

◆ *Plenary Presentation: To Sail beyond the Sunset: Navigating the Uncharted Waters of Bioethics*

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The promises and perils of new developments in science—some happening now and some anticipated—invite questions about their ethical and legal implications.

New technologies can potentially enhance performance and have vast effects on productivity, evolution, quality of life, and the social environment. The convergence of technologies extends their reach to changing the nature of a human being.

NIBC

The new technologies, in the rubric NIBC, have been classified as

- Nanoscience and nanotechnology (manipulation of matter on an atomic scale).
- Information technology, including computing and communications.
- Biotechnology and biomedicine, including genetic engineering and transgenics.
- Cognitive science, including cognitive neuroscience, neurotechnology, and psychopharmaceuticals.

When these converge, for example, as nano-info, we have smart dust, which gathers information surreptitiously and can be sent to sense tumor cells; smart dust can also be used in terrorism. Another example is the lifelog, a digital diary of everything a person does. In nano-bio, implantable computers send information

on body function (including neural activities). A nano-bio-cogno convergence gives us the brain pacemaker, a neuroprosthetic device for restoring brain performance; and extending this to nano-bio-info-cogno, the full NIBC, produces neural interfaces for enhancing memory, the senses, and human technogenics (cyborgs).

As the biotechnologists imagine a future of high performance, Linda MacDonald Glenn, as a bioethicist, imagines the ethical meaning of these developments. As a lawyer, Glenn also anticipates the legal implications.

Ethics

In a context of extending the nature and abilities of people, one of the fundamental questions for the ethicist or lawyer is, What does it mean to be human (or a person)? Western philosophy says that the human and the person are the same thing and that the human holds a clear position in the hierarchy of the chain of being. In the Judeo-Christian tradition, the earth is the center of the universe, and the person is situated within it. In Jainist-Buddhist-Hindu thought, human life is interdependent with other life forms. A genetic definition of the human is not useful, because a slight difference in genetic makeup corresponds to an entirely different creature.

Law

Except for the distinction between person and property, no current legislative or statutory definition of the person exists. But even that is not universal—in the past slaves, women, and children have been defined as property, and corporations as persons. Quasipersons include dead bodies and frozen embryos.

Although the current definitions of

the human or the person are problematic for the law, the convergence of NIBC technologies adds new factors. Scenarios for the future include cyborg soldiers or human chimeras created to do dangerous or demeaning work. The law currently says that a person has no claim to surrendered body parts. If cyborgs were created from spare human parts, would it matter which parts or how much of one person was used? Would it affect the status of the cyborg? What would be the legal status of a cyborg made of nonbiologic parts controlled by human brain tissue?

An artificial uterus is being developed. In current law, the rights of a fetus are subsumed under the right of a woman to have control over her own body. If the woman is removed from the scenario, the personhood of the fetus becomes preeminent. But does it have the rights of a full person?

A chimpanzee, not being human, is not a person in law. However, if the chimpanzee has a brain chip implanted to enhance its functioning, will it acquire the rights of a person whose brain functions similarly?

Glenn proposed that the great ladder of being of Western philosophy will become a pyramid of being. As new intelligent life forms are created through the genius of converging technologies, the courts will need to determine where they fit on a continuum from property (inanimate objects that cannot suffer) to personhood (with full rights and responsibilities). 