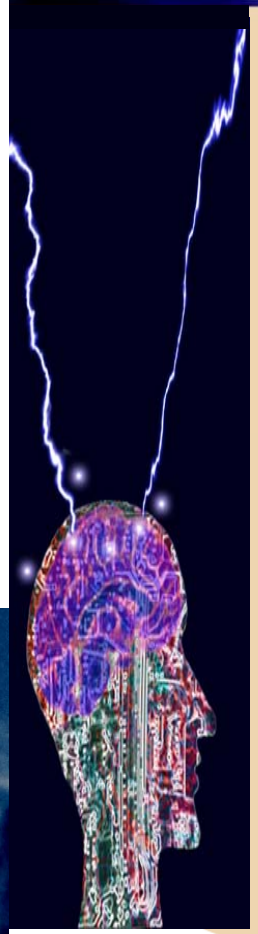
The Center for Nanotechnology in Society
ARIZONA STATE UNIVERSITY

End-to-End: Real-Time Technology Assessment of Nanotechnology and the Human Brain

Dr. Clark Miller, Associate Professor,
Science Policy and Political Science,
Arizona State University

The End-to-End project at CNS-ASU is a real-time technology assessment of the application of nanotechnology to the human brain, in order to systematically assess the convergence of nanotechnology with biotechnology, information technology, cognitive science and neuroscience (NBIC). At the same time that the assessments are done, they are fed back to the innovation process in order to shape NBIC technologies in ways that enhance societal outcomes.



Manipulating the brain and enhancing cognitive functionality is arguably among the most morally significant emerging technologies likely to impact humans in the next quarter century. The human brain is intimately involved in the creation of human thought, meaning, identity, intelligence and reasoning; the metaphorical and real transformation of the human brain into a biological machine capable of understanding analysis, repair and modification is likely to have enormous ramifications across human societies.

End-to-End explores these themes of human identity, enhancement and biology in a number of real-time technology assessment (RTTA) research projects. These projects include the characterization of nano-neuro research data, the characterization of public and scientist opinions and values, the construction of scenarios to encourage responsible debate about technological futures, and the implementation of nationwide citizen deliberation panels on nano-neural research. End-to-End also incorporates its themes into other CNS-ASU outreach and education activities, e.g., monthly Science Cafés on topics such as the ethics of designing adaptive technology for the central nervous system, and whether robots need a Bill of Rights.

Characterization of nano-neuro research data has identified cochlear implants as the first widespread neural implant where nanotechnology may offer a range of potential applications to improve or enhance the procedure.

Studying the history of cochlear implant technologies offers numerous insights regarding the social meanings that neural implants can give rise to, such as debate over the "disabled" status of deaf culture, or the use of cochlear implants in children.

Brain interface technologies have demonstrated the theoretical feasibility (if not yet great practical success) of creating communication pathways between the human brain and computers. Nanotechnology offers one potential route for improving such interfaces through miniaturization, novel nano-bio configurations, new material properties, etc.

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