

### **Neurotechnology and Human Rights Consultation**

## Centre for AI & Digital Ethics, University of Melbourne, submission

Australian Human Rights Commission

June 2023

### **1. Overview**

The Centre for AI & Digital Ethics (CAIDE) at the University of Melbourne welcomes the opportunity to respond to Australian Human Rights Commission invitation for written submissions for its consultation on *Neurotechnology and Human Rights* (the Consultation).

Neurotechnology offers hope to many currently experiencing a variety of challenges such as living in a locked-in state, being prone to seizures, or experiencing quadriplegia. It may prove to be effective in supporting people living with mental health issues. It may also provide advances in recreational pursuits, such as gaming. However, given the nature of neurotechnology, with direct connection to, and collection of, neuronal activity, Human Rights guardrails should be in place.

#### About this consultation

The United Nations' (UN) Human Rights Council (HRC) has requested the Advisory Committee to prepare a study<sup>1</sup> on the impact, opportunities and challenges of neurotechnology with regard to the promotion and protection of all human rights. This study will be presented to the HRC at its 57th session. The HRC requested that the Advisory Committee's study consider the views and inputs of relevant stakeholders.

#### About this submission

This submission was prepared by the University of Melbourne's Centre for Artificial Intelligence and Digital Ethics (CAIDE). The Centre facilitates cross-disciplinary research, teaching and leadership, bringing together expertise from the Melbourne Law School, the Melbourne School of Computing and Information Systems, the Faculty of Engineering and Information Technology, the Faculty of Arts, the Faculty of Medicine Dentistry and Health Sciences, the Melbourne Graduate School of Education, and the Faculty of Science at the University of Melbourne.

The submission addresses the key human rights impacts, risks and opportunities associated with emerging neurotechnology, and provides an outline of the way these differ depending on the application and type of neurotechnology (as impacts are contextual). The submission also offers responses to five of the eight questions (bolded) included in the Consultation.

For further information, or to discuss the submission, Dr Michael Wildenauer at the Centre for AI and Digital Ethics can be contacted via email at <u>m.wildenauer@unimelb.edu.au</u>.

#### **1.1 Abbreviations**

- CAIDE Centre for AI & Digital Ethics, University of Melbourne
- CAT Convention Against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment
- CCPR Human Rights Committee
- ICRPD Convention on the Rights of Persons with Disabilities
- ICCPR International Covenant on Civil and Political Rights
- ICESCR International Covenant on Economic, Social, and Cultural Rights
- OHCHR Office of the High Commissioner for Human Rights
- UI User Interface

<sup>&</sup>lt;sup>1</sup> <u>https://www.ohchr.org/en/hr-bodies/hrc/advisory-committee/neurotechnologies-and-human-rights</u>

## 2. General Approach to Human Rights & Neurotechnology

Neurotechnology of all types is growing in importance in medical applications. Given many of the current and proposed beneficiaries of neurotechnology are people with disabilities and people experiencing vulnerability, ensuring that human rights protections are kept central is vital along with a focus on lived experience and user centered design in developing soft law guidelines, standards or regulation to govern this technology. Disability-inclusive efforts that actively involve people with disability in the development, design and implementation of technology, as well as its governance, will help to ensure neurotechnology is truly enabling rather than further disabling.

Further, the likely increased spread of neurotechnology to non-medically supervised applications calls for more general evaluations of their impacts on human rights due to the centrality of the human brain and nervous system to autonomy and existence. Existing issues such as cyber risk, privacy concerns, and chilling of open expression may be exacerbated by the connectedness of neurotechnology to the brain and the fact that usually relatively opaque (to the casual observer) signals are rendered into digital data that can be used or abused in the same way that any data can be.

This submission suggests that at present, there is no requirement for new rights specifically addressed to neurotechnology. Our preference is the nuanced application of existing Human Rights instruments to address specific high-risk concerns around the development and deployment of neurotechnology. The issuing of General Comments from the appropriate Committees addressing various ways in which neurotechnology engages existing rights is however both necessary for the future and sufficient at present.

This submission begins by offering three overarching observations.

#### 2.1 Context is important

Neurotechnology may have the ability to decode neural activity (read) or to modulate this activity (write) or both. It is apparent that a different set of human rights may be at risk, or the magnitude of such risk may differ according to the capabilities of the particular device.

#### Invasive v non-invasive

Invasive neurotechnology, where devices are implanted or inserted into the recipient, is currently restricted to medical uses (but see 2.2 below), however non-invasive neurotechnology has both medically supervised and non-medically supervised applications available currently or under development. A device that can easily be removed (such a skull cap with EEG sensors) may implicate a similar set of rights for the user as do implanted electrodes, but possibly to a different degree and require a different balance between rights. For example, while privacy is still to be protected, the nature of an implanted device and the use to which it is put means that signals of a certain type may be observable and decipherable to others.

#### Intended purpose of devices

Rights often require balancing, sometimes this is as a result of choice by the individual. However, there is a difference in quality between choices between the case where a non-invasive device is used to enable faster game play and for example, where it is used to treat severe depression or epilepsy. For those requiring an implanted device to regain motor function or the ability to communicate, choices between balancing privacy and improved function may be severely constrained, making protection of rights even more important.

#### Neurotechnology can have both positive and negative impacts on human rights

While much of the conversation around neurotechnology and human rights (correctly) concerns downside risks, it is important to remember that such technology can also help protect, promote and preserve rights in several ways (see 3 below). These include improving access to and participation in education, information, political and legal processes, as well as maximizing health and wellbeing

outcomes.

#### 2.2 Keeping ahead of the market is important

While invasive neurotechnology is currently restricted to medical uses under medical supervision, the uptake of neurotechnology such as magnetic stimulation of parts of the brain by DIY users in order to be smarter or faster or less depressed<sup>2</sup>, body hacking and the availability of open-source EEG boards<sup>3</sup>, means that this may not always be the case. Witness the DIY enthusiasm for transcranial direct-current stimulation, or tDCS<sup>4</sup>, as perhaps an indicator that there will someday be a market for invasive or semi-invasive neurotechnology for non-medically supervised users.

#### 2.3 Universal application is important

For-profit organizations, often fast-moving startups, are at the forefront of exciting and novel developments in the field of neurotechnology. While most such businesses in the medical device field understand their obligations to end users and behave accordingly, there are others who do not, and along with many businesses in the consumer-use device space, embody the Silicon Valley ethos of "move fast and break things". International Human Rights Law, because of its status as a(-n almost) universal standard and set of consensus instruments, has an important role to play to put organizations developing neurotechnology on notice that a) technology they develop has potential human rights impacts, b) their activities are subject to observation, and c) there may be legal consequences. A focus on neurotechnology by supranational human rights organizations may also have the effect of motivating a focus on this technology by consumer regulators within countries.

Such global surveillance is also important in preventing arbitrage by corporations to take advantage of local laws and regulations (or often the lack thereof) in testing and trials.

#### Haves v Have-nots

As is often the case, the technology that shows the most promise in the improvement of lives, at present also requires relatively sophisticated infrastructure in order to implement it that may not be available in some areas of the globe. Moreover, it comes at a price point that may prevent those who may benefit most from accessing the technology, even in relatively wealthy countries. These kinds of factors may constrain the choices of potential recipients of the technologies in such a way that informed consent is illusory, as the choice can be a stark binary: consent to whatever conditions are set, or do not receive the technology. Human Rights oversight of for-profit organizations, particularly those trialing devices in the Global South or people experiencing vulnerability is therefore critical.

While equity of access to neurotechnology for medical purposes is an important goal, it is difficult to see how this could be imposed in jurisdictions where governments do not wish to or are unable to afford to subsidize access, leaving the market to determine who will benefit.

#### Horizontal Protection of Rights is Required

The fact that most of the development of novel neurotechnology for medical or non-medical use is undertaken by for-profit organizations requires governments to meet their obligation to regulate third parties in order to fulfill their duty to protect human rights in this area. This has to be a multi-pronged approach. For example, for human rights to be enjoyed to the fullest extent possible by all users of

<sup>&</sup>lt;sup>2</sup> See <u>https://archive.nytimes.com/op-talk.blogs.nytimes.com/2014/07/17/this-procedure-may-improve-your-brain-and-uncover-the-real-you/</u> <u>https://www.instructables.com/Transcranial-Magnetic-Stimulation-TMS-Device/</u>

<sup>&</sup>lt;sup>3</sup> See for example <u>https://www.crowdsupply.com/hackerbci/pieeg</u>

<sup>&</sup>lt;sup>4</sup> See for example <u>https://www.ebay.com.au/itm/223068328670?chn=ps&\_ul=AU&norover=1&mkevt=1&mkrid=705-139619-5960-</u>

<sup>&</sup>lt;u>0&mkcid=2&mkscid=101&itemid=223068328670&targetid=1405537545298&device=c&mktype=pla&googleloc=9071</u> <u>482&poi=&campaignid=19649531412&mkgroupid=146789074798&rlsatarget=pla-</u>

<sup>&</sup>lt;u>1405537545298&abcId=9305371&merchantid=7364522&gclid=CjwKCAjwp6CkBhB\_EiwAlQVyxYPz9oOWr2cD5QvthFk</u> <u>1N2xJJSZjRw-PrPBFbhJKaL1xbinMv\_bTkhoCMWwQAvD\_BwE</u>

the technology, not only human rights organizations but also regulators in the therapeutic/medical device and in the consumer protection arenas must be involved. As has been suggested for AI, neurotechnology should also be assessed, in an ongoing manner, against human rights principles and obligations<sup>5</sup>.

<sup>&</sup>lt;sup>5</sup> Karen Yeung, Andrew Howes and Ganna Pogrebna, 'Al Governance by Human Rights-Centred Design, Deliberation and Oversight: An End to Ethics Washing' in Markus D Dubber, Frank Pasquale and Sunit Das (eds), The Oxford Handbook of Al Ethics (Oxford University Press, 2020) 77, cited in Australian Human Rights Commission, *Human rights and technology: final report* (2021), 92.

## **3. Summary of Potential Impacts on Rights**

#### 3.1 Medically supervised neurotechnology

At present some neurotechnology is invasive in nature, requiring brain surgery or at the least, endovascular surgery. Invasive neurotechnology is used to decode or to modulate neuronal activity, to provide communications with those in a locked-in state, to warn of or forestall seizures, and control muscles or movement in prostheses. Other invasive neurotechnology has been used to restore function in vision and hearing. There are also many non-invasive devices in development and in use, used in treating for example, mental illnesses, which are intended for physician-supervised use with patients. Examples include transcranial direct current stimulation (tDCS) and transcranial magnetic stimulation (TMS) or providing communications channels for those with quadriplegia by allowing remote operation of keyboards or mice.

#### Negative impacts on ICRPD rights (non-exhaustive)

- Art. 15.1 Freedom from non-consensual scientific experimentation. Possibly the use of training data to inform the development of other devices.
- Art. 17 Protecting the mental integrity of the person.
- Art. 21 Freedom of expression may be limited by the choice architecture of a device's UI or chilled by the transparency of the thought process.
- Art. 22 Allowing a reasonable level of privacy may be difficult in some circumstances, but still to be respected.
- Art. 25 Enjoyment of the highest attainable standard of health could be transgressed in cases where invasive devices are removed for non-medical reasons such as product obsolescence or company bankruptcy<sup>6</sup>. This could also be considered to engage with the CAT Art. 1, intentional infliction of severe pain or suffering. Art. 25(e) the prohibition of discrimination against persons with disabilities in the provision of health or life insurance could be transgressed should data from devices used to treat non-visible illness such as depression, leak to insurers.

#### Negative impact on similar more general rights in ICCPR

- Art. 7 Freedom from non-consensual scientific experimentation.
- Art. 17 Right to privacy. Allowing a reasonable level of privacy may be difficult in some circumstances, but still to be respected.
- Art. 18 Freedom of thought may be chilled by the design of the neurotechnology and its interface.

#### Positive impacts by promoting and supporting ICRPD rights (non-exhaustive)

Many of these impacts concern the provision of neurotechnology- and computer-mediated access and participation with respect to information, services, and civic activities (assuming robust consent and informed decision making by people with disability about the design and deployment of the technology).

- Art. 9.2(f) Ensuring access to information by means of controlling a computer.
- Art. 12.3 Providing access to exercise their legal capacity.
- Art. 24 Enabling effective participation in a free society.
- Art. 25 Promoting the highest attainable standard of health, particularly improved mental health through the ability to communicate for persons with a locked-in condition.
- Art. 26 Support participation and inclusion in the community through improved communication (computer control, cochlear implants) and mobility (e.g. spinal implants, bionic eye).
- Art. 29 Participation in political and public life e.g. (a) voting, also and possibly ICCPR Art. 25 Right to Vote.

<sup>&</sup>lt;sup>6</sup> See for example <u>https://spectrum.ieee.org/bionic-eye-obsolete</u>

• Art. 30 Promoting access to participation in cultural life, recreation, leisure and sport.

#### 3.2 Not medically supervised neurotechnology

This is typically non-invasive neurotechnology, more susceptible to dual use than is invasive neurotechnology at present. The key characteristic is that the technology is not mediated or supervised by medical professionals. It will not have been tested and approved for a particular medical application by regulators, but developed specifically for non-medical purposes, or alternatively have been approved for one purpose but being used for a different purpose or modality (off-label use)<sup>7</sup>, or repurposed by DIY enthusiasts.

#### Use by consumers to control devices

 There is some negative impact on a number of ICCPR rights of which Art. 17 Privacy would seem to be most salient and most at risk. Data collected from the device (possibly combined with other biometric data from phones and wearables) could constitute a serious invasion of privacy (both data and physical). Art. 18 Freedom of thought could be implicated if such data was used to nudge a user by governments or advertisers or data surveillance had a chilling effect on freedom of thought or expression.

# Use by consumers for "wellness" or self-improvement purposes not under the care of a physician (such as self-treatment of depression)

- ICCPR Art. 17 Privacy would again seem to be impacted, as could Art. 18.
- ICRPD Art. 25(e) The prohibition of discrimination against persons with disabilities in the provision of health or life insurance could be impacted should data on use for self-treatment of (e.g.) depression become available to insurers.

#### Use by employers for certain occupations to monitor alertness, focus, etc.

- Negative impact on ICESCR rights including:
  - Art. 6.2 Employment under conditions safeguarding fundamental political and economic freedoms to the individual.
  - Art. 7(b) Safe and healthy working conditions where the required use of neurotechnology devices may cause mental or physical injury.
  - Art. 8(a) The right of association in joining a trade union could be chilled by the surveillance aspect of neurotechnology.

# Use by State actors in policing and national security activities (e.g., lie detectors, or detection of political opponents or LGBTI individuals by repressive regimes)

- Negative impact on ICCPR rights, of which the following seem most concerning:
  - Art. 14.3(g) Not be compelled to self-incriminate by confessing to illegal acts or associations.
  - Art. 17 Not be subject to arbitrary or unlawful interference with privacy, which has been interpreted to include sexual identity.
  - Art. 18 Freedom of thought, conscience and religion could be greatly impacted by the repurposing of non-invasive neurotechnology to serve as lie or loyalty detectors.

#### Use by military forces to control devices (e.g., drones)

<sup>&</sup>lt;sup>7</sup> See Therapeutic Goods Administration <u>https://www.tga.gov.au/resources/resource/guidance/label-use-medical-devices-frequently-asked-questions</u>

• While the defence forces share many characteristics of a large employer, the particularities of this environment put it beyond the scope of this submission.

### 4. Questions from the Australian Human Rights Commission

## **1.** What human rights will be most impacted by the development and use of neurotechnologies? (top 3)

For medically supervised and justified applications of neurotechnology (particularly but not solely, invasive devices), many of the most impacted rights are those contained in the Convention on Rights of Persons with Disabilities (ICRPD).

- a. Article 17 Rights to mental integrity are at risk in the case where the neurotechnology device is able to "write" to or modulate the activity of the brain.
- b. Article 22.1 Not being subjected to arbitrary or unlawful interference with privacy is a difficult and important area given that neuronal activity is required to be monitored and may be on display or recorded.
- c. Rights engaged by the removal, decommissioning, or end-of-life of an invasive piece of neurotechnology. ICRPD Article 25 Enjoyment of the highest attainable standard of health rights are transgressed when the medically unwarranted removal of neurotechnology results in disability or physical or mental injury. These actions could also engage CPRD Art. 15.1 non-consensual experimentation rights or even the CAT.

For other applications of neurotechnology, typically non-invasive in nature at present, the most impacted rights are those protected by the ICCPR.

- d. Article 17 Right to not be subjected to arbitrary interference with privacy, is extremely important in consumer use of the technology. This is particularly the case when biometric data from neurotechnology is combined with other biometric and location-based data to paint a possibly very intimate picture of an individual and those with whom they interact.
- e. Where State actors use neurotechnology for policing or national security use, this not only engages ICCPR Article 17, it also has serious impacts on Article 14.3(g) The right not to be compelled to testify against oneself or to confess guilt. In addition, this would have a profound impact in legal systems where the right not to self-incriminate is foundational.

Finally, a human rights impact of potentially vast scale if not perhaps quite as essential to human dignity as mental integrity etc., is that of off the shelf or direct to consumer consumer neurotechnology re-purposed for use by employers as tools for Workplace Health & Safety. Workplace surveillance is a pressing issue<sup>8</sup>, even with current technology, and the introduction of neurotechnology "wearables" may exacerbate the ability and desire of some employers to ever more closely monitor those in occupations such as truck drivers for focus and warehouse workers going "off-task" and in some cases also monitor union membership.<sup>9</sup>

f. ICESCR Article 6.2 Employment under conditions safeguarding fundamental political and economic freedoms to the individual would be most impacted.

## 2. What are the biggest challenges and risks that the development, testing and use of neurotechnologies pose to human rights?

<sup>&</sup>lt;sup>8</sup> See for example <u>https://www.ohsrep.org.au/intrusive\_workplace\_surveillance</u> <u>https://democompany.teramind.co/#/report/Focus+Dashboard\_https://www.wired.com/story/amazon-worker-tracking-details-revealed/</u>

<sup>&</sup>lt;sup>9</sup> See <u>https://www.washingtonpost.com/technology/2021/12/02/amazon-workplace-monitoring-unions/</u>

There are several major challenges that neurotechnologies pose to human rights.

- a. The first challenge is that, as with artificial intelligence (AI), there is a risk that developments will outpace the ability of regulators and human rights bodies to understand the technology, the impacts of neurotechnology, and the velocity of development, leaving those bodies unable to deal with impacts to human rights in a timely manner (see 2.1 and 2.2 above).
- b. The second challenge is that because of the global, commercial, nature of the developers of novel neurotechnology, protecting the human rights of end users will require international coordination (see 2.3 above) and a commitment to the horizontal application of rights among human rights bodies and consumer regulators to prevent arbitrage or compliance-regime shopping.
- c. Because of the immense benefits on offer, regulators may be tempted to approve devices without due consideration of human rights impacts.
- d. In addition to challenges to human rights in an abstract fashion, it is important to remember that human rights impacts, particularly in the medical arena, risk causing real suffering to individuals, many of whom are experiencing extreme vulnerability.

#### 3. Will such risks be amplified by the development of consumer-oriented neurotechnologies?

This is certainly likely to be the case and particular risks and rights impacted have been discussed above in sections 2 and 3 above, and in the response to Q1 above.

## 4. What groups are more <u>likely to experience vulnerability</u> or risk? (noting that vulnerability reflects a relationship with structures of power rather than an innate or essential state of being)

Those groups who have the least power in a particular situation typically are the most at risk. In the case of medically supervised use of neurotechnology, people with the desire to regain function in movement, vision, or hearing, or to improve quality of life by reducing seizures or treating mental illness may feel that they have very constrained choices when seeking treatment by means of neurotechnology.

For consumer facing neurotechnology, the young whose decision-making is not fully developed may be most vulnerable to having their rights transgressed upon in terms of e.g., privacy and also run the greatest risk of negative effects on a still-developing brain.

5. What methods can be used to identify and assess the potential risks and impact of these technologies on human rights, in particular the human rights of persons with disabilities and other groups in vulnerable situations?

6. Will such risks be amplified by the development of consumer-oriented neurotechnologies?

#### 7. From a human rights perspective, what opportunities could the use of neurotechnologies bring?

As discussed above in 2.1 and 3.1, neurotechnologies may bring profoundly beneficial effects, in particular to people experiencing loss of function or mental and neurological illness. This is particularly true in those cases where communications with wider society are enabled for those for whom this is currently impossible (e.g., locked-in state) or where capabilities that improve access to or participation in a wider choice of education, employment, and civic options. Many of these positive supports fall under ICESCR but ICRPD and ICCPR rights (such as the ability to exercise certain legal and voting rights) may also be further promoted.

8. Can these opportunities be balanced against the identified risks and impact

### 5. Conclusion

While similar rights may be impacted in medical and non-medical settings, they do differ by application and the magnitude of the impacts, and the balance required between these rights is very different. This submission seeks to highlight the disquiet over the possibility that people experiencing vulnerability or people with disabilities may need to choose (but should not have to) between e.g., a right to non-interference with mental integrity or privacy on the one hand, and devices that enable autonomy of movement or restore function on the other, should human rights concerns not be placed at the centre of the development and deployment of novel neurotechnological devices.

Concerns also exist for non-medical uses of neurotechnology. This might involve consumer products that erode privacy by excessive data collection (particularly of sensitive information) and even use this information to then manipulate consumer decision-making. Or the surveillance and control uses to which employers may put neurotechnology, not only impacting privacy but also rights to safe and healthy working conditions. A further concern is use of neurotechnology by state actors in ways that severely burden civic rights to fair trials and unfettered participation civil society.

Finally, although we believe that existing human rights are sufficient to address the issues raised by developments in neurotechnology, and no new rights are required at present, statements on the impacts of neurotechnology on rights from the UN HRC or the OHCHR or a General Comment from the CCPR interpreting human rights in light of the distinctiveness of neurotechnology and its unique nature would be helpful to the cause of ensuring neurotechnology serves to improve the lives of humanity.

## Contributors

Prepared by:

Dr Michael Wildenauer, Centre for AI and Digital Ethics, and the Melbourne Law School

Prof Jeannie Marie Paterson, Centre for AI and Digital Ethics and the Melbourne Law School

Dr Piers Gooding, Melbourne Law School