

## **Approaches to a Science-Based\* Origin Story by Jennifer Morgan**

Many today are exploring a science-based grand narrative with different intentions, approaches, and emphases, and are using different names to describe the work. This paper is an attempt to name, define, and classify different terms and lineages.

Grand narratives, or origin stories, are “cosmologies” that provide models of the origin of the universe, place the human in relationship to the Earth/Universe, and guide human behavior. Myths and religions\*\* are cosmologies that served these functions for thousands of years. As scientists began to piece together discoveries, a comprehensive grand narrative began to emerge as a new cosmology that explained the origin of the universe and placed the human in relationship to the Earth/Universe. Thus science entered a territory formerly occupied by myths and religion.

*Is there a way to see different lineages as contributing to a larger task — developing a functional cosmology for today? A cosmology that is intellectually rigorous, affectively engaging, personally and culturally meaningful, and guides our behavior?*

All of the lineages identified below are grounded in a science-based grand narrative. There are two major groupings, each with a different focus: 1) those that focus predominantly on developing an evidence-based narrative, and 2) integral lineages, also based on science, that focus predominantly on the subjective impact of a grand narrative on the listener and the values and behaviors it encourages. A further important distinction between these two groupings is that many in the integral lineages look to wisdom traditions, as well as science, as important sources for developing a current functional cosmology.

It's important to note that there's considerable flow among ALL lineages and the lines between them can get blurred. These lineages are less rigorous than, say, the tree of life. Many people have been influenced by multiple sources representing different lineages. Taking a look at broad delineations, however, can be helpful.

\* Definition of Scientific Method -- a method of procedure that has characterized natural science since the 17th century, consisting in systematic observation, measurement, and experiment, and the formulation, testing, and modification of hypotheses.

\* \*Dr. William Grassie defines a myth as "a story that serves to define the fundamental world view of a culture by explaining aspects of the natural world and delineating the psychological and social practices and ideals of a society."

## The Evidence-Based Lineages

### I. Lineage Originated by Natural Scientists

In this lineage, natural scientists (astrophysicists, biologists, geologists, paleontologists, and others) aimed to piece together scientific discoveries into a comprehensive evidence-based narrative, characterized by a quantitative approach to material nature. How did the universe evolve? What is the structure of the universe? These are some of the questions of natural scientists. (Deep in the DNA of this lineage are memories of times when their quest for truth was halted by church hierarchy.)

#### “Cosmic Evolution”

One term used in this group is “*Cosmic Evolution*,” a term used primarily by astronomers and astrophysicists and has its roots in the ancient Greek philosophers of the fifth century BCE. Heraclitus reasoned that all things change, that the universe is not static. But it was only in the mid-20th century, with empirical studies of galaxies, stars, planets, and life, that natural scientists began to combine physical, biological, and cultural evolution into a comprehensive narrative showing an evolutionary universe. Thus, the term “evolution” which until then had only referred to life, was expanded to cover the whole story of the universe, including all the transformations that happened before the advent of life. Astronomer Carl Sagan, astrophysicist Eric Chaisson and others began to use the term *Cosmic Evolution* in the 1980s. To quote Eric Chaisson’s website (see below): “Cosmic evolution is an inclusive working hypothesis that strives to integrate the big and the small, the near and the far, the past and the present, into a unified whole. Though many details remain outstanding, the overall conceptual framework of existence, including the rise of complexity from radiation to matter to life, seems reasonable and comprehensible. To understand, or at least appreciate, all this—with breadth, depth, and a sense of unification among the natural sciences—is the task before us.”

*Defining resources of this lineage are:*

Cosmic Evolution Timeline: From Big Bang to Humankind, this website contains text, images, animations, movies, and hyperlinked references.

[https://www.cfa.harvard.edu/~ejchaisson/reprints/AofT\\_splash.jpg](https://www.cfa.harvard.edu/~ejchaisson/reprints/AofT_splash.jpg)

Eric Chaisson's Cosmic Evolution website with a short video produced by Eric Chaisson. "Arrow of Time" tells the cosmic story in twelve minutes.

[https://www.cfa.harvard.edu/~ejchaisson/cosmic\\_evolution/docs/fr\\_1/fr\\_1\\_intro\\_movies.html](https://www.cfa.harvard.edu/~ejchaisson/cosmic_evolution/docs/fr_1/fr_1_intro_movies.html)

### **"Epic of Evolution"**

A branch of the lineage of natural scientists went another step in understanding the significance of a science-based narrative. They started to use the word "Epic" to suggest that the science narrative is a majestic story of heroic proportions that serves much the same function that mythic creation stories of the past served for every culture. The idea is often asserted in this lineage that the scientific narrative can, and should, replace religion; religion is a thing of the past, based on superstition, they would say, and it's time for humanity to grow past this more "primitive" stage in its evolution. *Epic of Evolution* was first used as a term by Edward O. Wilson, the Harvard biologist, in 1978 in his book *On Human Nature*, the Harvard biologist; Eric Chaisson, the astrophysicist, was also among the first to use the term.

A number of leaders coming out of religious backgrounds adopted the term "Epic of Evolution" such as Thomas Berry, Brian Swimme (see below), Philip Hefner and Ursula Goodenough (Institute on Religion in an Age of Science), Connie Barlow, Michael Dowd (author, *Thank God for Evolution*), Loyal Rue (author, *Religion is Not About God*), Gordon D. Kaufman (author, *In The Beginning--Creativity*), Sr. Miriam MacGillis (founder, Genesis Farm and developer of the first Earth Literacy Program), and others.

For information about evidence-based and integral lineages using the term "Epic of Evolution," see [http://en.wikipedia.org/wiki/Epic\\_of\\_evolution](http://en.wikipedia.org/wiki/Epic_of_evolution). Those in the subjective lineages are further discussed below.

Important resources created by those who use the term "Epic of Evolution" with an evidence-based orientation are:

*Epic of Evolution*, by Eric Chaisson (2007)

<http://www.deeptimejourney.org/resource/epic-of-evolution-seven-ages-of-the-cosmos/>

*Consilience: The Unity of Knowledge*, by E.O. Wilson (1999)

<http://www.deeptimejourney.org/resource/consilience-the-unity-of-knowledge/>

*On Human Nature*, by E. O. Wilson (1978)

<http://www.deeptimejourney.org/resource/on-human-nature>

[This section will be rewritten.]

## “Environmental Evolution” and “Gaia Hypothesis”

These terms were initiated by Lynn Margulis ( James Lovelock?), the microbiologist who put forward the importance of symbiogenesis, that symbiotic relationships between organisms are a major driving force of evolution, even more important than competition. Endosymbiosis, the origin of the eucaryotic cell as a symbiotic partnership between eubacteria and archaeobacteria, is a theory that Margulis brought from unorthodoxy to orthodoxy. Margulis and Lovelock made a huge contributions to a Science-Based Origin Story in the idea that the whole of earth is evolving together. Pieces cannot be separated. All the metabolisms of life take place inside of bacteria and communities of life are not only coupled to each other, they are also coupled to the their environments. The emergent properties of Earth/Universe arise out of networks of relationships.

Important resources:

The Gaia Hypothesis, by James Lovelock and Lynn Margulis

Lynn Margulis' wiki page: [http://en.wikipedia.org/wiki/Lynn\\_Margulis](http://en.wikipedia.org/wiki/Lynn_Margulis)

Environmental Evolution: Effects of the Origin and Evolution of Life on Planet Earth, by Lynn Margulis, edited by Clifford Matthews and Aaron Haselton

Environmental Evolution: An organization of followers of James Lovelock and Lynn Margulis

<http://www.environmentalevolution.org>

## II. Lineage Initiated by Social Scientists

Social science includes, among others, the fields of history, economics, anthropology, archeology, linguistics, political science, and sociology . . . fields having to do with the human. Traditionally, history has been considered a humanity, particularly when it has to do with subjective interpretations of facts and causes. As a social science, however, historians focus on history as an evidence-based story -- as do the natural scientists, focussing on quantitative methods -- but their starting point is different. They start with humans and look backward and outward. To understand humans, they would say, one must understand their origin, what they're part of, and how they are expressions of patterns larger than humans.

### “Big History”

The term *Big History* was coined by historian David Christian (author of *Maps of Time: An Introduction to Big History*) of Australia's Macquarie University. The International Big History Association was formed in 2010 and held its first international conference in

2012. Although Big History represents a coalition of scholars from the sciences and the humanities, its dominant reference point is the social sciences, since it was founded predominantly by historians and others in the social sciences. Characterized as “macrohistory,” it focuses on how humankind fits within the universe from the Big Bang to the present, examining long term themes and trends. David Christian’s 18-minute TED talk describes the basics of Big History as a succession of stages, or thresholds, in a progression toward greater complexity. Fred Spier, also among the first Big Historians, has written extensively on complexity theory, thresholds and energy.

Dominican University, San Rafael, CA, is the first college to offer Big History to all of its incoming freshman as an integrated multi-disciplinary program. It was developed by big historian DTJN member Cynthia Stokes Brown (author of *Big History: From the Big Bang to the Present*) and Mojdan Behmand, the former Big History Program Director.

The founders of this lineage generally share with those who first used the term Epic of Evolution the idea that religion is a thing of the past and should be replaced by more rational ways of knowing.

*Important resources and links for this lineage are:*

<http://www.dominican.edu/academics/big-history>

Big History Wikipedia page: [http://en.wikipedia.org/wiki/Big\\_History#cite\\_note-tws2M13-2](http://en.wikipedia.org/wiki/Big_History#cite_note-tws2M13-2)

International Big History Association -- <http://ibhanet.org/>

The History of the World in 18 Minutes, Ted Talk by David Christian (2011)  
<http://www.deeptimejourney.org/resource/the-history-of-the-world-in-18-minutes/>

Big History: Between Nothing and Everything, by David Christian, Cynthia Stokes Brown, and Craig Benjamin (2014)  
<http://www.deeptimejourney.org/resource/big-history-between-nothing-and-everything-new-york-mcgraw-hill-2014/>

Big History: From the Big Bang to the Present, by Cynthia Stokes Brown (2007)  
<http://www.deeptimejourney.org/resource/cynthia-stokes-brown-big-history-from-the-big-bang-to-the-present-2nd-ed-new-york-new-press-2012-1st-ed-2007/>

Maps of Time: An Introduction to Big History, by David Christian (2011)  
<http://www.deeptimejourney.org/resource/maps-of-time-an-introduction-to-big-history/>

This Fleeting World: A Short History of Humanity  
<http://www.deeptimejourney.org/resource/this-fleeting-world-a-short-history-of-humanity/>

Big History and the Future of Humanity

<http://www.deeptimejourney.org/resource/big-history-and-the-future-of-humanity/>

## II. Integral Lineages

The Integral Lineages discussed here are also grounded in a science-based grand narrative. The dominant focus, however, is different from the Evidence-Based Lineages, in that they prioritize: 1) interpretations and meaning, particularly how the narrative radically shifts human identity, 2) an experienced sense of relationship to Earth/Cosmos, and 3) the implications of the narrative for values and behavior. The transformation of the human inside an evolving universe is an emphasis in this group.

Unlike the Evidence-Based Lineages which predominantly assert that religion is a relic of the past, the Integral Lineages assert that religion, or more accurately the affective engagement fostered by religion, in addition to rational ways of knowing, are crucial for evolution to proceed toward a vibrant future for the planet. Some of these lineages are explicitly connected with a particular religious tradition; others are not.

Many in these lineages express a concern that science, at times, has established a new “dogma,” or interpretations that overstep the logical bounds of the scientific method. Statements such as “there is no meaning in the universe apart from the meaning that humans impose on the universe,” and “evolution proceeds *only* through random accidental interactions,” are a few examples of such critiques.

On the other hand, those in the Evidence-Based Lineages say that those in the Integral Lineages sometimes conflate science with *interpretations* of science. Science is misrepresented, they would say, when evidence-based statements (that have consensus in the science community) are not clearly distinguished from *interpretations* of those statements that are not shared by the scientific community.

The two independent lineages discussed here are: 1) Cosmic Education as developed by Maria Montessori, 2) a lineage informed by science and religion, and 3) a living universe lineage. There are -- for sure -- many independent Integral Lineages not named here. One example is a lineage inspired by Sri Aurobindo. If you can tell us about other lineages, please contact us. [info@deeptimejourney.org](mailto:info@deeptimejourney.org).

### 1. Montessori Cosmic Education Lineage

In the 1940s, toward the end of her life, Maria Montessori (1870 - 1952) and her son Mario developed a Cosmic Education Curriculum for the Elementary Level based on the idea that an evolutionary Cosmos is a foundational context for understanding human identity and should be the primary reference for all subjects. Given her science

background as one of the first women doctors in Italy, she had been trained in the importance of observation, and noticed that elementary age children ask the great cosmic questions: Where do I come from? Where does everything come from? She concluded that the elementary years are the time to introduce the Cosmic Story.

The shared origin and interdependence of all things is a major focus of Cosmic Education, with the intent of creating a new more peaceful human in right relationship with other humans and the earth. Cosmic Education is covered in two books by Montessori: *Education for a New World* and *To Educate the Human Potential* (1948). The more recent book by Michael and D'Neil Duffy, *Children of the Universe: Cosmic Education in the Elementary Classroom* (2002) is an excellent primer on Cosmic Education and used by Montessori teachers worldwide.

*Important resources and links for this lineage are:*

[http://en.wikipedia.org/wiki/Maria\\_Montessori](http://en.wikipedia.org/wiki/Maria_Montessori)

*To Develop the Human Potential*, by Maria Montessori (1948)

*Children of the Universe: Cosmic Education in the Montessori Elementary Classroom*, by Michael and D'Neil Duffy (Originally released in 2002, Updated in 2013?)

<http://www.deeptimejourney.org/resource/children-of-the-universe-cosmic-education-in-the-montessori-elementary-classroom/>

## **2. Integral Lineages Informed by Science and the Humanities**

### **“The Divine Milieu”**

One important lineage in the modern era that explicitly views cosmic evolution as a “sacred story” starts with Pierre Teilhard de Chardin (1881 - 1955), a French Jesuit priest and paleontologist/geologist who participated in the discovery of Peking Man. He was the first religious leader to set forth a sweeping account of the unfolding of the universe in his books *The Phenomenon of Man* and *The Divine Milieu*, suggesting that the universe was rising and converging toward an Omega point. He expanded upon the notion of a noosphere, or the evolution of a mind sphere. Though Teilhard's work is explicitly Christian, his powerful prose evokes in many, Christian and non-Christian alike, a palpable experience of connection (communion) with deep cosmic mystery.

Defining resources and important links are:

American Teilhard Association: <http://teiharddechardin.org/>

*The Divine Milieu*, by Teilhard de Chardin (1957)  
<http://www.deeptimejourney.org/resource/the-divine-milieu/>

*The Phenomenon of Man*, by Teilhard de Chardin (1955)  
<http://www.deeptimejourney.org/resource/the-phenomenon-of-man/>

*Hymn of the Universe*, by Teilhard de Chardin (1969)  
<http://www.deeptimejourney.org/resource/hymn-of-the-universe/>

*Heart of Matter*, by Teilhard de Chardin (1978)

\* It's important to note here that Indigenous have always viewed the cosmos as sacred and "alive."

### **"The New Story,"**

Thomas Berry (1914 - 2009), a Catholic Passionist priest, was deeply inspired by Teilhard de Chardin and served as president of the American Teilhard Association. Unlike Teilhard, who focussed on reconciling his Christian beliefs with science, Berry sought to understand foundational cultural stories as a lens that shape how humanity interacts with the natural world. Asian religions were a significant influence on his thinking; he lived in China in 1948 and authored two books on Asian religions. Berry asserted that the environmental crisis could be attributed to the Western religious/cultural focus on a transcendent God and the failure to see Earth as sacred.

The story of an evolving Universe, emerging from science, opened the door for upending the transcendental focus, by pointing to creativity and transformation as a property of the Universe itself. Berry focussed on the implications of an evolving Universe for human identity, particularly the human/Earth relationship and how it needs to be grounded in reverence for Earth/Cosmos.

Berry's landmark essay, *The New Story: Comments on The Origin, Identification and Transmission of Values*, published in 1978 asserted that Western culture was between origin stories, or functional cosmologies, that give us a sense of meaning and relationship. "The old one doesn't work, and a new one hasn't taken hold," he said. The New Story (also sometimes called "The New Cosmology") most importantly is one in which there isn't a discontinuity between the human and everything else. The human comes out of the cosmos and is the cosmos reflecting on itself, said Berry, and many others.

Defining resources are:

*The New Story* (Landmark Essay by Thomas Berry, 1978)

<http://www.deeptimejourney.org/resource/the-new-story/>

*The Dream of the Earth*, by Thomas Berry (1988)

<http://www.deeptimejourney.org/resource/the-dream-of-the-earth/>

*The Great Work: Our Way Into the Future* (2000)

<http://www.deeptimejourney.org/resource/the-great-work-our-way-into-the-future/>

*The Sacred Universe: Earth, Spirituality and Religion in the Twenty First Century*, by Thomas Berry (2009)

<http://www.deeptimejourney.org/resource/the-sacred-universe-earth-spirituality-and-religion-in-the-twenty-first-century>

*The Great Story* (Video, 2002)

<http://www.deeptimejourney.org/resource/thomas-berry-the-great-story-home-video-version/>

*Thomas Berry Speaks*, Video by Marty Ostrow

<http://www.deeptimejourney.org/resource/thomas-berry-speaks/>

For more information about Thomas Berry, go to the Thomas Berry Foundation, [www.thomasberry.org](http://www.thomasberry.org)

### **“The Story of the Universe” and “The New Cosmology”**

Brian Swimme (b. 1950) an evolutionary philosopher with a background in mathematics of the early Universe -- contributed a grounding in modern science to this values oriented lineage. Together, Berry and Swimme wrote *The Universe Story* (1994) which represented a convergence of human history with evolutionary history centered on the imperative for humans to enter into a mutually enhancing relationship with the earth. Berry frequently said that there can be no peace among humans without peace with the planet. “The underlying assumption [in this lineage] is that with a change of worldview will come an appropriately comprehensive ethics of reverence for all life.” (From the Thomas Berry Foundation, [www.thomasberry.org](http://www.thomasberry.org))

Many programs offered by members of Sisters of Earth, an organization of Catholic sisters use the terms Story of the Universe, The New Story and The New Cosmology. Of particular note is Miriam MacGillis, a Dominican sister who founded Genesis Farm,

Blairstown, New Jersey to teach the Story of the Universe and demonstrate ways of living in a mutually enhancing relationship with earth.

Defining resources are:

*The Universe is a Green Dragon: A Cosmic Creation Story*, by Brian Swimme (1984)  
[http://www.amazon.com/Universe-Green-Dragon-Cosmic-Creation/dp/0939680149/ref=sr\\_1\\_3?s=books&ie=UTF8&qid=1412018393&sr=1-3&keywords=the+universe+story](http://www.amazon.com/Universe-Green-Dragon-Cosmic-Creation/dp/0939680149/ref=sr_1_3?s=books&ie=UTF8&qid=1412018393&sr=1-3&keywords=the+universe+story)

*The Universe Story: From the Primordial Flaring Forth to the Ecozoic Era—A Celebration of the Unfolding Cosmos*, by Thomas Berry and Brian Swimme (1994)  
<http://www.deeptimejourney.org/resource/the-universe-story-from-the-primordial-flaring-forth-to-the-ecozoic-era-a-celebration-of-the-unfolding-cosmos/>

*The Hidden Heart of the Cosmos: Humanity and the New Story*, by Brian Swimme (1999)  
<http://www.deeptimejourney.org/resource/the-hidden-heart-of-the-cosmos-humanity-and-the-new-story/>

Wikipedia page on Brian Swimme: [http://en.wikipedia.org/wiki/Brian\\_Swimme](http://en.wikipedia.org/wiki/Brian_Swimme)

### **“Journey of the Universe”**

The term *Journey of the Universe* -- which suggests that the universe as a whole is on a journey -- was the name of an Emmy Award winning film produced by Brian Swimme (see above) and historians of religion Mary Evelyn Tucker and John Grim. All three were deeply inspired by the work of Thomas Berry. Mary Evelyn Tucker’s area of study is Asian religions; John Grim’s is indigenous traditions. The movie, book, and educational series by the same name are grounded in an integration of science and the humanities, showing patterns of emergence, the deepening human awareness of the larger journey of the universe, and the human role and responsibility for co-creating the future. The human is not an accidental by product of cosmic evolution, but an integral part of the cosmic narrative. Mary Evelyn Tucker and John Grim, co-founders and co-directors of the Forum on Religion and Ecology, have written numerous books on the contribution of the world’s religions for creating an ethos of respect and reverence for the earth, and the foundational importance of this attitude for the future health and well being of our planet.

Defining resources:

*Journey of the Universe* (Book) by Brian Swimme and Mary Evelyn Tucker (2011)

<http://www.deeptimejourney.org/resource/journey-universe-book/>

*Journey of the Universe* (Movie), Narrated by Brian Swimme, Produced by Mary Evelyn Tucker and John Grim (2011)

<http://www.deeptimejourney.org/resource/journey-of-the-universe-movie/>

*Journey of the Universe* (Conversations/Educational Series Overview) (2012)

For more information go to the Journey of the Universe site:

<http://www.journeyoftheuniverse.org/>

and the Forum on Religion and Ecology: <http://fore.research.yale.edu/>

### **3) Integral Lineages Focused on a Systems Paradigm**

**(Weak Section, Please Comment)**

This lineage focuses on the paradigmatic implications of an evolving universe. Fritjof Capra, a theoretical physicist who conducted research in particle physics and systems theory and others have focused on the “Systems” aspect. The descriptive text on Fritjof Capra’s new book, *A Systems View of Life*, says: “Taking a broad sweep through history and across scientific disciplines, the authors examine the appearance of key concepts such as autopoiesis, dissipative structures, social networks, and a systemic understanding of evolution. The implications of the systems view of life for health care, management, and our global ecological and economic crises are also discussed.” According to Capra’s wiki page: “Using Thomas Kuhn’s *The Structure of Scientific Revolutions* as a stepping stone, the book explores parallels between new paradigm thinking in science and in religion; the authors posit that, together, these new paradigms offer remarkably compatible views about the universe.”

[Others?]

*Belonging to the Universe*, by Fritjof Capra and David Steindl-Rast (Benedictine monk)

*A Systems View of Life*, by Fritjof Capra

### **4) Integral Lineage — Ken Wilbur**

**(Need description here.)**

*A Brief History of Everything*, by Ken Wilbur

### **5) Integral Lineage Focused on the role of Consciousness**

**(Weak Section, Please Comment)**

This lineage focuses on the role of consciousness as the driver of an evolving universe. It asserts that consciousness, in some form, is integral to the whole universe, not only in

the human. It is not a by-product of a highly developed nervous system and biological brain, according to this view, but rather is a self-organizing force at the very foundations of the universe. There is, in some sense, a world mind that connects, and is shared by everything, though not the same in each thing. Physicist Freeman subscribes to this view. [\[A definition of consciousness is needed here.\]](#)

Sri Aurobindo, the Indian nationalist, philosopher, yogi, poet, and guru believed that the, according to the Sri Aurobindo wiki page, “current concept of evolution merely describes a phenomenon and does not explain the reason behind it, while he finds that life to be already present in the matter. He argued that nature (which he interpreted as divine) has evolved life out of matter and then mind out of life, in other words that evolution had a purpose. He believed that matter has an impulse to become life, and that life has a similar impulse to become mind. He stated that he found the task of understanding the nature of reality arduous and difficult to justify by immediate tangible results.

Duane Elgin, an important leader/thinker in this lineage has worked in ecological and spiritual transformation for over four decades. His focus isn't the universe as a “Living System,” in which the universe as a whole shares life-like characteristics or creativity. [\[Need more about Duane.\]](#)

[\[Others??\]](#)

*Important Resources for this lineage:*

[\[Sri Aurobindo's most important resources?\]](#)

*The Living Universe and Awakening Earth*, by Duane Elgin

<http://www.deeptimejourney.org/resource/the-living-universe-where-are-we-who-are-we-where-are-we-going/>

*Awakening Earth*, by Duane Elgin

*Table of Contrasts Between Living and Dead Universe*, by Duane Elgin

<http://www.deeptimejourney.org/resource/table-of-contrasts-between-dead-and-living-universe-paradigms-2/>

## **Conclusion**

This paper is an attempt to name and describe different approaches, and thereby to foster understanding between different lineages. By understanding different intentions, approaches, and emphases, it is hoped that all can see different roles in developing a functional cosmology for our time.

**Dear Reader:**

Please note that this paper is a *draft* representing my thinking, and contributions from others, as of this day, April 10, 2015. I invite your comments. All comments will be taken into consideration for future versions.

Thank you,  
Jennifer Morgan  
President and Founder, Deep Time Journey Network