

# HUMAN X DESIGN

AN ETHICAL FRAMEWORK FOR HUMAN AUGMENTATION

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# HUMAN BY DESIGN

## AN ETHICAL FRAMEWORK FOR HUMAN AUGMENTATION

**The diverse board of experts was carefully selected by conference organizers following an international search for leading thinkers in the fields of human augmentation, bioethics, and technology. The authors have collaborated to create the framework, unaffiliated with the conference organizers and sponsors, both of whom had no input into the final document.**

### INTRODUCTION

Rapid advances in science and technology are opening doors for the fulfillment of human desires in ways that were not previously possible. Neural, genetic, pharmacological and physical forms of augmentation of the human experience promise to multiply both in number and complexity over the next decades. It is our responsibility to create a public, open discourse around the ethical implications of technology that will shape what it means to be human in the near and distant future.

Human augmentation is a deliberate act. It is a permanent or temporary bodily intervention that changes or augments otherwise normal ranges of human function. Augmentation varies wildly in scope and power, from common forms of cosmetic surgery, to pharmacological interventions, gene therapy, neural implants, and prosthetics. Many forms of human augmentation have become so commonplace and socially accepted that they do not pose difficult ethical questions in their use.

Other technological interventions, such as increasingly advanced forms of sensory augmentation and genetic modification, pose weighty ethical questions. Augmented humans may be scaled versions of our current selves and possess greater intelligence or strength, or they may vary in kind, possessing abilities that humans have never before

encountered as a species. Augmentation might create humans with unforeseeable motivations, challenging received conceptions of “human nature.” The ethical issues raised by such changes must be acknowledged and debated by those that might use augmentation technology, those that might be affected by its widespread use, and those that create it. Most importantly, these questions must be debated in a public forum, engendering civic discourse.

Human augmentation can entail the directed and intentional use of biotechnological power to enhance or improve an individual’s native capacities and performances, and the stakes for an individual are high. But the social stakes are also high: In the future, those that have access, power, and resources to augment will certainly stand to gain tremendously from their altered physical and mental states.

Although it may not be possible to unambiguously distinguish interventions that are “therapeutic” from ones that are “enhancing,” this distinction should not be abandoned. In fact, this contextual categorization sits at the forefront of public, private, governmental, institutional, and monetary engagement with the future of augmentation technologies and tools. The public health, funding and social implications of this distinction are far-reaching.

The Ethical Framework for Human Augmentation that is presented here is a tool for navigating the ethical questions that emerge around human augmentation. It is designed to be inclusive of the wide community of stakeholders within fields that touch upon human augmentation technology—medical professionals, the DIY community, corporate interests, legislators, and those in the military.

It may provide a framework for doctors to act upon medical interventions requested by an individual for the purposes of enhancing a bodily function or creating a new set of abilities. It can guide inventors in deciding to abandon or pursue certain research areas that may have far-reaching implications. It can guide manufacturers towards

transparency or increased access to users of licensed hardware and software. It can help guide patients in deciding what they can reasonably request of medical professionals and manufacturers. It could guide legislators in the process of writing laws around the use of certain forms of technology. It might guide regulators in deciding whether to approve or reject a proposed technology for public or private use.

Importantly, this ethical framework is designed to help foster democratic forms of deliberation for different groups of people that have a stake in the future of the lived human experience.

## **METHODS**

The board of experts was selected by conference organizers following a search for leading thinkers in the fields of Human Augmentation and Bioethics. The authors have collaborated to create the framework, unaffiliated with the conference organizers and sponsors, both of whom had no input into the final document.

The board met over the course of ten weeks to discuss precedents for ethical codes of behavior, led by a board moderator who assisted in editing written documentation of the meetings. Democratic deliberation was used as a framework for these discussions. A final ethical framework evolved out these meetings and was edited and researched by the board moderator and turned into a finalized document.

There are a number of historical precedents for a “code” of ethical behavior within emergent fields of science. We used a number of documents as frameworks for our own deliberation. These documents are used more or less pragmatically by different stakeholder groups, and we incorporated our researched understanding of the usefulness and impact of these documents into our own framework.

In chronological order, these documents included:

- a. **DIY Bio Code of Ethics** (2011)
  - i. <https://diybio.org/codes/>
- b. **Presidential Commission for the Study of Bioethical Issues** (2010)
  - i. *New Directions: Ethics of Synthetic Biology and Emerging Technologies*  
[http://bioethics.gov/sites/default/files/PCSBI-Synthetic-Biology-Report-12.16.10\\_0.pdf](http://bioethics.gov/sites/default/files/PCSBI-Synthetic-Biology-Report-12.16.10_0.pdf)
- c. **Ethics of Human Enhancement: 25 Questions & Answers** (2009)
  - i. Prepared for the NSF  
[http://ethics.calpoly.edu/nsf\\_report.pdf](http://ethics.calpoly.edu/nsf_report.pdf)
- d. **Presidential Commission for the Study of Bioethical Issues** (2006)
  - i. *Bioethics for Every Generation: Deliberation and Education in Health, Science, and Technology*  
[http://bioethics.gov/sites/default/files/PCSBI\\_Bioethics-Deliberation\\_0.pdf](http://bioethics.gov/sites/default/files/PCSBI_Bioethics-Deliberation_0.pdf)
- e. **Transhumanist Declaration** (2002)
  - i. <http://transhumanism.org/index.php/wta/declaration>
- f. **Belmont Report** (1979)
  - i. <http://www.hhs.gov/ohrp/regulations-and-policy/belmont-report/>
- g. **Asilomar Convention** (1975)
  - i. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC432675/>

## **ETHICAL FRAMEWORK**

We relied on the frameworks presented in multiple documents, including *New Directions: Ethics of Synthetic Biology and Emerging Technologies* and *Bioethics for Every Generation: Deliberation and Education in Health, Science, and Technology*. These documents were co-authored by one of our group members, Dr. Nita Farahany. The principles of

democratic deliberation outlined in *Bioethics for Every Generation* reflects an approach to collaborative decision making that embraces respectful debate of opposing views and active participation by citizens.

There are four guiding principles of ethics under which we categorize specific recommendations that will guide further democratic deliberation of augmentation for specific stakeholder groups.

### **1. Promote Freedom and Responsibility**

- a. Develop fair policies and intelligent regulation of augmentation technologies.

### **2. Promote Public Beneficence**

- b. Recognize complexity of augmentation and integrate complexity into deliberation of ethical decisions.
- c. Minimize social disruption.

### **3. Promote Responsible Stewardship**

- d. Create educational resources for the public and those interested in deliberating human augmentation.
- e. Understand the rights and obligations of the augmentation community.
- f. Adopt ethical principles for behavior and research.

### **4. Promote Justice**

- g. Promote fairness and equity for all.
- h. Safeguard autonomy for individuals.

### **Promote Freedom and Responsibility**

The freedom of individuals to pursue augmentation in accord with their desires is only rightfully limited by the social ramifications of their choices (i.e., to prevent harm to others). The decision of individuals to use technology to alter their body should be an autonomous decision. It should be noted that autonomous decisions are not context-

less. The decision to alter one's body in an advantageous way can be disadvantageous to others and should always be considered.

### **Develop Fair Policies and Intelligent Regulation of Technology**

There should be a balanced, educated, and flexible regulatory approach to human augmentation. All communities should encourage this for the safety and longevity of research and public access to technology. Limitations can be justifiable inasmuch as technology can increase disparity and inequality, reduce autonomy, and increase suffering of some while disproportionately benefiting others.

### **Promote Public Beneficence**

Public beneficence is the moral obligation to act in socially responsible ways. It means respecting the good of all members of the community both as individuals and as a community, being especially attentive to minimize social harms. Respecting human good means acting in such a way that the basic capacities of human nature—life and bodily integrity, pursuit of knowledge, interpersonal harmony, pursuit of religious fulfillment, skillful performance in work and play, inner harmony—are not deliberately harmed or destroyed. Respecting public good means upholding those conditions in society that allows individuals and communities ready and thorough access to the means for their own fulfillment.

### **Recognize Complexity of Augmentation**

Augmentation is contextual and thus an ethical treatment of the space must always consider the individual, social, and specific contexts surrounding augmentation. Predictions of social, economic, and cultural responses to technological interventions should always be considered in concert with the development of a particular technology. Further distinctions in context that should be analyzed include the distinction between therapy and enhancement, the environment (i.e., military vs. civilian) in which augmentation is occurring and whether a distinction between temporary and permanent interventions can be made in a particular instance.

### **Reduce Social Disruption**

In general there should be an attempt to minimize harmful forms of social disruption that might arise from human augmentation. There is significant potential for social disruption as a result of human augmentation. Current disparities in access to medical treatments or assistive technologies are inherently disruptive. Societal discord may arise due to limited access to augmentation for specific groups, explicit augmentation requirements for employment, or superior capacity or performance by augmented individuals creating *de facto* obligations for individuals. Risk-reward calculations should be made when the benefit to an individual is weighed against the disruption to society or others, and decisions should be made based on outcomes that promote a peaceful, safe, and equitable future.

### **Promote Responsible Stewardship**

There is a shared responsibility by all stakeholders and those with the power and authority to make decisions in the field of augmentation to recognize the power of their positions. These individuals and groups must always consider the stakeholders who have no voice and no power to shape the future of technological innovation and interventions. This includes children, the elderly, the sick, the indigent, future generations of children, and the environment.

### **Create Educational Resources**

Create and promote educational programs for the public that encourage an understanding of the implications and benefits of various forms of human augmentation and the accompanying technologies.

### **Understand the Rights and Obligations of the Community**

Encourage accountability and responsibility of individuals, groups, and communities for the safety of themselves and others in their public or private research and their personal behavior.



## **Adopt Ethical Principles for Behavior and Research**

It is the obligation of those in the community to adopt a code of ethics in their research and promote ethical behavior.

### **Promote Justice**

The welfare of single individual or group should never be arbitrarily preferred over the welfare of any other. At all stages of innovation, justice should be prioritized. Funding, research, and development of technologies and tools of human augmentation should be pursued with equal access, wide distribution, and fair benefit-to-risk ratios in mind. Promote justice by respecting human dignity and considering the right of all humans to be valued and respected. Everyone should receive ethical treatment in the face of different forms of augmentation, not only a select group of individuals.

### **Promote Fairness and Equity**

Promote fairness and equity by balancing incentives for private research as well as encouraging open, transparent access to technology, data, and research.

### **Safeguard Individual Autonomy**

Promote and support the autonomy of the individual to alter their own bodies and retain control over future alterations of their bodies.

## **QUESTIONS FOR STAKEHOLDERS**

How should stakeholder communities approach ethical questions? We hope that communities conducting research in an institutionalized or DIY context, regulating technology, dispensing with medical treatment, building businesses or engaging in any form of discourse around human augmentation might use our framework to engage in democratic deliberation. We have gathered a number of practical questions that stakeholders can use to prompt discussions. Asking themselves these questions, they may decide that they are violating the ethical framework outlined above or advancing a

more just society.

### **The Medical Community**

- Is a medical intervention the best way to achieve what an individual desires?
- Is the benefit to the patient commensurate with the harm/risk to the patient and the community?
- Is the patient aware of the harm, risk, benefits, and alternatives involved in the procedure?
- Is respecting the autonomy of the patient balanced with the ethical consideration of the doctor conducting the procedure and their role in society as a doctor?
- Are there robust conscience protections for medical practitioners who conscientiously object to participating in augmentation requests?

### **The DIY Community**

- Should DIY users have access to customization options that, if incorrectly used, could hurt them?
- Should DIY users be able to give or sell their innovations directly to other users?
- How should the interests of DIY users be balanced against the rightful interests of the wider community?

### **Corporate Interests**

- What are a device provider's obligations to patients who wish to interact with their augmentations without using the provider as a gatekeeper?
- Should they accommodate the requests of individuals even if it is not in their financial interests (e.g., only a small percentage of users will take advantage of the customized features)?
- Should customizability be increased if it can have significant impact on development costs, risks to users, and the complexity of regulatory approval?

- Does a patient's right to self-determination and bodily autonomy outweigh the cost to the provider?
- How should the financial interests of companies and corporations be balanced against the interests of the community?
- Should market forces be the chief regulator shaping the future of the field of augmentation?

### **The Public Policy Community**

- How should public policy be used to protect the interests of developers and users of augmentation technology?
- How should it be used to defend fair distribution of augmentation technology, especially among the indigent?
- How should policy be used to protect against deliberate abuses of augmentation technology?
- To what extent should national legislators consider, or be obligated to consider, the global implications of decisions that impact their national citizenry?
- If we allow for providers to conscientiously object on religious or moral grounds how should we define how much autonomy individuals/providers have within a regulatory framework that restricts it?

### **The Military**

- Can the military ask—or order—soldiers to augment their bodies in ways that are irreversible?
- Can the military ask, or order, soldiers to augment themselves in ways that make them more likely to act in certain ways?
- Is it immoral to augment the capacities of soldiers to make them more effective or efficient during times of war?
- How can the military accommodate or facilitate the reintegration of an augmented soldier into civilian population if they have been augmented with conspicuously different capacities?

## **CONCLUSION**

It is implausible to think that any small group of individuals could arrive at a code of ethics that is both broad enough and specific enough to practically assist in navigating such a complicated, diverse, and organic community of human endeavor that spans fields like synthetic biology, genetic engineering, medical device manufacturing, artificial intelligence, reproductive science, and robotics.

In order to foster a sense of private agency and bolster public responsibility, discourse around human augmentation has to happen, now. We hope this framework provides some tailored ways of deliberating the ethical questions that will shape our future.