Science diplomacy in an era of fragmentation

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Keynote address:

The Future of Science Diplomacy: African perspectives in a changing Global order

Stellenbosch University

17 September 2026

Collectively the diplomatic world is in a very different era to just a little over a decade ago. Then there was a level of relative enthusiasm within international affairs. The multilateral system, despite its relative impotency, was still valued; the rules-based system that evolved from the 19th century and became entrenched after the two world wars was still largely intact; and conflicts, while still a scourge, were not of existential scale. The great powers were doing what great powers have always done - namely jostling for influence, protecting their interests, influencing countries in their ambit and trying to recruit others. And science was interacting with diplomacy in ways that also suggested a level of optimism – the Sendai agreement on Disaster Risk Reduction, the Paris climate accords, and the launch of the Sustainable Developmental Goals (SDGs) were all achieved in 2015. But there were already growing signs of change and tension. A multipolar world was emerging, populism was growing, technology was becoming a big disruptor, and great powers were increasingly ignoring the rules based order. Globalisation was increasingly questioned.

So where are we now, eleven years on? The global economy is struggling. We have experienced Covid but not necessarily learnt from it. Countries are turning inwards. Major powers are directly involved in bloody conflicts in the Gulf and in East Europe, the

impotency of the multilateral system even in its core role of conflict resolution is obvious. The great powers are acting more overtly in a transactional way, and progress on the SDGs, perhaps unsurprisingly, is minimal. The future of technology dominates nearly every aspect of geostrategic, economic and political thinking.

Indeed the inherent interlinkage between science, technology, economics, security and geostrategic interests has now become dominant in the minds of political leaders. The universal mantra of ministers of science at the two major ministerial meetings in 2025 was "*as open as possible, as closed as necessary*" but the latter is extending from a narrow security lens to economic interests and perhaps re-emerging as "*as closed as possible, as open as necessary*".

This is not the place to discuss why the world has retrenched so rapidly, but it is associated with a shifting balance between long-term and short-term thinking in policy and political circles. The result is many governments are increasingly focused on the here and now, at the expense of the long-term and future generations. If we could understand what to do to encourage long-term policy making we might make progress on many issues of the global commons.

And it is in this context, that I will discuss science diplomacy. I am not going to enter what has become a rather sterile academic debate of trying to define it. It is clearly about how science and diplomacy can work together either formally or informally to achieve diplomatic goals acknowledging that there are also contexts where diplomacy can assist trans-jurisdictional science with diplomatic spinoffs.

There are several groups of actors that need to be considered, and each has different drivers. The public science community itself which fosters collaboration and sharing of knowledge across borders and whose primary approach is reviewing observations and theory to reach conclusions based on the sufficiency and quality of evidence that can advance knowledge; the diplomatic community from nation states who have the responsibility for negotiating national interests; and the international community of diplomats and officials who have diverse roles across national borders and in trying to

develop global and regional approaches against the background of national interests. Science diplomats in various forms operate and have a potential role in all these sectors. There is a small but growing community of individuals who are trained and comfortable in operating across these very different cultures and approaches.

And there is the role of the private sector which operates across borders and increasingly plays a critical role in funding science, including more discovery research within its own walls, in driving technology and in shaping national and international agendas but whose own agenda is generally about economic capture. Nation states and the private sector have overlapping agendas as economic growth and security have always been core to national agendas and the nation state and private sector are increasingly intertwined in doing so. Some countries have even appointed diplomatic representation to Silicon Valley.

In the discussion that follows I focus on the goals of science diplomacy rather than on the actors. I shall focus on the nation state, the multilateral system and diplomacy rather than on the myriad of ways science itself builds relationships and understandings. Science of course provides knowledge on which other actors, be they businesses, governments or diplomats, can act. Science supports many international agreements in areas ranging from trade to arms control to environmental management. Indeed science diplomacy has always been a pragmatic and increasingly transactional tool for diplomats to use. Importantly science is a potentially unique part of a diplomatic toolkit which can operate both formally and informally as effectively a universal language.

Formal science diplomacy has evolved over the past 100 years. The major powers at the beginning of the 20th century overtly used science to forge defence and security alliances and to build the machines of war. After the Second World War science allowed the two Cold War superpowers to project soft power, to build alliances, and even to build a bridge between the two geopolitical poles. Sometimes open collaboration could be agreed: for example with the Montreal treaty, the International Space Station, the Antarctic Treaty, and the formation of IPCC and IIASA. When the cold war ended a somewhat optimistic era of cooperation emerged which allowed some of the developments I mentioned in my

opening remarks. Small and developing countries saw they too could use science to advance their own diplomatic and development goals. Perhaps 2015 was the zenith with the three major accords of that era. But now we are in a fourth and much more vulnerable and rather unstable stage. We face many existential threats and as the 19th century showed, a world where multiple great powers compete leads to fluid situations in which incendiary consequences can easily occur. Even when the world faced an existential crisis in the form of Covid, power politics impeded the global response and in turn fuelled domestic unrest. The two great powers could not work together and the multilateral system struggled to mediate. Global North-South differences over mRNA and vaccine access impeded an equitable global response.

Science has also evolved greatly over the past two decades. There is a welcome, much greater diversity of actors but at the same time geopolitical and domestic considerations have become much greater and are generating real and implied barriers. Science-based innovation is now at the heart of both economic and geostrategic competition. Disinformation, fuelled by aspects of the pandemic, by commercial interests, and the actions of state and non-state actors, has grown. Domestically the changed information environment has driven greater polarisation and fuelled populism. It has led in some countries to political interference in science becoming more apparent. International science cooperation has been made more difficult.

Technological developments – especially in AI – are changing every aspect of human existence from how we learn and how we develop to how we interact with others, how decisions are made and by whom, and in fuelling inequalities. The implications for who has power and gains riches are obvious. The world is fractured by different approaches to these technologies. In some countries there is an obvious tension between public and private interest, and a lack of willingness to put short-term interests and global division aside and think through how such technologies should be managed – a matter which is clearly global in its implications, and one where the ISC has been active.

It is in this very transactional context that we now need to think about what does science diplomacy have to offer. But first let me say something more about science. Science is

defined by a set of principles that allow it to claim to be universal. It is unfortunate that at times it is termed 'western science'. This is a misnomer for many reasons. First the principles that allow it to be universal have their origin in places other than Europe. Secondly the knowledge system applies irrespective of culture or context. Thirdly many cultures and histories have had an impact on how science has evolved. It is true that science was a major tool of the colonial expeditions of the European powers in past centuries and it is therefore understandable that some in colonised countries might want to make a political statement in what they call science, but I hope that we can get beyond that and accept that science is a global knowledge system.

Perhaps the biggest challenge facing science and diplomacy is the future of the SDGs and the management of what is called the "global commons". The agendas of both communities are not well aligned. No analysis of the SDGs would suggest that we have made any real progress in the past decade, and the manifest problems with the original SDG framing remain undiscussed even as we approach 2030. On one hand the SDGs were ambitious encompassing nearly every aspect of our existence on the planet, albeit with some gross omissions. On the other hand they had some flaws that meant that progress at best would be uneven and in the face of collapsing global consensus and in an increasingly transactional age, progress would be unlikely. In a sense they tried to do too much and in doing so likely achieved little. It did not define specific goals clearly, but rather was aspirational – leaving potential targets in the hands of governments.

And there were many unspoken issues.

The goals were not just about sustainability, they also encompassed the three domains of the original UN charter - peace, development and human rights. They were organised in 17 pillars that did not reflect the way governments operated and the targets and indicators beyond being voluntary and self-set did not necessarily meet the most relevant aspects of a particular goal. Further the inherent trade-offs and conflicts were not discussed - there is after all a fundamental conflict between goals that try to minimise resource extraction from the planet and those that set out to maximise human wellbeing as illustrated here. Goals 16 and 17 together were intended to provide the governance,

rule of law, and international cooperation required to achieve all other 2030 global goals but these seem almost cynical given the state of the multilateral system.

And there were two large omissions – firstly the absence of any specific goal over technology and its regulation. The digital and AI world and indeed life science developments were rapidly emerging as fundamental drivers of change with both opportunity and risk. Secondly the failure to get to the core developmental issue of equity of access to technology, and in particular the issues of technology transfer between the global north and south, was left to be dealt with through the Science Technology Mechanism forum and 10-member group – a stakeholder event which had little effective input into global policy making.

So what will happen after 2030? Most commentators think, at best, that with a little tinkering and perhaps without unanimity, the SDGs will be extended but given the state of global affairs they will have little traction. That would be a problematic outcome. It may be that the real efforts of both formal and informal science diplomacy must be to help diplomats and countries understand that real progress needs to be made on many issues. And here lies another problem with the SDGs: some issues require global action, some require action at a local level, and yet the SDGs made no attempt to differentiate between them.

Several suggestions have been made about the future of the SDGs – the most obvious have been to reduce and cluster the goals – for example The World in 2050 Report and proposals from Jeffrey Sachs and others. But while labels that are simpler and more structured might help, the underlying issues are those of what to do and at what level – from global to local – and with what level of accountability.

Four words merit reflection – **coordination, cooperation, collaboration,** and **competition**[1]. They are not synonymous and each one of them may play different parts in the future.

In science we want to collaborate – but that is not how the core foci of economics and diplomacy work and we need to think through that lens.

Coordination simply requires agreement to some alignment of behaviours - it does not imply anything about shared goals or willingly sharing burdens. Governments coordinate when they seek to deconflict when armed forces come across each other in peacetime. Air traffic control rules are another example of international coordination.

Cooperation means an intentional willingness to work together generally after a period of bargaining because it will improve each of their outcomes better than working alone. It is used extensively in the international arena via trade agreements, alliances, arms control treaties and more.

Collaboration means that countries get beyond alignment or bargaining to integrate activities with shared information and institutional linkages. Obvious examples are in intelligence sharing, in joint space programmes, and in a few places in regulatory sharing - for example the European food safety authority.

So the default position of coordination and cooperation in formal diplomacy is different from in science where collaboration is the desired goal.

Yet at the same time **competition** is always present even between allies, whether in science or in diplomacy. It co-exists with cooperation and collaboration and how that is expressed and managed is core to how both work.

[1] And as Daan Du Toit, deputy director general of DSTI (South Africa) pointed out in his response to my presentation there is a fifth C: we cannot forget **context** when we think about any issue where science and diplomacy interact.

I have deviated down this line because I want to now discuss the future of the global commons[2]. My view is that achieving real progress on global issues requires understanding that different issues of the commons will require different solutions from the diplomatic community. We tend to consider the global commons as if they were a unitary set of problems: of course they are not, and because they are not, we cannot approach or manage each of them in the same way. There are arguably at least five very different dimensions[3].

The obvious class are the spaces which lie outside national jurisdictions. The Antarctic, ocean, inner and deep space, and the moon are examples. To date we have only partially solved on a case-by-case basis how to approach them. The landmark success was the Antarctic treaty signed in 1959 after the success of the 1957 international geophysical year sponsored by the ISC's predecessor ICSU. It reserves space below 60th latitude south for peaceful purposes – mainly science. The treaty has expanded from its original 12 members to now 58 countries; and the Scientific Committee on Antarctic Research, an ISC affiliate body, acts to encourage cooperation and coordinate research. The logistical realities of the deep south have sustained the treaty; the treaty relied on the US and USSR recognising it was in their mutual interests to support the pacification of the southern pole. It is interesting to speculate whether such a treaty could still be negotiated now given the current situation of melting ice, the intelligence interests in circumpolar satellites, as examples. But we have it and it is important that the treaty stays in place. To date no rogue actor has broken the Treaty on the ice although the marine resources remain subject to illegal fishing

But when we get to the deep oceans, while there is a ratified treaty to cover deep sea mining, some countries are looking for potential economic gains. The inherent conflict, also seen with climate change, is reflected in the observation that countries most

[2] My Koi Tū colleague Dr Annalise Higgins has contributed to this analysis of the global commons
[3] Which could be lumped or split in different ways.

advanced in thinking about such exploitation include some of the least developed island states in the world – one can understand their motives.

Inner space has become a contested space. The commercial and intelligence interests have meant that there is an extraordinary amount of stuff up there. Commercial interests and state interests in asteroids and the moon are growing and the current outer space treaty is no longer appropriate

The second class of global commons is where we have a common goal. Avoidance of conflict would be a common goal even if it is totally aspirational. But climate change must be more than aspirational and it must be a global goal in that it must be tackled globally. Alignment here is essential but we cannot yet achieve that with many countries shifting their policy focus to very short-term thinking. Mitigation is both a local and global responsibility acknowledging that the costs and types of mitigation will fall unevenly – but debate becomes stuck on important issues of past and current emissions and the wish of many people for a better standard of living and this inhibits progress. National and global interests, economic and environmental interests collide. Adaptation will be primarily local but could become regional or international if geoengineering at scale becomes necessary. Issues around such deployment have been extensively discussed in the last two years and the risk is growing of unilateral deployment with broader implications. Biodiversity loss may be a common goal but to a greater extent it must be tackled at local levels in specific ecosystems many of which cross borders – here alignment of goals is essential allowing cooperation and hopefully greater collaboration.

The third class of global commons is that of common services and standards. Postal services, air traffic control and radio wave spectrum allocation and regulation are but simple examples where the global community must agree if the services are to function. It is in everyone's interests that they do. The internet itself may be a further example.

The fourth class of global commons is that of the advanced technological dimension. We are in an era where this dimension is dominating. Whether it is through the changed information environment or through the impact of AI and soon quantum, every part of our

lives and a nation's operations and strategy is affected. It creates dangers and opportunities. Opportunities lie in the way governments work, the way businesses work, in what science is done, in improving our access to knowledge. The dangers lie: in manipulation of our thinking, of impairing critical thinking, of manipulating democracies, of greater not lesser inequalities, of loss of agency, in autonomous warfare and much more.

The issues have been apparent now for several years. High-level principles have been stated by the UN, OECD, UNESCO, ITU, European Union and by many governments but the pace of technological change is marching on unabated, largely driven by the private sector. The need for some forms of oversight seems obvious but the very different approaches of the major technopoles makes meaningful resolution unlikely. The ISC pointed out that AI is a set of tools and it is the specific use that needs to be considered and potentially regulated. But the pace of development, largely in the private and/or security sector and dominated by two superpowers means that broader issues that should be explored are not being so despite political statements at multiple summits.

But we should think more broadly of this class of global commons – perhaps the global interest is best defined by a global interest in the regulation of technologies that have cross-boundary inevitability and where societal impacts might be existential – this might include for example synthetic biology such as mirror DNA technologies.

The fifth class of global commons is what *should* be shared – knowledge, technologies and critical resources. Science itself is a form of global commons in that its knowledge is there to be shared even though much of its application will be via the private sector. To a large extent public science has done that, notwithstanding the issues of open access and paywalls. But there are many technologies the world has unequal access to. Some might be justified by market principles but unequal sharing of mRNA vaccines during Covid suggests that the concept of North-South technology transfer that were discussed when the SDGs were launched evaporates in the realities of politics and money. Compute power may become a similar issue of unequal access – indeed I worry that in smaller countries we may see a reduction in our effective sovereignty. To a certain extent,

platform companies already override smaller country interests in terms of social media regulation and protecting local news media. There may be other forms of critical shared goods – they may be quite material – for example some critical minerals have uses that means every country needs access.

These distinct types of global commons which require distinctive reflection highlight the most important issues facing science diplomacy. We are in a phase of geopolitical development in which national interests, short-term economic interests and security issues drown out interests in the longer-term state of the planet and its residents – many of which are common. This is a very transactional environment compared to an arguably more aspirational environment when the SDGs were launched

The 'tragedy of the commons' is a common metaphor and the solution to the tragedy is found in cooperation. Human societal evolution required societies to develop rules and mores to deal with the freeloader or cheater. But we face a situation now where we do not even have political consensus on the need to protect the global commons and many nations are effectively freeloaders. The phrase "coalition of the willing" has been used in less savoury circumstances, but perhaps with regard to the global commons, we cannot allow solutions to be blocked by one or two players; progress must be made.

A decade ago along with Vaughan Turekian, Robin Grimes and Teruo Kishi, I wrote a piece that pointed out how science diplomacy could advance a country's individual interests in multiple ways[4]. The more science helps a country in its connections, in its pragmatic relationships and in negotiations - be it for security, economic environmental or technology capture purposes - the more science becomes embedded formally or informally in diplomacy. We also pointed out that coordination and cooperation was often needed to manage common resources – often environmental or economic. Again science can be used to define what parties agree on so negotiations can flow. Science is often key to monitoring agreements in place at regional or even global levels. Working on

[4] P.D. Gluckman, et al (2017), Science Diplomacy: A Pragmatic Perspective from the Inside," *Science & Diplomacy*, 6, http:// www.sciencediplomacy.org/article/2018/pragmatic-perspective

issues of the global commons requires countries to recognise it is in their *direct national interest to do so*. This is the biggest challenge and is why I have argued for the critical role of science advisors within ministries of foreign affairs.

The situation however has evolved since we wrote that paper. International affairs are now much more obviously driven by short-term economic and security interests. Both superpowers in association with their major platform companies are creating spheres of influence and control. As technologies expand their influence the tension between their interests and those of middle and low powers will grow. In a technological world where compute power and infrastructure may be dominant, the concept of absolute sovereignty may disappear for many countries. For them, technological access and protection will come to dominate in science and technology diplomacy and transactionalism will become more obvious[5]. It will be important but hard to keep a focus on the global commons.

To date I have said little about the formal multilateral system. I doubt major change is possible in the foreseeable future so we must work with what we have. Beyond the headlines of the Security Council and the General Assembly, many agreements and issues are still well addressed in the UN system. There are many UN agencies that at technical level do a major job and within fiscal and political constraints do it well. WMO, UNDRR, UNEP, FAO, UNDP, IAEA, and WHO are all examples of agencies that work intensively within their mandates. But all of them ultimately come under diplomatic oversight and in some cases tight control. Many have highly competent scientific components and the ISC works closely with these. Many partner with us in international science activities via our affiliate bodies. I am delighted to say that UNESCO, which has science in its title, has recognised that the ISC and UNESCO must be closely aligned: only a few weeks ago I met with the new Director General and signed an eight-year action-orientated agreement – this is after a long period of relatively constrained relationships.

[5] Turekian V, Gluckman P (2025) Rewiring science diplomacy. *Science* https://doi.org/10.1126/science.aeb4815

But ISC also has a broader role in the multilateral space. For this reason we have a presence in New York and soon Geneva. We provide substantive input to the Secretary General's science advisory board, work with UNESCO to provide support for the group of friends, a member state organisation of science for action, as well as co-chairing the major group on Science and Technology. Much of this is a recent effort and it is critical because, despite everything else I have said, it is in multilateral dialogue where much can be achieved. Science must be part of that.

The more we can help diplomats see the value in science assisting them in a pragmatic and transactionally focused world, the more we can work with them to deal with longer-term issues that will need reframing if we are to move forward. It would be a tragedy if we accepted the current situation as impossible and it was years before progress on global issues again became possible. We must be pragmatic – all countries want security, they want economic growth, they want progress for their citizens.

But I make a plea. Science has been too removed from much of society, and science must rebuild its social contract without just asking for more money. My recent piece in Nature suggests the importance of doing so[6].

While I may sound somewhat pessimistic I do not want to end on that note.

Science is effectively a universal language. But there are still barriers to be broken down if science is to meet its promise as a universal language and to use its ability to provide a pragmatic rationale for cooperation, coordination, and collaboration while allowing for healthy competition. It offers promise for supporting a flailing international system, while recognising its diversity in who does it, where it is done and in what context.

This is where science can informally do so much. Through collaborative research we can help develop actionable knowledge to address many of the challenges affecting

[6] Gluckman P (2026), Why science must reinforce its social contract. *Nature* 656(8127):274. doi: 10.1038/d41586-026-02444-1.

societies, nations, regions and the globe. By promoting international scientific cooperation we can build contacts and collegiality that can have direct diplomatic spillovers. This is why I am so delighted that the ISC has been funded by the European Commission to lead a global discourse on the principles and values that support multilateral scientific cooperation. Perhaps the informal multilateral system of which the science community is a core part can take a greater lead in partnership with others in addressing some of the issues I have raised. It did so at least once before with the 1985 Villach conference where under sponsorship from ICSU, WHO and UNEP, scientists came together to challenge nations to take global warming seriously. From that the IPCC eventually emerged. I hope the ISC working with IIASA can announce a major initiative in science diplomacy before year-end.

Science can assist countries in looking beyond their own vested interests – indeed it can help achieve what will be core to progress – but they will need to see that it is in their own vested interest to advance on regional and global issues. By starting with what we can already do, we can build the confidence that science can do what only a universal language can do: that is allow people to talk to each other and hopefully find common understandings that can lead to common solutions.