



Ethics and IPR - Much Needed Legal Solutions for Tomorrow

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This article considers the protection of authorship in scientific papers. We analysed the role of authorship in the light of the current legal and ethical framework. We have discovered that standard rules of copyright law refer to the relationship between the 'author' and the result of their creative activity. 'Authors' are not originators of a discovery, idea, procedure, theory, method or other immaterial contribution to research unless they have fixed the intellectual work in any tangible medium of expression. At times, it is challenging to identify scientific products, which are an essential contribution to research projects, which means that copyright law might not protect them. These two contexts, modern science and copyright law, allow us to conclude that ethical codes for researchers properly define the right to be an author of a scientific paper. The study aims to clarify that (1) international human rights guarantee the protection of the author's moral rights of the original contribution to the research project, (2) this obligation is not implemented correctly by national legislators, (3) national legislators' task is to create an adequate legal protection system for original contributions to research science according to the example of the solutions adopted by the German legislator.

Keywords: Human Rights, Legal and Ethical Rules of Authorship, Research Contribution, Authorship Attribution, Protecting Original Research Contribution, Responsibility

Guidelines of the International Committee of Medical Journal Editors provide that a person who meets all authorship criteria within the copyright or ethical framework should be listed as the author of a paper. In other words, an author of an article is any creator with a direct, substantial and significant intellectual contribution to the research or any composer of written documentation (such as a manuscript).¹ Unfortunately, ghost authorship and guest (honour) authorship are plaguing the research world, and they respectively silence or take away recognition from talented scholars around the globe.² As scholars, we must ensure that our work continues to be adequately recognized and respected.

This article analyses the reasons for unprotecting author's rights to a contribution to research, and discusses the topic through the following perspectives: modern scientific, legal, and ethical framework. We believe that the phenomenon is far more complex and addresses some of the fundamental issues in contemporary science and authorship law. The critical question about science is: *What is science,*

and which activities produce a scientific product? In this context, copyright arrangements governing a person's rights to claim authorship of a scientific work are a critical and necessary element of any evolving scientific community.

Authorship – Views and Needs of Modern Science

In the 21st century, we are witnessing a rapid development of technology that strongly influences research methods, scientific teams' structure, and publication policies.³ These have introduced to sciences a high degree of fragmentation into different subspecialties of research and a need for specialized researchers. Consequently, many scientists usually do not carry out research alone or in small research teams with a relatively narrow research specialization. Instead, research becomes interdisciplinary. The complexity of this issue can often lead to difficulties with answering one of the most fundamental questions: *'Who is a creator of research and who should be an author of a paper?'* For example, in the field of empirical sciences, the role of a researcher in an interdisciplinary team can vary significantly. Firstly, the team members can be divided into

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experimentalists and theorists, experts in their specific areas of interest. Those specialists analyse different objects using background knowledge in, e.g., physics, mathematics, or medicine. Furthermore, technical staff can also participate actively in the research work. By definition, technical staff should only be associated with routine and predictable activities. Still, there can be circumstances in which such activities require significant effort classified as reaching beyond routine work. Therefore, individual research products of team members can be a routine, or an indisputably original and intellectual contribution to the research. Nevertheless, due to different levels of sophistication, it is often difficult to clearly distinguish between the team members performing only routine tasks and the members who have made an indisputably original contribution. It is rarely the case that research documents have a single author. This poses the following difficulties for the team leader: *Who should be classed as an author, who should only be given acknowledgement for their routine activity in the project, and who should be the first, the last or the corresponding author in the work to be published?*⁴

The Human Rights Perspective to Authorship and the Right to be an Author

Despite the importance of authorship, there is no definition of ‘author’ at any jurisdictional level (international, regional, and national).⁵ The jurisprudence on copyright has not subjected the concept of authorship to any straightforward and clear test.⁶ Lawyers explain that some characteristics of ‘author’ and ‘authorship’ might be deduced from the legal description of ‘literary and artistic work’ at the international level of copyright legislation. Under Article 2 of the Berne Convention, literary, scientific, and artistic works are ‘under protection,’ regardless of the style or form of their expression. Legislators in the countries that have ratified that Convention, e.g., the UK or the USA, can stipulate that works shall not be protected in general or under specified categories unless fixed in some material form.⁷ In this light, e.g., §102 (Subject matter of copyright: in general) of the US Copyright Law Act provides that:

“(a) Copyright protection subsists, in accordance with this title, in original works of authorship fixed in any tangible medium of expression, now known or later developed, from which they can be perceived, reproduced, or otherwise

communicated, either directly or with the aid of a machine or device (...). (b) In no case does copyright protection for an original work of authorship extend to any idea, procedure, process, system, method of operation, concept, principle, or discovery, regardless of the form in which it is described, explained, illustrated, or embodied in such work.” Similarly, under the UK Copyright Law Act: *Copyright is a property right which subsists in accordance with this Part in the following descriptions of work (a) original literary, dramatic, musical or artistic works, (...)* (Section 1.1. (1)), *“Copyright does not subsist in a literary, dramatic or musical work unless and until it is recorded, in writing or otherwise; and references in this Part to the time at which such a work is made are to the time at which it is so recorded.”* (Section 3.2. (1)), *“In this Part “author”, in relation to a work, means the person who creates it.”* (Section 9.1. (1)).

Legislators consider authorship as a matter of fact.⁸ In this regard, authorship refers to the relationship between the author or artist and the result of their creative activity. The ‘author of work’ becomes a natural beneficiary of this relation within the meaning of law. The ‘author’ or ‘creator’ is the person that introduces changes in the world through their own effort, which exceeds ordinary and routine activities. The nature of these activities must be strictly creative and intellectual. The activities should result in intellectual work with an individual and unique contribution of its author. Moreover, the intellectual work should be fixed in any form (fixed in any tangible medium of expression), while its value, purpose, or method of expression is irrelevant. Only the final form of the work is relevant. The forms used by legislators include words, mathematical symbols, figurative marks, or plastic models as channels of expression for intellectual works. Accordingly, in legal terms, legislators agree that an author is not a creator/author of a discovery, idea, procedure, or method. Therefore, the legal concept of author does not include an ‘author of an idea,’ ‘author of a discovery’ or ‘author of a theory.’ The authors of ideas, discoveries or theories may be afforded legal protection only indirectly, more specifically, whenever they can furnish their discoveries, concepts, ideas or theories with a form of work, *i.e.*, the authors will express their concepts and theories using words, mathematical formulas, or drawings, and then,

announce them as a work within the meaning of copyright law.

From the legal perspective, the actual and significant input of an individual team member into the research results to be published is not always sufficient enough in many countries to claim authorship of a scientific publication. The impact of particular researchers on the research work can vary. A researcher's contribution may be restricted to formulating the research hypothesis or designating a research method, *i.e.*, specification and design of a research workflow. Such activities are not protected by copyright because they are viewed as creating ideas, methods, theories, or procedures, rather than work. The role of researchers may also be restricted to a design, production, or collection of an experimental object (a sample) for the research team, or carrying out a scientific experiment using specific equipment to obtain relevant results. The latter example also does not fulfil the legal requirement of an output intellectual work fixed in any tangible medium of expression. This requirement means that intellectual creation must be expressed in the least unstable physical form, and, in a way, that its characteristics and content determine the legal consequence and provide legitimate grounds to recognize it as a work in terms of copyright law. If a team member does not create a paper manuscript and only offers scientific data, the researcher's right to be an author of the paper can be questioned. Firstly, since the presentation format of pure scientific data usually does not fulfil the work requirement within the meaning of copyright legislation. Secondly, in that case, the originality and intellectuality of their contribution to the research is a disputable matter. One can question whether the scientific data derive from a human creative act of an evident, unique and original nature. In other words, there may be doubts whether the research act was creative, or, despite its specialized character, it can be considered routine, leading to a result possible to obtain from another experienced researcher representing the same discipline, that is the same results in the same presentation format.

With respect to copyright law, researchers can be recognised as authors of a scientific publication when their research contribution is identified as autonomous, original, significant, and fixed as a work. When a scientific work does not comply with the characteristics mentioned above, researchers cannot claim authorship of a scientific paper in accordance

with copyright law. This practice is detrimental to the objectivism and authority of the published research and stands behind the ghost-writing phenomenon. The 'ghost authorship' issue can be a consequence of copyright law being used to question the authorship status of a creator of an individual, creative and original scientific contribution to the research which is not expressed as work according to copyright.

It should be made clear that the Berne Convention has set a standard of protecting two kinds of copyrights relating to a creative contribution to work, namely author's moral and economic rights to work. Under Article 6bis (1) of the Convention:

"Independently of the author's economic rights, and even after the transfer of the said rights, the author shall have the right to claim authorship of the work and to object to any distortion, mutilation or other modification of, or other derogatory action in relation to, the said work, which would be prejudicial to his honour or reputation."

As far as this standard is concerned, international legislation provides for a researcher's right to protect their intellectual contribution to research in broad terms. Commonly acknowledged to be an element of customary international law, the Universal Declaration of Human Rights, in Article 27(2), provides that:

"Everyone has the right to the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author."

Linking the scope of protection afforded to a person's scientific production not only with resultant tangible interests but also moral rights to claim authorship has significant consequences. It means that this protection applies to each intellectual contribution to research, regardless of whether or not the contribution takes the form of a materialized work under copyright law. Therefore, the right to derive, from creative work, moral rights to claim authorship can be interpreted as a researcher's right to disclose to the public the subject and value of his intellectual contribution to a scientific publication in which the contribution was used. The resulting protection will take the form of either the researcher's claim to have his name published amongst the authors of the scientific publication or to have a note of thanks for his help and contribution to the research on the acknowledgement page. Accordingly, it is accepted that reliable attribution of authorship in the

scientific community should not only follow specific copyright standards. It should also respect and include additional rules based on established honest and reliable customs of the authorship attribution process that recognize researchers whose contribution to research is direct, original, and substantially intellectual.

The Concept of Scientific Authorship

From the 1960s onwards, the number of authors per scientific paper has increased steadily. Nowadays, technological progress has increasingly influenced research, creating situations that call for modification of the copyright law definition of an author. Since lawmakers have not reacted to those challenges and have not protected many researchers' moral rights to authorship, the scientific community has started establishing good practices of fair attribution of collective authorship in scientific papers. It has been a long process and work is still in progress. Interestingly, in 1952, Wilson Jr. wrote about such practices in a book entitled "An Introduction to Scientific Research," pointing out that:

*"After the title comes the author's name or a list of names. Here is a golden opportunity for losing friends. The decision as to what names should be included, and in what order, requires fair-mindedness and objectivity above the ordinary."*⁹

Wilson formulated the following authorship attribution rules: (1) The author whose name comes first on the paper should be the main creator of research deserving the most credit for the work; (2) The following persons on the list of co-authors of a paper should be listed in the equivalent order to the amount and value of their contribution to the research. Wilson added that

"to be a co-author is both an honour and a responsibility. Many make it a rule not to accept (or impose!) co-authorship unless they have done a good deal more than suggest the problem or even than guide its solution somewhat remotely from on high." Furthermore, the author highlights that it is extremely important that proper credit is given for support from other scientists. Appropriate acknowledgements (such as thanks) should be given to anyone who suggested a problem/hypothesis, provided useful suggestions with regard to the method, solution or interpretation of results. In this context Wilson argues: *"Few secrets are hidden, and a man who*

infringes on the intellectual property of others will have his sins passed around the world with amazing rapidity by the gossip of his fellow scientists. Careers have been damaged for life by a few thoughtless acts of kind."

All this has made even more apparent the dissonance between copyright and scientific authorship. Scientific authorship has become the subject of analyses by historians and philosophers of science. Research conducted at the interface of intellectual property and science and technology studies concludes that, similarly to intellectual property law, scientific authorship relates to something fixed on a carrier (an article, a book, an abstract). Therefore, journals and scientists can legally protect scientific publications from misappropriation or reproduction of articles without their consent. However, the analogy ends there. A non-scientific work reflects the personal creativity and original expression of its creator. Consequently, copyrights protect the form of expression. Furthermore, as a result of its fixation in a tangible medium (even without a further requirement for publication), a non-scientific work is protected by copyright. To adopt the same reasoning concerning a scientific work would disqualify its author as a scientist because it would place the results of his research in the domain of artifacts and fiction rather than truth. Researchers cannot copyright the content of their claims about nature because nature is a "fact," and facts (like the landscape depicted in a painting) cannot be copyrighted. They belong to the public domain. Until a scientific finding is published and peer-reviewed by the international scientific community, it does not count as such and does not benefit the scientist who created it. Only receiving recognition bestows on a scientific finding by a particular author the nature of nature. Therefore, the principles of attribution of scientific works are different from those in intellectual property law. A scientific author is literally a non-author according to the definition of intellectual property. Scientific authorship is not about property rights but about recognising authorship of an objective statement about nature. These issues have become particularly urgent due to numerous cases of scientific fraud and misconduct. Consequently, the scientific community has inextricably linked the attribution of credit and authorship in science with responsibility for the integrity of the research process. The scientist

receives credit but must also take epistemological (and perhaps legal) responsibility for the veracity of the claims they publish.¹⁰

Authorship – Perspective of Ethical Codes and Protection of Original Contribution to Research

Defining the principles of fair attribution of a publication's authorship is very important to the integrity of the research process. It builds trust in the results of research and scientists.¹¹ Therefore, government research or educational institutions, as well as associations of scientific journal publishers, have, globally, started to develop comprehensive standards which aim to guarantee the reliability and honesty of attributing scientific authorship.^{12,13} Initially, the resulting guidelines were formulated as recommendations regarding the preferred or desired best practices in science, including recommendations for authorship of publications. Later, the aforementioned bodies decided to develop moral norms that would establish ethical standards as codes of ethics for researchers to define how to conduct research and publish the results, including how to attribute authorship.^{12,14,15} For example, The International Committee of Medical Journal Editors has defined the role of authors and contributors and recommended that authorship be based on the following four criteria: "Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; drafting the work or revising it critically for important intellectual content; final approval of the version to be published; Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. (...) Those who do not meet all four criteria should be acknowledged (...). These authorship criteria are intended to preserve the status of authorship for those who deserve credit and can take responsibility for the work. The criteria are not intended for use as a means to disqualify colleagues from authorship who otherwise meet authorship criteria by denying them the opportunity to meet criterion under Section 2 or 3. Therefore, all individuals who meet the first criterion should have the opportunity to participate in the review, drafting, and final approval of the manuscript."¹⁵ These rules have originated from established customs which are commonly considered desirable amongst the scientific

community and perceived by this community as a guarantee of fairness and transparency in research and publication of research results. Based on the analysis of the provisions laid down in codes of ethics for researchers and their established interpretation and application, it is possible to identify commonly recognised, applicable and desirable rules for the attribution of authorship of scientific publications.

In line with these rules, each direct and substantial intellectual contribution to the research process which results in the creation of a specific publication entitles its author to be awarded the status of a co-author of this scientific publication. A prerequisite for the formulation of such a claim is the ability to prove that the contribution to the research was individual, original, creative, and substantial. In this context, codes of ethics clarify that input into research can, particularly, involve a significant contribution to the initiative of a scientific idea or a scientific hypothesis, formulation of a concept or designing research, along with a significant share in data acquisition (experimental or other data), drafting the article or revising it critically for important intellectual content, or preparing substantial sections of the paper, e.g. literature review, findings or results.

The decision on authorship issues should be made by all team members collectively, preferably early in their cooperative work. The order of authorship has no generally agreed-upon definition but cannot be arbitrary. It should be consistent with the common practices across disciplines, research groups, and countries, e.g. alphabetical or ordered listing of authors according to some rules. Nevertheless, the applicable standard of ordered listing of authors should give readers and evaluators information about the contribution of individual authors to the scientific work and the possibility to identify their roles in the manuscript. Furthermore, there is a direct relationship between authorship and responsibility which can be derived from ethical codes. More specifically, each co-author of the work is accountable for authenticity and quality of the published research. They should also be able to refer to each section of the content of the work (including written documentation, such as papers), unless it is specified that co-authors are only responsible for specific parts of the work within their research competency.

Moreover, codes of ethics consider it unacceptable to use others' contributions without mentioning their roles in the research in the acknowledgement section

or references in a published paper. In this context, in a paper, authors are obligated to cite other related researchers' works which have influenced the published research. Codes of ethics also clarify that any substantial contribution should be acknowledged in a paper, including technical and non-scientific contributions, *e.g.* interviewers, survey management staff, data processors, IT staff, clerical staff, statistical advisers, reviewers, students, supervisors of a research team and those who assisted in obtaining funding. A commonly accepted method to recognize an institution's or a third party's input into the published research results is a note of thanks adequate to the help provided.

It is not easy to distinguish between intellectual and technical contributions to research. Team members can be further categorized into scientific and technical authors, whilst the latter are usually acknowledged by using the following formula "with the technical assistance of x and y." Technical authors are usually responsible for carrying out important laboratory work or statistical-mathematical analysis, instead of formulating a research hypothesis, designing research methods or discussing the findings. It is difficult to explicitly evaluate an input of a researcher as solely technical (excluding a creative approach), considering the current degree of inter-disciplinarity and complexity of research. Hence, the term technical author should be interpreted in a very precise manner and reserved only for a person performing automated and routine activities involving the use of only commercially available scientific apparatus or doing mathematical-statistical modelling of the results based on commercially available algorithms. A technical author is each researcher who would obtain the same results using the same research tool since they depend on the correct performance of a commonly known procedure, in contrary to the creative approach.

Considering the above aspects, codes of ethics recommend that the attribution of authorship adopted in a publication must be clearly and explicitly accepted by all members of a research team at an early stage of the research process. Accordingly, a decision to mention a researcher only in the form of acknowledgment must meet the following requirements. Firstly, it must be explicitly accepted by the researcher. Secondly, it must not be in contradiction to the obligations under the joint research agreement, which means that a researcher cannot be deprived of the right to the work's

authorship in case such right was guaranteed in the agreement. Finally, it must be consistent with the principles of ethics concerning the attribution of authorship of a scientific work as commonly accepted by the scientific community, and must not lead to acceptance of ghost authorship.

Discussion-A Call for Protection

Scientific institutions, societies, and associations from many countries have adopted ethical codes to protect the researcher's moral rights to authorship of scientific papers based on their original contribution to research. Their combination brings together representatives of various disciplines of science, as well as publishers of scientific journals or international organisations. Currently, we are witnessing the final step in the process of unifying international ethical standards in research.¹⁶ These institutions standardised the provisions originating from their documents to establish the common highest international ethical standards for research and have delivered the Declaration of Support for the European Charter for researchers.¹⁸ These documents were adopted at different regulatory levels and by various institutions (Table 1).

Using textual interpretation in combination with systemic one and comparative analysis of the guidelines for attribution of scientific authorship, we have established that all the institutions mentioned above have adopted documents with identical content, especially in the context of the subjective right of scientific authorship. This analysis leads to discover the applicable paradigm of scientific authorship and its binding protection in the international scientific community. The paradigm mentioned above is presented in Table 2 as a conceptual framework for scientists' moral obligations with regard to fair and ethical scientific authorship.

The study of common and well-known ethical standards has allowed us to unify the scientific authorship concept. The unification of that concept is based on three pillars. The first one relates to the recognition of the freedom of research and protection of an intellectual contribution as a natural human right. This right originates from the inherent and inalienable dignity of a person and is a derivative of an individual's right to freedom of expression²². The second one concerns the ongoing universalisation of ethical standards for researching and publishing scientific data in many countries. This is a result of

Table 1—Most representative ethical codes for researchers		
Level of ethical regulation	Region, country, institution or organisation adopting the ethical regulations	Title of the ethical regulation
Regional level	The European Union	The European Charter for Researchers & The Code of Conduct for the Recruitment of Researchers (2005) ^{16,18}
National level	France	The European Code of Conduct for Research Integrity (2017) ¹⁷
	Denmark	Integrity and responsibility in research practices Guide of CNRS Ethics Committee (2017) ¹⁹
	Poland	The Danish Code of Conduct for Research Integrity (2014) ¹⁴
	Israel	Code of Ethics for Researchers of the General Assembly (2020) ^{14,18}
Binding at universities of recognized repute	USA	Integrity in Research of Israel National Council for Research & Development (1998) ¹²
	USA	Conduct of Research at Stanford University (2007) ¹⁴
	United Kingdom	Authorship Guidelines of Harvard Medical School (1999) ¹⁴
	Israel	Authorship Guidelines of the University of Manchester (2021) ¹⁴
Adopted by scientific associations and scientific publishers	USA	Code of Academic Ethics - Ben-Gurion University of the Negev (2007) ^{14,18}
	USA	The Code of Ethics of the American Educational Research Association (2011) ²⁰
	United Kingdom	Authorship Guidelines for Academic Papers of the British Sociological Association (2001) ¹⁴
	Authorship guidelines of scientific publishers	Guidelines of the Committee on Publication Ethics (COPE) How to handle authorship disputes: A guide for new researchers (2003) ¹³
	Authorship guidelines of scientific publishers	Guidelines of the International Committee of Medical Journal Editors (ICMJE), Defining the Role of Authors and Contributors (2021) ²¹
		International Committee of Medical Journal Editors, Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals (2019) ¹⁵
		Nature Research journals' authorship policy (2021) ¹³

internationalisation of those standards, which has been triggered by the adoption of international codes of ethics for researchers. The regulations laid down therein are consistent with the recommendations for scientific authorship protecting the author's rights of scientific creators as developed earlier by the scientific community. The third pillar relates to the enforcement of the subjective right to protect scientific work, including an intellectual contribution to research. Ethical codes for scientists guarantee that right by establishing formal procedures to enforce liability for infringements of authorship of a scholarly contribution to research. Rules of that procedure demand that competent, impartial, and independent ethics committees be established at scientific institutions and ensure that researchers accused of committing misconduct have the right to a fair and public hearing of their case before an independent ethical institution.

The provisions laid down in the codes and recommendations should be interpreted as rules

established by the scientific community on the exercise of the freedom of research. Their underlying objective is to limit this freedom by establishing the requirement for strict compliance with the principles of research ethics adopted by the academic community. The legal bases for such self-imposed restrictions in the scientific community can be found in Article 8(2) of the European Convention on Human Rights or Article 19(3) of the International Covenant on Civil and Political Rights. Given the specific nature of these regulations, the respective national legislators were able to delegate the right to prepare and adopt ethical codes for researchers to authoritative scientific bodies or scientific institutions and, then, to international organisations. This is not to say that the codes of ethics for researchers have the status of unofficial, non-legally binding recommendations. Regarding the afore-mentioned norms laid down in international conventions, these codes should be assigned the status of binding provisions of law applicable in the world of science.

Table 2— Paradigm of scientific authorship

Who or what is protected by ethical rules?	Way of protection and types of scientists' subjective rights or duties
1 Scientific creation	A protected value by ethical rules even if it is not expressed as a work; It is each original, direct, significant, intellectual contribution to research even it is not expressed as a work
2 Creator of science	Author of scientific creation is recognized as the creator of science; Creator of science has a subjective right to protect a moral interest to be recognized as an author of a contribution to science and, consequently, as co-author of a scientific paper
3 Definition of creator of science	An author of a scientific idea; An author of the scientific conception or design of the project; An author of experimental data; An executor of the practical (e.g., acquisition and/or processing of data/material) or intellectual (e.g., analysis and interpretation of data/material) work in a scientific project; An author of the manuscript of a publication (who wrote substantial sections of the paper, e.g. synthesizing findings in the literature review or the findings/results section or was involved in drafting the article or revising it critically for important intellectual content)
4 Definition of an unintellectual contribution to research	It is other than intellectual but substantial contribution to the scientific project (this might include interviewers, survey management staff, data processors, computer staff, clerical staff, statistical advisers, colleagues who have reviewed the article, students who have undertaken some sessional work, the supervisor of a research team or someone who has assisted in obtaining funding, sponsors and funding institution); Ethical rules protect an unintellectual contribution to a scientific project
5 Definition of who or what should be acknowledged in the paper	The performer of unintellectual contribution to the scientific project has a subjective right to be acknowledged in a paper for their assistance to the research of another kind than intellectual credit (this might include interviewers, survey management staff, data processors, computer staff, clerical staff, statistical advisers, colleagues who have reviewed the article, students who have undertaken some sessional work, the supervisor of a research team or someone who has assisted in obtaining funding); Sponsors and funding institutions have to be thanked
6 Authorship and responsibility	Authorship and responsibility for the authenticity and quality of the published research are tightly coupled and defined as: Values and principles protected by ethical rules; An obligation of the researcher to take responsibility for the quality, authenticity and correctness of the published joint research;
7 Research misconduct	Research misconduct is stigmatized, and therefore the scientific community is required to: - define cases of research misconduct; - conduct a research misconduct investigation in an Impartial, expedient and professional way involving the Disciplinary Spokesperson and a professional and unbiased ethical institution, respecting the principles of presumption of innocence and protecting the researcher's reputation

Consequently, these provisions make it possible to restrict every freedom and right vested in a man to realise the aim of protecting values important to democratic states and societies. These values include respect for the rights or reputation of others or protection of public morals. This is because democratic states and the democratic and civilised international community have reserved a legal right to demand that researchers comply with fundamental ethical standards. These standards, compiled in the form of legally binding ethical codes for researchers, on the one hand, restrict the freedom of research but, on the other hand, protect the right to the authorship

of scientific output and public morality, thus ensuring fairness and transparency of research.

Conclusion

Achieving fair attribution of authorship of scientific works and preventing guest or ghost authorship is possible only if the scientific community accepts that the recommendations for attributing authorship as included in ethics codes for researchers are mandatory rules of law established by and for that community. Raising this awareness will contribute to developing a model of researcher's ethical conduct. This will lead to formulation of the highest publishing

standards and to their observance. Based on ethical codes for researchers, the scientific community should propagate requirements for papers' authors to disclose comprehensive information about the circumstances behind the paper.

The codes require that the subject, scope, and weight of a substantive, material, financial or any other input of any person contributing to the design and conduct of the research, analysis of research findings or elaboration of the final form of a scientific publication be appropriately recognised as a co-authorship of a publication or acknowledged for the respective help in the research. The editors of scientific journals require the corresponding author to submit a declaration that the attribution of authorship is in compliance with ethical rules in a specific scientific community or country. Common sanctioning of such obligations among editors of scientific journals and promoting the right behaviours, especially among junior scientists, should be treated not only as a manifestation of accepted ethical principles but also as an expression of social accountability and respect for the citizen's right to public information on the conduct of research. Particular countries or international law-making authorities have not adopted ethical codes, and, thus, from a formal standpoint, the standards are not part of the legal system. Consequently, ethical codes issued by the operation of many scientific institutions, societies, and associations from many countries shall not be recognised as a source of universally binding law of the territory of countries which is the seat of the body issuing such enactments. Complaints about misconduct under ethical codes (including the right to be an author based on ethical code) are considered in disciplinary proceedings by disciplinary committees. Still, in the court of law, in cases of collective authorship of a scientific paper, the judge may refuse to apply the scientific authorship rules from the code of ethics because these regulations are not countries' universally binding laws. Thus, if an intellectual contribution to research if the contribution it is not fixed as a work within meaning of copyright, the court may refuse to protect authorship.

In that context, the provision of Article 27(2) of the Universal Declaration of Human Rights should be remembered, which has established an obligation to protect the moral and material interests resulting from any person's scientific production. That norm enshrines the researchers' subjective right to protect

their intellectual contribution to research, regardless of whether or not the contribution is expressed as work in the copyright law sense of the word. Based on those rights, scientists may seek protection and demand to be known as science creators of their scientific discoveries.

The conclusion of these considerations is that lawmakers should improve the scientific authorship protection by reinforcing in the law the meaning of ethical codes for scientists in the context of court proceedings. A straightforward solution would be to establish a regulation by the national or international lawmaker to protect the authorship right of a scientific product's author under the universally applicable law, based on the analysed ethical standards of the scientific authorship concept. The German lawmaker has adopted such provision in the Framework Act for Higher Education (Hochschulrahmengesetz, 1976), that is the regulation derogating Copyright Law's application to scientific authorship. §24 entitled "Publication of research results" provides that "in the publication of research results, staff members who have made their own scientific or other significant contribution shall be named as co-authors; where possible, their contribution shall be identified."²³ That norm protects the authorship rights of each team member, creators of scientific products and performers of technical products. This is a good solution and should be commonly adopted. Thus, based on standard and well-known rules of ethical codes for researchers, scientific authorship can be defined in specific rules on scientific publishing that override general authorship rules in Copyright Law.

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