Rebalancing the Encounter between Science Diplomacy and International Relations Theory

Carolin Kaltofen
Department of Science, Technology, Engineering and Public Policy,
University College London

Michele Acuto
Melbourne School of Design, University of Melbourne

Abstract

Whether it is in climate change negotiations, pandemic scares, security threats or sustainable development agendas, science and technology are today at the heart of international affairs. Yet there is still limited academic work that deals with the complex relationships between international diplomatic and scientific endeavours. How can we bridge this divide and possibly 'rebalance' the encounter between the practice of science diplomacy, its practitioner-driven literature, and the discussions of international relations theory (IR) that underpin the study of world politics? Here we propose that this move could start from a more explicit placing of science diplomacy discussions across the IR spectrum. We pose that taking seriously science 'diplomacy', whilst undoing conventions around the hitherto limited 'IR' reading of science in its literature, would do well in establishing this reality not just as a domain of reflective practitioners, but as an effective launchpad for international theorizing as much as more academically-driven practice.

Science and technology are today steadily at the heart of international affairs. Whether it is in climate change negotiations, pandemic scares, security threats or sustainable development agendas, the role of scientists and scientific information in world politics pervades the spectrum of global policy challenges like never before. Yet there is still limited, if not just 'niche', academic work that deals with the complex relationships that link modern

diplomatic and scientific endeavours as a whole. Although the 'sparse' academic engagement with science diplomacy is pointed out by most writings in the traditional science diplomacy literature (e.g. Fähnrich, 2016), the persistence of this gap is even more surprising given the significant role played by scientific innovation in shaping the landscape of international politics. This for instance is well represented in the extensive literature and well-established track record of engagement between international relations (IR) considerations and questions of nuclear disarmament (Lowenthal, 2011), or indeed in the now prominent global environmental governance scholarship observing the dynamics of the UN frameworks around climate change (Bestill and Corell, 2008; Miller and Edwards, 2001). So how can we bridge this divide and possibly 'rebalance' the encounter between the practice of science diplomacy, its practitioner-driven literature, and the discussions of international relations theory that underpin the study of world politics? We would like to propose here that this move could start from a more explicit placing of science diplomacy discussions across the IR spectrum, and that taking seriously science 'diplomacy', while undoing conventions around the hitherto limited 'IR' reading of science in its literature, would do well in establishing this reality not just as a domain of reflective practitioners, but as an effective launch pad for international theorising as much as more academically driven resource for critical practice.

Situating science diplomacy in the IR spectrum

National interest and state-centric approach

Irrespective of which interpretation one chooses, unravelling science diplomacy from the point of international relations (IR) theory implies by default its analysis as a phenomenon of global order and change. This viewpoint requires a stance towards the role and status of different actors, including states, with respect to the question of order. However, it seems that situating science diplomacy within one of the mainstream theories of IR might only offer fragmented readings of the phenomenon itself by privileging one '-ism' over the other. For example, from a realist perspective, scientific cooperation purposefully employed as part of bilateral or multilateral relations, has been a key science diplomacy practice at the back of which

national interest has been pursued strategically and successfully. However, to reduce science diplomacy to the situation where science is used for, or in, diplomacy, and therefore putting scientific communities at the service of national governments risks mischaracterising scientists and scientific endeavours (Flink and Schreiterer, 2010). Hence, current science diplomacy canon argues there is to be a reverse dynamic ('diplomacy for science') as well, where international scientific cooperation around applied and basic research are the main objectives and supported by national governments (Pozza, 2014; Royal Society 2010); Wilson, 2014. While this dimension of science diplomacy gives more credit to the importance of scientific research in its own right and to some extent depoliticises the work that scientists do, it does not sit with a realist conception. From a realist point of view, the only motivation for governments to justify such endeavours is the pursuit of national interest and international balance of power (Wagner, 2002). '[W]e go over there, we collect wonderful data, we build our careers on the work that we do in [foreign countries]' (Frehill & Seely-Gant 2016, p. 73) and without any such outcome or other clear benefits for national governments there would be no reason to invest resources, give up strategic advantage or leverage through sharing scientific knowledge, and increase risk by opening up channels that cannot be sufficiently monitored (Smith, 2014).

In essence, the category 'diplomacy for science' simply does not exist within the realist paradigm, for which science diplomacy as concept and practice denotes the instrumental use of scientific 'capital' for political ends. This approach turns science diplomacy into an updated version of Booth's 'security game' that is 'played by diplomats and soldiers [and scientists] on behalf of the statesmen' (Booth 1991). Fittingly, the Royal Society's seminal report exploring science diplomacy's new frontiers, has as its subtitle 'navigating the changing balance of power', which besides the direct reference to a realist view of world order, also frames science for diplomacy as an international security issue for which 'Foreign ministries should place greater emphasis on science within their strategies' (Royal Society 2010, pp. vi, 11; RS hereafter). This view is often supported by scientists themselves who seem to be very aware of the importance of strategic reason behind international research initiatives that are state funded, where the only possible justification for such public expenditure is the presence of 'some strategic reason' (Frehill

& Seely-Gant 2016, p. 68). Granted that there is more to science diplomacy than national interest, the fact that it is too enthusiastically treated as being 'still a fluid concept' and its ambiguous and, unfortunately, controversial conceptual characterisation by the Royal Society (2010) creates unnecessary hostage to fortune.

Liberal states and international cooperation approach

The more liberal understanding of science diplomacy as 'soft power' is also somewhat contentious. Potentially, the idea that science diplomacy 'draws on the "soft power" of science' (RS 2010, p. 11) might open up science diplomacy to more IR criticism than the realist interpretation. First, soft power is equally geared at serving national interest and maintaining or increasing state power than is any other pursuit of power (Pozza 2014). In this sense, Kaczmarska and Keating (2017, pp. 1, 2) argue for instance that the perception of soft power 'suffers from a liberal democratic bias' that obscures the latent 'conservative', potentially authoritarian, character of soft power, which a closer look at the seminal Royal Society Report might confirm. Here science is identified to be a source of soft power because it 'provides a non-ideological environment for the participation and free exchange of ideas between people, regardless of cultural, national or religious backgrounds' (RS 2010, p. vi). Shortly after this statement follows the observation that, therefore, scientific communities are 'well placed to support diplomacy' (which is state interest informed by political ideology) and offering 'channels of scientific exchange' that can be 'aligned with wider foreign policy goals' (RS 2010, p. vi). Irrespective whether or not science is indeed free from ideology, the Royal Society report highlights the value of science as being free from political doctrine and systems of ideas. The statement, repeated throughout much of the science diplomacy canon, that science should be 'aligned' with the political principles of a foreign ministry could be taken quite sceptically in certain IR camps seeking to go beyond the mainstream '-isms' (e.g. cosmopolitanism and constructivism), and in a normative sense it might be seen by many in the discipline as potentially corrupting the endeavour of science diplomacy towards national(istic) interests. Ultimately, the soft power approach depicts science diplomacy in a way that is perhaps not significantly different from realist power politics that are underpinned by national strategic

reason. The point here is not to reduce science diplomacy to state doctrine. Rather it is to highlight that identifying science diplomacy as soft power instrument is indeed a very risky move and that there is still much conceptual fine-tuning needed to ensure the credibility of science diplomacy as also a normative project and a theoretical grounding that overcomes a simplified deployment of 'mainstream' IR approaches, if not a contribution that reaches beyond these.

Nonstate and global governance approach

A more nuanced inquiry into the relation between science diplomacy and the state is needed not only in order to delineate it from plain power politics, but also because science diplomacy occurs just as much between states as it does between states and other nonstate institutions. Articles in this special issue (Hornsby and Parshotam; Su and Mayer; Tanczer et al., all this issue) are certainly ripe with examples of this 'polylateral' kind of diplomacy – something today well accepted by diplomatic scholars at large (Wiseman, 2010). The role nonstate actors in managing regional and global affairs, such as providing technical assistance and capacity building, is increasing steadily and has been at the core of IR as both practice and discipline for several decades. While originally a concern of Neoliberal Institutionalists or English School proponents, questions about changing statehood and world order as indicated by the growing global cooperative action taken by institutions and regimes soon split IR scholarship over the 'global governance' debate. No matter whether state-centric or more explicitly functionalist in nature, when looking at science diplomacy as international scientific cooperation its increasing global connectedness is apparent. As Bernstein and Cashore (2007, p. 347) note, especially in areas where 'national and international regulation of significant global social and environmental problems has been absent or weak' such as trade, environmental protection and cyber security, 'an array of voluntary, self-regulatory, shared governance and private arrangements has begun to fill the policy void'. As a result, nonstate governance systems are proliferating to address global problems, from issues like fisheries depletion, food security, rural poverty and working conditions (Bernstein and Cashore, 2007, p. 348), and within these frameworks expert communities have been

playing a crucial role by producing and providing scientific and technological knowledge for the likes of standard setting and regulation as well as by capacity building, track-2 dialogues, access to philanthropic funding and a growing array of other activities shaping the format of global governance.

It is in this context that science diplomacy takes on a very different role as to state-centric understanding. The concept of para-diplomacy as the conduct of international relations between subnational entities, or between these and nongovernmental actors on the international scene, might be better suited to describe the type of science diplomacy seen in global governance even if these activities appear to take place on the 'frontiers' of more formalised state-based interactions (Hocking, 1999). Notably, para-diplomacy has received considerable attention from global governance scholars unrelated to the emerging trend of science diplomacy. Yet, the basic tenets of para-diplomacy as 'multifunctional vehicle for the promotion of interests and identity' between sub-state entities (i.e. regional governments) due to the 'decentralization of political power or administrative responsibilities' (Lecours 2008, pp. ii; 1), help thinking through the multi-layered diplomacy of and through science. Interestingly the strength of science in this variant of science diplomacy is not necessarily due to its noble neutral nature of science. Rather, scientific communities are much more flexible and faster in responding to global challenges by operating partly outside the constraints of state bureaucracy and political disputes, as demonstrated with the example of global internatent governance and the role of Computer Security Incident Response Teams (see Tanczer et al. in this issue).

However, IR's more narrowly construed understanding of 'diplomacy' is a serious drawback to the science para-diplomacy approach. Although diplomacy studies' broader sense of 'diplomacy' accommodates nonstate actors, IR's 'diplomacy' very often does not. To address the coexistence of diplomacy as broad and narrow is cardinal for science diplomacy scholarship, determining the limits of its study while testing IR's claim over science diplomacy as for IR claiming hold over it. Para-diplomacy is a product of diplomacy studies that sits uneasy with IR's take on diplomacy. From an IR viewpoint, diplomacy has classically taken the shape of an investigation in the conduct of international relations, and, thus, as a key practice of statecraft in that it represents the capacity of states and state-representing entities to

conduct external (or 'foreign') relations. Yet, throughout much of the 1980s and 1990s diplomatic studies has also developed an increasingly refined appreciation of the multiplicity of 'levels' and contexts in which diplomacy occurs beyond state politics. This domain of para-diplomacy, as already noted above, has demonstrated resilience and continuous inquiry, while the study of diplomatic relations expanded beyond traditional (state-centric) approaches to what Stuart Murray (2008) called 'new' and 'innovative' approaches to diplomatic studies. This is, however, a transition that much science diplomacy writing has struggled to engage with, remaining locked in liberal and state-centric assumptions on diplomacy, and only marginally making its way into the new diplomatic studies debates. At the same diplomatic studies have in themselves remained a 'specialist' concern in IR, and as a field of study they have more typically occupied a boundary-spanning role (e.g. reaching into history, negotiation theory or area studies) than a central positioning in the canons of mainstream IR. It might be time, then, to take science 'diplomacy' more seriously.

Taking science 'diplomacy' seriously

In our view, taking seriously the term 'science diplomacy' is about being more rigorous on the value of the term itself. To decouple science diplomacy from its currently fragmented form, we would argue that a more coherent foundation in theorisation is a necessary condition for a more effective deployment of the term. This does not mean that science diplomacy needs theoretical 'add-ons' or conceptual discussions merely layered on top of cases and anecdotes. Science diplomacy might in fact be in need of a more fundamental and less fragmented rethinking. Filling of gaps might only just take us so far and, from an IR standpoint, it might be necessary to conceive this scholarship relatively anew and certainly much more explicitly in dialogue with IR theory, diplomatic studies and their conceptual underpinnings. This can begin, as demonstrated above, by juxtaposing science diplomacy to ways of conceptualising IR, as with realism, liberalism of the global governance paradigm. This not to oppose or dismiss canonical understanding of science diplomacy as thus far developed in the practitioner-driven scholarship, but rather of performing some degree of constructive critique. However rudimental the execution, we see this critique as the

continuation the existing dialectic underpinning the discourse on this term, which in the process of delving deeper into science diplomacy gets scaled in our paper to the meta-theoretical level: not an issue of what sort of para-diplomacy 'science diplomacy' is, but rather what theoretical basis does its discussion rely on. Science diplomacy as IR framework shaped by the imperatives of the international problematique (science diplomacy as international relations) is brought into opposition with a framework for understanding that emerges from science diplomacy as 'science' 'diplomacy' – the negotiation of its terms proper. As we argue, the first step of 'taking seriously' the term is followed by bringing 'science' and 'diplomacy' into a meaningful conversation, which could help to think anew, or at least advance more explicitly, the foundation of science diplomacy.

Making space for diplomacy in 'science diplomacy'

As diplomatic scholars have been regularly arguing in the past few decades, diplomacy is not just simply a relevant niche in international theory, but a defining factor in the minimisation of frictions on the international stage and the engine room of IR. As outlined above, diplomatic studies are rich in theory and this wealth of analytical engagement is made even wider by a consideration of diplomacy as also engaged with negotiation theory. In fact, diplomatic studies have for long suffered from a Nicholson view of diplomacy, as seeing the world through the embassy window with the heavy shadow of the profession of the diplomat beyond much theorisation. In this sense, and conscious of the practice turn of much IR as well as its limitations, we argue that it necessary to embrace a rediscovery of the broader college and the boundary questions shaping the practice of diplomacy. If we take diplomacy in a less IR-centric sense, the broader landscape of diplomatic research is perhaps less coherent than it might appear at first sight, and in fact currently split between negotiation approaches and IR lenses. If to answer this demand for a more systematic enquiry of the doing of science diplomacy we were to limit our account of diplomacy to diplomatic studies narrowly construed within (and bordering the domain of) IR, we would also repeat a common limitation of this line of inquiry: that of its relative split from negotiation theory and the academic study of negotiated relations.

Parallel, and yet fairly distinct, to the development of diplomatic studies,

the domain of negotiation theory has flourished throughout the past decades, engendering a variety of inquiries that could be critical in taking the diplomacy of science diplomacy more seriously, but also conversely contribute to the advancement of diplomatic studies beyond its IR connection (Acuto, 2011; Murray et al. 2011). It is important to understand how this scholarship has a series of unique characteristics that can ground even more effectively a thorough and systematic study of science diplomacy. First and foremost, negotiation theory represents inquiries that in a sense, especially seen the focus of IR on power politics and the international, is broader than diplomatic studies: it is well rooted across business and management studies, has also focused more explicitly on the negotiation of interpersonal relationships and individual interaction, not just on those of political representatives. Thus, negotiation theory is of wider applicability and has reached through numerous academic disciplines, but also 'hit the shelves' of popular writing and general interest reading lists – especially in relation to negotiation techniques. Hence, negotiation theory as addressing micro-level interactions in extensive ways, offers numerous opportunities for theoretical synergies between scientific and diplomacy.

Negotiation theory has been mostly influenced by the dominant role of conflict resolution studies in its theorisation, with its roots not just (and in fact in a limited way) in politics and IR, but rather in behavioural and decision analysis, game theory, psychological approaches, and not least law – in key international programmes like those at Harvard's Programme on Negotiation or the Fletcher School of Law and Diplomacy in the US closely linked to legal studies. As demonstrated for instance by publications in journals like Negotiation or Journal of Conflict Resolution, negotiation theory is very often more positivist than diplomatic studies, deploying methods more akin to much political science, including practice theory, than IR. Particularly important to our argument that the 'diplomacy' of science diplomacy should be engaged with more systematically in cases and theorisations (and hence 'seriously' in a scholarly sense), is the fact that this positivist and behaviouralist tendency has lent itself to develop a vocabulary of negotiation theory that can be applied empirically to replicable and comparable studies. We have today a well-established landscape of terminology on negotiation, such as well-rehearsed discussion of 'bargaining ranges', the role of interest-

based positions in negotiation and diplomacy, 'integrative' and 'distributive' takes on mediation and diplomacy (Starkey et al., 2005).

While these studies have offered numerous contributions of both theoretical (mostly positivist) and pedagogical (mostly practice-oriented) nature to the study of a variety of types negotiations from business to conflict, they have, however, also often forgotten the bigger picture of international relations as represented in the three IR views discussed above. Even the most IR-like considerations of negotiation theory, such as those of conflict resolution, rarely contribute to the core of the contemporary debates at the heart of international theory, and vice versa. An explicit engagement with these 'grand' questions of power and world politics at the heart of the international – and perhaps a more commonly taught and researched presence of negotiating dynamics in diplomatic studies curricula – could allow for a systematic analysis of behaviours in diplomacy, as well rehearsed in negotiation theory, but also of political structures and trends in diplomatic affairs, as well discussed in diplomatic studies. This allows us to appreciate the specificity of the interactions, allowing for comparable and scientifically sound assessments, while not missing the bigger pictures of global transformations. Appreciating the scientific gesture as constitutive of global governance shifts, and vice versa. Hence, while the positivist tendencies of these inquiries and terminologies have often been looked at with some scepticism and detachment from diplomatic studies, a more explicit testing of negotiation theory with an explicit diplomatic studies purpose (i.e. IR), especially in relation to practice and global order turns discussed here, could be a highly fertile ground where to set out a rejuvenated programme of science diplomacy. While leaving a field ripe for exploration, we do recognise that 'science' too warrants a closer engagement. In other words, the extent to which science diplomacy transcends traditional IR paradigms, or indeed IR itself, is consequential to taking 'science' in its dynamics and internal logics, as seriously as we advocate here for diplomacy – a double move to engender the evolution of science diplomacy also as a theory. This begins, in our view, by going beyond simplistic readings of the science of science diplomacy as just epistemic communities – practically undoing one of the core conventions of more canon science diplomacy writing to date.

Undoing conventions of science diplomacy

We need a firmer stance towards the conventional conflation of science diplomacy with the idea of 'epistemic communities'. A surprising large amount that has chosen to analyse science diplomacy is this way. Originally formulated by Haas (1989), the framework seeks to conceptualise the influence of knowledge-based experts to formulate policy within the international system. Yet, beyond a currently limited capacity to illustrate some functions of science diplomacy, epistemic communities as function of science diplomacy is misleading. This is, first, as it has led to conflate the two and use them interchangeably and, second, as it results in narrowing the remit of science diplomacy to fit not only the epistemic communities framework but also assumes that science diplomacy is within the remit of IR with limited appreciation of its diplomatic characteristics.

This does not mean dismissing overlaps in the practices described by both science diplomacy as well as epistemic communities literatures, neither is it a dismissal of the latter as such. In fact, our concern is one over the light-handed application of 'epistemic communities' terminology, which works in the defence of this framework emphasises that it cannot be detached from its explanatory purpose. It is in this light that we discuss the intersection between science diplomacy and epistemics communities and the challenges arising from working within this space. Science diplomacy can imply predefined actors, states and nonstate actors, that pursue government interest internationally, as a process that connects, facilitates or mediates between different (epistemic) practices and as unfolding through various knowledge systems across scales. The intersection of science diplomacy and epistemic communities is their pairing of expert knowledge and 'wicked' problems which includes the shared emphasis of knowledge as process as well as enabler or product. Expanding the intersection beyond this point, however, is a narrowing of science diplomacy leading into the discussion of specific instances of science diplomacy instead of its general conceptual affinity with Haas's framework.

The conceptually 'superficial' treatment of epistemic communities in which the term 'is more frequently used metaphorically to describe any group of experts giving policy advice' (Dunlop 2011, p. 4) has inspired an equally generous application of the term to the heterogeneous set of phenomena

implied by science diplomacy (Davis & Patman 2014). This suggests the appropriation of a selective or incomplete reading of the epistemic communities framework to explore situations for which it is not equipped. The ideational underpinnings of epistemic communities are detached from the urgency, responsibility and normativity underpinning science diplomacy phenomena for the most part. Hass notes that the consensual knowledge and ideas sustaining and projected by a specific community cannot be compromised by political pressures. Epistemic communities are conceived of as different from other expert communities, such as pressure or advocacy groups, insofar as epistemic communities adhere to a 'shared set of causal and principled (analytic and normative) beliefs, [and] a consensual knowledgebase' that despite a 'common policy enterprise (common interest)' are not compromised in pursuit of the latter (Haas 1992, p. 18). Based on the empirical analysis of five different epistemic communities Haas concludes that '[i]f confronted with anomalies that undermined their causal beliefs, they would withdraw from the policy debate, unlike interest groups' (Haas 1992, p. 18).

In comparison to science diplomacy this suggests, first, the collaboration between an epistemic and policy/political community is consensual, void of pressure to maintain the collaboration should either party wish to withdraw. Diplomacy, however, extends a political imperative from which it cannot be withdrawn. Second, Haas's statement also that epistemic communities engage in an advisory capacity, to assess and inform, possibly influence 'state interest' and according policies (Haas 1992, p. 1). Knowledge, when leveraged as a mean to influence, loses science diplomacy's interest in 'knowledge relations' as an end in themselves. Third, Hass clearly suggests that epistemic communities advise without inheriting responsibility over their influence in decision-making (as distinct to the obligation to the policy community). Science diplomacy strikes a contrast for it justifies its existence in part through the responsibility of collective action (Bernstein and Cashore 2007). Fourth, epistemic communities imply that informing is generally directed at governments, which is different from ideas of 'science communities' that in their actions engage diplomatically. Fifth, epistemic communities struggle when confronted with the diplomatic habit to 'negotiate' and compromise which is somewhat alien to 'technicians' and 'experts' often concerned with

scientific tasks. (Hass 1992; Bueger, 2014). Ultimately, science diplomacy could be considered as the inversion of the epistemic communities blue-print.

A practice-based approach to science diplomacy

We want to argue, however, that there is purchase in branching out from epistemic communities to epistemic practices. From this point of view, Christian Bueger's (2014, 2015) heuristic identification of different types of epistemic communities can be a crucial analytic tool for developing a science diplomacy that balances scientific as well as diplomatic practices. Bueger distinguishes three generations by their understanding of the relationship between science and international politics. Needless to say, the difference between the perception of this relationship by practitioners vis-a-vis that of scholars is fundamental and with the view to explore science diplomacy's theoretical foundation, the focus is this relationship under the scholarly microscope. The second generation focus on epistemic discourse and effects of knowledge itself can collapse the first generation's strict separation of science and politics; it is not concerned with the causal mechanisms by different communities, but with the long-term effect knowledge practices (discourse) have on global order and politics. Enquiries into the history of science diplomacy would benefit mostly from this approach providing the conceptual tools and vocabulary to unpack which and how which scientific discoveries have been in part shaping ideas of international space, its classification as system and of the dynamics within it.

The third generation equally useful to science diplomacy for it understands the relationship between science and global politics at a higher level of analysis by including the broad variety of expert practice ('advising' as the sole focus of the first generation). Epistemic practices are 'configurations of material and bodily activities (doings and sayings), forms of knowledge (rules, habits, projects or affections), and objects and artefacts (technologies and things)' (Bueger, 2014, p. 48). As such, it focuses as much on actors as it does on processes and their effects, which has the potential to complement the study of science diplomacy as boundary object in quite profound ways. The generational model and tool described by Bueger speaks to many aspects of the later generation of science diplomacy scholarship, by adding needed structure to our analysis of science diplomacy (as distinct from the structuring

of the phenomena themselves) while informing also the richer, integrated and more inclusive empirical analysis of the practice of science diplomacy.

Echoed by a range of contributions to this special issue, the limits between political space and that of the sciences have blended into each other beyond separation (Su and Mayer, Grimes, Leese, and Singh in this issue). Arguably, governance and government trends in many parts of the world are reflective of this hybridity and actively seeking greater integration between the two realms. Similarly, and as argued earlier, the connection between science and politics is of historic tradition, not least due to its co-constitutive character. Accordingly, for science diplomacy to appropriately capture this hybridity is imperative. Yet, even though the very term 'science diplomacy' signifies such fusion, the signified has no adequate means of neither addressing nor emphasising hybridity as it lacks focus and means to analyse those interactions that blend and blur the boundary in practice, especially when conceived of as international practice. Conversely, this suggests the need to understand the doing of science diplomacy in detail which leads us to detach the analysis from the scope and imperative of IR (again) to follow a line of enquiry that starts locally. Despite science diplomacy implying international reach, it is virtually impossible to understand the epistemic practices of the boundary work that is science diplomacy as truly international. Instead, we argue for a practice theory approach that begins its theorisation by analysing the (inter-)actions of scientist diplomats and diplomatic scientist, the experts.

Hence, we want to argue that the second generation takes a predominantly pragmatic approach by grounding science diplomacy theory in real-time not abstract practices requiring far less abstraction than the first generation approach. We propose further that a framework for science diplomacy should be 'characterised by empirical inquiries on the practises of relating science, politics, and other forms of knowledge, actors and practises to each other' (Bueger, 2014, p. 50). Despite the commonplace association of international and regional institutions, government departments and ministries, and/or influential nonstate entities as the actors of science diplomacy, we prioritise the view inscribed into the very term of science diplomacy which is to emphasise modes of interaction over the types of actors. Thus, science diplomacy is better conceived of as a relational and pragmatic concept instead of a 'tool' for the modern government because it

neither be 'employed' as such nor by just one actor only – whether individual, state or nonstate – neither between only higher-level actors (e.g. regional or international) without epistemic practices 'on the ground'. This viewpoint sketches science diplomacy as a multitude of networked, yet determinable knowledge practices across borders, such as researching and providing evidence, reporting, advising, (Bueger, 2015). These practices originate and are maintained at the level of the everyday and that of routine (conventionally micro), including settings such as research sites and labs, boardrooms, universities, conferences and summits that Bueger refers to as 'crucial nodal points' and 'major hosts of epistemic practices' (Bueger, 2015, p. 8). Together with libraries, online databases, transport and communications systems, these laboratories are part of local, regional and global epistemic infrastructure that enables, facilitates or prevents the practice of science diplomacy. Building on practice theory, we understand expertise as largely hybrid already and reject the ontological difference between science and politics, but argue that it could only ever be a practical difference. Thus, science diplomacy emerges out of and is maintained by practices of expertise, which are, therefore, the analytic anchor for the effective theorisation of science diplomacy.

Grounding in localised (micro-level) interactions allows for a richer analysis of science diplomacy, capturing glimpses ofits complexity due to three theoretical advantages introduced by a practice-based approach. First, it does not need the state to be actively involved. Epistemic practice emancipates science diplomacy from its image as state or nonstate dynamic, as merely an abstraction and representation of changing global order. Second, it does not need to start with a priori distinction between epistemic and diplomatic practice and, thus, allows for both to be analysed at equal measure, which is to take diplomacy seriously. Third, a practice approach makes the importance of individual and group actors, including their needs and interests, central to the second generation thinking in science diplomacy. In other words, it the concreteness of actors does not need to be subsumed or homogenised by the vacuous state or sub-/ nonstate actors for science diplomacy to work conceptually. Whether scientists, politicians, policy makers, practitioners or diplomats, reasons for entering cooperation – dialogue or communication, research, exchange, trade – are based on, for example, ideas, habits, dis/positions and traditions. These motivations and

modes of practice converge in their interaction with each other. It is argued that at the interactions of science diplomacy assume tangible, clear and applied meaning which here are understood as feeding back into the study of science diplomacy while advancing its practice where possible. Consequently, aligning with Mayer's rational for techno-politics (Mayer et al., 2014), science diplomacy can (indeed we think should) be mapped in much more detail, identifying key variables that structure, but also appreciate more aspects of its 'complexity', 'hybridity' and 'dynamism' of epistemic/diplomatic practices, tracing them as they become renegotiated, developed and renewed continuously for as long as science diplomacy refers indeed to the process of maintaining relations as well as their abstract, symbolic representation at the international level.

Conclusions

In this essay we set out to understand science diplomacy's intellectual grounding in order to push more explicitly towards an IR-oriented theorisation of this practice beyond its practitioner accounts or niche positioning. A more contextual reading of science diplomacy vis-a-vis IR, we have argued, can help with developing a framework of analysis that takes the dynamics of science and diplomacy seriously from theoretical points of view. As science diplomacy is primarily treated as a phenomenon of world politics, we began by analysing its main tenets as found in the emerging literature with reference to the key IR positions it subsequently inspired. Yet there are also some dangers in conceptualising science diplomacy with IR theory as the main reference point. Science diplomacy's historical, conceptual and practical diversity and hybridity do not allow for it to be analysed by conventional theories, IR and diplomacy, respectively, without losing analytic authenticity and practical strength. The limits imposed by an IR analysis remind us that science diplomacy needs to be understood as a much longer continuum and one that is inseparable from the intrinsic relation between epistemic practice and the emergence of international politics. With this caveat, we see this as an opportunity to reverse the currently ascribed causal connection between international relations and science diplomacy, where the latter is seen as a subsequent product of the developing international system. The historicity of the relation between science and diplomacy suggests science diplomacy is not

a symptomatic trend in IR, but much rather its enabling condition. Instead of science diplomacy as the encounter between science and international politics, science diplomacy might be more appropriately conceived of, as we have detailed here, as the practical alliance of epistemic and diplomatic practices. A better appreciation of this alliance can be structured through practice and negotiation theory at a micro-level, taking a closer, more systematic and yet still scholarly look at the practical underpinnings of what makes up for 'science diplomacy' today as much as historically. The analytic value in taking science primarily as practice rather than institution, and in taking a similar approach to diplomacy, open up a chance to understand relationships as not restricted to traditional actors of IR often represented by 'light touch' theorizations of the science diplomacy canon. A framework for the inquiry of science diplomacy we suggest takes seriously both practices, scientific and diplomatic, made possible by ways of immanent critique before science diplomacy through a more substantial engagement with practice theory, negotiation and mediation theory, which also serves to complement the boundary work that science diplomacy implies. Mindful of the limitations of each, we have argued here for a combined pragmatic approach grounded in the empirical analysis of micro-level science diplomacy. This is a call for more work, and new work, in a field that, as other contributions to this special issue evidence, is ripe for greater scholarly engagement.

Notes

1. See for example Frank Smith's (2014) (non-normative) evaluation of the successes and failures of science diplomacy in Indonesia.

2. Cognisant of the difficulty to scale up practice theory to the international and the range of approaches seeking to do so, we suggest a more sustained engagement with international practice theory (IPT) as outlined by Bueger and Gadinger (2014).

3. This closely aligns with the ontology of techno-politics advanced by Mayer et al. (2014).

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