

COMMON HUMAN RIGHTS CHALLENGES RAISED BY DIFFERENT APPLICATIONS OF NEUROTECHNOLOGIES IN THE BIOMEDICAL FIELDS

EXECUTIVE SUMMARY



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CONSEIL DE L'EUROPE

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ABOUT THE AUTHOR

Dr. Marcello lenca is a Principal Investigator at the College of Humanities at EPFL where he leads the ERA-NET funded Intelligent Systems Ethics research unit. He is also an affiliate member of the Health Ethics and Policy unit, Department of Health Sciences and Technology, and an ordinary member of the Competence for Rehabilitation Engineering & Science at ETH Zurich, Switzerland.

Dr. lenca's scholarship focuses on the ethical, legal, social and policy implications of emerging technologies. In particular, he investigates the broader implications of new (and often converging) sociotechnical trends such as Artificial Intelligence (AI), big data, digital epidemiology, robotics, assisted living, digital health, social media, dual use, and neurotechnology. He and his team use both theoretical and empirical methods to explore the requirements for responsible innovation, ethically aligned technology design, user-centred design, and human-centered technology assessment.

Dr. lenca is actively involved in science and technology policy within international organizations and professional societies. In particular, he is a member of the Organisation for Economic Co-operation and Development's (OECD) Steering Group on Neurotechnology and the representative of the Swiss Delegation (appointed by the Swiss State Secretariat for Education, Research and Innovation, SERI). He has also been invited to serve as an expert advisor to the Council of Europe's Ad Hoc Committee on Artificial Intelligence and the Bioethics Committee. Dr. lenca has written reports for the OECD, the Council of Europe, and the European Parliament's Panel for the Future of Science and Technology. He is a Member of the Board of Directors of the Italian Neuroethics Society (SINe), a former Board Member and current member of the Nominating Committee of the International Neuroethics Society (INS).

lenca is a member of the Editorial Board of several academic journals such as Neuroethics, Bioethica Forum, Frontiers in Neuroergonomics and Frontiers in Genetics. lenca has received several awards for social responsibility in science and technology such as the Vontobel Award for Ageing Research (Switzerland), the Prize Pato de Carvalho (Portugal), the Sonia Lupien Award (Canada), the Paul Schotsmans Prize from the European Association of Centres of Medical Ethics (EACME).

He has authored one monograph, several edited volumes, more than 60 scientific articles in peer-review journals, several book chapters and is a frequent contributor to Scientific American. His research was featured in academic journals such as Neuron, Nature Biotechnology, Nature Machine Intelligence, Nature Medicine and media outlets such as Nature, The New Yorker, The Guardian, The Times, Die Welt, The Independent, the Financial Times and others.

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- lenca, M. (2021). On neurorights. *Frontiers in Human Neuroscience*, 15: 701258.
- lenca, M., & Andorno, R. (2017). Towards new human rights in the age of neuroscience and neurotechnology. *Life sciences, society and policy*, 13(1), 1-27.
- lenca, M. (2017). The Right to Cognitive Liberty. *Scientific American*, 317(2), 10-10.
- lenca, M. (2019). *Intelligenza2: per un'unione di intelligenza naturale e artificiale*. Rosenberg & Sellier.

GLOSSARY

- **Alpha waves:** neural oscillations in the frequency range of 8-12 Hz.
- **Belief:** An attitude that some proposition about the world is true.
- **Biomarker:** a biological marker, i.e., a measurable indicator of some biological state or condition.
- **Brain (human):** The central organ of the human nervous system.
- **Brain function:** the function of neuronal circuits in the brain.
- **Cognition:** the set of mental processes such as thinking, knowing, remembering, judging, and problem-solving.
- **Cognitive enhancement:** Interventions in the brain that improve cognition (e.g., attention, concentration, and information processing in executive functions such as reasoning and decision-making).
- **Cognitive liberty:** the right of individuals to make free and competent decisions regarding their minds and brains.
- **Locked-in syndrome:** A neurological condition in which the patient is alert and conscious but is unable to move or communicate verbally due to complete paralysis of almost all voluntary muscles of the body with the exception of vertical eye movements and blinking.
- **Mental content:** the content of a mental state, either conceptual or non-conceptual.
- **Mental integrity:** the integrity of the human mind.
- **Mental privacy:** people's right against the unconsented intrusion by third parties into their brain data as well as against the unauthorized collection of those data.
- **Neurorights:** Ethical, legal, social or natural principles of freedom or entitlement related to a person's cerebral and mental domain.
- **Neurodiscrimination:** discrimination based on neural features.
- **Neuroimaging:** the use of various techniques to either directly or indirectly image the structure, function, or pharmacology of the nervous system.
- **Neurostimulation:** purposeful modulation of the nervous system's activity using invasive (e.g., microelectrodes) or non-invasive means (e.g. transcranial magnetic stimulation or transcranial electric stimulation).
- **Neurotechnology:** the broad and heterogenous spectrum of methods, systems and instruments that establish a connection pathway to the human brain through which neuronal activity can be recorded and/or altered.
- **Personhood:** the status of being a person as opposed to a nonperson.
- **Psychological continuity:** people's continuity of their mental life over time (e.g., continuity across non-synchronous mental states).

EXECUTIVE SUMMARY

Neurotechnologies are emerging technologies that establish a connection pathway to the human brain through which human neuronal activity can be recorded and/or altered. These technologies open novel opportunities for exploring, influencing, or intercommunicating with the human brain. Medical neurotechnologies offer the potential to help people with neurological or psychiatric conditions such as Parkinson’s disease, dementia, stroke, and major depressive disorder. Non-medical neurotechnology systems provide new tools and methods to monitor and modulate brain activity in healthy subjects and to interact with digital devices. Intervening effectively and safely in the human brain through neurotechnology is a scientific frontier that must be reached for the good of humanity. At the same time, however, it raises major ethical and legal challenges. Neuroethics and neurolaw are the two main areas of scholarship that address, respectively, the ethical and legal issues raised by our ever-improving ability to intervene in the brain through neurotechnology.

In the past decade, philosophical-legal studies in the fields of neuroethics and neurolaw have given increasing prominence to a normative analysis of the ethical-legal challenges in the mind and brain sciences in terms of rights, freedoms, entitlements, and associated obligations. This way of analyzing the ethical and legal implications of neuroscience has come to be known as “neurorights”. Neurorights can be defined as the ethical, legal, social, or natural principles of freedom or entitlement related to a person’s cerebral and mental domain; that is, the fundamental normative rules for the protection and preservation of the human brain and mind. In their most popular version, neurorights have been defined as an emerging category of human rights designed to protect the brain-mind sphere of the person.

Reflections on neurorights have received ample coverage in the mainstream media and have become a mainstream topic in the public neuroethics discourse. Further, they are rapidly becoming an emerging regulatory tool of international politics. Yet, several meta-ethical, normative-ethical, legal-philosophical and practical challenges need to be solved to ensure that neurorights can be used as effective instruments of global neurotechnology governance and be adequately imported into international human rights law. To overcome these challenges, this report attempts to provide a comprehensive normative-ethical, historical and conceptual analysis of neurorights. In particular, the objective of this report is fivefold as it attempts to (i) provide an overview of current and likely future biomedical neurotechnologies; (ii) reconstruct a history of neurorights and situate these rights in the broader history of ideas; (iii) summarize ongoing policy initiatives related to neurorights in the present international policy landscape; (iv) proactively address some unresolved ethical-legal challenges; and (v) identify priority areas for further academic reflection and policy work in this domain.

The findings of this report suggest that neurorights reflect fundamental human interests that are deeply rooted in the history of ideas. These rights introduce normative specifications related to the protection of the person's cerebral and mental domain that are not merely repetitive of existing human rights frameworks, but add a new, fundamental level of normative protection. This corroborates the view that human beings generally enjoy a set of rights against certain kinds of interferences in their brains and minds, including those interferences involved in the misuse of neurotechnologies. In addition to protecting against the misuse of neurotechnology, the neurorights spectrum also contains moral and legal provisions aimed at ensuring that neuroscientific and neurotechnological progress is used to empower people and improve human well-being (positive rights). To a large extent, the findings of this report also corroborate the normatively stronger thesis that the fundamental rights and freedoms relating to the human brain and mind should be seen as the fundamental substrate of all other rights and freedoms.

This overview indicates that there is not yet complete consensus regarding the conceptual-normative boundaries and terminology of neurorights. Divergences exist in relation to how these rights are interpreted, named, and conceptually articulated. Nonetheless, some degree of convergence is emerging around three main families of neurorights. First and foremost, the need for specific provisions on the protection of private brain-related information seems to share a high degree of acceptance and recognition. The right to mental privacy appears to be the candidate best equipped conceptually to take on this role. Second, the right to mental integrity appears to have the highest degree of legal entrenchment. While there are some variations in the interpretation of this right, there is full theoretical consensus about the need to protect the person from psychological harm and mental interference. Third, a variety of neurorights candidates have been proposed to preserve and promote the freedom of the human mind and thereby prevent external manipulation. These include

evolutionary interpretations of the right to freedom of thought, the right to cognitive liberty, and the right to personal identity.

On the other side of the coin, positive rights such as promoting justice and equality—e.g., through ensuring egalitarian access to neurotechnology for biomedical use and promoting patient welfare on the basis of the ethical principle of beneficence—have so far occupied a secondary role in the neurorights debate.

Introducing neurorights into the human rights framework may require adding new protocols to existing instruments or even stipulating new multilateral instruments entirely devoted to neuroethics and neurolaw. In either case, some fundamental ethical, meta-ethical, and legal issues must be addressed in order to overcome problems such as rights inflation and to provide an adequate normative justification for neurorights. These include introducing justificatory tests for the introduction of neurorights, clarifying the relationship between moral and legal neurorights and harmonizing neurorights with existing normative instruments.

The Council of Europe's Convention for the Protection of Human Rights and Dignity of the Human Being with regard to the Application of Biology and Medicine (Oviedo Convention) offers an ideal platform and normative substrate for the protection and promotion of neurorights. Given its focus on prohibiting the misuse of innovations in biomedicine, protecting the dignity and identity of all human beings, and guaranteeing respect for their integrity and fundamental freedoms, the Convention is well placed for either enshrining neurorights through ad hoc protocols or for serving as a basis for future instruments.

Understanding, treating, and augmenting the human brain and mind is one of the great scientific challenges of our age. Achieving these goals in a way that preserves justice, safeguards fundamental rights and human dignity is the corresponding task of ethics and law. Neurorights will likely be a useful tool to accomplish this task.

