

Nature's Own Intellectual Creation:

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Copyright in Creative Expressions of Bioart

1. INTRODUCTION

The concept of bioart describes the dialogue between art and science, which essentially involves organic matter as material and biotechnological methods as a tool of artistic expression. A living design medium refers to material production that incorporates simple living organisms, material driven design, and co-designing, with something having its own agency (Camere & Karana, 2018: 570–584; Karana et al., 2015: 35–54). In this context, artists become experimenters, collectors, and natural realtors or agents. These new settings bring forth interesting questions from the perspective of those areas of law, such as intellectual property laws (IP, IPR), that are conventionally used to govern artistic creations. Notably, copyright law is particularly prominent in this regard. An intriguing question is: how does this type of 'new' art comply with copyright rules that are primarily designed to protect literary and artistic – human-generated – works?

On viewing bioart through copyright lenses, one may discover that it does not easily align with several key elements, structure, and justifications of most copyright systems. For instance, the normative justification of copyright, especially in civil law countries, strongly relies on the so-called labour theory (Locke, 1690) which states that the fruits of a person's intellectual labour ought to be recognised as their (intellectual) property – and personality theory (Hegel, 1967), which surmises that creation is a form of self-expression, and a creative work includes a piece of its author's personality, and thus, copyright ultimately protects the personality of the author. In modern EU copyright law, these justifications for copyright are strongly present in the concept of originality. Originality is the *sine qua non* criteria for a work to attract copyright protection. In the EU jurisdictions, a work is considered to be original, if it is its 'author's own intellectual creation' (Infopaq International A/S v. Danske Dagblades Forening 2009, para. 37). This, thus raises the question: whether and to what extent can a work of bioart be its 'author's own intellectual creation', when its form is either completely dependent on, or is a result of co-designing with something else than the human author (that is, with nature)?

This article addresses this key question, enlightening how expressions of bioart appear to the eyes of EU copyright law. The article relies on two narratives of bioarts: Narrative 1 – 'Wind painting: a living design medium' and Narrative 2 – 'No needle needed'. The article illustrates the potential conflicts between the normative justification of copyright and the ways in which bioart is created. In addition, it analyses whether the European standard of originality can be fulfilled in expressions of bioart, and, if so, what are the (typical) features of bioart that may endanger the presence of originality.

The article is structured as follows: Section 2 describes the methodology used, which primarily is derived from the use of narratives and traditional methods applied in legal analysis. Section 3 presents the two selected narratives, describing in concrete terms the process of creating bioart and bringing to the forefront situations in the creative process that challenge the prevailing idea of originality in EU copyright law. A more thorough legal analysis follows in Section 4, with a focus on the concept of originality, as well as other related concepts, such as 'authorship' and 'work'. Section 5 applies these copyright concepts to the selected narratives and discusses the challenges that bioart brings to the copyright system. Section 6 subsequently summarises and concludes, also discoursing over the possible future developments for IPR in bioarts' protection, such as the use of related rights to copyright.

2. METHODOLOGY

The article utilises a multi-method approach, combining narrative types of methodologies with traditional methods used in legal analysis.

First, the article uses narrative recollection as a supplementary method with narrative inquiry to generate understanding through the 'personal and collective narratives in diverse professional and cultural settings' (Bochner & Ellis, 2003: 507). The authors engage in reflexive writing of the narrative accounts of their own experiences, which are collaboratively analysed further in order to glean findings. Two of the authors, practising bioartists, explored their agency in two bioart processes by reflecting on and reconstructing their individual experiences. They based their reflections on tacit knowledge, contemplative self-examination, and learning from experience (Leitch & Day, 2006: 180), and supported their reflections by visual data such as photographs and sketches. The narratives elucidate the legal issues at stake.

Second, the article utilises normative approaches and legal dogmatics. The legal dogmatic method is normally used to identify legal rules and to solve their indeterminacies (Tuori, 2002). In this article, the dogmatics is used to build a normative framework for the special copyright issues that arise in the context of bioart, especially regarding conditions for protection.



Figure 1. Metamorphoses of wind, from factual wind painting sketches to work of art. 'Pyhä I-IV', paper and ink, 40x50cm. Heidi Pietarinen [Author 3], 2021. The wind paintings were exhibited under my authorship: Growth, Death and Decay November 17 – December 3, 2021 in Hämärä Gallery, BioARTEch Laboratory, Faculty of Art and Design, University of Lapland, Rovaniemi, Finland. Photographs ©Heidi Pietarinen.

3. NARRATIVE CASES ON BIOART

3.1. Narrative 1

Wind Painting: A Living Design Medium by Heidi Pietarinen

Last summer I made wind paintings in the Keropirtti region near Pyhätunturi ('The Holy Fjell') in Lapland, northern Finland. I was curious to see how the wind and tree as living design mediums become perceptible to humans. Here, a living design medium refers to material production that incorporates simple living organisms such as wind or tree (a living design medium), material driven design and co-designing, with an entity having its own agency (Camere & Karana, 2018; Lauri, 2021). The fieldwork included data collection on wind painting methods and processes, which were materialised in exhibitions at the University of Lapland art galleries in Rovaniemi, Finland, in 2021.

Wind painting was an attempt at getting the wind and pine tree branches to paint on paper with black ink. First, I placed a painting pad and watercolour paper (300 g/m²) on the ground under the tree. Then I attached a paintbrush to the pine branch using a fine and flexible metal wire. Just before I applied the brush to the paper, I dipped it into black undiluted ink, as used in calligraphy.

The wind painting equipment (i.e. painting pad, paper, paintbrush, ink, and wire) and the pine tree, thus created a human-non-human 'assemblage' of diverse elements, that can also be referred to as a new whole in three dimensions, containing various vibrant materials. In the wind, the 'assemblage' started to live, because each member of the composition contained a certain vital force, the agency and the elements were working together. Each pine tree branch seemed to have a personality of their own: they repeated their own movements and trajectories according to their own tendencies (Bennett, 2010: 20–38; Närhinen, 2016). The wind paintings were also dependent on the weather conditions (e.g. wind, heat, rain) and the equipment (i.e. shape and weight of brushes and papers, (in)flexible yarn or (un)diluted ink). Moreover, the paintings were an exploration of biomimicry, which is to mimic good ideas from nature and convert them into design.

After I attached a brush to the branch, making the wind paintings, tracking the wind's movement, the tree seemed to almost take on a personality of its own, speaking in quick bursts, gentle whispers, or occasionally making an emphatic point (see Grant et al., 2019). The painting sessions were fairly long, up to 30 minutes, because there was no need to dip the brush in the ink in the middle of painting. Some of the wind paintings were made within a few minutes, like quick sketches of a live model (croquis), while a series of brief paintings were made in a short period of time, after which the painting brush changed position, stopped painting or another wind painting was painted. The paintings were made at the same spot, during the daytime and several painting sessions were arranged sequentially. Sometimes I let the tree paint on its own, not paying any attention,

while at other times I followed every step of its painting sessions all the way to the end. This meant that the tree just stopped painting or repeated the same pattern, looking like a bow pattern. These patterns can be construed as being the tree's artist statements – description of their work, providing the viewer an understanding of the beginning and the end of the painting process.

During the wind painting sessions, I felt like being in a dialogical relationship with the tree. I was surrounded by a Wood Wide Web (the underground root system of trees), or more broadly 'the whole web of life on earth' (Ballardi & Casi, 2020: 3; Wohlleben, 2016: 29, 67–68). From time to time, the tree showed its own hermit character and the painting did not proceed. I safely inferred that the pine tree did not want to talk to me or paint with me, so it was really about painting without painting myself. Many a time I wondered how trees might process data or even make decisions in a wider sense, and how to understand these processes based on art-led research. I was curious about the narratives and influences told by trees, because narratives should not be thought of merely as written or spoken language, but as what we do – as doing is thinking.

After painting with the tree 'collaborators' in Pyhätunturi, I asked: What are the abilities of these wind paintings? What are the bridges between us? (See Grant et al., 2021) Language is the most important feeler today, but which organisms demonstrate consciousness? Can trees understand themselves, and if they can, what rights should they have? For example, should trees (especially those with beard lichen) be granted legal personhood and be recognised as living entities, like the Whanganui River in New Zealand, the Ganges and Yamuna rivers in India and the Atrato River in Colombia? It is certain that it seems more and more logical to treat nature as a living entity, similar to how we see humans as individuals. The aim is ambitious, because we should recognise higher intrinsic value not only in humans, but in non-human nature as well (Ballardini & Casi 2020; Rauhala 2017 & 2021).

The wind and pine tree branches were a precisely designed tool for data collection. Wind painting helped me to see things that cannot be seen with the naked eye, like making wind's repetitive movements visible and materialising tree movement oscillations in wind. The ink dots on paper were also another interesting focal point, because they did not only reveal the starting point of the wind painting but indicated where I had placed the brush in the first place.

Creating the wind paintings was an exclusively private experience in the Finnish forest that gave rise to empathetic connections between me and the tree, allowing for a more general and profound understanding of the relation between human and nature. Wind paintings are both (non-)human and (in)tangible; we can document these elements and bring them to life in our own ways as long as these breathtaking natural wonders – pine trees with beard lichen – exist.

3.2. Narrative 2

No Needle Needed by Melanie Sarantou

My interest in textiles and fashion lured me into my first professional occupation. It was much later in life that I became involved with growing bird seed in my windowsill in Rovaniemi where I worked and lived at the time. It was the festive season, just after Christmas and I was lonely, removed from my family due to the Covid-19 pandemic. I longed to have a living entity in my space. It was dark and quiet.

In dark moist.

Bedding of wool.

Silent growth, hidden roots.

Will they reveal themselves?

Will they teach me?

The seed, spotted during Christmas shopping in the supermarket, conjured up ideas of growth and life in my mind. The idea happened; it came in a flash. Being a felting artist, I had some wool in my apartment, so I experimented with growing seeds in wool, envisioning how warm and cosy it would be for the little seed. The sprouting fascinated me as it was eerie, almost weird. I forgot how magical it was from my childhood. The roots of the sprouts most interested me with their lacy spindly appearance. To my surprise, the roots soon started revealing peculiar antics; due to their agency they were growing through the cardboard I had on the windowsill, finding their way through to the surface. Working in the dark while I was living my life, the roots were relentlessly active.

It was then that the experimentation began. Layers of wool, seeds, boxes, water, paper, lights, all brought together in a space we found at the university where I worked. A biolab arose quickly. My plan was to observe and discover what the roots wanted to do, what they could do, and what they wanted to show to me and teach me. If they can find their way through cardboard, what else can they accomplish? The several layers of colourful wool, water, and light became the playground of the roots. I wondered, do they play, or do they work? They did it all: crafted, stitched, coiled, curled, crocheted, traced, sketched, laced, made.

Then, one fine day, I realised that I was out of control, apart from watering and keeping a light switch on in the biolab, the roots were rather shyly trying to escape my unabating gaze. Semi-revealed, I could trace their crafting through the sheer bottom of the box, which I provided as their adventure playground. Or did they work? The roots carefully crafted a textile, stitching it skillfully with patterns of gold embossed on the colourful layers of wool. This was the wonder, yet another discovery awaited. There was growth, but soon there was also death. Mould set in. Rot. When death arrived, another life took over. Yet, growth continued in one form or another.

Did I end the growth, or did it end itself?

Did I control it, or did they?

I did not stitch, only waited next to the adventure playground.

Next to the working roots.

Upon reflection on the processes observed in the biolab, bioart may be the performances, or the outcomes of skillful labour that may be (partly) non-human. Bioart, which may be a performance or an outcome, an end of a process. As humans, our roles as makers are often only partial. I have learned that by being a bystander and observer, the wonders of discovery can be revealed.



Figure 1. Sunflower bird seeds were sprouted on a bed of Finnish lambswool and leather paper in which circular cartwheel shapes were cut. This was my first intervention apart from providing light and water to the seeds



Figure 3. The seedlings are seen from the side after six weeks. My second intervention was to inhibit growth by placing them in the snow for four hours. My interest was to understand the agency of the roots. They were returned to the laboratory with no watering.



Figure 2. After six weeks the sunflower seedlings have grown through the cartwheel shapes, creating an interesting mesh of patterns, semi-attaching to the leather paper



Figures 4-6. The metamorphosis continued as the seedlings were drying out, the roots changed colour and the final stages were achieved.



Figure 7. The textile was exhibited under my authorship during an exhibition in 2021. Photographs ©Melanie Sarantou.

4. EUROPEAN COPYRIGHT LAW – SOME STARTING POINTS

Before going into the details regarding the extent of application of the European copyright framework on bioart, it is imperative to provide a general overview of some key notions of copyright law. In the context of bioarts and copyright, especially concepts related to authorship and the interpretation of originality are central.

4.1. Author

In the field of copyright, authors have always been the starting point and central to the discussion. Copyright entitlement is usually justified based on the above-mentioned labour theory of property by John Locke (1690), according to which, the intellectual labour of the author – in combination with other resources – justifies the author's right over the fruit of their labours. Moreover, the personality theory by Hegel (Acton, 1967) claims that a work belongs to or reflects the personality of their creator. In the perspective of European law, international copyright treaties to which the EU is a member, e.g. Berne Convention 1979, WIPO Copyright Treaty (WCT) and Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)), EU legislation (e.g. The Satellite and Cable Directive 1993; The Database Directive 1996; The Rental Directive 2006; The Computer Programs Directive 2009), cases brought before the Court of Justice of European Union ('CJEU'), as well as national laws and cases all tend to interpret the concept of 'author' as a natural person, with very limited openings towards legal persons' authorships. As such, an author might be lacking from expressions created by, for instance, a software, an artificial intelligence ('AI'), an animal or a force of nature. However, although the main EU copyright directives offer some harmonised definition of 'author', there is not yet a uniform understanding of any similar or related concepts in EU copyright law. On the one hand, the directives define 'author' only for specific types of works, and, on the other, there is still no clear answer as to whether a legal person can be regarded as an 'author'. At the same time, it becomes necessary to interpret and understand this issue also in line with the concept of originality, as presented below.

4.2 Work

What is a 'work' in copyright law terms? Neither the international treaties to which the EU is a party (WCT and TRIPS), nor the EU copyright legislation contain an exclusive list of protectable work categories. In the EU, for instance, the Information Society Directive ('InfoSoc Directive', 2001) requires Member States to grant various exclusive rights to their works, however, notably without defining the concept and meaning of work.

The CJEU has held that due to EU law's absence of express reference to the law of Member States for the purpose of determining the meaning and the scope of the concept of work, this concept must be given an autonomous and uniform interpretation throughout the EU (see e.g. Infopaq, para. 27). In its Levola judgment (Levola Hengelo BV v. Smilde Foods BV 2017), the CJEU clarified that a work is a subject matter that is both original in the sense that it is its author's own intellectual creation, and 'expressed in a manner which makes it identifiable with sufficient precision and objectivity, even though that expression is not necessarily in permanent form' (ibid., para. 40). Regardless of the expression not needing to be permanent, the requirement of precision and objectivity, as well as copyright tradition, stipulate that the work under study has to be fixed in some form. The requirement of identifiability is vital in order to know the entity to which we are applying the other mandatory copyright requirements (McCutcheon, 2019: 946).

4.3 Originality

In addition to being identifiable with sufficient precision and objectivity, a work must be original to qualify for protection. The requirement of originality in European copyright law is defined in the Computer Programs Directive (Article 1(3)), the Database Directive (Article 3(1)), and the Term Directive (Article 6(1)) as the 'author's own intellectual creation'. However, up until the 2009 Infopaq decision, this interpretation of 'originality' applied only to specific categories of works, namely photographs, computer programs, and databases. Infopaq extended the 'author's own intellectual creation' standard to all other work categories. Based on the argument that the InfoSoc Directive should be rooted in similar principles as other directives, the CJEU held that copyright protection within the meaning of Article 2(a) of the InfoSoc Directive should apply only to subject matter that is original in the sense that it is its author's own intellectual creation (Infopaq, paras 36–37). The CJEU further interpreted this concept in other key decisions, such as Murphy (Football Association Premier League Ltd et al v. QC Leisure et al. 2011), Painer (Eva-Maria Painer v. Standard Verlags GmbH et al. 2010), and Football DataCo (Football DataCo Ltd et al., v. Yahoo! et al. 2012), stating that 'author's own intellectual creation' means that the author should 'stamp their personal touch or reflect their personality in the sense that they express their creative abilities in an original manner by making free and creative choices'. Indeed, the emphasis on the 'personal touch' and 'personality' followed by the CJEU in interpreting the concept of 'originality' indicates the idea of the author as a natural person, since only human beings can possess personality and a personal touch.

5. COPYRIGHT AND BIOARTS: LESSONS LEARNED FROM THE CASES

5.1 Authorship in Bioart

The narratives in Section 3 enlighten how forces of nature participate in the making of bioart. This raises certain issues regarding authorship and, as a consequence, issues regarding originality, since authorship is the source of originality. In accordance with the normative justification of copyright, the author deserves the protection for a certain creative action of theirs, which has resulted in an original outcome. It is the author's creative actions – or the lack thereof – that matter. For instance, if a rock has become shaped in an artistic-looking way through natural phenomena, a human being who finds this rock cannot be considered the 'author' of the rock, since there is no creative input from this person (Antikainen, 2021: 45).

As it is generally agreed that a copyright-protected work needs a human author, creation of a work of bioart needs a sufficient amount of human input to qualify for protection. Recently, there has been discussion whether authorship could be 'opened' to other agents than humans – for instance, to artificial intelligence that creates artistic works (see e.g. Rosati, 2017). Following the same analogy as in the AI discussion, one could ask: could we open authorship to nature, or natural organisms, so that their creations could qualify for copyright protected subject matter? At the moment, this is not possible in the EU context, mainly because nature and natural organisms do not have legal personhood, meaning that they cannot be considered as rightholders. Since one of the main functions of 'authorship' is to determine the first rightholder of a copyright-protected work, we must consider nature's ability of being a rightholder. Globally, elements of nature being rightholders is not completely unheard of, especially in countries with vocal indigenous communities. For example, in 2017 New Zealand granted the Whanganui River legal personhood (Kramm, 2020). It is also worth pointing out that other entities than human beings being considered as designated copyright holders is not totally unheard of either. For example, the Software Directive (Article 2(1)) and Database Directive (Article 4(1)) permit Member States' national laws to consider legal persons as 'authors' of computer programs. Against this backdrop, considering nature as author is not as far-fetched as it might seem at first glance.

It is not uncommon for bioartists to make strong authorial claims to their work, regardless of their heavy reliance on nature and existing biotechnology in the creation of bioart (McCutcheon, 2018: 7). The artists making such claims may not be completely wrong. Even if it is agreed that under no circumstances can nature be considered as author, it is not certain that even in those bioart instalments where nature would 'do most of the work' there would not be a sufficient level of human input, resulting in the standard of originality being fulfilled. Narrative 1 serves as a good example of this. In this particular case, the human author created a setting and possibilities for the 'tree author' to paint. Although the tree author seemed to do most of the work, it can be argued that the human author's 'free and creative choices' – as required by EU copyright law – are present in the arrangements that she made. By making various choices in organising and arranging the possibility for the tree to paint and by supervising the tree's painting, as well as deciding when the tree

was done with the painting and when it was time to start another painting, the human author stamped the work with her personal touch (see Painer, para. 92). As the human author (Heidi Pietarinen) herself describes in Narrative 1, 'it was really about painting without painting myself'.

If it is concluded that expressions of bioarts are capable of qualifying for copyright protection when there is a sufficient level of human input, some practical problems may occur. When assessing originality, drawing a line between the fruits of skillful human labour and nature's contribution can be complicated. One might need to evaluate whether the non-human agent was merely a tool to the human as opposed to when such non-human agent was a (co-)author. The problem here is hence very similar to e.g. assessing whether a human-author has used software as a tool to create an expression, or whether the software generated the expression independently. In the case of bioart, this is even more problematic, because an expression of bioart – even when it is human-authored – tends to mutate over time, as Narrative 2 enlightens. To what extent can the human author claim authorship? Would it be fair, or justified, if the human author would also be considered as the owner of a mutation, if they have not contributed to the mutation process? If the human author at some point quits making free and creative choices that affect the work, and lets the work evolve independently, the human author may not be considered as the owner of the forthcoming mutations of the work. In Narrative 2, the human author (Melanie Sarantou) admits that she is out of control – she is merely following and inspecting the roots to do their work; to mutate, to change, and eventually, to die. At the point when the human author quits being in control and becomes a passive follower instead of an active subject, it is difficult to argue that they would be making free and creative choices, resulting in the standard of originality being fulfilled and therefore resulting in authorship.

5.2 Bioart as a 'Work'

The issues that bioart has in relation to the general definition of 'work' in copyright law, can be roughly divided into two categories: (I) bioart tends to be ephemeral, and (II) expressions of bioart often change their form consistently.

As described earlier, bioart tends to heavily rely on living systems or semi-living material. Consequently, most bioart is ephemeral. The activity of seeds, roots, moulds, plants, and other components is momentary. It is almost inevitable that at some point a bioart expression will disintegrate. Thus, bioart is often doomed to 'expire', to vanish. After that, there is no longer a 'work'. However, the CJEU confirmed in *Levola* that a subject matter protected by copyright does not necessarily need to be in permanent form (para. 40). Therefore, the ephemeral nature of bioart does not per se form an obstacle for copyright protection.

Even though ephemerality does not necessarily exclude expressions of bioarts from the scope of copyright, their constant change of form might very well do so. Once again, the *Levola* judgment might give us a guideline here. In *Levola*, the CJEU clarified that a work is a subject matter that is both original, and 'expressed in a manner which makes it identifiable with sufficient precision and objectivity' (para. 40). Arguably, the indirect consequence of the requirement of precision and objectivity requires the work to be fixed in some form. Even though a requirement of fixation is not found in the legislative texts per se, this requirement aligns with general copyright tradition. The question therefore is whether an expression of bioart is identifiable enough, if participation of nature or living organisms causes the work to change and evolve in a continuous, uncontrollable manner? If the change is continuous, how to determine the stage when the work is 'finished' – when the bioart process ceases to be merely a process and becomes a 'work'? In *Narrative 1*, the tree painted sketches with the help of a human. The human author decided when the sketch was finished; when it was time for the tree to stop painting. It was therefore the human author who dictated when the bioart process ended and when the work was finished. Moreover, there is no doubt that the sketches are identifiable with sufficient precision and objectivity.

Assessing whether *Narrative 2* also includes a 'work' in copyright terms, is more complicated. This expression of bioart seems more like a process, where different stages of the process developed many possibly original works that may have been identifiable with sufficient precision and objectivity. However, these works were not fixated, nor did they last – they eventually mutated into something else, and then the whole process died. Overall, it appears that bioart in *Narrative 2* should be considered more of a process or a performance than an actual work in copyright sense. The various stages of this process have been captured by a camera. However, these documented stages themselves do not constitute 'works' – the work(s) of art here is the photograph of the bioart process.

5.3 Originality in Bioart

Although copyright was created for protection of literary and artistic works, not just anything that can be labelled as 'art' qualifies for protection (McCutcheon, 2018: 3–4). Regardless of the EU standard of originality now treating different categories of works in an equal manner (Härkönen, 2021: 103) and copyright law therefore not per se excluding works of bioart from protectable subject matter, it is likely that many expressions of bioart fail to fulfil the standard of originality due to a lack of sufficient human input.

The EU standard of originality includes a few features that are worth taking a closer look at due to their potential conflict with expressions of bioart. The roots of all these conflicts are in the traditional (and prevailing) interpretation of originality, according to which originality is something that results from a human author (see e.g. Ginsburg, 2018: 131). As mentioned above in Subsection 5.1, with bioart we are inevitably confronted with the question of whether nature's contribution is so dominant that the resulting expression is not the 'author's own intellectual creation'. This is the case if forces of nature dictate the creative process to the extent that the author's free and creative choices are not present. In this kind of situation, it is possible to draw an analogy from the CJEU judgment in *Brompton* (SI, *Brompton Bicycle Ltd v. Chedech/Get2Get*. 2020). Based on *Brompton*, we may say that an expression of bioart cannot be an original work resulting from intellectual creation in the case where the realisation of this expression has been dictated by nature working its own way, which has left no room for creative freedom (*ibid.*, paras 30–31, 34). Therefore, to establish whether this expression falls within the scope of copyright protection, one needs to determine whether, for instance through making various choices and arranging possibilities for a nature's agent to create a work, its author has expressed their creative ability in an original manner. This is the case, if the author has made free and creative choices and has created the expression in such a way that it reflects their personality.

A key question is: who is in control – the human, or the non-human agent? Defining when the line of control for the human author is crossed might be challenging, and must be evaluated case by case. If this line is crossed and the non-human agent is the 'lead-author' of the bioart process, the chances for the result to be considered as an original work decrease significantly. However, the non-human author's leading role does not necessarily rule out the possibility of having an original work, if there are at least some parts in the expression that are the human author's own intellectual creations. But in cases like this the resulting copyright protection would likely be quite narrow, since the complete expression of bioart would not merit protection.

Originality in expressions of bioart appears to connect to the perpetual idea-expression dichotomy of copyright law. Ideas, procedures, methods of operation, or mathematical concepts as such can never be protected, but expressions of them can be. Respectively, copyright requires originality from an expression – not from an idea. Therefore, no matter how original, unique, creative, or novel an artist's idea of using nature to create bioart is, the artist cannot claim copyright to it. It appears that many bioart installations and experiments would fall into the 'idea' category, because they lack a clear expression that can be identified precisely and objectively.

6. CONCLUDING REMARKS

Defining copyright law concepts such as 'originality', 'authorship', and 'work' has historically proven to be complex. This is even more the case when these concepts are applied to non-human creativity (Rosati, 2017: 976). Interestingly, the copyright issues and considerations with bioarts presented in previous sections are very similar to those that are often assessed in cases of AI authorship. Both forms of creativity include a non-human agent, which limits the human author's possibilities to affect the creative process (at least to a certain degree), and hence, the creative output. Especially the problems regarding authorship and originality are strongly present in both AI-generated creativity and expressions of bioart. This illustrates how copyright law clashes with new ways to produce literary and artistic works.

What seems to lie beneath most of the conflicts between copyright and bioart is that whereas copyright law is very 'result-oriented', bioart is fundamentally 'process-oriented'. Instantiations of bioart often follow a long process of research, experimentation, and trial. In bioart, the process is usually as important as the result (McCutcheon, 2018: 6). On the contrary, copyright law very much focuses on the finished work. This fundamental difference is very likely to act as a gatekeeper that excludes many bioart creations from the scope of copyright protection. All this being said, our intention is not to claim that copyright law ought to find ways to forcefully include expressions of bioart in the scope of protected subject matter. If an expression of bioart fails to fulfil the standard of originality or cannot be identified with sufficient precision and objectivity, it then rightfully needs to be excluded from the scope of copyright. This, however, does not mean that it would not deserve to be protected. Fostering creativity and innovation of bioartists is as important as supporting any other artists. Therefore, it is worthwhile to consider other types of IP. For instance, expressions of bioart that are not works in the sense of copyright law could potentially be viewed as performances and therefore be protected as such, attracting 'performance rights', that are one type of related rights to copyright (Directive 2006/116/EC of the European Parliament and of the Council of 12 December 2006 on the term of protection of copyright and certain related rights). But even then, due to the variety of ways in which bioart manifests itself, it is almost certain that there would remain many instantiations of bioart that would not qualify to be protected as performances, either. It might be inevitable that many bioart instantiations simply belong to the public domain.

This article has addressed the key concerns that obstruct a connection between expressions of bioart and copyright protection. We welcome further research on the kind of legal issues that arise after concluding that an expression of bioart constitutes an original work, such as practical problems related to infringement scenarios. Even though a work does not need to be permanent in order to attract copyright protection, the question remains as to how to prove whether there is an infringement, and at what stage there has been an infringement in case the work is constantly changing and evolving (such as in Narrative 2). Even in cases of art made of living material, there ought to be some 'final' version of a work, a stage of development for instance, that is then changed, altered, or otherwise treated in a manner that infringes the rights of the author. In case the enforcement of copyright to a work of bioart makes no sense due to practical obstacles, one might need to question the whole significance of protecting such work.

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This article is authored by a multidisciplinary research group, consisting of two lawyers and two artists. The doctrinal study of law and the legal analysis in this article were performed by Dr. Heidi Härkönen and Dr. Rosa Maria Ballardini, who both have specialised in intellectual property law research. They utilised the study to build a normative framework for the special copyright issues that arise in the context of bioart, and tailored policy arguments concerning how IP should treat bioart. Dr. Heidi Pietarinen and Dr. Melanie Sarantou, both of whom are practising bioartists, were in charge of the artistic work and wrote the reflective narrative accounts of their own experiences. All four authors collaboratively analysed the narratives further in order to glean findings. Finally, Härkönen and Ballardini were responsible for analysing and drawing conclusions from the IP protection status of the expressions of bioart showcased in the narratives.

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