

Since 2014, the NIH BRAIN Initiative has embarked on an exciting endeavor to revolutionize our understanding of how the brain works. This work is anchored on unraveling the circuits and computations underlying complex behaviors through the development of novel neurotechnologies. Ultimately, it may deliver great insight and treatments to help patients who experience the most devastating effects of brain disorders or injury and may transform daily life even for healthy people.

What is neuroethics? A tool for the advancement of neuroscience

The most fundamental aspects of our selves - such as personality and temperament - can be rapidly changed due to brain illness, injury, and, in some cases, brain interventions. **Neuroscience research raises unique ethical questions, beyond typical research ethics or compliance issues.** Familiar topics in bioethics such as privacy, safety, fairness, freedom and free will, personal identity, informed consent, and moral responsibility, can take on new dimensions and complexities given the unprecedented precision of new neurotechnologies and tools, and the brain's centrality to human identity¹. Questions that are important to address include, for example:

- What implications do new neurotechnologies have on notions of free will and agency? What, if any, are the broader implications for legal policies or commercial realms?
- Do researchers, funders, and other stakeholders have responsibilities to facilitate access to and maintenance of implanted neural devices for research participants after a trial has ended?
- How do research participants' and investigators' perceptions of the risks and benefits of data sharing align or differ?
- An improved understanding of brain circuitry may allow for the prediction of risk for future brain disorders and resilience against injury. How might this, in turn, affect healthcare, insurability, and healthcare policy?

Neuroethicists can partner with neuroscientists to address these and other questions that arise in association with neuroscience research – both its conduct, and application of research findings. Neuroethicists can help scan the horizon and assist in anticipating and navigating ethical concerns. As such, neuroethics can empower a neuroscience research team and help to inform how studies are designed, conducted, interpreted, and applied. Importantly, neuroethics is not a policing mechanism meant as a constraint on neuroscience progress, but rather a valuable tool that scientists can utilize to facilitate neuroscience research. For these reasons, neuroethics is a priority research area under the NIH BRAIN Initiative.



¹ Henry T. Greely, Khara M. Ramos, Christine Grady. *Neuroethics in the Age of Brain Projects* Neuron, 2016 Nov 2, 92(3): 637–641.

How is neuroethics research conducted?

Neuroethicists utilize a series of analytical and philosophical frameworks² to identify and explore the underlying values and assumptions of a variety of stakeholders. This approach allows them to **anticipate and help mitigate challenging value conflicts to empower neuroscience research and clinical practice.**



There are two major forms of neuroethics research:

1. Conceptual/philosophical research involves the analysis of key concepts, the values at stake in ethical challenges, and ways to navigate ethical dilemmas. It can make use of ethical theories, legal scholarship, and/or the analysis of similar cases. For example, it may involve an analysis of what privacy is, and when researchers ought to prioritize protecting participants' privacy.
2. Empirical research involves the collection of data relevant to an ethical issue. Often, social science research methods are used (such as interviews or surveys) to explore or quantify perspectives of relevant stakeholders. For example, this may involve studying scientists' and research participants' views and values around data sharing.

How can I integrate neuroethics into my project?

Integrating a neuroethics perspective into a research project can be a powerful way to maximize positive impact of the research. Such integration opportunities could include:

1. Seeking the advice of an ethicist on experimental design, research protocols, etc.
2. Collaborating with an ethicist to explore an ethical challenge related to the implementation of the experiment or possible implications of study findings.
3. Collaborating with an ethicist to conduct parallel empirical ethics studies with patients, participants, the public, or researchers.

What are the NIH BRAIN Initiative's neuroethics efforts?

- Funding [neuroethics research projects](#) within the scope of the BRAIN Initiative
- Managing the [Neuroethics Working Group \(NEWG\)](#) and organizing topical workshops
- Facilitating collaborations between BRAIN-funded neuroscientists and neuroethicists
- Identifying relevant ethical questions within the NIH BRAIN Initiative research portfolio
- Disseminating NEWG findings through high-profile publications

To learn more please visit: <https://www.braininitiative.nih.gov/about/neuroethics.htm>

And see: [Neuroethics Guiding Principles for the NIH BRAIN Initiative](#), Greely *et al.*, J Neurosci. 2018; [Ethical Challenges of Risk, Informed Consent, and Posttrial Responsibilities in Human Research With Neural Devices](#) by Hendriks *et al.* JAMA Neurology, 2019; and [Neuroethics: Fostering Collaborations to Enable Neuroscientific Discovery](#), Farahany & Ramos, American Journal of Bioethics Neurosci, 2020.

² Martha J. Farah. *An ethics toolbox for neurotechnology* Neuron, 2015 Apr 8, 86(1): 34-7.