INTRODUCTION

Throughout history, humanity has striven for ever more capable means to understand and control the natural world. Toward these ends, humans have engaged in social cooperation and the use of increasingly sophisticated tools to maximize inherent biological abilities and to compensate for biological inadequacies. The late George Bugliarello (2007) referred to this interaction of biological strengths and weaknesses, social engagement, and the use of tools (i.e., machines) as BioSoMa. This process can be seen in the iterative technologization of much of western society following the second Industrial Revolution. Indeed, the momentum gained by the end of the 1800s was such that the twentieth century may rightly be viewed as the dawn of the age of technology, during which time the pace and breadth of technological innovation, invention, and use increased to the point of being a formidable sociocultural force.

The concomitant rise of the scientific estate during the mid- to late 1800s was at least in part attributable to the development and use of new tools through which to sharpen the acuity of investigation and analysis, manipulate nature, and affect the
human condition. In this way, technology became the predominant implement of modern science: Technology enabled more detailed, complex observation and experimentation, and the information gained through such studies advanced the fund of available knowledge and led to the formulation of new theories. This “tools-to-theory” heuristic as described by Gigerenzer and Goldstein (Gigerenzer 1991; Gigerenzer and Goldstein 2008) was instrumental to progress in theoretical and experimental psychology, clinical neurology, and studies of the brain, which by the early to mid-1970s became known as “neuroscience.” S. C. Gilfillan has claimed that technology progresses through evolutionary improvement and revolutionary invention (Gilfillan 1963). I concur but add that technological advancements can also be directed toward and incur revolutionary invention (i.e., innovation) and improvement upon the evolutionary process. Thus, there is a mutuality of “tools-to-theory” and “theory-to-tools” heuristics that results in new ideas, concepts, devices, abilities, and outcomes. It is in this light that we must view the field, practices, and effects of neuroscience and neurotechnology.

**THE INFLUENCE OF NEUROSCIENCE**

Over the past 20 years, neuroscience has assumed a progressively more prominent role in shaping the worldview(s) of the time and most likely that of the future. There is a strong—and I believe defensible—sentiment, both within the sciences and the public, that the brain represents the “next frontier” of exploration and discovery. Through the use of iteratively more advanced technology and techniques, neuroscience has achieved an enhanced understanding of nervous systems at a variety of levels. At present, we have a generally solid working knowledge of the substrates and mechanisms of neurological structure and function—that is, the basic material aspects of what neural cells and networks are made of and the activities of these cells and structures.

We have just begun to fit this into a more formal conceptualization of brain function as a complex dynamic process of systems-nested-within-systems, and the overall functions natural systems, at-large. Perhaps what is more (if not most) important is that we can only speculate about the possible ways that consciousness, or this function called “mind,” could occur in the brain—the question of efficient causality—that philosopher David Chalmers has classified as one of the principal “hard problems” of neuroscience (Chalmers 1995). Additionally, although we might posit that manifesting consciousness confers apparent survival and evolutionary benefit, more existential if not transcendental questions remain about how and why nervous systems obtain and entail ever-increasing complexity that enables consciousness to occur and to what ends such complexification—and expanding cognition—could lead.

**NEUROSCIENCE AND NEUROTECHNOLOGY: WORKS IN PROGRESS**

_Beware that you do not lose the substance by grasping at the shadow._

_Aesop, Fables_

Despite the omnipresent hard problems, neuroscience and neurotechnology increasingly are being employed to assess and affect thought, feeling, behaviors, and, more
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broadly, constructs of normality. Far too often neuroscientific outcomes and information are misperceived, and neurotechnologies are misused to wage arguments that are inappropriate or fallacious. Such misperception and misuse can result from the miscommunication of what neuroscientific data actually mean and of the capabilities and limitations of various neurotechnologies. I strongly advocate discernment of hard from soft neuroscience: The former being that which is actually produced and disseminated within the scholarly community, whereas the latter tends to be that which is excerpted, or in some cases, bastardized in the extra-academic sphere. There are a number of reasons why hard science goes soft, but suffice it to say that fault can lay on both sides of the proverbial fence that separates the scientific and non-scientific communities, and this speaks to the shared responsibilities of science (as a self-regulating enterprise), scientists, and public media to avoid what philosopher Roger Scruton refers to as “neuro-nonsense” (personal communication, July 2009). As Matthew Crawford has claimed, there are limits to “neurotalk” (Crawford 2010) and to what neuroscience and neurotechnology can actually do, and these limitations need to be recognized and appreciated if we are to use neuroscience and its technologies in ways that are sound. This point has been well expressed by a number of scholars, including Walter Glannon (2007), Eric Racine (2010), Hillary Rose (2004), Steven Rose (2005), Robert Uttal (2003), and most recently Raymond Tallis (2011).

Some of the theoretical and practical constraints of neuroscience and neurotechnology may be overcome through the process of scientific convergence (see Vaseashta, Chapter 2 in this volume). As a number of authors have noted, convergence “emerges” as the foci and activities of several disciplines fuse so that the sum of their research and outcomes is greater than its constituent parts (Giordano 2011; Sharp and Langer 2011; Vaseashta 2011). Such convergence is occurring among the disciplines that create, employ, and constitute the field of neurotechnology—and so we bear witness to a merging of physics, chemistry, nanoscience, cyberscience, and engineering, and the engagement of genetics, anatomy, pharmacology, physiology, and cognitive psychology—in ways that in the parlance of biologist E. O Wilson (1998) might be described as “consilient.”

Not merely a technical sharing, convergence represents a synthetic approach that explicitly seeks to foster the innovative use of knowledge, skill, and tool sets to elucidate the nature and potential mechanisms of scientific questions and problems, delimiting existing approaches to question-problem resolution, and developing novel means of addressing and solving such problems (Vaseashta 2011; see also Chapter 2, this book). This approach is crucial for progress because the current utility of many neurotechnologies is limited by factors, including (1) temporal or spatial constraints (e.g., functional magnetic resonance imaging [fMRI] and forms of electroencephalography), (2) difficulties of matching certain types of neurological data (e.g., from neuroimaging, neurogenetic studies) to databases that are large enough to enable statistically relevant and meaningful comparative or normative inferences, (3) a lack of specificity of action and effect (e.g., transcranial or direct magnetic stimulation), and (4) size restrictions and cumbersome configurations of micro- and macroscale devices. So the convergence of neuro-, nano-, geno-, and cyberscience and -technologies can be seen as an enabling paradigm for delimiting current utility and fostering new directions and opportunities for their use and applicability.
CURRENT NEUROTECHNOLOGIES

In general, neurotechnology could be defined as those devices that are utilized to investigate, assess, access, and manipulate the structure and function of neural systems. Working within this definition, such devices can be specifically categorized as assessment neurotechnologies and interventional neurotechnologies.

Assessment neurotechnologies include various forms of neuroimaging, encephalography, thermography, genomic/genetic and proteomic technologies, and neural biomarker assays (see Table 1.1). Interventional neurotechnologies include neuro- and psychopharmacological agents and novel pharmaceutics; transcranial and indwelling brain stimulation devices; peripheral neural stimulators; neural cell, tissue, and genetic implants and transplants; in-dwelling micro and submicro electronics; and various forms of nerve- and brain-machine interfacing neuroprosthetic systems (see Table 1.2).

Studies of the potential utility of various neurotechnologies as research tools in clinical practice and, in certain cases, in the public sphere (regarding this latter phenomenon, see Giordano and DuRousseau 2011) have been steadily and robustly increasing over the past 10 years. This trend is reflected by the almost linear rise in the number of scientific reports appearing in peer-reviewed scholarly journals that specifically deal with assessment neurotechnologies, including neuroimaging in general (see Figure 1.1), specific types of imaging (e.g., positron emission tomography

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**TABLE 1.1**

**Assessment Neurotechnologies**

- Computerized tomography (CT)
- Positron emission tomography (PET)
- Single-photon emission computerized tomography (SPECT)
- Magnetic resonance imaging (MRI)
- Functional magnetic resonance imaging (fMRI)
- Diffusion tensor imaging (DTI)

**TABLE 1.2**

**Interventional Neurotechnologies**

- Neuropsychopharmacologics
- Neuronano-devices
  - Nanopharmaceuticals and delivery vehicles
  - Nanosensors and nanoscaffolds
- Transcranial magnetic stimulation (TMS)
- Deep brain stimulation (DBS)
- Neural tissue grafts and implants
- Neuroprostheses/orthotics
- Brain-machine interfaces (BMI)
- Neurogenetic manipulations
Neurotechnology as Demiurgical Force

[PET], single-photon emission computed tomography [SPECT], fMRI, diffusion tensor imaging [DTI]; see Figure 1.2a–d), magneto- and quantitative encephalography (see Figure 1.3a–b), neurogenetics and proteomics (see Figure 1.4a–b), and interventional neurotechnologies, such as transcranial magnetic stimulation (TMS; see Figure 1.5), deep brain stimulation (DBS; see Figure 1.6), neural stem cells (see Figure 1.7), and neural tissue grafts and implants (see Figure 1.8).

THE PROMISE AND PROBLEMS OF NEUROTECHNOLOGY

The tools of neuroscience have become a prominent means to evaluate and manipulate the cognition, emotions, and behaviors of both humans and nonhuman species, and such capacity manifests far-reaching potential to affect ethical, legal, and social norms, status, and actions. With such capability comes a heightened responsibility for pragmatic assessment and frank communication of (actual) findings, limitations and potential benefits, burdens and harms, and prudent use of these devices—as well as the information and effects they yield—in the medical and social realm. It is tempting, or in some cases terrifying, to engage in free-wheeling speculation about possible utopian or dystopian trajectories of neuroscientific progress and neurotechnological use. Although it is always best to keep fact and fiction in their place, science fiction can serve as a window and mirror to the social psyche’s hopes and fears about neuroscience, as science fiction is frequently based on, and often becomes, some dimension of science fact (Schneider 2009; Urbanski 1975).

Despite the lure of fantasy, it is imperative to step back from any fictionalized accounts, and focus on the realities at hand, as I believe that neuroscientific fact is more challenging than fiction. Yet caution is required, for here we encounter the combined effects of the technological imperative and mechanistic dilemma. Humans

![Number of articles: Neuroimaging](image)

FIGURE 1.1 Neuroimaging (search entry: neuroimag").

* To obtain information for this and all figures in this chapter, the PubMed database (managed by the U.S. National Center for Biotechnology Information, U.S. Library of Medicine, and U.S. National Institutes of Health) was searched, and the number of articles per year was retrieved using the search entry term(s) listed below each subject heading. Standard Boolean operators were used to formulate search entries, and an asterisk (*) in a search term denotes searching for several suffixes for the root term. Although the PubMed database does not exclusively represent the total number of articles published on a given topic or category, this type of surveillance can be useful to demonstrate trends in research and publication volume.
are seemingly compelled by a need to know, explain, and control the natural world (Schlenker 2009), and as a species, we construct tools and devise techniques toward these ends (Bugliarello 2007). This demiurgical drive can be self-perpetuating, and philosopher Hans Lenk (1973) has referred to this as the “technological imperative,” which is characterized by the ever-increasing reliance on the development and incentive use of technology (an “if it can be built, do so, and if you build it, use it” mindset). It is in this context that we confront the mechanistic dilemma (Giordano 2010a): Although science and technology provide important tools to understand and control
the mechanisms of nature, any such knowledge is incomplete (Almeder 1998), and yet there is a strong pull to utilize and act upon partial knowledge to effect the ends of more expansive knowledge and control.

Boyd's (1995) "observe-orient-decide-act" method (i.e., the OODA loop) of information assessment, analysis, and decision making may be of value to avoid ampliative arguments or "ready-shoot-aim" approaches to the use of neuroscience and

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FIGURE 1.2 (Continued)
neurotechnology. But such reasoning does not necessarily exempt a lack of bias in thought and action. Cognition tends to be a Bayesian process, and as Mercier and Sperber (2011) have recently shown, reasoning provides an approach to situations or problems that engages subjective cognitive and emotional perspectives in comparison (and perhaps contest) with the ideas of others. This reveals what I call Anselm's paradox: Simply put, we believe in order to understand (rather than understand in

FIGURE 1.4 (a) Neurogenetics (search entry: neurogenetics). (b) Neuroproteomics (search entry: (neuro and proteomics or neuroproteomics)).

FIGURE 1.5 Transcranial magnetic stimulation (search entry: transcranial magnetic stimulation).
order to form beliefs). The root of the paradox lies in our process of rationalization; we engage reason to overcome the influence of beliefs, yet we are wedded to the beliefs that shape the way we reason. Indeed, as Christian Smith (2003) has claimed, we are moral believing animals, and our cognitions, emotions, and actions are based

* After Anselm of Canterbury's maxim of "credo ut intelligam" ("I believe that I may understand"), which was based on Augustine of Hippo's notion of "believe that thou mayest understand" (see Charlesworth 2003).
on and predicated by our beliefs, including a belief in our capacity for and the solid-
ity of reason.

By its nature, reasoning, as an individual and group process, may advance biases
that can both initiate and, as history has shown, be used to justify the use of sci-
ence and technology in ways that are inapt or frankly cruel (Gamble 1997; Whitaker
2001). Despite certain Pollyannaish claims to the contrary, science is based on and
articulates a set of beliefs, and it is neither a value-free nor unbiased culture. Like
any tool, neuroscience can reflect “builders’ bias” in the way it is developed and
employed (Giordano 2010a) and may be particularly liable to misinterpretation and
misuse given the rapid flow of neuroscientific information, formulation of new facts
and “truths,” persistent vagaries of the brain–mind relationship, and changing con-
structs of what constitutes normal neuropsychiatric function (American Psychiatric
Association in press; Armstrong 2010; Patil and Giordano 2010). One need only
look to the diagnosis of drapetomania in nineteenth-century United States, the T-4
Program of Hitler’s Germany, or to the use of neuropsychiatric diagnoses in Stalinist
Russia for blatant examples of how such information may be purloined to serve and
justify malevolent agendas. As so well stated by Mephistopheles in Goethe’s Faust,
“it’s called reason and man needs it—and it alone—to be more beastly than any
beast” (Goethe 1808/1832).

HOMO TECHNOLOGICUS: DEVELOPMENTS AND EVOLUTION
OF NEUROTECHNOLOGY—AND HUMANITY

Developments in neuroscience contribute to the evolution of neurotechnology, and
with this evolution come new techniques, knowledge, and capabilities, which in turn
affect the nature of humanity. It may be, as Paolo Benanti, Roland Benedikter, and
I have posited in this volume, that we are seeing Clynes and Kline’s serial process
of cyborgization (Clynes and Kline 1960; Gray 1995), not on a course toward some
construct of posthuman being but instead toward a more implicit transhumanism
that reveals the human-in-transition, defined by and dependent on technology and
a technologically enabled worldview. We are a species in evolution, and our current
trajectory and future state might be regarded as Homo sapiens technologicus—that
is, the human whose ways of knowing and being are evermore generated by and reli-
ant on technology—and thus we are on a path of both far-reaching possibility and
potentially profound problems (see also Benedikter, Giordano, and FitzGerald 2010).

To be sure, any progression into a new era is likely to foster changes in individual
and social attitudes in relation to the capabilities and effects offered by science and
technology; our relationship to neurotechnologies is no different. It is interesting to
speculate on how the iterative, transitional process of Homo sapiens technologicus
might occur, and I wonder how we as individuals, communities, and a species will
direct and handle such change. Increased availability of neurotechnology will pro-
mote their broader and more widespread use, and although we might avoid some, but
not all, of the issues and problems incurred by the use of these devices, others are
more ingrained and pervasive. Navigating the possibilities of what and how neuro-
technologies can be used (versus what technologies should be used), in whom, and in
which ways will require stringent analysis of findings and facts, and well-informed
guidelines and policies to direct neurotechnological research and its applications. This may be increasingly important given the pull of market and sociopolitical forces upon the scope and extent of neurotechnological research, development, and utilization.

AVOIDING ICARUS' FOLLY: ADDRESSING NEUROETHICAL, LEGAL, AND SOCIAL ISSUES

I posit that what is required is an approach that appreciates how developments in neuroscience and technology contribute to the evolution of both the field and the human user. As neurotechnology enables more complex information to become available, existing pre- and proscriptions regarding the uses of particular neuroscientific techniques and technologies should be reexamined, reassessed, and altered as necessary and as consistent with the spirit and dictates of science to remain self-reflective, self-critical, and self-revising. I believe that neurotechnology may be instrumental to such efforts. This is not circular reasoning; the techniques and technologies of neuroscience may provide a fuller and more finely grained understanding of cognition, emotion, and behavior, and they could afford insights to the ways we perceive and relate to experience; generate and maintain notions of good, bad, right, and wrong; and formulate cognitions and decisions.

If and when framed in a biopsychosocial context, such approaches constitute neuroethics in the so-called first tradition (i.e., as "neuromorality") and can be useful in developing ethical and legal methods to guide the study and employment of neuroscience (e.g., neuroethics in the "second tradition"; Giordano 2010b, 2012; Giordano and Olds 2010). But, here too, let us exercise caution and not succumb to Icarus' folly of hubris: Although neuroscience, neurotechnology, and neuroethics may be regarded as tools with which to gain insights to our nature, capabilities, and limitations, we must ensure that the methods we use—to conduct such science, realistically assess its validity, and evaluate its value as a social force—are rigorous and sound. To do so will require deep discussion and dialectic that engages scholars from the natural and social sciences and humanities, and involves participants from government and of course the public. It is my hope that this book will be useful in informing such discourse by defining key premises, possibilities, and problems that arise at the frontiers of neurotechnological research and its various applications in health care and society at large.

ACKNOWLEDGMENTS

The author acknowledges the research and technical assistance of Rhiannon Bower in the preparation of this chapter.

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Neurotechnology as Demiurgical Force


Incising the Brain, Mind, and Self
The intricate—and still not fully understood—relationship of the structures and functions of the brain to the properties of consciousness, cognition, emotion, and behavior that define what it is to be a human person represents an important philosophical and pragmatic construct of neurosurgery. Of course, any surgical intervention involves possibilities of changing the physical structure of the body to alter some subjective or objective qualities that are regarded to represent “the self” (one need only consider cosmetic surgery, perhaps the most obvious example). And, like all forms of surgery, neurosurgery possesses certain inherent risks (e.g., infection, hemorrhage), which are of concern when balancing benefits, burdens, and harms. Increasingly, neurosurgical intervention is being regarded as a valid, viable, and valuable option for the treatment of a number of neurological disorders and psychiatric conditions [1-4].

Yet, there is something about incising the brain and the relationship of brain-to-mind-to-self that conjures concerns of a more profound sort. There is disquiet about using neurosurgery to change thoughts and emotions, if not what is considered by many to be the “essence” of the “self” [5]. Perhaps it is that consciousness is wholly subjective and internal, and thus there is something almost sanctified—and inviolable—about that space where consciousness, thought, feeling, and the ability to experience and exercise the qualities that define the “me-ness of me” are generated, or at least focused. For over 100 years, neurosurgery has crossed that threshold of inviolability with ever-improving finesse. In this essay, I first discuss the concerns raised by these interventions and then introduce a comprehensive framework for identifying and addressing ethical issues in neurosurgery.

Altering Behavior and Thought with Neurosurgical Techniques and Technologies
Attempts at cutting the brain to alter the mind and self are not new, and history reveals similar concerns about the prior use of techniques, such as leucotomy and lobotomy, that were “state-of-the-science” at the time [6]. Retrospection now enables us to view such techniques as relatively crude. With this in mind, I look to the current palette of neurotechnologically enabled neurosurgical interventions with enthusiasm—and apprehension. The newest methods evoke imaginings that border on the science-fictional, and fictionalized accounts and the fears they evoke should
not be taken lightly: they tend to reveal important dimensions of public perception and emotion [7].

Arguably, the use of novel neurosurgical techniques and technologies to alter behavior (e.g., impulse control disorders), cognition and emotion (e.g., depressive disorders, posttraumatic stress disorder), and memories (e.g., restoring function following brain insult, mitigating memories of traumatic events) could all be regarded positively as therapeutic. There are near-term possibilities of utilizing neurosurgery-dependent neurotechnologic approaches to treat personality disorders, reduce criminal behavior, and augment specific dimensions of cognitive performance [8, 9]. Yet, these very same approaches could be employed as means to ends that are more controversial: e.g., to enforce social norms or “public safety” [10]. To what extent can—and should—these interventions be used to alter human thought, intellect, mood, personality, belief, and actions? And how do we know whether to categorize these interventions as treatments of “abnormalities” (particularly if said norms are neuroscientifically defined), enhancements (and how far can and should brain functions and human performance be enhanced?), or “enablements” (e.g., to promote qualities deemed desirable in certain public servants and professionals such as peace officers, fire fighters, soldiers, or even physicians) [11-14 ]? What will this portend for the practice—and ethics—of neurosurgery?

Much of this remains something of a brave new world, as many of the mechanisms and effects of these novel techniques remain unknown precisely because they are, in fact, new. Thus, ongoing research is important to establish and clarify the possible benefits, burdens, risks, and harms. Since many of the more controversial aspects of these approaches are related to control of human cognition, emotion, and behavior, animal research alone will not suffice [15]. At this stage—and in the near future—much of clinical neurosurgery that employs advanced technology will likely be regarded as a research endeavor. Given that any such intervention is exploring uncharted interactions between a novel neurotechnology and its effect upon the brain, the possibility arises of neurosurgery having unanticipated outcomes and unintended consequences as well as its being used to enforce social norms.

**Toward a Preparatory Neuroethical Framework: A Twelve-Step Approach**

In many ways, ethical issues in neurosurgery overlap with those of surgery and medicine in general. Surgical intervention must always regard relative risks, harms, gains, and losses; well-informed patients must completely and genuinely consent to the treatment(s) offered; and equitable allocation and distribution of services, resources, and goods must be considered [16]. However, these ethical issues are amplified in neurosurgery given the unknowns of the brain-mind relationship, the novelty of neurologic techniques and technologies, and uncertainties arising from their intersection [17]. As a result, actual benefits and harms can be misperceived or misrepresented, available science and technology can be over- and underused, and the extent of care can be inadequate to provide and sustain meaningful good to patients and society at-large—all of which can impact the current and near-future practice of neurosurgery. Such issues are the domain of the field of neuroethics.
We have called for a preparatory neuroethical posture [18], which (a) realistically appraises the actual capabilities and limitations of the tools and techniques at hand; (b) works to define the domains and dimensions that new techniques and technologies will influence; (c) employs qualitative and quantitative modeling to plot benefits, burdens, and risks as accurately as possible; and (d) addresses what can and should be done to mitigate risks and harms while maximizing benefits [19].

A first step in this process is to characterize and parse neuroethical issues into six essential questions:

1. **What** types of techniques and technologies are available for current use, and what are their defined benefits and known and potential burdens and risks?
2. **Why** are specific techniques and technologies being considered or advocated for use, and why and how can technical capabilities affect identified substrates of neurological and psychiatric disorders and conditions that require treatment?
3. **Who** will receive these neurosurgically administered interventions (i.e., which disorders and conditions are to be targeted, which specific patients will be candidates for such interventions)?
4. **When** will neurosurgically administered interventions such as deep brain stimulation (DBS) be considered within a therapeutic algorithm or protocol? Will (and how will) factors such as age and comorbidities be considered in making such decisions?
5. **Where** will these techniques be practiced (e.g., large medical center “hubs,” private practice clinics, specified research-based trials)?
6. **Which** funding mechanisms will be employed to subsidize equitable provision of resources and services necessary for both the intervention and any subsequent care that may be required?

These questions (the “six Ws”) can be seen as serial and interrelated, yielding a detailed description and definition of the ethical problems in neurosurgery that are—and will soon be—generated by new developments in neuroscience and neurotechnology.

From this point, the six W questions listed above should be framed and informed by considering the “six Cs” (expanding upon initial work by William Casebeer [20]):

1. **Capacities** and limitations of the neurotechnology and neurosurgical intervention in question [16],
2. **Consequences** that will be incurred by patients, patients’ families, and society as a result of the intervention in the short, intermediate, and long-term,
3. **Character** of the patient (e.g., patterns of cognition, emotion, and behavior) that could be affected by the intervention,
4. **Continuity of clinical care** for any and all adverse or undesirable effects and manifestations of the intervention (including multidisciplinary approaches, or repeated neurosurgery to alter or reverse the initial treatment) [15],
5. **Consent** based upon the provision of the greatest extent of information possible [20],
6. **Contexts** of culture and circumstances that may affect the aforementioned variables [21].

These lists of considerations for addressing, analyzing, and answering neuroethics questions can be used together with a general approach to ethical reasoning (as shown in table 1) to formulate a decision and actions.

**Table 1. Using the six Ws and six Cs in a typical ethical reasoning process**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gather and assess all relevant facts (i.e., the six Ws).</td>
</tr>
<tr>
<td>2</td>
<td>Identify the circumstances of the case (i.e., what, who, when, where).</td>
</tr>
<tr>
<td>3</td>
<td>Identify the agents involved and their respective roles.</td>
</tr>
<tr>
<td>4</td>
<td>Identify the nature of the ethical issue, question, or problem (i.e., the six Ws) and if/how these relate to capacities, consequences, character, or contexts (4 of the Cs).</td>
</tr>
<tr>
<td>5</td>
<td>Plot possible actions toward resolving the issue or problem and offer a grounding rationale for each (considering the six Ws).</td>
</tr>
<tr>
<td>6</td>
<td>Identify potential trajectories, outcomes, and effects of each possible action (considering the six Cs).</td>
</tr>
<tr>
<td>7</td>
<td>Discern what should be done and why (to maximize beneficial consequences in particular contexts).</td>
</tr>
</tbody>
</table>

This approach acknowledges that (a) the most contemporary science and technology represent a “frontier” of possibilities, (b) conditions at the frontier are always somewhat uncertain, and (c) given such uncertainties, things can—and often will—go wrong [11, 16]. Indeed, pressing the boundaries of innovation can sometimes be risky. But risk need not stifle the quest for novel tools and methods. Rather, it’s better and far more valuable to pragmatically assess trajectories of effect and recognize, prevent, or mitigate potential problems before they escalate in order to reap the benefits that new techniques and tools may afford [22].

**Conclusion**

Rapid developments in neuroscience and neurotechnology position neurosurgery to be increasingly employed to treat an expanding range of neurological and psychiatric conditions—and generate a host of ethical concerns about the ways such techniques might be used and misused. Neuroethics provides a set of practices for realistically defining horizons of possibility and pursuing the deliberations necessary to move ahead with prudence [11, 17, 21, 23]. But the field cannot continue to advance without representation in medical education and training at a variety of levels and through a diversity of resources, inclusive of medical curricula, resident training, grand rounds, and case presentations [24]. Such education will ultimately be vital to informing and developing neuroethically sound guidelines and policies to direct the provision and use of clinical resources, goods, and services and to providing public education about the trajectories and implications of employing neuroscientific techniques and neurotechnology in neurology, psychiatry, and neurosurgery.
References


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Minding Brain Science in Medicine: On the Need for Neuroethical Engagement for Guidance of Neuroscience in Clinical Contexts

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ABSTRACT: The Presidential Commission for the Study of Bioethical Issues (PCSBI) released the second volume of its Gray Matters report in March 2015 to address neuroethical, legal, and social issues arising in and from efforts of the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative. In concert with recommendations made in the Gray Matters volumes, we herein offer what we believe to be four crucial—and actionable—goals for neuroethics: First, neuroethics should be dedicated to evaluating the validity and value of current and proposed approaches to assessing and altering the structure and functions of the brain. Second, neuroethical tools and methods must be developed to interpret, and enable sound use of neuroscientific information, techniques, and technologies in biomedical research and clinical practice. Third, neuroethics should use newly emerging neuroscientific findings to inform common conceptions and definitions of the normal structure and functions of the brain, and how the brain should be treated to recover or improve its functional capacities. Fourth, neuroethics should be prominently featured in the education and training of researchers and clinicians, so as to enable more pragmatic and ethically prudent capability in laboratory and clinical settings, as well as policy- and public-oriented fields, organizations, and agencies.

KEY WORDS: neuroethics; neuroscience; neurotechnology; medicine; guidelines; funding; education

I. BACKGROUND

The Presidential Commission for the Study of Bioethical Issues (PCSBI) released the second volume of its \textit{Gray Matters} report in March 2015\textsuperscript{1} in response to President Obama’s 2013 request to directly address neuroethical, legal, and social issues arising in, and from efforts and developments of, the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative.\textsuperscript{2} This new report, subtitled \textit{Topics at the Intersection of Neuroscience, Ethics, and Society},\textsuperscript{3} enlarges upon the emphasis of the first volume of \textit{Gray Matters}’ call for “…integrating ethics explicitly and systematically into the relatively new field of contemporary neuroscience…to…consider societal...
implications of neuroscience research from the start.”

Upholding ethical standards for evaluating biomedical advances has long been a task of bioethics in general and medical ethics in particular. Accordingly, the Presidential Commission provided fourteen recommendations embodying four ethical priorities for the BRAIN initiative, namely: advancing public health and welfare, protecting the autonomy and best interests of the vulnerable, promoting the justice of resource distribution and of the legal system, and preventing harms from public ignorance about neuroscientific matters.

II. THE NEED FOR NEUROETHICS

The second volume of *Gray Matters* clearly identified the need to address these issues. Since its titular inception some thirteen years ago, the field of neuroethics has developed to engage both the ethical concerns accompanying the progress of neuroscience, and radical implications of neuroscience for conceptions of the self and our ability to be moral beings. Neuroscience and neurotechnology are, and will increasingly be, defining new capabilities to assess and affect the brain, and these are generating both exciting opportunities—and provocative, if not somewhat controversial challenges—in neurology, psychiatry, rehabilitation, and pain care in pediatric, adult, and geriatric settings.

The neuroethical questions, debates, and problems fostered by these developments and their applications are real, here, and now, and will only expand and be amplified given that this year’s BRAIN initiative funding is dedicated to advancing translational programs at the National Institutes of Health (NIH), and sustains first-year allocations in support of ongoing medical translational projects [e.g., *Systems-Based Neurotechnology for Emerging Therapies* (SUBNETS), and *Restoring Active Memory (RAM)*] undertaken by the Defense Advanced Research Projects Agency (DARPA). Absent at least any plan for what directions and stances guidelines and policy should assume, there is real risk of playing a hobbled game of “catch-up” on the ethical, medical, legal, and economic fronts upon which neuroscience and neurotechnology are employed and leveraged to affect individuals, communities, and groups in, and as parts of, various publics in international contexts. This manuscript provides what we posit to be crucial roles and tasks of neuroethics that will be necessary to engage as these federally funded projects gain momentum and come to fruition.

III. TOWARD ACTIONABLE GOALS

We argue that neuroethics needs to be intrinsically engaged at those fronts, and not merely an after-the-fact consideration. Toward this end there must be dedicated efforts to enact neuroethical investigation, deliberation, and diligence in key groups of potential effect- and change-agents. This will necessitate research, education (on a variety of levels), training, and articulation, and each and all of these endeavors will require explicit subsidy.

Accordingly, and in concert with the recommendations made in the *Gray Matters* volumes, we offer what we believe to be four crucial—and actionable—goals for neuroethics:
First, as a set of practices, neuroethics should be dedicated to evaluating the validity and value of current and proposed approaches to assessing and altering the structure and functions of the brain.

Second, neuroethical tools and methods must be developed to interpret, and enable sound use of, any and all neuroscientific information, techniques, and technologies in biomedical research and clinical practice.

Third, neuroethics as a discipline should promote and work to use newly emerging neuroscientific findings to both transform common conceptions and definitions of the normal structure and functions of the brain, and moderate popular notions about how the brain should be treated to recover or improve its functional capacities of cognition, emotion, and/or behavior.

Fourth, neuroethics should be a prominent feature in the education and training of the next generation of researchers and clinicians, so as to enable more neuroscientifically pragmatic and ethically prudent capability in laboratory and clinical settings, as well as policy- and public-oriented fields, organizations, and agencies.

IV. THE NECESSITY OF FUNDING—AND RELEVANCE

The field of neuroethics is not prepared or equipped to undertake these goals in isolation, and only well-funded, interdisciplinary investigations can depict how such goals and objectives can and should be realistically attained.8–10 Thus, while President Obama has dedicated significant funding to the BRAIN initiative, and tasked the PCSBI with studying and making recommendations about ethical issues spawned by this initiative, we opine that broader funding and an expanded research portfolio in neuroethics are required. It is indeed noteworthy that the federal agencies receiving BRAIN initiative funding to date (i.e., DARPA, NIH) each consult intramural groups specifically devoted to addressing neuroethical issues.

Yet, we believe that one of the functions of these intramural groups should be to pose key domains and dimensions of neuroethics that will be important to employing neuroscience and neurotechnology in both medicine and society at large.11 These should serve as the basis for requests for ideas and proposals (RFI/RFP) solicited from interdisciplinary teams of scholars, researchers, and clinicians to address realistic questions and/or possible solutions focal to guiding brain research and its potential applications.

To be relevant in translational medical contexts, these issues and approaches should not remain academic, but should be grounded to the realities and needs of clinical care, and should appreciate the contingencies of socio-cultural diversity, economics, and politics, for neither neuroscience, neuroethics, nor medicine exist in a social vacuum. Neuroethics can develop guidelines for monitoring and comprehending proposed and enacted brain modulations and modifications, and develop analytic tools and methodologies to integrate interdisciplinary information about the significance and impact of such alterations.
V. CONCLUSIONS

Neuroscientific discoveries and neurotechnological tools will become ever more important to advancing many diagnostic and therapeutic capabilities of medicine. The ethical challenges at the frontlines of brain-related medicine multiply as fast as the therapies based upon neurotechnology, and difficult choices more frequently confront physicians, patients, and families. These decision-points in turn radiate throughout health care institutions and systems as they attempt to fulfill their missions. Arguably, the good of any such developments can only be achieved by insuring the ethical probity of brain research and its translation in clinical practice. Moreover, given that any ethical decision-making begins from depiction and analyses of the facts and realities at hand, the need for a pragmatic view of what cutting-edge neurotechnologies can do, and what neuroscientific information actually means, will only increase.

We believe that as a discipline, neuroethics is well-poised to accomplish these tasks. We have called for “no new neuroscience without neuroethics,” and unapologetically restate that assertion again here. Ultimately, the medical profession’s receptivity to neuroethics, and support for the worthy aims of neuroethics, as outlined in this essay, will be crucial for the reciprocal development and ultimate success of both neuroethics and the sound use of neuroscientific techniques and technologies in medical care.

VI. ACKNOWLEDGMENTS

This work was supported in part by funding from the William H. and Ruth Crane Schaefer Endowment (J.G.), Children’s Hospital and Clinics Foundation (J.G.), and an unrestricted research and educational grant from Thync Biotechnologies (J.G.).

REFERENCES

The Human Prospect
A Neohumanist Perspective

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The human prospect(s) of neuroscience and neurotechnology: Domains of influence and the necessity – and questions – of neuroethics

By James Giordano, PhD

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Abstract:
Neuroscience and the technologies it develops and employs have become a profound international force, exerting effects upon the scope and tenor of healthcare, socio-cultures, economics, and global relations. In this essay, I provide an overview of neuroscientific and neurotechnological approaches to assessing and accessing the brain, and explicate how neuroscience exerts influence in the metaphysical, epistemic, anthropological and ethical domains. I posit that when taken together, these domains of effect establish the substance and work of the field of neuroethics.

Herein, I describe key issues and fundamental questions that are the foci of neuroethics. To address these issues and questions, I offer that the field and practice of neuroethics will must engage ongoing discourse, formulation of methods and protocols, and establishment of standards and guidelines that realistically reflect – and respond to – specific developments and trajectories of neuroscience. Through such address – and dedicated educational efforts – neuroethics can define and direct the ways that neuroscience will influence the human prospect upon the 21st century world stage.

Key words: neuroethics; neurotechnology; neuroscience; culture
NEUROSCIENCE AND NEUROTECHNOLOGY –
A GENERATION OF PROGRESS

Through a deepened and broadened focus upon the structure and functions of nervous systems and the brain, neuroscience is addressing perdurable questions about the “bases” of consciousness, cognition, and action, and concepts of self-determination, morality, and the “nature” of mind and being. Built upon the groundwork provided by research of the late 19th and 20th centuries, and propelled by various governmental and commercial programs of support since 1990, the field has had a surge in activity, reflected, for example, by a greater than 70% growth during the 10 year period from 2000-2010, as evidenced by the increased number of studies reporting basic and translational research and various clinical applications.1, 2 Today, neuroscience and neurotechnology (i.e. neuroS/T) can be viewed not as separate dimensions, but rather as a singular, reciprocal – and inextricably inter-reliant – enterprise, entailing iterative heuristic progress that employs extant tools to establish theory, which then prompts the development and use of more capable and precise tools with which to both (a) address, adapt and/or confirm theories anew, and (b) afford information and instruments that can be translated into knowledge and applications in medicine, public life, and various spheres of

Table I. Categories of Neurotechnologies

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<thead>
<tr>
<th>Assessment Neurotechnologies</th>
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<tr>
<td><strong>Imaging Approaches</strong></td>
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<tr>
<td>Computed Tomography (CT)</td>
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<td>Positron Emission Tomography (PET)</td>
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<td>Single Photon Emission Computed Tomography (SPECT)</td>
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<td>Magnetic Resonance Imaging (MRI)</td>
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<td>Functional Magnetic Resonance Imaging (fMRI)</td>
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<tr>
<td>Functional Near Infrared Spectroscopy (fNIRS)</td>
</tr>
<tr>
<td>Diffusion Tensor Imaging (DTI)</td>
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<tr>
<td><strong>Physiological Recording Approaches</strong></td>
</tr>
<tr>
<td>Electroencephalography (EEG)</td>
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<tr>
<td>Quantitative Electroencephalography (qEEG)</td>
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<tr>
<td>Magneto-encephalography (MEG)</td>
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<tr>
<td><strong>Genomic, Genetic and Proteomic Analyses</strong></td>
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<tr>
<td><strong>Neurochemical Biomarker Analyses</strong></td>
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<tr>
<td><strong>Interventional Neurotechnologies</strong></td>
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<tr>
<td>Neuro-psychopharmaceuticals</td>
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<tr>
<td>Transcranial Magnetic and Electrical Stimulation</td>
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<tr>
<td>In-dwelling (Deep) Brain Stimulation</td>
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<tr>
<td>Peripheral/Cranial Nerve Stimulation</td>
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<tr>
<td>Genetic Modification</td>
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<tr>
<td>Tissue and Gene Transplants</td>
</tr>
<tr>
<td>Brain-Machine Interface Devices (Neuroprosthetics)</td>
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human activity and relations (an overview of extant categories and types of neurotechnologies is provided in Table I).

Contemporary brain science is advancing on an international and multi-dimensional scale through projects such as the European Union’s Human Brain Project, and the newly announced Brain Research through Advancing Innovative Neurotechnologies (BRAIN) initiative in the United States.\textsuperscript{3} At present, the interval needed to translate concept to construct, and theory to tools is estimated at 60 to 90 months.\textsuperscript{4} Without doubt, there is much that neuroS/T has achieved, and can achieve, but there is much that remains unknown, and which remains yet unaccomplished – if not untenable. This cresting of scientific and technological capability has prompted considerable speculation about the current and future potential of neuroS/T, and has spawned attendant hopes and fears about the ways that such techniques and technologies might be used, and the means and ends they will effect. In this light, it becomes important to parse fact from fiction, and reality from fantasy when examining what can and should be done with the knowledge and capabilities we possess, and what should be done about the information and abilities we lack. Perhaps more importantly, an undergirding question is whether we – as individuals, communities, and publics – will be able to tell the difference between the knowns and unknowns, facts and fictions, and exert appropriate judgement and control in the ways that neuroS/T is used.

**NEURO S/T: DOMAINS OF EFFECT AND NEUROETHICAL ISSUES**

In the main, advances in neuroS/T engage four interactive domains:

**The metaphysical** – Neuroscience is based upon a naturalistic view of the known universe and its events. Brains and their functions entail processes that are consistent with a current understanding of nature. Of course, the fund of information, and thus any understanding of the known realities of the natural universe will change as a consequence of new approaches in scientific investigation. This speaks to the epistemological domain as discussed below. As well, the naturalistic metaphysics of neuroscience establishes certain parameters of the anthropological and ethical domains, in that it grounds any speculations about, and undertakings of the human being and human action to natural explanations.\textsuperscript{5}
The epistemological – Namely, the naturalistic methodology of neuroscientific inquiry, outcomes it obtains and the limits of such methods, inquiries and knowledge. From this is an accounting of what and how this information contributes to other domains of human knowledge, and how this knowledge informs and in some cases influences longstanding philosophical questions about the nature of consciousness, the person, self, free will - and if such terms can and/or should even be used, or if a new lexicon needs to be developed.

The anthropological – NeuroS/T is a human endeavor, developed by humans, for use by humans to affect the human condition (including our relationship to each other and the natural world), the human predicament (of pain, suffering, disease, injury and the finitude of life), human nature, and the being that is the human. Here we must address and examine those ways that current and future developments in neuroS/T can (a) define both common and variant aspects of human structure and function, and (b) realistically affect these variables to alter humans and other organisms, and our interactions (with each other, the technologies we create, and the world).

The ethical – NeuroS/T, like any science – is employed to advance human knowledge and capability so as to fortify survival, and perhaps more appropriately, flourishing. If flourishing is defined as strivings for the good(s) of life, it then becomes important to address and examine how such goods are defined by various individuals, groups and societies, how neuroS/T can, are and should (or should not) be employed to obtain such goods. This then situates any consideration of neuroS/T research and application squarely within the realm of the field and practices of neuroethics.

Neuroethics, as a field, is devoted to two main tasks: (1) the study of neurobiological functions that are operative in proto-moral, moral and ethical cognition, emotions and actions; and (2) those ethical issues fostered by neuroscientific research and uses in medicine, public life and national security, intelligence and defense.6

At present, key neuroethical issues include:

(1) The validity and relative value of using various forms of assessment neuroS/T (such as neuroimaging, neurogenetics, biomarker evaluation) to define, describe, and/or predict patterns, and types of thought, emotionality and behaviors.
This incurs consequences in medicine and public health (as relates to predicting dispositions to potential neurological and/or psychiatric disorders), law (as regards using neuroS/T to define capability and culpability) and socio-political standards and actions (by using neurocentric criteria to establish norms and then basing social, economic and politico-legal treatment of individuals upon these definitions and distinctions).

NeuroS/T-based assessments have been shown to be useful in experimental, and certain clinical and social applications, by illustrating particular functional and dysfunctional parameters of brain structure and activity. However, these approaches also incur a number of potentially controversial issues and questions, based, at least in part, upon the capabilities and limitations of the techniques themselves. For example, neuroimaging technologies and techniques (e.g.- positron emission tomography (PET), functional magnetic resonance imaging (fMRI), diffusion tensor imaging (DTI)) tend to have rather good spatial resolution, but less than optimal temporal resolution. In contrast, physiological measures (e.g.- quantitative encephalography (qEEG) and magnetoencephalography (MEG)) have very good temporal resolution, but generally restricted spatial precision. Genomic and genetic assessments may be viable in assessing certain predispositions to patterns of neural structure and function, but direct prediction of resulting phenotypes can be difficult (if not impossible) given the diversity of interacting biological and environmental factors affecting physical expression. If used together (in what is being developed as a paradigmatic approach, called Advanced Integrative Scientific Convergence, AISC), many of these constraints can be de-limited. But while creating opportunities for technical embellishment and diminished constraints, convergence may also increase the questions and problems generated by the use of multiple techniques.

I posit that the utility – and applicability – of these approaches are credible if and only if the relative constraints and underlying assumptions (and misassumptions) are acknowledged and accounted for in any and all attempts to apply said techniques – especially in situations beyond the research or restricted clinical realm (such as social norming and/or law). Can we “scan brains to read minds”, or “plot genes to predict future thoughts and actions”? No; at least not to the degree entertained in popular media, and fictional accounts that tend to prompt public fears. Are we on a path to such possibilities? Perhaps, and here we encounter something of a paradox: Given (a) trends in, and relative speed of neuroS/T advancement, and (b) recent
events of social violence in Columbine, Oslo, Phoenix, Newtown and Boston (if not those of 9/11), there is a pervasive – if not increasingly strong – call from the public (as well as certain government sectors) to “do something” and employ imaging and genetic neurotechnologies to define, describe and predict who will be most likely to commit acts of aggression or violence.

At the same time, there is an equally strong fear that such neurotechnologies will be used to probe the sanctity of consciousness and usurp privacy and autonomy. How can a balance be struck between calls for protection and equivocal calls for privacy? What concerns me is that we might lose insight to the capabilities and limitations of these technologies and techniques, and imprudently begin to increasingly employ them in inapt ways (e.g., for legal inference or determinations of culpability or even disposition to certain patterns of thought and action, beyond the pale of actual current technological capabilities). Moreover, given the growing availability of, and reliance upon neuroS/T, might the use of such tools for assessment then instigate (a more widespread) employment of neuroS/T for cognitive, emotional and/or behavioral control?

(2) The potential use and misuse of interventional neuroS/T (such as novel drugs, transcranial and direct brain stimulation, implantable devices and gene and tissue transplants and implants, and brain-machine interfacing) to affect fundamental aspects of personality or “the self” as defined in first, second- or third-person perspectives.

Might neuroS/T be used to change the subjective experience of being by altering mental representations of past and present, so as to affect thought, feelings and actions in the future? Recent work in deep brain stimulation (DBS), transcranial magnetic stimulation (TMS), and optogenetics is impressive, and can be seen as an ardent step toward affecting cognitive functions to alter emotional reactivity and behavior. These studies are indeed important, but we must be cautious against spinning hype from fact.

Let’s bear in mind that there are a lot of ways to “manipulate” memories, thoughts and the emotions that are yoked to them. These range from the rather crude to the extremely sophisticated. Altering brain activity to change cognitive and emotional states relative and relevant to situational responses is not a new approach, even in the brain sciences. What is new is the specificity and precision that state-of-the-art techniques and technologies enable.
For example, the use of selective pharmacological agents (such as certain types of benzodiazepine derivatives, such as midazolam), transcranial magnetic or electrical stimulation, and deep brain stimulation are all currently possible (although it’d be hard to picture these being covertly employed). There is also building impetus to employ interventional neuroS/T to augment cognitive, emotional, and decisional abilities, and in this way, affect performance in learning and memory, acquisition of knowledge and skill, and to alter “talent”, “sensitivity” and perhaps “morality” (however defined). But what – and whose – criteria will provide the yardstick(s) of need, value or desirability? On one hand, such applications of neuroS/T can be seen as providing new vistas – and means – for self-improvement. On the other, these same approaches can be leveraged to enforce medico-legal and political standards and norms. In both scenarios, economics play a role in shaping how – and to whom – various techniques and technologies would be provided.

I offer that at the core, what generates unease is not the cutting-edge or even the covert nature of such techniques, but rather the question of using science and technology to probe and change thoughts and emotions. Arguably, this too is not new, although the mode(s), extent, and directness of such evaluation and change are certainly novel. This harkens a bit of sci-fi, (think here of the Hollywood films Terminal Man, A Clockwork Orange, Eternal Sunshine of the Spotless Mind, and Limitless), and these depictions are reflective of public sentiment, at least to some extent. Without doubt, there are situations that might sustain the use of neuroS/T to alter if not eradicate memories (eg.- traumatic events, profoundly sad or disturbing experiences, etc), and change cognitions and emotions (e.g.- depressive disorder; post-traumatic stress syndrome, and florid psychopathy) and these can be seen in a positive, therapeutic light. However, this same capability could also be used in ways that might – and perhaps should – be viewed as more controversial and provocative, such as in interrogations, intelligence operations, and even certain contexts of what is construed to be “public safety”.

But let’s say that we were somehow able to constrain the use of neuroS/T to the clinical milieu; we must still consider, for example, how “informed” consent can really be, given the newness of these techniques and technologies. Does this mitigate further research and use in practice? Indeed not, as the only way to fortify determinations of benefits, burdens, risks and harms is through ongoing research. And since most of the contestable issues regard-
ing the use of neuroS/T centers upon the assessment and control of human mental function, animal research will likely be insufficient, thereby necessitating human trials. Of course, many potential side and adverse effects will be reduced through the careful design and conduct of any such studies. Yet, the fact that this research employs and investigates heretofore unknown interactions between technologies and the brain creates strong probability that unanticipated outcomes can and will occur. How will responsibilities for unintended consequences be addressed and managed? Will the financial structure of medicine be revised to accommodate the trend and trajectories of cutting edge neuroS/T and its translations into clinical contexts?

As well, one need only to look at recent history to recognize that limiting neuroS/T to the clinical arena is unlikely (examples of this “spill-over” effect include cosmetic surgery, psychopharmacology; erectogenic drugs; and as explicitly apropos to this discussion, the extra-clinical use of neurotechnologies such as EEG-based neurofeedback, and transcranial electrical stimulation). To what extent can – and should – these approaches be used to alter and augment human thought, intellect, mood and emotion, personality, belief and/or action? What type or extent of interventions constitute treatment (of “abnormalities”, for example, if said norms are neuroscientifically defined), versus enhancements (and how far can and should brain functions and human performance be enhanced)? Might there be some “middle ground” – such as socially sanctioned and justifiable “enablement” (a term developed by our group) in which key individuals in select professions (eg.- peace officers, fire fighters, physicians, soldiers, et al) might receive neuroS/T augmentation of those capabilities that are deemed important and/or necessary to upholding their social status as protectors of the polis? What professions might be appropriate? Would it not be of benefit to augment the performance of other professionals, for example, lawyers, pilots, and even clergy? What about a cadre of augmented engineers to design and create ever improved technologies to enable human flourishing? And what happens if these individuals can no longer perform such duties, or are no longer in such jobs; should they then be “dis-enabled”, or will their augmented/altered capabilities render them misfit for other aspects of society? How will these “dis-enabled” individuals be cared for? Who decides? Who pays?

(3) The commercialization and global leveraging of neuroS/T.

Recent reports estimate that neuroS/T generated over $150 billion in rev-
enues, and in excess of 5% total market growth in 2011-12. Furthermore, current predictions posit a greater than 60% increase neuroS/T research, development and translational application(s) within the next 10 years, with Asian, and South American efforts becoming equal to, if not surpassing US and European output. This establishes brain science as a major economic factor and force affecting power distributions upon the world stage of the forthcoming decade. The strong market-pull for those neurotechnologies that may be viewed (via communicated popular/consumer beliefs) or intentionally construed (via advertising) to be of high value (e.g.- for cognitive, emotional or behavioral augmentation), may generate potential for inapt use as a consequence of commodification of neurotechnology into the consumer sphere and as a result, a default to relying upon caveat emptor as an undergirding ethico-legal precept.

This will likely incur social control by manipulating aspects of both economic and biological states through the use of neuroscience and technology (i.e.- in form(s) of what philosopher Michel Foucault referred to as “bio-power” and “bio-politics”). Thus it will become important – and necessary – to consider and acknowledge the needs and values of other, non-Western nations and groups when examining and articulating neuroethical issues and their possible resolution(s). It will no longer be adequate – or appropriate – to base international discussion, guidelines, treaties, policies, and laws upon solely Western ethics when attempting to address and govern neuroS/T research and use. What constitutes equitable distribution of the techniques, technologies and goods afforded by these approaches? How will neuroS/T affect global cultures, and what ways will neuroS/T be used to leverage national and international norms, lifestyles and qualities of life, laws, relationships, economics and politics?

Such leveraging of brain science is not limited to the portfolios of international economics; rather it is also crucial to consider the use of neuroS/T in military operations. The formal definition of a weapon as “a means of contending against an other” would warrant more accurate insight to the ways that neuroS/T might be employed to foster improved understanding and insight to precipitating factors that spawn cognitive and emotional precipitants of aggression and violence. In an optimistic, but nonetheless pragmatic view, I have argued that neuroS/T could be employed in such ways to defer conflict. But human history and contemporary events prompt re-examination of the viability of weaponizable neuroS/T to incur sickness
and death, and to negatively impact local, national and international public health.\textsuperscript{16}

**NEUROETHICAL QUESTIONS**

I posit that from these arise three major - and I believe inter-related – neuroethical questions and debates:

**First** is what we – as individuals, communities, organizations, nations and perhaps even a species – will do with the information and capability conferred by neurotechnology, and what we will do about the capability and information we lack (and by extension, whether we will be insightful and exercise sufficient judgment to know the difference). In other words, will we be (a) sufficiently *pragmatic* in our assessment of neuroscience and neurotechnology to recognize the actual strengths and limitations of these approaches, and (b) sufficiently *prudent* in the ways we use and limit the outcomes and products of these approaches to leverage medical, social, economic, legal and even political effects and power?

**Second** is whether neurotechnologies developed and articulated under current funding initiatives will be translated into clinical care, and/or publicly viable – and sound – use within a reasonable window of time, or whether these approaches are so nascent as to remain little more than incipient drops in the proverbial bucket that will be required to evoke the sea change of effect necessary to realize brain science as a viable public good. This is a double-edged sword; while we must be concerned about *not* translating neurotechnological research into clinical care, we must be equally concerned about the ampliative claims and under-estimated potential adverse effects that prompt over-expedience in moving novel technologies to the clinical forefront.

**Third** is how assessment and interventional neurotechnologies can, should and/or should not be used to define, predict and change the cognitive, emotional and behavioral states, conditions and manifestations that are associated with various brain structures and functions. Of course, this incurs a host of derivative issues, questions and problems, including if and how neurotechnologically-based or -derived information might be used to establish neurocentric criteria for normality and abnormality, what thresholds
(of both neurotechnological accuracy and neurobiological function) will be employed to initiate medical, socio-legal and/or political actions, and if and how various neurotechnologies will be utilized to execute such actions (by changing thought, emotions, beliefs, and actions).

Under this rubric we also confront the use – and potential misuse – of neurotechnology in dual-use agendas, both by intent and by co-optation. Surely, public safety and national security use of neurotechnology are not inherently capricious, nefarious or problematic. As noted above, such applications are often directed at discerning and mitigating risks of violence that could affect the population, and increasing the effectiveness of military medicine to prevent or reduce the burden of neuropsychiatric insult and trauma. Despite this, neurotechnology can – and I believe – will be used to effect great purchase in national defense, military and political spheres, both as weaponized techniques and technologies, and perhaps more subtly, but none the less potently, to effect new economic balances of power upon the ever more diversified world-stage that is contingent upon the market space occupied by cutting edge neurotechnologies (in medical, public life, and of course, defense uses). The question is how such neurotechnological research and applications will be assessed, surveyed, guided and governed, and what types of organizations will bear the responsibility of such ethico-legal stewardship on the international stage?

THE CHALLENGE – AND OPPORTUNITY – OF GUIDING NEURO S/T AS HUMAN PROSPECT

In assuming a path forward it will be essential to create equilibrium between postures of assertivism and precautionism. Toward this end, I have advocated more of a preparatory stance, wherein the neuroethical tasks will be to 1) realistically assess the science and technology that will be executable at present and in the near future, 2) model trajectories for use, misuse and effect, and thereupon 3) develop guidelines and approaches that will be necessary to identify, address and either prevent problems, or resolve them at their inception or early in their development.

I believe that such a preparatory posture is necessary because adherence to a frank precautionary principle is untenable for two principal reasons: First is the momentum of progress; these paths of neurotechnological development can and likely will occur, at least in some form. Second is that the progres-
sion of neurotechnological research and its applications are increasing, not least due to investments like BRAIN in the United States, as well as other national and international agendas, and therefore a “wait and see” attitude toward addressing neuroethico-legal and social issues created by neuroS/T, or an attempt to constrain neurotechnological development is disingenuous, if not downright foolish. Rather, I re-iterate that it will be wiser to take genuine stock of what areas and types of neuroS/T are being subsidized, fortified and advanced, assess how such technological developments will affect local, regional, national, and global societies, economics and politics, and employ neuroethics in an empirical, predictive and preparatory way so as to afford both readiness for, and guidance of neurotechnological use (and its effects) in various domains of global culture.

We have opined that the internationalization of neuroS/T necessitates a move away from older, exclusively Western philosophy and ethics. A contemporary neuroethics can only be meaningful and applicable upon the 21st century world-stage if the socio-cultural contingencies and exigencies of various stake- and share-holders in neuroS/T are taken into accord. In light of this, we have advocated a cosmopolitan approach that can be articulated within particular communitarian contexts through adapting certain existing principles and the development of others. While hypothetical and tentative, we maintain that this construct, while not without problems (such as potential tensions arising from inter-communitarian engagement), affords promise as a methodological paradigm for a “globalizable” neuroethics.

As a work-in-progress, the field will require dedicated efforts toward formation of working groups, ongoing discourse, formulation of methods and protocols, and establishment of standards and guidelines. I propose that (like the Human Genome Project) 2-3% of the total BRAIN budget be allocated to addressing specific neuroethical, legal and social issues (NELSI) arising in and from its funded scientific projects. To wit, I advocate a non-agnostic approach, in which there is targeted address of the NELSI that could likely be generated by the science that would be conducted under particular requests for proposals (RFPs). As well, I would hope that there would be equivalent investment by the private and commercial sectors in establishing well-conceived and precise NELSI projects that reflect and are aligned with the direction, scope and activities of these groups’ respective endeavors in neurotechnological research and its translation. Clearly these issues and questions loom large on the forefront of neuroscientific research and use. I
am very much encouraged by the proactive engagement of groups such as the Nuffield Council of Bioethics (in the UK), President’s Commission for the Study of Bioethical Issues, and Defense Advanced Research Projects Agency’s (DARPA) Neuroscience Ethics’ Legal and Social Issues Panel (in the USA) in the explicit dedication to these issues, both in acknowledgment of neuroS/T progress to date, and in advance of major incentivized programs in brain research.\textsuperscript{20}

Moreover, I think that the importance of educating professionals (in a variety of fields, including the sciences, humanities, law and politics) as well as the general public about what neuroS/T can and cannot do cannot be overemphasized, given the current level and planned courses of research, development and use, and the neuroethical, legal and social issues likely to be spawned by the realistic employment of neuroS/T in medicine, public life and international relations. Without doubt, neuroS/T can and will affect if not change the human predicament of suffering and pain, will affect the human condition, and may alter the human being – and conceptualizations of what it means to be human or a person. Learning must precede positive change, and absent this learning, change can evoke false hopes and fear, and give rise to misdirected action – often with dire consequences.

These undertakings need not be disparate; to the contrary, it might be of great benefit – and maximum effect – if monies were aggregated to support the formation of a network of neuroethics’ centers (both in and outside of academia) that would serve as interactive, governmentally independent, scholarly resources and think tanks that could conjoin multi-disciplinary scholars and practitioners to focus upon key issues – and domains of issues – germane to major areas of neuroscientific and neurotechnological investment, development and articulation affecting various spheres of society (e.g., medicine, public life, the military, etc).

That neuroS/T becomes a salient and powerful reality – and force – that will affect the human prospect of the 21st century society is inevitable. How this force is to be realized remains to be determined…and is subject to our insight, pragmatism and prudence.

Acknowledgments

This work was supported by a grant from the JW Fulbright Foundation, the
Biography

James Giordano PhD, MPhil is Chief of the Neuroethics Studies Program in the Pellegrino Center for Clinical Bioethics, and is a professor on the core faculties of the Inter-disciplinary Neuroscience Program, Division of Integrative Physiology/Department of Biochemistry, and Graduate Liberal Studies Program at Georgetown University, Washington, DC. Prof. Giordano is Clark Faculty Fellow in Neuroethics at the Human Science Center of the Ludwig-Maximilians Universität, Munich, Germany, and is William H. and Ruth Crane Schaefer Distinguished Visiting Professor of Neuroscience and Neuroethics at Gallaudet University, Washington, DC.

Notes and References

3. For additional information on the European Union Human Brain Project, see: https://www.humanbrainproject.eu; For further information about the United States’ Brain Research through Advancing Innovative Neurotechnologies initiative, see: https://www.whitehouse.gov/share/brain-initiative.
5. See: Robert Almeder. Harmless Naturalism, Chicago: Open
Court, 1998, for a discussion of limits of scientism, and varieties of naturalism, apropos Paul Kurtz’s notion of skeptical inquiry. Note also that such a naturalistic metaphysics need not exclude or denigrate notions of the transcendent, or spiritual and/or religious views, beliefs and practices. The so-called “hard questions or problems’ of neuroscience, namely how “mind” occurs in brain, leaves open the issue of whether the brain is a generator of consciousness, an antenna (to aggregate physical forces that coalesce into consciousness within the structural conditions of a neural network) or both. This comports with a number of naturalistically oriented religious perspectives of the universe, matter and being (such as that of Bernard Lonergan, Karl Rahner, and Pierre Teilhard de Chardin, for example), and/or views toward a syncretic or synthetic philosophy, such as that proposed by Herbert Spencer (see, for, the contemporary examples, the works of Carol Rausch Albright, James Ashbrook, Arthur Clarke, Paul Davies, Martin Gardner). Counterpoint is provided by authors such as Richard Dawkins, Daniel Dennett, and Sam Harris; and Richard Feynman, Stephen Jay Gould, and Matt Young (for example) offer more mid-ground positions of science and religion as non-overlapping, but nonetheless important, meaningful, and valuable doxa. A complete discussion of the tensions, conflict and potential conciliation of science and religion is well beyond the scope of this essay. For a reasonable, balanced overview, the reader is referred to: *Science and Religion: Are They Compatible*, edited by Paul Kurtz (with assistance of Barry Karr and Ranjit Sandhu), NY: Prometheus Press, 2003.


7. James Giordano, Integrative convergence in neuroscience: trajectories, problems and the need for a progressive neurobioethics. In: *Technological Innovation in Sensing and Detecting Chemical, Biological, Radiological, Nuclear Threats and Ecological Terrorism*,

9. The use of purposive, identified fictional accounts to depict both possible manifestations of science and technology, as well as public effects and sentiment(s) is a form of artistic endeavour that is referred to (in the classical Greek literature) as *Eidóla*. For address of neuroscience-fiction as *Eidóla*, see: Rachel Wurzman and James Giordano. Neuroscience fiction as *Eidóla*: On the Neuroethical role and responsibilities of representations of neuroscience (Presented at the annual meeting of the International Society for Neuroethics, San Diego, CA, November 8, 2013), and to be published in *AJOB Neuroscience*, 2014.


15. Ibidem, note 8. See also: Fabrice Jotterand and James Giordano. Real-time functional magnetic resonance imaging and brain-


20. For additional information regarding the activities of the United Kingdom’s Nuffield Council on Bioethics studies on neurotechnology, see: www.nuffieldbioethics.org, and for information regarding activities of the US’ President’s Commission for the Studies of Bioethical Issues dedicated to the forthcoming BRAIN
ABSTRACT:
Although Congress passed the Equal Pay Act in 1963 as an amendment to the Fair Labor Standards Act, it has not proven successful in remedying pay inequality between men and women. The Equal Pay Act provides that employers may not pay men and women unequal compensation where they perform substantially similar work, but there were many loopholes in that statute allowing employers to escape liability for unequal pay, particularly where they could justify the unequal pay on the basis of “a factor other than sex”.

Presently the wage gap between men and women continues. According to the National Committee on Pay Equity, women in 1973 earned 56.6% of what men earned. By 2010, the gap had narrowed somewhat. Women then earned 77.4% of men's earnings. Still women in the U.S. have a long way to go for full wage parity. Our federal and state equal pay laws must be amended to eliminate the escape clause that has so long impeded women's equality.

KEY WORDS: EQUAL PAY ACT, PAY EQUALITY

The White House Council on Women and Girls was created by President Barack Obama in early 2009 to provide a coordinated federal response to the challenges confronted by American women and girls. As part of its mission, the Council partnered with several government agencies, including the Office of Management and Budget and the Department of Commerce, to create a report on the status of U.S. females. The report particularly
highlighted the following significant facts:

Women have made enormous progress on some fronts. Women have not only caught up with men in college attendance, but younger women are now more likely than younger men to have a college or a master's degree. Women are also working more and the number of women and men in the labor force has nearly equalized in recent years. As women’s work has increased, their earnings constitute a growing share of family income.

Yet, these gains in education and labor force involvement have not yet translated into wage and income equity. At all levels of education, women earned about 75% of what their male counterparts earned in 2009. In part because of these lower earnings and in part because unmarried and divorced women are the most likely to have responsibility for raising and supporting their children, women are more likely to be in poverty than men. These economic inequities are even more acute for women of color.

Although the U.S. Congress passed the Equal Pay Act in 1963 as an amendment to the Fair Labor Standards Act, it has not proven successful in remedying pay inequality between men and women. The Equal Pay Act of 1963, 29 U.S.C. § 206(d) provides:

(1) No employer . . . shall discriminate . . . on the basis of sex by paying wages to employees in such establishment at a rate less than the rate at which he pays wages to employees of the opposite sex ... for equal work on jobs the performance of which requires equal skill, effort, and responsibility, and which are performed under similar working conditions, except where such payment is made pursuant to
(i) a seniority system;
(ii) a merit system;
(iii) a system which measures earnings by quantity or quality of production;
(iv) a differential based on any other factor other than sex.

It is immediately clear that subsection (iv) is an exception which swallows up the rule. The “factor other than sex” affirmative defense has most often allowed employers to escape liability for unequal pay, as it has been altogether too easy for them to fabricate some other reason for the wage disparity. Most
U.S. federal courts have interpreted this defense as requiring the employer to show that there was at least a legitimate business reason for the pay differential. Some courts, however, have ruled that a business-related reason was not necessary and that the employer’s justification need not even be wise or reasonable.

THE HISTORY OF U.S. EQUAL PAY LAW

But in 1963, when the Equal Pay Act was passed, there were high hopes that the Act would remedy many years of pay discrimination against women. Caroline Davis, Director of the United Auto Workers Union Women’s Department, then testified before the U.S. Senate that “the aspirations of the people of the world, as expressed in the Declaration of Human Rights, recognized that ‘unequal pay is immoral’”. Ms. Davis compared the United States unfavorably to the 39 nations who had previously accepted the “equal pay for equal work” convention of the International Labor Organization. Cited in her Senate testimony was the frivolous argument being made by some employers that, since women live longer statistically than men, pension programs cost disproportionately more for women, and hence justify a lower than equal wage. She countered that most of these same employers do not even provide pensions for their workers. Demolishing other rationales advanced for paying women less, such as medical insurance costs and absenteeism associated with motherhood as “pseudo arguments”, Ms. Davis concluded her remarks to the Senate with these stirring words:

Equal pay, equal opportunities, equal rights, so that every American can accept an equal obligation to the community, if established, will ultimately enable the American community to endure. The profits that a few ethically marginal employers make by paying substandard wages will not help the Nation prevail, nor will exploitation based on economic and social discrimination.

When Congress was first debating the need for legislation to remedy pay disparities between men and women, President Dwight Eisenhower told the Congress that “legislation to apply the principle of equal pay for equal work without discrimination because of sex is a matter of simple justice”.

Noble sentiments such as these accompanied the Equal Pay Act’s enactment
in 1963, but unfortunately, equal pay for women in the United States would prove elusive thereafter, due in no small part to the “escape clause” of the “factor other than sex” defense.

**UNSUCCESSFUL IN REMEDYING PAY INEQUITY**

This failure of the law to redress pay inequity is illustrated by one court decision (out of many), the case of *Irby v. Bittick*, 44 F.3d 949 (11th Cir. 1995). In that case, Barbara Irby, a female Sheriff's Deputy in Monroe County, Georgia, sued her employer, Sheriff Bittick, under the Equal Pay Act, because her salary was considerably lower than those of two male Deputies who worked in the same division at the Sheriff’s Department. The two male Deputies, Jones and Evans, were initially employees of the City of Forsyth, Georgia, but worked in the investigations division of the Sheriff’s Department from 1983 until 1989, when they elected to join the Sheriff’s Department as County investigators. Ms. Irby was hired as a Deputy in the Sheriff’s Department in 1987 and worked in all three divisions before her permanent assignment to the investigations division in 1989.

The Sheriff continued paying Jones and Evans what the City had been paying them, a sum substantially higher than the amount the Sheriff’s Department was paying Ms. Irby. It was undisputed that Irby, Jones and Evans performed equal work within the meaning of the Equal Pay Act. The question then became whether Jones and Evans were paid more because of a “factor other than sex”. The employer bears the burden of proof of this affirmative defense, and must show that the factor of sex provided no basis for the wage differential.

The *Irby* court first looked at previous court decisions construing the Equal Pay Act, which found that factors other than sex included unique characteristics of the same job, such as an individual’s experience, training or ability, as well as “special exigent circumstances connected with the business”, citing *Glenn v. General Motors Corp.*, 841 F.2d 1567, 1571 (11th Cir.), cert. denied, 488 U.S. 948 (1988). As is readily apparent, it could be practically anything.

One thing that it is not, however, is prior salary. As the decision in *Glenn* made clear, “prior salary alone cannot justify pay disparity” under the Equal
Pay Act. 841 F.2d at 1571. But if the employer’s reason for paying men more than women is a combination of prior salary and experience, for example, the 
Irby court stated that “there is no prohibition on utilizing prior pay as part of a mixed-motive” as a factor other than sex. 44 F.3d at 955.

The mixed-motive reason advanced by the employer in 
Irby was prior salary plus more experience within the investigations division. The court in that case held that this reason was a legitimate factor other than sex justifying the significant pay disparity between Ms. Irby and her male comparators. The inequity in this decision in favor of the employer was noted by the dissenting Judge, who pointed out that two male Deputies had been in the investigations division longer than Jones and Evans, but were paid less than they were, though they were still paid more than Ms. Irby.

This decision is typical of many others when women filed suit against their employers under the Equal Pay Act. It was simply too easy for the courts to find that whatever the employer’s reason for the pay disparity was, it was a “factor other than sex”. But the hurdles faced by women trying to enforce the law granting them equal pay were not limited to the “factor other than sex” escape clause.

As though these difficulties were not severe enough, in 2007, the U.S. Supreme Court put another obstacle in the path of women’s pay equality. Lilly Ledbetter had sued her employer, Goodyear Tire & Rubber Co., under the Equal Pay Act, when she learned that she had been paid less than her male counterparts for many years. The Supreme Court held in Ledbetter v. Goodyear Tire & Rubber Co., 550 U.S. 618 (2007), that, since the employer’s initial pay decision had been taken years before Ms. Ledbetter discovered the pay inequity, she could not sue her employer under the Equal Pay Act because the decision had not been made within the 180 day statute of limitations before she filed her complaint.

Fortunately, Congress overrode this unjust Supreme Court opinion and passed the Lilly Ledbetter Fair Pay Act of 2009. Pub. L. 111-2. The Act provides that each discriminatory paycheck, not just the employer’s first decision to pay the woman unequally, resets the time to file a pay discrimination claim. The Ledbetter Act made it easier for female workers to file pay claims, even if they discover the unequal pay years after it began.
Ms. Ledbetter and many other women workers would have learned more quickly that they were being paid less than their male counterparts if most employers had not implemented pay secrecy policies. Many employers forbid their employees to discuss their pay with one another and punish those who do. This roadblock often prevents women workers from discovering that they are not being paid as well as the men who work beside them.

STILL UNEQUAL AFTER ALL THESE YEARS

Presently the wage gap between men and women continues. According to the National Committee on Pay Equity, women in 1973 earned 56.6% of what men earned. By 2010, the gap had narrowed somewhat. Women then earned 77.4% of men's earnings. Still women in the U.S. have a long way to go for full wage parity. Economist Evelyn Murphy, President of The Wage Project, estimates that over a working lifetime of 47 years, the current wage gap amounts to a loss in wages for a woman of $700,000 for a high school graduate, $1.2 million for a college graduate, and $2 million for a professional school graduate. These are staggering figures.

The Coalition of Labor Union Women opines that the wage gap still exists because many women continue to be segregated into low-paying occupations. More than half of all women workers hold sales, clerical and service jobs. Studies show that the more an occupation is dominated by women, the less it pays.

Why should men care whether women receive equal pay? Why should American businesses care? All Americans should care because, not only is it good for women, it is good for the U.S. economy. According to a study conducted by Women Certified, a women’s consumer advocacy organization, 41% of women are their families’ sole source of income and women contribute 83% of the U.S. gross national product. So pay inequity hurts not only businesses, but families. The AFL-CIO study shows that the average 25-year-old woman who works full-time, year-round until she retires at age 65 will earn $523,000 less than the average working man. And at the current rate of change, working women in the U.S. will not achieve equal pay until after the year 2050.
Only if U.S. women take action to remedy unequal pay, both on behalf of themselves and their female colleagues, can meaningful equality of compensation be a reality.

Marcia Cohen is the legal counsel for the Institute for Science and Human Values.
REPORT ON THE NINTH INTERNATIONAL HUMANIST MOSCOW STATE SUMMER SCHOOL, “TWENTY-FIRST CENTURY: THE THEORY AND PRACTICE OF NEW HUMANISM”

JULY-AUGUST 2012

BY TONI VAN PELT

ABSTRACT:
Russia presents special challenges to humanist activists. Humanists from the U.S. present humanism to students in Russia. Covered are such subjects as pornography, privacy and the Internet, and humanism from an African American perspective. Russian food and culture are discussed, as is Russian politics and problems within the nation.

KEY WORDS: RUSSIA, VALERII KUVAKIN

I had just finished a presentation to nine men and three women at the summer school of Moscow State University, to very mixed reactions, on the dangers of pornography to society, when I decided to begin this memo while things were still fresh in my mind. The three women students are all Russian (white). One is in her twenties and two in their thirties. One man is from Iran, one is from Turkmenistan. Two men are considered black, two men are in their twenties, the rest in their forties and fifties. Except for one man in his third year and one woman in her fourth year, they are all working on their advanced degrees. One woman and two men hold their doctorates in philosophy. For some, this is not their first time attending the Humanist House sessions. Some have even traveled to the U.S. to attend Paul Kurtz’s summer school in Buffalo.

Our group also consists of our leader, Valerii Kuvakin, professor of
philosophy at Moscow State University, Joep Schrijvers, a gay white man, author and writer from Amsterdam, Norm Allen, a black male historian, editor of The Human Prospect, ISHV’s publication, from Buffalo, and myself, ISHV’s Public Policy director, a white feminist woman, from St Petersburg, Florida. It turns out all three of us are activists in our own way, I'm the feminist, Norm, the black activist and Joep, a gay man. All of us are rather exotic in our own way, I think, for most of the students. I doubt that many had met people who openly identified in the ways we did.

We are residing in a small village, Subbotovo, in the country, about a two hour drive from Moscow. It has a mini market, much like one in the U.S., and a very colorful new church. There is a bus stop on the corner. That is it for commercial enterprise. The rest of the village consists of homes, many of them being built or new, some older, mostly renovated. Some have garages and even separate buildings with wet and dry saunas. Certainly they are up to American standards. It seems many Muscovites leave the city in the summer for the countryside. A charming river runs throughout the village and its outskirts.

Many villagers and their children swim in the afternoon. There are small wooden docks along the riverside for entering and leaving the water. It seems as if most everyone has a dog. There are chickens running around freely in the neighborhood streets and yards, with a rooster or two crowing at will. We are in farm country with many grain crops being harvested. Surprisingly, I do not see cows or pigs. We take walks in the woods and along the country dirt roads. It is truly a lovely, relaxing spot to spend the summer in.

We eat, sleep and study in the Humanist House, established by Valerii Kuvakin, our host, for ten days, and most certainly the “Paul Kurtz” of the Russian Federation. He is extraordinarily energetic and a very brave white man in his mid-70's.

Two flags fly from the porch—one Russian, one of the United Nations. A map of the world labeled in the Russian language hangs on the wall. Many books sit on multiple shelves in most of the rooms. The house itself is very comfortable for such a large party. There are three bathrooms, one for the men with extra urinals, one for the women and one unisex. In four bedrooms there are three single beds each. They are large bedrooms with
closets. There is a very large stuffed pink elephant hanging on the wall in the living/class room, holding a small Russian flag in a green and pink vest, with a sign in Russian pinned to its chest (I never did find out what it said.) On another wall there are photos of famous Russian philosophers including Valerii Kuvakin, and one famous American philosopher, Paul Kurtz; on another are black and white photos of the lovely, surrounding countryside.

As I write this I am listening to a fascinating lecture by Joep Schrijvers of Amsterdam, about the new concepts of suveillance, selfveillance and dataveillance. It is eye opening for most of us. We are aware of much—but not all—of what he says. But he is connecting the dots in a way we have not thought of before. He has traveled the world to observe how societies are changing. We have moved from a world of hope and optimism to one of fear and negativity. He points out that the sign of a declining society is when its cities are returning to pasture land (think Detroit for one). Very aptly put.

Back to our Russian home. The wooden kitchen table is very long with slightly unstable benches and small stools for us to sit on. The food is simple and good. We are fortunate that Tanya, Valerii’s sister, is caring for us. She grows a wonderful garden of vegetables, herbs and fruit, lemons, pears, apples, cabbage, lettuce, tomatoes, cucumbers, dill, parsley, carrots, potatoes, the list goes on. As you can imagine the salads are very fresh. Each morning I see her in the garden picking the food we will consume for the day. Seafood and beet salads are also served.

The meats are mostly processed; sausages (we call them hot dogs; short, big and fat) salami, baloney and other lunch meat and good cheese; all of these are served at breakfast as well as lunch (Russian dinner) and dinner (Russian supper). There are also lovely homemade pickles, four kinds of homemade jams; apple, raspberry, a berry I’m not familiar with (we decided perhaps something like a cranberry) and a type of purple grape jam. We usually have hard boiled eggs on the table and some days, Tanya prepares lovely omelets or scrambled eggs with sausage. We have hot cereal as a choice each morning. Surprisingly for me the butter and bread were not very good anywhere we went in Russia. The bread was plain white or a dark wheat, rather boring.

We have breaded, fried fish, pork chops, chicken breast, and squash (delicious), excellent hot and cold soups (very delicious. Turns out Borsch is
served hot, not cold as I thought. It is quite tasty). Sour cream is served in salad dressing, for soups and other foods. We have also enjoyed a very good stew and roasted chicken.

For starch we usually have buckwheat, though on occasion we have rice or noodles in our soup. We enjoy pasta with butter, no sauce, and roasted and fried potatoes. Yum.

Each day water is boiled for our use (we all drink it, including the Russians). We have bottled water, it is salted, which I find unusual. No ice. Frequently most drinks are served at room temperature, warm or even hot. Tanya makes fresh delicious lemonade and other fruit drinks. Tea, or chai in Russian, is a time honored enjoyment with each meal and before bedtime. They do not seem to drink coffee. (They have instant for foreigners, and a few different brands of them.) We have no sodas—until the last day on which a liter of Coke was on the banquet table—except for some unfamiliar carbonated drinks served in liter bottles. I think one is made of barley or wheat. I didn’t enjoy them at all.

We don’t drink spirits except for one night when we have wine in a box. I don’t drink wine at home but I found the white wine to be very tasty. We had a wonderful banquet the last night, served with wine and vodka! We made many, many toasts at dinner and had a blast. Four or five of the men were involved in preparing a Russian shish kabob outdoors on an open fire for the banquet, quite flavorful. One of the things I find amazing is how familiar I am with much of the food. My maternal grandparents were Slovak. I find on this trip that the Slovak language is based on the Cyrillic language, as is Russian. My grandmother kept a very large garden for most of my life until she moved into an assisted living facility in her late eighties. My mother prepared many of our meals in the same way that Tanya does.

The weather in Moscow and at the Humanist House was cool in the mornings, heating up (a lot) in the afternoons and turning much cooler again in the late evening (long pants and jackets are needed). The sun was up very early and it stayed light until around 10:30pm each night. This was good for very long walks. We walked in small groups and larger groups, or in solitude, at least once daily. We would have a mid-afternoon walk on break, and perhaps a short walk, and every evening, usually an hour or so amble throughout the countryside.
We learned about each other and discussed the lessons, asking questions, sometimes very tense, teasing out our differences and similarities. We have much in common and many different experiences. They are largely conservative in their thinking. Birth control and abortion are legal and non issues for them. I finally realize most of them are or will become the thought leaders of their regions. One of the women has just completed the first textbook on humanism in Russian.

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_Toni Van Pelt is congressional lobbyist for the Institute for Science and Human Values. She currently serves on the board of the National Organization for Women as the Southeast Regional Director._
THE WAR AGAINST DEATH

BY PETER ROGATZ, MD

ABSTRACT:
At the end of a debilitating disease, a patient may reach a point where persistent suffering outweighs the benefit of extending life. Some of the patient’s deterioration will be due to the implacable progress of her/his disease but, too often, it may be the result of a physician seeking to delay death and persisting in aggressive therapy.

The interests of the patient in such a situation may be viewed in terms of a war metaphor, in which physicians are the generals, conceiving of death as an enemy they must try to defeat and employing every available weapon in a war that cannot be won. In these instances, pursuing the war no longer extends life in a beneficial way but merely extends the time it takes for the patient to die. In war, if a general is gripped by the desire to achieve victory at any cost, civilian authority must prevail. Similarly, in each patient’s personal struggle as the end approaches, civilian authority -- the patient or his/her surrogate -- must take command and determine when it is no longer reasonable to prosecute the war. More is not always better.

KEY WORDS: END-OF-LIFE

In 2006, Israeli prime minister Ariel Sharon suffered a massive stroke and apparently has been in a persistent vegetative state on life support for the past seven years. We might characterize his condition as a death-like state of life or, alternatively, as a life-like state of death. We may wonder what Ariel Sharon would wish for himself and be moved to consider what we would want for ourselves.

To live well into our 90s in reasonably good health, enjoying family and friends, nature, hobbies, music, art and reading is a precious gift – but one that not all are privileged to enjoy. As we live longer, many will find themselves in a struggle with serious illness. We may view this struggle as a
war in which our doctors and hospitals are the generals.

War is an anathema, but the war against disease is one we should prosecute vigorously. The research laboratory can be seen as a staging area for this war and the individual patient becomes the ultimate battleground. Sometimes we win spectacular victories against cancer and stroke, against diseases of heart, joints, kidney, lung, and liver. Such victories, however, can never be absolute. Most of us eventually will face months or years of gradually diminishing capacity, coping as effectively as possible with the pain and disability that accompany chronic disease. And so the war goes on.

Prosecuting this war, we understand that we cannot conquer death. Yet, even as we recognize this fact, we are tempted by the technologic imperative – the impulse to use every available weapon to defeat the enemy. It is difficult to resist this impulse. With our modern armamentarium, we sometimes try to barricade the door and keep death at bay as long as possible, counting every day as a victory in the long war.

As we try to stand our ground in a war that we must eventually lose, it is the patient who pays a price in terms of symptoms – initially manageable, but ultimately debilitating: pain, cough, shortness of breath, weakness, paralysis, constipation, diarrhea, incontinence and – most devastating – diminished cognition that robs the patient of the ability to recognize family and friends and, ultimately, of awareness itself.

Some of this deterioration is due to the implacable progress of disease, but some of it is the result of the weapons we use – irradiation of tissues, injection of toxic chemicals, insertion of tubes, ventilators, disfiguring surgeries – the whole panoply of our technologic expertise. In the war against death, the law of diminishing returns confronts us with a painful dilemma. Frequently, a time is reached when our weapons no longer extend life in a way that benefits the patient but merely extend the time it takes for the patient to die, and when victories in the war against death may be outweighed by what we might characterize as “collateral damage.”

We need not surrender prematurely, for modern medicine wins many battles, often giving patients months and years of enjoyable life. But there is a point beyond which the patient may become the victim of a war that has dragged
on too long. In war, if a general becomes blinded by the desire to achieve victory at any cost, then civilian authority must prevail. Similarly, in each patient's personal struggle as the end approaches, it is the patient (or an authorized surrogate, if the patient has lost the capacity to make decisions) who must take command of the field and determine when it is no longer reasonable to prosecute the war.

For many patients, illness reaches a stage at which it becomes apparent that aggressive life-sustaining treatment cannot produce a cure and may actually be subjecting the patient to distress that far outweighs the value of pursuing the current course of therapy. This does not mean that the physician must throw up her hands and stop all treatment nor that the patient must be resigned to accept the ravages of the disease and passively await death.

Great progress has been made in recent decades in developing palliative care techniques that provide substantial relief from the symptoms associated with advanced disease. Such techniques, in the hands of those trained in palliation, form the backbone of hospice care, which can provide invaluable support to those confronting end-of-life: the patient, the patient’s loved ones, and the physician.

Some patients, some families and even some physicians seem to equate hospice care and the palliative techniques utilized in hospice with “giving up.” Quite the contrary, this is an approach designed to optimize each patient’s remaining time. And there is evidence that many patients who receive hospice care not only live more comfortably, but actually live longer – and at lower cost – than comparable patients who do not receive such care.

Although we see this issue primarily in human terms, it is inextricably linked with the cost of medical care. Medical expenditures during the last year of life amount to more than one-fourth of all medical expenditures. One day in a hospital’s intensive care unit costs many thousands of dollars. A patient with advanced disease may linger and suffer for weeks in a borderland between life and death. Heavy expenditures may buy us the ability to delay death for days, months, sometimes even for years -- but often at a terrible cost to the patient in terms of quality of life. Although no patient should ever be denied necessary and appropriate medical care for financial reasons, we must recognize that it is possible to incur costs blindly,
doing harm rather than good. More is not always better.

The war metaphor that has underpinned much of this discussion, although useful in some ways, can be misleading if it tempts us to perceive death as an enemy we must try to defeat. To conceive of our physicians as our protectors against death under all circumstances is a mistake. In the end there can be no protection against death and its arrival must not be seen by patient, family or physician as a defeat.

Faced, on occasion, with overzealous efforts to conquer death, we must realize, with Swinburne, “that even the weariest river winds somewhere safe to sea.”

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ABSTRACT:
As unfolding world events are becoming increasingly global in nature, the need for a unified planetary response is becoming more evident. If immorality and greed are left unchecked, the results will have devastating effects upon the planet and the human condition. Human beings have an ethical and moral responsibility to shape the future.

KEY WORDS: HUMANIST, RESPONSIBILITY, PLANETARY

All people born on this planet received a legacy from generations past, as will future generations. Such legacies as science, art, philosophy, humanism, freedom and equality, are treasured because they enhance the human condition. Unfortunately, for most of the earth’s inhabitants, the legacies they receive are greed, war, pollution, dominance, imposed ignorance, starvation, pain and suffering, and even death. The planet has become a playground for some of the world’s most immoral people to impose their will on the rest of humanity as well as on the earth itself. As the unfolding world events are becoming more global in nature, the need for a unified planetary response is becoming more evident. If such immorality and greed are left unchecked, the results will be devastating to the planetary and human condition. Even though the past cannot be changed, the future certainly can be, and that’s where we, the present, emerge as the shapers of the future.

WHAT CAN BE DONE?

The course is clear for individuals that believe in a human condition that includes freedom of speech, the right to a healthy and clean planet, the right to hold an individual belief system, and the freedom from those who would take away these rights. Regardless of race, religion or ethnicity, likeminded
people must work together as a planetary coalition, guided by ethics, science, reason, morality and empathy. This coalition must be vocal, active, and dedicated to using all the tools at their disposal to create a unified force that cannot be ignored.

WHAT TOOLS CAN BE USED?

**Ethics:** Whether we are theists, agnostics, or atheists, we can live our lives with compassion, reason, ethics and morality, and should not take advantage of others just because their condition makes them vulnerable. Our planetary responsibility should be to help the disadvantaged, not to exploit them. The right course of action is rarely the easiest at first, so we must be strong, and also join forces with likeminded individuals. There is strength in numbers.

**Truth:** There is no substitute. We must become teachers and shine a light on ignorance and oppression. Not everyone is going to embrace the truth quickly or easily. For people to change their belief system, they have to be receptive to science and reason, and they have to be treated with the same respect that we would expect from them. That respect coupled with a humanist approach may just plant a seed that will grow into enlightenment.

**Humanism:** We are all one planetary family, regardless of race, religion, or ethnicity. What affects one of us will more than likely affect all of us.

**Tolerance:** No two people will concur on every topic. My father used to tell me, “You catch more flies with honey then with vinegar.” While that old adage is probably true with flies, it also applies to people. You cannot ridicule someone’s beliefs and then expect fruitful dialogue to emerge.

**Politics:** Form grassroots political organizations. We can vote against the officials that do not adhere to humanist ethics and vote for the officials that do. Support the candidates that are most aligned to the above beliefs. Support the organizations that are working to bring this metamorphosis about, for example, The Institute for Science and Hu-
man Values. These organizations need a lobbying arm that is working towards the same goals.

I believe that the moral, humanist and empathetic fraction of humanity outnumbers the immoral and greedy part. I also believe that with perseverance and individual involvement we can eventually win this fight for a healthy planetary environment, where each individual has a chance for a good life. It won't be easy and it's certainly harder than doing nothing, but look at what doing nothing to change clearly bad situations has brought upon us in the past.

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A SUMMARY OF THE NEO-HUMANIST STATEMENT
OF SECULAR PRINCIPLES AND VALUES:
PERSONAL, PROGRESSIVE, AND PLANETARY

Preamble:
Our planetary community is facing serious problems that can only be solved by cooperative global action. Fresh thinking is required. Humanity needs to reconstruct human values in the light of scientific knowledge. We introduce the term “Neo-Humanism” to present a daring new approach.

The Next Step Forward:
There are various forms of religious and non-religious beliefs in the world. On the one end of the spectrum are traditional religious beliefs; on the other “the new atheism.” Not enough attention is paid to humanism as an alternative. This Statement advocates non-religious secular Neo-Humanism.

Sixteen recommendations. Neo-Humanists:
1. aspire to be more inclusive by appealing to both non-religious and religious humanists and to religious believers who share common goals;
2. are skeptical of traditional theism;
3. are best defined by what they are for, not what they are against;
4. wish to use critical thinking, evidence, and reason to evaluate claims to knowledge;
5. apply similar considerations to ethics and values;
6. are committed to a key set of values: happiness, creative actualization, reason in harmony with emotion, quality, and excellence;
7. emphasize moral growth (particularly for children), empathy, and responsibility;
8. advocate the right to privacy;
9. support the democratic way of life, tolerance, and fairness;
10. recognize the importance of personal morality, good will, and a positive attitude toward life;
11. accept responsibility for the well-being of society, guaranteeing various rights, including those of women, racial, ethnic, and sexual minorities; and supporting education, health care, gainful employment, and other social benefits;
12. support a green economy;
13. advocate population restraint, environmental protection, and the protection of other species;
14. recognize the need for Neo-Humanists to engage actively in politics;
15. take progressive positions on the economy;
16. hold that humanity needs to move beyond egocentric individualism and chauvinistic nationalism to develop transnational planetary institutions to cope with global problems—such efforts include a strengthened World Court, an eventual World Parliament, and a Planetary Environmental Monitoring Agency that would set standards for controlling global warming and ecology.

Those who endorse this Statement accept its main principles and values, but may not agree with all of its provisions. We invite others to join us in these endeavors. Read the complete statement at: www.instituteforscienceandhumanvalues.net
I surely do not deny that religions have some good as sources of meaning, consolation, charity, and hope, but they have also been dysfunctional. The question is whether these religious institutions can be profoundly reformed or replaced by others that are more relevant to the present condition of world (not simply Western) civilization.
~ Paul Kurtz