

# Politics for the Neurocentric Age\*

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## Abstract

*The enormous leaps in our technologies for viewing the brain, the advances in our scientific understanding of cognition and neural functioning, and the massive amounts of resources being directed toward the brain sciences have transformed our understanding of our selves and our society. These transformations have ushered in the Neurocentric Age. This article examines the rise of neuroscience as a predominant way of knowing, and traces the shifts in the logic of governance and administration of power that are emerging from our growing fascination with the brain and modifying our minds. It concludes with a vision for an ethical and progressive neuropolitics for the 21<sup>st</sup> Century.*

**Keywords:** neurocentric, neuropolitics, neuropower, governmentality, locus of cognition, distribution of the sensible

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## A Pax-Neurona?

"I have addicted myself to the opening of heads," confessed Thomas Willis, the 17th Century father of neurology, referring to his somewhat macabre passion for dissecting human brains. Medicine prior to Willis viewed the brain as essentially a homeostatic organ, keeping the body's heat, animal spirits, and vital humours efficiently moderated. Philosopher Henry More, in his scoffing dismissal of the brain, described it as nothing more than a "bowl of curds." The seat of the soul and all that is human, for most natural philosophers of the time, was placed in the heart and liver. Willis and his colleagues in the Invisible College<sup>1</sup> corrected this view, showing that it is indeed the brain that enables the mind.

Since the "discovery" of the brain as the house of consciousness and the organ that enables the mind, its centrality in philosophical and political discourse has been secured. In this article, I begin by looking at the rise of neuroscience as a way of knowing and the way the brain has become a key

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site of political and social contestation. Next, I lay out the theoretical foundations of neuropolitics, and the characteristics of neuropower that is driving this political re-orientation. Then I look at some implications and applications of neuropolitics in a world of accelerating change and fluid identities. And I end with a vision for an exuberant neuropolitics—a democratized and participatory experiment in how we experience the world and order our societies.

While the fine details of the relationship between brain and mind remain at issue, the goal of this paper is not to weigh in directly on these debates. I do, however, need to define the terms as I will be using them. The brain is the biological organ that sits in our heads. It is the organ that processes perception, sensation, attention and thought. It houses (for now) our conscious minds. The mind, while enabled by the brain, extends beyond the brain and is part of an ecology that includes the body, the world, and the technologies we use to think, remember, and do things. The mind is embodied thought, and the process of how our brain-body-world system constructs an identity, a will, and a self.

While philosophers like Rene Descartes were recognizing that the mind makes us human, science historian Carl Zimmer argues that it was Willis, with his meticulous observation and explanation of neurological functioning, who ushered in the *Neurocentric Age*: the era "in which the brain is central not only to the body but to our conception of ourselves" (2004a, p.4). This is no minor revolution, and the study of the brain from its very inception raised existential crises about human identity and human destiny. From the start, critics of Willis decried his "mad itch for innovation," predicting that his theories would "end in the ruin of the human race" (Zimmer, 2004a, p.151). We see these fears about the loss of autonomy, identity, and free will recurring throughout the historical (and contemporary) discourses around neuroscience. These discourses drive the politics that emerge from advances in the brain sciences. Indeed, the original goal to uncover the secrets of the brain was politically motivated and contested. It was a science nurtured by men and women "scarred by civil war" who "hoped that a new conception of the brain would bring order and tranquility to the world" (Zimmer, 2004a, pp.6-7). This hope remains alive and well, but its promise unfulfilled.

But order and tranquility do not mean equality. In fact, much of Willis' work and the knowledge that emerged from studies of the brain and mind were directed toward maintaining hierarchical social orders by lending the legitimacy of scientific objectivity to established power relations. Newly demonstrable differences in brain function were correlated to status differences between nobles and brutes. In other words, certain individuals or classes were destined to rule or to follow—to be thinkers or to be workers—based on inherent qualities of their biological brains, which could now be claimed to be reliably and objectively known. Willis aimed to "raise this prejudice to a medical fact" (Zimmer, 2004b, pp.43-44).

One of the truisms of the history of science is that knowledge and technologies generated for a certain purpose often exceed, transform, or even undermine the original intention of the creator(s). Neuroscience and neurotechnologies are no different. Even though Willis intended his research to maintain and reproduce certain social relations—to create a *pax-neurona*—neuroscience has led to a complete re-evaluation

of our given assumptions about who we are and how we order life. Our "mad itch" to uncover the secrets of the brain is and will continue to be epistemologically and politically disruptive. One of the most important stories of the 21st century will be the tale of what happens when Willis' addiction to the 'opening of heads' is shared by an entire civilization. How will life, social order and power be transformed in the service of this addiction?

Considering the enormous leaps in our technologies for viewing the brain, the advances in our scientific understanding of cognition and neural functioning, and the massive amounts of resources being directed toward the brain sciences, we have now truly entered a Neurocentric Age.

### **From Enclosure to Disclosure**

The brain sciences have exploded just as philosophical, biological, cultural, and political boundaries are being redrawn to accommodate the movement of information through networks, and as we learn to program and re-program the virtual and physical structures around us. In just a few generations, we have moved from modern societies of discipline, in which power is concerned with moving individual through a series of enclosures, to postmodern societies of control, in which power acts on individuals through a system of continuous and free-floating modulation.

In these societies of control, we see a "crisis of enclosures" (Deleuze, 1990). The cranial enclosure is no different these days.<sup>2</sup> Brain imaging technologies are beginning to allow the conscious (and unconscious) mind to be "read," i.e. to communicate meaningfully without the traditional means of exchange with the world, such as spoken words, bodily gestures, facial expressions, written text, etc. Blood flow, heat fluctuations, electrical signatures, and chemical reactions are being rendered intelligible via imaging tools like functional magnetic resonance imaging (fMRI), near infrared spectroscopy (fNIRS), electroencephalography (EEG), optogenetic neuromodulation, and other direct brain-computer interfaces (Estep, 2010). The previously unseen products of our brains and minds—thoughts, memories, sensations, emotions—can now be viewed and "objectively" measured (and managed) with increasing precision and control. The brain now discloses much more information than it ever did before. An army of neuroscientists are riding and fueling a wave of excitement about the power and potential application of these new tools and new information.

With new brain-computer interface and neuromodulation technologies, "programming the mind" is moving from the realm of metaphor, as we might have used the phrase to indicate a kind of focused training, and into a literal practice that blends mind and computation. There are now dozens of research labs not only investigating, but building workable mind-machine interfaces that can translate neurological functioning, including thought, into machine-readable and executable information. And this communication is going both ways, with information being written *into* the brain (McGilvray, 2010). The latest Ansari X-Prize calls for a new generation of brain-computer interfaces that will "reward nothing less than a team that provides vision to the blind, new bodies to disabled people, and perhaps even a geographical 'sixth sense' akin to a GPS iPhone app in the brain" (Orca, 2010). The Sony Corporation has

patented a device concept that would ostensibly direct ultrasound at certain parts of the brain to create sensory experiences in the user (Hogan & Fox, 2005).

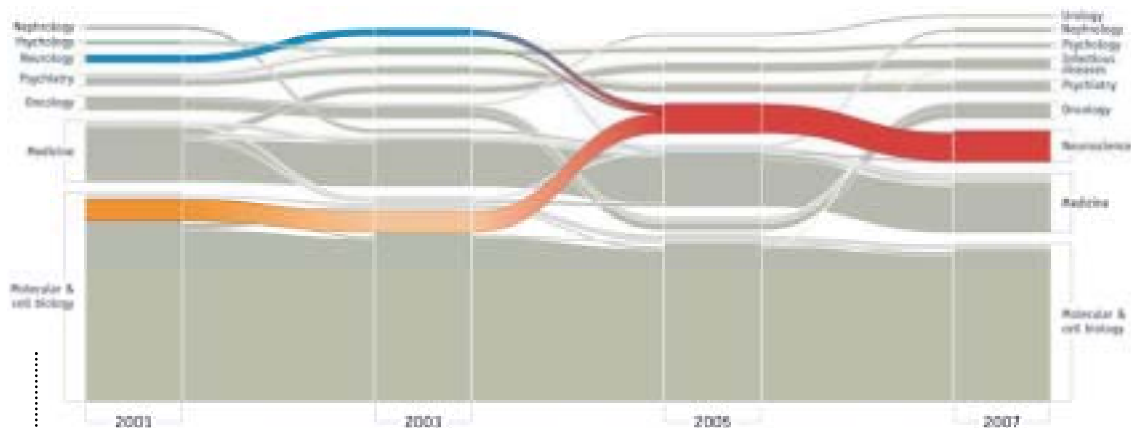
While still mostly experimental and of limited application, these tools to gaze into the brain, manipulate the mind (both invasively and non-invasively), and translate thought directly into digital code, will change how we communicate and create new avenues for mental surveillance, self-modulation, and control. They will create new dilemmas and new roles for those in power. They will be part of the evolution of governmentality—the mindset that determines the rules and responsibilities of government—that sees the continuous surveillance, regulation, and modulation of the mind as its responsibility and duty.

But what makes the attention to this political struggle even more urgent is that we don't need to wait until a future in which neuroenhancing chemicals or brain-scanning machines in airports are part of everyday life. The governance of thought, cognitive enhancement, neurodiversity, and the re-mapping of mental spaces is happening now, as the transformative power of neuroscience has already woven itself into the fabric of our cognitive environments, into mind-body-world relations, and indeed, into the fabric of our imaginations.

### Neurocentrism

New governmentalities enable, and are enabled by, an infrastructure of knowledge generation and dissemination. In the last 10 years, we've seen an unprecedented convergence of scientific research around the neuro- and cognitive sciences. A recent analysis of scientific publications finds,

*The biggest structural change in scientific citation patterns over the past decade: the transformation of neuroscience from interdisciplinary specialty to a mature and stand-alone discipline, comparable to physics or chemistry, economics or law, molecular biology or medicine (Rosvall & Bergstrom, 2010).*



From: Rosvall M, Bergstrom CT (2010) Mapping Change in Large Networks

Figure 1. The growth of the discipline of neuroscience.

The impact of this neurocentric turn is being felt in other disciplines, and new approaches to epistemology, research methods, and long-standing philosophical dilemmas are being generated and debated (cf. Churchland, 2002; Connolly, 2004; Edelman, 2006). We are looking to the brain sciences as the explanatory touchstone for diverse questions and disciplines, and we are already witnessing neuro- becoming the *prefix du jour*, generating an array of *neurologisms*<sup>3</sup> (Dunagan, 2004).

Tying neuroscience directly to market forces, a movement they deem "neurocapitalism," Marxist critics Ewa Hess and Henric Jokelt recognize the rising influence of neuroscience and its:

*usurpatory tendency to become not only the humanities of science, but the leading science of the twenty-first century. The legitimacy, impetus and promise of this claim derive from the maxim that all human behaviour is determined by the laws governing neuronal activity and the way it is organised in the brain (2009).*

Neuroscience is following a path similar to genetics in the 1990s, as it became a dominant explanatory frame for human activities. Although the complexity of the biology has reduced the fervor around each new discovery, we still see legions of geneticists looking for the "gene for obesity," the "gene for aggression," or the "gene for" all sorts of human behaviors and characteristics. As neuroscience takes its place in the pantheon of explanatory models, we will see a new generation of discoveries of the "neural correlates" of obesity, of aggression, and all sorts of human behaviors and characteristics.

Psychologists have begun to observe the phenomena of legitimacy surrounding the "seductive allure of neuroscience explanations" in popular media today. According to the authors of a recent psychological study, arguments accompanied by references to neuroscience research or images of the brain (even if the research or image was completely irrelevant to the argument), had a significant effect on the judgment of non-experts about the truth and reliability of the argument. In short, arguments with brain images were judged to be much more reliable than those without such images (Weisberg, Keil, Goodstein, Rawson, & Gray, 2008). If you want your argument to be believed, whether that argument is about global politics or the correct way to fry an egg, put a brain scan next to it!

These points are not meant to be dismissive of the work of those in the brain sciences—the research are already bringing great insight into human behavior, and will undoubtedly lead to treatments and interventions to improve the lives of millions with conditions that are untreatable today. The point I am making is that we should be wary of falling into the latest 'magic bullet' mentality that sees neuroscience and neurotechnologies as the solution to all our problems, from health to law to selling more soup. The challenge for neuroscientists and ethicists is to create a nuanced and layered view of developments to temper the litany of hype, and to contextualize the rise of the brain sciences within larger psycho-social processes, shifting political-economies, and mythologies surrounding the brain and mind.<sup>4</sup> My goal is to examine the process as it is occurring now—to continue to question the priorities and values that drive this research and its application in the future, with the goal of seeing neuroscience deliver its greatest benefit to the most people on Earth.

And it also means to not think of neuropolitics as the exclusive domain of neuroscience, and not just concerning the brain. The growing neurocentrism in how we define the sites and stakes of politics is directing our attention inside the head. People tend to be much more alarmed by the potential for abuse of neural implants, brain-computer interfaces, and mind altering drugs than they do to the extended cognitive environments already built around them.

It is not only the direct brain-computer interfaces, however, that are re-drawing the lines of inside and outside, public and private, mind and world. We are living more of our lives through digital social networks—sharing more and more of our thoughts, feelings, and memories with others in this hybrid plane of digital and physical worlds. Besides the disclosure of a previously conceived enclosure, the mind is networking out further and further and using digital technologies, communications media, and mobile devices as extended cognitive partners. This off-loading and scaffolding is, as N. Katherine Hayles observes "multiplying the sites at which cognizing can take place," as well as "the entities who can count as agents" (2001, p.147). These extended cognitive sites and distributed agency will expand the playing field and define the stakeholders of neuropolitics in practice.

### Constructing Neuropolitics

Neuropolitics is a framework that allows us to re-imagine culture, power, and political subjectivity in the light of our increasing knowledge about the human brain and extended mind. Political theorist William Connolly defines neuropolitics as "the politics through which cultural life mixes into the composition of brain-body processes. And vice-versa" (Connolly, 2002, p.xii). His work traces the complex encounters between the physical processes of the mind and the social world. He shows how thinking is altered by both internal contemplative techniques, like meditation, as well as by "outside" techniques, such as external neural stimulation or even television. Ultimately, *a priori* inside/outside distinctions are blurred beyond usefulness. If neuroscience has the goal of explaining the functions of the brain, the role of neuropolitics is to re-conceptualize these functions in terms of their political effects and to explore the worlds that emerge out of brain-body-culture interactions.

One of the central dilemmas of neuropolitics, identified by Andrew Murphie, is that "the more that is claimed for the central powers of the brain, or for what might be held within the brain, the more the brain seems subjected to pre-arranged powers (as opposed to participation within them)" (2006, p.119). Neuropolitics 'makes political' the emerging powers associated with the increasing attention to and facticity of the brain, and questions how the tools of visualizing, modifying, and controlling the human brain (inside the cranium and in the extended cognitive environment) influences the kinds of futures we can imagine, and the choices we make from those images.

### The "Neuro" of Neuropolitics

Neuroscience is the study of the brain and the nervous system, but it has come to be associated with many distinct bodies of knowledge from computer science to

philosophy. I am taking a broad definition of the "neuro" in neuropolitics, to include approaches from cognitive science, philosophy of mind, ethnography, computer science and other fields that are uncovering the functional details about how embodied human brains interact and use their environments for thinking and doing. We need to expand our view of the mind as entirely a product of the brain, and understand the systems that make the mind possible.

The simple but seismic shift in perspective here is that the mind is "less and less in the head" (Clark, 2004). So, there are many more things from the body and our environment that *matter* and deserve attention in the current conceptions of how thinking occurs. Part of being human is the ability to "offload" and recombine cognitive processes with technology and the environment—allowing the mind to have access to a much greater repository of personal and civilizational memory, and to take-on more complex puzzles and abstractions than would be possible if everything was kept in the head. Much like McLuhan's dictum that "we shape our tools, and thereafter our tools shape us," developmental psychology has shown that we spend our childhood adjusting our mentality to the world, and thereafter we spend most of the rest of our lives adjusting the world to our mentality. We are just beginning to understand what that really means to the way we design our societies, and how we can "hack" this human tendency.

### **Locus of Cognition**

Every morning my computer and I wake up together. It is much more than an alarm clock, more than my morning coffee, brushing my teeth, or other rituals of waking. I am not truly awake until I have accessed the information on my computer: picking up on the notes half-thought and blog posts half-read, checking for new emails, trolling through Twitter and my social networks, and getting the morning's news. Philosopher Andy Clark said he felt like he had the functional equivalent of a stroke after he lost his laptop—forgetting meetings, names, contacts, and streams of thoughts. Many people are intuitively aware that their networked computing machines, from desktop computer to mobile devices, don't just *feel like*—but really *are*—functional extensions of their minds.

Neuropolitics, then, requires understanding our *locus of cognition*: the site where history, politics, technology, and biological materiality converge around an embodied thinker, conditioning what is thinkable. Much like the analogous concept of a *locus of enunciation*, which places both the speaker and the words spoken within a context of history, politics, and power, *locus of cognition* binds the multiple layers of the cultural, biological, and individual within a political ecology of mind.

By attending to the *locus of cognition*, we can acknowledge the neuropolitical stakes of such things as unequal access to information, (dis)advantageous cognitive environments, the mind control of cultural practices of meaning-making, evolutionary influences on processes of thinking, and on down to the micropolitics of disposition, comportment, and habit. It helps us to interrogate *where* and *what* we are, how we process and relate our thoughts, and how these expressions are made meaningful. Simply, *locus of cognition* gives us a vehicle to look at the politics of distributed cog-



dition that avoids the pitfalls of the "individualistic isolationist biases" that characterized early cognitive neuroscience and that frame mainstream political debate today (Clark, 2004, p.221).

### The "Politics" of Neuropolitics

The roots of theorist Jacques Ranciere's 'politics of aesthetics' can be traced to his study of worker movements and political resistance in the late 19<sup>th</sup> Century France. In *The Nights of Labor*, he showed how workers' time and space was rigidly ordered to allow work, sleep, and not much else. Politics occurred, in Ranciere's view, when these workers began to use their limited free time to write poetry, to study philosophy, and to deliberate democracy (1989). Their political power was born when they demanded and exerted the "right to think," and when their voices began to be heard in the public sphere. So, to use Ranciere's definition, politics is the "distribution of the sensible" that "revolves around what is seen and what can be said about it, around who has the ability to see and the talent to speak, around the properties of space and the possibilities of time" (2006, pp.12-13).

Ranciere's definition shifts the project of politics and governance from the goal of agreement, and instead looks at how the preconditions of political life are made, and then made invisible. It is not an account of how the game is played, but rather how the rules were determined and who is allowed to play. The things we tend to associate with politics—voting, legislation, committees, etc.—are not politics in this view. These systems and practices are, instead, merely *policing* the boundaries of pre-established order.

So, a neuropolitics based on Ranciere's notion of politics as a distribution of the sensible points our attention to disruptions in the sensible order: seeing what was not seen before, hearing what was not heard before, counting what was not counted before. This approach is not in opposition or exclusion of activities such as research using brain scans to understand political preferences (Fowler & Schreiber, 2008), methods for cognitive enhancement, or the practices of mental surveillance, but it changes our perspective on those practices.

"The brain is a category buster" as NYU cognitive neuroscientist Elizabeth Phelps observes (in Lehrer, 2007), yet much of the discourse around the new neuroscience either exaggerates or minimizes the transformations that are possible—in many cases obscuring the changes that are preferable for democratic politics, which I will explore later. These discourses are very actively in play right now, and are examples of how structures and logics are policed, and how possibilities are conditioned. The assumptions upon which much of our social order is based are changing profoundly, and it in this transformation that neuropolitics, in contrast to neuro-policing, will emerge.

The examples of bounded time and "rights" to think is especially appropriate for a disciplined society of biopower and enclosures. A society of control, however, which is less about bounded time, and more about continual differential modulation of thought, in which the same person negotiates a shifting terrain of roles, access, and expectations, is more complex. It is much more dependent on networked layers of differential interactions and temporary articulations of speed and distance, and this it is



much more unstable and unpredictable. And although emerging issues are centered around the brain and mind, they are producing forms of power that are spilling out into the broader world in meaningful and novel ways.

### **The Delicate Force of Neuropower**

*"Japanese poetry never modifies. There is a way of saying boat, rock, mist, frog, crow, hail, heron, chrysanthemum, that includes them all."*

Chris Marker (1983)

The forms of power that are emerging from new movements in technology, science, politics, and economic organization are both more transparent and less tangible. In a sense this power is much more precise, powerful, and transformative than previous forms, yet it is also more ambiguous, uncertain, and fragile. These days we can plainly describe the litany of ways our brains and minds are being modified by technologies, pharmaceuticals, medicine, education, media, social networks (Garreau, 2005; Lynch, 2009; Small, 2008). Yet, we can also simply say "mind" and conger all the almost mythical permutations and potentialities that our collective consciousness possesses.

The kind of power that resonates more with Japanese poetry than it does missiles and shock troops is both seductive and terrifying. Within this context, let's look at the shifts in boundaries and amplitude of control under the heading: neuropower.<sup>5</sup> Neuropower is a form of knowledge-power that works through the modulation mental processes, functions, and expressions, for individuals and aggregate populations. Through brain imaging, medical treatments and neuroceuticals, augmentation technologies, digital networks, legal regimes, and guiding conceptual paradigms, neuropower acts on mental functions that were previously unseen, ignored, off-limits, or ungovernable. Neuropower is the enabling logic of a governmentality that sees the regulation of cognition, sensation, attention, mood, and mental fitness as part of its purview and responsibility.

As I see it, there are at least 7 modes of neuropower, moving from forms of direct intervention and control, to more subtle conditioning of the sensible and the thinkable. Put together, they signal a shift in the modality of responsibility and control for our governance systems.

#### **1. Mental surveillance**

Already, via our public and private electronic chatter, our minds are being mined by intelligence agencies, commercial entities, and the many eyes of our digital networks. Sophisticated data portraits and patterns of our thoughts, desires, moods, and preferences can be gleaned from this information as we spend much of our lives "mindcasting" to the world. Our cumulative expression on the Internet is an invaluable source for understanding (and exploiting) what's inside our heads, and for predicting our behaviors (Giles, 2010).

But more immediate and direct means of neural surveillance are also being developed and implemented. The so-called "No Lie MRI" and the next generation of lie detector tests that use the latest in neural imaging technologies are being tested for use

in police investigations and as evidence in courtrooms. These technologies are already making a difference in jurisprudence. Evidence from an EEG device called BEOS, Brain Electrical Oscillations Signature, was used to convict a woman of murder in India last year (Saini, 2009).<sup>6</sup> An Israeli company, WeCU ("We See You"), and the US Government's FAST (Future Attribute Screening Technology) are current systems being tested to glean intentionality of a suspect through a combination of agent interpretation and neuroimaging, body language, temperature, and other physical data. Mental screening is likely where we will first bump up against neuropower, as it is set to become a regular part of our lives.

## 2. Brain facticity

"The most elementary aesthetic act," says Bateson echoing Kant, "is the selection of a fact" (Bateson, 1972, p.458). Neural imaging, computational simulations, and neuroinformatics are creating mountains of new data and metrics for visualizing and mapping the brain. Informatics is the new grammar for understanding biology and the brain. Where neuroscientists once sketched crude geographies of brain function based on studies of patients with traumatic injuries or known neurodegenerative disorders, researchers now have a battery of high resolution tools to see and quantify how neurons fire together and how functional regions wire together across the brain. Resolution of neural imaging is improving quickly, and we are getting a clearer, more immediate picture of how brains work in real-time. More and more of the brain and our mental activities are being measured and becoming "facts."

With new facts come new baselines for mental states, cognitive abilities, and other neural functions. We will see new measurements and metrics for normality emerge. Most of us know with a high degree of accuracy what our vitals are. We closely monitor our weight, heart rate, blood pressure, cholesterol, etc. We also know how our vitals stack up in comparison to the larger population, and this data is part of how we craft our social identity and measure ourselves against the common expectations for healthy living. These measures are known and sensible because they are the health metrics of biopower—the form of power that has governed "life" for generations. Now, we are seeing a shift in knowledge-powers. We already see consumer-level genetic testing and profiling by companies like 23andme and My Daughter's DNA. We are learning how our genetic profiles reflect on our health outcomes, and how these projected outcomes compare to the population.

In an age of neuropower, we will also begin to see a whole constellation of measurements, metrics, and knowledge form around cognitive and emotional states. Soon, we will come to know (and obsess) over our average dopamine levels, our brain fitness levels, our working memory score, and our optimal concentration range. Then, we will cognitively train or neuromodulate in order to *do something* about those scores to bring them into optimal states. As a population, we'll begin to measure our happiness or mental acuity and productivity. We'll design government policy and develop cognitive ergonomics to help raise our mental effectiveness and to track our progress over time.<sup>7</sup>

All this new information about how our brains work, as individuals and in the aggregate, is creating new dilemmas for researchers and for policy-makers to manage these knowledge-powers and protect people from potential abuses. As genetic researchers eventually learned, "information can be as toxic as a dangerous drug" (Green, 2007). Neuroscientists are rightly worried that their research could be used for social control. An early signal of this anxiety is reflected in a pledge being circulated amongst neuroscientists in which signatories "refuse to participate in the application of neuroscience to violations of basic human rights or international law (Bell, 2010). But it's not just state actors who will be involved in ethically ambiguous applications of neurotechnology. The market, the workplace, and the educational system are creating new incentives and desires as well.

### 3. Neurocompetitive environments

As the old business adage goes: You can't manage what you can't measure. With new imagining techniques and neuroliteracies also come new expectations for interventions. These expectations and desires will be met by a range of pharmaceuticals, brain training software, neurofeedback applications, and augmented cognition technologies.

But what will be modulating our brains to do? In a competitive job market, with a scarcity of good jobs, the drive for any competitive advantage will be sought out. Better concentration, better memory, better multi-tasking, reduced need for sleep—all these are rewarded in this competitive landscape. A recent survey of scientists showed that over 20% had admitted to taking some sort of pharmaceutical enhancement drug—be it Ritalin for concentration, or Provigil for attenuating the effects of fatigue (Maher, 2009). Zack Lynch, President of the Neurotechnology Industry Organization, calls this the drive for "neurocompetitive advantage" (2010, pp.95-96).

This advantage would be very persuasive (or coercive) to large numbers of people, driving them into the neuroceutical market. It is already creating a spate of policy and regulatory issues. A recent article in the *Journal of Medical Ethics*, provocatively titled "When the Boss turns Pusher," captures the growing concern for potential coercion in the workplace in which non-enhancement is a decided disadvantage (Appel, 2008). The author calls for a new set of regulations and protections for workers from direct or implied coercion to take pharmaceuticals or other enhancements for improved productivity. These new potentially perverse incentives, the unequal access to cognitive technologies, and the potential amplified health risks are pushing the need and expectation of governmental intervention into areas of cognitive liberty and the economics of augmentation.

### 4. Predicting and preempting behavior

The logic of surveillance is to gather information and feedback to effectively intervene to control a system or situation. With single individuals now with unprecedented capabilities for inflicting mass destruction, governments are bearing greater responsibility for protecting its citizens from these unpredictable violent acts. Thus governing these new risks requires a form of temporal expansionism. Although a systemic view of the causes and motivations of violence would be welcomed, it is naïve

to expect governments around the world to shift their policies in such a way to address these root causes. Instead, we will continue to see a battle between perpetration and policing.

This policing now must push past the border of the cranium, and look into our very thoughts. And, we are only at the beginning. President Obama has tasked the Homeland Security and Energy Departments with developing more advanced screening technology, including brain scans, because: "In the never-ending race to protect our country, we have to stay one step ahead of a nimble adversary" (Obama, in Tarm, 2010) In today's theater of operations, where so-called "super-empowered angry individuals" can inflict massive damage, and where the distance between thought and action is small and shrinking, one-step-ahead invariably means one-thought-ahead.

### 5. Sensibility at high speeds: Similarity as equality

An artifact of acceleration of time and the compression of space is the reduced capacity for parsing sensation. Everything whizzes by us like a blur, and we are forced to react and make judgments on the basis of partial and uncertain knowledge. A flashing blue light in our rear-view mirror sends a jolt of adrenaline racing through us, our amygdala fires wildly sending waves of fear and panic through our bodies. We hit the brake as we imagine large fines, higher insurance rates, an angry spouse. But the blue light was only a neon sign reflected off the windshield of the car behind us, and not the police. We let out a deep sigh of relief. What does this sensation feel like at a collective level.

The state of heightened fear we live in now, in a world where volatile thoughts lead to violent actions with increasing speed and force, and where security forces are given the mandate of prevention and preemption, behaviors and devices that in any way resemble or remind us of potentially violent actions or weapons are treated AS violent actions or weapons. A guerrilla ad campaign for a cartoon movie causes city-wide shutdowns (Smalley & Mishra); geek-art on sweatshirts is seen as an explosive device (Brett, 2008); strapping Jewish prayer boxes to your head is an attempt to blow up a plane (Mucha & Steele, 2010).<sup>8</sup> (Over)reactions to threats seen at high speed will become more common and risk averse authorities will usher in an age where if it looks like dangerous at a glance, it IS dangerous.

### 6. Ownership of the extended mind

Ownership and control of information and the technologies of cognition extension and augmentation is a critical political issue. Lobbying and legislation increasing control over all forms of expression, image, brand, invention, and creative content is expanding in scope and extending in duration. This overall move toward the tighter control of creative content is leading to what Stanford law professor Lawrence Lessig calls a "permission society":

*The rough divide between the free and the controlled has now been erased. The internet has set the stage for this erasure and, pushed by big media, the law has now affected it. For the first time in our tradition, the ordinary ways in which individuals create and share culture fall within the reach of the regulation of law,*

*which has expanded to draw within its control a vast amount of culture and creativity that it had never reached before. The consequence is that we are less and less a free culture, and more and more a permission culture (2005, p.8).*

The software we use to help us think, create, and share ideas comes with terms of use that give enormous power to the software provider. Although the notion of an 'ownership society' has been tossed about in recent years, in reality, we are becoming a licensing or renting society. Nowadays, we don't typically own the software we buy or the applications we download. We license them, and this creates an entirely different set of rights, expectations, and distribution of power. This power relationship is important when we are talking about real property, but it is especially significant and disturbing when it pertains to the scaffolding of our extended minds.

If a company wants to repossess your home for failure to pay, that is one thing. If it wants to erase or block the use of their software, which might contain photos, or diary entries, or personal emails—products of our extended minds—then that is an unprecedented expansion of control, and one that signals a new boundary of power. Permissions and "guardians at the gates" of our extended minds condition the way we use our technologies and shapes our possibilities for thought and expressions. We need the rights to tinker with our technological augmentations, because true democracy requires the ability to tinker with our thinking, freely and frequently.

## **7. Framing mind and metaphor**

The closest thing we have to the understanding the neural correlates of hegemony is the power of metaphor and narrative in framing our individual and civilization worldviews. Learning is the process, and the synapse is the location where culture and politics become part of our biology, and the past and the future are neurologically linked. In other words, we envision our futures with the same neurological systems and brain regions that we use to recall the past (Bar, 2009). Thus, whoever controls the metaphors and stories of our past and present, colonizes our thoughts and visions of the future.

Social movements and political revolutions throughout history and across cultures have been spurred by the emergence of new guiding metaphors. The Enlightenment challenged the dominant spiritual hierarchy, offering instead the model of the world as a giant clock, and God as the distant clockmaker. Economic formations, political systems, and social structures were created and configured in this image. Although there have been several scientific revolutions since the height of the Enlightenment, all the major political systems in the world were designed to run on the assumption that the world is like a clock with predictable outcomes given knowable inputs.

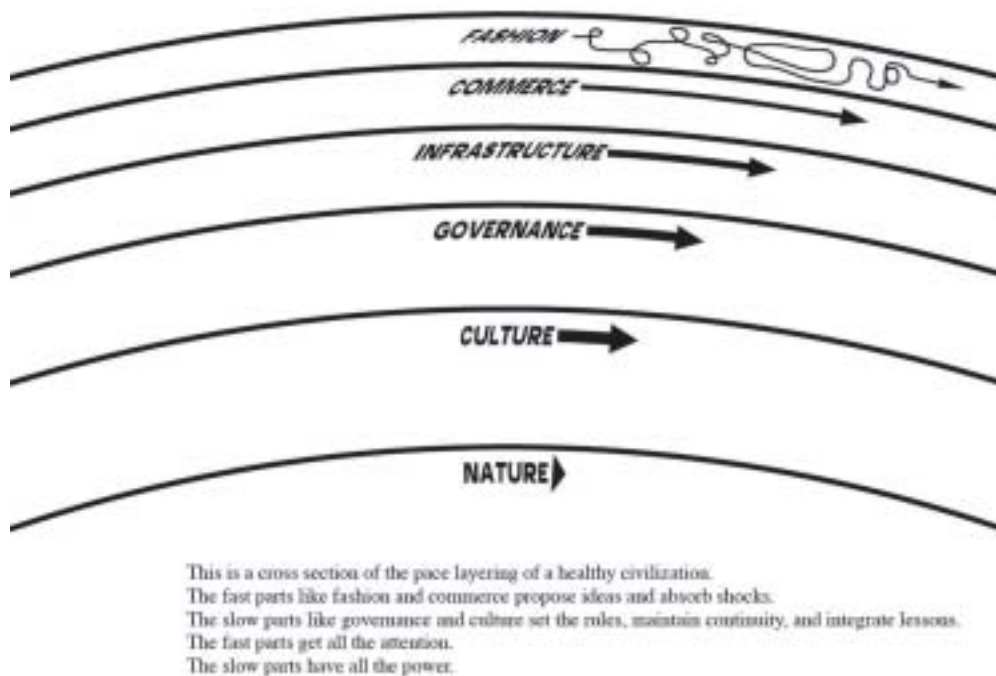
Recently, we've seen the rise of computational metaphors, exemplified by the notion that the universe is a giant "program" that is "running" through the stuff we call matter and energy. In this view, inscription is incorporation, and governance is reimagined as the writing of code that is executed throughout society. This model, combined with the injection of neuroscience, is leading networked groups, organizations, or nations to see themselves as an extended, programmable nervous system.

Cognitive models are foundational to construction of political worldviews and systems. As old paradigms like rational-actor theory or individualist-isolationist models of thought give way to new models of behavioral economics or distributed cognition, political orders and possibilities change as well. Neuroscience will not only change the way we see and interact with our brains and minds, it will transform our political imaginations.

Neuropower, forming as a means of control, will sow the seeds of greater uncertainty and social disruption. In the next two sections, I'd like to explore how speed is changing the governance of the mind, and how exuberant identities are transforming political participation and subjectivity.

### A Fashionable Mind: Brains at High Speed

Developments in brain sciences and neurotechnologies are happening at an extraordinary pace. Speed and control are intimately linked variables. Victory usually goes to the fastest, but speed is hard to handle. The result of our expanding capacities to modify the brain at higher and higher levels of precision and control signals unprecedented disruptions to what Stewart Brand calls the: "levels of pace and size in the working structure of a robust and adaptable civilization" (2000, p.35). These levels or layers are:



graphic from: [http://www.edge.org/3rd\\_culture/serpentine07/images/Brand1000.jpg](http://www.edge.org/3rd_culture/serpentine07/images/Brand1000.jpg)



"In a healthy society," Brand continues, "each level is allowed to operate at its own pace, safely sustained by the slower levels below and kept invigorated by the livelier levels above" (2000, p.36). Each level has its own logic and sensibility that we are in the process of dramatically reordering.

This differential modulation and redistribution of the sensible applies to many of our systems, from our identities to our global environment, but in terms of the mind, the speed of change and the reach of control that new neurotechnoscience has generated has catalyzed the percolation of the faster rates of neurological change down into the more fundamental, slow-moving (biological) zones.

Speed is permeating the system, increasingly pulling infrastructure, governance, culture, and nature along at the pace of fashion. As acceleration moves down the layers, power moves up. The resistance to augmentation and enhancement seen in neuroethical debates can be understood from this perspective. We are developing the ability to change deep structures of our bodies, minds, and identities with the speed and care (or carelessness) of art and fashion.

The term "cosmetic neurology," coined by the physician and neuroethicist Arjun Chatterjee, reflects the critique of a "surface-level" approach to neural and cognitive augmentation, as well as the unease with the association to art and fashion. The role of physicians and clinicians in this new world, according to Chatterjee, will move from being authoritative masters of medical knowledge and practice, to being "gatekeepers" in their patients "pursuit of happiness" (2004).

Brand continues, "the division of powers among the layers of civilization allows us to relax about a few of our worries" (2000, p.39). As these powers and speeds are conflated, we will be increasingly obligated to un-relax ourselves, to take the wheel of the vehicle carrying all the levels from fashion to nature, and to do so with our foot firmly seemingly planted on the accelerator. What kind of world exists when brains are *fashionable*?

### **From Exclusion to Exuberance: Neuropolitical Subjectivities**

In 2007, Michael Chorost, author of book praising cochlear implants, stood before an assembly at Gallaudet University—the school for the deaf, and told them that deafness as we have known it is coming to an end. He told them that the way of sensing the world that Gallaudet and others in the deaf community have worked so hard to make acceptable, and around which they have built their identity, might become extinct. Deafness is heading toward virtual extinction due to the availability of cochlear implants, better access to drugs to treat infections in pregnant women and infants, and the fact that 96% of deaf children have hearing parents and those parents prefer for their children to be part of the hearing world.

Coming from a recently "cured" deaf man, this might have appeared as another treacherous attempt by an "Uncle Tom" of the normal hearing world to further marginalize and contribute to the genocide of deaf culture (in the words of a 1991 National Association for the Deaf protest statement).<sup>9</sup> Most of the work of the deaf culture movement has been to remove the stigma and barriers to living a productive life in a hearing-centered world. It has strived to build respect for the distinct qualities and



accomplishments of deaf culture—including the original invention and propagation of an entirely new language based on visual communication. It was also to make the deaf "heard" in the public sphere and counted as political subjects. If so much work has been done to make the non-hearing mode-of-being a valued part of the cultural and political terrain, deaf advocates argue, why let it go or be destroyed by new technological implements? Aren't we *all* losing something important and that should be saved?

But Chorost's forecast of the end of deafness was not a betrayal, not a call to give up and join those with normal biological hearing. It was not an attempt to euthanize a soon-to-be obsolete sensory world from the story of civilization. He offered, instead, a transformational proposal to the Gallaudet students and to the deaf community at large, one that exemplifies the way neuropolitics can be used as a process of negotiating the many layers of sensation, biology, technology, and identity politics. *It is an early signal of neuropolitics in action.*

Chorost proposed that instead of focus identity on deafness itself—and lamenting its extinction—the deaf community could and should become the vanguard of a new movement of sensory perception. Hearing remains a node in sensory identity politics, but it is not a dichotomy between hearing/non-hearing, but rather a range of new and mediated ways of sensing the world. The non-normal hearing community should seize the opportunity to show the nation and the world "new ways of using technology to communicate and build communities" (2007). For Chorost, this means the embrace of new neuro-sensory technologies, an indifference to "mere" replication of biological hearing, and a transformation in the conception of hearing. He proposes that this community re-draw the *map* of the audible (to mix a metaphor) making new sounds available to perception.

Those with next generation implants that work directly on the auditory nerve could *program* their hearing environment, filtering and amplifying certain sounds, and otherwise modulate their sensations and perceptions in ways unavailable to the "normal" hearing community. Those with hearing modifications can thus interact and "use" their environment differently, changing their *locus of cognition*, and offering a new realm of experience to the world.

One form of disruptive neuropolitics may see sensory and cognitive enhancement as the de-facto requirement for legitimacy and political participation. It may be the accentuation, not the diminution, of embodied differences in sensibility born by technological augmentation and modification that will define the politically-qualified subject.

## A Vision of Neuropolitics

A progressive iteration of neuropolitics involves the challenging of all *a priori* givens of political qualification, and emphasizing the plurality of subjects in politics, including augmented, unaugmented, and the differently networked. It doesn't seek an abrogation of difference under the political necessity of a universal sensibility, nor does it seek a communicative unity by technological or any other means. We need political models of how to build and maintain cooperative and democratic communities tolerant of multiple and shifting models of existence and new ways of "interfacing

with the body and the brain." It is this kind of neuropolitics that Chorost points to in his vision for a re-purposed Gallaudet:

*It could be a campus populated by people with unaltered, altered, and enhanced bodies of all kinds, with the common goal of exploring new ways of experiencing the world, new ways of communicating with each other, and new ways of sustaining communities that meet the primal human needs of being understood, being accepted, and being valued (2007).*

This is a vision we can extend beyond the halls of Gallaudet, and that can drive a new movement toward personal and collective augmentation, social justice, and participatory political systems design.

## Conclusion

The acceleration of just about everything, including neurotechnologies and neuroscience has pushed the human mind into sharp relief. We are seeing our thoughts, emotions, and memories burst into view in the synaesthesia of speed. The brain and the functioning of the mind have become "available" to perception, examination, and contestability in ways and in dimensions never experienced before. Critical thinkers in politics, science, art, philosophy, and culture are as Hayles notes, "struggling to envision what will come after the fracturing of consciousness" (2001, p.15) Marshall McLuhan offers an evocative metaphor that is still appropriate to capture the feeling of this special moment in history:

*Just before an airplane breaks the sound barrier, sound waves become visible on the wings of the plane. The sudden visibility of sound just as sound ends is an apt instance of that great pattern of being that reveals new and opposite forms just as the earlier forms reach their peak performance (1964, p.12).*

There are certainly new and opposite cognitive, social, and political forms taking shape before us: artificial intelligences, cyborgs, posthuman subjectivity, a breakdown of mind along with the destruction of the planet, a technoprogressive democracy, a society of control networked from synapse to street, and on and on. This paper was an attempt to look out the window at our minds as they reach the "sound barrier," and what possibilities, if any, might lie just beyond the sonic boom. We're almost there; meet you on the other side.

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## Notes

1. The Invisible College was a group of scientists, doctors, and natural philosophers in 17<sup>th</sup> Century England—many of whom went on to form the Royal Society.
2. We have experienced the loss of historical, philosophical, and narrative closures as well. The ability to name, to signify, and make meaning is an enormous power. In a sense, meaning, values, boundaries, the present, reality, consensus, synapses, perception are all "loss." They make themselves present, real, meaning-full by the reduction of other possibilities. This is a necessary process for thinking, acting, learning, and being in the world, but it seems that good theories, good meditative practices, or good drugs often make us aware of what is usually taken for granted. We become aware of the contingent choices and massive societal, political, and psychological "editing-out" we have done in creating the world. A role for scholars/theorists/futurists is to *dis-close* these partitions, to re-open the options and alternatives we have over-written with our tendency to aspire to comprehensive accounts.
3. Neuro-law, neuro-cinema, neuro-ethics, neuro-marketing, neuro-culture, and on and on. I have reservations about contributing to this increasingly clichéd space.
4. Inayatullah's Causal Layered Analysis, for example.
5. I used the term "neurotechnbiopower" in Dunagan (2004), but have shortened it to "neuropower" here. Cf. Engin Isin's (2004) article that uses the term neuropower in a related sense, also following a genealogy from Foucault's biopower.
6. fMRI in the courts are a very contentious and unsettled issue. For a historical view, see (Khoshbin and Khoshbin, 2007), and for current issues see (Madrigal, 2010).
7. See, for example, neurocompetitive advantage in Lynch (2004), and the work of UK's Foresight program on "Mental capital and wellbeing."
8. "Taking no chances, the pilot decided to make an unscheduled landing in Philadelphia and reported a man with a device with "wires" on the plane, Sullivan said. The wires turned out to be the leather straps, officials said."
9. As Chorost points out in his presentation, the NAD later changed their view on cochlear implants, accepting the surgery as an individual choice.

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