

BASIC SCIENCES INFRASTRUCTURES FOR ETHICAL AND RESPONSIBLE  
COLLABORATIVE DEVELOPMENT

WORLD SCIENCE FORUM 2019

**22<sup>nd</sup> November - 11:30 - 13:00**

HRH Princess Sumaya bint El Hassan

Ladies and Gentlemen:

I am honoured to join you all for this thematic session on BASIC SCIENCES INFRASTRUCTURES FOR ETHICAL AND RESPONSIBLE COLLABORATIVE DEVELOPMENT. And what a wonderful time it is to be discussing this topic, as we celebrate the designation by the current UNESCO General Conference of 2022 as INTERNATIONAL YEAR OF BASIC SCIENCES FOR DEVELOPMENT. Jordan was proud to champion this initiative with several partner nations, and many individuals who made this dream a reality are in this room today. Congratulations to all of you. But now the real work begins!

That real work will help us to win hearts and minds, and hopefully to loosen purse strings. For there is little doubt that we in Lower- and Middle-Income Countries so often face challenges at home when expressing and promoting the concept of ‘basic’ as opposed to ‘applied’ science. There is all-too-often often a feeling that basic science has no place in national planning because it absorbs precious resources and supports research that does not tackle immediate, pressing problems. Indeed, many see wide support of basic science as a luxury that only wealthy, developed nations may enjoy.

This is a challenge and such opinions threaten the stable development of many of the neediest nations on our planet. The fact is that any nation that does not support some sort of basic science infrastructure, and the individuals and communities that emerge from it, will remain indefinitely as a consumer of new knowledge, rather than becoming a producer of knowledge and innovation. Such a situation can only serve to exacerbate knowledge gaps and to increase the costs of gaining, and therefore applying knowledge for development, or even for survival.

It would better reflect our needs and our goals, and perhaps make our task easier, if we could only recast the labels, from basic and applied to ‘curiosity-driven’ and ‘mission-oriented’. But even then, we would have to emphasise and celebrate the value of curiosity when it is combined with the scientific method. For this is the formula that has allowed humankind to progress to where we are today, and it is the same formula that must make all our nations more durable and more innovative. Basic science must be the foundation on which societies and habitats survive, thrive and grow sustainably.

We must never shy away from extoling the essential virtues of basic science, even in the most challenged economies and communities. The process of investigating and answering the fundamental questions about our world is immensely important in every context and community, and the outcomes can have considerable beneficial social, environmental or economic implications, if tackled in the right way.

Sometimes, it is only by tangible example that the message can be sent and received successfully: That is, that out of basic science, applied solutions are nurtured and grown. Indeed, so many real ‘applied’ products have been conceived or created on a bedrock of basic science: so many pharmaceuticals, including mass-produced penicillin; photovoltaics and solar cells; Li-ion batteries; quantum dots and organic light-emitting diodes for TVs; gene-editing; the internet; the laser printer; the personal computer mouse, hypertext, bit-mapped screens, graphical user interfaces; laser technology; semiconductor doping; radar; nuclear energy. The list goes on!

Ladies and Gentlemen: There are times when language fails to convey real meaning and absolute importance. The fact is, there is nothing ‘basic’ about basic science. It is the oxygen of lively curiosity and of innate innovation.

Many of the great international institutions of basic science have long seen the importance of supporting basic research and education in science-lagging countries, and I hope we all agree that the benefits are obvious and shared. Developing countries, by building strength and capacity in science, may harness and produce the knowledge and skills that they need to address diverse challenges, notably with regard to energy, water, the environment, health and poverty. And of course, these are challenges that are notoriously ignorant of border controls – so a national challenge ignored can quickly become regional or even global.

For this reason, many basic science institutions in research-strong nations support projects to increase the overall quality of research and innovation taking place around the world, so that they can jointly tackle challenges that may affect us all.

However, we must ensure that the priority is always to support basic science in those countries that most need it, and to ensure that the cycle of support and investment produces talent and infrastructure that may remain in those nations as part of a growing science base. Otherwise, the support is futile and the benefits extremely short-lived.

There is no doubt that research-strong nations exert a certain degree of ‘soft power’ by establishing international collaborations, with vital funding and mentorship as incentives. We must also acknowledge that research-strong countries remain ‘research-strong’ because they create and replenish a diverse talent pool. The fact is that, just like those challenges we should be facing together, the best talent also knows no boundaries – talent is an exploitable commodity and the mechanisms that make this work are hidden in plain sight – I could mention scholar exchange programmes, PhD fellowships, and visiting scholarships. They are

part of the reality of our uneven world. We must acknowledge these imbalances and admit to the drain and gain of talent that they facilitate. This situation is not going to change overnight and will never disappear completely. I simply ask that we are mindful of what our true mission should be – to discover, empower and support scientific talent in those countries that need it most, and to ensure that a good amount of this talent, once liberated through opportunity, remains at home to build the strongest possible science base. That is when true change will happen.

Ladies and Gentlemen: We will hear much about SESAME at this meeting and in the future – and rightly so. This is a basic science infrastructure project that makes Jordan proud and makes political and scientific sense. This is a third-generation synchrotron light source that provides a co-operative venue for researchers to engage in experimental science. Most importantly, it's a user facility that provides access to scientists, including graduate students, from universities and research institutes to carry out high-level experiments.

It is a surprise to many that people, not least in Jordan, do not realise that SESAME serves no 'applied' purpose – it is a complex instrument created for the sole purpose of uncovering new knowledge while drawing together scientists from across our region. It is a true example of how basic science is anything but basic in its importance and its potential.

As we plan for the International Year of Basic Science for Development in 2022, let us ensure that we reframe the debate to place low- and middle-income countries at the forefront - as hosts, beneficiaries and, most importantly as long-term science enriched economies.

I would like to thank our co-organisers of this session – the International Union of Pure and Applied Physics (IUPAP), International Union of Crystallography, The Abdus Salam International Centre for Theoretical Physics (ICTP), CERN, International Science Council (ISC), ICISE, and Dhofar University.

I look forward to hearing from my fellow speakers today, and to supporting basic science initiatives now and in the exciting years to come.