NeurotechEU
The European University of Brain and Technology

Description of the Alliance: NeurotechEU is the European University of Brain and Technology (www.theneurotech.eu), founded in 2020 under the European Universities Initiative. NeurotechEU aims to establish a trans-European network of excellence in the field of brain and technology to increase Europe's competitiveness in education, research, and innovation. By bringing together leading European universities and associated partners, NeurotechEU creates a unique educational environment where the next generation of researchers, professionals, and citizens can cooperate and work across different European and global cultures.

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D3.6. Charter of NeurotechEU++ Shared Values

Executive summary

Alliances such as NeurotechEU bring together learners and staff to work on collaborative projects as partners committed to our shared vision and mission, irrespective of geographical context or institutional conditions. Each partner is expected to lead all its NeurotechEU activities following our shared values and responsibilities as equal contributors to our joint efforts. The following set of values and principles of collaboration have been integral to building a network of excellence in our academic and administrative endeavours.

Our shared values

1. Integrity and professional responsibility
2. Creativity and innovation
3. Borderless learning and responsible internalization
4. Equal opportunities, diversity and inclusivity (EDI)
5. Academic freedom and freedom of expression

Principles of collaboration

- Commitment to excellence and continuous improvement
- Promotion of inclusivity and widening access
- Facilitation of mobility with environmental responsibility
- Empowerment and engagement for collective social impact

Section II is focused on the implementation of our shared values and principles. The Magna Charta Observatory 'Living values' devoted to supporting universities in developing and implementing their values, was the initial framework upon which NeurotechEU's shared values were brought forward in Phase I to guide the materialization of our goals. Since 2020 when it was founded, NeurotechEU has implemented its shared values and, during Phase II, we will continue to improve our collaboration.

Section III of this Charter describes the ethical standards we set for neurotechnology research and innovation at NeurotechEU. Adopting UNESCO's definition of neurotechnology, NeurotechEU conducts its operations by the following standards:

- Respect, protection, and promotion of human rights, fundamental freedoms, and human dignity.
- Sustainability, responsibility, accountability, responsivity.
- Responsible animal research.

This Charter embraces a human-centred approach through fundamental ethical principles including but not limited to self-determination, freedom of thought, responsibility, privacy, personal and collective identity, fairness, trust, respect, reciprocity, and justice. Furthermore, it incorporates the respect, promotion and protection of human rights, including children's rights following UNESCO's principles of beneficence, proportionality and do no harm; minimize the potential risks of neuroenhancement; self-determination and freedom of thought; mental privacy and the protection of neural data; trustworthiness; global justice and community engagement; best Interests of the child and protection of future generations; enjoying the benefits of scientific-technological progress and its applications.

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CHARTER OF NEUROTECHEU++ SHARED VALUES

(Phase II: 2023-2027)

NeurotechEU NeurotechEU-The University of Brain and Technology represents a European alliance of eight universities with a focus on neurotechnology and recognizes that education is a human right, a public good, and should be accessible to all. As a trans-European network of excellence in brain research and neurotechnologies, NeurotechEU is dedicated to increasing the competitiveness of European education, research, the economy and society by educating students across all levels (bachelor's, master's, doctoral and lifelong learners) and shaping the next generation of multidisciplinary scientists, innovators and entrepreneurs that will address Europe's challenges in technology and health.

As a niche alliance of the European Education Area (EEA) and the European Research Area (ERA), NeurotechEU Alliance is developing new and innovative concepts for deep transnational institutional cooperation to stimulate long-lasting transformation of European higher education. NeurotechEU's transdisciplinary approach not only enriches the educational experience of our learners but also advances innovative solutions to complex challenges in neurotechnology across an eight-dimensional space that defines the envelope of current and future research, education, and application of neurotechnology: empirical and clinical neuroscience, neuromorphic computing, theoretical neuroscience, neuromorphic control/neurorobotics, neuroinformatics, neuroprosthetics, clinical neurotechnology, and neurometaphysics.

Engaging with industry and associated partners, NeurotechEU facilitates collaboration among experts from various disciplines beyond conventional academic boundaries. Moreover, NeurotechEU aims to establish a multidisciplinary, international, and intersectoral approach to project-based learning within a multicultural and multilingual environment that reflects the principles of super-diversity. Super-diversity underscores the need for a nuanced understanding of multidimensionality in contemporary societies, focusing on the intersections of various social categories and the implications for social cohesion, identity, and policy-making. With this innovative approach, NeurotechEU recognizes the interplay between academic and institutional cultural identities, languages, and backgrounds, creating a dynamic environment where diverse learners, academics, and staff continuously solve complex societal challenges. In recognizing super-diversity as a characteristic of European university alliances- the coexistence of multiple identities within a single community - NeurotechEU strives to actively adapt its educational strategies to address societal challenges.

As NeurotechEU encourages collaboration across various fields, integrating insights from medicine, neuroscience, technology, engineering, ethics, humanities, law, business, and social sciences, its partner institutions are committed to the following principles and shared values:

- Commitment to excellence and continuous transdisciplinary collaboration.
- Promotion of inclusivity and widening access to education, research and innovation.
- Facilitation of mobility with environmental responsibility.
- Empowerment and engagement for collective social impact.

- Integrity and professional reasonability.
- Creativity and innovation.
- Borderless learning and responsible internationalization.
- Equal opportunities, diversity and inclusion.
- Academic freedom and freedom of expression.

NeurotechEU relies on the good cooperation of several European Universities acting as equal partners, all sharing the vision of advancing excellence in higher education while promoting European values and identity. The NeurotechEU alliance is formed by eight higher education institutions covering across Europe: Radboud University, the Netherlands; Universidad Miguel Hernández de Elche, Spain; Karolinska Institutet, Sweden; Rheinische Friedrich-Wilhelms-Universität Bonn, Germany; Boğaziçi Üniversitesi, Turkey; Universitatea de Medicină și Farmacie Iuliu Hatieganu din Cluj-Napoca, Romania; Université de Lille, France; Háskólinn í Reykjavík, Iceland.

SECTION I. Principles of Collaboration and Shared Values

I.1. Principles of Collaboration

Alliances such as NeurotechEU bring together learners and staff to work on collaborative projects as partners committed to our shared vision and mission, irrespective of geographical context or institutional conditions. Each partner is expected to lead all its NeurotechEU activities following our shared values and responsibilities as equal contributors to our joint efforts. The following principles have been integral to building a network of excellence in our academic and administrative endeavours.

1.a. Commitment to excellence and continuous improvement

Strive for excellence in both education and research by holding the highest academic and professional standards.

Continuous improvement by learning about best practices implemented by other European alliances.

1.b. Promotion of inclusivity and widening access

Commit to widening access to education, research and innovation. Aim towards an inclusive education and research for all, including those from disadvantaged, vulnerable and underrepresented groups regardless of their origin, ethnicity, disability status, gender, or sexual orientation.

Acknowledge and actively sustain strategies to eliminate systemic barriers, racism and discrimination across and within our educational institutions.

1.c. Facilitation of mobility with environmental responsibility

Create mobility opportunities for learners, academics, and staff to promote cross-cultural and professional development.

Reconcile mobility objectives with environmental considerations, minimizing ecosystem impact and addressing global warming.

Offer ongoing support and orientation to help students navigate academic life effectively.

Provide access to NeurotechEU Campus+, a digital platform where students can take online courses and engage in activities and blended learning opportunities.

1.d. Empowerment and engagement for collective social impact

Empower learners, academics, and staff by providing the tools for success and rewarding innovative ideas.

Promote stakeholder engagement and develop sustainable collaboration models with associated partners and other stakeholders.

Create relevant and innovative educational activities, such as micro-courses for lifelong learners on platforms like Campus+.

Continue to pave pathways for social impact by engaging partners in new opportunities, programs, and lifelong learning projects.

I.2. NeurotechEU++ Shared Values

To live up to the vision of a strong alliance with shared values, rather than several different universities, departments, and administrative units, all NeurotechEU's partners are committed to developing a shared understanding of the core values represented by joined curricula delivered across inter-university campuses, where partners benefit from flexible academic trajectories, including mobility opportunities. NeurotechEU alliance promotes a challenge-based approach in which students, academics and associated partners cooperate across disciplinary boundaries, forming highly functional teams focused on finding innovative solutions to the most significant issues facing Europe today. NeurotechEU supports the educational, professional and personal development of its learners and staff students and graduates via its mobility programs, respecting and promoting the Erasmus+ Charter[i] and the digital transformation goals offered via NeurotechEU Campus+. Shared strategies for sustainable development, along with the development of joint educational programs, including in the area of interdisciplinary knowledge creation, are designed to effectively address the challenges of transnational collaboration. These will also promote equal opportunities and access, wide inclusion, and focus on diversity and fairness across all NeurotechEU's policies. In accordance with the Bologna Convention and the living values of Observatory Magna Charta Universitatum, the NeurotechEU alliance shares the following set of values and associated behaviours.

2.1. Integrity and professional responsibility

At NeurotechEU, integrity is aligned with ethical and professional principles and practices in higher education. NeurotechEU upholds the highest ethical standards in learning, teaching, innovation and research and promotes excellence in all our strategic and operational activities. This commitment is reflected in both personal and professional conduct. It includes fostering respectful relationships, maintaining professional boundaries, and engaging ethically across all aspects of our work, ensuring that every action contributes to a trustworthy and respectful environment.

2.2. Creativity and innovation

NeurotechEU, as a niche alliance, places creativity and innovation at the forefront of developing groundbreaking neurotechnology. Within this dynamic network of universities, we are uniquely positioned to merge diverse perspectives and expertise, fostering an ecosystem where groundbreaking projects and transformative approaches can flourish. Through collaborative research, cross-border exchanges, and a commitment to continuous innovation, NeurotechEU aspires to be a leader in developing technologies that advance both science and society, ensuring that creativity and ethics remain the cornerstones of our growth and impact. We challenge traditional boundaries and embrace forward-thinking methodologies by bringing together highly functional teams from neuroscience, technology, and engineering. The alliance's commitment to co-creating neurotechnology and redefining how we understand and interface with the human brain.

2.3. Borderless learning and responsible internalization

NeurotechEU stands for an open, global, and interconnected approach to education, research and innovation that goes beyond traditional regional, national or institutional boundaries. With a global representation and by promoting shared responsibility, NeurotechEU stands for inclusive and interconnected educational opportunities and tackles societal challenges through lifelong learning, innovation, and a focus on collective social impact.

NeurotechEU aims to establish a multidisciplinary, international, and intersectoral approach to learning within a multicultural and multilingual environment that reflects the principles of superdiversity, contemporary educational landscapes are characterized by an intricate tapestry of cultural identities, languages, and experiences. NeurotechEU incorporates international and global dimensions. Responsible internationalization is a concept that encompasses strategies for creating favorable conditions for international cooperation, including the professional responsibility of minimizing and managing risks in an increasingly volatile environment while aligning its overarching goals with the global goals for sustainable development set by the United Nations.

2.4. Equal opportunities, diversity and inclusivity (EDI) for learners, academics and staff

NeurotechEU prohibits all forms of discrimination and advances equal opportunities in alignment with current European and national legislation. By addressing the intersectionality of gender with other identities, NeurotechEU aims towards widening accessii to education for all our learners and staff, with a focus on vulnerable, disadvantaged but overlooked groups, such as adults, returning or second-career students, refugees, ethnic minority students and vocational students, disabled students, and LGBTQIA+ learners, academics and staff. By increasingly focusing on learning mobility that is accessible for all, in particular for learners, academics and staff with fewer opportunities, mobility initiatives contribute to reducing inequalities and improving social cohesion and gender equality at and across all partner universities.

The alliance will continue to reinforce anti-discrimination measures in all its activities and partnerships in accordance with the current EU legislation. Therefore, NeurotechEU is committed to:

- Continue to provide inclusive education, research, and innovation opportunities while combating all forms of discrimination, such as sexism, racism, xenophobia and antisemitism.
- Continue to actively include migrants, forced migrants, and citizens with a migrant background at all levels of the alliance.
- Continue to actively support and promote gender equality, LGBTIQIA+ equality and the inclusion of people regardless of gender or sexual orientation.
- Foster diversity in cultures, religions, and ethnic groups by promoting mutual respect and understanding among individuals with varied values, languages, heritages, and statuses. This includes providing language support, culturally relevant resources, and opportunities for cross-cultural engagement. By embracing our combined strengths and its super-diversity, the alliance not only enhances the academic experience but also contributes to collective social impact and wide inclusion of the cultural tapestry offered by eight partner universities.
- Create secure, inclusive conditions for neurodiverse learners and staff and those with disabilities who need more support to participate in education equally.

2.5. Academic freedom and freedom of expression

At NeurotechEU academic freedom is both a right and a responsibility, enabling our partner universities to remain independent, innovative, and proactive agents of change free from external pressures. Aligned with the fundamental academic values of Erasmus+ and the Rome Ministerial Communiqué, we protect unrestricted freedom in research, teaching, and knowledge dissemination. Complementing this, freedom of expression ensures the free flow of ideas, information, and diverse perspectives within and beyond our academic community.

SECTION II: NeurotechEU++ Implementation of Shared Values

The Magna Charta Observatory 'Living values' devoted to supporting universities in developing and implementing their values, was the initial framework upon which NeurotechEU's shared values were brought forward in Phase I to guide the materialization of our goals. Since 2020 when it was founded, NeurotechEU has implemented its shared values and in Phase II, will continue to improve its collaboration across our European societies with a global reach and impact.

During Phase II, NeurotechEU began developing a Code of Conduct, i.e.,_a set of internal procedures related to the implementation of shared values. Further actions will consider adapting to the needs of our alliance the Magna Charta Observatory's additional guidelines designed for the implementation of values at the institutional level of a university.

These guidelines will reflect the implementation of shared values across the alliance, at our institutions, and in all activities representing NeurotechEU, including those with our associated partners. The shared values of the NeurotechEU alliance are appropriate for full partners, associate partners and future partners.

The process should naturally engage all relevant constituencies including:

a. academic, administrative, and technical staff at all levels across all units/departments of the university;

b. students at all programme levels and across all, campuses, departments and schools, including student organizations and those involved in the students' consultative structures;

c. relevant external stakeholders, including those from the business, political, and social communities and governing agencies;

d. senior university leaders and members of governing boards. Each constituency will have different preferred means of engaging with the process; hence it is recommended to be flexible rather than to force dialogue into a specific format or too limited a timeframe.

A whole range of mechanisms will be deployed to ensure the involvement and commitment of the various institutional and stakeholder constituencies. These include the use of the guidelines; the use of Delphi techniques (successive questionnaires to sample constituents such as those designed by MCO's Quality Assurance) to refine drafts; initial staff induction to work packages briefings; an alliance-wide NeurotechEU webpage dedicated to our shared values and principles of collaboration to create an interactive dialogue on NeurotechEu's Discussion Forum; briefing sessions for the Board of Governors, institutional leads, and work package leads; open meetings and focus groups on specific topics.
Please consult **Appendix A** for a comprehensive outline of this section.

SECTION III: Ethical Neurotechnology Research and Innovation at NeurotechEU++

This section describes the guiding values and principles for ethical neurotechnology research and innovation. It refers to research and innovation conducted within the NeurotechEU and outside the scope of Neurotech Research and Innovation (NeurotechRI).

Definition of neurotechnology. Neurotechnology refers to devices, systems, and procedures—encompassing both hardware and software—that directly access, monitor, analyze, predict or modulate both the human and non-human nervous system in order to understand, influence, restore, or anticipate its structure, activity, function, or intentions (speech, motor). Neurotechnology combines elements of neuroscience, engineering, and computing.

Shared Values for Ethical Neurotechnology Research and Innovation at NeurotechEU

This Section of the Charter approaches neurotechnology ethics as a systematic normative reflection based on a holistic, multicultural, multidisciplinary, pluralistic and evolving framework of interdependent values, principles, and actions that can guide societies in dealing responsibly with the impacts of neurotechnology on human beings, societies, and the environment and ecosystems.

Respect, protection, and promotion of human rights, fundamental freedoms, and human dignity. To protect the inherent dignity of individuals, NeurotechEU recognizes the inviolable and inherent dignity of

every human being as the foundation of universal human rights and fundamental freedoms. Respect, protection, and promotion of human dignity, as established by international human rights law, are essential in developing and using neurotechnology. This dignity encompasses the recognition of the intrinsic and equal value of each person's forms of identity and their protective attributes regardless of race, colour, descent, sex, gender, age, language, religion, beliefs, neurobiological or mental characteristics, political opinion, national or social origin, economic status, disability, or any other grounds. Neurotechnology must never be used in ways that objectify, exploit, or undermine the dignity and rights of any individual, particularly vulnerable populations, throughout their lifespan.

Ensuring and respecting diversity, inclusivity, non-discrimination and fairness. To ensure fair and inclusive practices, NeurotechEU will use neurotechnology in a manner that ensures and respects diversity, inclusivity and fairness. This means that NeurotechEU should never be used to profile, discriminate, target, or exploit individuals, particularly those in vulnerable situations. All actors involved must avoid reinforcing or perpetuating discriminatory practices and must ensure that neurotechnology does not amplify existing inequalities or create new forms of discrimination based on characteristics such as neurological or neuropsychological features.

Neurotechnology, including its interface with other technologies such as artificial intelligence (AI) should not be used to profile, discriminate, target or exploit people based on grounds protected under human rights law. This use should be particularly avoided/prohibited in the context of vulnerable people or people in vulnerable situations (Recommendation on the Ethics of Artificial Intelligence, Unesco, November 23 2021).

To ensure fair and equitable distribution of neurotechnology benefits, it is imperative to consider the specific needs of different patient groups, genders, age segments, cultural systems, language communities, and marginalized and vulnerable populations. Individuals and groups should be allowed to make lifestyle choices, express beliefs and opinions, share personal experiences, and participate in co-designing technologies, provided that these choices are made in ways that respect the rights of others and the well-being of society.

Sustainability, responsibility, accountability, responsivity. Materials that are used for neurotechnology can be difficult to mine and the process is harmful to the environment (e.g., lithium used for batteries). Both first- and second-generation devices will have an end of-life and become toxic waste. Comprehensive policies should minimize environmental impact and promote recycling and safe disposal practices, ensuring that waste management does not adversely affect human health or ecosystems.

Responsible animal research. Alongside the use of laboratory studies, cell and tissue culture techniques, computer simulations and human volunteers, animal research is still indispensable for some biological and medical research and sometimes even required by law. At the institutional level, there are different regulations, NeurotechEU will continue to conduct responsible animal research which will be carried out under strict conditions, with special approval, according to national legislation and only if alternatives are

not possible. Animal research will be conducted following the 3Rs principles of replacement, reduction and refinement.

Guiding Principles of Ethical Neurotechnology Research and Innovation at NeurotechEU++

This Charter embraces a human-centered approach through fundamental ethical principles including but not limited to self-determination, freedom of thought, responsibility, privacy, personal and collective identity, fairness, trust, respect, reciprocity, and justice. Furthermore, it incorporates the respect, promotion and protection of human rights, including children's rights.

Beneficence, Proportionality and Do No Harm. Neurotechnology should promote health, awareness, and well-being, empower individuals to make informed decisions about their brain, the whole nervous system, and mental health while fostering a better understanding of themselves.
Neurotechnology should contribute to human flourishing without causing harm or subordination, whether physically, economically, socially, politically, culturally, or mentally. The 'do no harm' principle must guide the entire lifecycle of neurotechnology, ensuring that the quality of life is protected and promoted. Any restrictions on human rights must adhere to legal principles, including legality, legitimate aim, necessity, and proportionality. The principles of proportionality, balance and legitimacy should govern the use of neurotechnology and the data it enables, to ensure their use are: (a) appropriate and proportional to the objective and expected benefits that is aimed to be achieved; (b) do not infringe upon the foundational values of this document; (c) appropriate to the context and target user group; (d) based on safety principles and rigorous scientific evidence.

Potential Risks of Neuroenhancement. The temptation to embrace neuroenhancement may lead to the risk of not only unexpected damage to the nervous system, but also to amplified biological-and technologically based inequalities within society. It threatens the very concept of civility and challenges our understanding of humanity–including the rights and obligations held by each group within a given community or society. Thus, neuro-enhancement interventions must be subject to rigorous scientific and ethical scrutiny; policies must ensure equal access to neuroenhancement technologies to prevent the deepening of socioeconomic and biological inequalities; individuals must be fully informed of the risks and benefits of neuroenhancement and participation in enhancement interventions must be voluntary without coercion; no person should experience discrimination, exclusion, or social marginalization based on whether they have chosen to enhance or not; neuroenhancement policies must uphold fundamental human rights, promoting dignity, solidarity, and respect for all individuals; the alliance must continuously reflect on the ethical implications of technological advances; and there must be constant ongoing reflection and evaluation of our work in this area.

Self-determination and Freedom of Thought. Throughout the entire lifecycle of neurotechnology, the protection and promotion of freedom of thought, mental self-determination, and mental privacy must be secured. Individuals have the right to make free, informed, and voluntary decisions about their engagement with neurotechnology, including the right to refuse or withdraw from its use at any time. Where surrogate consent is used, the best interests of the affected individual should be considered.

Research participants should be informed of potential side effects and be allowed to disclose if they have any contraindications for the procedures used. Informed consent should be comprehensive and transparent, providing detailed information about the purposes, risks, benefits, alternatives, and possible outcomes of the technology in all its application domains, ensuring that consent is voluntary and that individuals fully understand the implications for their privacy, autonomy, and well-being. Neurotechnology should never be used to exert undue influence or manipulation, whether through force, coercion, or other means that compromise cognitive liberty. This protection covers both the internal processing of thoughts and their external expression, ensuring holistic freedom from interference.

Mental Privacy and the Protection of Neural Data. As neurotechnology advances in its capacity to access and analyze individual brain data, the concept of mental privacy becomes increasingly critical. Mental privacy refers to the right of individuals to maintain control over their cognitive and neural information, preventing unauthorized access to their thoughts, mental states, and neurobiological data. Due to the challenges of fully anonymizing brain-related data, there is a heightened risk of identifying individuals beyond the intended context of data collection. This exposure could lead to stigmatization, discrimination, or the unintentional disclosure of neural correlates related to diseases, disorders, or other mental conditions—without the explicit consent of the person whose data is being used. Mental privacy seeks to safeguard individuals from such vulnerabilities and ensure that any access to or use of brain data is authorized and ethically managed. Therefore, mental privacy is fundamental for the protection of human dignity, personal identity, and agency. The collection, processing, and sharing of neural data must be conducted with free and informed consent in ways that respect the ethical and human rights principles outlined in this Charter. This includes safeguarding against the misuse or unauthorized access of neural and cognitive biometric data, particularly in contexts where such data might be aggregated with other sources.

Trustworthiness. Neurotechnology systems for human use should always ensure trustworthiness across their entire lifecycle to guarantee the respect, promotion and protection of human rights and fundamental freedoms. This requires, among other things, that (a) these systems do not replicate or amplify biases, (b) are transparent, traceable and explainable, (c) are grounded on solid scientific evidence, (d) and define clear conditions for responsibility and accountability.

Global Justice and Community Engagement. Public awareness of brain health including the health of the nervous system and mental health, should become a priority for societies focused on developing neurotechnology. New opportunities for the general public to enhance their general understanding of neurotechnology, including the importance of neural data should be promoted through open and accessible education, public engagement, training, capacity-building, and science communication. Effective public engagement and respect for diversity necessitate consideration of linguistic, social, and cultural diversity. These elements are crucial to upholding the principles of autonomy and self-determination. Learning about the impact of neurotechnology should be grounded by its impact

on human rights and access to rights. Meaningful community engagement must ensure collective decision-making and respect for communities' values, heritage, culture and identity.

Best Interests of the Child and Protection of future generations. Childhood and adolescence are rapidly changing and life-defining periods of brain development. It is crucial to preserve the rights of children, adolescents, and future generations to make autonomous decisions and their privacy. Technology should be assessed to ensure the best interests and the flourishing of the child as an evolving, intuitive person.
From an ethical perspective, it is important to balance the potential benefits of enhancing cognitive function through neurotechnology for early diagnosis, instruction, education, and continuous learning with a commitment to the holistic development of the child. This includes nurturing their social life, fostering meaningful relationships, and promoting a healthy lifestyle encompassing nutrition and physical activity.

Enjoying the benefits of scientific-technological progress and its applications. Scientific research and development focusing on neurotechnology should be transparent, comply with the best standards of evidence and aligned with international principles of responsible conduct of research and scientific integrity. This requires, among other things, clinical trials involving neurotechnology applications to comply with guidelines on the preregistration of trials, fair selection of participants, approval by independent ethics committees and responsible and transparent communication of the scientific findings.
Access to neurotechnology that contributes to human health and well-being should be equitable. The benefits of these technologies should be fairly distributed across individuals and communities globally. Efforts, including international cooperation, should be made to overcome challenges, and solutions should never take advantage of gaps in neurotechnological regulations. Solutions should focus on resolving the lack of necessary technological or medical infrastructure, education and skills, as well as ethical-legal frameworks.
The development and impact assessment of novel neurotechnology should consider the implementation of human-centred paradigms in which end-users are not merely passive recipients of the technologies but active co-shapers on an equal footing. End users should participate in the whole life cycle.

APPENDIX A. Section II. NeurotechEU++ Implementation of Shared Values (OUTLINE)

In the next versions of the **Charter of NTEU Values** we will discuss the following set of values proposed by one of our partners:

Common Values of NeurotechEU

1. **Excellence and Innovation**
    - Commitment to the highest standards of education and research while fostering creativity and continuous improvement in neurotechnology and -science.
2. **Inclusivity and Equity**
    - Ensuring equitable access to education and opportunities for all, valuing diverse perspectives, and actively combating discrimination.
3. **Integrity and Ethical Responsibility**
    - Upholding the highest ethical standards in all activities, promoting transparency, accountability, and respect for all individuals.
4. **Collaboration and Community Engagement**
    - Fostering strong partnerships among institutions and stakeholders, encouraging collective action for social impact and addressing societal challenges.
5. **Sustainability and Global Citizenship**
    - Committing to environmentally responsible practices and promoting a sense of global responsibility in education, research, and innovation.

In order to scale up our joint operations, a detailed implementation outline will be developed in collaboration with MCO and other interested partners.

Key Steps will involve the following proposed phases:

1. **Collaborative Planning Phase**. Develop a detailed implementation outline with MCO and partners.
2. **Resource Mapping.** Assess current and required resources for the implementation of the plan. This will involve a feasibility assessment conducted by the Management and Coordination Office of NeurotechEU.
3. **Behavioral Alignment Phase.** Define organizational behaviours and guidelines to support shared values across the alliance with an understanding that current institutional approaches will be slightly modified to identify shared strategies for alliance-building activities.
4. **Code of Conduct Integration**. During this phase, work packages and working groups will discuss potential gaps and suggest improvements to be added to policies and guidelines **Inclusivity and Adaptability**. Ensure values are suitable for all partners and other EU alliances.
5. **Integration and Continuous Improvement. NeurotechEU will advance its shared strategies and policies towards shared goals and learning objectives.**
   Strategic Integration. Incorporate the outcomes into the Strategic Plan and other relevant policy and strategic documents, ensuring ongoing refinement and adaptation.
   Process Evaluation. Continuously reflect on and assess the implementation process's effectiveness, paving the way for the initiation of subsequent cycles and iterations.

The last step will involve several transversal strategies related to gender equality, widening access, advocacy and inclusivity, recruitment and continuation of studies, support in developing human potential, the implementation of the Code of Conduct, and additional guidelines.

Additional recommendations include the following actionable items:

- **Share ethical procedures and ideas, best practices, among the consortium, and promote open communication.** Partner members undertake to facilitate the dissemination of information, principles and values associated with the ethical dimensions of neuroscience to their students, their staff and beyond, by any means deemed appropriate to raise awareness of the various issues it covers (organization of training or conferences, writing of best practice guides, dissemination of news in newsletters, etc.). Communities directly involved in research or teaching in neuroscience must identify information and tools that will enable ethical and legal developments in the field to be shared as effectively as possible among them, and to enable their integration by all, regardless of skills or previous knowledge.
- **Raising awareness of ethical and legal issues among students studying neuroscience from the very beginning of their training.** The integration of good practices, values and good reflexes in neuroscience can only be achieved if awareness of the ethical issues of research in the field is raised from the first stages of training, whether through integration into existing courses, the development of new teaching, or through training outside the curriculum. The level of information and awareness must be adapted to the specificities of fundamentally interdisciplinary research, which could reach beyond the circle of specialists alone, and take into account the fact that no one will be able to master all of the issues alone.
- **Promote beneficial applications, short- and long-term oversight, safeguards, and prevent misuse**. Particular attention will be given to sharing feedback facilitating the development of good practices and the protection of all those involved in research and training in neuroscience.
- **Integrate ethics and legal issues early and explicitly throughout research**. Neuroscience researchers, including students, must integrate into their research devices and procedures that allow them to assess the ethical, legal and societal impact of their work at different stages of their research, and particularly – but not exclusively – upstream of it. One of the objectives of these procedures will be to avoid the development of unconscious habits.
- **Include ethic boards**. To ensure proper respect for the ethical dimensions of neuroscience research, researchers must rely on committees, whether existing ethics committees or, when it seems appropriate or necessary, ad hoc committees. In all cases, the importance of opinions external to the teams conducting the research is essential.
- **Promote interdisciplinary, inclusion of humanities.** Neuroscience research and teaching are interdisciplinary by nature, in that they involve stakeholders from a wide variety of disciplines (medicine, psychology, computer science, law, etc.). This interdisciplinarity involves facilitating the transfer of knowledge, practices, and awareness of the issues at stake, so that everyone can take ownership of the different aspects of the research conducted.

APPENDIX B. Glossary of Terms and Definitions

The definitions provided in this Glossary are intended as explanatory definitions used in relation to the contents of the shared values and guidelines.

Colour blindness refers to a legal principle which considers race as irrelevant in laws, policies and in society at large.

Disadvantaged students. Disadvantaged students often face specific challenges compared to their peers in higher education. This can take many forms (e.g. disability, low family income, little or no family support, many school moves, mental health, pregnancy, having less time to study because one has to earn one's living by working or having caring duties). The disadvantage may be permanent, may occur from time to time or only for a limited period. Disadvantaged students can be part of an

underrepresented group, but do not have to be. Therefore, disadvantaged and underrepresented are not synonymous.

The term "disadvantaged students" typically refers to individuals who face barriers to education due to various factors, including:

Socio-economic Status: Students from low-income families who may lack access to educational resources, support, and opportunities.

Geographical Location: Students from rural or remote areas may have limited access to quality education and support services.

Cultural and Linguistic Background: Students from minority ethnic or linguistic groups may experience challenges related to language barriers or cultural differences.

Disability: Students with physical or learning disabilities who may require additional support to access education.

Social Exclusion: Individuals from marginalized communities, including refugees, migrants, and those facing discrimination based on race, gender, or sexual orientation.

Discrimination. The Charter of Fundamental Rights of the EU states explicitly in its Article 20 that everyone is equal before the law and in its Article 21(1) that 'any discrimination based on any ground such as sex, race, color, ethnic or social origin, genetic features, language, religion or belief, political or any other opinion, membership of a national minority, property, birth, disability, age or sexual orientation shall be prohibited'.

The Racial Equality Directive defines discrimination as 'treating a person less favourably than another person on the basis of race and/or ethnicity or creating any practice or arrangement, which would, for no legally justifiable reason, put persons of certain races and/or ethnicities at a disadvantage'.

Erasmus+ is the EU's programme to support education, training, youth and sport in Europe. It has an estimated budget of €26.2 billion. This is nearly double the funding compared to its predecessor programme (2014-2020). The 2021-2027 programme places a strong focus on social inclusion, the green and digital transitions, and promoting young people's participation in democratic life. It supports priorities and activities set out in the European Education Area, Digital Education Action Plan and the European Skills Agenda. The programme also supports the European Pillar of Social Rights, it implements the EU Youth Strategy 2019-2027

And develops the European dimension in sport.

European Education Area (EEA). The European Education Area fosters collaboration among European Union Member States to build more resilient and inclusive national education and training systems.

European Research Area (ERA). The European Research Area (ERA) is the ambition to create a single, borderless market for research, innovation and technology across the EU. By strongly aligning their research policies and programmes, European countries become more effective in the research sector. The ERA is based on excellence and prioritizes investments and reforms in research and innovation, boosts market uptake, strengthens mobility of researchers and free flow of knowledge and technology improves access to excellence.

Horizon Europe. Horizon Europe is the EU's key funding program for research and innovation until 2027. It provides grants for collaborative research projects that often involve international mobility for researchers and academic staff.

Intersectionality. Intersectionality examines the intersections of the three most important global systems of domination: racism/colonialism, capitalism and patriarchy; and their by-products: classism, homo- and transphobia, cis- and heterosexism and all other forms of discrimination, racism, and exclusion. Intersectionality looks at the ways in which various social categories such as gender, class, race, sexuality, disability, religion and other identity axes are interwoven on multiple and simultaneous levels. The discrimination resulting from these mutually reinforcing identities leads to systemic injustice and social inequality. The concept of intersectionality is grounded in decades of activism that battled the challenges of racism and sexism throughout the 20th century.

Intersectionality as an analytical tool for studying, understanding and responding to the ways in which sex and gender intersect with other personal characteristics/identities, and how these intersections contribute to unique experiences of discrimination. Some studies have concluded that various factors can influence educational achievements at the intersection of gender and ethnicity.

The concept starts from the premise that people live multiple, layered identities derived from social relations, history and the operation of structures of power. The intersectional analysis aims to reveal multiple identities, exposing the different types of intersectional and multiple discrimination and disadvantages that occur because of the combination of identities and the intersection of sex and gender with other grounds.

Intersectionality without race. One challenge to a true and effective mobilization of intersectionality throughout Europe is the widespread reluctance to face the significance of race and the reality of racism in Europe. European countries have a tradition of blindly opposing colour or race, in particular in the legal arena where race is deemed irrelevant in the field of law, politics and society.

LGBTQIA+ stands for lesbian, gay, bisexual, transgender, queer (or sometimes questioning), intersex, asexual, and others. The “plus” represents other sexual identities, including pansexual and Two-Spirit.

The Magna Charta Universitatum (MCU) was first signed by 388 universities from around the world in 1988 on the 900th anniversary of the founding of the University of Bologna. The document contained the fundamental principles of academic freedom and institutional autonomy.

Minority. A non-dominant group that is usually numerically smaller than the majority population of a state or region regarding its ethnic, religious or linguistic characteristics; members of this group (if only implicitly) maintain solidarity with their own culture, traditions, religion or language.

Origin. While the Racial Equality Directive does not define 'ethnic or racial origin', its preamble states explicitly that use of the term 'race' does not imply any admission by the EU of 'theories which attempt to determine the existence of separate human races'.

The Member States have adopted various formulations in their national legislation: some do not mention 'race', referring only to 'ethnic' belonging or origin; others refer to 'presumed race' or 'real or presumed' racial belonging; yet others explicitly mention skin color as a protected ground or as a

characteristic feature of a national or ethnic minority. The boundary between religion and ethnicity is not clearly defined, as case law in some countries recognizes discrimination against Jews, Muslims and Sikhs as racial discrimination.

The unspeakability and erasure of race speak about a process of marginalization and depoliticization as intersectionality has been embraced and adopted by academia and mainstream feminist movements in Europe.

The current European anti-discrimination framework overly emphasizes the individual dimension of discrimination, which is primarily characterized by individual discriminatory practices, including deliberate behaviour, discriminatory expressions of opinions as well as actions and decisions which lead to indirect discrimination. This approach overlooks the broader context of discrimination, such as the role played by institutions through unintended actions, or, to some extent, the hidden effects of seemingly neutral laws and policies. Additionally, it disregards the historical legacy of power and racism that continues to influence our current political systems, norms and values. In this section, we outline the four key dimensions of discrimination.

Superdiversity reflects both inclusion and exclusion, as urban transformations bring multiple opportunities and challenges in higher education. The literature on superdiversity addresses not only how diversity is managed but also how it is perceived - either as a benefit or a threat - based on local conditions and socio-political dynamics (Crul et al., 2018).

Superdiversity at NeurotechEU refers to the strengths afforded by the diversification of learners, academics and staff across our nations' states. It expresses the complex and dynamic nature of diversity across our alliance, characterized by a multitude of academic cultures, ethnicities, nationalities, languages, and cultural practices. It emphasizes that diversity is not merely about the individual but also about institutional practices in which different groups interact as multidimensional, unfixed, and porous social categories. A super-diversity approach encourages the re-evaluation and recognition of as opposed to views based on hardened, one-dimensional thinking about social groups.

Therefore, at NeurotechEU, **super-diversity** encompasses **diverse institutional cultures** in addition to individuals' overlapping social identities; these co-evolve and shape each other. However, recognizing super-diversity across a multinational alliance without the acknowledgement of various forms of discrimination could become a unique form of systemic exclusion and erasure.

Therefore, intersectionality remains a necessary tool, crucial for developing future trans-alliance policies and practices that promote diversity, equity and inclusion across our shared operations.

Race. The recognition of race as an intersectional unit of analysis is critical in addressing structural, historical, and institutional inequalities. Some countries do not use this term. Criticism towards the introduction of "race" into political and academic debates overlooks the **institutional, structural and historical racism** on which European countries' economic, political and cultural institutions are built.

Post-racialism is a discourse and ideology which dictates that the category "race" has been transcended and that it no longer constitutes an organizing principle of society. In the absence of race, intersectionality only reinforces a status quo that denies the existence of people and systems that intersectionality was intended to reveal.

Racialization. Processes that negatively label others using race as a label, are also referred to as 'race making.'

Racism. Ideas or theories of superiority of one race or group of persons about one type of skin colour or ethnic origin.

Underrepresented students. A group of learners is underrepresented in relation to certain characteristics (e.g. gender, age, nationality, geographic origin, socio-economic background, ethnic minorities) if its share among the students is lower than the share of a comparable group in the total population. This can be documented at the time of admission, during the course of studies or at graduation. Individuals usually have several underrepresented characteristics, which is why combinations of underrepresented characteristics ("intersectionality") should always be considered. Furthermore, underrepresentation can also impact different levels of higher education – study programmes, faculty or departments, higher education institutions, and higher education system. This definition is complementary to the London Communiqué, "that the student body entering, participating in and completing higher education at all levels should reflect the diversity of our populations", but does not fully cover it.

Vulnerable students. Vulnerable students may be at risk of disadvantage and in addition, have special (protection) needs (e.g. because they suffer from an illness, including mental health, or have a disability, because they are minors, because their residence permit depends on the success of their studies, because they are at risk of being discriminated against. These learners are vulnerable in the sense that they may not be able to ensure their personal well-being, or that they may not be able to protect themselves from harm or exploitation and need additional support or attention.

Xenophobia. Attitudes, prejudices and behavior that reject, exclude and often vilify people based on the perception that they are outsiders or foreigners to the community, society or national identity.

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[i] European Commission: Directorate-General for Education, Youth, Sport and Culture, *Erasmus student charter*, Publications Office of the European Union, 2022, https://data.europa.eu/doi/10.2766/45379

[ii] Widening Access within NeurotechEU: summary of best practices. Phase I NeurotechEU Deliverable D7.1. Available online at https://theneurotech.eu/downloads.