

Bagels & Biotech: Emerging Neurotechnologies

Key Takeaways

The National Academy of Medicine's first [Bagels & Biotech event](#) on May 19, 2026 explored the rapid evolution of neurotechnologies, including neural sensing, neuromodulation, and brain-computer interfaces. Speakers **John Ngai**, National Institutes of Health Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative, and **Anna Wexler**, University of Pennsylvania Division of Medical Ethics and Health Policy, discussed how these tools are creating new possibilities for treating neurological and psychiatric conditions, while also raising questions about ethics, governance, data privacy, long-term patient support, access, and the potential movement of medical technologies into consumer markets.

Neurotechnology is advancing rapidly and beginning to transform care.

New neurotechnologies are moving from science fiction toward real-world clinical use. Brain-computer interfaces and neuromodulation tools are already being studied for conditions such as treatment-resistant depression, obsessive compulsive disorder, epilepsy, chronic pain, paralysis, ALS, and other neurological and psychiatric disorders. Speakers highlighted examples of technologies that can restore communication for people who have lost the ability to speak, reduce debilitating pain, and support movement or sensory function through neural prosthetics.

These advances are being accelerated by better understanding of neural circuits, improved recording of brain activity, miniaturization of devices, and AI-driven decoding. As these tools improve, they may become less invasive, more functional, and more accessible. However, the speakers emphasized that the pace of innovation must be matched by careful attention to the social, ethical, and governance challenges that come with technologies directly connected to the brain.

Long-term responsibility to patients is a central ethical challenge.

A major theme of the discussion was the responsibility owed to research participants and patients who receive implanted neural devices. These technologies can be life-changing, but they can also create long-term dependencies on device maintenance, software updates, batteries, technical support, and specialized clinical expertise. When a clinical trial ends, a researcher leaves an institution, or a company stops supporting a device, patients may be left with implants that no longer function or cannot be maintained.

Speakers described this issue as “device abandonment” or “continuing responsibility.” They emphasized that goodwill from researchers is not enough to protect patients over the long term. Stronger systems may be needed, such as institutional commitments, long-term care plans, insurance mechanisms, escrow funds, or broader policy changes that clarify who is responsible for ongoing support after a study or product lifecycle ends.

Brain data raises difficult privacy and governance questions.

The event also focused on the governance of neural data. Speakers discussed whether brain data is fundamentally different from other health, biometric, behavioral, or digital data. Some argue that neural data is unique because of its connection to identity, thought, emotion, and mental states. Others noted that smartphones, search histories, wearable devices, and AI chats can already reveal highly personal information.

The discussion underscored that de-identification may no longer be a reliable safeguard. As data analytics and AI tools become more powerful, information that appears anonymous today may be identifiable tomorrow. This raises questions about how to protect privacy while still enabling responsible data sharing, research, and innovation. Speakers also noted that inconsistent state-by-state approaches could create barriers to research and data exchange, suggesting the need for more consistent standards.

Governance must keep pace as technologies move across sectors.

Neurotechnologies do not stay neatly within traditional regulatory categories. Tools developed for medical applications may later be adapted for consumer products, wellness uses, workplace applications, military purposes, or human enhancement. This creates challenges for regulatory systems that were built around clearer distinctions between medicine, research, consumer technology, and public health.

Speakers noted that several leading neurotechnology companies are beginning with medical applications but have longer-term ambitions for broader consumer platforms. This raises questions about where research ethics, medical oversight, consumer protection, and privacy law should apply.

Access must be addressed early.

Participants emphasized that breakthrough technologies will only fulfill their promise if people who need them can access them. Some current systems are large, expensive, invasive, highly specialized, and dependent on expert teams. Even when technologies work, cost, insurance coverage, geography, clinical infrastructure, and baseline access to care could limit who benefits.

The discussion drew parallels to other biomedical fields, such as genetics, where transformative treatments exist but remain out of reach for many patients. Speakers suggested that platform technologies could help accelerate progress across multiple conditions, but proactive planning is needed to ensure these tools do not widen existing inequities in care.

Overall takeaway

Emerging neurotechnologies have extraordinary potential to restore function, relieve suffering, and expand what is possible in health and medicine. But their development raises questions about patient responsibility, data privacy, governance, access, and the boundary between medical treatment and human enhancement. Responsible innovation will require early, multidisciplinary engagement among researchers, clinicians, patients, ethicists, policymakers, regulators, companies, funders, and communities.

Bagels and Biotech is an initiative of the [NAM Action Collaborative on Translating Emerging Science, Technology, and Innovation](https://nam.edu/action-collaborative-on-translating-emerging-science-technology-and-innovation) in collaboration with the National Academies Programs on Biomedical and Health Sciences & Life Sciences and Biotechnology. View all events in the discussion series at nam.edu/product/bagels-and-biotech.

