

Science for Ireland: Propelling Research and Innovation Success

As the Government of Ireland develops the successor to Innovation 2020 - the country's strategy for research and development, science and technology - the Microbiology Society calls for it to set out an ambitious, long-term vision for science, society and the economy.

We recommend that the Government should:



Strengthen public and private investment in research and innovation

Renew the 2.5% vision and incentivise private investment

With input from the research and innovation community, articulate a vision for the 2.5% target that sets out the public research and development budget up to 2025 and strengthens the attractiveness of Ireland for private investment through the provision of more public research resources and effective policies in procurement, regulation, taxation, immigration and access to data.

Enhance investment in research infrastructures

Devise an ambitious, coordinated and forward-looking national strategy for infrastructures and set up a committee responsible for overseeing its implementation.



Develop, attract and retain scientific talent

Support a diverse range of scientific research

Reconsider current policies and rebalance the funding of science, to strongly support not only applied or oriented basic research in prioritised areas, but also basic research across the full breadth of scientific disciplines.

Invest in new opportunities to grow the talent pool

Allocate a greater proportion of responsive-mode budgets to investigator-led research projects, improve the frequency and regularity of funding calls and increase the number of flexible and transferable fellowships specifically targeting excellent early career scientists, especially post-doctoral researchers.

Recruit and retain international scientific talent

Collaborate with the science and innovation community to co-create an immigration policy that facilitates the global movement of talent into Ireland.



Support research and innovation through expert advice and cooperation

Embed independent expert advice across Government

Appoint independent Chief Scientific Advisors in Government Departments and ensure that they have sufficient resources to advise and make a difference.

Foster 'all-island' approaches to research and innovation

Enhance research and development schemes such as bilateral funding agreements and joint research centres, academic appointments and research studentships between the Republic of Ireland and Northern Ireland, and the Republic of Ireland and the UK.



Over recent years, Ireland's sustained investment in research and development (R&D) and innovation has been instrumental in generating and using new knowledge and technologies, in securing high-value foreign direct investment (FDI) flows, and in creating high-demand jobs and skills in a knowledge-driven economy.

In the decade since the global financial crisis, the Government has kept science near the top of the national agenda and the establishment of an ambitious target to increase R&D intensity to 2.5% of gross national product has been emblematic of Ireland's ambition to become a global innovation leader. However, during this period, economic turbulence and financial constraints have forced tough choices on research funders and consequently research prioritisation strategies have been employed to maintain Ireland's R&D and innovation competitiveness by concentrating funding in areas that might yield economic and societal impact.

As the Government develops the successor to Innovation 2020, Ireland's strategy for research and development, science and technology, we are calling for it to set out an ambitious, long-term vision for science, society and the economy. This new strategy must build on these foundations but should go further and tackle systemic challenges so that the country's researchers, innovators and educators can play their full part in continuing to secure sustainable, long-term prosperity in Ireland.

The Microbiology Society has designed this position statement based on views gathered from its members in the Republic of Ireland and Northern Ireland through a series of surveys, workshops and one-to-one interviews from December 2018 to November 2019. Following these discussions, we recommend that the Government should:



Strengthen public and private investment in research and innovation

Renew the 2.5% vision and incentivise private investment

Ireland's investment in R&D is failing to keep pace with other leading nations and is said to have led to the fall of Irish universities in global ranking charts [1], impacting the country's capacity to attract and retain talented researchers and innovative companies from Ireland and overseas. The long-term transformation of the research ecosystem underpinned by Innovation 2020's 2.5% target requires more ambitious and coordinated action, including a significant increase in public investment in R&D.

In addition, industry drives the Irish economy and almost two-thirds of the additional R&D investment to reach the 2.5% target will need to come from private investment, in particular from FDI. The country's ability to create a compelling combination of tangible factors (such as a 12.5% corporate tax rate and a refundable tax credit for R&D activity) and more intangible elements (such as a 'can do' attitude to business), makes it one of the most attractive global investment locations [2].





We therefore call upon the Government to articulate a renewed vision for the 2.5% target, setting out the public R&D budget up to 2025 and organising action and delivery across Departments. We encourage the Government to pull all the levers it can to build on Ireland's industrial successes; the top three factors in determining the attractiveness of a location for private R&D investment are quality of researchers, availability of researchers and access to specialised R&D knowledge [3]. These factors are all dependent on the provision of more public research resources and effective policies in areas such as procurement, regulation, taxation, immigration and access to data.

Finally, a 'roadmap' setting out the steps that will be taken to reach this ambitious target should be developed by the Government with input from the research and innovation community, including academia and industry.

Enhance investment in research infrastructures

Ireland's excellence in R&D is underpinned by a highly-effective research ecosystem supported by appropriate research infrastructures (RIs). Successive years of underfunding for new RIs alongside insufficient support for the maintenance of existing infrastructures has become a critical cause of concern for the research community. The last round of the Programme for Research for Third-Level Institutions (PRTLTI) funding was a decade ago and many of the infrastructures purchased under the programme are coming to an advanced stage of their life cycles [4].

Currently, RIs investment is mainly administered through ad-hoc funding calls from Science Foundation Ireland (SFI) and confined within a few research prioritisation areas, which in turn fails to address the infrastructural needs of many disciplines.¹

The development of a RIs investment strategy relevant to the wider research base would be instrumental in achieving Ireland's ambitions for research and innovation. We therefore support the Royal Irish Academy's (RIA) recommendation to devise an "ambitious, coordinated, and forward-looking national strategy for RIs" and the set-up of a 'permanent committee' responsible for overseeing its implementation' [4]. To address sustainability and development challenges, such a strategy should include robust processes to evaluate, coordinate and act on changing needs to create, maintain and replace RIs.

¹Proposal must comply with the legal remit of SFI, which is to "promote, develop and assist the carrying out of oriented basic and applied research in strategic areas of scientific endeavour that concern the future development and competitiveness of industry and enterprise in the State" [5].



Develop, attract, and retain scientific talent

Support a diverse range of scientific research

Diversity builds resilience and encourages creativity. Irish researchers work together across a wide range of disciplines to address major national and global challenges. Their recognised strengths and productivity make them attractive partners for top scientists and businesses worldwide. In the years following the recession, the Government's research prioritisation strategy has been employed to maintain the country's knowledge economy by concentrating funding in areas of applied research that might yield financial and commercial impact. Although successful in those aspects, the funding strategy has led to a lack of breadth, depth and adaptability in the Irish research base. These are all vital components to the scientific community's ability to identify, create or seize new and potentially paradigm-shifting opportunities. Investment in innovation should not come at the expense of other parts of the research base. Through a variety of paths, basic research leads to productive advances, builds human capital and attracts companies that hope to benefit from a vibrant research ecosystem.

We call on the Government, in devising the successor to Innovation 2020, to reconsider its current policies and rebalance the funding of science, to strongly support not only applied or oriented basic research in prioritised areas, but also basic research across the full breadth of scientific disciplines¹. Mitigation measures, including new response mode funding allocated on the basis of excellence, should be considered to guarantee the sustained breath and diversity of the research base and to reap the full rewards of research and innovation.

Invest in new opportunities to grow the talent pool

Excellent researchers must be given the opportunity to explore their interests in order to maximise the effects of R&D investments. A resilient and reactive research funding ecosystem must remain carefully balanced with investment in programmes and research centres. However, further focus now needs to be placed on individual flexibility and autonomy to ensure that the most talented scientists from Ireland and overseas stay in research. The SFI Frontiers for the Future Programme which consolidates and replaces the SFI Investigators and SFI Career Development Award Programmes is a welcome initiative [7]. But this new funding stream is still at a low level compared to existing larger-scale funding opportunities for pre-defined research programmes.



¹This call was first made in 2015 by the Irish Scientists for Basic Research in an 'Open Letter to the Government of Ireland' [6].



We recommend that funding agencies allocate a greater proportion of their responsive-mode budgets to investigator-led research projects. In addition, more frequent and regular responsive mode calls that allow researchers to plan further ahead will be instrumental in stimulating a rise in Ireland's research intensity, in attracting the best scientists, and in incentivising inward investment.

Conventional academic career paths that tie young researchers to institutions may discourage mobility and limit opportunities for innovation. Postdoctoral fellowships give more opportunities with regards to location and movement between academia and industry. The Government has taken positive steps in that direction, but it should assess what more needs to be done to increase the number of flexible and transferable fellowships specifically targeting excellent early career scientists, especially post-doctoral researchers.

Recruit and retain international scientific talent

The current recruitment and retention pattern in Ireland appears to suggest that, unless they are of recent Irish descent or have close family connections, most international scientists come to the country for a short period of time before moving away, using their Irish interlude as a stepping stone in their careers. Ireland will only be considered one of the worlds' leading R&D and innovation locations once overseas scientists opt to pursue research careers in the country for scientific motives alone.

The reasons that foreign recruits fail to take root in the long term are many and funding agencies can do little on their own to address these. However, they can help to mitigate the culture shock for incoming researchers by offering advice and assistance, including financially, in partnership with the host Higher Education Institute, to settle and to retain scientific talent.

We call for the Government to collaborate with the science and innovation community to co-create an immigration policy that facilitates the global movement of talent into the country. One that ensures that, in the immediate- to mid-term future, Ireland can rely on home-grown talent but also benefit from a long-lasting flow of scientific expertise and ideas from around the world.



Support research and innovation through expert advice and cooperation

Embed independent expert advice across Government

Robust policy making is increasingly reliant on expert scientific advice to address unexpected economic and social challenges [8]. Ireland's cutting-edge R&D should be reflected in high-quality evidence-based policy making. The presence of a Chief Scientific Advisor (CSA) to the Government of Ireland has strengthened links with the scientific community and led to an improvement in the uptake of research in policy making. This could be further reinforced by appointing independent CSAs in Government Departments and ensuring that they have sufficient resources to advise and make a difference as well as direct access to Ministers.



Foster 'all-island' approaches to research and innovation

Successful scientific endeavours rely on a thriving cross-border exchange of ideas. This is especially relevant in the case of the Republic of Ireland and Northern Ireland (and of the Republic of Ireland and the United Kingdom (UK)) where collaborative research projects have grown and flourished for many years. Ireland cannot underestimate the threats that the UK's withdrawal from the European Union (EU) poses to this unique relationship and to research and innovation across the island.¹ It is vital that scientific collaboration between the two nations continues to be fully supported and that people, goods and services remain able to circulate without further restrictions.

We call for enhanced beneficial R&D and innovation schemes such as bilateral funding agreements and joint research centres, academic appointments and research studentships between the Republic of Ireland and Northern Ireland, and the Republic of Ireland and the UK to enable innovation and economic growth. We also believe that cross-border partnerships across academia and industry should be actively supported as they are essential in creating new value chains, facilitating technology transfer and enabling the passage from lab research to real-life application.

We therefore support the RIA's recommendations to: "maintain the north-south, east-west axis in research and higher education; address underinvestment in research to better position Ireland as a global hub for excellence in teaching, learning and research; and align national research and internationalization strategies that will grow Ireland's reputation as a hub for international talent"[9]. We also encourage increased funding, support and recognition for 'all-island' fora where scientists, policy makers, investors and users of research and innovation can further opportunities for collaboration.

³The Royal Irish Academy Brexit Taskforce noted the following risks for future north-south collaboration: "Brexit may jeopardise Horizon 2020 and other research programmes with UK partners; and overburden the Irish higher-education sector with rapidly rising international student numbers"[9].



The Case for Microbiology

Microbiology has, for decades, played an important role in the Irish society and in its economy. Those with microbiology training have gone on to play critical roles in vital and vibrant sectors of the economy such as biotechnology, pharmaceuticals and food.

Today, microbiology in Ireland is very strong at undergraduate level with large numbers of students enrolled in microbiology degrees or courses with high microbiology content. However, a lack of funding and career progression opportunities for early and mid-career researchers means that the talent pipeline is dangerously weak.

Established microbiology-associated Principal Investigators can support funding authorities like SFI in achieving their own strategic goals (e.g. deliver economic and societal benefit, future proof the diverse talent and research pipeline, meet climate change challenges through innovation [10]). But more funding opportunities must be made available for them to effectively contribute.

Applied microbiology investigation needs a constant stream of ideas from discovery-oriented work. For example, the development of the Cas9 endonuclease for genome editing draws upon more than a decade of basic research into understanding the biological function of the repetitive elements now known as CRISPR, which are found throughout the bacterial and archaeal diversity. Currently, insufficient support for pure 'blue skies' microbiology research puts the whole Irish research and innovation system at risk of being damaged.

Urgent action is needed to strengthen the pipeline so that microbiologists and other highly skilled workers can play their part in securing Ireland's future prosperity and fuelling productivity growth in new and established industrial sectors.

High quality PhD training and post-doctoral research not only serve the industries of today it allows the country to maintain the flexibility to respond to the, as-yet, unforeseen opportunities of the future.

About the Microbiology Society

The Microbiology Society is a membership charity for scientists interested in microbes, their effects and their practical uses. It is one of the largest microbiology societies in Europe with a worldwide membership based in universities, industry, hospitals, research institutes and schools.

Our members have a unique depth and breadth of knowledge about the discipline. The Society's role is to help unlock and harness the potential of that knowledge.

#ScienceforIreland

We believe that the issues and recommendations highlighted here go beyond the remit of microbiology research and innovation. Alongside this position statement we are setting out a vision for what an ambitious, long-term strategy for science can achieve for Ireland, its researchers, innovators, and educators. Opinion pieces and inputs from members, stakeholders and other organisations can help drive this vision forward. Contact us at policy@microbiologysociety.org to join the discussion and help propel scientific success in Ireland post Innovation 2020.



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Image credits:

Thitima Thongkham: Abstract mash line and point scales on dark background with map of Ireland.
Totojang: Microscope with lab glassware, science laboratory research and development concept.