Tyndall 2030

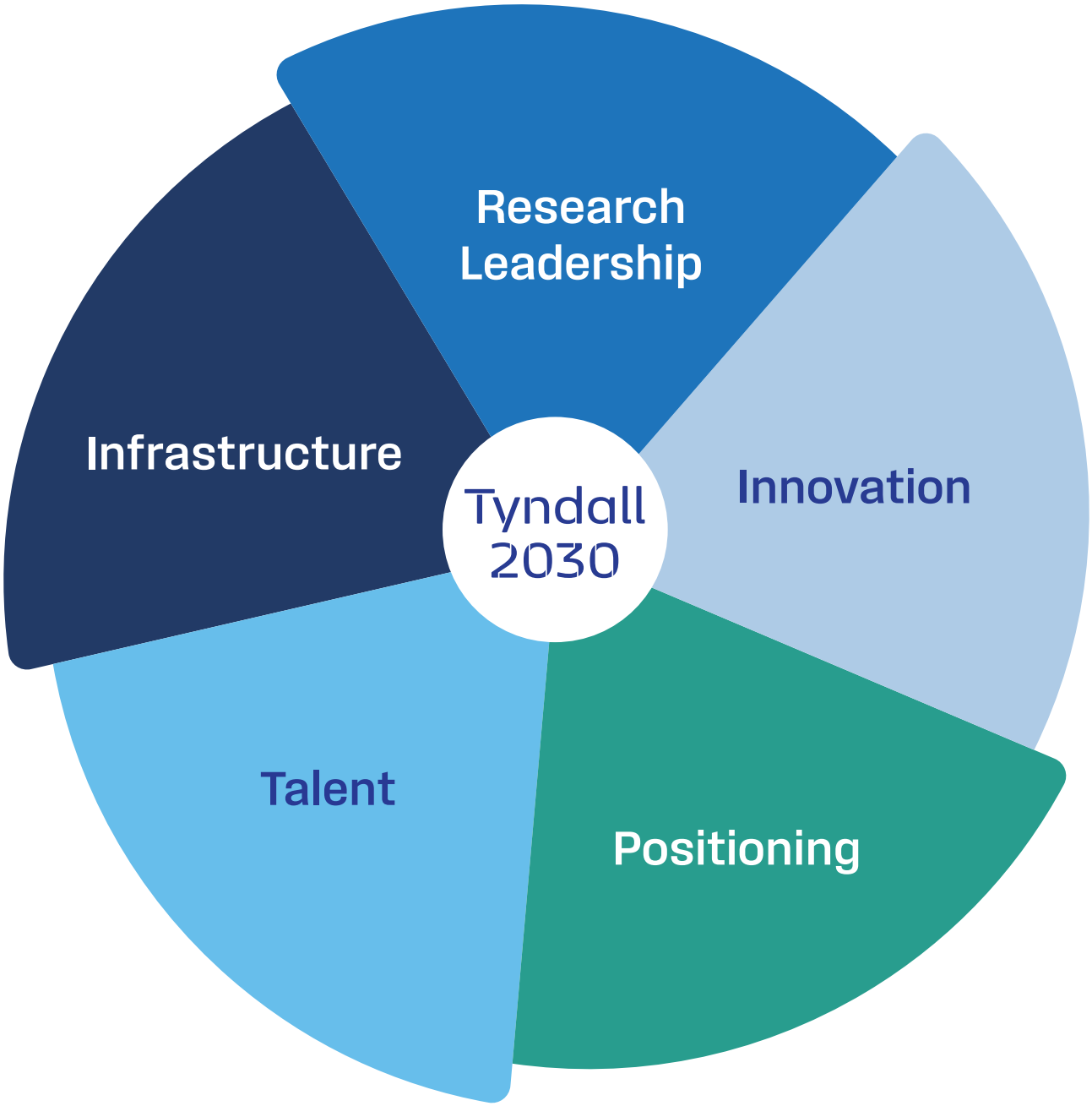
Strategic Plan 2026-2030

Connecting ideas. Delivering impact.

Rialtas na hÉireann
Government of Ireland

UCC
Coláiste na hOllscoile Corcaigh
University College Cork, Ireland

Tyndall



Research Leadership	Excellence and distinction in selected programmes of scale
Innovation	Commercialising breakthrough semiconductor technologies
Positioning	Securing Ireland's place at the core of the global chips landscape
Talent	An employer of choice and career accelerator
Infrastructure	Physical and digital foundations for the next wave of breakthroughs

Contents

Chair's Foreword

Tyndall 2030 represents a step change in the role the institute will play nationally and internationally in delivering on Europe's ambitions to achieve strategic autonomy in semiconductors.

The importance of that role cannot be understated. Semiconductors are foundational for society. They are as fundamental as water and electricity to a functioning society and economy. There is almost nothing in our lives that is not dependent on semiconductors in one way or another.

Despite that critical importance, their availability was taken for granted for many years. The manufacturing model for semiconductors underwent a profound change from the 1990s onwards. Large swathes of the industry switched to an outsourcing model with manufacturing transferred to locations mainly in Asia and primarily in Taiwan.

From a purely business perspective, this made sense. The leading semiconductor companies could focus on higher-value R&D and design activities, with the capital cost of manufacturing transferred to outsourcing partners. The model also had the advantage of enabling companies to reduce and increase orders in accordance with market conditions.

The downside of that dependency on the outsourcing or foundry model was exposed during the Covid-19 pandemic when chip shortages negatively impacted on manufacturing industries across Europe and the Western World. Geopolitical tensions, wars and other disruptions have further highlighted that exposure.

The response on both sides of the Atlantic has been the introduction of their respective Chips Acts aimed at reducing that dependence and recovering strategic sovereignty in this vital area.

The Irish Government was among the first to recognise the importance of the European Chips Act and the central role this country has to play in achieving its objectives. Ireland has a long-established advanced semiconductor ecosystem and recognises the opportunity to scale this sector.

That recognition manifests itself in policies like *Silicon Island - Ireland's National Semiconductor Strategy* and *Impact 2030 - Ireland's Research and Innovation Strategy*.

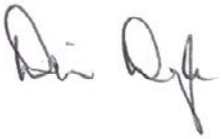
Tyndall 2030 aligns with those strategies and aims to place the institute at the focal point of Ireland's semiconductor ecosystem. In the past, our strategic focus has rightly been on excellence in everything we do. Tyndall 2030 will see us translate that excellence into leadership in semiconductors not just for the institute but for Ireland and Europe as well.

In crafting this strategy, we have engaged closely with Tyndall's establishing partners - the Department of Further and Higher Education, Research, Innovation and Science and University College Cork - as well as with other universities and research-performing organisations, Government Departments including the Department of Enterprise, Tourism and Employment, public agencies including Enterprise Ireland, IDA Ireland and Research Ireland, and our industry and other partners.

This process helped us confirm the role Tyndall can play in establishing Ireland as an acknowledged leader in semiconductor research and innovation which not only supports the European chips agenda but influences and shapes it.

Tyndall will do this by becoming an international leader in semiconductor and related research, by translating research and innovation into new value-adding technologies and employment-creating enterprises, by orchestrating the entire semiconductor ecosystem to focus on shared goals, and by attracting and developing the world-class talent required to maintain that leadership position. This ambition will be enabled through the sustained investment in Tyndall's facilities as large-scale national semiconductor infrastructure for research and innovation.

I look forward to working with the great team we have at Tyndall, the Board and our external stakeholders and partners to deliver the objectives of Tyndall 2030 both for the institute and for Ireland.



Dr Denis Doyle
Board Chair

CEO's Message

The core of the Tyndall 2030 strategy is a clear mission and purpose to advance semiconductor research and innovation and translate that into real-world impact.

This will be achieved through strong collaboration with industry and other academic and research institutions, the commercialisation of outputs, and the development of the world-class deep-tech talent and development of our large-scale research infrastructure. Our ambition is to position Ireland as a global leader in sustainable semiconductor innovation. In that sense, the strategy is not about Tyndall's future, it is about Ireland's future as a flourishing society and economy in a digitalised world.

In achieving that goal and delivering on our mission, our focus will be on connecting ideas and delivering impact, the central theme of the Tyndall 2030 strategy.

Tyndall is uniquely well positioned to connect ideas. Our expertise spans the full semiconductor materials-to-systems value chain, and our research and innovation activities cover the full spectrum from discovery through application to deployment.

Even more importantly, Tyndall is a highly multidisciplinary institution. There are no boundaries between scientific disciplines or between our people. That collaborative culture has been key to the success of Tyndall over the years. It is what makes Tyndall excellent at building thriving and impactful ecosystems both within and beyond the institute.

Tyndall 2030 will build on that and see the institute become a curator of ideas, convenor of partners and broker of collaborations which will help to establish Ireland as a global centre of excellence for semiconductor research and innovation. It will also position our expanding world-class infrastructure as a shared national asset - accessible to universities and research performing institutions across Ireland and to leading European and international partners.

Real-world impact is critically important if we want to translate our research excellence into leadership on the international stage. That means connecting the technology to the world that needs it, whether that is agriculture, healthcare or climate action. We commercialise our research outputs and turn them into measurable economic impacts. We connect industry to academia and Ireland to Europe to maximise our impact.

Tyndall 2030 also supports and complements the ambition of the Irish Government's Silicon Island strategy. We are not starting from a zero base. Ireland has the capabilities needed to build top-tier semiconductor manufacturing facilities, we have the design expertise, we have the research and innovation capacity, we have the manufacturing know-how, and much else besides. The whole value chain exists in Ireland, and Tyndall is at its very heart.

With a strong foundation and a broad base of expertise, Ireland is well positioned to become a global location of choice for semiconductor research and innovation.

As I look ahead to the implementation of Tyndall 2030, I am confident that we can achieve and perhaps exceed the ambitious goals we have set for ourselves. Our success and track record of excellence over the years has put us in a position of strength, ready to move to the next level. I am immensely proud of what the team here at Tyndall has achieved with the support of the Department of Further and Higher Education, Research, Innovation and Science, University College Cork and our State agency, academic and industry partners. Those achievements have given us the capability to avail of the exciting opportunities which are sure to materialise over the next five years.

Professor William Scanlon
CEO

Tyndall

Key Messages

Tyndall 2030 sets out how public investment in semiconductors translates into national capability, economic impact, and long-term competitiveness, enabling delivery at scale rather than project by project

Tyndall 2030 aligns with Impact 2030, integrating research excellence, talent, and infrastructure as national assets and translating excellence into measurable economic and societal impact

Tyndall 2030 strengthens translation and commercialisation, supporting spinouts, startups, and scaling SMEs by improving access to infrastructure, expertise, and global networks

Tyndall 2030 positions Ireland as a capable partner in delivering the objectives of the European Chips Act, exercising leadership, supporting programmes at scale, and shaping future research, innovation, and skills initiatives

Tyndall 2030 provides a delivery mechanism for Silicon Island, strengthening lab-to-fab pathways, supporting enterprise growth, and reinforcing Ireland's position in strategic value chains

Tyndall 2030 underpins Ireland's investment proposition by combining deep research capability, world-class infrastructure, and trusted national collaboration to anchor sustained value

Tyndall 2030 commits to excellence with purpose, offering world-class facilities and clear pathways from discovery to impact through leadership, collaboration, and real world outcomes

2030

Introduction

Tyndall National Institute occupies a unique and critical position within Ireland's research and innovation system. Tyndall was established as a standalone institute through a partnership between the Department of Further and Higher Education, Research, Innovation and Science (DFHERIS) and University College Cork (UCC). The institute is widely recognised as the cornerstone of Ireland's semiconductor ecosystem as the only organisation that spans fundamental and applied research, advanced fabrication and prototyping, industry engagement, and semiconductor talent development at scale. It is a trusted partner to multinational and indigenous industry, a leading European research and technology organisation (RTO), and a central pillar of Ireland's national semiconductor capability.

Tyndall expertise spans the full technology stack – from advanced materials integration and device fabrication to integrated systems and applications – ensuring that research excellence is translated into real-world impact. Internationally recognised as a research leader in semiconductor technologies, Tyndall applies its capabilities across key sectors, including information and communications, health and life sciences, agritech and food security, energy and climate mitigation, as well as emerging areas such as quantum technologies and future compute.

Tyndall plays a central role in Ireland's engagement with the European Chips Act through multiple strategic initiatives. It is a hosting partner in the EU Chips Joint Undertaking Pilot Lines NanoIC, FAMES, and PIXEUROPE, a leading partner in the quantum pilot line P4Q, and coordinates I-C3, Ireland's Chips Competence Centre.

However, the context in which Tyndall operates has changed fundamentally. Ireland has moved beyond viewing semiconductors as an important research domain and has made a clear and deliberate policy choice to treat the sector as a strategic national priority. Through *Silicon Island: Ireland's National Semiconductor Strategy*, *Impact 2030: Ireland's Research and Innovation Strategy*, and aligned national enterprise strategies, the State has explicitly recognised semiconductors and advanced digital technologies as foundational to long-term economic competitiveness, technological capability, and societal resilience. This represents a decisive shift in ambition – from a mere contributor to global value chains to becoming a meaningful and influential player within them – and places new expectations on how national capability is organised, mobilised, and delivered.

This ambition has been shaped by a rapidly changing geopolitical environment, intensifying global competition for advanced technologies, and Europe's response through the European Chips Act and its broader competitiveness and industrial policy agenda. At European level, the Chips Act and the Competitiveness Compass signal a decisive shift in approach: moving away from fragmented participation towards coordinated capability – building at scale, spanning research, innovation, manufacturing, and skills.

For Ireland, this creates both opportunity and responsibility. Success now depends not only on excellence in research, but on the ability to convert capability into impact – at national scale and with clear European relevance. Ireland is well positioned to make this shift thanks to its unusual depth across the full semiconductor value chain, combined with strong policy alignment and international connectivity.

As national and European ambitions have escalated, expectations of delivery have increased accordingly. While Tyndall's foundations are strong, Ireland's ambitions now extend beyond what can be delivered through existing execution models alone. The conditions that once supported success in semiconductor research have changed. International leadership is no longer secured through excellence delivered across dispersed projects or institutions, but through the ability to build and deploy critical-mass national capability with speed, coherence, and continuity. Without sharper strategic focus, greater scale, and a clearer national mandate, there is a risk that Ireland remains a capable contributor rather than a shaper of European and global semiconductor strategy.

Semiconductors have become strategic assets: capital-intensive, system-level technologies that require sustained focus, integrated infrastructure, and close alignment between research, industry, and skills development. In this environment, fragmented excellence, however strong, cannot deliver the scale, pace, or consistency required to achieve national impact or international influence. For Ireland, a coordinated national platform is not simply an enhancement of the existing model, but the only credible means of realising its stated ambitions in semiconductors.

Tyndall 2030 defines a deliberate shift in Tyndall's future position.

It sets out how Tyndall will operate as a national platform, extending beyond the role of a traditional research and innovation institute, to deliver Ireland's ambitions in semiconductors, advanced digital technologies, skills, and innovation-led enterprise growth. Building on the foundations of previous strategies, Tyndall 2030 represents an evolution in scale, focus, and execution. It is not incremental. It is a purposeful repositioning towards sharper strategic prioritisation, stronger delivery capability, and clearer national and European positioning - characterised by leadership rather than participation, translation rather than invention alone, and coordinated national impact rather than isolated excellence.

Under Tyndall 2030, Tyndall will operate as:

- A **research leader**, focused on areas where Ireland can credibly lead internationally.
- An **innovation-driven translation engine**, systematically converting research excellence into manufacturable technologies, scalable companies, and economic impact.
- A **national convenor**, aligning industry, academia, and policy around shared priorities.
- A **talent and infrastructure anchor**, recognising that world-class people are attracted to, and developed in, world-class environments.
- An **international representative**, helping shape European and global semiconductor technology agendas on Ireland's behalf.

Alongside wide-ranging internal consultations with the institute's staff and Board, this strategy has been shaped through extensive engagement with the UCC Senior Leadership, UCC Schools and Departments, and Government Departments, including DFHERIS and the Department of Enterprise, Tourism and Employment (DETE) as well as industry, research organisations, and public agencies. Stakeholders strongly endorsed Tyndall's central role while calling for it to be empowered to act decisively as a bridge from research to semiconductor innovation and technology manufacturing, a champion of indigenous capability alongside multinational collaboration, and a leader in coordinated national semiconductor skills development.

Tyndall 2030 positions Tyndall as the national platform that converts research strength into strategic capability, turning ambition into delivery and participation into leadership.

Mission and Vision

Mission

Advancing semiconductor research and innovation from materials-to-systems through impactful industry and academic partnerships and the commercialisation of sustainable technologies, consolidating Tyndall and Ireland as a beacon for talent and technology

Vision

To position Ireland as a global leader in sustainable semiconductor innovation

Connecting ideas. Delivering impact.

At the heart of Tyndall 2030 is a clear and purposeful mission. Tyndall exists to advance semiconductor research and innovation from materials through to full systems, ensuring that excellence in research is translated into real-world impact through deep industry engagement, strong academic partnerships, and the commercialisation of sustainable technologies.

Our mission reflects a deliberate emphasis on research as a national capability - one that delivers economic growth, skills, and long-term resilience. By operating across the full materials-to-systems value chain, Tyndall provides Ireland with a unique platform that connects discovery, application, and deployment. In doing so, it consolidates both Tyndall and Ireland as an international point of reference for advanced semiconductor research, innovation, and talent.

Tyndall 2030 is about positioning Ireland as a global leader in sustainable semiconductor innovation. This is not about scale for its own sake, but about leadership in areas where Ireland can genuinely shape international direction; delivering technologies that underpin digitalisation, energy efficiency, climate action, and secure supply chains.

The tagline, '*Connecting ideas. Delivering impact.*', captures Tyndall's role as a connector and a delivery engine: connecting research and industry, policy and technology, Ireland and Europe, and most importantly converting ideas into measurable economic and societal outcomes.

Together, the mission, vision, and tagline articulate a simple but powerful proposition.

Tyndall 2030 is about turning national ambition into global impact, ensuring that Ireland's investment in semiconductors delivers lasting value for the economy, for skills, and for society.

To deliver this ambition, Tyndall 2030 is structured around five mutually reinforcing strategic themes: **Research Leadership**, **Innovation**, **Positioning**, **Talent**, and **Infrastructure**. Together, these directly align with Silicon Island's focus on capability, resilience, and skills, and Impact 2030's requirement for measurable economic and societal return from public research and innovation investment.

In essence, Tyndall 2030 is about delivering research leadership and future-defining technologies, underpinned by state-of-the-art national infrastructure, to position both Tyndall and Ireland as global leaders in semiconductor innovation and skills - and as an employer of choice for world-class talent.

Our values in action

Tyndall 2030 is grounded in our core values. Ambition drives our commitment to lead internationally rather than participate marginally. Collaboration underpins our role as a national convenor across research, industry, and policy. Diversity strengthens our talent base, culture, and creativity. Excellence remains the foundation of our research and innovation. Integrity guides our partnerships, governance, and stewardship of public investment.

Together, these values shape a strategy focused on delivery. Tyndall 2030 sets out how Tyndall will convert national ambition into global impact - and ensure that Ireland's investment in semiconductors delivers lasting value for the economy, for skills, and for society.

Ambition

Collaboration

Diversity

Excellence

Integrity

drives our commitment to lead internationally rather than participate marginally

underpins our role as a national convenor across research, industry, and policy

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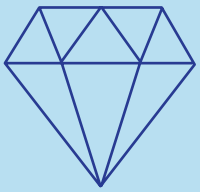
remains the foundation of our research and innovation



guides our partnerships, governance, and stewardship of public investment


CW RETURN
CW FLOW
SFI
Funded by
Science Foundation Ireland

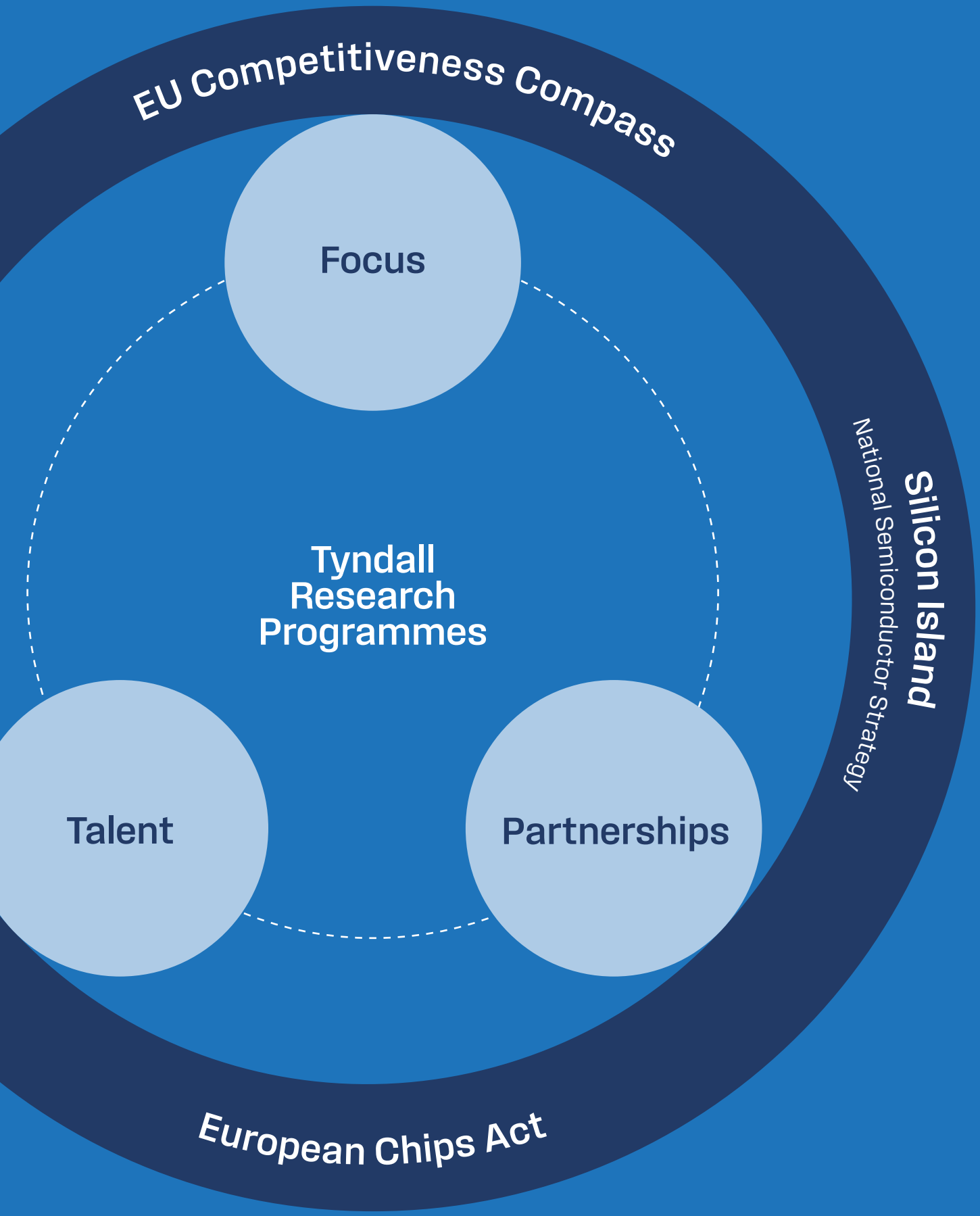
Research Leadership

Aim

Lead in semiconductor and semiconductor-enabled research focus areas aligned to the targets of Silicon Island and the European Chips Act

Strategic priorities

- → Drive research focus
- → Establish key strategic partnerships
- → Create world-class talent pools


EU Competitiveness Compass
Focus
Tyndall
Research
Programmes
Talent
Partnerships
Silicon Island
National Semiconductor Strategy
European Chips Act

Our first commitment is to research leadership - not simply participation in excellent research. In a context of increasing international competition, fragmented effort dilutes impact and limits influence. To secure long-term economic, technological, and skills benefits for Ireland, Tyndall must focus on leadership where it can genuinely set direction, attract world-class talent, and anchor national capability.

Tyndall will therefore make deliberate choices to lead internationally in a small number of strategically critical research areas aligned with national priorities, including the National Semiconductor Strategy and the European Chips Act. Consistent with Research Ireland's strategic focus on concentrating investment to achieve scale and global standing, areas selected will be those where Ireland has the potential to achieve recognised global leadership, and where sustained investment can deliver scale, visibility, and impact.

Rather than spreading effort thinly, Tyndall will concentrate resources to build critical mass, coherence, and long-term excellence in its core leadership areas. In parallel, we will maintain a strong and dynamic pipeline of emerging research themes, ensuring future resilience and responsiveness to new opportunities. In our priority themes, we will build the quality, scale, and capability required to lead internationally, supported by continuous improvement processes that sustain excellence while actively nurturing high-potential catalyst topics for future growth.

These priorities will be anchored through strategic research partnerships of scale with leading national and international RTOs and research performing organisations (RPOs), in line with Research Ireland's emphasis on partnership, connectivity, and system-level impact. Tyndall will take leadership roles within the partnerships where it adds the greatest value, thus ensuring that Ireland helps shape research agendas rather than simply participating in them.

In parallel, Tyndall will create world-class talent pools by attracting and developing globally leading researchers through distinctive, internationally recognised programmes tightly aligned with our priority research areas. By integrating focused investment, strategic partnerships, and talent development, Tyndall will operate as a coherent national platform for research leadership, positioning both the institute and Ireland at the forefront of international semiconductor research.

What success looks like

Tyndall will concentrate resources on a small number of internationally competitive programmes of scale, aligned to national and EU priorities, such as heterogeneous integration, advanced packaging, disruptive materials-enabled innovation and system-level semiconductor technologies.

By 2030, this will mean:

→ At least three internationally recognised programmes of scale.

→ A pipeline of emerging catalyst themes, e.g. quantum technologies, future compute and advanced connectivity technologies.

→ Strategic partnerships with leading RTOs and universities where Ireland leads, not follows.

→ All will be supported by attracting and developing a significant number of new senior staff, e.g. at least 20 new Principal Scientists, more than 25% of whom are women.

Tyndall 2030 converts research excellence into leadership in semiconductors which can be established and sustained at international scale.

Case Study 1

Heterogeneous integration and advanced packaging

Tyndall is a recognised European leader in heterogeneous integration and advanced packaging, addressing one of the key technological challenges facing next-generation semiconductor, photonic, and quantum systems.

Through its Photonics Packaging and Systems Integration programme, Tyndall develops advanced packaging technologies that integrate photonic, electronic, and optoelectronic components into compact, high-performance systems, spanning fundamental research through to pilot-scale manufacturing. Tyndall's work focuses on wafer-scale and 3D photonic-electronic integration, including optical and electrical coupling, thermal management, and system-level co-design. A long-term research vision centres on 3D photonic-electronic chiplet systems, enabling high-bandwidth, energy-efficient architectures for communications, sensing, and computing applications. These activities are supported by state-of-the-art front-end and back-end fabrication and packaging facilities, allowing rapid transition from laboratory concepts to manufacturable solutions.

In parallel, Tyndall advances heterogeneous integration at the device and materials level, combining III-V semiconductors, silicon, and silicon nitride platforms to realise integrated photonic and electronic functionality that cannot be achieved monolithically. This capability underpins applications ranging from high-speed optical interconnects to quantum and cryogenic systems, where advanced packaging is essential for real-world deployment.

These activities are closely linked with IPIC - the Research Ireland Centre for Photonics, which is hosted at Tyndall and serves as Ireland's leading collaborative research centre for photonic integration research, innovation, and PhD training. IPIC strengthens this capability by providing a critical mass of research excellence and talent, bringing together more than 200 researchers, engineers, and PhD students across multiple Irish institutions, with Tyndall as the primary host site. The centre has delivered significant outputs in high-impact publications, European research leadership, and industry-engaged innovation.

Case Study 2

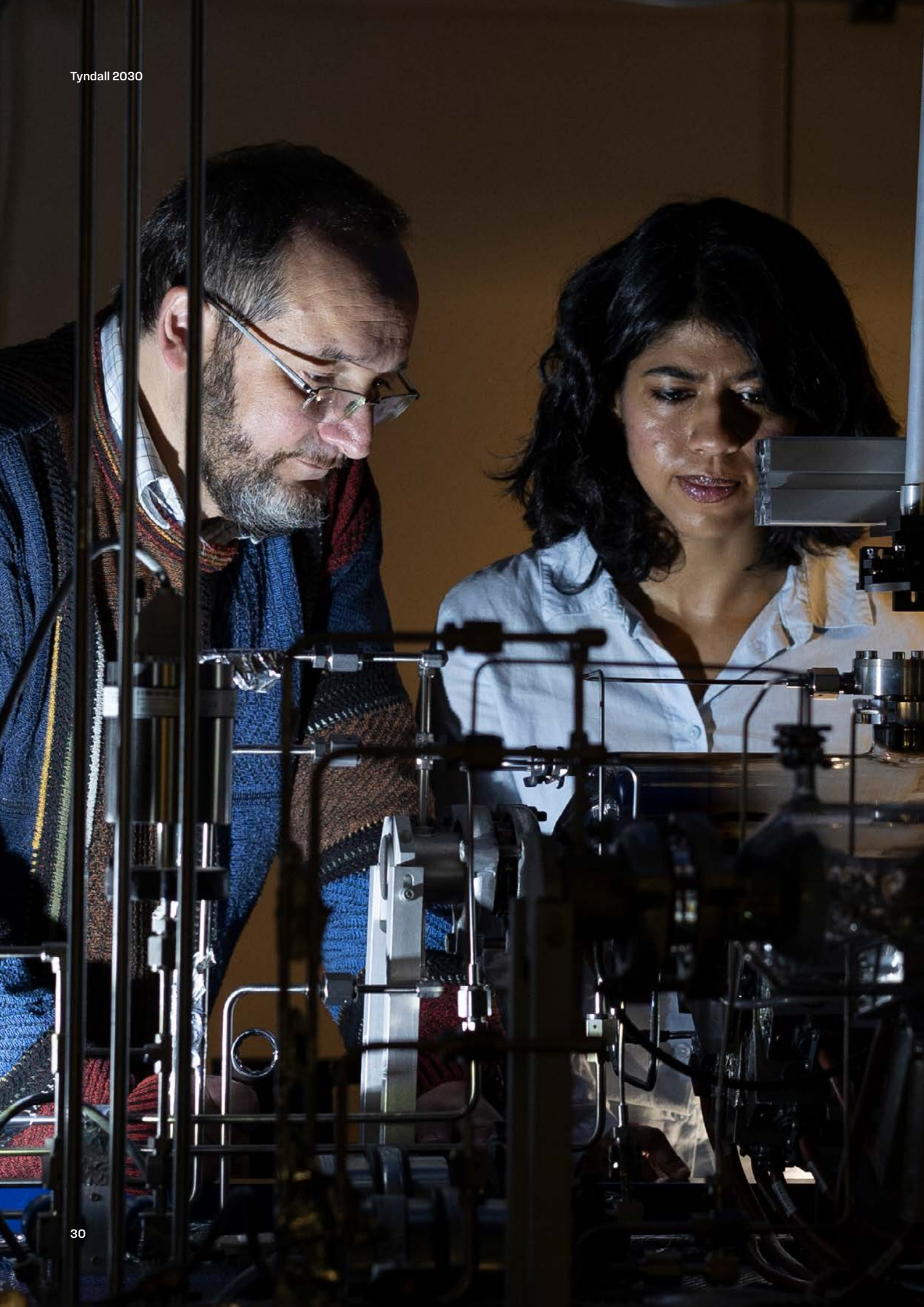
Wireless communications

Tyndall's Wireless Communications Laboratory leads research activities in next-generation wireless systems and is recognised internationally for its contributions to cellular network architectures, small cells, and emerging 6G technologies.

The laboratory is led by Professor Holger Claussen, an authority on wireless communications and former Head of Wireless Communications Research at Nokia Bell Labs, where his work helped shape foundational technologies for modern cellular networks.

The laboratory was established with a strong emphasis on recruiting and developing internationally leading researchers across radio frequency (RF) systems, access technologies, network protocols, artificial intelligence (AI), and quantum-enabled communications. This interdisciplinary structure reflects Professor Claussen's experience in building high-impact research teams and enables the laboratory to address wireless communication challenges across the full system stack.

A defining characteristic of the laboratory is its deep integration with strategic academic, industry, and public sector partners, demonstrated through several flagship collaborative projects. In the GUARD project, the laboratory collaborates with AtechSYN, VRAI, WAZP, University College Dublin, University of Limerick, and the Irish Naval Service to develop autonomous drone-based systems for maritime surveillance and drug interdiction, combining advanced wireless multi-connectivity with AI-enabled sensing. The MISTRAL project brings together Tyndall, Trinity College Dublin (TCD), AtechSYN, and the Irish Defence Forces to enable reliable long-range communications using AI-driven aerial relays, targeting defence, humanitarian, and emergency response scenarios.



Case Study 3

Quantum technologies

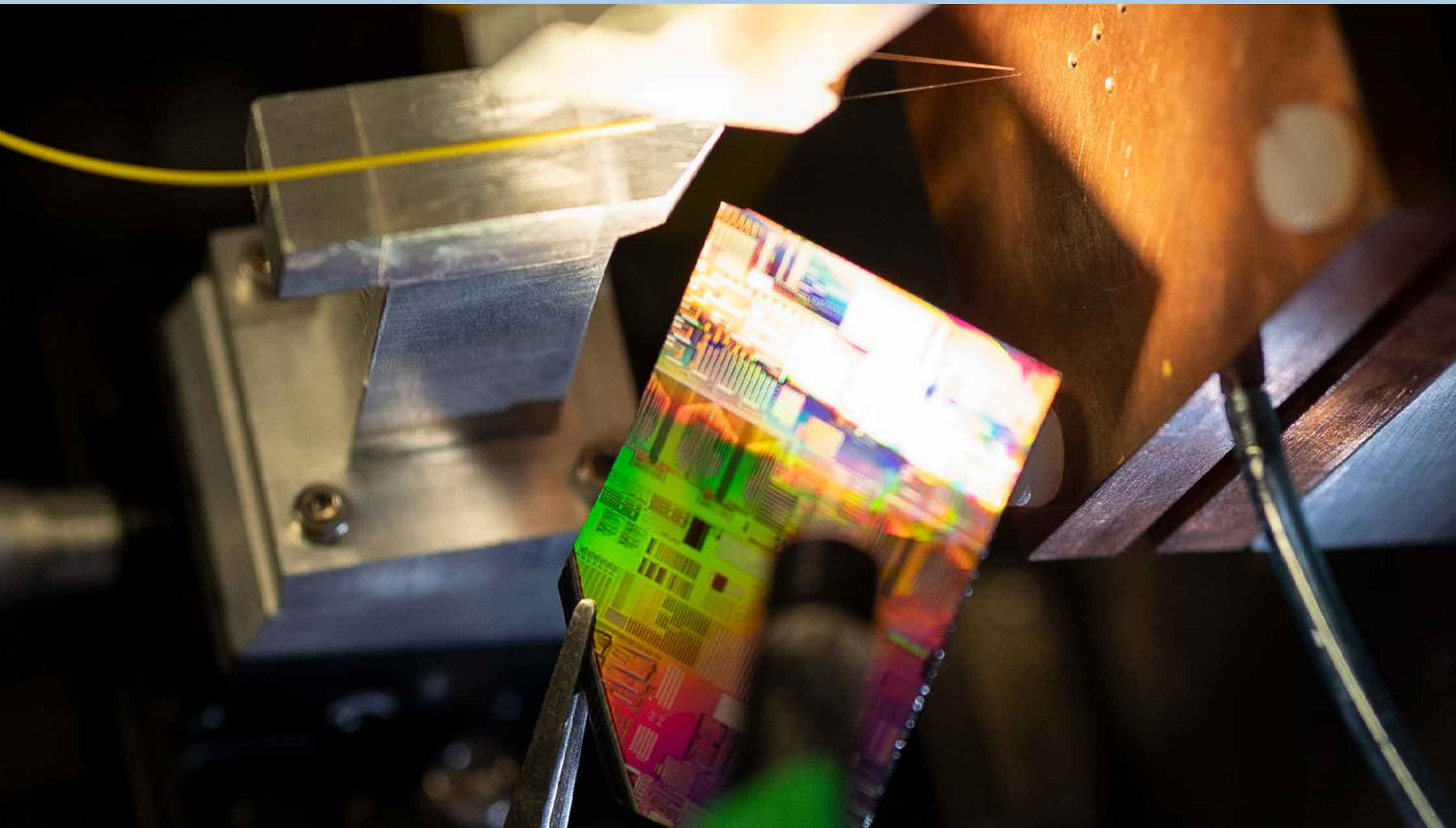
Tyndall has established a strong and expanding portfolio in quantum technologies, focused on translating fundamental quantum science into scalable, engineered systems. Central to this activity is the Quantum Computer Engineering Centre (QCEC), Ireland's first dedicated quantum engineering centre, created to bridge quantum theory and practical implementation through deep-tech research spanning materials, devices, and systems engineering, while supporting workforce development and industry collaboration.

A core strength of Tyndall's quantum programme is its internationally leading position in quantum photonics, underpinned by long-standing expertise in photonics, nano-electronics, and semiconductor manufacturing. This is exemplified by Tyndall's central role in QCEED, a €3m European Innovation Council (EIC) Pathfinder project led from Tyndall, which brings together a pan-European consortium to address key bottlenecks in scalable photonic quantum computing using engineered semiconductor quantum-dot sources and integrated photonics.

At a systems and infrastructure level, Tyndall is a core partner in IrelandQCI, the €10m national Quantum Communications Infrastructure project within the EU-wide EuroQCI programme. IrelandQCI focuses on deploying secure quantum communication technologies, including quantum key distribution (QKD), by integrating quantum devices into Ireland's existing fibre-optic networks, strengthening national cybersecurity resilience against future quantum threats.

Tyndall is also a key partner and Irish host of the €50m European Photonics for Quantum (P4Q) pilot line, a major EU initiative aimed at establishing a scalable manufacturing ecosystem for quantum photonic chips. Through P4Q, Tyndall contributes specialist capabilities in advanced and cryogenic packaging of quantum photonic devices, a critical enabler for scalable quantum sensing, communication, and computing technologies.

Innovation



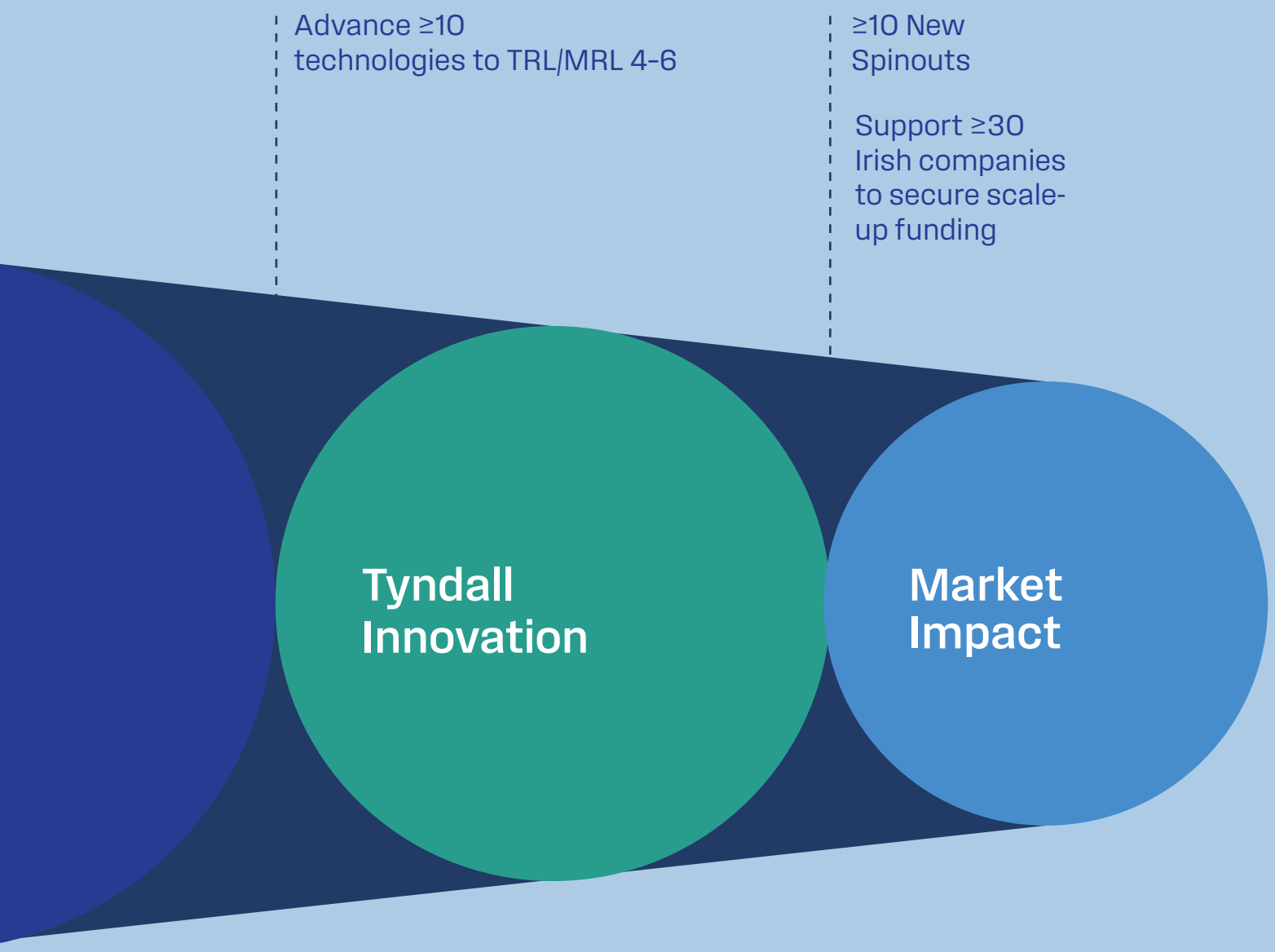
Aim

Create the environment to commercialise breakthrough innovations to grow Ireland's semiconductor sector

Strategic priorities

- → Develop future semiconductor technologies
- → Build Ireland's global R&D innovation hub
- → Create Ireland's future semiconductor companies

Ideas & Discovery


Advance ≥10
technologies to TRL/MRL 4-6
≥10 New
Spinouts
Support ≥30
Irish companies
to secure scale-
up funding
Tyndall
Innovation
Market
Impact

Innovation is the most significant strategic shift represented by Tyndall 2030. While Ireland has a strong record of research excellence, stakeholders were clear that excellence must be more strongly coupled with innovation if we are to realise our national ambition. Public investment in research should translate more systematically into economic impact, industrial capability, and scalable indigenous enterprise.

To support the objectives of Impact 2030 and Silicon Island, Tyndall must operate not only as a source of discovery and invention, but as a national translation engine that bridges research, industry, and commercial deployment. This positions Tyndall as a critical interface between Research Ireland-funded excellence, Enterprise Ireland-supported indigenous innovation, and IDA Ireland's objectives to embed and scale innovation within Ireland's foreign direct investment (FDI) base.

Tyndall will therefore embed innovation and commercialisation as core, mission-critical activities. Our focus is on systematically converting research excellence into manufacturable technologies, scalable companies, and measurable economic and societal impact for Ireland. Innovation at Tyndall will prioritise the advancement of sustainable semiconductor and semiconductor-enabled technologies to levels of maturity that enable effective transfer to industry, including startups and scaling small and medium-sized enterprises (SMEs). This represents a shift from largely project-driven commercialisation to a deliberate, structured approach to translation at scale.

Innovation delivery will be enabled through integrated investment in people, culture, and infrastructure. This approach is consistent with Research Ireland's emphasis on talent and infrastructure, Enterprise Ireland's focus on capability building and scaling the indigenous SME sector, and IDA Ireland's objective to deepen, embed, and differentiate Ireland's research, development and innovation (RD&I) offering for foreign direct investment.

Tyndall will build the capability required to support innovation across the full technology lifecycle, from early-stage research through to industry-ready solutions. We will embed entrepreneurship, industrial engagement, and commercial awareness into our culture, thus ensuring that innovation is recognised, supported, and rewarded across the organisation. Facilities, processes, and governance will be aligned to streamline progression from lab-to- fab.

Through close co-development with industry, Tyndall will operate as Ireland's global R&D innovation hub. We will work in deep partnership with multinational and indigenous companies - supported through IDA Ireland and Enterprise Ireland, respectively - providing access to research expertise, advanced infrastructure, and prototyping capability. This model will attract international partners to use Tyndall as a nucleus for codeveloping next-generation technologies, while simultaneously supporting indigenous SMEs to scale and compete globally. By integrating research excellence with disciplined translation and industrial partnership, Tyndall will ensure that innovation delivers sustained national benefit and positions Ireland as a leader in semiconductor-driven enterprise growth.

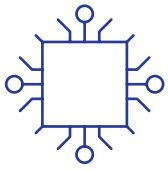
What success looks like

Tyndall 2030 delivers a step change in innovation.

By 2030,

→ Innovation and commercial engagement will represent 40% of our total activity, reflecting our shift from delivering inventions to acting as a national translation engine for semiconductor technologies.

→ We will advance future technologies to industry-ready maturity through sustained co-development with both multinational and indigenous companies, positioning Tyndall as Ireland's global semiconductor R&D innovation hub, with at least 30 companies in residence.



→ Critically, our innovation will drive indigenous enterprise growth - creating new spinouts and supporting Irish companies to scale.

This directly supports Impact 2030's focus on indigenous enterprise growth and strong returns on public investment, while reinforcing Ireland's position as an open economy

Case Study 1

MagIC: making magnetic components disappear for sustainable energy-efficient electronics

A major roadblock to minimising energy consumption in electronics (from smartphones to data centre servers) has been the inability to miniaturise and integrate power supply circuits into microprocessor chips due to bulky magnetic inductors in the off-chip, dc-dc converters used to deliver power to the system circuits.

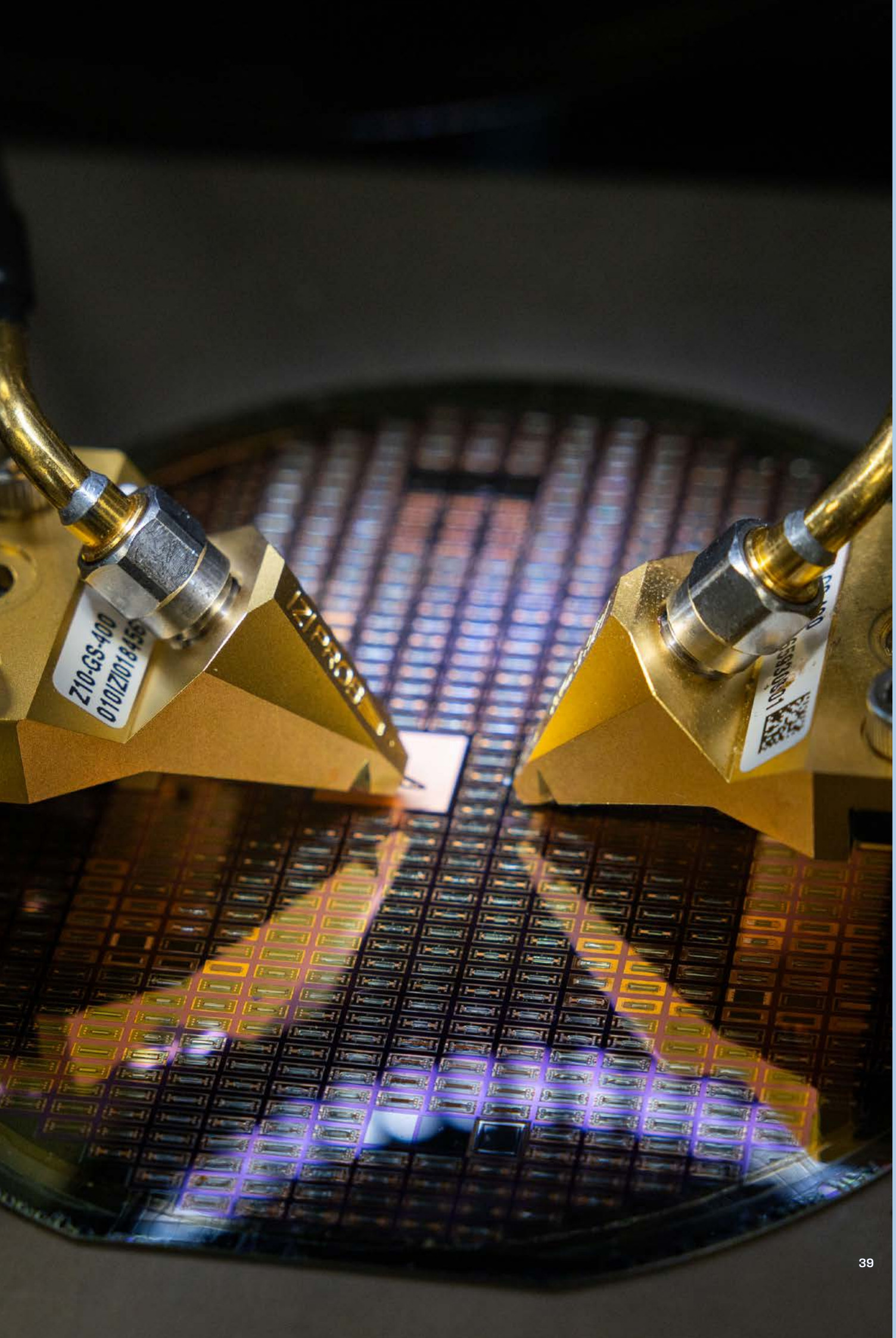
For more than a decade, Tyndall has supported the investment of more than 200 person years in the MagIC programme and in the Integrated Magnetics Group, enabling the programme to become recognised as world-leading and the group to be acknowledged as global thought leaders in this highly disruptive, emerging space.

The MagIC platform comprises:

- magnetics (inductors) from 1 to 100 nH, Q-factor above 25, 100 MHz operation and beyond, footprint less than 1 mm2, height below 100 microns
- validated design/simulation tools
- process flows and design rules for high-volume fabrication
- material specifications for laminated, thin-film magnetic cores
- magnetic material characterisation protocols and inductor test methodologies.

While most of MagIC's client engagements are confidential under non-disclosure agreement (NDA), we can say that the MagIC platform is licensed to two global smartphone brands and a leading semiconductor foundry. Tyndall also supports a significant number of supply chain partners, thus ensuring that a viable supply chain is in place to accelerate adoption. The team has had funded collaborations with more than 16 world-leading companies and has co-authored journal and conference publications with many institutions and European companies, including AT&S, Bosch, Global Foundries, IBM, Infineon, MuRata/IPDiA, Tridonic, Würth Elektronik as well as Intel and Texas Instruments in the United States of America (USA). In 2019, the team had a joint patent granted with Apple.

Following a recent announcement, the MagIC platform has now been made openly accessible to the wider research and innovation community through the FAMES Chips Joint Undertaking Pilot Line, thus significantly lowering barriers to adoption and enabling broader academic and industrial engagement with the technology.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Case Study 2

A national infrastructure resource for startups and SMEs

State investment in world-class infrastructure and technology at Tyndall over many years has enabled the institute to provide an exceptional work environment for deep-tech SMEs.

Today, eight SMEs are working on-site in Tyndall. These companies employ 27 staff who have access to leading-edge fabrication and testing laboratories as well as the expertise of Tyndall research and engineering staff.

Four of these companies are using Tyndall infrastructure and manufacturing expertise for early pilot production and qualification of innovative new products in semiconductor, manufacturing equipment, satellite communications and medtech markets.

Very significantly, the quality of the environment on offer at Tyndall has attracted companies such as FiconTEC from Germany, PixQuanta from the Netherlands, and X-Celeprint from the USA, all of which would not otherwise have established operations in Ireland were it not to take up residence at Tyndall. These companies are now on a growth journey, making societal and economic impact in Ireland and contributing to the national innovation ecosystem which connects SMEs and multinational companies on-site at Tyndall.

A notable feature of Tyndall's collaboration with spinout companies in Ireland is the fact that it is not limited to companies that are 'Tyndall's own'. SMEs from across the island leverage the institute's expertise and infrastructure, emphasising Tyndall's role as a national platform for supporting deep-tech spinouts by providing early-stage production and testing facilities.

Collaborations include fabricating the semiconductor wafers used by Dublin City University spinout Novus Diagnostics in its sepsis diagnostic system; providing advance manufacturing facilities for the TCD spinout Adama Innovations to manufacture its doped diamond Atomic Force Microscopy (AFM) tips; and supporting Lamhroe in the development of new approaches for wafer bonding and sealing of Gallium Arsenide (GaAs) RF devices.


SYSTEM-ON-CHIP
Groundbreaking quantum
AMD
IPIC
#BRINGING PHOTONICS TO LIFE

Case Study 3

Creating the next generation of high-potential startups

Central to Tyndall's strategy is the formation of new ventures to commercialise the intellectual property (IP) created within the institute. Success in spinout and startup activity is not measured just in terms of the number of new enterprises established but also in the survival rate of the individual companies. While establishing a new company can be relatively straightforward, building one that endures depends on the presence of deep-tech differentiation and defensible IP.

Tyndall has been responsible for the creation of multiple deep-tech spinout companies spanning photonics, micro- and nano-electronics, sensing, and communications. Several of these companies have achieved significant commercial outcomes through acquisition by global technology leaders. Notable examples include InfiniLED, acquired by Meta; SensL, acquired by ON Semiconductor; and Firecomms, acquired by ZJF Group, demonstrating the ability of Tyndall-derived technologies to scale into international markets.

Alongside these exits, a number of spinouts continue to operate as independent enterprises. These include Vivid Photonics, launched in 2025 to commercialise a first-of-its-kind superluminescent diode technology for AR/VR applications; FastNet Photonics, focused on electroabsorption modulated lasers for optical communications; Varadis, which commercialises radiation-sensing technologies for space and high-reliability markets; Endurance Semiconductors, focused on the commercialisation of a 3C-SiC-on-silicon power-electronics platform targeting AI data centres, electric mobility and renewable energy systems; and Pulpo Semiconductor (PulpoSemi), a recent Tyndall spinout developing advanced power delivery and voltage regulation technologies for AI system-on-chips, based on licensed Tyndall IP.

Collectively, these companies illustrate Tyndall's ability to translate long-term, high-risk research into commercially viable ventures, supported by strong industrial relevance, defensible IP, and sustained engagement with national and international innovation ecosystems.

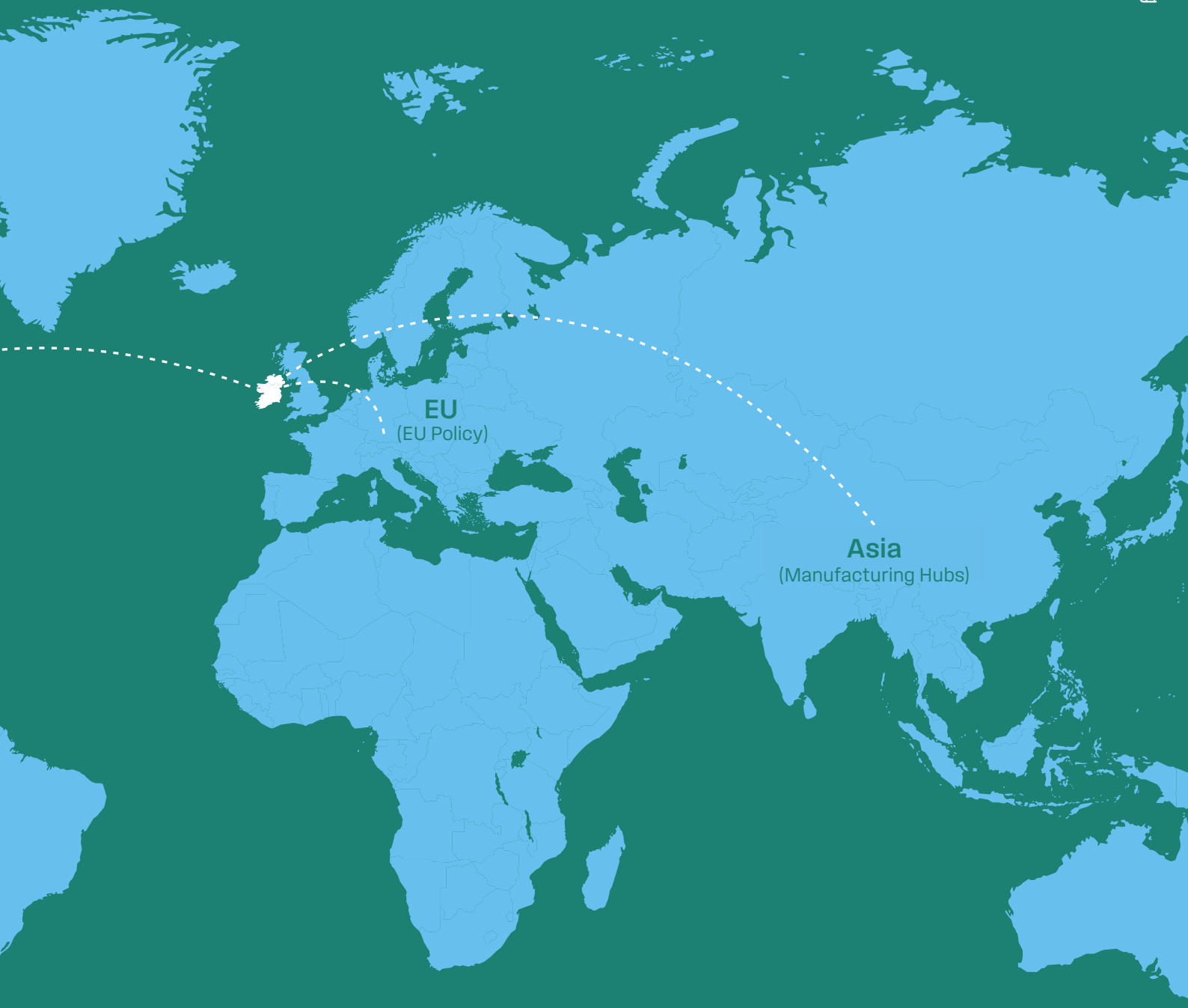
Positioning

Aim

Secure Tyndall and Ireland's position at the core of the European and global semiconductor technology and skills landscape

Strategic priorities

- → Champion thought leadership
- → Scale global partner networks
- → Steer and lead major strategic initiatives



Produce ≥20 influential Vision Papers, Technology Roadmaps, or Foresight Studies

Secure ≥5 leadership roles in formal global partnerships

Place ≥10 Tyndall experts per year in key policy advisory roles

Ireland cannot influence what it does not help shape. As semiconductors and advanced digital technologies become central to economic competitiveness, security, and societal resilience, influence is increasingly determined by presence at the tables where priorities, roadmaps, and investments are decided. To deliver on national ambition, Ireland must operate at the core of European and global semiconductor strategy. Tyndall 2030 therefore positions Tyndall as a critical national asset for international engagement, influence, and leadership.

Tyndall's ambition is to act as Ireland's national platform for shaping European and global semiconductor research and innovation agendas. This role complements Research Ireland's system-level leadership in research excellence and talent, IDA Ireland's focus on embedding Ireland within globally strategic value chains, and Enterprise Ireland's objective to connect international opportunity to indigenous enterprise growth. It goes beyond participation in international programmes to a more assertive role in setting direction, framing priorities, and convening partnerships.

Through this positioning, Tyndall will champion Ireland's thought leadership in semiconductors and digital technologies, strengthening the national ecosystem's visibility and influence across research, industry, and policy communities. Working in concert with IDA Ireland and Enterprise Ireland, Tyndall will help ensure that Irish capabilities, priorities, and strengths are reflected in major European and global initiatives, translating international engagement into opportunity for both FDI investment and the scale up of indigenous SMEs.

This positioning will be delivered through deliberate leadership and partnership. Tyndall will scale and deepen global partner networks with leading industry players, RTOs, universities, and policy bodies. Within these networks, Tyndall will take leadership roles where it adds the greatest value for the national and European ecosystem, enabling Ireland to shape agendas rather than follow them. We will actively contribute to, and lead, influential vision papers, technology roadmaps, and strategic forums that define future semiconductor directions.

Through its positioning role, Tyndall will also steer and lead major policy-driven initiatives that translate international influence into tangible national benefit. These initiatives will be converted into strategic research programmes, infrastructure investment, and talent development pathways aligned with Ireland's long-term needs. Connecting policy, research, and industry execution, Tyndall will ensure that international engagement results in transformative semiconductor innovation and a highly skilled workforce for Ireland.

By operating as a trusted national platform for international leadership, Tyndall will help position Ireland as a credible, influential, and proactive shaper of the global semiconductor landscape.

What success looks like

Tyndall will be positioned at the core of the European and global semiconductor landscape - not just participating but shaping direction and priorities.

By 2030,

→ We will do this through clear thought leadership, with Tyndall experts leading influential vision papers and technology roadmaps that ensure Ireland's voice is heard where strategy is set.

→ We will scale our global partnerships, holding leadership roles in major international networks and acting as Ireland's trusted technical and policy advisor.

→ Crucially, we will convert influence into action by leading policy-driven initiatives that deliver new research programmes and national skills pathways - reinforcing our ambitions under the Talent theme priorities.

Together, these actions will ensure that Tyndall 2030 converts trust into influence, influence into leadership, and leadership into sustained national, European and global impact.

Case Study 1
Silicon Island

Silicon Island: Ireland's National Semiconductor Strategy sets out a coordinated national vision to strengthen Ireland's position in the global semiconductor value chain in alignment with the European Chips Act and Europe's Digital Decade. The strategy was officially launched at Tyndall in May 2025 by the Minister for Enterprise, Tourism and Employment, Peter Burke TD, bringing together government, industry, startups, and research leaders to mark a pivotal moment in Ireland's semiconductor ambitions.

The launch at Tyndall reflected the institute's central role in Ireland's semiconductor ecosystem, with the strategy highlighting Tyndall as a key delivery partner through research excellence, infrastructure, and skills development. Silicon Island focuses on expanding Ireland's semiconductor ecosystem, strengthening the talent pipeline, and capturing opportunities across advanced manufacturing, chip design, and research, while supporting Ireland's engagement with European-scale initiatives under the European Chips Act.

Tyndall played a formative role in shaping and advocating this national strategy through its influential position paper, *Ireland's Role in the Global Semiconductor Industry*. Published in the context of the European Chips Act, the paper set out a clear call for a national chips strategy, arguing that Ireland is well positioned to scale its semiconductor sector by mobilising research capacity, pilot line infrastructure, innovation ecosystems, and a sustainable skills pipeline.

The paper articulated the strategic importance of semiconductors to Ireland's economic resilience and technological sovereignty and directly informed national policy discussions by outlining concrete actions across research and innovation, talent development, and industry engagement. This piece of thought leadership by Tyndall helped frame the policy rationale that ultimately culminated in the launch of Silicon Island, positioning Tyndall as both an advocate and an anchor institution for the strategy's delivery.


Rialtas na hÉireann
Government of Ireland
Silicon Island
Ireland's National
Semiconductor

Case Study 2

Chips initiatives under the European Chips Act and Silicon Island

Aligning with Silicon Island and the European Chips Act, Tyndall actively participates in pan-European initiatives that strengthen Europe's semiconductor research and innovation capacity under the Chips Joint Undertaking (Chips JU). The Chips JU is the primary implementation body of the Chips for Europe Initiative, supported by approximately €3.3bn in European Union (EU) funding, and focuses on bridging the gap between research and industrial manufacturing by translating laboratory innovation into manufacturable technologies and prototype products for industry uptake.

Tyndall participates in three of the five Pilot Lines approved by the Chips JU, which act as key aggregators of semiconductor R&I capacity across Europe. These Pilot Lines are led by European RTOs and are co-funded by the European Union and participating Member States, with Ireland's participation supported through IDA Ireland. They provide shared infrastructure and expertise that enable the transition from lab-to-fab, supporting process development, prototyping, and early industrial adoption.

Tyndall is a hosting partner in the NanoIC, FAMES, and PIXEurope Pilot Lines. NanoIC, led by Belgium's RTO imec, focuses on advanced systems-on-chip research beyond the 2 nm logic node, with Tyndall contributing pathfinding activities on the integration of emerging materials for embedded memory. FAMES, led by the French RTO CEA-Leti, addresses advanced fully depleted silicon-on-insulator technologies integrated with non-volatile memories, RF components, 3D integration options, and smart power management; within FAMES, Tyndall advances power-delivery solutions through its integrated magnetics platform and micro-transfer-printing technologies for on-chip passive integration. PIXEurope establishes foundations for advanced photonic integrated circuits, covering design, fabrication, assembly, packaging, and testing, with Tyndall leading packaging technology development and contributing to the prototyping and technology transfer gateway, including training activities.

Complementing these Pilot Lines, Tyndall also plays a central role in the Photonics for Quantum (P4Q) Pilot Line that industrialises quantum photonic technologies by developing scalable manufacturing, packaging, and testing capabilities for quantum photonic chips. In addition, Tyndall coordinates I-C3, Ireland's Chips Competence Centre supported through Enterprise Ireland, which provides structured access for startups and SMEs to Chips JU Pilot Lines, design platforms, training, and funding pathways, thus ensuring effective national engagement with the European semiconductor ecosystem.

Case Study 3

ENTIRE European digital innovation hub

European digital innovation hubs (EDIHs) have been established across EU Member States and associated countries to assist SMEs and public service organisations (PSOs) that have not yet embraced modern technologies to digitally transform their businesses and bridge the productivity gap with the multinational sector. The EDIHs accelerate the transition to the digital economy in key sectors, including health, energy, agriculture, and transport through the four pillars of test-before-invest programmes, funding, training and skills provision, and networking.

Tyndall leads the consortium delivering the ENTIRE European digital innovation hub, with national participation supported through Enterprise Ireland. ENTIRE has already been very successful in its first 30 months of operation, supporting Irish SMEs and PSOs in their digital transformation journeys, with 210 organisations already serviced/supported across the four key pillars of the EDIH programme.

ENTIRE will enter Phase 2 in 2026 building on the expertise, infrastructures and technology platforms available through the consortium, together with those of the network of EDIHs nationally and across the EU. ENTIRE-2 will expand its focus and scope in AI and scale its services and supports for digital transformation.

Talent

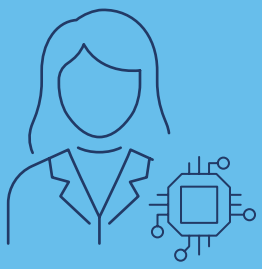
Aim

Attract, develop, and deliver high-performing talent empowered by a culture of excellence, ambition and entrepreneurship

Strategic priorities

- → Attract top talent
- → Strengthen Tyndall's talent framework
- → Enhance innovation and entrepreneurship
- → Amplify leadership and culture

+ Principal Scientists

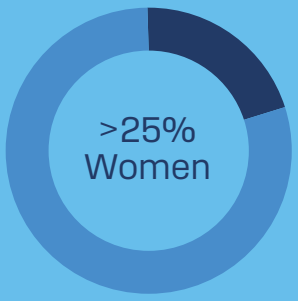


+ Senior Researchers

+ Industry Transfer

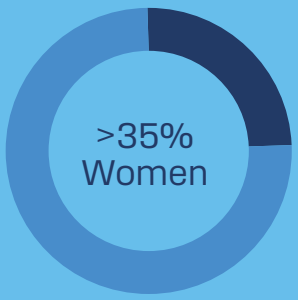
Principal Scientists

Attract/develop **≥20** new Principal Scientists



Senior Researchers

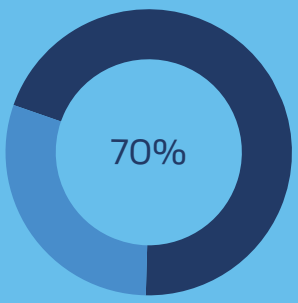
Attract/develop **≥40** new Senior Researchers



Industry Transfer

Powering the Ecosystem

≥70% of departing staff transferring to industry



Talent is the critical enabler of Tyndall 2030. Across all external consultations, skills shortages were consistently identified as the single greatest risk to Ireland's semiconductor ambitions. This challenge is also reflected in the strategies of Research Ireland, Enterprise Ireland, and IDA Ireland, each of which recognises talent availability as a constraint on research excellence, enterprise growth, and inward investment. Without sufficient depth, scale, and capability in people, investment in infrastructure and research cannot deliver sustained impact. World-class facilities and programmes depend fundamentally on world-class people. Talent ambition is therefore inseparable from Ireland's ability to lead internationally in semiconductors and advanced digital technologies.

Tyndall 2030 positions Tyndall as the national leader in semiconductor talent development, complementing Research Ireland's leadership in building research talent and careers, Enterprise Ireland's focus on developing skills for indigenous enterprise and scale up, and IDA Ireland's objective to ensure that Ireland can meet the skills demands of strategic international investment. Our ambition is to attract, develop, and deliver high-performing people across all career stages, supported by a culture of excellence, ambition, and entrepreneurship.

Tyndall will act as a career accelerator, providing researchers, engineers, technologists, and professional staff with clear pathways to develop capability, leadership, and impact. In doing so, we will strengthen Ireland's talent base across academia, industry, and emerging enterprise - supplying highly skilled people into multinational operations, indigenous SMEs, startups, and the wider research and innovation system.

Talent delivery will be underpinned by a systemic and integrated approach. Tyndall will position itself as an employer of choice, nationally and internationally, by offering inspiring career opportunities, world-class research environments, and exposure to industry-relevant challenges at scale. We will strengthen our talent framework, establishing clear and agile career pathways across all job families to support attraction, development, and progression. These pathways will provide transparency and consistency, while remaining flexible enough to respond to evolving organisational and national needs.

At the same time, we will embed innovation, entrepreneurship, and leadership development into Tyndall's culture. By fostering inclusive, high-performing teams and investing in leadership capability at all levels, we will build a strong and sustainable pipeline of future leaders. Talent development at Tyndall will not be an isolated organisational objective, but a national contribution - delivering highly skilled people into industry, startups, and the wider research ecosystem.

By integrating attraction, development, leadership, and culture, Tyndall will build the talent capability required to underpin Ireland's semiconductor ecosystem, support industry growth, and sustain long-term national competitiveness.

What success looks like

By 2030,

→ Tyndall will have a fully embedded talent framework, with clear career pathways across all job families to support attraction, development, and retention.

→ We will strengthen senior capability by attracting or developing 20 Principal Scientists (or above this grade) and 40 Senior Researchers, building the leadership depth needed to deliver impact at scale.

→ Critically, talent development will translate into national and European benefit, with at least 70% of postgraduates and postdocs transitioning into roles in industry or startups.

→ Alongside this, a Future Leaders Programme will deliver a strong pipeline of inclusive, people-centred leaders.

Together, these targets deliver the critical people and skills base required to sustain and scale Ireland's national semiconductor ambitions, industrial growth, and international leadership.

Case Study 1
Summer internship programme

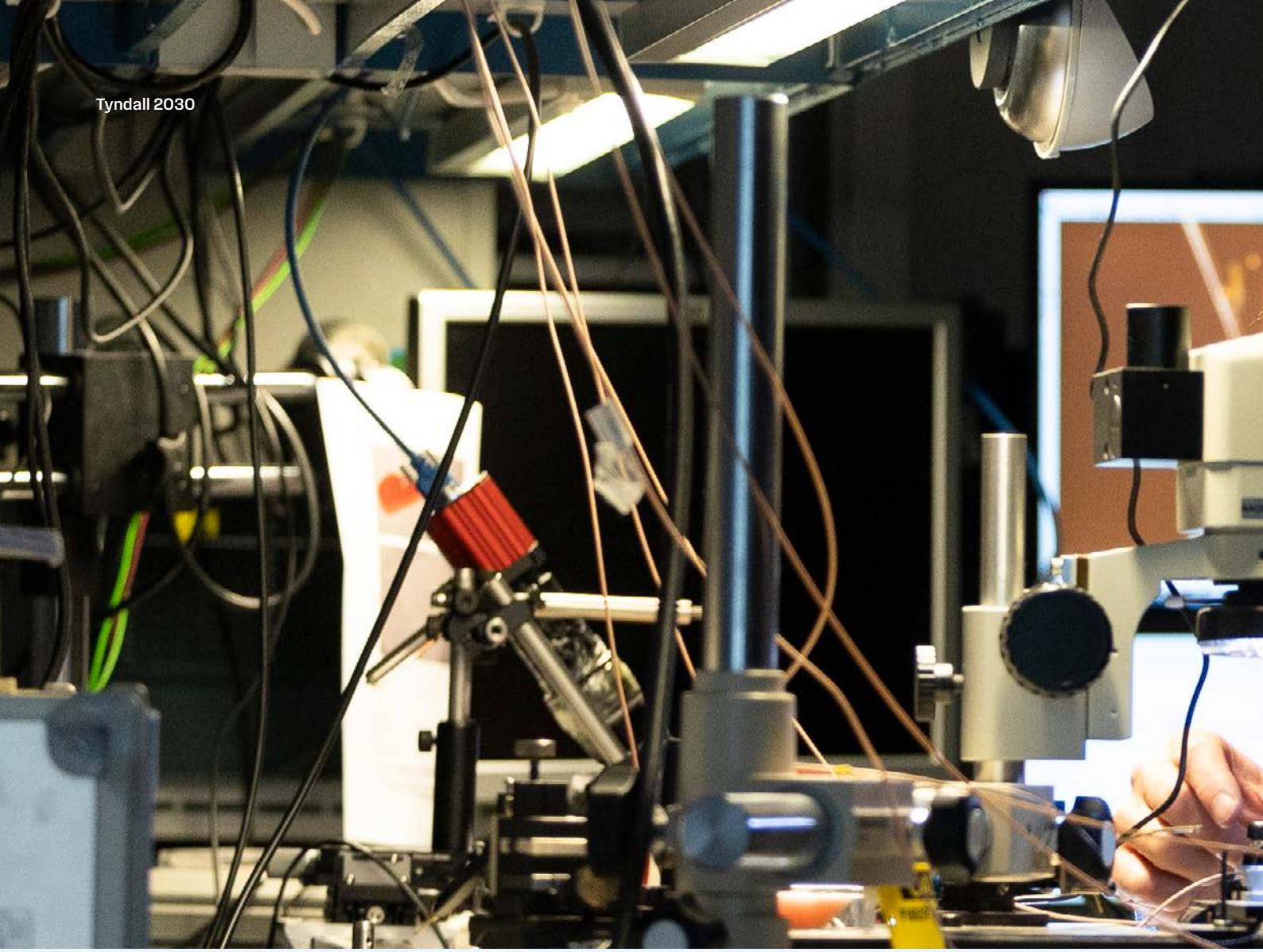
Tyndall delivers a highly regarded summer internship programme, formally known as the Tyndall and IPIC Summer Fellowship Programme, which provides undergraduate STEM (science, technology, engineering and mathematics) students with an immersive introduction to world-class research environments and practices. The programme is a paid, 12-week research internship, hosted by Tyndall and open to students enrolled in Irish higher education institutions, with a limited number of places available to EU students for NanoIC Pilot Line-related projects. Each Summer Fellow is embedded within an active research group and mentored by a senior researcher aligned to their chosen research area.

Interns undertake defined research projects across Tyndall's core research themes, including compound semiconductors, wafer-scale and chip technologies, communications, CMOS and emerging platforms, packaging and integration, quantum technologies, health and wellbeing, and environment and energy. In addition to hands-on laboratory or modelling work, the programme includes a structured workshop series covering research communication, commercialisation, and innovation skills, designed to broaden participants' understanding of how research translates into societal and economic impact. The programme is delivered in a blended format, combining supervised on-site laboratory access with online learning and mentoring where appropriate.

To date, more than 180 undergraduate interns have completed the programme, with 40% of participants being women, thus contributing to improved gender balance within the deep-tech talent pipeline. The programme has grown significantly over time and will welcome 30 Summer Fellows in 2026 - three times the number supported in its early years. Alumni career tracking shows strong downstream impact. Around two-thirds of Fellows progress directly into industry roles after graduation, while approximately one-third pursue PhD studies. Of those completing PhDs, some have transitioned into industry, others have established academic careers, and a number remain within Tyndall's research community.

Collectively, these outcomes demonstrate the programme's effectiveness in developing skilled, industry-ready graduates and future research leaders for Ireland's semiconductor and deep-tech ecosystem.


Tyndall
National Institute
Institiúid Náisiúnta



Tyndall 2030

Case Study 2

Explorer pre-commercialisation programme

Explorer is a deep-tech pre-commercialisation programme led by IPIC with generous support from Austrian semiconductor manufacturer ams OSRAM. This tailored training and mentorship initiative is open to researchers from all universities across the island of Ireland who are developing deep-tech solutions and wish to assess the commercial potential of their innovations.

Through a combination of technical, commercial and entrepreneurial mentorship, the programme guides participants in understanding the end-to-end process of technology commercialisation. A central objective is to help teams validate market need, strengthen value propositions, and build credible commercialisation plans. The programme is explicitly designed to prepare participants to submit high-quality applications to national funding instruments, including Enterprise Ireland's Commercialisation Fund (Proof-of-Concept Fund, Feasibility Study Grant and Commercialisation Fund Award) and Research Ireland's ARC Hub commercialisation funding, providing a clear and structured pathway from research to viable products, services, and startups.

To date, Explorer has supported 42 commercialisation teams, demonstrating strong demand across the Irish research base. From these, 10 feasibility studies have been awarded, seven full commercialisation grants have been secured, and one ARC Hub funding award has been won. Importantly, the programme has already contributed to the launch of one startup, with several additional ventures actively progressing through the pipeline.

Case Study 3

Professor Stefan Anderson Engels

Professor Stefan Anderson Engels was recruited to Tyndall in 2016 to build the biophotonics activity at Tyndall, funded by the SFI Professorship Programme (now Research Ireland). As a professor of biophotonics he has always been keen to develop novel photonics techniques to help patients. He has co-founded four companies, two of which have gone public while another has been acquired. Professor Engels has received several prizes - including the SKAPA award, the most prestigious entrepreneurship award in Sweden, as well as the 'Lindbomska belöningen' from the Swedish Royal Academy of Sciences for his teaching achievements.

Professor Engels's research involves clinical translation, addressing challenges identified by clinicians where photonics could potentially provide a solution. This includes surgical guidance, early detection/diagnostics of malignant tumours and monitoring of pre-term infants. In addition, his team is conducting more fundamental research into deep biophotonics tissue imaging.

In his words, "the hard-working team at Biophotonics at Tyndall is amazing, providing plenty of joy, stimulation and inspiration every day. Combined with world-leading collaborators from multiple disciplines, this provides an excellent work platform for applied and fundamental research in biophotonics. Tyndall's strategic importance to Irish society combined with the many biomedical device industries here provides fantastic research, funding, and industrial collaboration opportunities."

Case Study 4

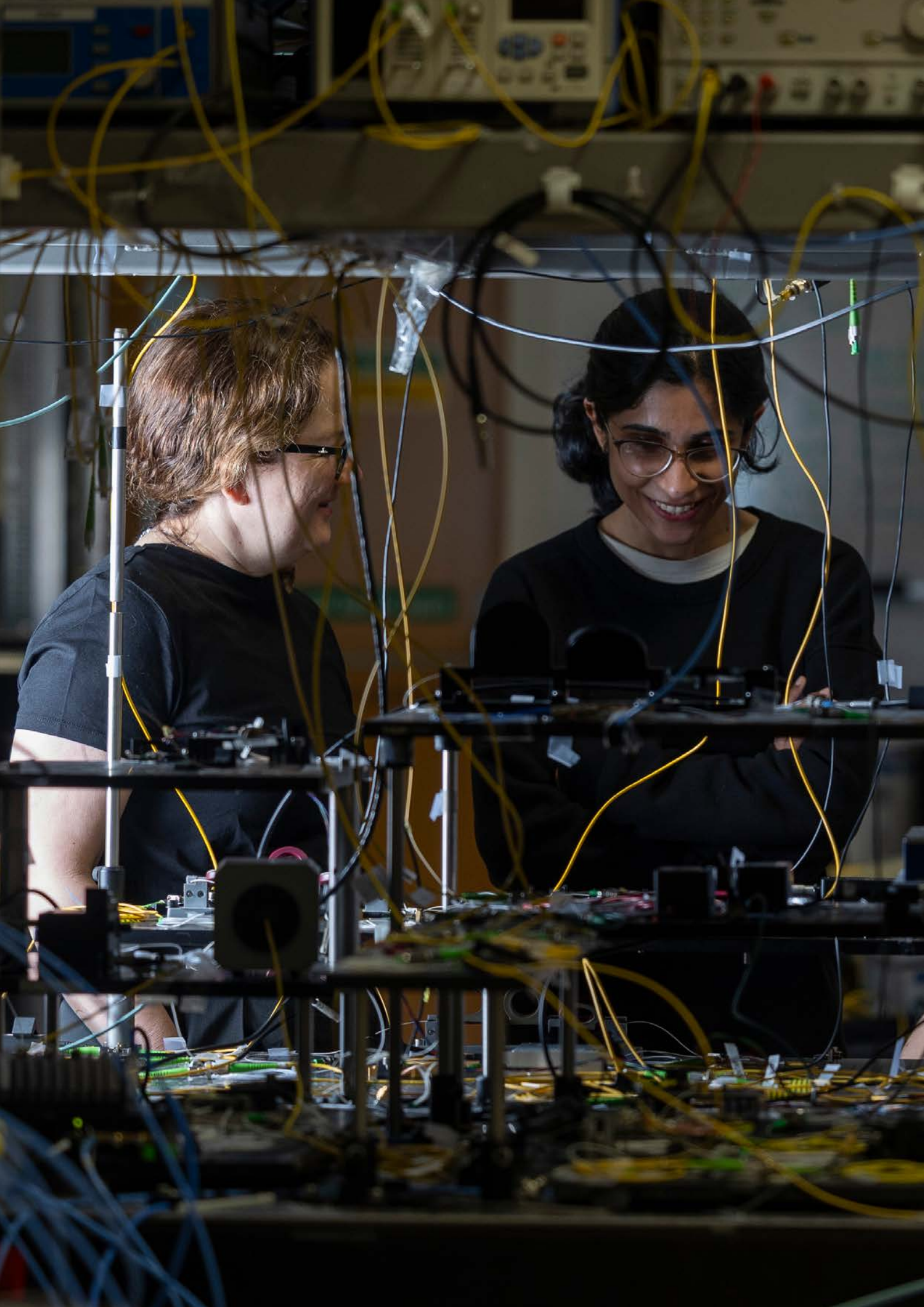
Professor Dimitra Psychogiou

Professor Dimitra Psychogiou was recruited to Tyndall and University College Cork in 2021 to establish and lead a world-class programme in advanced RF and microwave technologies, following an internationally distinguished academic career in the USA. She holds a PhD from ETH Zürich and previously served as a Senior Research Scientist at Purdue University and as an Assistant Professor at the University of Colorado Boulder. She is currently a Full Professor of Microwave Engineering at UCC, Head of the Advanced RF Technologies Group at Tyndall, and a Research Professor supported by the SFI Research Professorship Programme (now Research Ireland).

Professor Psychogiou's research focuses on the design and realisation of reconfigurable microwave and millimetre-wave RF components, including tuneable and reflectionless filters, multifunctional RF front-ends, frequency-agile antennas, acoustic-wave resonator-based devices, and additive manufacturing approaches for RF systems. Her work underpins next-generation 5G/6G wireless, satellite communications, and adaptive RF systems, combining fundamental electromagnetic theory with manufacturable device concepts. She has authored hundreds of peer-reviewed publications and is widely recognised as a global leader in RF passive technologies. Her contributions have been recognised through multiple prestigious awards, including the IEEE MTT-S Outstanding Young Engineer Award, the Roberto Sorrentino Prize, the NSF CAREER Award, and the URSI Young Scientist Award.

In parallel with her research leadership, Professor Psychogiou plays an active role in international scientific governance, serving as Chair of the IEEE Microwave Control Techniques Committee (MTT-13), President of URSI Ireland, and Associate Editor for leading IEEE and EuMA journals. At Tyndall, she leads a growing interdisciplinary team and collaborates closely with industry and European partners, positioning Ireland at the forefront of advanced RF technologies.

According to Professor Psychogiou, the combination of Tyndall's deep-tech infrastructure, strong industrial base, and collaborative research culture provides an exceptional platform for impactful research, talent development, and technology translation in future wireless and semiconductor systems.



Infrastructure

Aim

Build the physical and digital infrastructure to drive the next wave of Ireland's semiconductor breakthroughs

Strategic priorities

- → Expand buildings, labs and fabs
- → Deliver equipment, tooling and technology
- → Streamline access

Expansion

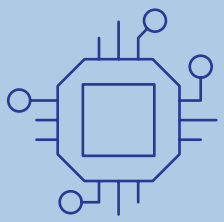
Cleanroom

Future-proof

Open Access

Tyndall campus expansion

final business case for Nexus National Cleanroom Facility



increase tool replacement rates to 10% per year

5-fold increase in funded infrastructure access for academia and industry

Infrastructure underpins Tyndall 2030 by providing the world-class environment to which world-class people are attracted and are developed and enabled to deliver impact. Achieving research leadership, innovation impact, and talent ambition at national scale depends on physical and digital infrastructure that operates at sufficient scale, quality, and performance. World-class research, effective lab-to-fab translation, and deep industry engagement require facilities, equipment, and digital platforms designed for sustained excellence. Infrastructure is therefore not a supporting consideration, but a critical foundation of Ireland's ability to compete and lead internationally in semiconductors and advanced digital technologies.

Tyndall 2030 therefore positions infrastructure as strategic national capability rather than institutional expansion. Our focus is on delivering world-class facilities, advanced tooling, and modern digital platforms that enable cutting-edge research, accelerate translation from research to manufacturing, and support deep and sustained engagement with industry and academic partners. This infrastructure will underpin Tyndall's role as a national platform - attracting global talent, enabling innovation at scale, and supporting the next wave of Ireland's semiconductor breakthroughs. This approach aligns with Research Ireland's emphasis on shared, high-quality research infrastructure, IDA Ireland's objective to differentiate Ireland's RD&I proposition for globally competitive investment projects, and Enterprise Ireland's focus on providing indigenous SMEs with access to advanced capability to innovate and scale.

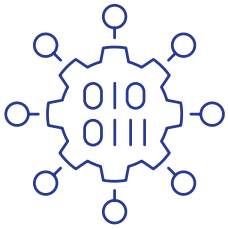
Infrastructure delivery will be deliberate, accessible, and future focused. Tyndall will pursue three integrated strategic priorities to ensure that infrastructure capability matches national ambition. First, we will expand and modernise buildings, laboratories, and fabrication facilities to provide sustainable, world-class environments that operate at national scale. These facilities will be designed to support long-term growth, flexibility, and safe, efficient operation across a diverse range of research and innovation activities.

Second, we will invest in cutting-edge equipment, tooling, and digital capability. This investment will sustain research leadership, strengthen lab-to-fab pathways, and enhance Tyndall's value proposition to industry and academic collaborators. Continuous renewal of critical infrastructure will ensure relevance as technologies evolve, supporting both IDA Ireland's ambition to embed high-value RD&I within Ireland's FDI base and Enterprise Ireland's objective to enable indigenous companies to access advanced capability without duplicative investment.

Third, we will streamline access to infrastructure, making it easier and faster for industry and academia to engage with Tyndall and utilise national facilities. By aligning processes, access arrangements and support structures, we will maximise utilisation and impact. Through these actions, infrastructure becomes a national delivery capability - enabling Tyndall to operate at the scale, speed, and impact that Ireland's ambitions now require.

What success looks like

By 2030,



→ Tyndall's infrastructure will expand to national scale, including the delivery of Tyndall North Mall facility. A business case will also be completed in line with national infrastructure guidelines for Nexus, a National Cleanroom Facility for advanced semiconductor research and innovation, underpinned by shared investment, governance, and delivery across research and industry.

→ We will sustain research leadership through continuous investment in equipment and digital capability, increasing tool replacement rates to 10% per year and ensuring that our high-performance computing (HPC) infrastructure remains state of the art.

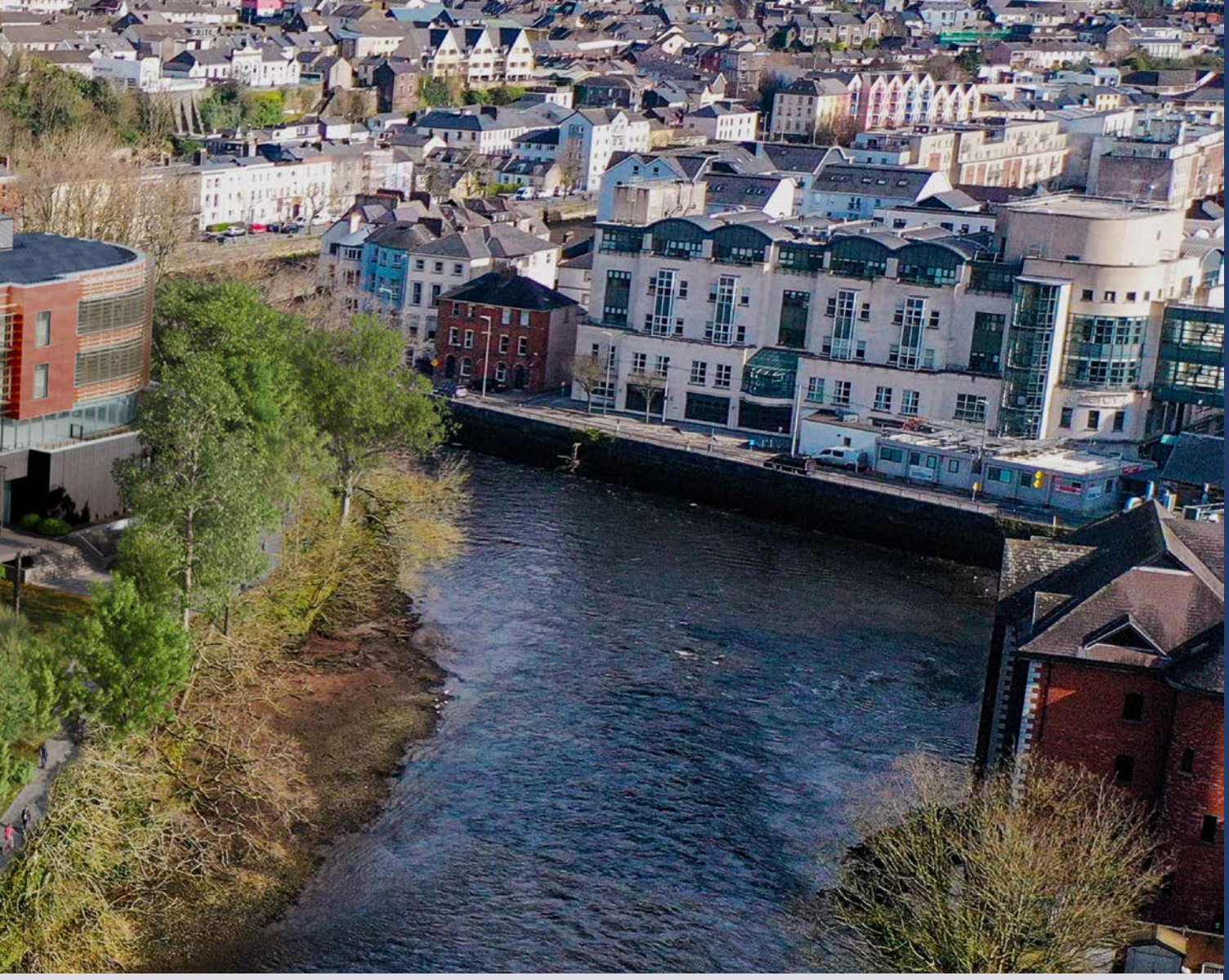
→ At the same time, we will dramatically expand access, delivering a five fold increase in funded infrastructure use by industry and academia.

These targets will put in place strategic national infrastructure that underpins research leadership, enables lab-to-fab translation, supports skills development at scale, and drives indigenous company creation and growth.

Case Study 1

Tyndall campus expansion

This project is the development of a new 17,500 m^2 facility on a site adjacent to the existing Tyndall campus in Cork. The new building will allow Tyndall to expand its research operations in a state-of-the-art facility, enabling a doubling in scale of the institute by 2030, in line with the *Government's National Development Plan (NDP)* and *Project Ireland 2040 National Planning Framework* commitments.



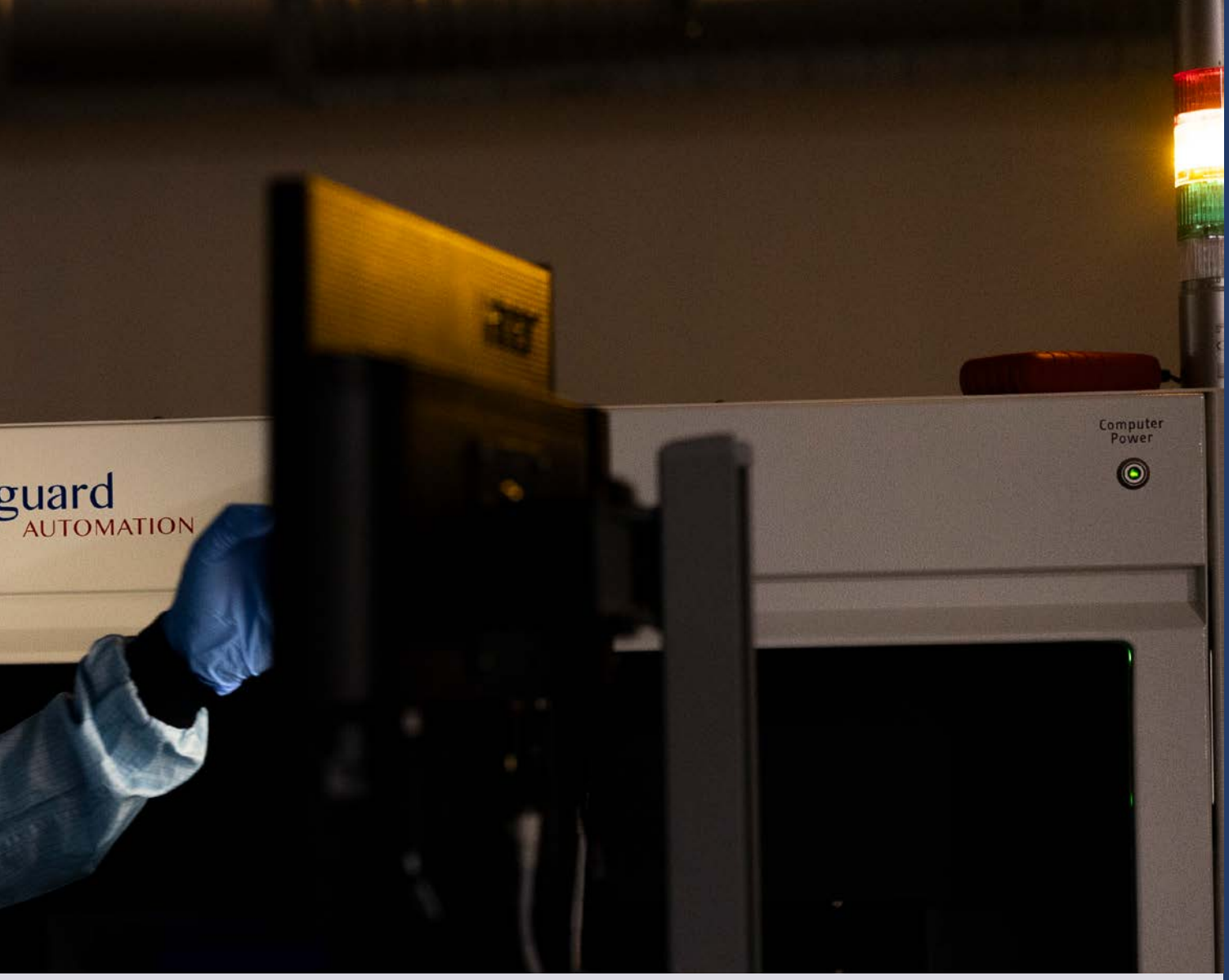
The new facility will be located on the North Mall site, also known as Distillery Fields, which is immediately across the north channel of the River Lee from the current location of Tyndall. It is proposed to integrate the new facility with the structure of the former bottling plant. The site will also host an Innovation Quarter, designed to colocate Tyndall researchers with industry researchers, SMEs, and startups. This model supports closer interaction between research, innovation, and enterprise, strengthening translational research and accelerating the pathway from laboratory research to industrial and commercial impact.

The Tyndall expansion responds directly to an explicit Government requirement to upgrade and expand national semiconductor research infrastructure. It has been referenced in Project Ireland 2040 and has received direct public investment of more than €100m under the NDP through the DFHERIS Inspire Programme. This investment positions Tyndall as national anchor infrastructure for semiconductors and deep-tech research, providing the physical scale, shared facilities, and collaborative environment required to support Ireland's ambitions under Silicon Island and the European Chips Act, while fostering sustained engagement with industry and startup communities.

Case Study 2

Training fab facility

In 2024, Tyndall completed the relocation and commissioning of its dedicated training fabrication (fab) facility, marking a significant step forward in hands-on skills development for the next generation of researchers and upskilling and reskilling of industry professionals. This facility plays a central role in our training programmes, offering PhD students, postdoctoral researchers and industry specialists the opportunity to gain practical experience in semiconductor device fabrication.



The training fab delivers a structured, one-week immersive course, during which participants are guided through the fabrication of a visible light-emitting diode (LED) using semiconductor wafer processing equipment. This hands-on experience complements theoretical knowledge with real-world technical skills, deepening participants' understanding of cleanroom protocols, fabrication workflows, and the operational intricacies of advanced micro- and nano-fabrication tools.

The relocation of the training fab to a newly refurbished facility ensures improved workflow, upgraded infrastructure, and a more streamlined learning environment. This initiative reflects Tyndall's broader commitment to fostering technical excellence and preparing talent to contribute effectively to both academic and industrial innovation ecosystems.

Case Study 3

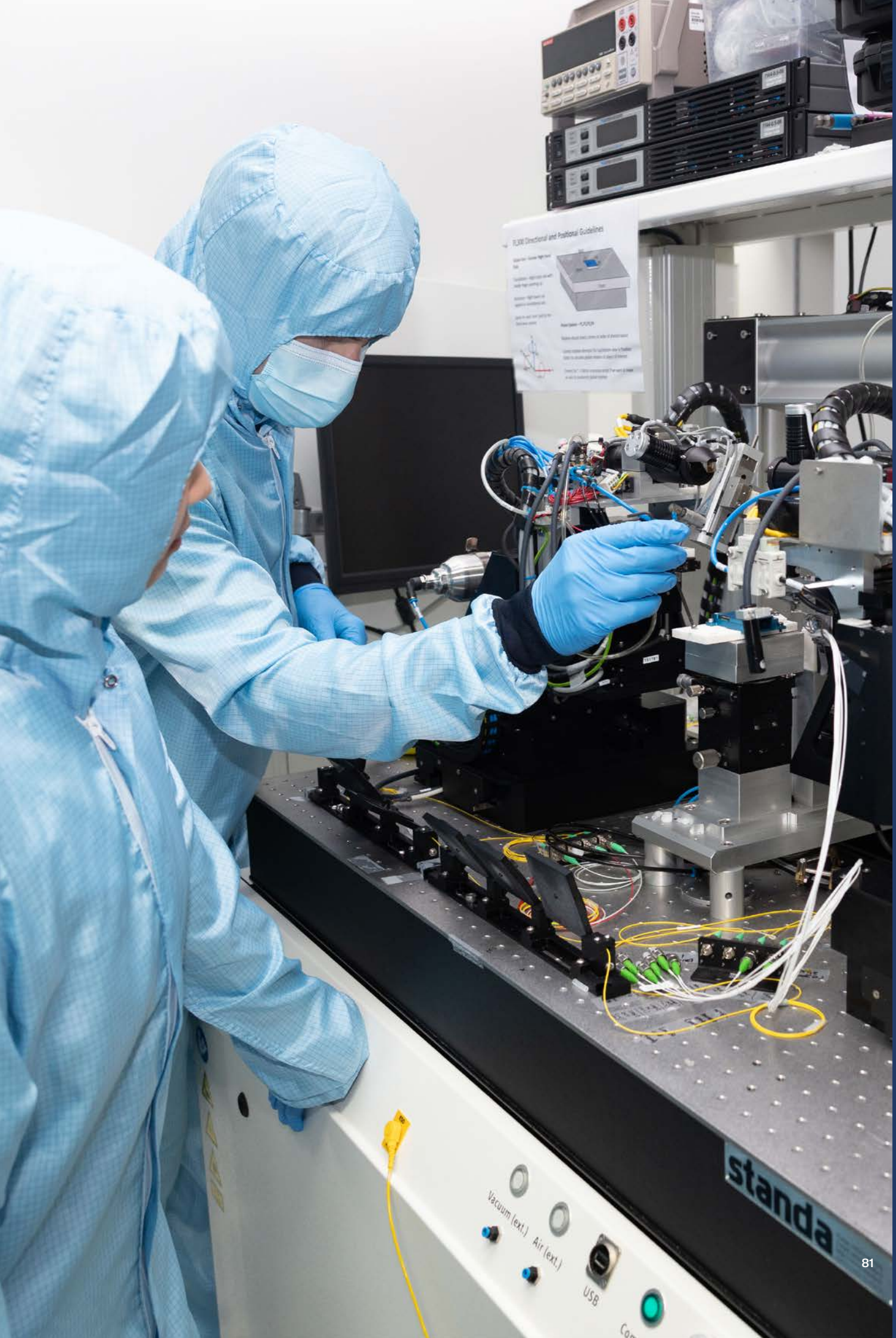
Open access infrastructure

Tyndall plays a leading role in European access-to-research-infrastructure programmes, enabling third-party users - particularly SMEs, startups, and early-career researchers - to access world-class semiconductor capabilities that would otherwise be inaccessible due to cost, scale, or technical complexity. Through EU-funded initiatives such as ASCENT, ASCENT+, EnABLES, and INFRACHIP, Tyndall acts as both a provider and coordinator of open, user-centric access to advanced facilities spanning nanoelectronics, power management, emerging materials, and sustainable semiconductor technologies.

Programmes such as ASCENT and ASCENT+, coordinated by Tyndall, have delivered free-of-charge transnational access to Europe's most advanced nanoelectronics infrastructure, lowering barriers for SMEs to validate concepts, access industrial-grade tools, and progress technologies from early research to proof of concept. A significant proportion of supported projects involve industry partners, demonstrating the effectiveness of these schemes in supporting SME-led innovation and derisking R&D investment. EnABLES, also coordinated by Tyndall, provided targeted access to facilities and expertise for powering the Internet of Things, supporting companies developing ultra-low-power, energy-harvesting and self-powered sensor systems through rapid feasibility studies and system-level integration.

Building on this foundation, INFRACHIP, led by Tyndall, establishes a new pan-European distributed research infrastructure for next-generation and sustainable semiconductor technologies, explicitly aligned with the European Chips Act. INFRACHIP integrates and extends earlier access programmes, providing SMEs with fast, structured access to more than 100 technology platforms while strengthening Europe's lab-to-fab pipeline.

In parallel, Tyndall played a central role in PhotonHub Europe and PIXAPP, offering industry and academia access to advanced photonic integration and packaging capabilities, including pilot-line services through the PIXAPP Gateway hosted at Tyndall. Together, these initiatives position Ireland - and Tyndall - as a strategic European hub for open, industry-focused research infrastructure, accelerating innovation, strengthening SME competitiveness, and supporting Europe's semiconductor sovereignty.


Vacuum (ext.)
Air (ext.)
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Case Study 4

Sustainable infrastructure

Tyndall has recently completed a major campus-wide decarbonisation project, delivering substantial reductions in energy use, carbon emissions, and operating costs across its Cork facilities. The project was undertaken using the Sustainable Energy Authority of Ireland (SEAI) Excellence in Energy Efficiency Design (EXEED) framework, providing a structured, evidence-based approach to developing a long-term decarbonisation strategy for a complex research environment that includes laboratories, cleanrooms, and heritage buildings dating back to the 1800s.

Through a comprehensive energy audit and 'efficiency-first' approach, Tyndall challenged existing operational practices before committing to capital-intensive solutions. The project examined space conditions, building fabric performance, utilities, and energy-intensive research infrastructure, enabling targeted interventions that do not compromise scientific capability. As a result, the initiative is delivering annual energy savings of approximately 3.6 GWh, a 29% reduction in energy demand, and the avoidance of around 723 tonnes of CO_2 emissions, alongside annual cost savings of more than €300k.

A key outcome of the project has been the near elimination of fossil fuel use for heating, achieved through the replacement of gas boilers with heat pump-based systems and enhanced energy monitoring and control.

Supported by ISO 50001 energy management practices, the project has put Tyndall well ahead of its 2030 decarbonisation targets, demonstrating how deep-tech research facilities can decarbonise at scale without disrupting operations.

This decarbonisation programme aligns Tyndall's internal operations with its research mission in energy and sustainability, reinforcing its role as a living laboratory for low-carbon solutions and a national exemplar for energy-intensive research infrastructure.

From Strategy to Implementation

Tyndall 2030 is designed not only to articulate ambition, but to enable delivery. Moving from strategy to implementation requires disciplined prioritisation, clear accountability, and a focus on outcomes rather than activity. To support this, Tyndall will operate with a clear delivery model in which strategic aims are translated into defined priorities, priorities into time bound actions, and actions into measurable outcomes tracked through a coherent set of key performance indicators (KPIs). This creates a direct line of sight from top level objectives to operational execution, enabling progress to be monitored, reviewed, and adjusted as conditions evolve.

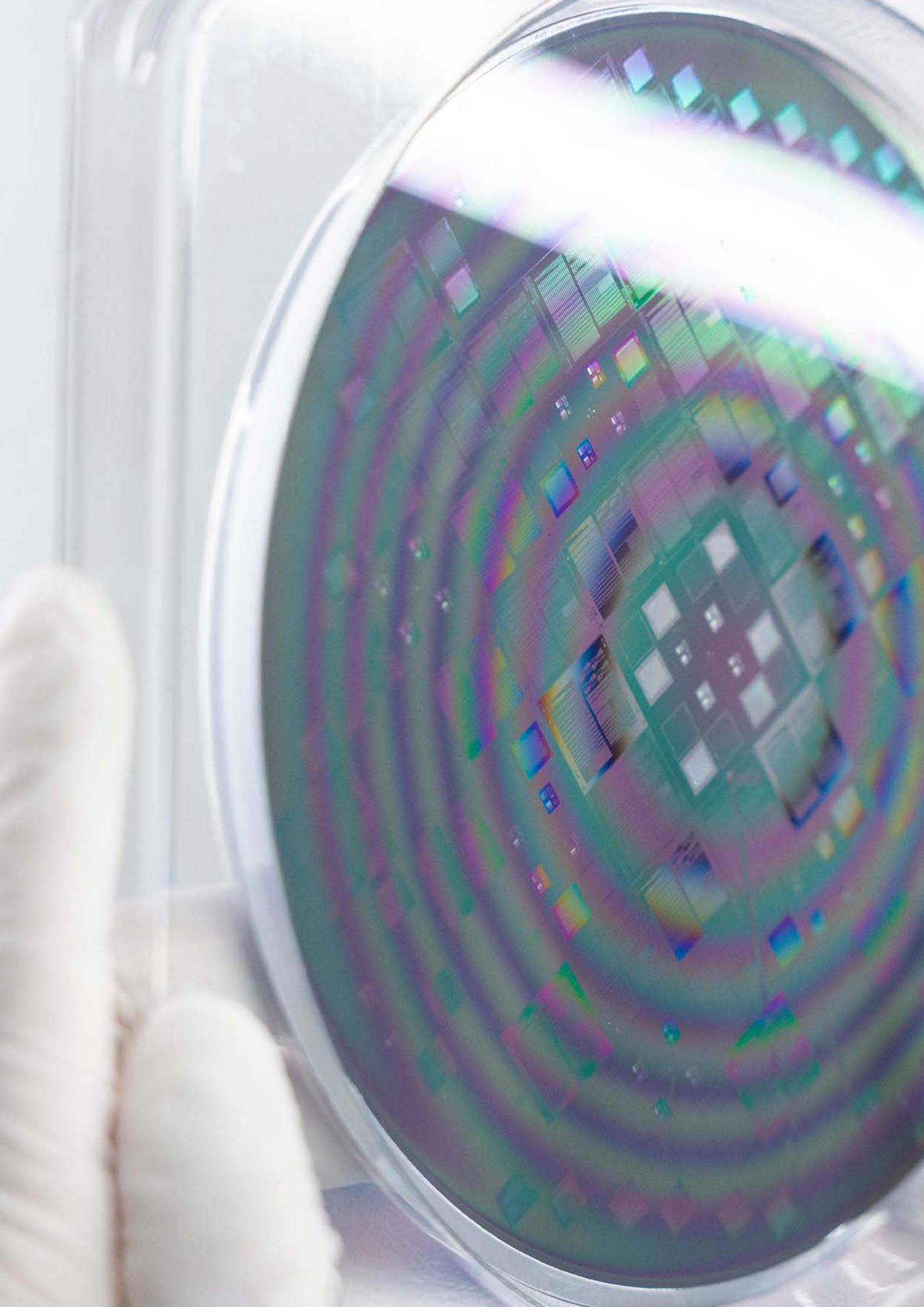
Governance and leadership are central to this approach. Tyndall 2030 strengthens internal decision-making and accountability structures to ensure that strategic choices are implemented consistently across the organisation. Leadership responsibility for delivery is embedded at programme level and supported by regular review against milestones, impact metrics, and objectives. This ensures that the strategy remains a living framework - actively guiding decisions and investment - rather than a static document.

Partnership is a core implementation mechanism. Delivery at scale depends on deep and sustained collaboration with industry, higher education institutions, public agencies, and European partners. Tyndall 2030 therefore places strong emphasis on structured partnerships of scale, moving beyond ad hoc collaboration towards long-term, outcome-driven engagement that supports research leadership, translation, skills development, and national infrastructure access.

Investment decisions under Tyndall 2030 are explicitly strategic rather than incremental. Capital investment in facilities, equipment, and digital infrastructure is prioritised to support programmes of scale, lab-to-fab translation, and national access. Talent investment is aligned to research prioritisation, leadership development, and skills pipelines that serve both industry and research needs. Innovation investment is focused on advancing technologies to maturity, strengthening technology transfer, and supporting indigenous enterprise growth.

Implementation is underpinned by a strong commitment to measurement and learning. The global KPIs defined in Tyndall 2030 turn the strategy into a clear delivery framework, measuring progress across income, people, research impact, innovation outcomes, skills, and national infrastructure access. By 2030, this will be reflected in increased income, headcount, and postgraduate numbers, with a significantly stronger contribution from industry and non-Exchequer sources. Innovation outcomes will be visible through companies-in-residence, spinouts, and technology transfer, while talent success will be measured by the sustained flow of skilled people into industry. Critically, access to semiconductor infrastructure will expand at national scale.

In this way, Tyndall 2030 moves decisively from ambition to action. It provides the structures, focus, and discipline required to convert Ireland's semiconductor strategy into delivered capability - ensuring that Tyndall operates not just as a centre of excellence, but as a national platform for execution. Tyndall is already trusted as Ireland's semiconductor anchor. Tyndall 2030 is about converting that trust, and Ireland's national ambition, into global impact—serving as a central delivery mechanism for Silicon Island, Impact 2030, and Ireland's role in Europe's semiconductor future.



Tyndall

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