lowercase, sans-serif font, centered within a dark blue rectangular background.

arm



The image is a horizontal composite of three distinct scenes. The left panel shows a perspective view of a server room with rows of racks filled with glowing orange and blue lights. The middle panel features a glowing blue wireframe model of a car, possibly representing autonomous vehicle technology. The right panel depicts a person in profile, holding and looking at a smartphone, with a blurred background suggesting an indoor setting. The text "Arm is Building the Future of AI Computing." is centered across the middle of the image in a white, sans-serif font.

Arm is Building the Future of AI Computing.

What does Arm actually do?



I O T



M O B I L E



P C



A U T O



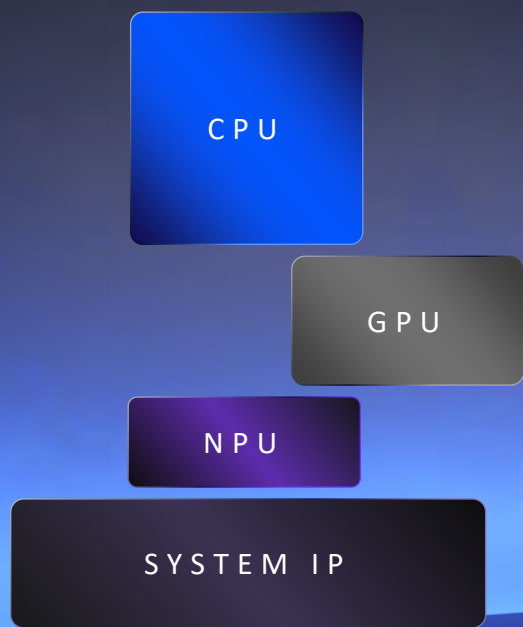
R O B O T I C S



C L O U D

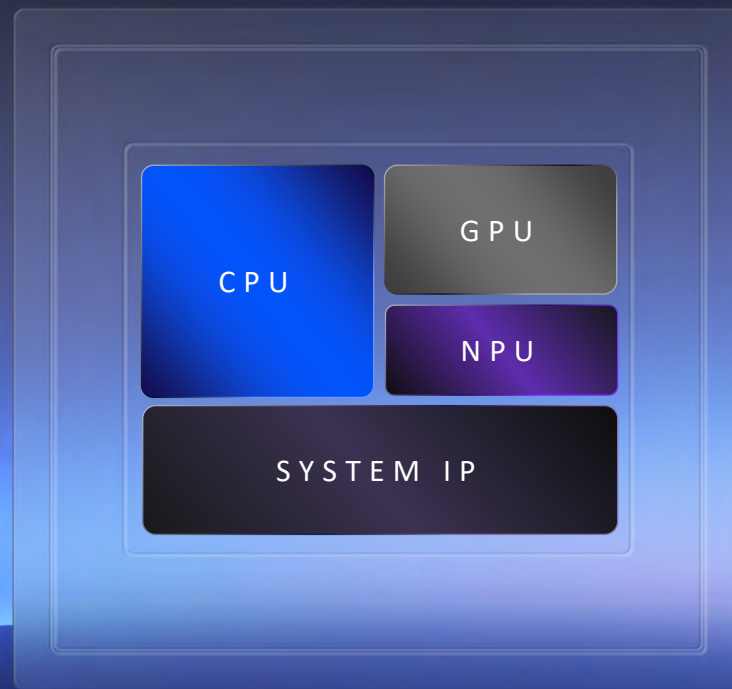
← ARM AI COMPUTE PLATFORM →

ARM'S PLATFORM



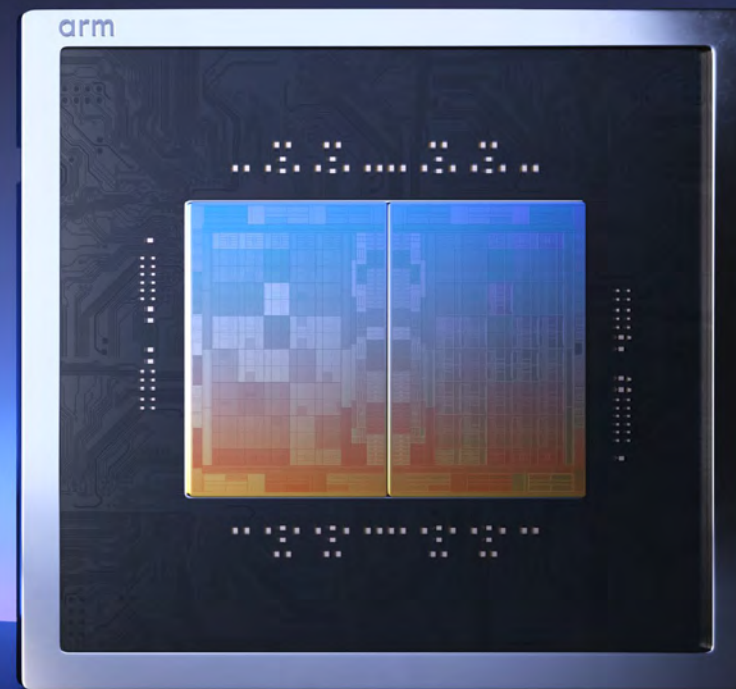
IP

+



Compute Subsystems (CSS)

+



First production silicon chip

arm AGI CPU

100%

OF THE CONNECTED
GLOBAL POPULATION

Only the Arm platform has the scale, performance, and power efficiency to enable AI everywhere.

>350B

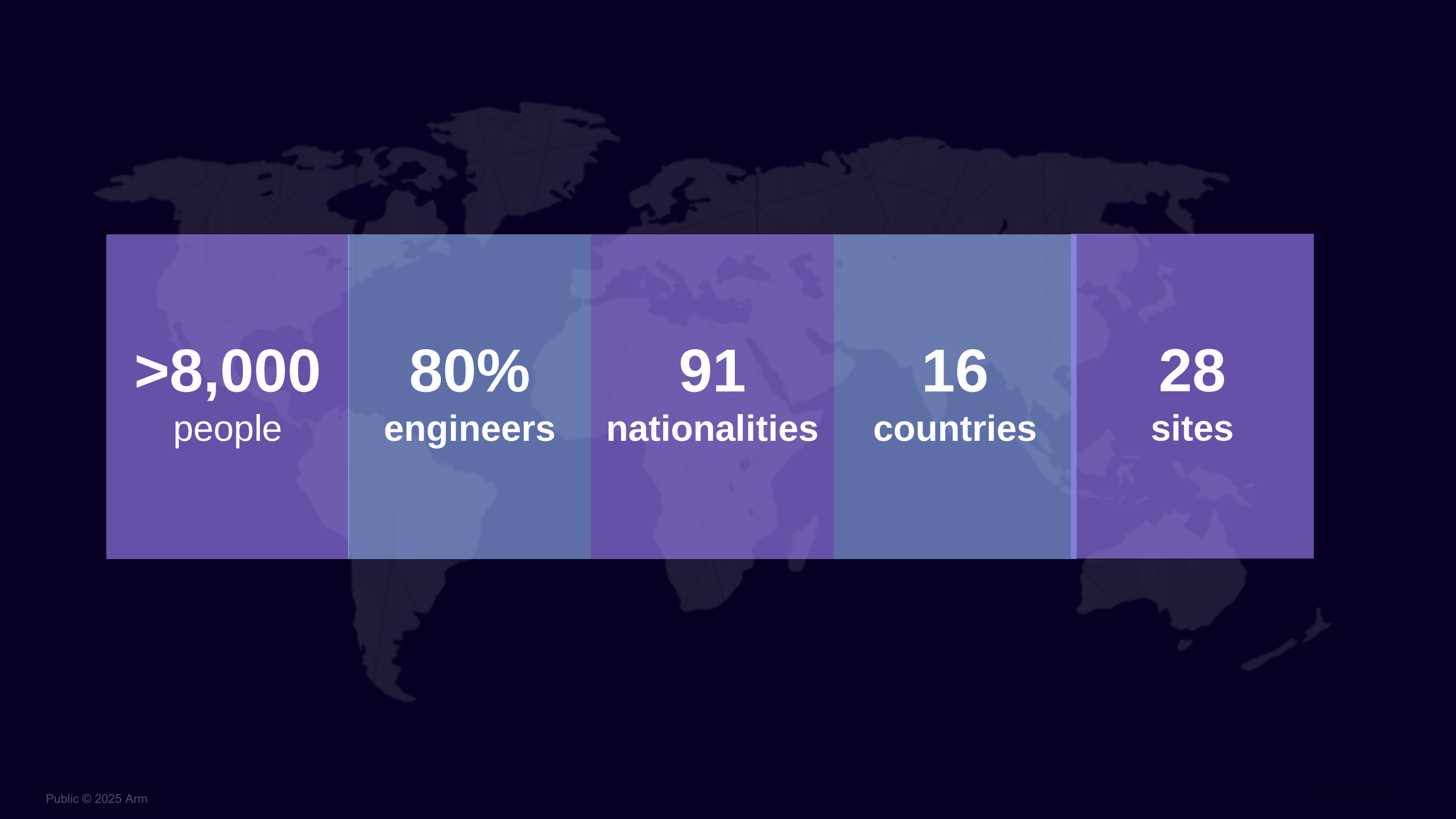
ARM-BASED CHIPS
SHIPPED TO-DATE

Arm is delivering the most power-efficient and most high-performance compute platform across multiple markets.

>22M

SOFTWARE
DEVELOPERS ON ARM

Arm has the broadest software support of any compute platform ever invented.



The infographic features a dark blue background with a faint world map. A horizontal bar is divided into five colored segments: purple, light blue, purple, light blue, and purple. Each segment contains white text representing a global statistic. The segments are separated by thin white vertical lines.

Statistic	Value
people	>8,000
engineers	80%
nationalities	91
countries	16
sites	28

>8,000
people

80%
engineers

91
nationalities

16
countries

28
sites

Teaching and Learning Resources on Arm



Education Kits

Academically rigorous teaching materials including covering core subject areas in Computer Engineering & STEM.



Online Courses

Freely accessible to ensure anyone can learn with Arm. Enables students, developers and engineers learn about state-of-the-art technologies from the Arm partner ecosystem.



Books

Textbooks suitable for classroom adoption in key computing subjects. Reference books target graduate students, researchers, and engineers.



Developer Labs

Hands-on, Arm-based project-based labs providing practical experience across AI, embedded, cloud, and systems technologies for real-world learning.



Arm Academic Access

Provides universities with freely available tools, software, and Arm IP to enable teaching and research.



Arm Expert Insights Videos

This video series showcases the latest technologies, research, and educational initiatives from Arm through timely workshops, webinars, and interviews.



Tools

Arm-based software and hardware development tools for building, debugging, and optimizing systems across edge, cloud, and embedded platforms.

EdKits and Courses

- Free MOOCs distributed via [Coursera](#) and [EdX](#)
- EdKits shared on [Arm Education GitHub](#) (freely accessible)
- Topics include **Edge and Cloud AI, Embedded Systems, Graphics & Gaming, SoC Design, VLSI, Software Optimization**

The screenshot displays the Arm Education website. At the top, the 'arm education' logo is prominent. Below it, the text 'Advanced Quantization: A practical Course' is visible. The main section features the course title 'ArmEducationX: Optimizing Generative AI on Arm Processors: from Edge to Cloud' in large, bold letters. To the right of the title, there is a QR code. Below the title, a brief description of the course is provided, followed by a 'Show more' link. At the bottom of the course section, the start and end dates are listed: 'Starts Jan 06' and 'Ends Jul 31, 2027'. Two buttons are present: 'Advance your career' and 'Audit course'.

arm education

Advanced Quantization: A practical Course

on introduction to extreme model quantization, hardware-aware optimization, and generative AI models. You'll explore advanced techniques to reduce model size, or compact LLMs on edge devices like Android smartphones.

Part Advanced AI series. For Part 2, focusing on Mixture of Experts (MoE) models, [fixture of Experts: A Practical Course](#).

lustrary ML engineers who want practical, ready-to-adapt examples for integrating LLMs into their own applications. It is also well-suited for ML researchers interested in

arm Education UNIVERSITY OF CAMBRIDGE

ArmEducationX, University of Cambridge: AI at the Edge on Arm: Understanding and Deploying LLMs for Mobile Devices

AI at the Edge will be powered by Arm. Discover the tools and techniques you'll learn

[Show more](#)

Starts Jan 06
Ends Jul 31, 2027

[Advance your career](#) [Audit course](#)

Arm Learning Paths

Reproducible tutorials teaching developers how to build better software, faster, on Arm.



For all software developers

Tutorials cover across industries and all skill levels. If you develop software on any Arm platform, this is for you.



Learn by doing

Each Learning Path is reproducible, helping developers upskill by completing tasks. Code snippets are included to help along the way.



Written by the community

Easy to contribute, in Markdown format through GitHub. All content is reviewed by Distinguished Engineers at Arm, ensuring the highest quality.

Run batch inference using vLLM

Build and Run vLLM on Arm Servers

Introduction

Build a vLLM from Source Code

Run batch inference using vLLM

Run an OpenAI-compatible server

Next Steps

[Log an issue](#)

[Fork and edit](#)

[Discuss on Discord](#)

Use a model from Hugging Face

vLLM is designed to work seamlessly with models from the Hugging Face Hub.

The first time you run vLLM, it downloads the required model. This means that you do not have to explicitly do

If you want to use a model that requires you to request access or accept the terms, you need to log in to Huggi

```
huggingface-cli login
```

Enter your Hugging Face token. You can generate a token from [Hugging Face Hub](#) by clicking your profile or **Tokens**.

You also need to visit the Hugging Face link printed in the login output and accept the terms by clicking the **Agree** button. You will then see the request-for-access form, depending on the model.

To run batched inference without the need for a login, you can use the `Qwen/Qwen2.5-0.5B-Instruct` m

Create a batch script

To run inference with multiple prompts, you can create a simple Python script to load a model and run the pro

Use a text editor to save the Python script below in a file called `batch.py`:

```
import json
from vllm import LLM, SamplingParams

# Sample prompts.
prompts = [
    "Write a hello world program in C",
    "Write a hello world program in Java",
    "Write a hello world program in Rust",
]

# Create a sampling params object.
sampling_params = SamplingParams(temperature=0.8, top_p=0.95, max_tokens=256)

# Create an LLM.
llm = LLM(model="Qwen/Qwen2.5-0.5B-Instruct", dtype="bfloat16")

# Generate texts from the prompts. The output is a list of RequestOutput objects
# that contain the prompt, generated text, and other information.
```

Additional Links

- **Visit Arm Teaching and Learning Materials**
 - <https://github.com/arm-education>
- **Visit Arm Online Courses**
 - <https://www.edx.org/school/armeducation>
- **Visit Arm Developer**
 - <https://developer.arm.com>
- **Visit Arm Developer Labs:**
 - <https://arm-education.github.io/Arm-Developer-Labs/>
- **Visit Arm Learning Paths**
 - <https://learn.arm.com>



UK Electronics
Skills Foundation

Simon Thomas
Paragraf





The Incredible World of Semiconductors

Why they are so important, why it's so exciting to work in the industry
and how you can be a successful part of it

CEO | Dr Simon Thomas

Introduction | My Path to Semiconductors

Dr Simon Thomas FREng, CEng, CPhys

Chief Executive, Paragraf



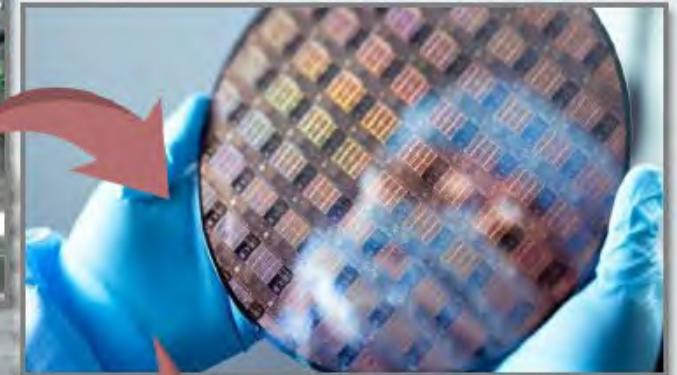
Fine Art



Aerospace
Engineering



Materials Science
& Engineering



Semiconductor
Process Engineering

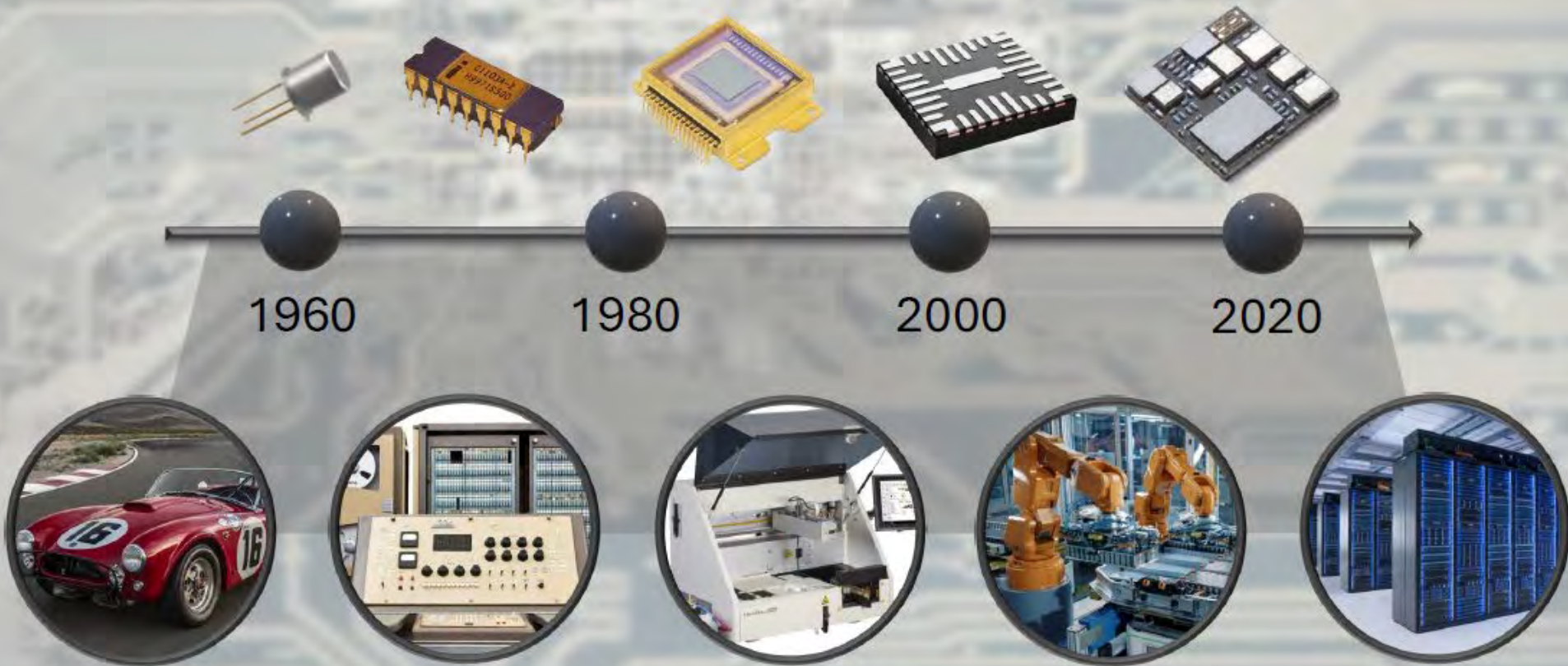


Semiconductor
Research



Why Semiconductors are so Important

The Solid State & the Semiconductor 'Lifeblood'

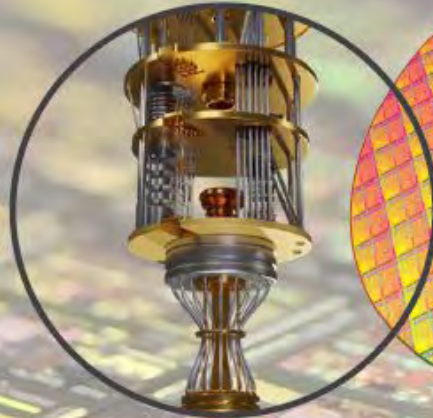


Why Semiconductors are only becoming more Important

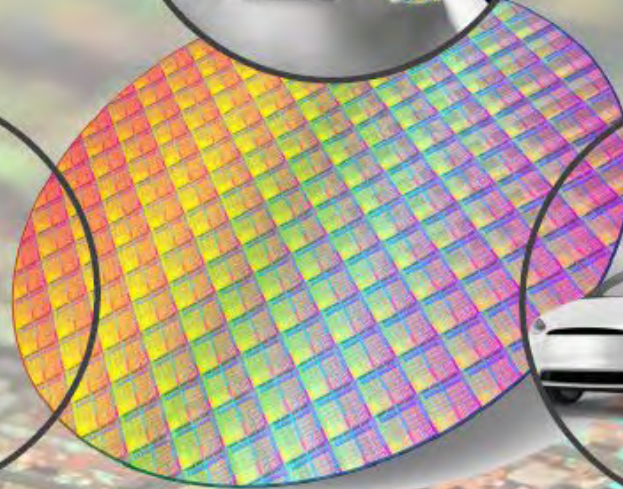
Our continuing need for new technology



The AI
Revolution



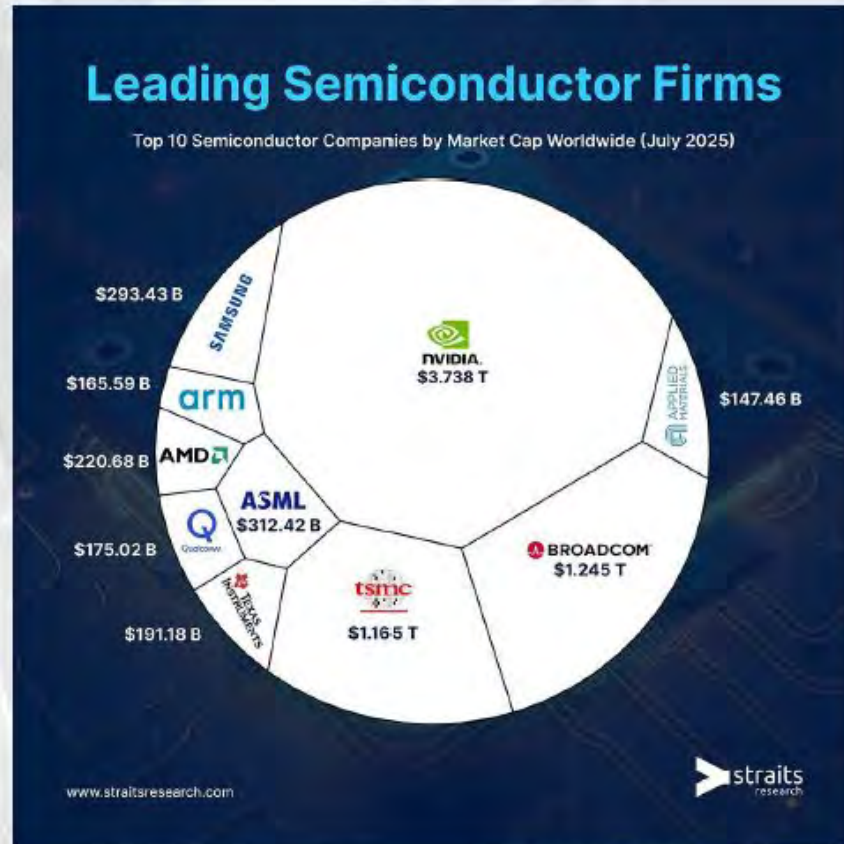
The Future
compute



The Electric
Drive

The need for semiconductors is ever increasing

Shown by the values across the manufacturing chain



Top 10 Semiconductor Vendors by Revenue, Worldwide, 2025

(Millions of U.S. Dollars)

2025 Ranking	2024 Ranking	Vendor	2025 Revenue	2025 Market Share (%)	2024 Revenue	2025-2024 Growth (%)
1	1	NVIDIA	125,703	15.8	76,692	63.9
2	2	Samsung Electronics	72,544	9.1	65,697	10.4
3	4	SK Hynix	60,640	7.6	44,186	37.2
4	3	Intel	47,883	6.0	49,804	-3.9
5	7	Micron Technology	41,487	5.2	27,619	50.2
6	5	Qualcomm	37,046	4.7	32,976	12.3
7	6	Broadcom	34,279	4.3	27,801	23.3
8	8	AMD	32,484	4.1	24,127	34.6
9	9	Apple	24,596	3.1	20,510	19.9
10	10	MediaTek	18,472	2.3	15,934	15.9
Other (outside top 10)			298,315	37.6	270,536	10.3
Total Market			793,449	100	655,822	21

Gartner.

Source: Gartner (January 2026)

>20% of Taiwan's GDP is from semiconductors... TSMC is nearly half of this!

Why working in semiconductors is so fun

And the myriad of opportunities the industry holds



Chip and device
design



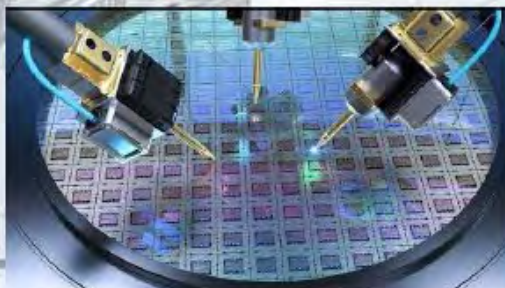
Materials synthesis
and development



Chip build and
manufacturing



System & tool
manufacturing



Chip testing and
device assembly



Field Applications
Engineering (FAE)

Why we started Paragraf

Our Unsustainable World

With Standard semiconductors by 2030 > 20% of the world's energy will be consumed by computing

In 2020 Datacenters used more energy than the UK,

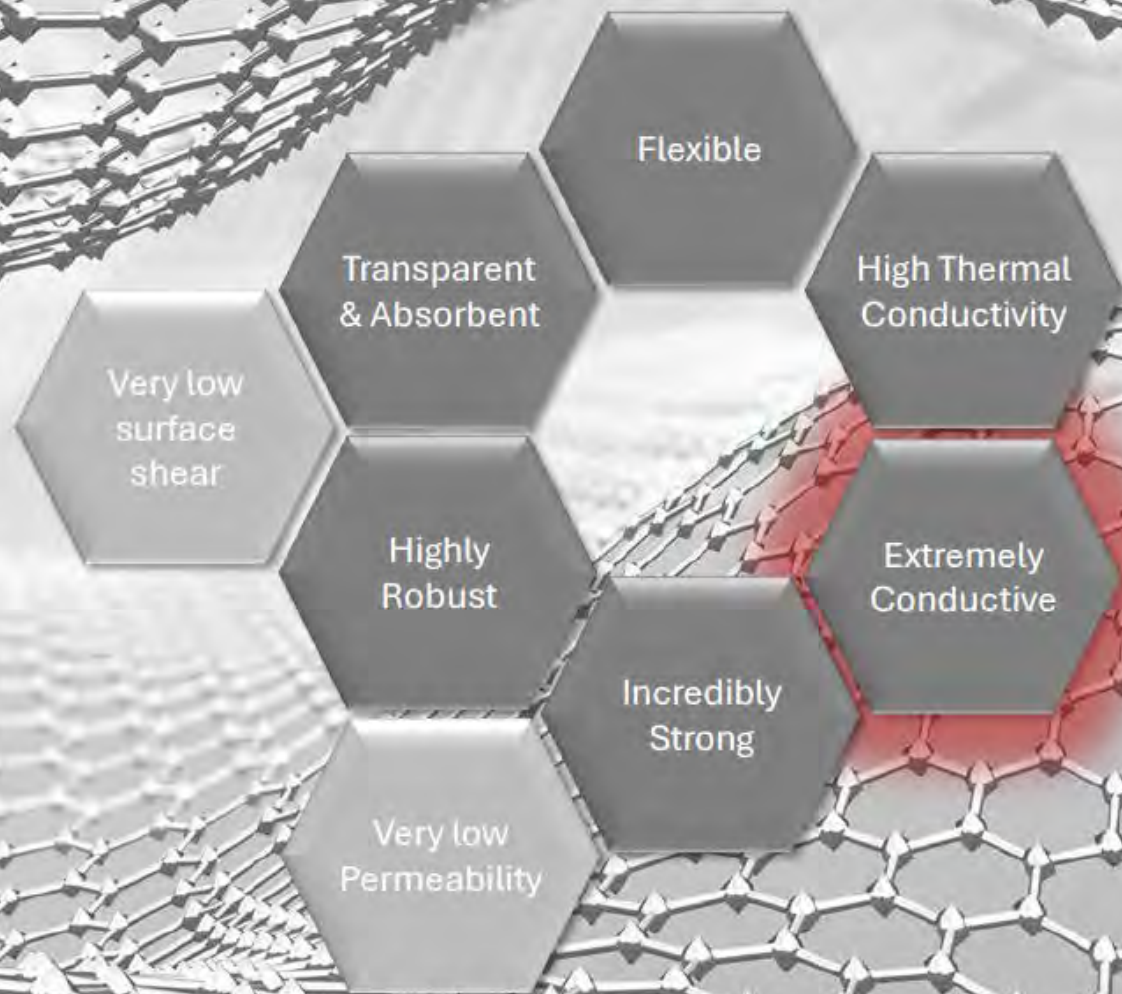
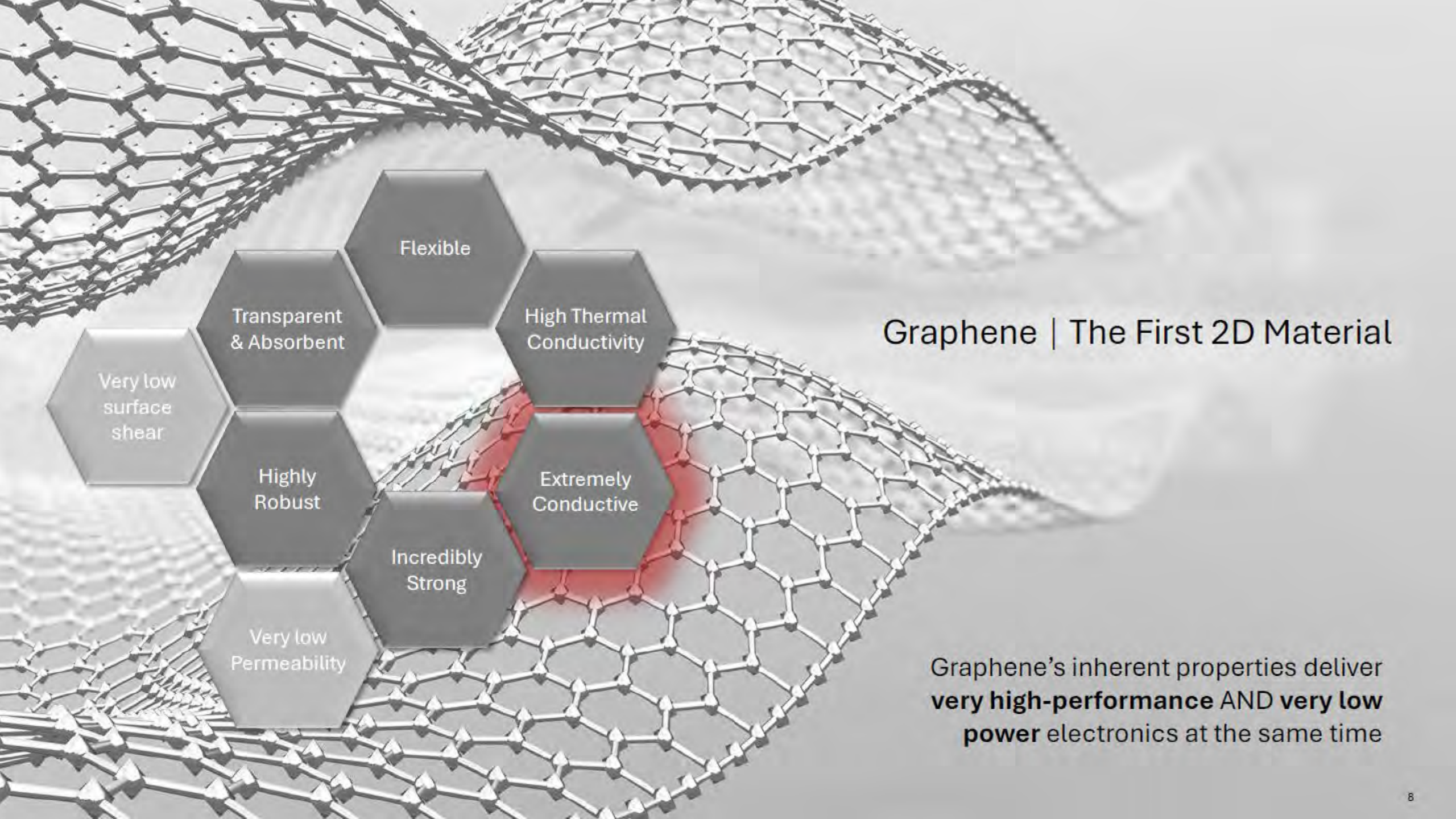
In 2020 Cryptocurrency mining used more energy than Argentina

In 2025 a simple ChatGPT query uses >10x the energy of a standard search engine

Sources: Frontier Group, IBM, IEA

By 2035 global energy usage will be more than global energy supply

**The solution is to use
advanced semiconductor
materials**



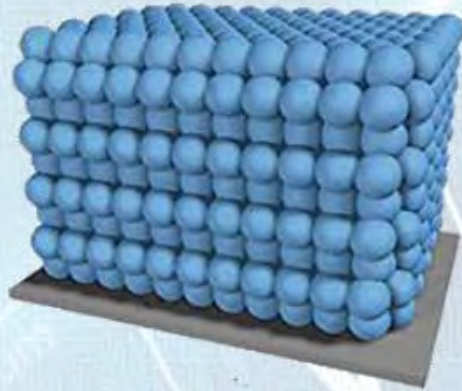
Graphene | The First 2D Material

Graphene's inherent properties deliver **very high-performance** AND **very low power** electronics at the same time

But Graphene is not the only possibility

The 2D revolution is underway

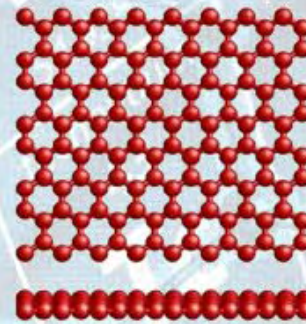
Bulk 3D Semiconductor Materials



Elemental (Silicon)
Binary (Gallium Nitride)
Tertiary (Indium Gallium Arsenide)

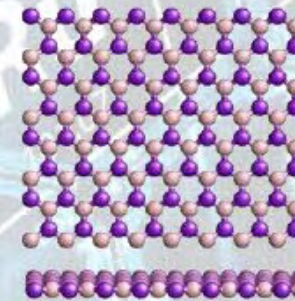
Two-Dimensional Materials

Elemental



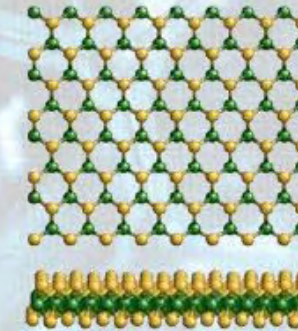
Graphene

Binary



Boron Nitride

Multiplane

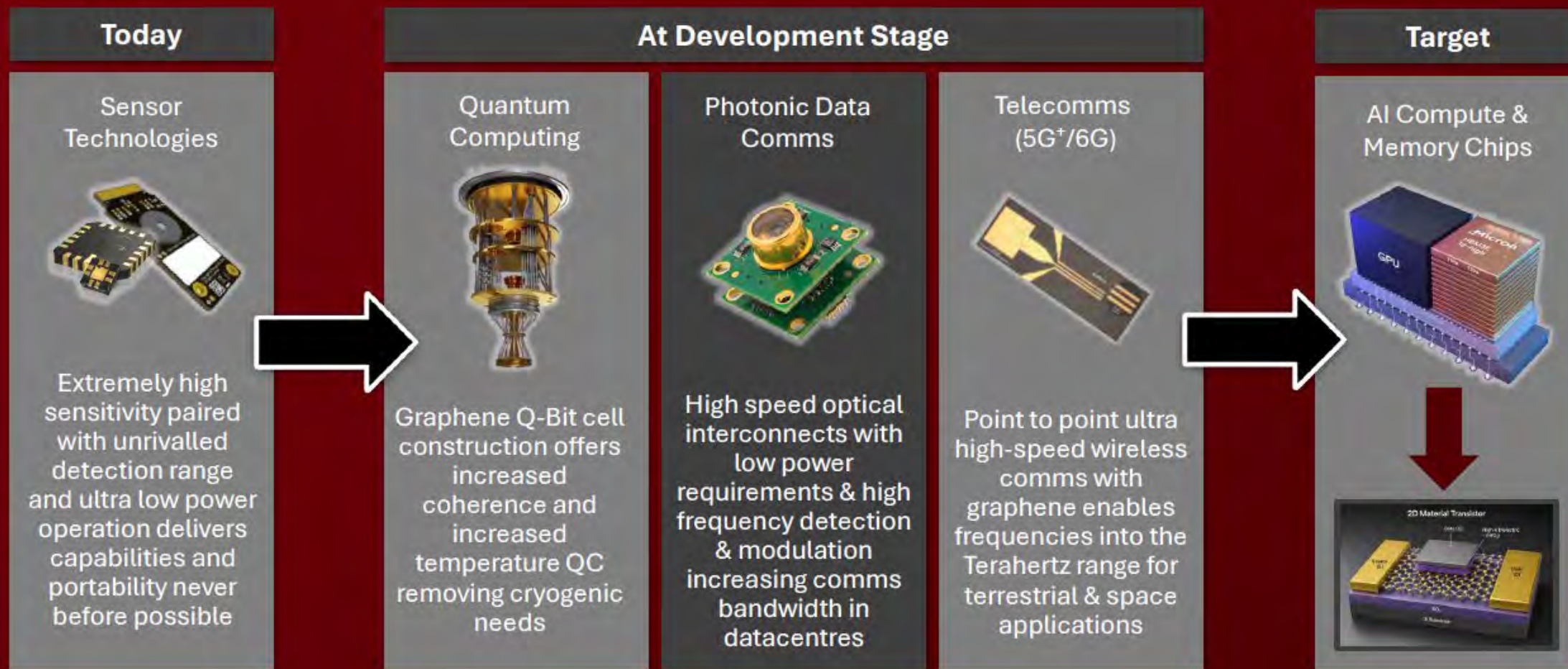


Dichalcogenide

2D Electron confinement unlocks extraordinary electronic properties
Delivering unique performance capabilities

Paragraf & the possibilities with 2D Materials

Not just making technology better but enabling new technology





Commercially Viable 2D Electronics

High-quality, high-performance graphene,
Boron Nitride and TMD-based electronic
devices created in an industry compatible
way

Paragraf the Business

The world's first 2D electronics company, with a global presence, unrivalled experience and the world's first commercial graphene electronics foundry



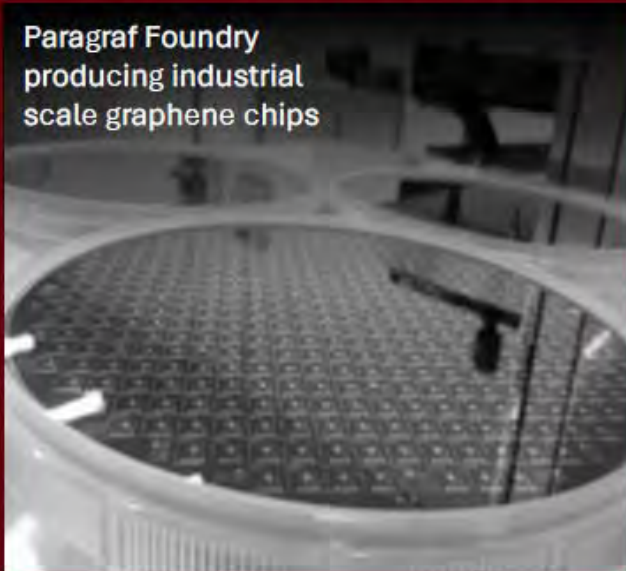
USA Applications Lab



UK Manufacturing Foundry



UK R&D Centre



Paragraf Foundry
producing industrial
scale graphene chips

Paragraf USA Inc.
San Diego

Paragraf Ltd.
Paragraf Foundry
Cambridge (2 sites)

Paragraf Tech Ltd.
Abu Dhabi

Paragraf Asia
Shanghai

Shanghai BD & Sales
Office



Abu Dhabi BD & Sales
Office



Founded 2018 from Cambridge University, UK
Financed through 4 private capital rounds totalling \$150m
**Now scaling foundry capabilities to enable customers access to
their requirements for graphene-based technologies**

Paragraf's commitments to deliver on the promise 2D Materials

Improve global society and the impact of electronics on the world

3 simple pillars define Paragraf and what the company is driving to achieve with two-dimensional materials

HEALTHY PEOPLE

Using 2D-based technologies to save and enhance lives



HEALTHY CITIES

Using 2D-based technologies to create a clean, positive living environment

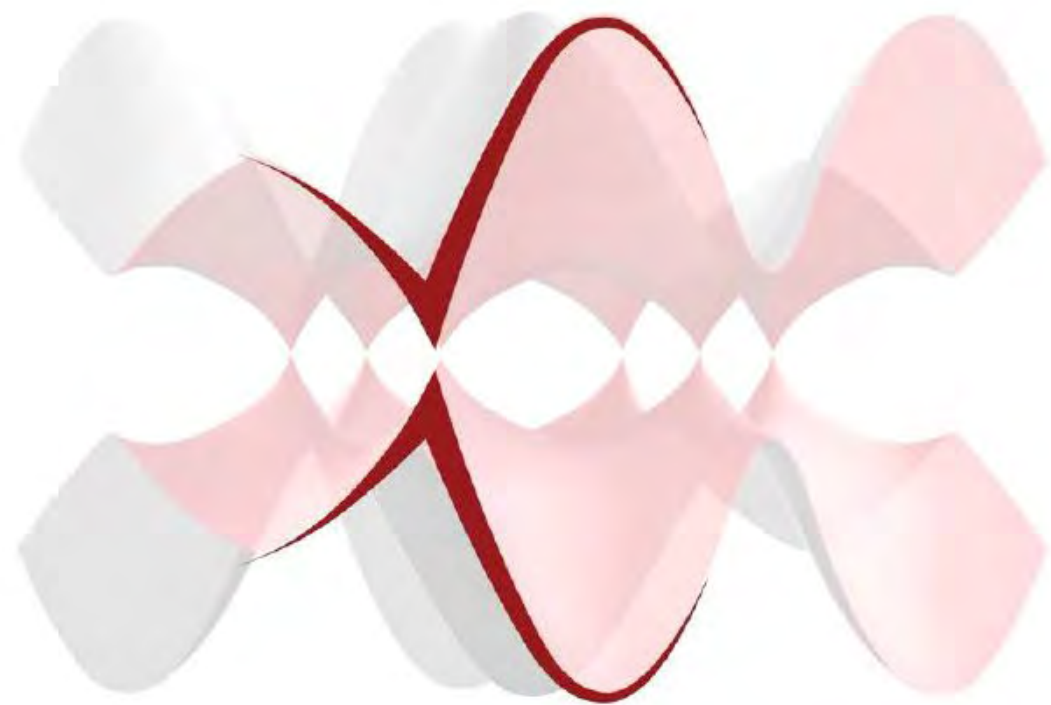


HEALTHY PLANET

Using 2D-based technologies to deliver a greener, cleaner future for us all



The impact semiconductors have and can have on the world is like no other technology space... and you can be a part of this exciting world





UK Electronics
Skills Foundation

Mahdieh Ghoddusi

UK Electronics Skills Foundation



UK Electronics
Skills Foundation



An Overview of the Semiconductor Talent Award



**UK Electronics
Skills Foundation**



Bursary

- £4,000 bursary in academic year 2026/27
- Payment through TechFirst Payment Partner, not UKESF



Learning

- Build understanding of the semiconductor industry, careers and professional skills
- Explore areas most relevant to your interests and future goals



Industry

- Meet and learn from people working across the semiconductor industry through events, mentoring, site visits and residential activities



Peers

- Part of a community of 700 Award-holders
- Learn from each other, share experiences and build your network

How you'll learn



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Online Learning

Access flexible content in your own time to build your knowledge and revisit topics as needed.



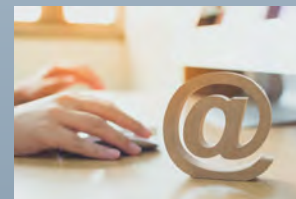
Webinars

Join live webinars and interactive expert sessions where possible to ask questions



In Person

Attend events, workshops, site visits and other face-to-face opportunities to meet people, experience different environments and build your network.



Stay Connected

Look out for our Friday emails for upcoming opportunities, as some are first come, first served while others require an application.

The UKESF Mentoring Programme



● Learn from experience

Connect with people with real industry experience

● Explore where you could go

Understand the industry, explore career options and learn from others' experience.

● Different ways to engage

Engage through group discussions, direct messaging and one-to-one conversations

● Starting this Autumn

Mentoring will begin later in the Autumn term, with full details shared with you beforehand.

Time with someone inside the industry, across a whole year – it is already yours, so it is worth making it count.



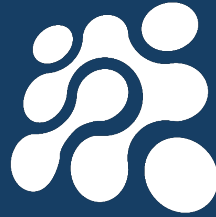
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Beyond 2026/2027

Q&A



We welcome your questions!



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Best of luck with your degree course!

Thank you



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