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Re-Enchantment Cosmologies: Mastery and Obsolescence in an Intelligent Universe

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ABSTRACT

Following modernity's founding dream of human mastery over the natural world, scientific discoveries produced a picture of an infinite, random, and indifferent universe, thus paradoxically revealing the utter insignificance of the "master/dreamer." Recently, the convergence of a number of extreme technoscientific projects—AI, Nanotechnology, Life Extension—has activated science-based cosmological visions in which humans and their "intelligence" are given a central purpose in the unfolding of the universe. The movement formed around the event-horizon of the Singularity is the most well-known version of these re-enchantment cosmologies. Yet this re-enchantment only serves as a prelude to an obsolescence: humans are here to give rise to other, better minds, a prospect that makes Singularitarians restless with both fear and exhilaration. [Keywords: Cosmology, Singularity, disenchantment, transhumanism, information, modernity]

Welcome to the Singularity

The young volunteer at the Singularity Summit steps up to the microphone in front of a full house at the 92nd Street YMCA in New York City to deliver

a TV host-style, drum-roll introduction: “And now the moment you’ve all been waiting for...Ray Kurzweil!” All the tweeting stops as the smart phones fall silent. Next to me, two graduate students wearing “Homo Sapiens Siliconis” t-shirts crane their necks for a better view. Behind me, designers from Lockheed Martin rise on tiptoe and a Canadian longevity activist takes a deep breath.

The dapper man who glides on to the stage is the unofficial leader and predictor-in-chief of The Singularity, a loosely organized social movement of futurists planning for the advent of superintelligence. Short and tan, with a thinning tuft of silver hair, Kurzweil has often claimed that his regimen of 100+ supplements a day and careful medical supervision have kept his biological age two decades lower than his chronological age. Longevity and youth are intrinsic goods, but he also would like to live long enough to see the Singularity. After all, what he calls “the most critical event in human history” is only about 40 years away. Nevertheless, he is signed up for cryonics just in case his least-favorite “event-horizon,” death, arrives prior to his favorite one, the Singularity. The main idea behind the Singularity is that humans, currently building faster, more powerful devices, will soon build greater than human intelligence. Such an intelligence will be able to build an intelligence greater than itself, which will build one even greater and so on, leading to an “intelligence explosion” so fast and vast that it will change all the rules we are familiar with. Kurzweil, who has made his career as much on predictions of the Singularity event as on technological invention,¹ predicts two principle features. The first is human obsolescence, with humans either merging into machines or being surpassed by them. However, he also has an anthropological awareness that “human” is but a human category: when, near the bagel table, I asked him why we ought to worry about humans at all, his answer was that maybe we don’t since “human is only that which can change itself.” His second prediction is that “intelligence, derived from its biological origins in human brains and its technological origins in human ingenuity, will begin to saturate the matter and energy in its midst” and “spread out from its origin on Earth.” He declares, “This is the ultimate destiny of the Singularity and of the universe” (Kurzweil 2005:364-372).

The basic scenario of a machine-led coup is older than HAL (of *2001: A Space Odyssey*) and at least as old as cybernetics, but over the past decade, in part thanks to the Singularity, it has come to occupy a new socio-cultural niche. No longer quarantined in philosophical or science

fiction speculation, it is now the foundation of a social movement which reaches into NASA and the NSF, counting amongst its supporters a wide range of scientists around the US. Kurzweil personifies this newly gained credibility and popularity. Mainstream magazines from *Time* to *Rolling Stone* have featured profiles on him. He has developed close links to NASA, Google, and much of Silicon Valley and acts as advisor to DARPA, the US Department of Defense's advanced research arm. Aside from me, over 900 other *Homo sapiens sapiens* attended the 2009 Singularity Summit, including experts as diverse as philosopher of mind David Chalmers; cognitive psychologist Gary Marcus; *Wired* editor Gary Wolf; mathematician, physicist, and inventor Stephen Wolfram; and a number of biologists, physicists, and neuroscientists (the 2005 summit had 300 attendees). With annual summits, blogs, t-shirts, activists, and even Singularity-bashers, the status of The Singularity as a movement is confirmed. Singularitarians themselves, however, tend to think of it as something more. "The problem with choosing or not choosing to be a part of our 'revolution,'" Michael Anissimov, an organizer of the Singularity Summit, wrote on his blog, "is that, for better or for worse, there probably is no choice. When superintelligence is created, it will impact everyone on Earth, whether we like it or not."²

What has made this techno-science imaginary so compelling today? The Singularity and other recent science-based futuristic projects have been commonly dismissed as sci-fi geek fantasies and marginal cults of "kooks,"³ or explained away in terms of a long tradition of American apocalyptic religiosity (Alexander 2003, Geraci 2010). It may be true that The Singularity's imaginaries of salvation and destruction through technology, of the end or transcendence of humanity, play into a long, interweaving history of technological utopianism, post-millennialism, apocalypse and other American end-time scenarios (Quandt 1973, Quinby 1994, Wojcik 1997, Masco this issue).

In this paper, I want to offer a more sinuous history at once internal to the movements themselves and connected to larger scientific and secular tensions between control and freedom, disenchantment and re-enchantment. I argue that such currents of futurism cannot be dismissed as isolated social curiosities, but must be viewed as part of a technoscientific continuum that traverses and influences capital—especially Silicon Valley capital—as well as important scientific, academic, and governmental institutions and discourses.

West Coast Futurism

I first heard of The Singularity during my fieldwork on Immortalism, or projects for achieving radically extended lives through scientific means, partly because one strategy for survival beyond biological death is thought by some to be mind uploading—a strategy embedded in, though not intrinsic to, the promise of Artificial Intelligence (AI). I met and interviewed Singularitarians in conferences on Cryonics, Transhumanism, AI, and Nanotechnology, in futurist meet-ups in New York, Arizona, Los Angeles, and Silicon Valley. I kept up on blogs and researched the history through interviews and old listservs. Through these nodes, I gradually became aware of the network of actors, objects, and ideas, as well as the prolific assemblage of visions, techniques, sciences, and projects coming together to make up the futurist movement of which The Singularity is a part.

Dispersed but overlapping, this network of futurist groups sprung up in the 1990s, although its origins date back to the 1970s, to the era when the oil crisis and the dire warnings of the Club of Rome about limited resources and population growth intersected with the heady adventures of the Apollo and Soyuz space voyages, linking anxieties over earthly finitude to the infinite possibilities of the universe beyond Earth's atmosphere, tying human survival to space colonization. A key group promoting this configuration was formed in 1975 in Arizona. Called L5, it became a locus of activity for futurists around the country. Early frequenters included Timothy Leary, Isaac Asimov, Marvin Minsky, Freeman Dyson, and Hans Moravec (Regis 1990, Bainbridge 2007:37). Importantly, a number of active members would go on to become key players in today's futurist movements, including cryonicist and future supplements mogul Saul Kent, the father of nanotechnology Eric Drexler, and social psychologist, transhumanist and Singularitarian William Sims Bainbridge.

As L5 lost momentum along with the space program, a few activists bridged the 1980s, promoting the notion of transcendence as a physical rather than spiritual concern. Amongst them was Drexler who published his original vision of nanotechnology in 1986; FM-2030, an Iranian-born futurist in LA, who through advocacy, teaching, and writing popularized the term transhumanism; Robert Ettinger, the father of cryonics and author of *Man Into Superman*; and Bainbridge, who in 1982 penned a manifesto called "Religions for a Galactic Civilization" explaining the need for a quasi-religion to motivate work towards space colonization, especially after what he felt was the "progressive collapse of utopian politics." That

manifesto sat silent for two decades until it spawned its own technocosmological group, The Order of Cosmic Engineers,⁴ whose goal is “to permeate our universe with benign intelligence, building and spreading it from inner space to outer space and beyond.”⁵ In the interim, Bainbridge became Program Director at the NSF’s Information and Intelligent Systems and a key actor in the NBIC convergence, or the unification of nanotech, biotech, informatics, and cognitive science (NBIC), of which I will explain more later.

The Singularity did not originate with Kurzweil. In 1993, a computer scientist, mathematician, and science fiction writer named Vernor Vinge delivered a lecture at a NASA-sponsored symposium that laid out a serious scenario in a half-troubled, half-exuberant tone. “Within 30 years, we will have the technological means to create superhuman intelligence,” he declared. “Shortly after, the human era will be ended” (Vinge 1993). Borrowing a term from mathematics and physics that describes a point past which known laws do not hold, Vinge called his threshold the Singularity. Such ideas had already been floated, but soon after the first decades of cybernetics AI work scaled back its ambitions. The underlying goal of replicating or surpassing human cognition and behavior, known as Artificial General Intelligence (AGI), was ignored in favor of creating machines that could accomplish small, specific tasks, or narrow AI, a transformation that one informant characterized as “going from playing god to programming home appliances.” The 1990s changed that: the Internet, the Human Genome Project, genetics and bioinformatics, nanotechnology, neuroscience and brain mapping, all based on the concept of “information” and the efficient reduction of the analog to the computational, revived the flagging dream of *general* AI (chess champion Garry Kasparov’s 1997 defeat by IBM’s Deep Blue is frequently mentioned as a turning point).

New futurist groups began exploring the social, personal, and ethical consequences of these sciences. In 1992, a British philosophy Ph.D. from UCLA with the adopted name of Max More, along with a colleague bearing the equally symbolic name of Tom Morrow, started the Extropy Institute (EI), so named to provide a counter-concept to entropy, signifying greater organization and energy, rather than dissolution and heat death. Many current futurists trace their roots and early sense of excitement back to the Extropian meetings. Some older names appeared on the roster of speakers (e.g., the ubiquitous Minsky), but a host of new names signaled both a wider social berth and the arrival of the biosciences and genetics,

exemplified by speakers like molecular biologist Cynthia Kenyon. EI was not focused on space, but widely concerned with technologies that professed new promises—control over biology, over the brain, over all matter in the universe, a set of promises that would become the stake of the NBIC convergence. EI eventually gave way to The World Transhumanist Association (WTA), formed in 1998 by the philosopher Nick Bostrom.⁶

In this period of futurist cross-fertilization, a young AI researcher, Eliezer Yudkowsky, and a programmer, Tyler Emerson, formed the Singularity Institute for Artificial Intelligence (SIAI). A bearded, convivial prodigy who speaks in formal, rational sentences and is proud to not have a Ph.D., “Eli” was excited by the prospect of superintelligent agents, but worried that such agents might end up, willfully or accidentally, destroying what we care about, like human lives. A crude illustration, commonly used by SIAI members, of an accidental case would be a superintelligence optimized to produce paperclips that would then take all matter in its vicinity and rearrange the atomic structure to obtain a lot of excellent paperclips. It may not despise you in particular, but since your atomic arrangement is not to its liking, it would also take you apart and transform you into a paperclip. To counter the threat, Yudkowsky urged research towards the development of *Friendly AI*. Back then, SIAI was hardly anything more than an e-mail list called SL4 (Shock Level 4), subscribed to by Transhumanists and Extropians, and a few researchers, but the early discussions contained the duality of anxiety and exhilaration that still characterizes the field. Yudkowsky’s worrier ethos and rhetoric has been passed down: whenever someone throws up an alarming new scenario, a Singularity fellow, shouldering the burden the rest of the world refuses to acknowledge, will say something like, “Oh, now I’m really beginning to worry.”

Occasionally mentioned on the SL4 list, Kurzweil had already published *The Age of Spiritual Machines* (1999), a book that presented a utopian future of unlimited energy and great sex enabled by conscious machines, but never mentioned the Singularity. The Singularity moved to the center of Kurzweil’s platform after he spoke in symposia at two futurist institutes, Foresight and Extropy, where he got politely lambasted from the audience by Yudkowsky. On his SL4 list, Yudkowsky accused Kurzweil of peddling a “pseudo-Singularity” that projected the inevitable development of “luxuries” such as “transhuman servants.” In contrast, Yudkowsky’s true Singularity was potentially alarming, required activist involvement, and would lead to a critical rupture that would bring on “transhumanity.”

Kurzweil, who was working on his book on the Singularity at the time, responded by becoming a board member. It benefited both. Kurzweil couldn't have assumed a wide mantle of authority without a connection to the activists who were pushing the concept to its limit, while the latter needed Kurzweil's clout and financial connections. SIAI found firm financial footing in large part thanks to Kurzweil's friend, the libertarian financial guru and futurist Peter Thiel, who made his money investing early in Facebook and has been known to rail against multiculturalism and fund anti-liberal activities. Today SIAI's operating budget is over \$600,000, compared, for example, to the much larger WTA's \$74,000.

Indeed, the growth of West Coast futurism as I have described it cannot be explained without the tech and biotech booms of the 1990s and the growth of Silicon Valley, which shifted the flow of financial and intellectual activity in the US. Between 1995 and 2002, manufacturing jobs increased by 46,000 whilst computer-related jobs increased by 1.2 million and the total number employed in the high tech industry reached 5.6 million (American Electronics Association 2002). Biotechnology (distinguished from high tech medicine by its focus on genetic, cellular, and molecular manipulation) grew rapidly during the same period, a growth marked by an ability to attract capital rather than create lots of jobs. Although most biotech firms had under 100 employees, they attracted over \$10 billion in investments (Cortright and Mayer 2002). In short, a large, new pool of both people and capital began looking out at the world through technoscience glasses, receptive to its new combination of hope and hype (Brown 2003).

Control and Autonomy

Yudkowski's worrier ethos and Kurzweil's charted predictions merged to present a state of urgency in the movement—a state achieved through an intense temporal compression, folding the (utopian or dystopian) distant future (Guyer 2007) into the present, a temporality authorized by the scientific modality of prediction. Kurzweil's predictions have the distinction of unfolding on grand temporal scales. In books and lectures, he compresses “the history of the world” into a battery of data sets and graphs illustrating *technological* paradigm shifts and canonical milestones from the Big Bang to the Cambrian explosion through the invention of agriculture to the development of computing power. These macrocosmic perspectives

are combined with microcosmic analyses of changes in transistor size, price, and processing power over the last few decades. The graphs are plotted to show that from time immemorial, technology has been obeying Moore's law⁷ and developing at exponential rates. What's more, they place us presently on the elbow of the exponential curves; technological development is about to rise up the steep arm. The Singularity, Kurzweil predicts, will arrive circa 2045.

Some quibble with the exact date, but as Ana Solomon, one of very few women involved with SIAI, confirmed, "It's not the terribly distant future. People who've thought about it hard around the Institute seem to be putting maybe about 50 percent probability mass around 2045, and 50 percent chance after. But I mean it's not like we're trying to touch five centuries from now or something."

The urgency is reified in the exponential curves. Singularitarians hold them up to emphasize what they think others don't understand: when you start moving straight up the arm, things will happen really fast. And things will be very different: "game changing" is the phrase commonly used. "If you acquire AI that's significantly above the human level and it's oriented around the things that we most care about, then that includes fixing them, from food to vaccines and so on—those are problems that a *controlled intelligence* could solve, instantly almost." At the same time, Solomon warns, "If you *don't direct it carefully*, we die and they equally."

Since, according to Solomon, "our institutions for directing scientific funding and so on aren't set up to deal with risks that are this tricky," the burden is assumed by the SIAI, which has set itself two goals: to accelerate the advent of super-intelligence, mainly by seeking ways to emulate the human brain on non-biological platforms; but also to protect humanity from it, principally by "coding" what they call "Gandhian values" into its foundation in order to avert an "existential threat." A properly-coded entity might still have the power to destroy humans, but, thanks to its coded values, will not *want* to do so, just as Gandhi would never have *wanted* to do so.

The complex relationships between desire, society, history, and power do not enter the discussions. But even without these, the notion of *controlled intelligence* faces the problem of autonomy. If its values are pre-determined and its actions already circumscribed by code, is friendly AI autonomous? And if it is not *truly* autonomous, then can it still be considered *truly* intelligent? Any human-level intelligent machine must, *in principle*, be able to intend, desire, and act *for itself*—i.e., not accept what has

been given—otherwise it does not qualify for the most important attribute modernity has accorded intelligent beings, autonomy being the legal and political foundation of the rational sovereign subject. But it seems that autonomy must also include potential destructiveness. In fact, extending Bataille (1997), an act of destruction, devaluing that which has been *given* as value, may be regarded as the ultimate mark of autonomy. To reproduce or master the mind—the technical version of the Enlightenment ideal of self-mastery—strategies like AGI, neural nets, or Whole Brain Emulation must also grant it “inherent out-of-controlness” (Dupuy 2008, Kelly 2006). In order to be read also as Autonomous Intelligence, AI must have the ability to make its own decisions, including a decision to annihilate us or, at the very least, parts of us.

Thus the paradox of *controlled intelligence* underlines a modern political, not technological, contradiction: autonomy is highly valued because it indicates self-mastery; but autonomy also implies the power to destroy. So while autonomy is promoted, it also activates mechanisms of control through force, obedience, or code.

The Intelligent Cosmos

The key premise animating the Singularitarian project is the relationship between information and intelligence. Information is regarded simply as patterns with varying degrees of complexity. Any arrangement of atoms is information. The atomic structure of a giant rock may contain more information than the genetic code of a human, but a rock can be represented by a few simple specifications, so most of its information is useless. The more complex and *purposive* an entity becomes, the more intelligent it may be considered.

Singularitarians chart the history of the universe anti-entropically, through the increasing organization of *information into intelligence*. Kurzweil breaks down this universal evolution into six epochs: from the appearance of physics and chemistry on Earth (information in atomic structures), to the development of biology (information in DNA), to the rise of the brain (information in neural patterns), to the creation of technology (information in design), to the merger of technology and human intelligence (the Singularity), to the final epoch—called “The Universe Wakes Up” or “The Intelligent Destiny of the Cosmos” when the universe’s matter is saturated with intelligence (purpose-driven information). He closes with

the following declaration: “This is the ultimate destiny of the Singularity and of the universe” (Kurzweil 2005:389).

So in the symbolic order of The Singularity’s cosmology, information is the essence of the universe; and intelligence is its teleology or purpose⁸ as well as the unit of “intrinsic value,” as Ben Goertzel, former director of research at SIAI, called it in a 2009 *Forbes* magazine article. But intelligence does not require biology—just some atoms and energy (Churchland 1988). The human mind is only the most recent and complex instance of its unfolding, biology merely its current platform, a background technology. Goertzel, for instance, writes that the new technologies are “as much about *mind and reality* as they are about AI algorithms” (2010:4, emphasis added). The Singularity’s cosmology gives unity and purpose to the universe through concepts that are posited to be independent of humans (information and intelligence) and constitutive of reality itself, yet “reflect the same purpose as our lives: to move toward greater intelligence” (Kurzweil 2005:372).

If Weberian disenchantment rests on two pillars, calculability and lack of cosmic purpose or meaning, then The Singularity addresses disenchantment directly. This is how Weber defined the term: “...principally there are no mysterious incalculable forces that come in to play, but rather one can, in principle, master all things by calculation. This means that the world is disenchanted” (1958:139). Yet, there is a domain in Weberian theory that is not subject to scientific rationality, even in principle. “The metaphysical needs of the human mind...are driven not by material need but by an inner compulsion to understand the world as a meaningful cosmos and to take up a position towards it” (Weber 1963:117). Science itself is not equipped to indicate a meaningful end internally. To the contrary, “If these natural sciences lead to anything in this way, they are apt to make the belief that there is such a thing as the ‘meaning’ of the universe die out at its very roots” (Weber 1958:144).

This distinction has come to mark the outer limits of the scientific domain, of what it’s authorized to cover and what it’s forced to leave blank. Plenty of scientific theories provide some account of the universe’s origins and particular features, but none answer what one informant called the “meaning-of-life-type questions.” There is a difference between an account of how the universe came to be and what matter it consists in (cosmogogenesis [Gell 1995]), and an account of what it, and we, are doing here

(cosmology). While explaining the “how” questions, contemporary science does not stage forays into “why” and “ought” questions (Gellner 1993).

To the contrary, science has generated what Alfred Gell (1995) writing about a totally different context—Polynesian rituals—called “cosmological collapse.” Beginning with the Copernican-Galilean opening up of the cosmos, scientific knowledge created a terrible suspicion that human existence is a random, temporary accident in some remote outpost of an infinite and indifferent universe. Heightening this sense of finitude, science subsequently generated a series of its own end-time scenarios, from the inevitable heat-death of the universe to the end of the species to the end of the planet via climate change or an impending asteroid collision or... Thus, the effects of disenchantment are heightened through the twined movement of scientific rationality reaching all the way from atoms up to multiverses, whilst falling categorically short of the metaphysical extremities. Using the language of the Order of Cosmic Engineers, one might say that with disenchantment, the connection between “inner space” and “outer space” was severed.

What effectively is offered in The Singularity’s infusion of matter with intelligence is the possibility of restoring that connection, “waking up the universe” with a sense of *its purpose* and of *our* role in *its* unfolding. Its most intelligent agents so far, humans are not just the decoders of the natural world, but the purveyors of the next epoch. Darwinian evolution’s accident-based, lumbering pace of change, “its lack of abstract intelligence, its reliance on random mutations, its blindness and incrementalism,” to quote Yudkowski (2008:323), will be superceded by a super intelligent agent engineered by humans.

In this way, humans are given a central if paradoxical role. Our very purpose as humans in this purposeful evolution of the universe is, as Goertzel explained to me, “to give rise to other types of minds.” The son of left-leaning 1960s liberals, Goertzel was careful to emphasize to me that Singularitarians come in different stripes and not everyone agrees on the way forward. Nevertheless, the general vision, which he compared to a Hegelian unfolding, seems to be quite uniform: “There’s intrinsic value in helping higher intelligence come into existence” (Goertzel 2009).

When I asked him to elaborate on the idea of being superceded by super-intelligence, Goertzel, who in admiration of Nietzsche named his son Zarathustra, said:

Growth goes beyond humans, beyond mushrooms and ants and such. Are ants obsolete or pigs obsolete? They exist and continue to do what they do, but they're not the most complex or most interesting creatures on the planet. That's what I'm assuming is the fate in store for humans. I hope some humans continue to exist in their current form, but there's going to be other minds. And if it really came down to it, I wouldn't hesitate to annihilate myself in favor of some amazing superbeing.

Goertzel's spirit of sacrifice made obsolescence seem like purpose.

Cosmic Selves

Part of what gives meaning to human activity amongst Singularitarians is the possibility of using science to derive purpose (meaning) from a universe originally emptied of it by science itself. In his recent book, *A Cosmist Manifesto*, Goertzel details an ideology he calls *cosmism*, a "practical philosophy," a "world-view and value-system" that "provides concrete guidance to the issues we face in our lives" (2010:2). The exercise of Joy, Growth, and Choice are advanced "not only as personal goals, but also as goals for other sentient beings and for the Cosmos" (2010:29). Thinking daily about the grand themes of the cosmos is important because "these ideas have simple, practical, everyday meanings" (2010:23). He views "Cosmism" as a way to actively try and grow by being constantly aware of the universe, the power and limitations of human subjectivity, to break the habits of the mind, prepare for changes in the future, and transform our selves.

Selves are, already, being transformed through discourse and practice. Regular human brains are frequently downgraded as "wet," "messy," and "primitive" products of evolution which, as one informant put it, were "not designed to be end-user modifiable." Both in papers and discussions, a general equivalence is assumed between mind, reality, and algorithmic processes and some refer to their mind as "my mental algorithms." This information-processing view of mind and self leads to new disciplines with the goal of thinking as would a "super-intelligence." Discussing what a superintelligence might or might not do, I was chastised for thinking "anthropocentrically." There is a concerted effort to reduce human "cognitive bias," by studying the subject,⁹ by rigorous, rational thinking and also by optimizing the physical brain with supplements. Much like

Helmreich's (1998) Artificial Life researchers who did not so much reproduce "life" on computers as redefine and multiply the notion of life, so many Singularitarians, futurists, and AI researchers are not reproducing the "mind" so much as reconfiguring the concept and functions of "mind." Still far from constructing a human mind on a silicon platform, they are constructing something like a "silicon" mind on a human platform.

Primitive mind uploading exercises are being attempted. For example, in the CyBeRev project, Bainbridge is collaborating with one of Kurzweil's colleagues, Martine Rothblatt, to load "mindfiles." He was promoting the project when I met him on the Space Coast of Florida, where—along with Minsky, Anissimov, More, and a number of biologists, transhumanists, and bioethicists—he was attending a conference on the legal rights of artificial agents. The conference was organized by Rothblatt's organization, Terasem, devoted to "diversity, unity and joyful immortality achieved through exponential growth of geo-ethical nanotechnology."¹⁰ Rothblatt, a transgender lawyer and activist who launched the first satellite-to-car radio company (Sirius) as well as the first nationwide vehicle geo-location system (Geostar), owns a biotech company and has written books on *The Apartheid of Sex* (1995) and *Unzipped Genes* (1997). On CyBeRev, participants submit information based on a psychological profile form designed by Bainbridge, and upload personal files such as photographs, data files, scanned journals, etc. These mindfiles are meant to help a universal superintelligence reconstitute the participant in the distant future. As such, they are not only stored but also "spacecast," transmitted as digital information into outer space via satellite. Rothblatt explains that "every Terasem participant who has mindfiles has already achieved a certain level of immortality by having aspects of their mindfiles already anywhere from up to 5 to 6 light years away from the earth."¹¹

Speaking to Singularity enthusiasts it becomes clear that, in different ways, a sense of cosmic connection and universal purpose plays an important role, even if it comes at the expense of human obsolescence. Indeed, "human" obsolescence is viewed as an opportunity. Richard's childhood dream was to become an astronaut but a badly torn ACL prevented him from pursuing it. "I live in a very primitive society and we are stuck here in our nest so to speak, and technology hasn't evolved to take us anywhere else," Richard laments. "We should remake the universe as suits intelligent life. There's a great deal of opportunity for us to do amazing things. But right now we're stuck in these primitive bodies that fall apart on us."

In the meantime, that dream of space was re-configured for Richard through an engagement with existential questions.

My interest is in exploring, in understanding, learning. It's that eternal question philosophers have been asking: "Why? Why all this?" And the only way to get an answer is to stick around long enough. In the big scheme of things, I'm just another ant in the world. The only way I'm going to understand the universe is if I live long enough, be able to explore and expand my own intelligence.

Like others, Richard expressed frustration that his existential questions had no echoes around him, in school, amongst his friends, or in mainstream science—a reminder of Giddens' observation that modernity is marked by the "exclusion from social life of fundamental existential issues" (1991:156) to which it cannot provide satisfying answers. Another informant, Ted, explained:

I've probably had these discussions with friends but they don't care to strive to achieve these answers anywhere near the level I do. I just need to understand why things are. The other day I was spending a couple of hours on the Internet researching these very strange creatures that live in the deepest part of the oceans, just wondering why was that thing here...and it just creates more of a mystery: why is everything going on? It just keeps me at that top level of "Where did we come from?" I want to have an answer to what's going on here, on a universal scale!...I think science could get us to that point, the only question is: "how long will it take and will we survive that long?"

The reckoning of life on a cosmic scale, the everyday grappling with a larger existential purpose, is an emergent discipline around which new practices and affects are being formed, building what I call a *cosmic self*.

Convergence and Teleology

In 2001, Bainbridge and a colleague organized a conference sponsored by the National Science Foundation (NSF) and the Department of Commerce to explore the potential of the information sciences. That conference, and the resulting report, popularized the concept of the "NBIC convergence."

The NSF report stated that convergence is driven by the development of new paradigms that are, for the first time in human history, allowing for “a comprehensive understanding of the structure and behavior of matter from the nanoscale up to the most complex system yet discovered, the human brain” (Bainbridge and Roco 2003:1). Again, this linking up of the brain to the universe, of inner and outer space, is enabled by the treatment of everything—mind as well as matter—as “information” (the very assumption of Singularitarians). The NBIC sciences, like the Singularity, assume that information and algorithms not only represent but constitute the world (Golumbia 2009) and “the mind” can be taken beyond biology, beyond the wetness of its human platform. The essays in that and subsequent volumes (Bainbridge and Roco 2005) projected a radical rupture—also on a quasi-Singularitarian scale—in the landscape of human civilization, promising technologies such as “supercomputers the size of a cell in every human body, promoting health and preventing disease,” and “100,000 machines generating energy from solar cells that can all fit on the head of a pin” (Canton 2005:34). Without such innovations, they warned with urgency, “the future of civilization itself is in doubt” (Bainbridge and Roco 2005:2).

Through personal and institutional networks—Kurzweil-NASA-Bainbridge-NSF—the information-to-intelligence view of the cosmos is spawning an effort to formalize the informatic worldview by drawing on a range of sciences and scientists. Such teleological and cosmological views have some precedents in the sciences. Perhaps the most striking example is physicist Frank Tipler’s *The Anthropic Cosmological Principle* (Barrow and Tipler 1986), a text that influenced many Singularitarians. But the broadest example comes out of NASA. A recent NASA-sponsored publication, *Cosmos and Culture* (Dick and Lupisella 2010), includes multi-disciplinary contributions from anthropologists and philosophers to systems theorists and engineers. Edited by Steven Dick, astronomer and NASA’s chief historian, with Mark Lupisella, a NASA scientist, the volume is an effort to tie sociobiological views of cultural evolution to the physics and astronomy of the cosmos. Hence the new term “cosmocultural evolution” (Lupisella 2010), and the declaration that we are witnessing the “emergence of a novel scientific worldview that places life and intelligence at the center of the vast, seemingly impersonal physical processes of the cosmos” (Gardner 2010:379). From the NSF to NASA, the ultimate dream of convergence is to make the cosmos cultural and culture cosmological. As former NASA historian Steven Dick writes: “The

more we know about science, the more we know culture and cosmos are connected, to such an extent that we can now see that the cosmos is inextricably intertwined with human destiny..." (2010:25).

In significant theoretically and sociologically connected ways, then, the NBIC convergence of the information-based sciences and the Singularity adopt teleology to project a "scientific worldview" that fuses "cosmos and culture" into a common destiny. In other words, it's not just that Singularitarians are re-enchanting their own little corner of the universe, but that a particular possibility for re-enchantment seems to be carrying echoes through a larger segment of society.

Some scholars and theorists have challenged the notion of disenchantment by insisting that enchantment never left the modern world, but was just blinkered out of our view by the myth of modernity (Haraway 1998, Bennet 2001). "How could we be capable of disenchanting the world, when everyday our laboratories and our factories populate the world with hundreds of hybrids stranger than those of the day before?" asks Bruno Latour (1993:115). But this position confuses a sense of awe and alterity, an acknowledgement of mysteries, with enchantment. Disenchantment was not just a loss of the *sense* of awe or mystery but the production of a world view and the predominance of tools that, in principle, could translate that very *sense* into a set of explainable causal chains; that sense, in other words, would appear immediately limited or even false, a *de facto* illusion better explained through something like the brain's neuronal firings, or a genetic mutation. A collapsed cosmology is not restored through sacred leftovers, a celebration of contingency, the assertion that objects are agents or a sense of parochial awe about strange creatures. I argued earlier that disenchantment had to be viewed in terms of a double effect: science's ability in principle to explain the universe in causal-material terms, and its simultaneous inability to account for meaning and purpose in the universe, the metaphysical extremities. For re-enchantment to become an experience or condition, not just an assertion, for the previously disenchanted, it has to address the metaphysical extremities and—since both the disenchanted world and its aporias are generated through the scientific worldview—this can only come when the boundaries of those extremities are transgressed and reshaped through the limits and principles of science itself.

This is what I propose The Singularity has on offer. The Singularitarian vision responds to and arises through science's own aporias. By

¹⁰This mission statement appeared on various Terasem publications and websites. It is still the stated mission on one of several Terasem websites (<http://www.terasemweb.org/>, last accessed on August 14, 2012). However, the main website has recently rephrased its mission to read: "educating the public on the practicality and necessity of greatly extending human life, consistent with diversity and unity, via geoethical nanotechnology and personal cyberconsciousness..."

¹¹From a talk given at the Turing Church Online Workshop 1 conducted in the on-line space called Second Life on Saturday, November 20, 2010. Archives may be accessed at <http://cargocollective.com/turingchurch/Turing-Church-Online-Workshop-1>.

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Re-Enchantment Cosmologies: Mastery and Obsolescence in an Intelligent Universe

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魅惑宇宙学：宇宙中悟性受造者的超越与废退

[**关键词：**宇宙学，时空起点，幻灭，超人类主义，信息，现代性]

Заново очаровывающие космологии: Господство и устаревание в интеллигентной Вселенной

[**Ключевые слова:** космология, сингулярность, разочарование, трансгуманизм, информация, современность]

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إعادة الافتتان بعلوم الكون: السيادة والاهمال في الوجود الفطين

الكلمات الجامعة: علم الكون، الفذائة، عدم الوهم، البشرية الخارقة للعادة، المعلوماتية، الحدائة