

# Flexible Integrated Circuits: innovative materials, technologies and roadmaps

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# Introducing Pragmatic Semiconductor

The world leader in ultra-low-cost flexible chips (integrated circuits)

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## Cambridge

UK headquarters

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## Durham

UK manufacturing

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## >£300m

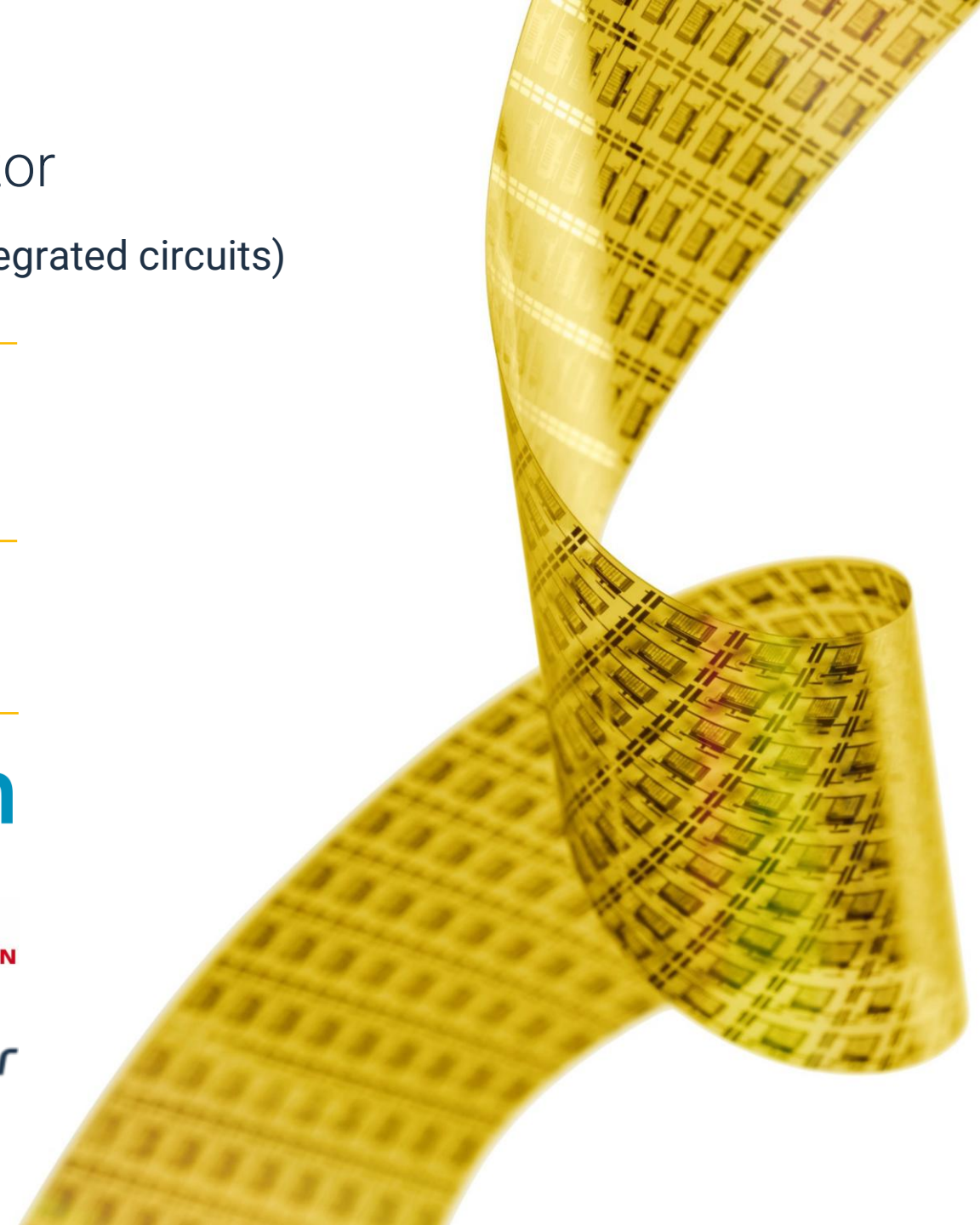
Funding to date

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## 350+

Employees and growing

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**Our vision** is to empower innovation that bridges our physical and digital worlds, for a sustainable future.





**Our mission** is to deliver pioneering flexible semiconductor technology at scale, accelerating the growth and success of our global customers, to positively impact peoples' lives and our planet.



Consumer



Healthcare



Logistics & Smart  
Manufacturing



Energy



Transportation

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# \$12.5 Trillion

Total Internet of Things  
Market Value by 2030

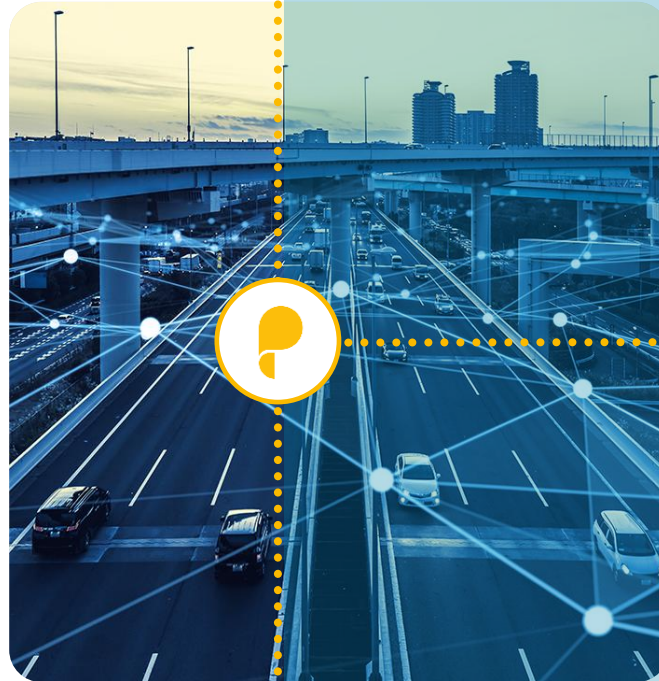


# Semiconductors: at the foundation of AI digital transformation

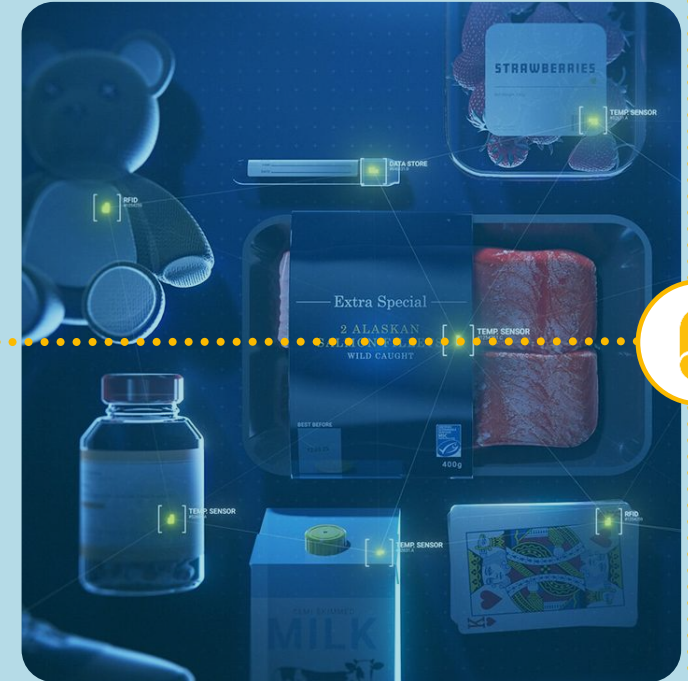
FlexICs bridge the physical and digital worlds at the edge... at scale



Cloud



Edge



Item



## Item-level intelligence – for good



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Enabling  
smarter packaging



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Reducing waste



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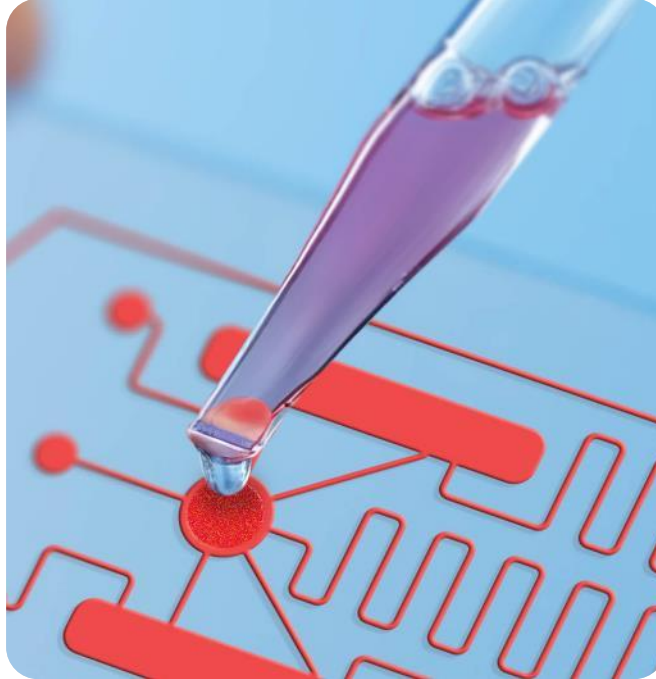
Reimagining  
low-cost, digital  
healthcare



# Endless future applications



VR/AR wearables



Biological computation



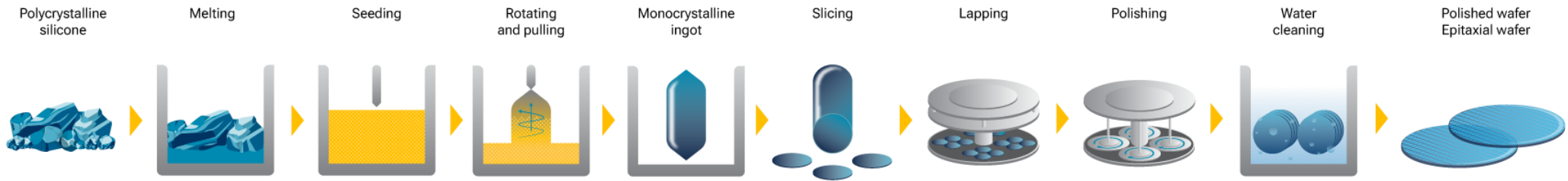
Sensor swarms



# Substrate preparation

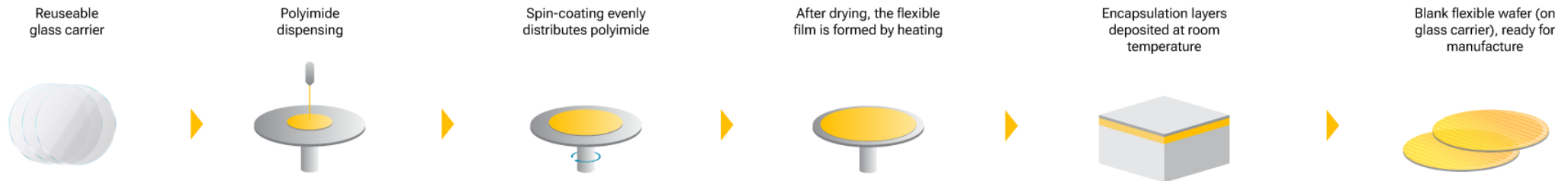
## Silicon substrate

An ultra-high-purity (99.9999+%) silicon wafer is prepared



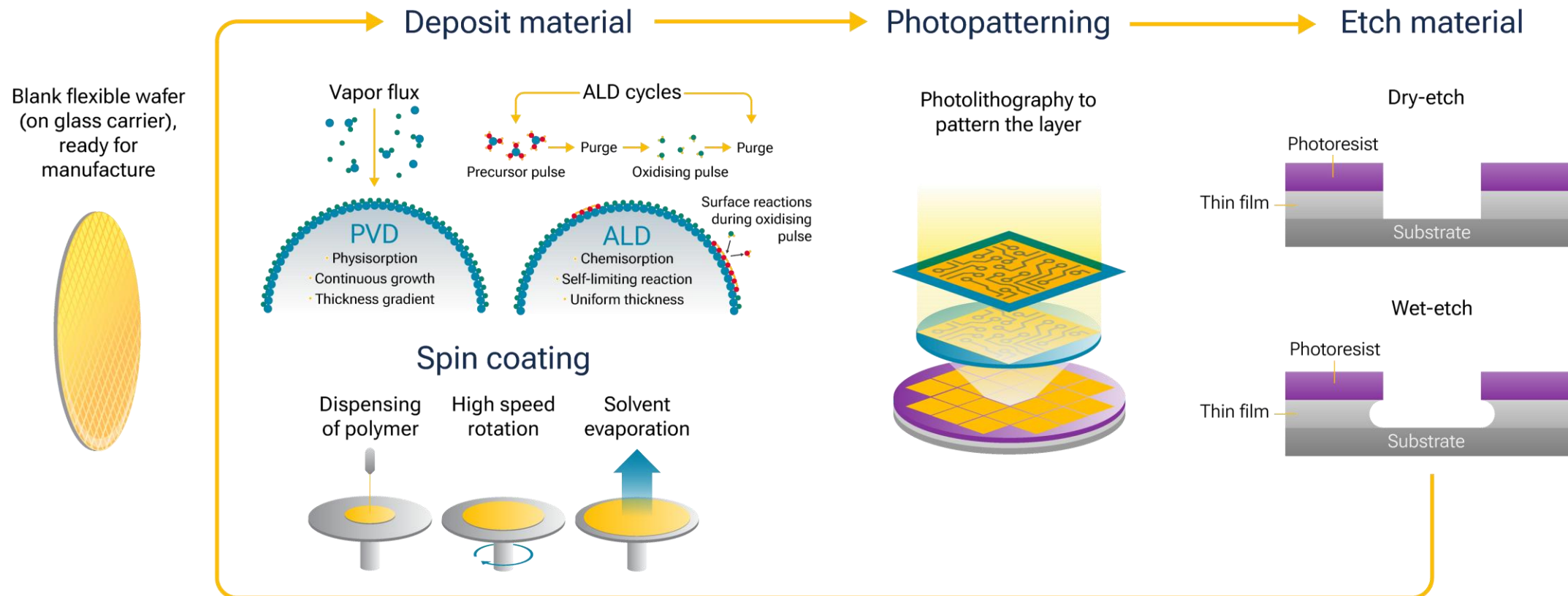
## Flexible substrate

A high-purity (99.9+%) flexible (polyimide) substrate is prepared in-line on a reusable glass carrier





# FlexIC manufacturing





# Revolutionising semiconductor manufacturing

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## Billions

of FlexICs per fab line  
per year

## <7 day

production cycle time –  
versus months for silicon

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## Low-cost

design and production

## Compact

<600 sqm fab footprint for  
modular, on-site capacity



Less energy



Less water



Fewer harmful  
chemicals

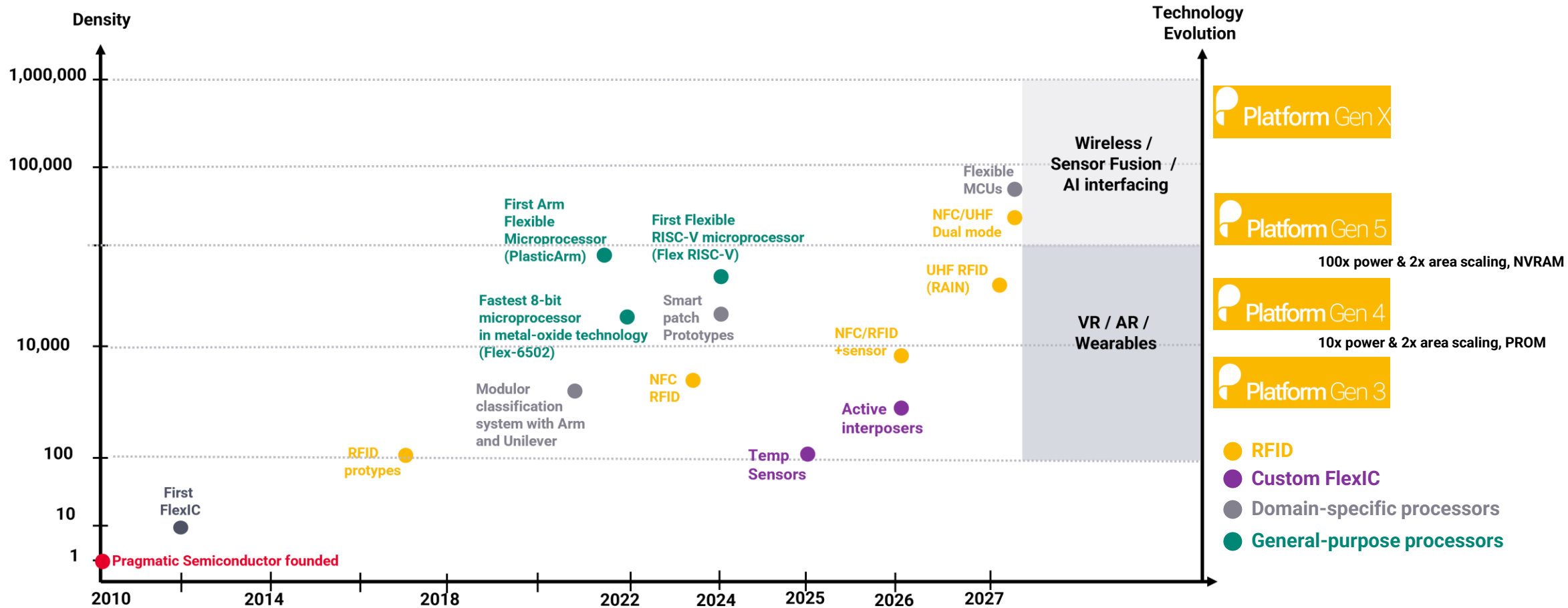


300 mm FlexIC wafer volume production



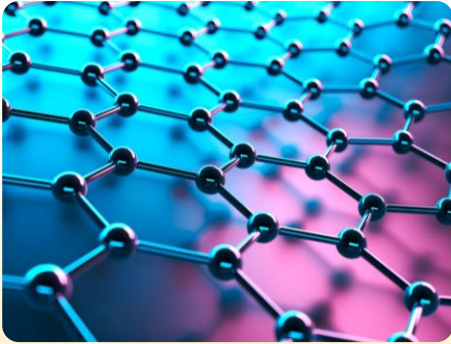
# FlexIC roadmap

Pragmatic Semiconductor Gen 5

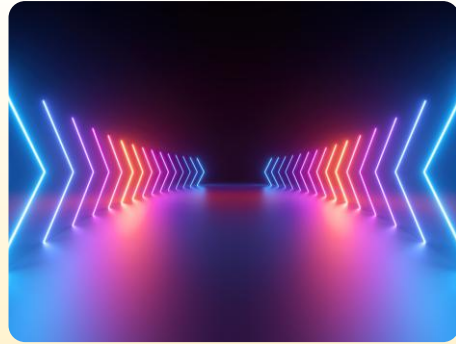




# Innovation ecosystem



Advanced materials



Advanced processes



Data/AI



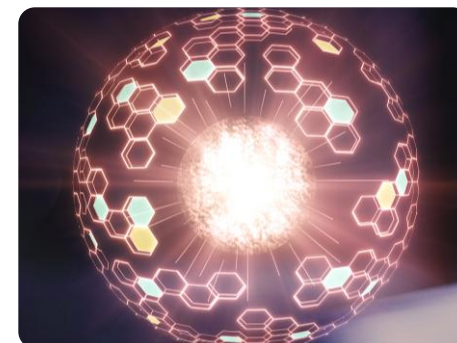
Integration



Test



Design automation



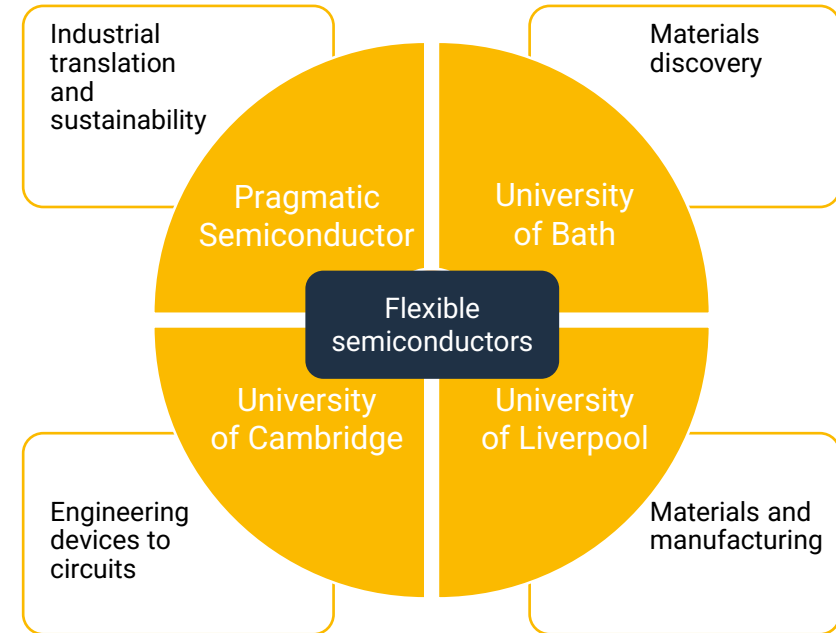
Ecosystem



# Case study: Project COSMIC

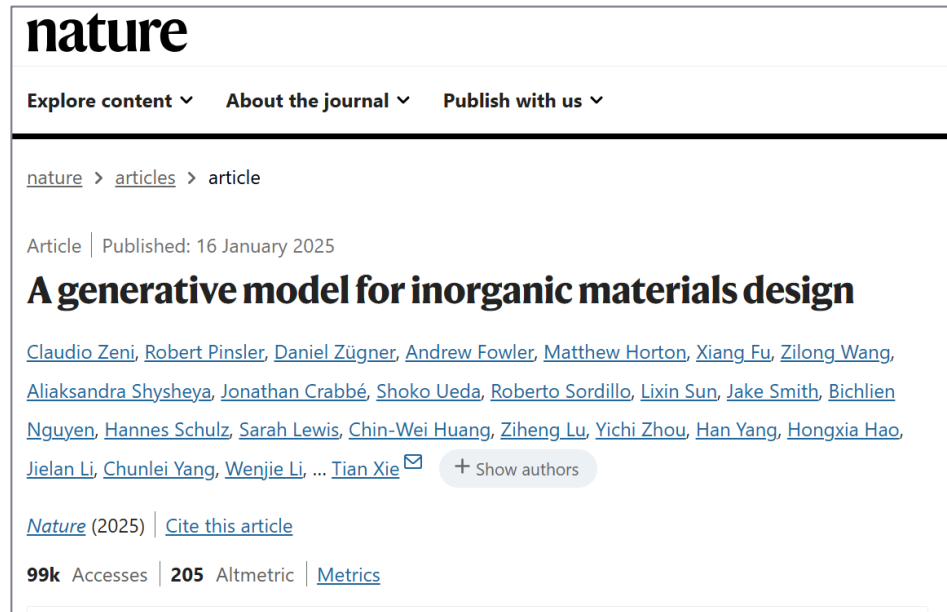
Innovative material processes of devices for low-power flexible electronics: creating a sustainable internet of everything

- Industrial academic partnership (~£6 million)
- Development of advanced chemical precursors and next-generation materials for the fabrication of p-type semiconducting thin films and devices

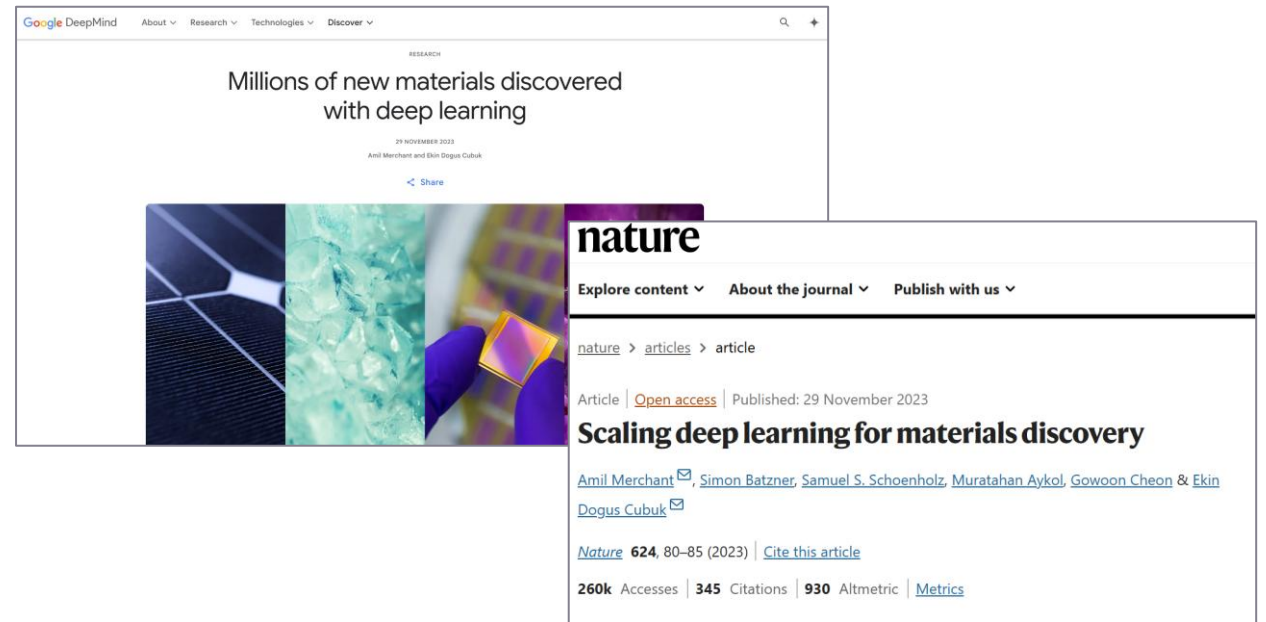




# Next generation material discovery



Zeni, C., Pinsler, R., Zügner, D. et al. A, *Nature* (2025).



Google DeepMind, *Nature* 624, 80–85 (2023).



# Thank you

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[www.pragmaticsemi.com](http://www.pragmaticsemi.com)



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