

**Opening statement Dr Ruth Freeman, Director Science for Society, Science Foundation Ireland.**

- Chairman and Members.
- Thank you for the invitation to appear here at the Joint Committee on Education, Further and Higher Education, Research, Innovation and Science
- I'm delighted to be able to contribute to your discussions on Leaving Certificate Reform
- Our people, their talent, skills and ideas have always been our greatest asset.
- Science Foundations Ireland's Education and Public Engagement connect the Irish public with STEM. We also aim to inspire young people's confidence and aspirations to pursue skills development and career choices in the STEM fields. We need scientists and engineers, and a public that can have a meaningful input into how research shapes our society. We want to smash the stereotypes which might tell our young people that STEM is not for them.
- The COVID-19 global pandemic has clearly shown the importance of having a scientific talent base to provide us with expertise to deal with the challenges that we have faced and continue to face.
- During this period, we have witnessed first-hand the very real pace of technological and scientific discovery – we had a vaccine discovered and tested in a year. Something that many would have thought impossible.
- The pandemic and addressing climate change are likely to change many aspects of our society, for example as many needed to work and study from home for health and safety reasons, this has brought about a focus on accelerating digital roles across our society and economy – workforce processes have been digitalised far quicker than expected with likely long-term implications for skills and society.
- Artificial Intelligence will, in the coming years rapidly change the workforce – driverless cars, writing legal document, journalism, doing accounts, and potentially writing music. These changes can be feared or planned for, and the opportunities embraced.
- The 21st century workplace will be a fast-evolving environment. Knowledge and specialist expertise will continue to be critical, but even more important will be the

ability to apply that knowledge and expertise in previously unimagined ways  
Therefore, the new senior cycle must encompass a programme of learning that enables students to develop skills and knowledge needed to address future challenges. They need to be equipped with the ability to solve complex problems by nurturing creative thinking and innovation. Students entering the workforce will benefit from having good communication and interpersonal skills, and the ability to work as part of a diverse team, be personally effective and ultimately to become lifelong learners.

- SFI, through its programmes, engages in supporting all stages of our STEM talent and skills pipeline - from the early years in primary schools through the Discover Primary Science & Maths Programme, through to Smart Future for career advice in secondary school, and on through to fourth level masters and PhD students to early career researchers and attracting world leading researchers to Ireland. We engage the entire country in a discussion about STEM during Science Week in November, which reaches over 250,000 people.
- Our funding opportunities support education and public engagement action throughout the country in a wide variety of organisations. Our annual Discover call is assessed by international peer review, and supports between 30-40 projects a year with an investment of approximately €4million. Projects cover a diverse range of interventions. For example, providing opportunities for coding, supporting profession development for teachers, activities for TY students, research projects examining why, for example, girls might be less likely to select physics as a subject etc. Our programmes are targeted towards a wide diversity of audiences, including the Traveller community, children and parents accommodated in Direct Provision Centres, and students on the autistic spectrum.
- At the core of our actions is the focus on building STEM learning throughout an individual life – what we term STEM capital. Equity of access to education in STEM, ensuring that all our people have equal opportunity to pursue STEM studies, will not only improve the country's scientific understanding, to make informed decisions about our collective future, but will also ensure we have the skills and talent to deliver the solutions to meet tomorrow's needs.

- Over many years SFI has supported a range of programmes in schools to support active engagement in STEM-related subjects. Programmes, such as Discover Primary Science and Maths, the European Space Education Resource Office (ESERO) education initiative, and the SFI Discover Awards have promoted more active forms of learning and the use of a range of authentic assessment strategies.
- We recognise that young people must be able to apply their creativity, knowledge and skills within and across disciplines and real-life situations. Participation in informal STEM education projects such as CanSat, Astro PI offered by ESERO Ireland as well as projects such as SciFest and BT Young Scientist & Technology Exhibition offer these opportunities, and we would welcome recognition for participating in such projects as part of any future Leaving Certificate assessment process.
- Helping our learners to work in this way requires our teachers to have sufficient pedagogical content knowledge, and expertise in assessment, to enable them to design and enact high-quality learning experiences and to use innovative approaches to support both formative and summative assessment approaches.
- Teachers require ongoing support to transform their professional practices so that learners are more actively engaged in their own learning, while also ensuring they are ready for the world of work and for a society where lifelong learning is now a key competence for all. SFI would welcome the formal accreditation of teacher professional development offered by SFI and other organisations to ensure a high standard, and act as a teacher incentive.
- Building on these approaches we welcome projects such as the Assessment of Transversal Skills in STEM, which is being led by DCU, to highlight the use of appropriate resources, digital tools, innovative pedagogies and curriculum innovation, to facilitate an integrated approach to STEM teaching and learning in schools, and this also needs to be reflected in how STEM related subjects are assessed.
- Digital technologies have the potential to transform teaching, learning and assessment experiences in ways that were previously not possible with textbooks. Many schools now want to capitalise on the efforts made by their teachers during the COVID-19 pandemic and on the new knowledge they have acquired to transform their practices so that education is more relevant to the lives of the young people they teach. SFI

supports the development of digital skills and digital technologies that can contribute to future resilience whilst ensuring that such developments are inclusive and remain focused on bridging the digital divide.

- SFI recognises the need for reform of the Leaving Certificate in terms of the subjects offered for students to study and also how these subjects are assessed. The *STEM Education Policy Statement 2017-2026* identifies the reforms underway in the Irish education system, while also recognising that young people require more than the ability to memorise facts and procedures.
- Many governments, including Australia, Finland, South Korea and Singapore, have already begun to implement fundamental changes to their education systems as part of a re-imagining of how they organise teaching, learning and assessment so as to better meet the needs of society in the 21st century.
- Consequently, these countries are now in the process of moving away from an over-reliance on teachers preparing students for high-stakes summative assessments to a fundamentally different model of education that is more focused on cultivating engaged, connected global citizens who are life-long learners.
- SFI has funded many initiatives which could be mainstreamed into the education system and help to bring Ireland on that same journey.
- A significant action by SFI this year is role we have taken in operationalising the Creating our Future Government of Ireland campaign. Creating Our Future is a government-led national brainstorm that will involve the people of Ireland in a conversation on the role research can and should play in addressing opportunities, challenges and hopes for the future.
- Today is the last day for people to put forward their ideas, but we can see from the over 10,000 that have already been submitted that there is an appetite from the public for new ways of teaching and learning.
- I will close by saying that I strongly believe we need our education system to recognise different types of learners, different ways of thinking and consider the different skills and expertise that contribute to a functioning society. It is incumbent on us to ensure that we educate now in a way that will enable us to build a sustainable, inclusive and just society in the future.