Neuroscience, National Security & the "War on Terror"

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Operating with little ethical oversight, the Defense Advanced Research Projects Agency (**DARPA**) has been tapping cutting-edge advances in neuroscience, computers and robotics in a quest to build the "perfect warfighter."

Dovetailing precisely with other projects to "dominate" the urban "battlespace" of global south and "homeland" cities, DARPA researchers are stretching moral boundaries where clear distinctions between "human" and "machine" are being consciously blurred. (see "**Simulating Urban Warfare**" and "**America's Cyborg Warriors**")

As the Center for Cognitive Liberty & Ethics **warns**,

> The right of a person to liberty, autonomy, and privacy over his or her own intellect is situated at the core of what it means to be a free person. This principle is what gives life to some of our most well-established and cherished rights. Today, as new drugs and other technologies are being developed for augmenting, monitoring, and manipulating mental processes, it is more important than ever to ensure that our legal system recognizes and protects cognitive liberty as a fundamental right. (CCLE, "Frequently Asked Questions," September 15, 2003)

Not only is the right to "liberty, autonomy, and privacy" being undermined by militarizing the life sciences, but the legal system itself is ill-equipped to deal with advances–and emerging threats–to "cognitive liberty" as America's corporatist surveillance state seek new means to elicit compliance and control over individuals as biological science is securitized under the rubric of "national security."

In **Mind Wars: Brain Research and National Defense** (Dana Press, 2006), bioethicist Jonathan Moreno lays out a frightening scenario where various Pentagon agencies with DARPA leading the charge, have been funding neuroscientific and biological research in the following areas:

Mind-machine interfaces, also called "neural prosthetics." Living robots" whose movements can be controlled via brain implants. Research has successfully been carried out on "roborats" and "robodogs" for mine clearing and other dubious purposes. "Cognitive feedback helmets" that provide commanders or their medical surrogates the ability to remotely view an individual soldiers' mental state. MRI and fMRI technologies for what has been called "brain fingerprinting" as an interrogation tool or airport screening for "terrorists." So-called "non-lethal" pulse weapons and other neurodisruptors for deployment in global south or "homeland" cities as "riot control" tools. "Neuroweapons" that use

biological agents to stimulate the release of neurotoxins. Research into concocting new pharmaceuticals that inhibit the urge to eat, sleep, suppress fear, or repress psychological inhibitions against killing.

With a multibillion dollar budget and dozens of projects in the pipeline, DARPA's Defense Sciences Office (**DSO**) are looking for newer and ever-more insidious means "to harness biology" for military applications. A short list of DSO projects include the following:

* Biological Sensory Structure Emulation (**BioSenSE**), a program "designed around the concept of understanding biological sensory structures through advanced characterization and emulating, or transferring, this knowledge to the creation of superior synthetic sensors." The majority of biological stimuli are deemed of "great military relevance" by Darpacrats.

* Cognitive Technology Threat Warning System (**CTTWS**), the intent of which is to integrate "advances in technology and biology" for a "soldier-portable" visual threat detection device that will utilized "cognitive visual processing algorithms" and "operator neural signature detection."

* Fundamental Laws of Biology (**FLB**), is described as a mathematical modeling program that "will impact DoD and national security by developing a rational and predictive basis for doing biological research to combat bioterrorism, maintain healthy personnel, and discover new vaccines and medicines"–or to facilitate the design of new biological weapons.

* Nano Air Vehicle (**NAV**), described by program managers as as a project that "will develop and demonstrate an extremely small (less than 7.5 cm), ultra-lightweight (less than 10 grams) air vehicle system with the potential to perform indoor and outdoor military missions. The program will explore novel, bio-inspired, conventional and unconventional configurations to provide the warfighter with unprecedented capability for urban mission operations." Paging John Anderton, white courtesy telephone!

* **Neovision** "will pursue an integrated approach to the object recognition pathway in the brain. This fundamental biological research will be accomplished using methods intentionally geared toward computational and modeling approaches that are amenable to hardware- and software-based implementations."

* Peak Soldier Performance (**PSP**) is designed to "create technologies that allow the warfighter to maintain peak physical and cognitive performance despite the harsh battlefield environment." In other words, develop drugs and nutrients for a "more efficient" soldier.

* Preventing Sleep Deprivation (**PSD**) is described as seeking to "enhance operational performance," under harsh conditions. Current approaches "under investigation" include "novel pharmaceuticals that enhance neural transmission, nutraceuticals that promote neurogenesis, cognitive training, and devices such as transcranial magnetic stimulation."

* Training Superiority (**DARWARS**), a suite of programs directly tying the military-industrial and entertainment complexes together into a seamless web. DARWARS seeks to provide "continuously available, on-demand, mission-level training for all forces at all echelons. Specifically, the program is developing, in areas of high military importance, new kinds of cognitive training systems that include elements of human-tutor interactions and the emotional involvement of computer games coupled with the feedback of Combat Training Center learning." Continuous "on-demand training anywhere, anytime, for everyone."

As with *all* dual-use research conducted by the agency, military relevance trump all other considerations. One need only examine the use of **psychological research** in the "war on terror" for some very troubling analogies.

AugCog

If behavioral psychology was handmaid to the horrors perpetrated at Guantánamo Bay, Abu Ghraib and CIA transnational "black sites," what new nightmares are in store for humanity when advances in neuroscience, complex computer algorithms and a secretive national security state enter stage (far) right? Let's take a look.

Amy Kruse, Ph.D., is described on DARPA's **website** as the creator of the concept of "operational neuroscience," designing programs that "are helping transform neuroscience from a laboratory discipline to one that is doing advanced research to deliver revolutionary capabilities important to our warfighters."

DSO's "Training and Human Effectiveness" brief claims this suite of programs is "revolutionizing training...for everyone, anywhere, and at any time." Kruse's area of expertise is "AugCog" or augmented cognition, a subset of neuroscientific research seeking models for a "brain-machine interface." Described by the Augmented Cognition International Society (**ACI**) as

> an emerging field of science that seeks to extend a user's abilities via computational technologies, which are explicitly designed to address bottlenecks, limitations, and biases in cognition and to improve decision making capabilities. The goal of AugCog science and technology is to develop computational methods and **neurotech tools** that can account for and accommodate information processing bottlenecks inherent in human-system interaction (e.g., limitations in attention, memory, learning, comprehension, visualization abilities, and decision making). ("What is Augmented Cognition?" ACI, no date) [emphasis added]

According to DARPA's **description** of the program, Improving Warfighter Information Intake Under Stress (AugCog):

> Military operators must frequently perform cognitively demanding tasks in stressful environments. The AugCog Program has developed technologies to mitigate sensory or cognitive overload and restore operational effectiveness by extending the information management capacity of the warfighter. This is accomplished through closed-loop computational systems that adapt to the state of the warfighter and thereby significantly improve performance.

The exploitation of human and other biological systems by DARPA raise profoundly troubling questions of how these security-related applications will be used by the United States to achieve global dominance at any and all cost. A recent article in ***Military Geospatial Technology*** reveal the technophilic preoccupations that obsess securocrats.

> Imagine a computer that can read human brain waves to assess the lay of the land. It might seem futuristic, but that's what the Defense Advanced Research Projects Agency (DARPA) and the National Geospatial-Intelligence Agency [NGA] had partially in mind when they awarded contracts under DARPA's

Urban Reasoning and Geospatial Exploitation Technology (URGENT) program. (Cheryl Gerber, "Seeing with Your Brain," Military Geospatial Technology, Vol. 6, Issue 3, June 5, 2008)

One of URGENT's "prime contractors, major defense grifter Lockheed Martin, call their "approach to the program Object Recognition via Brain-inspired Technology," (ORBIT). In conjunction with DARPA's URGENT program, the AugCog project is based on brain-inspired software that seeks to merge neuroscience with computers to create a technology that promises to deliver "situational awareness" to the "warfighter." But building complex 3-D mapping systems is merely the initial jump-off point for what may come once "brain-inspired" algorithms are "perfected."

One "product" that currently aids the "warfighter" and "counterterrorist" officials is called **Signature Analyst**, designed by corporate grifter **SPADAC**, a McClean, Virginia defense contractor with close ties to the Department of Homeland Security and the the NGA. According to SPADAC's website, Signature Analyst

> delivers enhanced objectivity by discerning subtle yet powerful and actionable insights, maximizing likelihood of success. Combining predictive analytics with spatial information as well as human terrain and social networking elements, the solution delivers effective consequence modeling and improved confidence in decisions for a range of global operational and business challenges.

The program claims it provides "situational awareness" by "finding commonalities" and "relationships" in distinct, seemingly disparate data sources, including past events, as well as "human terrain" and "social networking" information. As we have described previously, Scaleable Social Network Analysis was a data-mining tool designed by DARPA's Total Information Awareness office that worked in tandem with the National Security Agency's illegal spying programs.

One shudders to imagine what "consequences" DARPA and their corporate "partners" are "modeling." A commercial version of the "product" is in the works. One "benefit" of the Signature Analyst software trumpeted by SPADAC is that will "allow fewer analysts to evaluate more data in less time." Why its the perfect "predictive" tool for the current capitalist downturn!

Carrying the mechanistic human/machine model a step further, Lockheed Martin and their "partner" **Numenta**, a California-based software company, are working on applications for the Defense Department. According to Numenta's website, company founder Jeff Hawkins, author of the 2004 book *On Intelligence*, has "a deep interest in neuroscience and theories of the neocortex." We bet he does!

Indeed, Hawkins' team has designed a suite of software applications, the Numenta Platform for Intelligent Computing (**NuPIC**), based on what it calls "hierarchical temporal memory (HTM)," a "computing paradigm" that mimics the structure and function of the human neocortex, the area of the brain that handles high-level thought.

John Darvill ORBIT's chief investigator described Lockheed's relationship with Numenta to *Military Geospatial Technology* thusly: "Lockheed has been involved with Numenta technology for two years and is a member of the Numenta Partner Program for technical interchange. We have a collaborative technical relationship with Numenta. We use their

technology, modify it and apply it."

How? According to Numenta CEO Donna Dubinsky, HTM is designed to "be good at what the human brain can do–inference and pattern recognition even in the presence of noise." In a similar fashion, HTM "learns a model of the world" Dubinsky elaborated, "by exposure through its senses. In the same way, our software is self-learning and has to be exposed to the material that it has to learn. So we train the software. For example, we expose it to a lot of tanks so it learns tank-ness."

And *if* the software could be applied to an interrogation archetype, will it then "self-learn" how to "model" a sensory deprivation or psychological torture regimen, individually tailored to an "illegal enemy combatant" after it has been "exposed to the material"? Will the software in other words, be exposed "to a lot of torture so it learns torture-ness"?

Technological dual-use is a slippery slope towards atrocity and unimaginable horror, especially if left in the hands of American militarists.

Back to the Future

Here precisely, lies the crux of the problem of exploiting neuroscience and robotics in a quest for newer and ever more insidious military applications. The potential of neurologically interactive technologies to "enhance" human capabilities, indeed to invade the privacy of human thought, and infringe on the independence of our minds for "reasons of state," transform biological/medical research into a subset of weapons development.

To be sure, science, and in particular the cognitive sciences, have been seduced by the Pentagon and the CIA in the past. The literature on unethical CIA and Army research into quixotic quests for "mind control" over "enemy" agents and "target" populations–MKULTRA and their perverse offspring–are replete with the horror stories of their abused victims. Indeed, MKULTRA became the ideologically-charged basis for current interrogation and torture practices by the CIA, the military and their "outsourced" partners.

A perusal of the Company's seminal interrogation manuals, **KUBARK Counterintelligence Interrogation** and the **Human Resource Exploitation Training Manual-1983** drew liberally from the most up-to-date cognitive research of its time. Indeed, many of the sources cited in KUBARK and HRE were leading behavioral psychologists and psychiatrists "under contract" to the CIA, as documented by historians and researchers John Marks (*The Search for the Manchurian Candidate*), Alfred W. McCoy (*A Question of Torture*) and Christopher Simpson (*Science of Coercion*).

Indeed, as Simpson avers in *Science of Coercion*, the Human Ecology Fund, a CIA cut-out funneling money to prestigious academics such as **Albert Biderman**, underwrote research on "captivity behavior" and the efficacy "of drugs, electroshock, violence, and other coercive techniques during interrogation of prisoners."

Fast forward to the present. As anthropologist Hugh Gusterson **writes** regarding current Pentagon interest in neuroscientific research today,

> individual scientists will tell themselves that, if they don't do the research, someone else will. Research funding will be sufficiently dominated by military grant makers that it will cause some scientists to choose between accepting military funding or giving up their chosen field of research. And the very real

dual-use potential of these new technologies (the same brain implant can create a robosoldier or rehabilitate a Parkinson's disease sufferer) will allow scientists to tell themselves that they are "really" working on health technologies to improve the human lot, and the funding just happens to come from the Pentagon. ("The Militarization of Neuroscience," Bulletin of the Atomic Scientists, 9 April 2007)

In the final analysis, DARPA, the Pentagon agency that brought us the internet, are now searching for the means to militarize the human mind itself, viewed as the ultimate platform for imperialist domination and social control.

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