

Towards a Future Global Science:

Axioms for Modeling a Living Universe

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Prologue

Are planet Earth—and even the entire Universe—conscious and alive?

Most people think the answer to this question is a clear “no” because they believe that science has proven the universe to be made of non-living matter/energy, accidentally evolved from a singular event called the Big Bang, and that planets are accidentally assembled stardust—our own being Earth, on which life evolved from non-life, intelligence from dumb mud and consciousness from brain matter.

This is indeed the Creation Story of western science, but has it been proven? Current debates, and even court trials, between Darwinians and Creationists have opened the story to question. The debate is framed as being a conflict between science and religion, but the story of science itself is changing and this sharp, publicized conflict may be solved from within science itself.

In fact, many western scientists, influenced by also studying eastern sciences and

philosophies, have come to the startling conclusion that life does not come from non-life, that intelligence is already inherent in “dumb mud” and that planets, as well as people and their brains, evolve within a limitless universal consciousness that gives rise to everything we know as our universe.

Doesn't Science give us facts instead of beliefs?

How can they come to such conclusions in the face of scientific evidence to the contrary? The simple answer is that science *has* no evidence to the contrary. Science, not unlike religion, is founded on a set of beliefs—beliefs that were arrived at through reason, rather than revelation, but unproven beliefs nevertheless. These beliefs are the fundamental assumptions of science, which, by agreement among scientists, are the most reasonable assumptions that can be made as a basis for scientific inquiry. Unfortunately, as philosophy of science in academia has been replaced by more “practical” or “realistic” courses, even scientists lack awareness of the difference between their beliefs and the enterprise of forming theories and performing research. Nevertheless, all theory, research and interpretation of results is colored by the unproven foundational beliefs.

Originally, western science and religion were merged in Descartes' belief of a universe created by a Christian Grand Engineer God who designed all of Nature as machinery and put a bit of God-mind into his favorite robot, man, so that he, too, could create machinery. This belief accounted for conscious intelligence as the root of all creation, but was later revised to exclude God—thus divorcing science from religion. This also eliminated all consciousness and purpose from Nature while keeping the concept of Nature as an assembly of machinery, clearly implying that “natural” machinery could and did create itself in accidental processes. This remains the current

belief in biology, the study of life, although, somewhat ironically, physics has moved far beyond the mechanistic metaphor, if still divided on the primacy of consciousness.

Why are foundations of science a matter of interest to the world at large?

Every human culture has had a Creation Story to tell its people how Nature began and how to understand their human nature as a guide to their human lives. In some indigenous cultures and in the three powerful Abrahamic religious cultures—Judaism, Christianity and Islam, Creation was the intentional action of deity that remained as non-physical parental authority to humans, with priesthoods to maintain and enforce the relationship. Eastern religions, as well as some indigenous cultures, more philosophical in their bent, saw Creation as a naturally intelligent process of evolution within a cosmic sea or field of consciousness giving rise to material worlds. Thus the human world is divided by beliefs in what we might call external versus internal Creation, or a Creator agent versus an inherently creative universal process.

The European Enlightenment, while rooted in Christianity, led to the formation of secular states in which the alliance of economic power and science displaced the previous alliance of church and state. Therefore, the mandate for telling “official” creation stories shifted from religion to science. Scientific belief, though divorced intentionally from religion, would be classified as on the side of internal creation (with a small ‘c’ to distinguish it as accidental rather than intelligent), thus giving it some natural affinity with eastern philosophies, as so many western-trained scientists have discovered.

Authorship of the western scientific Creation Story is shared by physics and biology. Physics gives us the non-living accidental material universe originating in a Big Bang and then running down relentlessly by entropy (the 2nd Law of Thermodynamics),

while biology adds that life is “negentropy” swimming upstream against this tide in an endless competitive struggle in scarcity (Darwinian evolution)—a struggle life loses eventually in the overall heat death of the universe. It is of interest that both Darwinian theory and the concept of entropy date to the two decades between 1870 and 1890.

This depressing story—a mixture of foundational belief and research conducted and interpreted within the framework of those beliefs—gave rise to philosophies of meaninglessness and to the consumer societies that we now find to be unsustainable. This means they must be changed if humanity is to survive. Fortunately, as indicated above, the story no longer fits the data of science itself, and a valid scientific story antithetically filled with hope for a better future is possible.

The Hokkaido Foundations of Science Symposium

In July 2008, an international group of seven eastern philosophers and western scientists met to reconsider these fundamental assumptions of western science and begin to propose more appropriate alternatives for our times, with a long range view toward bringing western science and eastern science formally into alignment as a global science.

The dialogues among the participants focused on the reconsideration of foundational assumptions of western science: how each participant saw them, their implications for science and society, what changes in those assumptions are now in the air among ever increasing numbers of scientists trained in the western tradition, and what can be done to publicize this evolutionary trend among students and practitioners of science and to the international public at large, since the fundamental stories of science regarding the nature of the universe, our planet and humanity within that greater context affect worldviews inside and outside the practice of science as indicated above.

In a time of need to shift as quickly as possible from unsustainable lifestyles to sustainability around the globe, we recognized this issue, especially as concerns the relationship between consciousness and matter, to have key potential for facilitating that shift. With the success of this initial symposium featuring seven distinguished participants, plans were laid for larger, more inclusive symposia and a continuing public relations campaign to ensure that the issue gets beyond inspiring conversations and becomes an effective campaign to enlist as many like-minded scientists and supporters as possible in the very near future.

The current situation to for academic and research scientists:

Very few scientists are even aware that the entire edifice of science rests on a set of unproven beliefs about our universe and ourselves, such as that the universe is non-living, that humans can study this universe objectively, that physics can describe this universe adequately, that our consciousness is an emergent product of matter, etc. So the first task is to bring this awareness to science itself, and show that alternative sets of assumptions may fit the actual data of science better and lead to whole new fields of inquiry. For example: If the assumptions of Vedic science that consciousness is universally primary and gives rise to matter (the exact opposite of the belief than matter gives rise to consciousness) fit better as a foundation for western science, the implications would be enormous. And exactly this is the conclusion many western-trained scientists, including the symposium participants, have come to believe.

For the public:

The dominant world culture lives within the western scientific creation story that tells people the universe is accidental, meaningless matter running down relentlessly by entropy and that life is a competitive struggle in scarcity against this downward slide—as stated above, the most depressing creation story any culture has ever told and one not even fitting the results of scientific research itself. Living under these bleak scenarios has driven our consumer society for decades, only to reveal at last how very unsustainable it is. Now threatened not only by economic unsustainability, but also by climate disaster, the world is desperately in need of a better, more inspiring story to live by....and science, mandated to write our creation story, is now in a position to expand its horizons, reassess its foundational beliefs, and give us the new story filled with hope and promise that its own research results warrants. As that story will also be compatible with spiritual beliefs and development, it could also go far to reduce the tensions between science and religion and among the religions themselves.

What might a new scientific model of a universe based on a different set of assumptions look like? The following is an attempt to outline the current assumptions of western science, the historical factors giving rise to them and the reasons for adopting alternative assumptions better fitting the data of science itself.

Introduction to a Tentative Model of a Living Universe

Historical background:

The ancient Greek word for science was philosophy—*philos sophias*, the love of wisdom. This name was intended to set science on a course of searching for wisdom, for

practical guidance in human affairs through understanding the natural order of the cosmos to which we belong.

Science and philosophy, originally one and the same pursuit, were separated when western science adopted its materialist stance of positivist reductionism, yet the first part of the *Cambridge English Language Dictionary*'s definition of philosophy is still "the use of reason in understanding such things as the nature of reality and existence" (including epistemology and moral judgment). Thus, over the past several centuries, science and philosophy have remained inextricably intertwined on the subject of understanding reality, though philosophy shared morality with religion and got exclusive rights to epistemology—"the study of, or a theory of, the nature and grounds of knowledge, especially with reference to its limits and validity," in other words, "what can we know and how do we know that we know?"

From my perspective, this separation of science and philosophy such that science was no longer concerned with how it knew what it knew or with exercising moral judgment about the consequences of its discoveries and pronouncements has led to fundamental scientific errors in the first case and a misplaced lack of accountability in the second.

Western science assumed the existence of an objective material universe that can be formally modeled through objective observation and measurement. Thomas Ehrlich describes objectivity as follows:

Objectivity is commonly taken to mean, "freedom from idiosyncrasies." An idea is objective to the extent that it is unpolluted by the individual's beliefs or presuppositions; a critique is objective to the extent that the person making the criticisms

and suggestions ignores their own personal feelings and biases. Objectivity in this sense is often defined as the negative of personal subjectivity, or as the opposite of personal opinion.¹

Science set out not only to eliminate idiosyncrasy and bias by decreeing the separation of subjectivity (our inner world) from objectivity (our outer world), but to create a comprehensive and detailed model of the outer world as a universe independent of any individual human conception of it (whether revelatory or observed) and independent of human participation within it—an undisputed, public model of a “reality” entirely independent of our thoughts and actions.

This heroic exercise (never seen as an act of creation) depended in both conception and practice on the prior creation of two formal languages abstracted from natural language. It was mathematics and logic, together with their “translation” into physical machinery, that inspired the western scientific model of a physical universe.

The symbols of logic and mathematics have no intrinsic real-world meaning, even though Aristotle devised logic for ordering human thought around the same time that Euclid devised geometry (literally, the measurement of Earth) to order the physical world. Engineers assigning real-world meaning to mathematics made it possible to translate that formal language into physical buildings, bridges, ships and all sorts of mechanisms, or machinery. Similarly, European scientists, heirs to Arabic and Greek math and logic, found mathematical patterns to be very useful in modeling those aspects of nature they could quantify (measure).

European scientists thus adopted the positivist stance that reality is made up only of measurable things, and that their description as natural mechanisms provides the only

possible uncontaminated knowledge of reality. Machinery, having been invented and assembled from parts by man, could be totally understood by man. Formalizing nature as machinery was intended to make it equally understandable.

The task of positivist science was thus twofold: to discover what the parts of natural mechanisms are, and to see how the mechanisms work through the movement of these parts in relation to each other. Scientists took things apart in order to see how they were constructed as well as how they 'ticked' within the great Cosmic Clockworks. This method of reducing things to their parts came to be known as the reductionist method of positivist science.

Renaissance and Enlightenment Era mathematical models of the cosmos followed from Plato's insistence that God was a mathematician and from Descartes' conception of God as more than mathematician, as the *Grand Engineer* of Nature's mechanisms. Although Descartes, in his famous recognition "*I think, therefore I am,*" came very close to recognizing consciousness as fundamentally self-evident, therefore axiomatic to any model of the universe conceived by humans, he became a 'double dualist' by seeing God as the external Creator of Nature's mechanisms and Man as the external creator of his own simpler machinery by virtue of God's gift to him of godlike consciousness. (I call this kind of creation *allopoeitic* to distinguish it from self-creation, which is *autopoeitic*; see later.) Descartes claimed that man could eventually learn to make his bejeweled wind-up nightingales as complex as God's feathered ones. This belief underlies the whole of robotics, man-machine interface, artificial intelligence (AI) and artificial life (AL) today, and contributes to our failure to understand life as autopoeitic.

Logically complete, if not satisfying in a contemporary world, Descartes' scheme

was adopted, though its logic was soon destroyed when scientists decided they had no need for the hypothesis of God in their conception of Nature. *It was utterly illogical to eliminate the inventor engineer while keeping the concept of nature as mechanism.* Any dictionary defines mechanism as the purposive (invented) assembly of parts. Having no inventor for the mechanical universe, scientists were forced into the bizarre stance that nature's complex machinery had arisen accidentally, that the universe is a vast purposeless mechanism filled with smaller purposeless mechanisms, all running down by entropy (as machinery does). Western science is still devoted to rationalizing this illogical model taught to new scientists in every university.

The Foundational Assumptions or Axioms of Western Science:

With Nature reduced to mechanism, and no proposal of some life force deemed acceptable in lieu of God, positivism arrogated to the physics of non-life the responsibility for modeling the universe. The fundamental assumptions—the 'self evident truths' or axioms—underlying this positivist science include a) that the universe exists objectively (not subjectively) as matter located in three-dimensional space and linear time, b) that the universe is non-living, measurable and describable in familiar mechanical terms of matter and energy, c) that the universe has linear causal order discoverable through the science of physics, using mathematical measurement and logical reason (including induction and deduction), d) that the material universe is accidentally assembled from the smallest physical units into larger structures and interactive patterns through the workings of discoverable natural laws, e) that large structures can be understood by reducing them to their component parts, and f) that life is a rare and peculiar emergent phenomenon in a non-living universe, possibly restricted to a single

planet's surface and ultimately subject to the laws of physics.

The most fundamental laws of physics were formulated (on the basis of these axiomatic 'truths') in contained laboratory experiments and then extrapolated from laboratory to cosmos. They are well known as Newton's laws, including inertia, energy conservation and entropy—the dissipation of working energy, and with it the disintegration of order, along the "arrow of time."

Much, of course, has happened in the world of physics since these axioms were formulated and the laws 'discovered,' but despite later understanding of light and the broader electromagnetic spectrum, Big Bang theory, Einstein's equivalence of matter and energy and adjustments to laws of time and motion, the dissolution of hard particles into quantum waves, string theories, multi-dimensional worlds, zero point energy, non-locality and many candidates for a Grand Unified Theory, all together seeming to push for a fundamental change in worldview, a true paradigm shift in physics is yet to happen (or at least to be accepted).

The word physics is taken literally from the Greek word for nature: *physis*. European scientists from Galileo on assumed that physics in its modern meaning, including astronomy, was the true science of nature, while life sciences from organic chemistry to biology, evolution biology and psychology, were (and still are) deemed secondary. Natural laws are still limited to the physics of a non-living universe, into which biologists are expected to fit their explanations of life. Toward this end, the concept of negentropy was coined as a kind of swimming upstream that could increase order locally within the overall river of entropy. *Negentropy* is credited with the descent of man, according to Darwin, his predecessors and his followers, as the natural creature

of an evolutionary process billions of years long.

Biological evolution has become virtually axiomatic in the scientific worldview, though its recognition of man as a naturally evolved creature has had questionable social benefits, giving him scientific license to exploit fellow humans, often cruelly, along with the rest of the natural world now suffering a degree of devastation that threatens even human survival. The lack of moral accountability of science for social interpretations of Darwinian descent by natural selection, along with its failure to see the grave errors in the Darwinian hypothesis, has led to social ills from chaining children to machines for the sake of profits to the Holocaust and even to the current capitalist tyranny of the quarterly bottom line competition. The entrenched belief that man is doomed to perpetual hostile competition—the scientific belief underlying these social ills—is, as I will attempt to show, a serious misinterpretation of the evolutionary record.

The fundamental concept of a cold and lifeless, meaningless universe running down by entropy made decidedly poor inspiration for man to become the good and moral creature Darwin personally hoped he would become by overcoming his evolutionary heritage. One can argue that the marvels of engineering this mechanical scientific worldview did inspire had a great deal to do with the social attitude of scientific industrialism to “get what you can while you can” as things deteriorate.

It is interesting to note that the one species that believes in the prevailing rule of one-way entropy has visibly created such entropy by destroying ecosystems and degrading Earth’s atmosphere, waters and soils to the level of previous extinctions. Man standing on the Moon sees, as the only mark of his presence on Earth, its deserts. Biologically, we have been until now a desert-making species, which for the sake of its

own survival must now shift into being a desert-greening species reversing its entropic effect.

Assumptions for a more Integral Global Science:

An alternative scientific worldview or model cannot be justified on moral grounds, but what if we can construct a model of the universe that fits the data of human experience, including scientific experiment, better than the prevailing one and leads to morality, wisdom and health for humanity and other life forms, as in the original Greek intention?

Consider what might have happened had Galileo looked down through a microscope into a drop of pond water teeming with gyrating life forms instead of up through a telescope into the heavens, already conceived in his time as celestial mechanics? Might biology, rather than physics, have become the leading science into whose models all others must fit themselves? Might scientists then have seen life not as a rare accidental occurrence in futile struggle to build up syntropic systems against the inevitably destructive tide of entropy, but as the fundamental nature of an exuberantly creative universe?

Instead of projecting a universe of mechanism without inventor, assembling blindly through particular, atomic and molecular collisions a few of which came magically to life and further evolved by accidental mutations, I propose that there is reason to see the whole universe as alive, self-organizing endless fractal levels of living complexity as reflexive systems learning to play with possibilities in the intelligent co-creation of complex evolving systems.

I propose that it is actually more reasonable to project our life onto the entire

universe than our non-living machinery, which is a derivative of life, a truly emerging phenomenon, rather than a fundamental one. I propose that it is possible to create a scientific model of a living universe, and that such a model is not only scientifically justified but can lead to the wisdom required to build a better future for human life on and for our planet Earth as the ancient Greeks intuited it should.

The current revolution—the impending paradigm shift—in science is forcing reconsideration of its most fundamental assumptions, that is, of the worldview described above, of the basic beliefs supporting the current scientific model of our universe or cosmos and ourselves within it. Cosmos is defined as “the universe as an orderly construct,” so because I am proposing an orderly model of the universe, I will usually prefer the word cosmos.

In eliminating those aspects of the perceived world that are not measurable, western science relegated them variously to subjective, mental, mythological, imaginary, storytelling, fictional, spiritual and other categories identified as *unreal*. A few aspects of our world, such as taste, smell and electromagnetism were shifted from unreal to real as ways of measuring them were discovered.

My model of the cosmos includes *all* human experience. The goal of this new framework for science is proposed to be a) to model a coherent and self-consistent cosmos as a public reality conforming as much as possible to necessarily private individual realities, and b) to interpret this model for the purpose of orienting humanity within the cosmos and thus permitting it to understand its particular role within the greater cosmos.

Toward that end, I propose:

The scientific definition of reality should be the collective human experience of self, world and universe as inner and outer worlds perceived from individually unique perspectives. (We have no other legitimate basis for creating cosmic models.)

Consciousness (awareness) shall be axiomatic for the simple and obvious reason that no human experience can happen outside it.

Formal experiments have as their purpose the creation of publicly shareable models of reality that permit common understanding and prediction.

Autopoiesis (continuous self-creation) shall be adopted as the core definition of life. Since galaxies, stars, planets, organisms, cells, molecules, atoms and sub-atomic particles all fit this definition, this implies that life is the fundamental process of the cosmos, a self-creating living whole with self-creating living components in co-creative interaction.

Nature shall be conceived in fractal levels of holons in holarchy, holons defined as relatively self-contained living entities such as those listed in d) and holarchy defining their embeddedness and co-creative interdependence on energy, matter and information exchange.

Beginning with these few assumptions and definitions as a conceptual framework for an integral science, we can reassess the past findings of science based on previous models, discover past errors and redesign experiments as necessary. We can also look for new patterns of regularity. (I shall avoid the term laws because of its implication of a lawgiver.)

Reality as direct human experience:

The idea of defining reality in terms of human experience may seem strange to

any western scientist accustomed to believe in a fixed firmament that includes our Earth and humanity but exists separately from human experience of it. Yet the whole edifice of a separate, objective world has been built on a belief in objectivity that has been discredited by philosophers of science and increasingly by scientists themselves. If the claim of basing science on reason, on experiment (a word derived from *experience*) and on rational argument is to be upheld, then *we cannot postulate a world that is not within human experience as long as we have no way to be outside human experience.*

The simplest case for conceiving reality as human experience, as stated above, is that we have no other legitimate basis for creating cosmic models. Note that this conception happily eliminates the need to define nonreality.

Merriam Webster defines reality as

1 : the quality or state of being real, 2 a (1) : a real event, entity, or state of affairs (2) : the totality of real things and events; b : something that is neither derivative nor dependent but exists necessarily.

The first three definitions tell us nothing as they define reality in terms of real. Only the final definition begins to tell us something meaningful, that reality “is neither derivative nor dependent but exists necessarily.” The only thing fitting this latter definition is direct perception, for once any perception is reported to another, whether by a three-year-old, a scientist or a theologian, it clearly becomes derivative.

The *Cambridge English Language Dictionary* adds “existing in fact; not imaginary” to its definition of reality, but a perusal of its definition of *fact* tells us:

fact: something which is known to have happened or to exist, esp. something for which proof exists, or about which there is information

The only way to truly *know* that something has happened or exists is to have direct experience of it, as we just determined. This clearly implies that truth can only be subjective. Unfortunately, western science has denied subjective (direct) experience as a valid reality in maintaining that the objective practice of science is the only way to demonstrate it. This belief is still strong among scientists though philosophers of science have long held that science cannot reach truth but only useful hypotheses.

The way in which hypotheses are determined to be useful or not lies, of course, in testing them experimentally. If the experimental outcome predicted by the hypothesis is found, they are considered useful. The validity of extrapolation beyond the experiment itself can only be judged in terms of consistency with our direct experience of the world.

It has now been shown in very careful research, for example by Elisabeth Targ^{2,3} and Marilyn Schlitz^{3,4} that remote intention and experimenter expectation clearly influence experimental outcome despite laboratory controls. The repercussions of such research have only begun to be felt, but certainly threaten to undermine the basic premises of western science if not its results.

More generally, the objectivity so sacred to western science has proved logically impossible. As Gregory Bateson noted decades ago, philosopher of science Alfred Korzybski warned us (in discussing the relationship between scientific models and reality) that “the map isn’t the territory and the name is not the thing named.” As Bateson himself put it, “there are no pigs or coconuts in the brain.”⁵

No human has ever had a direct (real) experience except in the eternally present Now; all the rest can only be stories that weave particular and more general past experience into the present. We cannot directly experience the past or the future.

Whatever we are experiencing, from whatever combination of inner or outer sources, is our in-the-moment reality. Esoteric traditions have made much of this fundamental truth—the only truth there can be—while western science has totally ignored it until now. The only exception I have found was on a scientific delegation to China (in 1974), where a Chinese scientist defined science as “the summation of people’s experience.”

The task a science accepting this fundamental truth is to sort and order reports of direct experience into an abstract public model of reality, using tools of reason, math, logic, experiment and narrative to construct it.

Consciousness as axiomatic:

In two of my books,^{6,7} I introduced the idea of consciousness as fundamental to the cosmos without discussing human consciousness as fundamental to the construction of scientific models themselves. The fundamental assumptions of my model as listed above have to do with human experience of the universe and human conjecture about the universe based on, or derived from, human experience of it, because these are *all we have to go on* in creating models—scientific or other—of that universe. Human experience includes the perception of a tangible, substantive world, but this experience of a material world, even if coming through sense organs, lies entirely within human consciousness, or awareness.

The *Merriam Webster Dictionary* defines **consciousness** as “**the quality or state of being aware**” and **awareness** as “**having or showing realization, perception, or knowledge.**” The *Cambridge International Dictionary of English* calls **consciousness** “**aware, thinking, knowing**” and **awareness** “**knowing that something exists, or having knowledge or experience of a particular thing**”.

Consciousness and awareness *are usually listed as synonyms of one another*, though awareness is more often linked to the concept of knowledge than is consciousness.

The problem with this link to knowing is that knowledge is clearly culture bound. I shall therefore distinguish cosmic consciousness—a universal field of awareness—from human consciousness in its broadest, most fundamental, cross-cultural understanding as awareness of self-in-world and world-in-self.

This human awareness of *having* an internal and external life perceived in images, sounds, touch, smells, feelings, thoughts, stories, etc. can be shared with others to a certain extent through verbal and other forms of language, thus giving rise to a broader cultural, or public, shared awareness of many-in-world. Once humans acquire language, this awareness arises in large part as verbal thought, which is why Descartes' stated his bottom-line of *knowing* as: "*I think, therefore I am.*"

Taking Descartes' lead in seeking my most basic observations, they are:

I experience myself and others as alive.

I experience myself at the center of an apparently spatio-temporal "outer reality" or universe.

I experience myself as an inner self of perceptions, feelings and thoughts.

I/we have no experience of the apparently spatial "outer world" outside of our conscious awareness.

I/we have no direct experience outside of an eternal present or Now, yet I perceive my experience as though it lies on a continuum from past through Now to future.

We can share our experiences in stories that transcend direct experience because of this timeline and our ability to communicate.

Thus we clearly perceive ourselves as existing in a physical spacetime world, and are able to describe it, model it symbolically and create other sharable stories of past (memories, histories, evolutionary trajectories) and future (forecasts, projections, anticipations) experience within it. But we can only describe it from the perspective of human experience. If we believe other species, planets, etc. to exist in their own right, we must also believe in the possibility of alternative scientific descriptions of the cosmos from other perspectives.

Therefore:

Science can only order and model human experience within consciousness as communicated among humans;

We cannot prove any "true" reality other than that composed of both uniquely personal and collectively shared experience;

Recognizing our formalization of spacetime as a model of perception, rather than an objective reality, it becomes an important way of ordering shared experience.

That human individuals *can and do* share considerable (though far from perfect) agreement on external reality and varying degrees of agreement on internal reality is of very significant interest as it both makes society possible and produces a larger reality than any one individual can experience independently.

The best argument we have for the existence of a "real" vast universe is the *limitlessness* of human conscious awareness, whether it is focused inward or outward. Every scientific or spiritual discovery can be contained within its expansive capacity.

Inner focus, when sufficiently practiced through meditation and other spiritual practice gives rise to the experience of ultimate truth in a limitless Source, called I AM, Cosmic Consciousness or God by many names across all cultures and felt as loving bliss. Outer focus, when sufficiently practiced through scientific study and reasoning gives rise to the experience of a coherent, comprehensible, though limitless universe or cosmos and recognition of arrival at its truth also produces “breakthroughs” felt as bliss. Those who practice both disciplines come to recognize the unity of these end results as a non-dual cosmic reality.

Thus, building a scientific model on the fundamental assumption of consciousness as the source of reality does not shrink the cosmos one whit. But it keeps us within that cosmos as co-creators of it, as reflections of cosmic creation at all other levels. For reality co-created by humans through a private and public collaborative process suggests a greater holarchic universe of collaborative process. All Nature can thus be elegantly conceived as conscious collaborative process.

Note that as we have found no limits to human conscious awareness, our awareness is (necessarily) coextensive with any models we build of the entire universe. Anything we "discover" scientifically about the universe becomes part of our conscious awareness, and therefore of our experience.

Sophisticated ancient cultures such as Vedic, Taoist and Kotodama, along with many indigenous cultures, recognized the fundamental consciousness of all Nature, the entire Universe or Cosmos, and much in the findings and conceptualizations of physics and biology today leads us in that direction.

The Model and its Implications:

We stand at a critical time in human history where the “self-evident” axiomatic “truth” of a depressingly meaningless mechanical universe running down by entropy, magically giving rise to biological creatures doomed to endless competitive struggle to get what they can while they can, is no longer defensible. Most fundamentally, we see now that this model was built on the false concept of an objective universe independent of human observers. We are also in a position to see just how this western scientific model, which overrode previous religious models of “How Things Are,” has led human society astray. Our mechanistic social organizations no longer serve us, nor does the competitive economy that destroys ecosystems and impoverishes vast numbers of humans and leads to the endless warfare so basic to its model.

In its place, happily, we can construct a new scientific model on the far more self-evident truths outlined above, one that takes into account the entire gamut of human experience and recognizes the cosmos as fundamentally conscious and alive. Much progress has already been made by myself and many other scientists to flesh it out.

The new model offers a holistic view of life in which biology, physics and consciousness studies are mutually compatible and consistent. The new axiomatic definitions and assumptions given here for this model of a living universe sees it not as a collection of accidental biological entities evolving on rare planets of a non-living universe through the mechanics of natural selection, but as a holarchic, evolving, intelligent, process intrinsic to the cosmos itself—in short, as *the* natural process of the cosmos itself, as self-organizing expressions of a cosmic field of consciousness.

Cosmic autopoiesis—the self-creation of a living universe—promises to become an elegant view of the whole, with essentially the same production and recycling

5. Bateson, Gregory (1980) *Mind and Nature*. Bantam edition: New York
6. Harman, Willis and Elisabet Sahtouris (1998) **Biology Revisited**. North Atlantic Books: Berkeley, CA
7. Sahtouris, Elisabet (2000) **EarthDance: Living Systems in Evolution**. iUniverse.com: Ingram: New York

Proposed Call outs from text to use as Highlights

“Consider what might have happened had Galileo looked down through a microscope into a drop of pond water teeming with gyrating life forms instead of up through a telescope into the heavens, already conceived in his time as celestial mechanics?”

[pg 13 in formatted typescript]

“I propose that there is reason to see the whole universe as alive, self-organizing endless fractal levels of living complexity as reflexive systems learning to play with possibilities in the intelligent co-creation of complex evolving systems.”

[pg 13]

“We cannot directly experience the past or the future. Whatever we are experiencing, from whatever combination of inner or outer sources, is our in-the-moment reality.”

[pg 17-18]

“A conscious, self-creating living cosmos is one in which life is sacred, ethics are inherent in evolutionary maturation processes and humanity itself can follow countless other species out of a juvenile mode of competitive aggression into mature cooperation.”

[pg 23]

