

A Consortium Approach to Ethical and Values Issues in Emerging Technologies

Science/engineering ethics and bioethics scholars, as well as policymakers, have recognized that the socially responsible conduct of research requires careful deliberation upon the ethical issues posed by emerging technologies. Such deliberation is intended to educate professionals and the public about the potentials of such technologies, and prepare citizens for public discourse and policymaking concerning such emerging technologies. This brief proposal takes this recognition as an assumption and proposes an interdisciplinary consortium to address particular emerging technologies in a focused, disciplined, and rigorous fashion.

A needs manifesto: The problem of generality

The medical, bioethics, philosophy, legal, science, and health policy communities have exhibited a tremendous interest in the ethical issues in emerging biomedical technologies. This interest has been provoked by a legitimate concern about the responsible and conscientious development and application of new technologies. While many articles and books have been written, the field has been limited by a broad-based approach that tends to lump emerging technologies together (e.g., “cosmetic psychopharmacology,” “human cloning”, “genetic enhancement” etc.) leading to moral discussions of broad applicability and low specificity. The generality of the ethics discourse on biomedical enhancement, for instance, has generated discussions of existential concepts like human nature, authenticity, and social ideologies, but such broad concepts and concerns do not translate easily into user-friendly concepts, focused debate, and specific guidelines and policies for implementing new technologies. Too often bioethical and related discussion of emerging technologies have limited impact in the public and professional spheres.

We believe this limited impact is in large part due to three factors: (1) the practical intellectual hurdles to depth understanding of emerging technologies by scholars outside the field (2) the tendency for bioethics scholars to work “solo” in relative isolation from the range of experts and disciplines that are involved in the emerging technology, and (3) a lack of conceptual clarity in defining the domains and philosophical assumptions involved in creating and implementing emerging technologies. What this area of inquiry needs is a drilling-down, focused approach that addresses particular capacities, specific problems, and singular emerging technologies, coupled with a collaborative interdisciplinary team approach. The generality of the discourse to date is understandable, because a detailed, focused approach on a singular technology (for instance, bionic, mentation-controlled prosthetic limbs) requires both broad and deep expertise - expertise which never resides in a single individual or within a single discipline.

For these reasons, we propose the following consortium approach to addressing ethical, value, and policy issues in emerging biomedical technologies.

What is the consortium approach?

The consortium approach organizes a diverse group of institutions and individuals around a common template for interdisciplinary discussion and research. The consortium assembles a

diversity of expertise in tackling the complex challenges posed by emerging technologies. While led administratively by a smaller core group of individuals, the consortium alliances are fluid in bringing in experts from particular areas, foci of interest, disciplines, and institutions, all selected and driven by the problem focus and technology under consideration. When a particular project is completed, those expert consultants “leave” the consortium, while the core group moves on to a new project, selecting a new cohort of expert consultants. The challenges posed to scholarship on emerging biomedical technologies are remarkably uniform, despite the complexity of each particular problem area or emerging technology. Because these challenges to scholarship are standard, the procedure in addressing them can be organized around a standard template of inquiry - not an inflexible structure, but a heuristic platform for focused, systematic, and detailed inquiry into the ethical and value implications of emerging technologies.

What are the common challenges driving the consortium approach?

We identify five common challenges to rigorous scholarship on emerging technologies: (1) *education*, (2) *feasibility*, (3) *contingencies*, (4) *ethical and policy deliberation*, and (5) *impact assessment*.

The *Education Challenge* is relevant to the aforementioned problem of diverse expertise. In order to consider the ethical and value implications of emerging technologies, scholars must have a sophisticated understanding of disparate areas. First, the scholar must understand the scientific, technical, and practical aspects of the technological device or product under consideration. For instance, in the aforementioned discussion of bionic prosthetic devices, not only is understanding of the mechanical capabilities required, but also details of the neural-to-hardware interface(s) characteristics. Because the capabilities of emerging technologies are subject to varying degrees of speculation in development, describing the range of potential capabilities is an additional requirement. A second focus of education is the understanding of relevant areas of bodily and/or brain function: user characteristics. Education should bring scholars a substantive understanding of the relevant biological structures and functions that could meaningfully be manipulated or interface with technological interventions and devices. In the case of bionic prostheses, the range of potential neural-hardware interfaces would need to be described, as well as their potential interactions with relevant brain structures and functions. For instance, would prosthetic-limb brain control mechanisms involve whole-cortex interfaces (as in electroencephalographic technologies) or focal neural interfaces with motor neurons or cortical motor areas (or other possibilities)? Similar educational challenges are faced by philosopher/bioethicists and legal scholars, who would need to relate emerging technologies to current philosophical and bioethical viewpoints, regulatory guidelines, and legal/policy structures; indicating how these viewpoints and conceptualizations apply, and do not apply, to the emerging technology under consideration. The general response to the Education Challenge must be to raise the understanding and comprehension of the relevant sciences and disciplines to a shared and sophisticated level of background knowledge, conducive to higher-level and highly focused discussion.

The *Feasibility Challenge* builds upon the fruits of the efforts to overcome the Education Challenge, that is, to build upon a shared and sophisticated level of background knowledge for

all participating scholars. The Feasibility Challenge asks Consortium scholars to critically evaluate the practicality or feasibility of technological manipulations of the brain/body, or social group, under consideration. Given our current state of knowledge, in what directions might current technologies evolve? Again, given our current state of knowledge, what kinds of technical interventions are plausible? In the sample case of bionic prosthetics, which kinds of control mechanisms (brain/hardware interfaces) are feasible in the foreseeable future? Feasibility considerations also include identifying knowledge gaps which, if addressed through empirical research or conceptual analysis would increase the feasibility of a particular technological intervention or product. Feasibility also includes identifying legal, ethical, or political barriers, limiting conditions, or adverse consequences that could constrain technology development. For example, what kinds of political barriers would be posed by bionic prosthetic devices that were supernormal in their function (e.g., stronger than an organic limb)?

The Challenge posed by *Contingencies* involves identifying and sorting the feasible technological possibilities, and then considering the full range of their moral, practical, existential, religious, and political consequences. Analysis of technological contingencies can be accomplished through philosophical thought experiments and social science exploration techniques such as focus groups. If-then contingencies are thought experiments of the following structure: “If x , then what?”. For the bionic prosthetic case, one example of an if-then contingency might be: *If we were to develop bionic prosthetic arms that were supernormal in strength, then what might be the relevant values and interests at stake from the moral, practical, existential, religious, and political perspectives?* Through the Feasibility considerations, the credible technological possibilities are identified, and appropriate constraints on our knowledge applied. The challenge of the Contingencies is in a thorough and systematic identification of the diverse values and interests at stake in using the technology.

The Challenge posed by *Ethical and Policy Deliberation* builds upon the preliminary work of the preceding Challenges. At this stage, the Consortium scholars have educated each other about the technical details. They have explored carefully the feasibility in development and application of emerging technologies. They have identified a variety of contingencies, or ramifications about how the technology could be applied. The role of Consortium contributors is to identify the stakeholders, identify the values and interests of relevant stakeholders, and perform the intellectual labor of weighing and balancing values and interests, toward addressing relevant and specific moral and policy considerations.

Ethical and policy deliberation leads naturally to the Challenge of *Impact Assessment*. The role of impact assessment deliberations is to consider empirical methods for evaluating the “advice” issued by earlier Consortium work, stimulating new social science outcome research to assure that Consortium work indeed makes a difference for the relevant stakeholders. Typical questions addressed in the Impact Assessment stage include: How might Consortium conclusions be disseminated for maximum social impact? What groups are the natural constituencies for Consortium reports, and how might each constituency respond to these reports? What social mechanisms should be targeted as vehicles to address change and utilization of Consortium reports?

Of course, any of the five Challenges could identify knowledge gaps, practical constraints, or other limitations that would prevent a complete response to all five Challenges and not culminate in a thorough discussion of the ethical and value aspects of the emerging technology. However, we argue that in identifying such limitations, we are also performing an important scholarly as well as social service: through identifying the sources of such limitations, we give guidance to future research into the ethical/value considerations for the technology, and enhance the effective use of research resources. For example, the Consortium process may find that the considerations posed by bionic limbs may be too complex. If so, such conclusions would prompt a more narrow focus - a more narrowly defined technology, or indeed pose the key questions for additional research. In the example of bionic limbs, the project could be redefined to address a single brain-hardware interface for the bionic limb. Worthwhile in itself, framing research and scholarship in terms of current limitations facilitates productive work in the future.

What is the consortium template, and how does it work?

The consortium template is a standard framework for scholarly activities intended to explore ethical and value issues in emerging technologies. Guided by the five Challenges, the consortium template provides for a sequence of events to be edited and adapted to fit particular projects focusing on particular emerging technologies.

The consortium template serves several functions. Some of these include:

- (1) Identifying the technology to be considered by the Consortium, and organizes the topical theme into a concrete consortium Project.
- (2) Organizing the scholarship effort around the five Challenges, providing a provisional sequence of collaborative activities, as well as developing practical plans for the project (how many meetings, who will present particular Challenge material, preparatory work outside meetings, etc.).
- (3) Prompting Consortium planners to consider the relevant stakeholders and scholars to include in Project deliberations.
- (4) Identifying key personnel and their functions on the Project.
- (5) Addressing the calendar for Project development, and addresses persons taking the lead for each Project component.
- (6) Provides a narrative description of the Project focus, its intended objectives, and products.
- (7) Provides preliminary budget information.
- (8) The Consortium Template is intended to be useful in developing grant proposals for the project.

Consortium Projects - what are they?

Organized through the consortium template, Consortium Projects permit a systematic consideration of ethical and value issues regarding emerging technologies. In keeping with the example of mentally-controlled bionic prosthetic limbs, this topic could be the focus of a potential Consortium Project. Through both on-site conferences and online connections, the Project develops a sequence of scholarly inquiries into a specified topic, organized to address, in sequence, the four Challenges. The Consortium expects that after settling on a topic via online contact/discussion, relevant scholars, scientists, and potential technology users will be selected to participate in the Project, and a series of online and on-site meetings will be set up, suitable to the demands and particularities of the topic. International in focus, Project conferences are expected to be held in different cities and countries, so that truly international participation is assured. While various products are envisioned for each Project (books, consensus reports, policy briefs, methodological conference reports, websites, etc.) the products emerging from Projects will vary depending upon the topic and the progress of the Consortium scholars. We anticipate, and hope, that unexpected findings and insights will lead a Project to develop products and details not anticipated in the beginning of Project development.

Consortium Core Institutions and Leadership

The Consortium is organized around a collaborative core of institutions which lead Consortium efforts. Each institution draw upon their own resources in Consortium projects, and bring in additional institutions, individuals, and stakeholders depending upon the project focus. Led by a stable administrative core, the Consortium can foster collaborative international relationships.

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