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Article

The Institutional Guarantee of the Human Right to Science

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ABSTRACT

This article identifies and specifies the institutional guarantee of Article 15(1)(b) of the International Covenant on Economic, Social and Cultural Rights' human right to science and, on that basis, argues for the consolidation of an international law of science. Its contribution may be described as threefold. First, it argues that science should be understood as a public and common good and, more specifically, as a public participatory good in a non-instrumental notion thereof. On that basis, second, the article argues for the collective dimension of the human right to science *qua* right to a participatory good, specifying what that dimension entails in terms of both individual (collective and personal) scientific rights and group or communal scientific rights. Finally, the article argues for the positive obligations of States to adopt norms of domestic and international law of science and the corresponding domestic and international law statutes of scientific institutions.

KEYWORDS: science, international law of science, human right to science, participatory public good, collective rights, institutional guarantee

1. INTRODUCTION

This article identifies and specifies the institutional guarantee of Article 15(1)(b) of the International Covenant on Economic, Social and Cultural Rights' (ICESCR) human right to science and, on that basis, argues for the consolidation of an international law of science. The term 'law of science' refers to the German legal tradition of *Wissenschaftsrecht,* in existence since the nineteenth century.[1] In short, it is the law that enables science to be not only constrained, but also guaranteed, instituted and hence protected as an autonomous social practice in the first place. Without this (heteronomous) guarantee of science by law, the autonomy of science from both the State and the market could not be warranted. The same applies vis-à-vis science itself, as confirmed by Max Weber[2]: scientific autonomy cannot and should not be self-validating, i.e. science cannot and should not determine its own ends and its autonomy needs to be instituted and protected from itself.

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1 See for example Trute, *Die Forschung zwischen grundrechtlicher Freiheit und staatlicher Institutionalisierung. Das Wissenschaftsrecht as Recht kooperativer Verwaltunsgvorgänge* (1994).

2 See Weber, 'Wissenschaft als Beruf', in Baier et al. (eds), *Max Weber Gesamtausgabe,* Vol I.17 (1992 [1917/1919]) 71.

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In the introduction to his seminal 1942 piece 'The Normative Structure of Science',[3] Robert Merton captured this need for a normative guarantee of science. He did so by contrasting the mounting public and private instrumentalization of science with the counter-reaction, in a pendulum movement, of self-validation on the part of scientists and by emphasizing the need to counter that opposition. It is that very consensus of the 1940s[4] on the need to break a recurring cycle first of reinforcement, then of predation of science by politics and economics and, in reaction, of self-validation by scientists that enabled the adoption of the first measures for the international protection of science and the emergence of an international law of science in the post-war period.

This started in 1948 with international human rights law placing both an ultimate international legal guarantee of science and an ultimate legal limit thereon. This occurred through the declaration by Article 27(1) of the Universal Declaration of Human Rights (UDHR) of the human right 'to share in scientific advancement and its benefits'.[5] Declaring the 'human right to science', as that right to participate in science is more commonly called today, amounted to the first universal declaration of a public, and therefore third-party or heteronomous, guarantee of science as a social institution distinct from the State. It made science an institution of public international law, thereby protecting science both from the State and the market and from itself and the self-validation of science by science.

Regrettably, this new human rights impetus for the consolidation of an international law of science was short-lived. The Cold War rapidly dashed the hopes raised by the human right to science for an international institutionalization of science.[6] Indeed, while guaranteeing the human right to science anew in 1966, and in a binding way this time, Article 15(1)(b) ICESCR also reformulated the right in a purely redistributive and individual form, as the mere right 'to enjoy the benefits of scientific progress and its applications'.[7] By abandoning the participatory and hence collective dimensions of the right expressed in Article 27(1) UDHR,[8] Article 15 ICESCR introduced two distinctions that had intentionally been left out of the right in 1948's *travaux préparatoires*: on the one hand, the misleading distinction between 'participation' in science (guaranteed separately from then on as scientific freedom under Article 15(3) ICESCR) and 'enjoyment of its benefits' under Article 15(1)(b) ICESCR and, on the other, the related but equally problematic distinction between 'scientists' as the seemingly exclusive holders of a right to participate in science and 'everyone else' whose only right would be to enjoy the benefits of science.

Deprived of its participatory and collective dimension, the human right to science became toothless. Without surprise, it was superseded by other more specialized human rights whose realization relies on the equal access to the benefits of science (such as the human right to health or to food). The right was put to sleep for nearly 40 years. As a result, the international law of science that should have been built around the human right to science in the immediate post-war period did not develop as planned. The law adopted during the Cold War and which still

[3] Merton, 'The Normative Structure of Science', in Storer (ed), *The Sociology of Science: Theoretical and Empirical Investigations* (1973 [1942]) 223.

[4] See Nowotny, 'The Changing Nature of Public Science', in Nowotny et al. (eds), *The Public Nature of Science under Assault. Politics, Market, Science and the Law* (2005) 1.

[5] Universal Declaration of Human Rights, GA Res 217A (III), 10 December 1948, A/810 at 71.

[6] For the detail, see Besson, 'The "Human Right to Science" qua Right to Participate in Science and Enjoy its Benefits. The Participatory Good of Science and its Human Rights Implications' (2024) 28 *International Journal of Human Rights* 497 at 499 and 502–3.

[7] International Covenant on Economic, Social and Cultural Rights 1966, 993 UNTS 3. See Saul, Kinley and Mowbray, 'Article 15: Cultural Rights', in *The International Covenant on Economic, Social and Cultural Rights: Commentary, Cases and Materials* (2014) 1175.

[8] 'Sharing in' in the English version of Article 27(1) UDHR, GA Res 217A (III), 10 December 1948, A/810 at 71, is rendered by 'participation' in other languages, such as French, Spanish or Russian: see Mancisidor, 'The Dawning of a Right', in Porsdam and Porsdam Mann (eds), *The Right to Science: Then and Now* (2021), 17 at 24.

applies to science today is, in fact, anything but what its name promises. Going back to the definition of the 'law of science' given earlier, it certainly does not (yet) guarantee, institute or protect science. It does constrain it (for example with respect to biomedical research or research on nuclear or chemical weapons). However, for the rest, it merely instrumentalizes science to different purposes (for example military or economic).[9]

Fortunately, things started to change around 15 years ago, thanks in particular to a revival effort of its participatory dimension at the United Nations (UN). As a result, the human right to science may soon be able to unfold its full potential.[10] The most important documents pertaining to the interpretation and fleshing out of Article 15(1)(b) ICESCR have been, besides the UN General Assembly 1974 Declaration[11] and the UN Educational, Scientific and Cultural Organization's (UNESCO) 1974/2017 Recommendation[12] and its 1999 and 2005 Declarations,[13] the following: UNESCO's 2009 Venice Statement,[14] the UN Special Rapporteur on Cultural Rights' (SRCR) 2012, 2014, 2015 and 2024 reports,[15] and the UN Committee on Economic, Social and Cultural Rights' (CESCR) 2020 General Comment No 25.[16]

The reasons for this renewed interest in a long forgotten human right lie in the contemporary situation of science. In many respects, it is reminiscent of the 1940s, only much more critical. Indeed, if the difficulties linked to the public and private instrumentalization of science and the reaction of scientific self-validation identified by Merton have been cyclical over the centuries, they are now not only magnified, but also globalized. This makes the need for international law and institutions of science even more pressing than it was after the second World War.

The present article seizes this juncture and what may be referred to as a new international 'institutional moment for science'. Provided Article 15(1)(b) ICESCR's human right to science

[9] For details, see Ruffert and Steinecke, *The Global Administrative Law of Science* (2011).

[10] For recent scholarly efforts in the same direction, see Besson, 'The "Human Right to Science"', supra n 6; Bidault, 'Considering the Right to Enjoy the Benefits of Scientific Progress and Its Applications As a Cultural Right: A Change in Perspective', in Porsdam and Porsdam Mann (eds), *The Right to Science: Then and Now* (2021) 140; Boggio, 'The Right to Participate In and Enjoy the Benefits of Scientific Progress and Its Applications: A Conceptual Map' (2021) 34 *New York International Law Review* 43; Porsdam Mann, Porsdam, and Donders, 'Sleeping Beauty: The Right to Science as a Global Ethical Discourse' (2020) 42 *Human Rights Quarterly* 332; Besson, 'Introduction/Mapping the Issues', Special issue on the Human Right to Science (2015) 4 *European Journal of Human Rights* 403; Riedel, 'Sleeping Beauty or Let Sleeping Dogs Lie? The Right of Everyone to Enjoy the Benefits of Scientific Progress and Its Applications (REBSPA)', in Hestermeyer et al. (eds), *Coexistence, Cooperation and Solidarity: Liber Amicorum Rüdiger Wolfrum* (2012) 503; Müller, 'Remarks on the Venice Statement on the Right to Enjoy the Benefits of Scientific Progress and Its Applications (Article 15(1)(b) ICESCR)' (2010) 10 *Human Rights Law Review* 765; Chapman, 'Towards an Understanding of the Right to Enjoy the Benefits of Scientific Progress and Its Applications' (2009) 8 *Journal of Human Rights* 1; Claude, 'Scientists' Rights and the Human Right to the Benefits of Science', in Chapman and Russell (eds), *Core Obligations: Building A Framework for Economic, Social and Cultural Rights* (2002) 247.

[11] Declaration on the Use of Scientific and Technological Progress in the Interests of Peace and for the Benefit of Mankind, GA Res 3384 (XXX), 10 November 1975, A/10034 at 86.

[12] UNESCO, Recommendation on Science and Scientific Researchers (1974 Revised Text), 13 November 2017, SHS/BIO/PI/2017/3.

[13] UNESCO, Declaration on Science and the Use of Scientific Knowledge, 18 August 1999, 30 C/15; UNESCO, Universal Declaration on Bioethics and Human Rights, 19 October 2005, SHS/EST/BIO/06/1, SHS.2006/WS/14.

[14] UNESCO, Venice Statement on the Rights to Enjoy the Benefits of Scientific Progress and its Applications (Article 15(1)(b) ICESCR), 16–17 July 2009, SHS/RSP/HRS-GED/2009/PI/H/1.

[15] United Nations Human Rights Council (UN HRC), Report of the Special Rapporteur in the field of cultural rights, Ms Farida Shaheed, on 'The Right to Enjoy the Benefits of Scientific Progress and its Applications', 14 May 2012, A/HRC/20/26; UN HRC, Report of the Special Rapporteur in the field of cultural rights, Ms Farida Shaheed, on 'Copyright Policy and the Right to Science and Culture', 24 December 2014, A/HRC/28/57; UN HRC, Report of the Special Rapporteur in the field of cultural rights, Ms Farida Shaheed, on 'Patent Policy and the Right to Culture and Science', 4 August 2015, A/HRC/70/279; UN HRC, Report of the Special Rapporteur in the field of cultural rights, Ms Alexandra Xanthaki, on 'Right to Participate in Science', 21 February 2024, A/HRC/55/44; UN HRC, Report of the Special Rapporteur in the field of education, Ms Farida Shaheed, on 'Academic Freedom', 25 April 2024, A/HRC/56/58.

[16] CESCR, General Comment No 25: Science and economic, social and cultural rights (Article 15(1)(b), (2), (3) and (4) ICESCR), 30 April 2020, E/C.12/GC/25. That comment closed the sequel initiated by the publication of two earlier general comments on the other two rights protected by Article 15(1) ICESCR: CESCR General Comment No 21: Right of everyone to take part in cultural life (Article 15(1)(a) ICESCR), 21 December 2009, E/C.12/GC/21; CESCR General Comment No 17: The right of everyone to benefit from the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he or she is the author (Article 15(1)(c) ICESCR), 12 January 2006, E/C.12/GC/17.

is interpreted properly as a 'human right to participate in science and its benefits', as various UN bodies and scholars including myself have argued it should,[17] and hence recovers its collective and institutional dimensions, current efforts at reanimating it could indeed relaunch the project of an international law of science. More specifically, and to support this interpretation of the human right to science, the article purports to identify and unpack the positive obligations to adopt domestic and international law of science and set up and organize the corresponding scientific institutions that States incur from the right, i.e. their positive obligations to guarantee, institute, protect and constrain science. These obligations may be referred to as the 'institutional guarantee' of the human right to science because they pertain to the institution of science as a social practice. This institutional guarantee complements the personal guarantee of the right. While all human rights come with a personal guarantee, rights that protect an interest in a relational and participatory good and social practice, such as religious freedom or the right to democracy, also encompass an institutional guarantee.

The proposed argument is gradual and three-pronged. In a first section, the article argues that science is best approached as a public participatory good (2.). The second section unpacks the collective dimensions of the human right to science that protects that participatory good, as a set of both individual and group rights (3.). In a third section, the article turns to the institutional guarantee of those collective (individual and group) scientific rights and specifies the various positive obligations of States to adopt an international law of science and to set up international institutions of science (4.). Interestingly, the three steps in the proposed argument, i.e. the institutional guarantee of the human right to science, along with the public participatory good it protects and the collective dimension of the right that follows, have all been mentioned by UNESCO, the SRCR and the CESCR in their recent efforts to reanimate Article 15(1)(b) ICESCR's right. However, as we will see, this has only been done in passing, sometimes even inconsistently, and, more importantly, no arguments have been provided. The present article hopes to fill those gaps and contribute thereby not only to strengthening existing efforts to revive the human right to participate in science and its benefits, but also to steer them in the right direction. To that purpose, three takeaway proposals will be made in the conclusion.

This leads to a final remark on method. The article makes an argument in legal human rights theory.[18] What it proposes indeed is an interpretation of the human right to science that fits the law (unlike purely ethical theories of human rights) and one that justifies/criticizes it from within (unlike purely political theories of human rights). This is particularly important as the treatment of the human right to science so far has been either doctrinal, and hence mostly descriptive of the existing law without a justificatory or critical aim,[19] or philosophical, and hence situated at a distance from human rights legal reasoning and with a limited ability to guide it.[20] Positioning itself at a middle point in the debate, the interpretation of the human right to science proposed in this article may be read as a third and novel kind of contribution to the existing specialized literature on the topic.

2. SCIENCE AS A PUBLIC PARTICIPATORY GOOD

The object of the human right to science is the interest or good protected by that right, in this case 'science'. Science is difficult to define. It is an essentially contestable concept, whose

[17] See Bidault, supra n 10; Besson, The 'Human Right to Science', supra n 6. This is also the gist of CESCR, General Comment No 25, supra n 16 at para 11; and Report of the SRCR, 21 February 2024, supra n 15.

[18] See Besson, 'Legal Human Rights Theory', in Lippert-Rasmussen, Brownlee, and Coady (eds), *A Companion to Applied Philosophy* (2016) 328.

[19] See for example Boggio and Romano, *The Human Right to Science. History, Development and Normative Content* (2024).

[20] See for example Massimi, 'A Human Rights Approach to Scientific Progress: The Deontic Framework', in Shan (ed), *New Philosophical Perspectives on Scientific Progress* (2023) 392.

contestability has been enhanced even more by its recognition as an international human right in 1948. It is indeed part of the point of having a human right to science to have to discuss what 'good' science should amount to, just as the human right to democracy or culture fosters reasonable disagreement about democracy or culture.

Importantly, however, contestability does not mean that 'science' *qua* object of the human right to science is entirely indeterminate. On the contrary, its scope and meaning should and may be identified and specified from the minimal converging practice of States on the right to science, and consolidated through UN bodies' interpretations thereof. Moreover, two constraints on its scope and meaning stem from its being guaranteed as a human right, i.e. as being constitutive of the fundamental equal status of all human persons. Human rights are a sub-group of universal moral rights that protect the fundamental (and therefore universal) and general (and therefore equal) interests of the human person.[21] When applied to the human right to science, those two constraints have the following implications: first, the universality of the protected good or interest of science: its being protected by a human right implies that it should be universal enough to encompass diverse forms of science, without being uniform; and, second, its generality: its being protected by a human right implies that science should be open to all equally in terms of access and participation, albeit in different capacities and without diluting expertise and scientific authority.

Minimally then, and this corresponds by and large to the UN bodies' consolidation of the practice of States so far,[22] science may be defined as, on the one hand, any body of knowledge (applied or not) of which there are many diverse forms and, on the other hand, and without being able to separate the process from its outcome, the social practice by which that body of knowledge is constantly acquired and consolidated over time and space. To be considered scientific, moreover, this body of knowledge should be *reliable*, so that it can benefit from (epistemic) authority in the given scientific community, and thus be distinguished from charlatanism or pseudo-science. It should also—and this is no contradiction with its reliability—remain *contestable*, so as to be distinguished from purely dogmatic or religious knowledge whose authority rests solely on tradition.

This section takes a further step and is devoted to clarifying what this universal and equal 'good' of science *qua* object of a human right should consist of. Science should be considered, it argues, as a 'public good' (A.) and, more specifically, as a 'participatory' public good (B.).

A. Science as a Public Good

The term 'public good' refers to a good whose inherent value lies in its collective or social dimension, and hence in the fact that it is the good of a collective. One also speaks of 'social' or 'collective' goods. Of course, some public goods can be of value or interest to just one individual at a time. However, their quality as public goods lies in the fact that they amount to more than the sum of these individual interests in that good. In this sense, science can be described as a public good. It is in our collective interest to acquire and consolidate knowledge. It is the collective interest of scientists in their different scientific communities, i.e. of those who make a profession or 'vocation' out of their participation in scientific practice.[23] More broadly, it is also in the collective interest of us all. And this collective interest in science exceeds the sum of individual interests. One may enjoy some of the benefits of science individually, or even carry out some scientific research individually. However, like culture, science only has value because it is appreciated and pursued by others in parallel and sometimes together.

[21] See Besson, 'The Egalitarian Dimension of Human Rights', Beiheft 136 (2013) *Archiv für Sozial- und Rechtsphilosophie* 19.

[22] See Report of the SRCR, 21 February 2024, supra n 15 at paras 22 ff; CESCR, General Comment No 25, supra n 16 at paras 4 and 5; UNESCO, Recommendation on Science and Scientific Researchers, supra n 12 at paras 1 a), i) and ii).

[23] See Weber, supra n 2.

Some public goods can also be considered 'common' or 'communal' goods. Their specificity lies in the fact that they are not only in the collective interest of a group, but also a common responsibility of that group, thereby also turning that group into a 'community' *stricto sensu*. This is what the Latin *munus* for 'responsibility' or 'burden' in the term *com-munis* refers to. This is also the case of science: participating in science and its benefits is not only in the interest of all the members of a given scientific community or of all of us, but also a responsibility of each and every member of that community and, more generally, of the public community. This is what Paul Ricoeur called our shared 'responsibility towards knowledge'.[24] It is also how we may understand the various scientific responsibilities that make up the scientific ethos, including so-called 'integrity' in scientific ethics.

There is an important reason to prefer the term 'public' over the terms 'collective' or 'social' when referring to those goods. The term 'public' links the collective dimension of these goods to the institution of each 'people' (whose goods they are) into a 'public' by law, and hence to the institutional and legal identification of the goods of this people instituted as public. Of course, some collective goods can be considered collective independently of or, at least, prior to their legal recognition, such as health or peace. Other collective goods, however, cannot pre-exist their public legal recognition and hence their public institution as public goods. This is clearly the case of participatory goods like science, as I will explain next: the participatory dimension of the practices in question requires cooperation and organization, and therefore a form of public institutionalization and legalization.[25] This is even more so for participatory goods that are also common goods, like science, i.e. goods that entail a common responsibility on the part of those involved in the practice. Indeed, such a common responsibility requires public institutional and legal mediation to specify and allocate responsibilities within the scientific community.

Depending on the level of institutionalization and legalization of a given public good, that good can be considered national, regional or even international. One should prefer the term 'international' public good to 'global' or 'universal' public good. The term 'international' indeed includes a reference to the many peoples of international law, and therefore emphasizes the many 'publics' that institute and reinstitute these goods as international goods. One may also refer to them as 'interpublic' goods, as a result.[26] This multiple reiterative institutionalization of interpublic goods is particularly important in the case of a participatory good such as science, which brings together members of different scientific communities that intersect across time and space[27] and whose communities are instituted under different legal frameworks for the organization of science. It is not only in our collective interest to institute the international public good of science as such, but also our common responsibility to cooperate to do so. I will revert to the positive obligations to institute science internationally drawn from the human right to science in the fourth section.

Last but not least, the conception of 'public goods' (including 'common goods') proposed here differs from that of economists.[28] It is easy indeed to see how problematic such an understanding of public goods can be when applied to goods protected by human rights, and in particular by the human right to science. To consider science as a public good in the economic sense would treat it, and its benefits, as an instrument in the service of private interests, on the one hand, and as a resource or commodity to be produced, or even as an end product, on the other. More importantly, it would exempt the good of science from having to be guaranteed

[24] See Ricoeur, 'Préface', in Drèze and Debelle (eds), *Conceptions de l'université* (1969) 13.
[25] This is also how one may understand the publicness of science in Kitcher, *Science in a Democratic Society* (2011).
[26] On the term 'interpublic', see Kingsbury, 'International Law as Inter-Public Law', in Richardson and Williams (eds), *Moral Universalism and Pluralism: Nomos XLIX* (2009) 167.
[27] See Massimi, 'Chapter 11: Multiculturalism and Cosmopolitanism in science', in *Perspectival Realism* (2022) 332.
[28] See for example Kaul et al. (eds), *Providing Global Public Goods: Managing Globalization* (2003).

publicly at law before it can even be considered a public good and, to that extent, it would circumvent the legal and institutional dimension of science.

B. Science as a Participatory Good

What distinguishes 'participatory' goods from other public goods is that their collective value lies in participation in a social or collective practice. They are also referred to as 'interactional' or 'relational' goods.[29] To quote Denise Réaume, participatory goods 'involve activities that not only require many in order to produce the good, but are valuable only because of the joint involvement of many. The publicity of production itself is part of what is valued—the good is the participation.'[30] Admittedly, there may be cases where the individual contribution to and even the individual enjoyment of a participatory good is possible. However, these cases of 'diffuse' individual contribution and 'diffuse' individual enjoyment are not paradigmatic of the good. Indeed, its individual contribution and enjoyment merely derives from the primary contribution and enjoyment of the good that remain participatory. Thus, while individuals may contribute to and enjoy participatory goods, the latter may not strictly speaking be contributed to and enjoyed solely individually.[31]

There are two arguments in favour of this participatory approach to science: the cultural dimension of science and its epistemic dimension.

Firstly, science is a specific *cultural* practice. This is confirmed by the guarantee of the human right to participate in science as a cultural right under Article 27 UDHR and Article 15 ICESCR. If culture is to be considered participatory, then science should be too. To quote Réaume again, 'sharing cultural experiences is the important part of the benefit of having them'.[32] The participatory dimension of culture reflects the conditions of cultural creation and the possibility of actively contributing to the symbolic creation of our lives together. Those participatory conditions are also typical of scientific creation, as confirmed by the SRCR and the CESCR.[33] Of course, the cultural dimension of science does not mean that everything cultural can also be considered epistemic and hence scientific. This is where the criteria of reliability and contestability of science mentioned before come in. Importantly, however, there are many ways for a scientific practice to be reliable and contestable, precisely because the acquisition of knowledge may be culturally and historically situated in different ways. This issue of the diverse cultural and historical and, by extension, legal forms of sciences is particularly sensitive when the knowledge in question is referred to as 'indigenous' in relation to the peoples whose knowledge it is.[34] Indeed, probably because it is collective and participatory—and thereby goes against a prevalent, albeit ill-considered European-origined individualistic, a-cultural and a-historical conception of science—the epistemic practice in question is often downgraded from scientific to 'cultural' and the corresponding knowledge from scientific to 'folk' knowledge. In turn, this may explain why the 'dialogue' between these different forms of knowledge is sometimes reduced to an 'intercultural' dialogue,[35] instead of being approached as the kind

[29] See Brownlee, 'The Right to Participate in the Life of the Society', in Brownlee, Jenkins, and Neal (eds), *Being Social. A Philosophy of Social Human Rights* (2022) 71.

[30] See Réaume, 'Individuals, Groups, and Rights to Public Goods' (1988) 38 *University of Toronto Law Journal* 1 at 10. See also Waldron, 'Can Communal Goods Be Human Rights?' (1987) 28 *European Journal of Sociology* 296.

[31] See Réaume, ibid. at 11.

[32] See Réaume, ibid. at 11.

[33] See Report of the SRCR, 21 February 2024, supra n 15 at para 19; CESCR, General Comment No 25, supra n 16 at para 10.

[34] See Article 31 Declaration on the Rights of Indigenous Peoples, GA Res 61/295, 13 September 2007, A/61/49 (Vol. III). See da Cunha, *Savoirs autochtones: quelle nature, quels apports?* (2012) at 7.

[35] See CESCR, General Comment No 25, supra n 16 at paras 39–40.

of scientific cooperation States have a (human rights-based) obligation to organize[36] and that is embedded in a universal scientific endeavour interlacing many scientific communities.[37]

The second argument in favour of the participatory dimension of science as a public good is precisely that science is an *epistemic* cultural practice. As such, it requires the existence of a scientific community within which knowledge can be acquired and consolidated, then re-acquired and re-consolidated through constant contestation. To this extent, scientific knowledge is based on participation in this community and cannot be separated from it. This is of course evident when scientific research is carried out jointly, as in the natural sciences. However, it applies to all forms of scientific inquiry that can also be pursued individually, for example in history or beekeeping, but which only constitute scientific research if they are also carried out by others in parallel. Recent studies in the philosophy of sciences actually confirm that the acquisition and consolidation of scientific knowledge should not be seen as the product of an isolated individual working alone, but of a scientific community as a whole. Or, more precisely: of several scientific communities across time and space, since knowledge is and should be contested and consolidated through cross-fertilization between different forms of knowledge and therefore between scientific communities.[38] This interactional or participatory dimension of the fabric of science actually corresponds to two of the four dimensions of the pre-war 'normative structure' and 'ethos' of science captured, for instance, by Merton and which has since been referred to as 'CUDOS' (for 'communism', 'universalism', 'disinterestedness' and 'organized skepticism'): 'communism', and the requirement of scientific collaboration taking place publicly; and 'organized skepticism', and the interactional scientific contestability it requires.[39]

In fact, science should be understood as a participatory good through and through, whether it is a matter of contributing to the scientific practice or enjoying its benefits later on. To quote Réaume again, 'there is no end product because, in a sense, [participatory goods] are never completed, but are continuously reinterpreted and re-created by each generation.'[40] This is also why scientific knowledge is not a 'finished product': it is continually developed and consolidated. It would therefore be artificial to contrast scientific practice, which is a continuous process, with its results or benefits. And the same applies, by extension, to the misleading opposition mentioned earlier between the active and therefore collective participation of scientists in any given scientific practice with the passive and therefore individual access of everyone else to its benefits.[41] This realization of the long arc of scientific knowledge was actually the thrust of René Cassin's proposal, during the UDHR's *travaux préparatoires* in 1948. He proposed indeed to add participation 'in scientific research' to participation 'in its benefits' to capture what should be approached as a single, continuous and open participatory practice and to enable everyone, not just scientists, to participate in both science and its benefits, albeit in different capacities.[42]

It was this very participatory dimension of the human right to science that was deactivated in the new formulation of the right in 1966, with all the consequences mentioned in this article's introduction. The time has come to vindicate the participatory dimension of the human right to

[36] See Besson, 'Science without Borders and the Boundaries of Human Rights—Who Owes the Human Right to Science?', Special issue on the Human Right to Science (2015) 4 *European Journal of Human Rights* 462; Achermann and Besson, 'International Cooperation under the Human Right to Science: What and Whose Duties?' (2023) 8 *Frontiers in Sociology* 1. See also Report of the SRCR, 21 February 2024, supra n 15 at paras 27–28.

[37] On that collaboration, see da Cunha, supra n 34 at 42; Massimi, supra n 27 at 332–68.

[38] See Harding, *Is Science Multicultural? Postcolonialisms, Feminisms, and Epistemologies* (1998); Massimi, supra n 27 at 115 and 124 ff.

[39] See Merton, supra n 3 at 273–74 and 277–78.

[40] See Réaume, supra n 30 at 11.

[41] See also CESCR, General Comment No 25, supra n 16 at para 9.

[42] See René Cassin in UN Economic and Social Council, Commission on Human Rights, Third Session. Summary Record of the Seventieth Meeting, 21 June 1948, E/CN.4/SR.70.

science again and to re-interpret it as the 'human right to participate in science and its benefits' by reference to its original 1948 expression. Just as the human right 'to democracy' is in fact a right 'to participate in democratic procedures',[43] the human right 'to science' should be approached as a right 'to participate in science'.[44]

3. THE HUMAN RIGHT TO PARTICIPATE IN SCIENCE AS A COLLECTIVE RIGHT

The question to address next pertains to the personal scope of the human right that science *qua* public participatory good could and should give rise to. This section focuses on clarifying the participatory and hence collective dimension of the cluster of so-called 'scientific rights', i.e. the different rights arising under the human right to participate in science. After explaining what the 'collective' dimension of the human right to participate in science consists in (A.), it argues for two categories of scientific rights: first, 'individual scientific rights', which are individual rights to be exercised primarily collectively and only exceptionally personally (B.); and, second, 'group scientific rights', which are scientific communities' rights as groups (C.).

A. From Science as Public Participatory Good to 'Collective' Scientific Rights

A preliminary terminological clarification is in order given the polysemy of the term 'collective' when referring to rights pertaining to public goods such as the participatory good of science. First, the term may be used with respect to three different objects: to oppose a collective to an individual 'interest' in a collective good; to oppose a collective to an individual 'right-holder'; and/or to oppose a collective to an individual 'duty-bearer'. Second, and more strictly, 'collective' may be used to mean either 'joint', as in a joint individual interest, right-holder or duty-bearer, or 'group' as in a group's interest, right-holder or duty-bearer.[45] In what follows, I will use the term 'group' rights to refer to the second type of collective rights, i.e. the rights of a group, and the term 'collective' rights *stricto sensu* to refer to individual rights to be exercised collectively in the first sense of joint individual rights. As to 'personal' rights, finally, they are understood as individual rights that may be exercised alone or personally, hence the adjective 'personal'.

For the reasons discussed in the previous section and that have to do with the public participatory good of science, I will argue that 'core scientific rights' should be seen as participatory and therefore primarily as 'collective scientific rights', i.e. as individual rights to be exercised collectively. Of course, as mentioned before, there may be diffuse benefits of science that can be enjoyed individually and without the immediate participation of others. And the same applies to the conduct of scientific research, which can sometimes be a solitary endeavour. Consequently, secondly, I will argue that one could derive non-participatory and hence 'personal scientific rights' from the core collective scientific rights. Those individual rights may only be considered as 'derivative scientific rights', however. Finally, the participatory and collective dimension of the good protected by scientific rights justifies recognizing the distinct value of scientific communities, which should therefore also be granted rights distinct from their members. I will refer to this third group of scientific rights as 'group scientific rights' or, even more aptly as they are rights of scientific communities, as 'communal scientific rights'.

[43] See Besson, 'The Human Right to Democracy in International Law. Coming to Moral Terms with an Equivocal Legal Practice', in von Arnauld, von der Decken, and Susi (eds), *The Cambridge Handbook of New Human Rights. Recognition, Novelty, Rhetoric* (2020) 481.

[44] See CESCR, General Comment No 25, supra n 16 at para 11; Report of the SRCR, 21 February 2024, supra n 15. See also Bidault, supra n 10.

[45] Jones, 'Group Rights', in Zalta and Nodelman (eds), *The Stanford Encyclopedia of Philosophy* (2022) available at: plato.stanford.edu/archives/fall2022/entries/rights-group/.

This opposition between core scientific rights that are collective (individual or even group) rights and derivative scientific rights that are personal rights corresponds to the distinction made, in German or French constitutional law in particular, between the 'institutional' guarantee of scientific rights and the 'personal' guarantee of these same rights.[46] Freedom of scientific research, for example, is a right that can be described both as a collective freedom of participation in science in its institutional guarantee and as a personal freedom in its personal guarantee. Moreover, it confers both collective and group rights by virtue of its institutional guarantee: freedom of research in this case can be invoked by individual members of research institutions together and by these research institutions themselves as groups.

The reference to the 'collective' dimension of certain human rights is not only a source of conceptual confusion, a confusion which I hope to have dissipated through this terminological clarification. It is sometimes also criticized on normative grounds, especially from the perspective of the methodological individualism that has long dominated international human rights law and its theorizing.

The first normative objection concerns *group scientific rights*. The fear is that protecting the rights of scientific communities could undermine the (personal and collective) individual rights of the members of these communities, such as those of researchers within research institutions.[47] This is a version of the well-established individualist critique of group rights. This critique considers that group rights can at the most be justified in an instrumental way, as rights derived from the rights of group members. As a result, group rights should be approached only as an aggregation of individual rights, and not as human rights. Moreover, they should be made conditional on a duty of the group not to jeopardize the (personal or collective) individual rights of their members.

Generally, and like others, I do not share this conception of (human) rights. That conception is even more problematic in the case of science, actually. Indeed, the recognition of our collective interest in the social practices of science implies recognizing the inherent value of the scientific communities that make those scientific practices possible in the first place, especially through their self-regulation and self-organization. This is not to deny, however, that scientific communities' group rights typically do and should come with responsibilities that constrain their rights. Those scientific responsibilities stem, as I argued in the previous section, from the communal dimension of the good protected by the right and the scientific ethos. Moreover, as I will argue in the next section, they should actually also be specified as legal responsibilities of those scientific communities for the human right to participate in science itself. Finally, in the event of conflict, both the personal and collective individual scientific rights of members of those scientific communities should take precedence over the group scientific rights of the communities.

The second objection pertains to *collective scientific rights*. Those rights are, as explained before, individual rights to be exercised collectively and not personally. The objection pertains to the burden that such a conception of scientific rights imposes on individual scientific rightholders who may not wish to take part in the scientific practice. According to Réaume's discussion of the objection, 'in order to achieve [a scientific society], for example, it is necessary that there be many who take an active and genuine interest [in science], among other things. Everyone need not participate, but a substantial number must'.[48]

[46] See Grimm, Möllers, Zechlin, and Schimank, *Wissenschaftsfreiheit in Deutschland. Drei Rechtswissenschaftliche Perspektiven,* Wissenschaftspolitik im Dialog, Berlin-Brandenburgischen Akademie der Wissenschaften (2021); Beaud, *Le savoir en danger. Menaces sur la liberté académique* (2021) at 37–42.

[47] For a full discussion, see Waldron, 'The Dignity of Groups' (2008) *Acta Juridica* 66.

[48] See Réaume, supra n 30 at 13.

In response, let me first emphasize that the obligations arising from the human right to science are institutional, and not individual.[49] This is a difference therefore between the present (legal) argument and Réaume's purely moral argument: international human rights obligations only bind public institutions such as States and not individuals. Indeed, it is the point of institutional mediation to channel the obligations owed under the human right to science. States should make sure therefore that the collective burden of those duties is equally shared by individuals through their institutions. Moreover, the institutional obligation of States to organize science and ensure open and equal participation therein does not imply coercing anyone to take part. It is sufficient that a minimal protection of any given scientific practice is ensured, for instance, through taxes and public subsidies to that scientific practice. Finally, in any case, the individual right to participate in science also implies protection of the right not to participate.[50] True, in case of conflict, as we will see, collective scientific rights, i.e. individual scientific rights exercised collectively, should take precedence over personal scientific rights. As a result, it should be up to the members of a given scientific community to decide collectively on the pursuit of a minority scientific practice and on its modalities (for example a committee of professors deciding collectively not to maintain a chair in Roman law against the right of individual professors). Importantly, however, those rights should be exercised within the constraints of the public and social law of science and of the good self-regulation of science, as I will explain in the fourth section.

B. (Collective and Personal) Individual Scientific Rights

The first step in the proposed interpretation of the personal scope of the human right to science is to distinguish between 'core scientific rights' that are collective rights, i.e. individual rights to be exercised collectively, and 'derivative scientific rights' that are personal and may be exercised alone, but only derivately so.

First, the *core rights* to participate in science and its benefits are *collective rights*. Indeed, as argued before, a participatory good like science may not be enjoyed individually. Those collective scientific rights are individual rights, however: they are only collective to the extent that they are held together and need to be exercised together with others for the participation in the scientific practice and the enjoyment of its benefits to be effective.[51] Other examples of such collective rights in international human rights law are the individual right to democratic participation or, even more pertinent here, the individual right to take part in cultural life.

The right-holders of those collective scientific rights include scientists, of course, but also all the other members of the overlapping smaller and larger scientific communities constitutive of each public and across publics. In terms of content, the core participatory scientific rights give rise to both negative and positive duties and to duties to respect, protect and fulfil. They may include claim-rights, of course, but also freedom-rights. As example of the former, one may mention the right to open access to scientific results.[52] As to the latter, the best example is scientific freedom as guaranteed expressly by Article 15(3) ICESCR. Both are collective rights, however, to the extent that they are held and exercised jointly with others.

Importantly, participation in scientific practice, while indeed open to all as an equal human right, does not have to take place in the same capacity.[53] The equal right to participate does

[49] See Besson, 'The Bearers of Human Rights Duties and Responsibilities for Human Rights—A Quiet (R)Evolution' (2015) 32 *Social Philosophy and Policy* 244.

[50] See also Report of the SRCR, 21 February 2024, supra n 15 at paras 60–63.

[51] See also UNESCO, Recommendation on Science and Scientific Researchers, supra n 12 at para 1; UNESCO, Venice Statement, supra n 14 at para 12(e); Chapman, supra n 10.

[52] See for example UNESCO, Recommendation on Open Science, 23 November 2021, SC-PCB-SPP/2021/OS/UROS.

[53] See Report of the SRCR, 21 February 2024, supra n 15 at para 21; CESCR, General Comment No 25, supra n 16 at paras 4–5.

not, therefore, imply a right to participate 'as a scientist'. In fact, maintaining the arc between the scientists and the other 'knowers' open in the scientific practice can be seen as an essential dimension of the contestability of science.[54] Actually, this productive tension between the equal right to participate in a practice and the different statuses of participants in that practice is familiar in the context of other human rights that relate to social practices, such as democratic politics for instance. In those cases as well, the organizational autonomy of the community is protected as a human right, even when it is exclusive. This is because it contributes to the authority of the practice, whether that authority is epistemic as in science or political in a democracy. For example, the right to participate in democratic life includes an equal right to stand for election, but no right to be elected. In science, members of the scientific community in question and participants in scientific practice as an autonomous social practice have the right to organize access in such a way as to ensure the reliability and authority of this epistemic practice, including by requiring qualifications from their members.[55] As a matter of fact, it is even a collective right of its members to be able to do so, a right that is protected by the human right to participate in science. Of course, access to the scientific profession should always remain open and non-discriminatory, and this equal access to scientific training is also protected by the right to education.

Secondly, one should also mention the *derivative rights* to access and participate in science and its benefits which are individual rights to be exercised personally and may therefore be qualified as *personal rights*. They include, for instance, the right to access the scientific practice and enjoy its benefits, on the one hand, and the right to do so equally and without discrimination, on the other. Again, the right-holders include scientists, of course, but also all the other members of the public.

Those personal scientific rights are considered derivative because they derive from the existence of the participatory good of science itself and hence from the collective scientific rights that good gives rise to. Just as cases of 'diffuse' individual contribution to science and individual enjoyment of its benefits are not paradigmatic of the good of science that is participatory,[56] personal scientific rights are not paradigmatic scientific rights. They may only be effectively protected if the corresponding collective ones are protected and hence if they contribute to the latter's protection. In other words, they are instrumental to collective core scientific rights. This has various practical consequences. Starting with the justifications of restrictions to scientific rights, it implies that those justifications may not be person- specific only and have to take into account the personal rights of others in the collective exercise of those rights. Academic freedom may not be waived individually, for instance, and without due respect for the consequences on other researchers' academic freedom in a given scientific community. Another implication pertains to the resolution of conflicts between personal and collective rights themselves. As mentioned earlier, collective scientific rights should take precedence over personal scientific rights. Both types of individual scientific rights should, however, take priority of the group rights of scientific communities, and the time has come to turn to those.

C. Group Scientific Rights

As argued before, by virtue of their distinct value, scientific communities themselves may also be regarded as holders of scientific rights. Those rights should therefore also be considered as 'group' or 'communal' scientific rights and this is the second tier of the proposed interpretation of the personal scope of the human right to science.

[54] See Merton, supra n 3 at 273–74 and 277–78.
[55] See also Polanyi, 'The Republic of Science: Its Political and Economic Theory' (1962) 1 *Minerva* 54.
[56] See Réaume, supra n 30 at 10.

For a scientific community to be recognized as such, it should be organized for a scientific purpose, and therefore in such a way as to enable the acquisition and consolidation of reliable and contestable knowledge. These may be scientific institutions of the kind that have become dominant nowadays, such as universities or academies. However, they may also encompass other kinds of scientific communities, such as those encountered in the acquisition of local or indigenous knowledge such as beekeepers' associations or indigenous peoples.[57] They can be general or focused on specific types of knowledge, such as medicine, navigation or beekeeping.

These communities and their knowledge production should be instituted and organized as such by law. Importantly, however, and as mentioned earlier, there are many ways for a scientific practice to be reliable and contestable, precisely because the acquisition of knowledge may be culturally and historically situated in different ways. This is why, over the course of time, each scientific community may develop its own set of scientific norms and institutions, including its own laws of science.[58] Minimal requirements and constraints placed by the human right to science on those laws and institutions of science, however, shall be discussed as part of the institutional guarantee of the right in the next section. I will explain, in particular, why group or communal scientific rights cannot be granted to scientific communities entirely organized under private law. This excludes private companies or corporations developing privately organized research and development programs, for instance.

4. TOWARDS THE INTERNATIONAL LAW AND INSTITUTIONS OF SCIENCE

The third step in the argument amounts to fleshing out the institutional guarantee of those collective (individual and group) scientific rights and the content of the corresponding obligations. After explaining the institutional guarantee in general (A.), this section specifies the correlative positive obligations of States to adopt a (domestic and international) law of science (B.) and to set up (domestic and international) institutions of science (C.). Of course, the separation between law and institutions of science is artificial as both come together.[59]

A. The Institutional Guarantee of the Human Right to Science in General

As mentioned before, the institutional guarantee of the human right to participate in science complements the personal guarantee of the right.

In short, it is the guarantee of the 'good self-regulation' and, it is related, of the 'good self-government' of science. Indeed, as a right that relates to a participatory public good and, more precisely, to a normative social practice, its institutional guarantee implies the right to the autonomy or self-regulation of science, on the one hand. It also implies a right to the self-government of scientific communities, on the other. As a result, States' correlative positive obligations to fulfil the human right to science include guaranteeing the autonomy or self-regulation of science through the adoption of a heteronomous public law of science, on the one hand, and guaranteeing the self-government of scientific communities through the establishment of a public institutional framework for science that enables the social organization of science, on the other.

Two remarks are in order about those positive obligations. First, they are human rights obligations, and therefore minimal obligations, whose further content should be specified by States in context and may therefore vary. What this means is that, over and above the minimal

[57] See Report of the SRCR, 21 February 2024, supra n 15 at paras 41–42.

[58] See Lévi-Strauss, *La Pensée sauvage* (1962).

[59] See Besson, *Reconstructing the International Institutional Order*, Inaugural Lectures of the Collège de France (2021) available at: books.openedition.org/cdf/12335.

core duties identified from the convergent practice of States, each State can and should organize sciences legally and institutionally in the way that best suits the scientific practices in question. Second, these positive obligations to realize the human right to participate in science through law and institutions do not only apply in the domestic legal order of each State, but also, in a complementary way, in their international relations. The latter correspond to what is meant here by 'international law of science' and 'international institutions of science'. Indeed, if States have an obligation under the human right to participate in science to adopt an international law of science and to set up international science institutions, it is on the basis of an obligation which is specific to the human right to participate in science: the obligation of international cooperation in scientific matters under Article 15(4) ICESCR.

The binding nature of international scientific cooperation may be grounded specifically in the collective dimension of the obligations correlative to the human right to participate in science. As I argued elsewhere,[60] indeed, the justification for the collective and therefore cooperative dimension of those obligations is twofold. First, as a right pertaining to a practice whose scope may be universal, the human right to participate in science can only be effectively protected if all its duty-bearers in the world, i.e. States, cooperate to specify, allocate and fulfil jointly the obligations they owe separately to the persons under their respective jurisdiction. The latter, indeed, should be able to interact and cooperate in transnational scientific practices. Second, the collective nature of those obligations is also a condition for the feasibility of the protection of science against standard threats thereto for those have become transnational. One may think here of the intervention of another State in a given State's domestic scientific policy through investment or development incentives, but also of the involvement of transnational private corporations in research, both types of public and private threats on science now being transnational in scale.

This obligation of international scientific cooperation complements, for implementation purposes, all obligations that arise under the three main types of rights corresponding to the human right to participate in science: the right to access and participate in the scientific practice, the right to access and participate in the benefits of science, and the right to be protected from the negative effects (or, by opposition to benefits, 'misfits') of science.[61] By extension, this obligation of international cooperation also applies to the legal and institutional dimension of the human right to participate in science, which should be cooperative: all States should cooperate in establishing an international legal and institutional framework for science.[62] This is important to emphasize, as this cooperative dimension clearly distinguishes the international institutional dimension of the human right to participate in science from that of other human rights.

Interestingly, the idea of an international institutionalization of science is not new in the philosophy and history of sciences. It can be traced back to the humanist ideal of a 'universal republic of sciences'. This ideal developed with modern European science and strived during three centuries, from the Renaissance to the Enlightenment.[63] In short, proponents of the ideal approached the world's scientific community as an instituted body of equal citizens bound by various republican principles such as equality or integrity. Admittedly, the ideal had little to do with an actual legal and institutional order of science. Nevertheless, the idea of a universal republic of sciences captured three dimensions of the institutional guarantee of human right to science this article is aiming to unpack: first of all, the institution of the public good of

[60] See Besson, supra n 36; Achermann and Besson, supra n 36. See also Müller, supra n 10 at 779–83; Chapman, supra n 10 at 24–7 and 29–31.

[61] See Besson, The 'Human Right to Science', supra n 6.

[62] See for example CESCR, General Comment No 25, supra n 16 at para 77. For an earlier reference to the 'need to strengthen international cooperation', see Report of the SRCR, 14 May 2012, supra n 15 at para 67.

[63] See Bots and Waquet, *La République des lettres* (1997) at 67–8.

science by a public law of science, in the strict sense of the law that institutes the *res publica* as a 'republic'—the term 'republic' in the 'universal republic of sciences' thus reflects a republican reading of science as a 'public good' in the instituto-normative sense of the term presented earlier[64]; second, a public institution of science that is international and therefore potentially 'universal'—the term 'universal' in the 'universal republic of sciences' reflects our interest in guaranteeing, instituting, protecting and constraining scientific enterprises as endeavours that may be shared on a global scale through interactions across both time and space; and, finally, an international public institution of 'sciences' in all their scientific diversity—the term 'sciences' in the plural in the 'universal republic of sciences' reflects our interest in preserving the multiplicity of scientific practices and their intersections in spite or, maybe, because of the universal scope of the scientific endeavour.

There are two objections one may think of to these three dimensions of the proposed republican and universal institution of the public good of sciences and, by extension, of the proposed international law of sciences. First, 'republic . . . '. The universal republic of science of the renewed international law of science should not be identified with a 'world government' or 'world State' of science. Criticism of the government of science has been legitimately opposed to the international *law* of science from the very beginning. However, and as argued earlier, the legal and therefore heteronomous guarantee of science is a condition of its autonomy. Above all, this legal and heteronomous guarantee does not equate with assigning objectives and content to science and hence with scientific legalism. The negative ends or limits that the law places on science do not imply imposing positive objectives or a direction on scientific progress.

Second, '. . . universal . . . '. The universal republic of science of the revived international law of science should be universal without being uniform. Criticism of standardization has long been levelled at the *international* law of science. And rightly so, since modern European international law *qua* natural law of peoples and modern European science *qua* laws of nature developed hand in hand with the same normative and universal project[65]: that of a single, a-historical and a-cultural science and of a single, a-historical and a-cultural international law. The universality of international law, including the proposed international law of science, may therefore be suspected of aiming to re-entrench what has become the indisputable dogma of 'Science' in the singular and with a capital S, and thereby pursue the enterprise of absorbing or else disqualifying local or indigenous knowledge.[66] Fortunately, we now know that universality in the normative context does not necessarily imply unity or uniformity, even less the rejection of cultural plurality and history. On the contrary, universality can and should be built in context, alongside a common undertaking to compare the different normative structures of both science and law and to universalize common minima when such minima can be identified and be converged upon. One should emphasize, moreover, that the universal republic of 'sciences' instituted by international law refers to sciences in the plural and is therefore scientifically diverse. Every time this article refers to 'science' in the singular, out of coherence with Article 15(1)(b) ICESCR's language, it should therefore be read to mean 'sciences' in the plural.

B. The National and International Law of Science

The interpretation of the human right to participate in science as a public, participatory and communal good proposed in this article has three implications for the kind of national and

[64] On this conception, see Besson, 'The International Public: A Farewell to Functions in International Law' (2021) 115 *American Journal of International Law Unbound* 307; Besson, 'What can Public International Law do against Privatisation?' (2024) 15(4) *Transnational Legal Theory* 1-29.

[65] See Daston and Stolleis, 'Introduction: Nature, Law and Natural Law in Early Modern Europe', in Daston and Stolleis (eds), *Natural Law and Laws of Nature in Early Modern Europe: Jurisprudence, Theology, Moral and Natural Philosophy* (2008) 1.

[66] For this critique, see Harding, supra n 38.

international law of science States should adopt. Firstly, recognizing science as a public good requires the adoption of a constitutional law of science, in order to institute the good of science as a public or interpublic good and guarantee the autonomy of science (i). Secondly, its recognition as a participatory public good requires a legal framework for science that is also capable of enhancing scientific communities' right to self-regulation: this is what we might call the social law of science (ii). Thirdly and finally, the recognition of science as a communal public good requires that legal responsibilities be imposed on participants in the scientific practice and on their scientific communities: this is what we might call the law of good self-regulation of science (iii).

All three layers of the domestic and international law of science are required for the full guarantee, institution, protection and constraint of science. They should be approached as the successive layers of petals in a rose flower: there is no flower without them, but they each play a different role in composing it.

(i) The national and international constitutional law of science

Recognizing science as a public good requires, first and foremost, the adoption of a national and international constitutional law of sciences, that is to say of a form of higher public law of the State and between States. Indeed, only that kind of higher public law is capable of guaranteeing the autonomy of science vis-à-vis the State(s). Moreover, only such higher public law is capable of identifying and specifying the good of science into a public good of the people, the people which this same public law actually institutes, or into an interpublic good of all the peoples that public international law reinstitutes as publics on the international plane.[67] Of course, this higher public law of science does not have to be 'constitutional' by name. Nor does it have to be written law either. To that extent, it should not be identified with the constitutional law of the domestic constitutional States we know of. Nor, for the reasons given earlier, should it be conflated with the international constitutional law of a single world constituent power constituting a world State.[68] Minimally, however, all States are and should be instituted by a form of public law, as a requirement of the international rule of law,[69] and it is that higher public institutional law of State(s) that is at stake here. In terms of content, this national and international constitutional law of science should, of course, include a guarantee of the human right to participate in science itself, in both its personal and institutional dimensions. In particular, this means that national constitutional law, when it exists, should go further than simply guaranteeing the freedom of scientific research or academic freedom as it is mostly done currently.[70] Other elements should also be guaranteed constitutionally, such as the minimal public-law statute of scientific institutions and independent and sufficient public funding.[71]

At the international level, the obligation to adopt a minimum constitutional law on science rules out the possibility for States to resort exclusively to soft law when developing the international law of science. This requirement actually goes against a trend to the extent that the

[67] See Besson, The International Public, supra n 64.

[68] For a critique of the 'constitutionalist' reading of international law, see Besson, 'Whose Constitution(s)? International Law, Constitutionalism and Democracy', in Dunoff and Trachtman (eds), *Ruling the World? Constitutionalism, International Law and Global Governance* (2009) 381; Besson, 'We the Peoples of the United Nations—From Single Separate Instituent Powers to Multiple Nested Instituted Publics', in Niesen, Patberg and Rubinelli (eds), *The Oxford Handbook of Constituent Power* (2025) forthcoming.

[69] See Besson, What can Public International Law do against Privatisation, supra n 64, by reference to Waldron, 'Public Rule of Law' (2014) *NYU School of Law, Public Law Research Paper No 14–41*; Mégret, 'Are There "Inherently Sovereign Functions" in International Law?' (2021) 115 *American Journal of International Law* 452.

[70] See for example Article 20 (Liberté de la science) Swiss Constitution 1999, SR 101: 'La liberté de l'enseignement et de la recherche scientifiques est garantie'; Article 5(3) German Basic Law 1949, BGBl I p. 2478: 'Kunst und Wissenschaft, Forschung und Lehre sind frei. Die Freiheit der Lehre entbindet nicht von der Treue zur Verfassung'; Article 23 Japanese Constitution 1946: 'Academic freedom is guaranteed'.

[71] See also Report of the SRCR, 21 February 2024, supra n 15 at para 74.

latter has been, sadly quite correctly, referred to as a 'global administrative law of science'.[72] Generally speaking, the term 'global administrative law' (GAL) is a placeholder for what has become of public international law in the last 20 years: a law that has softened, a law that is neither public nor private anymore, and a law that 'regulates' through 'governance' instead of 'ruling' and 'governing'.[73] In short, GAL is an administrative law with no constituents and therefore no peoples to administer, and a law that is 'public' in name only.

Reducing the international law of science to GAL in this way is rather disappointing for a law that should be instituting a 'public good' or an 'interpublic good' such as science. It is important, instead, that States, for example when they are gathered at UNESCO, adopt international science treaties rather than issue recommendations or set standards through ethical committees. After all, UNESCO is one of the few post-war organizations, besides the World Health Organization (WHO), to hold the power to adopt treaties that are binding for its Member States, including on scientific matters. So far, it has never used that power in the context of science. Instead, as we can see in the current proposals for the global regulation and governance of the research on Artificial Intelligence (AI) for instance, normative and institutional confusion reigns: certain States, together with the Organization for Economic Cooperation and Development (OECD), UNESCO, the European Union (EU) and the Council of Europe, compete in standard-setting. Moreover, those standards amount to little more than a compilation of soft standards drawn from general ethics, scientific ethics or self-regulation and technical standardization by the private sector.[74]

(ii) The national and international social law of science

Recognition of science not just as a public good, but as a participatory public good, further requires the adoption of national and international laws that are able to set a third-party or heteronomous organizational framework for science as a social practice, without however encroaching too much on scientific communities' right to self-regulation. That legal framework should therefore involve scientific communities more actively in their own social organization. This is what could be referred to as the 'social' law of science, in echo to the national and international tradition of social law, and in particular labour law.

In short, and generally speaking, social law has brought a new dimension to the domestic and international legal orders and their division between public and private law: that of collective self-determination. It is to be identified neither with the horizontal dimension of private law relationships, nor with the vertical dimension of public law relationships. Securing collective self-determination in this way enables social law to proceed from the free association of individuals and their collective determination. Instead of laying down all the rules organizing a given social practice, social law enables the participants in that practice to adopt some of those rules together. This (controlled) hybridization of the public and private spheres under the umbrella of a social law is particularly evident in labour law, as exemplified by the law on union organization or by collective labour agreements. This is also the way to conceive of the second tier of the law of science. So conceived, indeed, the social law of science would be neither public nor private law, but a third type of law specific to the distinct social organization of science. On the one hand, and

[72] See Ruffert and Steinecke, supra n 9.

[73] For a critique, see Besson, 'Democratic Representation within International Organizations. From International Good Governance to International Good Government' (2022) 19 *International Organizations Law Review* 489.

[74] See UNESCO, Recommendation on the Ethics of Artificial Intelligence, 23 November 2021, SHS/BIO/PI/2021/1; OECD, Recommendation of the Council on Artificial Intelligence, 24 May 2019, C/MIN(2019)3/FINAL; EU, European Parliament legislative resolution on the proposal for a regulation of the European Parliament and of the Council on laying down harmonised rules on Artificial Intelligence (Artificial Intelligence Act) and amending certain Union Legislative Acts, 13 March 2024, COM(2021)0206-C9-0146/2021-2021/0106(COD); Council of Europe, Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law, 5 September 2024, CETS 225.

with respect to public law: even if science is to be integrated into the institutional framework of the State in the broadest sense, and if to this extent its law should be heteronomous and 'public' in the first constitutional tier described before, it should not necessarily be assimilated, all the way down, to the public or administrative law constitutive of and applicable to public institutions. On the contrary, it is a requirement of the participatory good of science that States should preserve the organizational autonomy of science and hence the right to collective self-determination of scientific communities in shaping the law of science.

This goes against an important trend of 'over-publicization' of science in practice, however. Consider, for example, the way in which administrative law is increasingly used domestically to limit the autonomy of scientific institutions, and in particular the academic freedom of universities and their researchers. It is the case in many countries in the world where universities have become extensions of the public administration.[75] The social law of science, if further developed along the lines proposed here, would enable those institutions to be protected against exactly this kind of public law. At the same time, the adoption of social law *qua* law of the State(s) would maintain the heteronomy of the law of science. To that extent, it would still be able to protect science against self-validation by science itself.

On the other hand, and with respect to private law: this social law of science should not be equated with private law either. In this respect, the social law of science proposed here should be distinguished from some sociologists of science's 'societal constitutional law',[76] which amounts in fact to little more than a form of private law or of pure self-regulation. This is very important in light of the growing privatization of the organization of many scientific institutions and, conversely, of the scientific research conducted entirely inside privately organized corporations. Such a development is problematic for it places the organization of science at the service of private utility and threatens its disinterested character.[77] It thereby contradicts the public good nature of science, whose value is collective and may not therefore be appropriated or else privatized. Moreover, this private body of knowledge, insofar as it can develop inside private research organizations, could not meet the two aforementioned criteria of reliability and, usually for reasons of competition and secrecy in private research, of contestability.

As I have argued elsewhere, the fact that those privately organized institutions fulfil public or, as argued here, social functions, such as scientific ones, does not suffice to make them public or social in the scientific sense: what matters for science's 'publicness' or, as argued here, 'socialness' is its legal and institutional organization as such.[78] Nor, and for that very same reason, is it a matter of public funding alone.[79] Private funding, provided it does not jeopardize the autonomy and disinterestedness of a scientific community and is therefore constrained by the public and then social law of science, does not disqualify the latter's public or social law status as a scientific community nor its scientific rights as a result. Conversely, merely hanging publicness or socialness onto public funding without a public or social legal framework for science does not suffice and cannot substitute for the legal nature of the organization and institution of science as

[75] For a similar critique regarding Germany, see Möllers, 'Funktionsgrenzen der Wissenschaftsfreiheit', in Grimm et al. (eds), *Wissenschaftsfreiheit in Deutschland. Drei Rechtswissenschaftliche Perspektiven,* Wissenschaftspolitik im Dialog, Berlin-Brandenburgischen Akademie der Wissenschaften (2021) 35.

[76] See Golia and Teubner, 'Societal Constitutionalism: Background, Theory, Debates' (2021) 15 *International Constitutional Law Journal* 357 at 395–411. For a transposition to science, Kunz, 'Tackling Threats to Academic Freedom Beyond the State: The Potential of Societal Constitutionalism in Protecting the Autonomy of Science in the Digital Era' (2023) 30 *Indiana Journal of Global Legal Studies* 265 at 283.

[77] See Merton, supra n 3 at 273–4 and 277–8.

[78] On this conception, see Besson, The International Public, supra n 64; Besson, What can Public International Law do against Privatisation, supra n 64.

[79] Contra Grimm, 'Wissenschaftsfreiheit als Funktionsgrundrecht', in Grimm et al. (eds), *Wissenschaftsfreiheit in Deutschland. Drei Rechtswissenschaftliche Perspektiven,* Wissenschaftspolitik im Dialog, Berlin-Brandenburgischen Akademie der Wissenschaften (2021) 17.

public or social. Finally, arguing for the private law-based organization of science on grounds of intellectual property (IP) rights is of no avail in this context. Indeed, both the CESCR and the SRCR have repeatedly emphasized that IP rights are not human rights and should not therefore be allowed to take priority in case of conflict with the human right to science.[80] This is actually confirmed by the historical recognition of scientific authors' or creators' rights under Article 15(1)(c) ICESCR as human rights distinct from private property rights.[81]

This proposal of a social law of science could be said to match the notion of a 'participatory national framework law' of science, whose adoption is considered an obligation under the human right to participate in science by the CESCR.[82] Curiously, the CESCR does not elaborate on what this framework law would entail precisely, nor on its international law equivalent.[83] One could, however, envisage the development of an 'international social law of science' along the lines of the minimum international labour law of the 1920s. That law was in fact designed as an international public-private hybrid. It was adopted, within the framework of the International Labour Organization (ILO)'s tripartite system of political representation, by representatives of both States and workers' and employers' associations, thereby closely associating their freedom to self-regulate to the making of international social law. I will come back to multipartism in the organization of the international self-government of science below.

(iii) The national and international law of the good self-regulation of science

Finally, the recognition of science not only as a public good, but as a community public good requires that responsibilities be imposed both on individual participants in scientific practice and on scientific communities: this is what we might call the 'law of the good self-regulation' of science.

As mentioned before, science is auto-'nomous' in the sense that it is a self-regulatory social practice. As such, it has its own 'normative structure'.[84] This is what one sometimes calls the scientific 'ethos', even if this notion becomes often difficult to distinguish from the general ethics that applies to science as to any field of social life. By reference to Niklas Luhmann,[85] the German legal tradition sometimes speaks of the *Eigengesetzlichkeit* of science and thus of its 'own legality'. Thereby, it emphasizes that science's normativity should be regarded as distinct from ethics. To keep this normative framework of science apart from the 'law' of science discussed in the two previous sections, however, and in particular from the social law of science for which I have just argued, it may be preferable to speak here of scientific 'self-regulation'. Even instituted and framed by both the constitutional and social law of science as proposed in this article, this scientific self-regulation should not remain unconstrained, however. And this is where the third tier of the national and international law steps in, aiming at making that self-regulation 'good' self-regulation by constraining it and by grounding legal responsibilities for science.

As mentioned before, scientists and scientific communities are not the only ones to incur legal responsibilities for the human right to participate in science by virtue of the communal dimension of the public good of science. Those legal responsibilities also apply to all of us. These responsibilities form, as I argued before, the passive international counterpart of the

[80] See CESCR, General Comment No 17, supra n 16; Report of the SRCR, 14 May 2012, supra n 15 at para 65; Report of the SRCR, 24 December 2014, supra n 15; Report of the SRCR, 4 August 2015, supra n 15.

[81] See Plomer, 'IP Rights and Human Rights: What History Tells Us and Why It Matters', in Porsdam and Porsdam Mann (eds), *The Right to Science. Then and Now* (2021) 54.

[82] See CESCR, General Comment No 25, supra n 16 at paras 52 and 86. See also UNESCO, Venice Statement, supra n 14 at paras 4, 16(a) and (d). For earlier discussions, see Declaration on the Use of Scientific and Technological Progress in the Interests of Peace and for the Benefit of Mankind, GA Res 3384 (XXX), 10 November 1975, A/10034 at 86 paras 1 and 5; or Report of the SRCR, 14 May 2012, supra n 15 at paras 67 and 75.

[83] See for example CESCR, General Comment No 25, supra n 16 at para 77.

[84] See Merton, supra n 3.

[85] See Luhmann, *Ausdifferenzierung des Rechts. Beiträge zur Rechtssoziologie und Rechtstheorie* (1981).

recognition of group or communal scientific rights to these institutions. Without them, the risk of domination of participants in the scientific practice by their scientific communities would be too important.

Admittedly, in practice, those responsibilities of scientists and scientific communities are often redundant with those stemming from scientific self-regulation, and in particular the various principles of scientific integrity. However, they may also conflict with them. In such cases, responsibilities for the human right to participate in science should prevail over conflicting scientific self-regulation rights or even responsibilities. This point was actually made by the SRCR in 2012 already: she regretted the inflation of scientific ethics to the detriment of the human right to science that has been too rarely invoked in that context and argued the right should become the explicit basis for future self-regulation in scientific ethics.[86]

To overcome this neglect, States should adopt a human rights–based legal framework for sound scientific self-regulation, including through international treaties. It is not enough for them to rely on the recommendations of international ethics committees, such as UNESCO's. At the domestic level, these legal responsibilities for the human right to participate in science should also be translated into obligations of hard law, in particular of domestic private or criminal law of science depending on the threats. As mentioned earlier, this minimal legal and therefore heteronomous guarantee of science is a condition of the latter's autonomy. It does not equate with assigning objectives and content to scientific ethics and should not be conflated with a form of scientific legalism therefore.

C. The National and International Institutions of Science

The institutional guarantee of the human right to participate in science gives rise to correlative obligations on the part of States to guarantee the self-government of science and, by extension, to adopt a public institutional framework for science that enables the social organization of science and its self-government. This applies at both national and international levels. I will examine three of these obligations. First, the obligation to organize a statute for national scientific institutions (i). Second, the obligation to organize a statute for international scientific unions (ii). Finally, the obligation to organize good scientific representation within international organizations (IOs) dealing with scientific matters (iii).

(i) A statute for national scientific institutions

The human right to participate in science does not only correspond to a right to participate in scientific practice and its benefits, but also a right to participate in the institution and organization of science itself.[87] This right to participate should be equal. It corresponds to a special form of the right to democratic self-determination. This democratic dimension of the human right to participate in science goes further, however, than the equal right of everyone to participate democratically in the specification of their own human rights in official law-making procedures, which is derived from the human right to democratic participation in public affairs. Indeed, the human right to participate in science also includes the right to participate democratically in the institution and organization of science itself.[88] This is what one may refer to as 'scientific citizenship', both domestic and cosmopolitan, as a complement to the more common, but much narrower notion of 'citizen science' *qua* 'open' or 'participatory science'.

[86] See Report of the SRCR, 14 May 2012, supra n 15 at para 53.

[87] See Report of the SRCR, 21 February 2024, supra n 15 at paras 20 and 49–56; CESCR, General Comment No 25, supra n 16 at para 10.

[88] Note that the kind of right to democratic participation at stake here pertains as much to the organization of the institutions of science itself as to the organization of political institutions addressing scientific issues, including that of 'science-policy interfaces' in politics.

In this respect, the human right to participate in science requires that States set up a public law statute for scientific institutions that enables the exercise of this equal right of everyone, including scientific communities and their members, albeit not only, to participate in the organization of science and of those scientific institutions. This minimal public-law statute of scientific institutions should guarantee the autonomy of those institutions and provide them with sufficient public funding. It should also require them to be democratic. As I have argued elsewhere, one may consider the minimal and consensual principles of democratic legitimacy to be the following: political equality; ultimate, effective popular control; deliberative contestability; and human rights protection.[89] The implications of those democratic principles are not necessarily the same for all public institutions, however. To that extent, they do not require the same for the social institutions of science as for the administrative organs of the State. However, not being democratic in the same way does not mean being dispensed from having to be democratic altogether.[90] It suffices here to think of the specific, contextualized forms of economic or social democracy currently being discussed for private corporations[91] or non-governmental organizations (NGOs).[92]

As mentioned before, and contrary to what one might think from the point of view of international human rights law, the 'public' dimension of the statute of scientific institutions that should be instituted by the minimal national and international constitutional law of science is not an obstacle to the recognition of their group scientific rights. This is because, as I explained earlier, even though they should be instituted and organized in a heteronomous way by public law, they are better understood as 'social' institutions, and hence as hybrid institutions that are neither public nor private. They should not therefore be considered as State organs, even if their actions can be attributed to the State in certain cases and thereby ground its responsibility for a breach of the human right to participate in science. To that extent, they may actually and, as argued before, should also be given legal responsibilities for the human right to participate in science, for instance in the form of private or criminal law duties under domestic and international law of science.

(ii) A statute for international scientific unions

The human right to participate in science's obligation to adopt a minimal public-law statute for scientific institutions also applies internationally. Indeed, the obligation of international scientific cooperation is just as participatory as all the other obligations grounded in the human right to participate in science. What this means is that the right to participate in science also gives everyone the right to participate in the international institution and organization of science, paving the way towards a form of cosmopolitanism in the international organization of science. This implies that the institutional organization of international scientific cooperation as well should be democratic. This is still far from being the case, however. For the time being, indeed, international scientific institutions have no specific statute under international law, and even less a democratic one.

In short, one may identify three types of international scientific institutions at play in the current international institutional landscape of science: 'academic unions', which bring together national academies on a universal or regional level, such as the InterAcademy Partnership;

[89] See Besson and Martí, 'Legitimate Actors of International Law-Making—Towards a Theory of International Democratic Representation' (2018) 9 *Jurisprudence* 504.

[90] See Kurtulmuş, 'The Democratization of Science', in Ludwig, Koskinen, Mncube, Poliseli and Reyes-Garcia (eds), *Global Epistemologies and Philosophies of Science* (2021) 145; Kitcher, supra n 25.

[91] See for example Ferreras, Malleson and Rogers (eds), *Democratizing the Corporation. The Bicameral Firm and Beyond* (2024); Gonzáles-Ricoy, 'Little Republics: Authority and the Political Nature of the Firm' (2021) 50 *Philosophy & Public Affairs* 90.

[92] See for example Peruzzotti, 'Civil Society Representation and Accountability: Restating Current Debates on the Representativeness and Accountability of Civic Associations', in Jordan and van Tujil (eds), *NGO Accountability: Politics, Principles and Innovations* (2006) 43.

'scientific unions', which have both institutional members (for example national academies) and individual ones, such as the International Science Council (ISC); and 'scientific associations', which bring together individual members only, either through conferences or on a more permanent basis, such as the World Medical Association. Besides those scientific institutions, there are also a number of civil society organizations, and in particular NGOs, with a scientific mandate, such as Scholars at Risk (SAR).

Regrettably, the relations between these international scientific institutions are not organized under international law and those institutions have simply grown and multiplied alongside each other. In itself, this should come as no surprise, given that the international law of institutions generally fails to respect the principle of the international rule of law.[93] International organizations, for instance, are regarded as 'public', but in the absence of any real public international law statute for them, one may legitimately question that qualification. Similarly, the so-called 'private' statute of civil society organizations, such as NGOs, remains just as underdeveloped in contemporary international law. So, this leaves the question of the exact statute of scientific institutions under the international law of institutions entirely open.

It suffices to take one single example here, that of an international scientific union: the ISC. The ISC's increasing standard-setting power in the field of international law of science raises the pressing question of its representativeness. Most of the time, international scientific unions, including the ISC, are considered, from the point of view of international law, as civil society organizations, or even as NGOs. Indeed, since their members are not States, they cannot qualify as IOs. Yet, their internal organization, as in the case of the ISC, is very similar to that of an IO. In fact, it is not surprising that the ISC should seek to emulate the organization of IOs, especially of IOs such as the ILO that include in their constituencies transnational unions like trade unions.

The time has come therefore to establish a public international law statute specific to international scientific unions. Such a statute could secure the democratic representation of national scientific institutions and of their individual members and, more generally, greater inclusion of the world's different scientific communities than it has been the case so far. To this end, scientific elections could be organized, along the lines of what is done for trade union elections, including for the purpose of transnational union representation at the ILO, for example. By implication, the lack of an international law statute for scientific NGOs equally involved in international scientific standard-setting is just as problematic. The confusion between international scientific unions, like the ISC, and these NGOs, such as SAR, on the one hand, or between these NGOs and the transnational technology companies that are increasingly involved in international law of science negotiations (for example on the global regulation of AI by the OECD, UNESCO or the EU), on the other, calls for an institutional distinction between them. One should aim at establishing a distinct international law statute for them as well.

(iii) A statute for scientific representation in international organizations

The obligation that arises under the human right to participate in science to adopt a public international law statute for scientific institutions also affects the statute of international organizations in general, when their object is primarily or secondarily science such as UNESCO, OECD or EU. Indeed, the right to participate in the international institution and organization of science implies that the institutional organization of international scientific cooperation, this time not only between scientists and scientific communities, but between the peoples of the world represented in particular by their States in those IOs, be participatory and egalitarian, and hence democratic. In IOs with a scientific or partly scientific mandate, this requires ensuring the

[93] See Besson, supra n 59; Besson, What can Public International Law do against Privatisation, supra n 64.

representation of all scientific communities, including local or indigenous knowledge communities, subjected to the international law of science. It also requires recognizing their institutional representatives certain participation rights that are equal to those of States, or at least specifically articulated with those of States in order to make sure there is no over- or under-representation of the same peoples and a breach of political equality. This may be described as a system of multiple or multipartite representation in IOs, i.e. of representation by multiple public, social and private institutions.[94] Such a system has found its best realization to date, despite some imperfections of course, in the system of tripartite representation, by States and employers' and employees' associations, set up at the ILO over a century ago for the purpose of adopting international labour law.[95] If the argument made in the previous section for an international social law of science is accepted, then so should the present one for a system of multipartite representation in the adoption of the international social law of science.

Unfortunately, multipartite representation is not yet a reality within international organizations with a scientific mandate. Most of these organizations suffer indeed from the different ailments of global technocracy. In the few cases where it is carried in those IOs' law-making processes, the scientific voice is expressed in different ways, none representative and democratically legitimate.[96] A case in point here is the WHO.[97] Therein the scientific voice is carried in many ways, all imperfect: by technocratic civil servants with no necessary mandate to represent the scientific communities in their country; by technoscientific NGOs whose involvement in IO deliberations is selected solely instrumentally in order to provide specific scientific information[98]; or by experts invited to decide by delegation of competence from IO bodies or by the full privatization of their decision-making methods to private companies.

The creation of 'science-policy interfaces' in IOs, as suggested by the SRCR in her 2024 report on participation in science,[99] only partially meets this critique. Indeed, such interfaces still need to be organized under both domestic and international public law. And, above all, they need to be organized in a democratic manner and this requires organizing the representation of and by scientific communities. Merely multiplying so-called scientific 'stakeholders' in the contemporary jargon of IO legitimacy, or including NGOs to compensate for their absence albeit without any regard to their respective representativeness, is no guarantee of democratic legitimacy.[100] Quite the contrary: the inclusion of those additional 'stakeholders' and NGOs usually erodes the representation of peoples by their States, by generating an over-representation of certain interests without any control by those peoples over those claiming to represent them. The representation of the scientific communities involved should therefore be ensured at all times. And so should their articulation with the other representatives of the world's peoples within these IOs in a coherent and representative system.

Again, it suffices to take one example here, that of UNESCO. Based on the argument presented so far, an option could be to reorganize representation in its midst along the lines of the ILO and its multiple instituent powers. This could be done by securing the representation of both member States and scientific institutions on the organization's General Conference and

[94] See Besson and Martí, supra n 89; Besson, Democratic Representation within International Organizations, supra n 73; Besson and Martí, 'No Democratic Representation without Institution. Lifting the Veil of Functionalist, Incorporation and Agency Theories of Democratic Representation by International Organizations', in Besson (ed), *Democratic Representation in and by International Organizations* (2025) forthcoming.

[95] See Boutros-Ghali, UN Secretary General, An Agenda for Democratization, 1996, [ST/]DPI/1867.

[96] See Louis and Maertens, *Why International Organizations Hate Politics: Depoliticizing the World* (2021).

[97] See Besson, 'Pour une représentation démocratique multiple au sein de l'Organisation mondiale de la santé', in de Frouville and Rousseau (eds), *Démocratiser l'Espace-Monde* (2024) 199.

[98] See Berman, 'Between Participation and Capture in International Rule-Making: The WHO Framework of Engagement with Non-State Actors' (2021) 32 *European Journal of International Law* 227.

[99] See Report of the SRCR, 21 February 2024, supra n 15 at paras 55–56.

[100] See Besson, We the Peoples of the United Nations, supra n 68.

Executive Board. This would not only ensure greater scientific representativeness of UNESCO, but also work towards greater representativeness of the scientific institutions involved themselves, both domestically and internationally. Efforts in this direction have been made at the UN Intergovernmental Panel on Climate Change (IPCC) and could be used as a model. However, they have only barely started to be implemented and the lack of representation of scientific diversity remains a common critique of the IPCC.[101]

By extension, working on the democratic representation of and by scientific institutions in IOs would secure better coordination of their respective activities in the field of the international law of science. Currently, indeed, different IOs and various scientific associations and scientific unions indulge in competing scientific and ethical standard-setting, for instance in the AI context as mentioned before, without any concern for the normative confusion this creates nor for the democratic legitimacy of the standards they adopt.

5. CONCLUSION

In light of the contemporary relevance of the human right to science, this article has explained and specified the institutional guarantee of the right and, on that basis, argued for the consolidation of an international law of science. Besides its scholarly input in legal human rights theory, the article may also be read as a contribution to the revival efforts of the human right to science *qua* right to participate in science that began some 15 years ago at the UN. Its contribution to those efforts may be described as threefold and corresponds to three gaps in UN bodies' current interpretations of Article 15(1)(b) ICESCR.

First, the article has argued that science should be understood as a public and common good and, more specifically, as a public participatory good. So doing, it has contributed to specifying a non-instrumental human rights notion of such goods, and one that should be carefully distinguished from the economic notion of public and common goods that has become prevalent in international law. While the reference to the public and common good of science should be a key part of any argument for a participatory interpretation of the human right to science, those goods have only been mentioned in passing by UNESCO and the SRCR in their recent interpretations of the right. When they have, the terms have not been defined precisely and sometimes even used inconsistently.[102] Second, the article has argued for the collective dimension of the human right to science *qua* right to a participatory good. So doing, it has contributed to specifying what that dimension entails in terms of both individual and group scientific rights and how different (collective and personal) individual scientific rights should relate in case of conflict. While the collective dimension of the human right to science and some of its communal right-holders are mentioned briefly in the SRCR's latest report,[103] and this emphasis should be commended, it has not been discussed in depth.

Finally, drawing on the participatory dimension of the human right to science and on the obligation of international scientific cooperation of States, the article has fleshed out robust positive obligations to adopt a constitutional, social and private/criminal domestic and international legal framework of science. This obligation also extends to the adoption of the corresponding domestic and international law statutes for various domestic and international scientific institutions and for their representative participation in international organizations. While the adoption of a 'national framework law' of science is mentioned as one of the positive

[101] See De Pryck and Hulme (eds), *A Critical Assessment of the Intergovernmental Panel on Climate Change* (2022).
[102] Report of the SRCR, 21 February 2024, supra n 15 at paras 78 and 96. See also UNESCO, Recommendation on Science and Scientific Researchers, supra n 12 Preamble.
[103] Report of the SRCR, 21 February 2024, supra n 15 at paras 41–42.

obligations stemming from the human right to science,[104] the CESCR has not yet elaborated on the international equivalent of that framework law. The proposals made in this article in response to those three gaps should hopefully steer the interpretation of the international institutional guarantee of the human right to science in the right direction in the future.

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[104] CESCR, General Comment No 25, supra n 16 at paras 52, 77 and 86. See also UNESCO, Venice Statement, supra n 14 at paras 16(a) and (d).

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