

# JSP

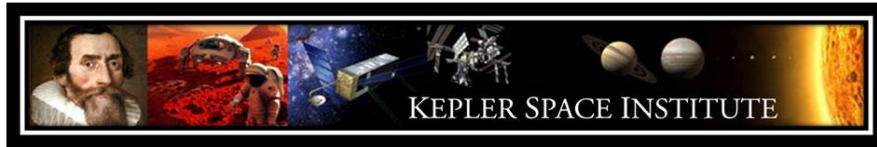
Volume 2, Number 1  
Spring 2013

**JOURNAL of  
SPACE  
PHILOSOPHY**

**"Flowers of the Cosmos"  
By John Bossard  
pg 45**

**"Space Settlement Design and Management:  
Entropy, Systems, and Sub-Optimization"  
By Bob Krone  
pg 101**





# Kepler Space Institute

Meeting the needs for the future of humans on Earth, and in Space, with dreams and skills of global scholars

*Dedicated to the belief  
that Space holds  
solutions for the  
betterment of humankind.*





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## Preface

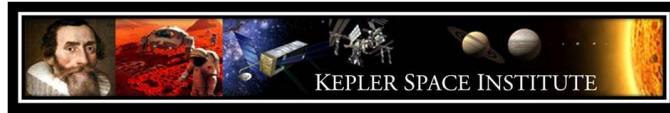
Philosophy has traditionally been rendered the love of wisdom or the search for wisdom. Aristotle, in his *Ethics*, took this further and associated the search for wisdom with the search for virtue, which he saw as a consistent choice to do what is moral and right. Kepler's approach to philosophy follows along a similar path to seek reverence for life within ethical civilization; that is, to look for ways forward that are beneficial rather than destructive, that help rather than harm. Our first principle, set out in Issue 1, is that reverence for life is the foundational purpose that will sustain humankind in perpetuity. The challenges of moving out into space will expand our horizons to the extent that we will be forced to revise our worldview completely. It is the responsibility of the right-minded to argue, advocate, and work for solutions that help humanity to grow ethically and morally as we also grow scientifically and technologically.

This journal is peer-reviewed. Submissions, to [BobKrone@aol.com](mailto:BobKrone@aol.com), will be considered for publication from anyone on Earth or in Space. Views contained in articles are those of the authors; not necessarily reflecting policy of Kepler Space Institute. Reproduction and downloading of Journal content for educational purposes is permitted; but authors hold copyrights of their material and professional accreditation is required.



**Bob Krone, PhD, Editor-in-Chief**  
**Gordon Arthur, PhD, Associate Editor**  
**Kseniya Khovanova-Rubicondo, PhD, Research Editor**





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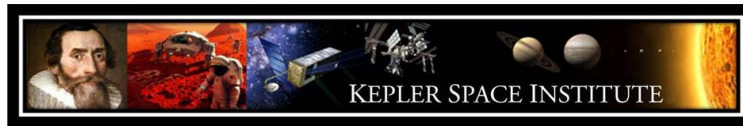
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Access to the Journal of Space Philosophy and downloading of its articles is available at [www.keplerspaceuniversity.com](http://www.keplerspaceuniversity.com). Anyone on Earth or in Space may submit his/her article to [BobKrone@aol.com](mailto:BobKrone@aol.com)





## Kepler Space Institute

Meeting the needs for the future of humans on Earth, and in  
Space, with dreams and skills of global scholars

**Press Release, April 1, 2013**

### **Universal Truths Unlocked in Philosophers’ Dreams**

**By Walter Putnam**

All too often, discussions on space exploration and development fail to recognize some of the underlying principles at work in discourse on subjects with such a potentially profound impact on civilization. We get so caught up in the fundamentals, the science and engineering and – dare we mention – the funding of complex projects and missions that we tend to overlook the “why” which propels our dreams.

It is true that there are practical reasons behind the goal of discovery and practical approaches are required to yield the desired results. Yet, there are no doubt intangible factors that come into play whenever humans venture forth to open new frontiers. There were sound reasons to invent a machine that enables us to fly through the air to get from point A to point B, quicker and without some of the obstacles of ground transportation. But who can deny that development of air travel followed centuries of dreaming about breaking the constraints of gravity and flying through the sky like a bird?

Some of the ideas that spring from the well of creation precede their practical application by many generations. Others seem to go hand in hand. Still others follow the flow, making sense of new developments after the fact in the way that we are just now beginning to realize the ramifications that the Internet is having, and will continue to have, on culture and civilization in the future.

In Dr. Robert Krone’s second volume of *The Journal of Space Philosophy*, produced under the auspices of Kepler Space Institute, of which Dr. Krone is provost, we continue to explore the universal truths that are interlocked with advancements in the study and exploration of extraterrestrial space. In Volume I, we were treated to essays on the meaning of a glimpse of Earth from space through Frank White’s explanation of “The Overview Effect,” the mysteries of “dark information” streaking throughout the Universe indicative of a Cosmic intelligence, as outlined by Dr. Joel Isaacson, and Dr. Terry Tang’s insights into the influence of Chinese language and culture on China’s space program.

These are just a few among the dozen essays contained in the Journal, which debuted in the autumn of 2012. In Volume II, we will continue to learn how these “universal truths” are unlocked by the study and understanding of philosophers. For just a sample: “What is Dark Energy? A Toroidal Model of the Cosmos: The Big Bagel” by Howard Bloom and “The Exploration Imperative,” by Rod Pyle.

It is not an idle study. The ideas and thoughts that run parallel with developments in the realm of space will have an impact not just on current developments, but also far into the future, as witnessed through the “Overview Effect” and its impact on protection of Earth’s environment, or as the global discoveries and explorations of the Renaissance planted the seeds of the Enlightenment, which in turn fostered new thoughts on human rights and freedoms, yielding a whole new way of thinking on democracy in the New World of the 18th Century.

####



## **About Kepler Space Institute and University**

**By Robert L. Frantz, President, Kepler Space Institute**

The vision for a United States Space University has been held by thousands of Space professionals and educators for decades. We are now moving forward towards our vision with the incorporation of Kepler Space Institute, Inc. in the state of Florida. Our next step will be to register with the Florida Department of Higher Education, after which we can assume our new name as Kepler Space University. Along with board member Walter Putnam, who has set up temporary living in Titusville, Florida, we have scouted potential sites for our new office. We will likely be within a five-minute drive of the Kennedy Space Center's main gate. We continue to operate Kepler Space Institute in South Carolina as a nonprofit and the center for our space development think tank.

Kepler Space Institute/University is committed to direct its efforts, resources, qualifications, and talents to endeavors that benefit humanity now and in the future. Our KSI leadership formulated the *Law of Space Abundance* in 2009, defined as "*Space offers abundant resources for humanity's needs.*" It was a logical law flowing from research and discoveries over centuries. We seek to guide people, groups, businesses, agencies, and international organizations to achieve new goals and visions facilitated by the material and spiritual resources that await us in Space. To this end, we have recently collaborated on an academic paper for asteroid mining moving us from words to deeds.

Our Kepler Team, which collectively has spent one thousand work years within the Space Community, is proud to be continuing the world's first *Journal of Space Philosophy* with this second issue. We invite global Space professionals and enthusiasts to subscribe to the Journal on our website, [www.keplerspaceuniversity.com](http://www.keplerspaceuniversity.com). There is no charge and we encourage global comments on our blog dedicated to the Journal, regarding the streams of intelligence you will find and on our proposed KSI Space Philosophy, "*Reverence for Life Within Ethical Civilization*" provided by our Provost, Dr. Bob Krone.

We are proud to use the name Kepler in recognition of Johannes Kepler, whose mathematical genius in defining our solar system remains a legacy today in the studies of orbital mechanics in aerospace education around the world. *The Journal of Space Philosophy* represents a new renaissance era in the spirit of Johannes Kepler, which will be the incubator in space development for both Earth's benefits and for humankind's survival.





This is where we will build a second Kepler office in the virtual world. We can also practice building here. The actual spaceship designs will be done above in the Starship Kepler now in virtual low earth orbit. The ship will initially have only a thin skin structure. Then it will be moved to a stabilized position at an Earth/Moon Lagrange Point. Here mined materials will be brought up on the space elevator tether first to have our robotically-run 3D printers print plates for inside the skin to provide deep space radiation protection. Once protected, human contractors can be sent up to complete the ship's infrastructure, again using 3D printers. The ship will spin slowly, as Von Braun envisioned, for artificial gravity.

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**About the Author:** Robert “Bob” Frantz’s first career was as a United States Marine Corps Fighter Pilot. His flying achievements and Vietnam War combat decorations led to his Chairman of the Board position in America’s Distinguished Flying Cross Society. His second flying career was as a commercial airlines Captain flying the globe with United Airlines. Between flights, he earned the University of Southern California’s Master of Science in Systems Management Degree Program, which launched him into the field of Education. He became an expert in the technology of online education, which he has applied to Ashburn University and Kepler Space Institute; he earned the PhD in Earth and Space Sciences. As this *Journal of Space Philosophy* is published online he is teaching, consulting and strategic planning for the future of Kepler Space University.



**Editor's Notes:** Kepler Space Institute and University (KSI & KSU) have been blessed throughout their short existence by the volunteer work of talented entrepreneurs with extensive experience in the Space Community. When our Founding President, Dr. Richard Kirby, died at the height of his intellectual productivity, on September 24, 2009, our group of Kepler leaders turned to Robert L. Frantz, who had all the qualifications needed to become President. He said "Yes" (no salary was available) and has brought KSI to operational status and supervised KSU planning ever since. *Bob Krone, PhD.*

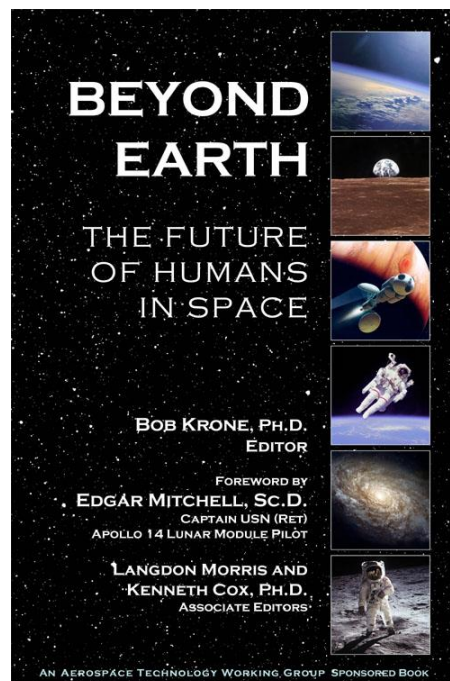
## The Roots of Kepler Space University

By Bob Krone, PhD, Provost

Humans have been in Space for fifty years. There is a huge global community of Space professionals and Space enthusiasts. Forty-two of them co-authored this book in 2006 after the Aerospace Technology Working Group brought Space Industry leadership together every six months beginning in 1989 (see [www.youtube.com/watch?v=SCICf0RzGYI&feature=youtu.be](http://www.youtube.com/watch?v=SCICf0RzGYI&feature=youtu.be)). Those 42 had 1000 person-years of Space experience across the hard and soft sciences and NASA's missions. *Universe Today* picked this book as one of the "Best Space Books of 2006."

A few of us concluded then that it was time to create a new Space University. Johannes Kepler's name was a logical choice. The basic vision was to meet the needs for the future of humans, on Earth and in Space, with the dreams and skills of the Beyond Earth Think Tank to exploit the Law of Space Abundance.

The University began formal planning 1 January 2009. When fully operational, that vision will be pursued through the research, intelligence, and inspiration of dedicated faculty working with global scholars. Kepler Space Institute (KSI) and the Journal of Space Philosophy are two major foundation stones for the future Kepler Space University.



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## Letters to the Editor

**Editor's Introduction:** With this issue the Journal of Space Philosophy initiates "Letters-to-the-Editor." Readers or Authors may submit letters to [BobKrone@aol.com](mailto:BobKrone@aol.com). Letters can comment on past Journal articles or be thoughts related to philosophy for the Future for humans in Space. Publication decision lies with the Editors of the Journal. When published, letters will not be edited, but submitted letters may be returned to authors for edit consideration before publishing.

In this Spring 2013 issue there are two important letters:

1. **From Dr. Joel Isaacson.** His letter provides results of discussion within the Cybercom Community of scientists on his "Nature's Cosmic Intelligence" article, published as the feature article in the Fall 2012 Journal of Space Philosophy, which describes his life's discovery and research into Recursive Distinctioning (RD). His discoveries have given the world of science INTELLIGENCE as the third major autonomous phenomena existing in the universe with ENERGY and MATTER.

2. **From Dr. Phil Harris.** Dr. Harris, one of the planet's most productive professional management and Space authors, having published 53 books, provides his letter to President Barack Obama, urging his Administration in his second term of office to focus on the resources of Space to solve United States and global problems.

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Dear Editor,

In the first issue of JSP, I introduced the notion of recursive distinctioning (RD) and wove it into nature's cosmic intelligence. During the weeks since, a number of new connections have arisen which link RD to quantum computing emulation within tiny structures inside neurons in the brain. The following summarize these developments.

The story starts about 75 years ago in some unlikely places and times.

The Majorana fermion (MF) is an elusive particle that was predicted in 1937 by Ettore Majorana, an Italian mathematician and theoretical physicist. It was pure mathematical speculation, based on the theoretical work of Paul Dirac.

The MF is the only elementary fermion that is its own antiparticle. This leads to exotic properties in that two interacting MFs may yield either a single MF or cause mutual annihilation. Logically, two distinct outcomes are possible, with 50% chance for either outcome. In quantum domains, things of this nature are quite common, for example, see Schrödinger's cat.

The MF particle was on the back burner for a long time, until people realized recently that it might be useful in quantum computation.

Early last year a group of Dutch experimental physicists announced detection of MF.

If we focus on the simplest RD, i.e., RD that operates on a single element (call it RD[1]), we discover that RD[1] always transforms a “thing” into itself in such a way that the thing is in one of two possible implied states. This is logically similar to having an UP or DOWN spin, in alternation. Thus RD[1] operates like an oscillator, or an elementary clock, and mimics MF.

Where can RD[1] be realized? This takes us into a fantastic journey within neurons in the brain, inside the domain of microtubules. What are microtubules?

Microtubules are parts of the cytoskeleton of the cytoplasm of all eukaryotic cells, including neurons. They are far more numerous than neurons and if these can do certain computations then the overall capacity of the brain to compute would be far greater than with neurons alone. Why do we think that microtubules can compute?

Microtubules have a very regular structure. The basic components are tubulins, which are two protein dimers, alpha-tubulin and beta-tubulin. The tubulins are arranged in a 2-D lattice that is wrapped into a tubular structure. About 30 years ago, Stuart Hameroff and others suggested that microtubules can do cellular automata computations. If so, they could do RD too.

Subsequently, Stuart Hameroff and Roger Penrose argued that microtubules can do quantum computing but they ran into great difficulty with that concept, partly because of decoherence effects.

Our concept is that microtubules can do emulation of quantum computing, via classical computation, that is based on RD processes, which in turn are based on CA.

The number of microtubules (within neurons) is fantastic and their sizes are at nano-scales. So, this emulation may be a very efficient computation, even if slower than direct quantum computing. Interestingly, in this architecture, the microtubules become the computing elements (zillions of concurrent CPUs), while neurons assume the I/O functionality.

The computational resources in microtubules, compared to neurons alone, are staggering. In synaptic switching, the numbers come out this way. Roughly  $10^{11}$  neurons in the human brain, with  $10^3$  synapses per neuron. Speed of switching is measured to be about one millisecond, thus about  $10^3$  operations per second, or approximately  $10^{17}$  bit states per second.

For microtubules automata, the scales are quite different and the computing power is staggering. These are the numbers. A single neuron contains  $10^7$  tubulins (which are the active switching elements in microtubules automata). Speed of switching is one nanosecond, so that the estimate is  $10^{16}$  operations per second per single neuron. For a

brain containing  $10^{11}$  neurons, the total computing capacity (via microtubules automata) is  $10^{27}$  operations per second, compared to  $10^{17}$  for neuronal/synaptic alone. They differ by a factor of  $10^{10}$ !!!

There is considerable activity in emulation of quantum automata, using a variety of techniques, including hardware, software, and firmware. Some of these emulate quantum superposition and even entanglement.

There is also literature discussing “microtubules automata,” and of course discussion of the Penrose/Hameroff quantum computing within microtubules.

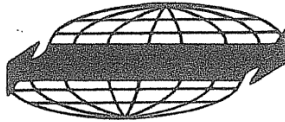
The possibility of CA in microtubules (as classical computation) meets very little resistance, if any. I adopt this notion and propose to look for RD in microtubules. RD[1], if confirmed in microtubules, would establish MF-like events therein and would be the first step toward quantum computing-like events in microtubules.

RD theory is gaining credence and its relevance to Nature’s cosmic intelligence is being enhanced.

Joel D. Isaacson, PhD

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MANAGEMENT OF CHANGE

**HARRIS INTERNATIONAL**  
CONSULTANTS TO MANAGEMENT ON ORGANIZATION & HUMAN RESOURCE DEVELOPMENT

January 22, 2013

**PHILIP R. HARRIS, Ph.D**  
PRESIDENT  
MANAGEMENT / SPACE  
PSYCHOLOGIST / AUTHOR

President and Mrs. Barack Obama  
THE WHITE HOUSE, Washington, DC 20500

Dear Barak and Michelle:

Today I celebrate my 87<sup>th</sup> birthday in the glow of your re-election and second inaugural. Your superb inaugural address yesterday was another example of your *audacity of hope!* May you gain the skill of synergistic relations to convince Republicans in Congress to enact your ambitious agenda. The goals you set forth for climate change, gun control, immigration reform, and economic recovery are indeed admirable. If you manage to get such reforms passed into legislation, then you are likely to achieve my prediction of your becoming one of our greatest American presidents, on a par with Washington and Lincoln.

However, there was one omission in your renewal plans for our beloved country. Thus, I hope one of your aides will ensure that you read this missive. The goal that you fail to address is the utilization of space resources which could remove poverty on this planet and provide new jobs. Originally, I brought this critical issue to your attention in my letter of July 4, 2008 while expressing support for your first campaign. Subsequently, I sent a copy of my book, *Space Enterprise*, to your wife on October 8, 2008, so that she would encourage you to read its message. However, in your first term, the vision you expressed for space development was befuddled.

Before you finish your second term, perhaps you will consider issuing an executive order to your NASA administrator that will utilize lunar resources on behalf of humanity! The American taxpayers deserve an ROI on their considerable investment in the Apollo missions to the Moon. The new space industry of communication satellites is only the beginning in that regard. Your General Bolden and Secretary of State Kerry require your instructions to forge new international agreements on commercial lunar development with China, India, and out national partners in ISS. Together this global community needs to establish a memorial of our going offworld – an Apollo Lunar Industrial Park on the Moon by year 2025 ! To achieve that objective, I recommend four exceptional consultants for help with such a macroproject – Dr. David Schunk (EM=docscilaw@aol.com); Dr. George Robinson (EM: astrolaw@aol.com); Steve Durst (EM=info@iloa.org); and Derek Webber (DWspace@aol.com). World space advocates have great hopes for your second term accomplishments beyond Earth!

Pax, *Philip Robert Harris*

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## Space Education, Learning, and Leading

By Joseph Sobodowski

**Editor's Introduction:** The consensus of the Kepler Space Institute Team is that Space Education, Learning, and Leading covers the most important subjects for the future of Space Exploration, Development, and Settlement. It is a huge research, academic, and practical subject. For that reason, we have identified it as "*The Feature Subject*" for this Spring 2013 issue of the Journal of Space Philosophy. We were delighted when Joseph Sobodowski said; "*I'll do it.*" During his entire professional career in the United States Air Force followed by teaching, research, and industry, he has been an avid self-educator, learner, and leader. In our planning for this feature subject it became clear that this first short article can only be a springboard for permanent research and documentation. So, our editorial decision was to open the subject to readers and ask for volunteers to join the *KSI Space Education, Learning, and Leading Team*. Joseph Sobodowski starts that super-project with the following thoughts and questions. Readers please send your thoughts to [sobodowski@aol.com](mailto:sobodowski@aol.com) and [bobkrone@aol.com](mailto:bobkrone@aol.com)

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***Learning is the only thing the mind never exhausts, never fears, and never regrets. It is one thing that will never fail us. (Leonardo da Vinci, 1452-1519)***

One important research question for this complex subject is:

***How can Space education be designed to prevent Earth's failures being exported to Space?***

### **Lessons from Earth's Education**

One billion of the Earth's seven billion people are illiterate. Illiteracy and poverty have a high correlation. Most of Earth's long-standing social, economic, and political problems could be reduced or solved with improved education. Tyrants control the uneducated in their societies through fear and propaganda to make them dependent followers through influencing their thinking and beliefs. There is education on Earth that can be defined as Education for self-serving, greedy, and/or evil motives.

Education is too often designed to benefit the educators at the expense of students. During my more than 33 years in Education, I have offered hundreds of students who were training to become math teachers \$50 if they could explain why  $-1 \text{ times } +5 \text{ equals } -5$  without quoting any rules. One student came close, but still could not answer the question. I have repeatedly asked students if they knew how to count. Of course everyone said "yes". So, I asked them to count in base 5. Can you imagine the response?

Over the years we have trained students to regurgitate or parrot information provided by highly motivated and dedicated teachers. It is my judgment that those days need to close. Not the highly motivated and dedicated aspect, but rather the regurgitation and parroting part. As young child I learned to count. Numbers started with 1. It was very gratifying to be able to count to 10. To my surprise, when I started kindergarten, the chart that was on the wall, just above the chalk board (can you imagine such a thing... a chalk board?) actually started with ZERO. No one explained why. It was just a rule.

So much of education is predicated on rules without explanation. English is the only language in the world where “fat chance” and “slim chance” mean the same thing. It is somewhat like students being allowed to develop their individuality as long as they comply with the teacher’s model. Interesting... Many years ago, Simon and Garfunkel recorded *Scarborough Fair*. I have been amazed at the intellectual prowess many educators have displayed by their explanations of the allegorical meaning of the phrase “Parsley, Sage, Rosemary, and Thyme”. One day, I happened to catch an interview with one of the two singers (I don’t remember which one) and when asked the meaning of the phrase, responded that there was no meaning. The words may in fact have been borrowed from a 19th-century ballad. The point is that many have attributed complex allegorical meanings to something that in all probability was never intended.

In the early days, Western Higher Education was of a liberal arts nature and was primarily focused on preparing people for the clergy. If an individual wanted to be a doctor or some other technical profession, he served as an apprentice to a skilled practitioner. Obviously, that changed with time and culture. However, generally speaking the premise holds true.

The Industrial Revolution brought about great changes in virtually every aspect of life. If an artist wanted to paint a train leaving the station, he or she had to paint pretty fast. Time was very limited because in the train would be gone. This 19th-century art movement originated with a group of Paris-based artists. Their brush strokes were such that they accentuated light and the passage of time. Please forgive the oversimplification, but the fact is that changes in culture brought about changes in Art and it has continued ever since....

The reader might wonder how all this relates to education as we contemplate how to explore, commercialize, and colonize space. The answer is simple. Education must adapt to the ever changing situation at hand.

Consider the situation here on Earth: poor or no education undermines security and progress for individuals and nations. It is a societal failure in many parts of the world as the 21st Century begins. When people lose freedom and are deprived of education, they lose humanity and become liabilities to themselves and others.

If those education inadequacies are transported to the development and settlement of humans in Space, the seeds of failure will be planted. The positive progress of science, technology, and education has made the Space Age possible. Radical new ideas are

needed for human settlement in Space. The *Journal of Space Philosophy* is dedicated, inter alia, to surface and document those ideas.

### **Why Education in Space Can Be Different**

In summary, Space now is a vacuum of human society. There is no history of tribal to national conflict and wars. There is no history of human enemies in Space. The errors of human society and politics on Earth are lessons for the design of human settlements in Space. The challenge for Earth's leadership in the 21st Century is to understand the importance of Space and to collaborate to create the needed innovations. The past fifty years of international collaboration leading to today's achievements in Space is evidence that it can be done. The purpose of the last century of Space exploration has been to learn about Space. Humans settling in Space will create radically new habitats which may, over time, become more important than Earth for the ultimate development of homo sapiens men and women in this completely new environment.

### **The Philosophy for Space Education**

On April 21, 2008, astrophysicist Stephen Hawking called for an era of Space conquest, stating:

*Spreading out into Space will have an even greater effect than Christopher Columbus' discovery of the New World. It will completely change the future of the human race and maybe determine whether we have any future at all.*

Since the purpose of this *Journal of Space Philosophy* is to be the stimulus for new research into all the philosophically related aspects of Space exploration, development, and human settlement, this essay will simply list some potential fundamental principles for Space education needs:

- Knowledge will be immediately available to everyone.
- Education on biological and cognitive adaptability.
- Education should be designed for the individual needs and capabilities of every student or scholar.
- Education should be a major subject of policymaking for any future Space mission or project.
- Education for Leadership – beginning with Moral and Ethical Codes.
- Education for a new discipline of Space Policy Sciences.
- Education for increasing the movement from theory to practice.
- Science and technology education.
- Education to implement the Law of Space Abundance for the benefit of Earth and Earth's people.
- Education for continual quality and performance improvement of education, learning and leading.

*By the way... Why does -1 times +5 equal -5? Rules are not allowed...*

**Readers' inputs are solicited.**

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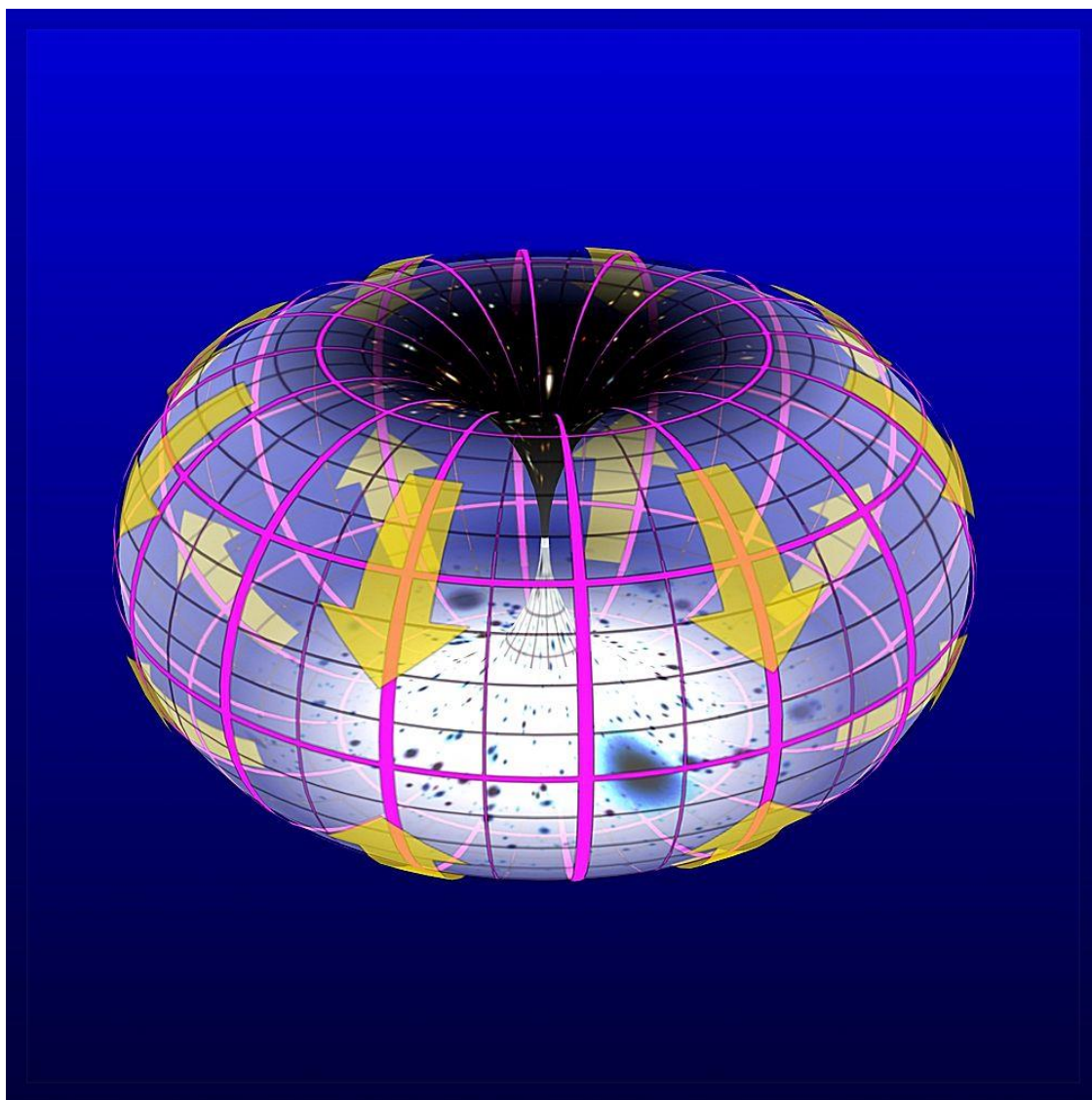
**About the Author:** Joseph Sobodowski has achieved success in business and education through his personal consistent study, hard work, and creativity. Presently he is the Chief Executive Officer of two engineering corporations – SmartFleet, Inc. and Fleet Engineering, Inc. That leadership caps 35 years in the corporate environment. He shared his time in that period with teaching in universities and colleges in Florida. His successes in the classroom got the attention of the Superintendent of the Miami-Dade County Public Schools and led to work as the Director of Workforce Development; successes there propelled him into the implementation of Performance-Based Incentive Funding for Miami-Dade County. His career as an educator included being on the Faculty of Florida State University's Development Research School in Tallahassee. While there he created an award-winning unique engineering program where students collaborated with a local FBO at the Tallahassee Regional Airport. Joe has been a licensed pilot through his adult life and this program was the only one of its kind in the United States.



**Editor's Notes:** A major reason for Mr. Sobodowski's remarkable successes in the business world is his learning-about-learning beginning as a young Airman in the United States Air Force. He became an educator in the Air Force, then spent 33 years as a Secondary Educator, Visiting Associate Professor of Electrical Engineering Technology at Florida International University and as Adjunct Professor at Miami-Dade Community College. Joe accepted our invitation to be a member of the Board of Directors of Kepler Space Institute. He was the logical choice to contribute his "*Philosophy for Space Education*" article to our first issue of the Journal of Space Philosophy. *Bob Krone, PhD.*

# What is Dark Energy? A Toroidal Model of the Cosmos The Big Bagel

By Howard Bloom



(Illustration: Bryan Brandenburg)

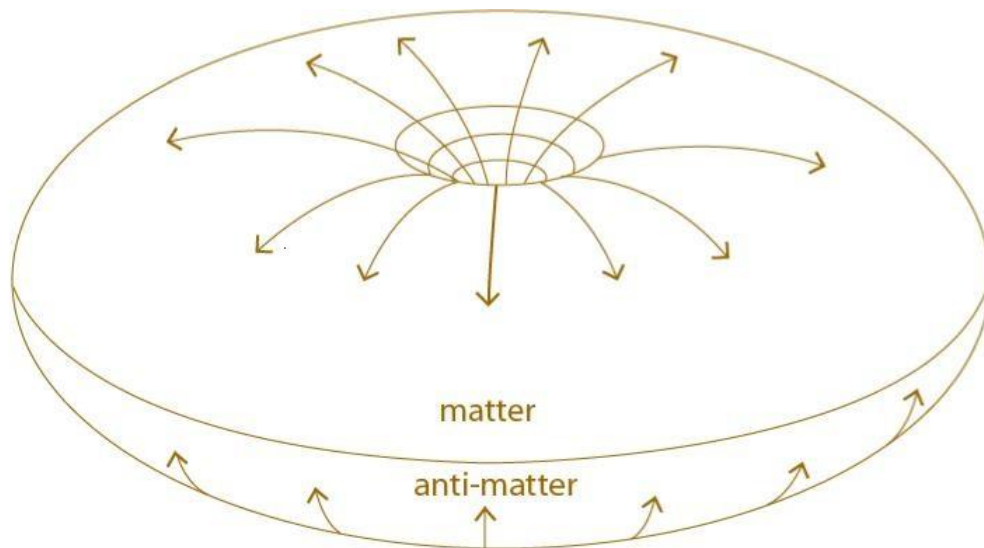


Big Bagel Theory, the Bloom Toroidal Model of the cosmos, is a theory of the beginning, middle, and end of the cosmos. A theory that explains Dark Energy.

Among the many brain-teasers in current science are these:

- 1) If matter and anti-matter are created simultaneously in equal amounts, why is there so much matter in this universe and so little anti-matter (the parity problem)? And
- 2) What the heck is dark energy?

The Bloom Toroidal Model of the Universe, aka The Big Bagel, answers both of these questions. And it makes an ominous prediction. According to standard cosmological models, the end of the universe is roughly 100 trillion years away. But according to the Bloom Toroidal Model, the end may be a mere 1.68 billion years down the road.



(Illustration: Sabine Allaey)

Big Bagel Theory was conceived in 1959, while I was a 16-year-old working at the world's then-largest cancer research facility, the Roswell Park Memorial Institute in Buffalo, NY. I was brainstorming with other Roswell Parkers daily during lunch breaks in the cafeteria on the implications of CPT (charge, parity, and time) symmetry. At the end of the summer, I put the finishing touches on a toroidal theory of the cosmos, Big Bagel Theory, then threw it away, convinced that it was comic-book science. But the theory contained two implicit predictions. And those predictions proved to be accurate.

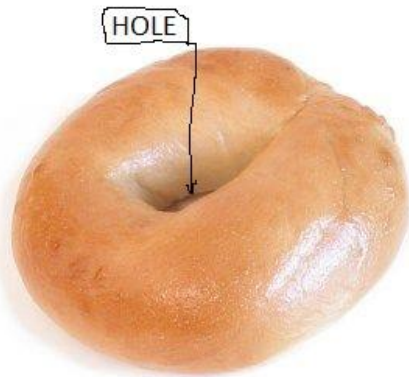
Big Bagel Theory implied an extremely rapid expansion of the universe immediately after the Big Bang, then a slowdown to a more leisurely pace.

In 1980, 21 years after the Big Bagel was conceived, Alan Guth's theory of inflation agreed with prediction number one... an extremely rapid expansion followed by less haste.

Big Bagel Theory also implied that at a certain point, the universe would begin to accelerate away from itself. It implied that the pace of cosmic expansion would pick up and keep adding more speed. That prediction proved accurate in September 1998, 38 years after Big Bagel was conceived, when Reiss et al. found that the cosmos was increasing in its rate of expansion. It was speeding up, accelerating.<sup>1</sup>

And the Big Bagel gained even more credence a few months after the Reiss discovery when the astronomical community came up with yet another finding. The acceleration started roughly 7.7 billion years into the cosmos's existence, 7.7 billion years ABB, seven billion seven-hundred million years after the big bang.<sup>2</sup>

These discoveries left a question. A huge one. Acceleration takes energy. Where does the energy hastening the cosmos's flight away from itself come from? To answer that question, the physics community resurrected the Cosmological Constant and invented the concept of Dark Energy. But neither of those moves explained where the energy jack-rabbling the cosmos comes from. Big Bagel theory does.



How does Big Bagel Theory work? Imagine a bagel with one of those anally retentive, infinitesimally tiny holes. Your bagel is an Einsteinian manifold, a sheet of time, space, and gravity. It is 13.72 billion years ago. An explosion spurts abruptly from the bagel's hole. Rocketing up the bagel's topside is a big bang of matter. Normal matter. But gushing from the hole on the bottom is an equal and opposite, a big bang of anti-matter. That is where all the anti-matter goes.

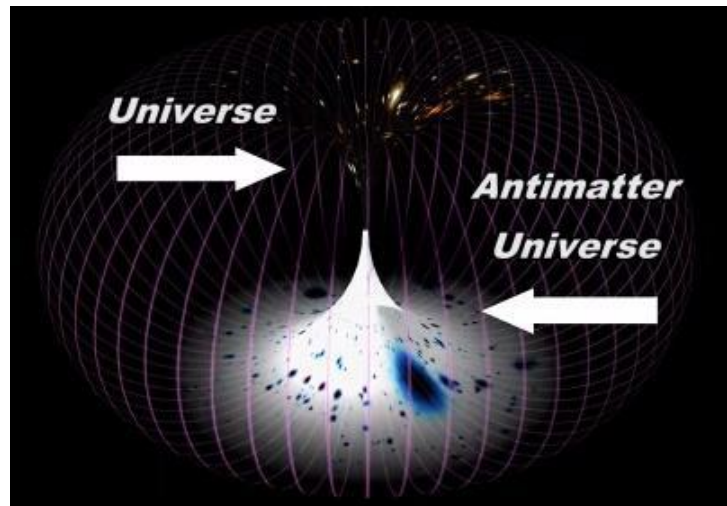
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<sup>1</sup> Adam G. Reiss et al., "Observational Evidence from Supernovae for an Accelerating Universe and a Cosmological Constant," *Astronomical Journal* 116, no. 3 (September 1998): 1009-38.

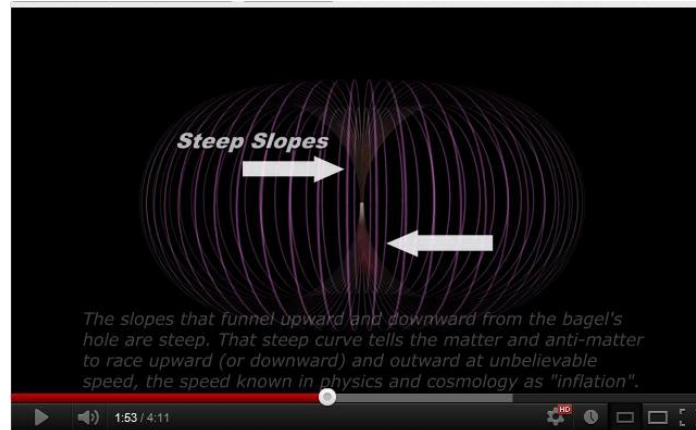
<sup>2</sup> Adam G. Riess and Michael S. Turner, "The Expanding Universe: From Slowdown to Speed Up," *Scientific American*, September 23, 2008, [www.scientificamerican.com/article.cfm?id=expanding-universe-slows-then-speeds](http://www.scientificamerican.com/article.cfm?id=expanding-universe-slows-then-speeds) (accessed September 10, 2011).



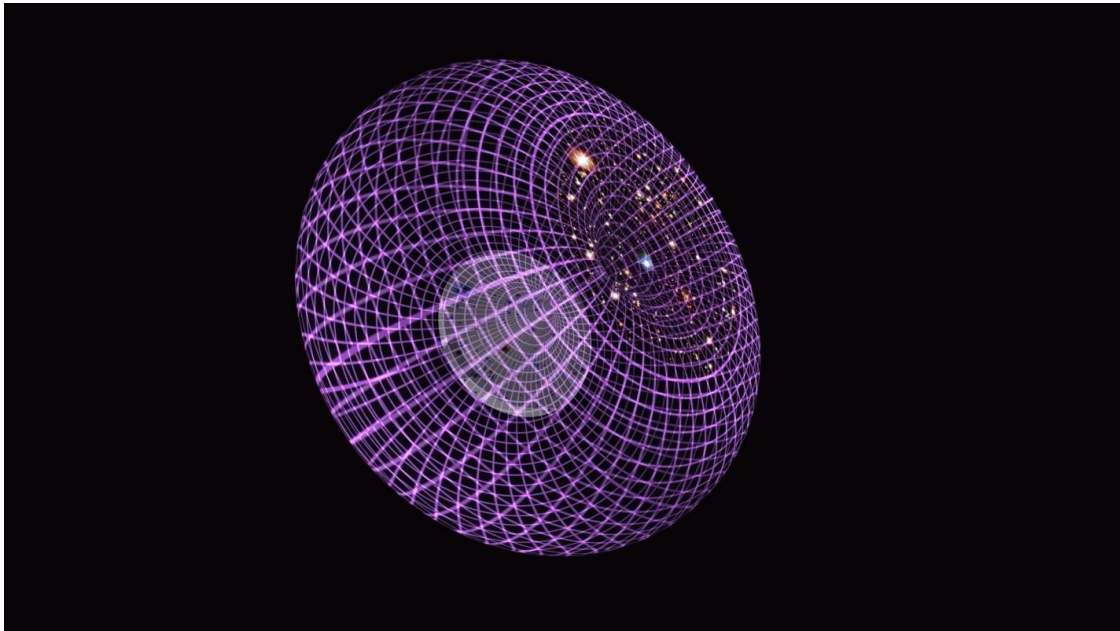
(Illustrations above and below: Bryan Brandenburg)



In Einsteinian manifolds, the shape of space tells matter how to move. A steep slope says move fast. Rush. Race. Speed. The slopes that funnel upward and downward from the bagel's hole are steep. That steep curve tells the matter and anti-matter universes to race upward (or downward) and outward at unbelievable speed, the speed known in cosmology as inflation.



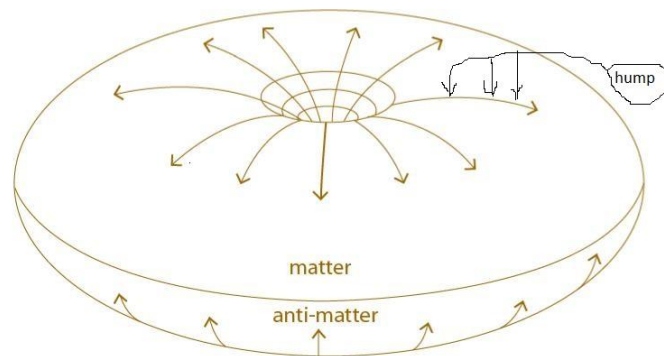
A still from the Bryan Brandenburg animation of Big Bagel Theory on YouTube:  
[www.youtube.com/watch?v=wdJyafSBCb0](http://www.youtube.com/watch?v=wdJyafSBCb0)



(Illustration: Bryan Brandenburg)

Note the sparkle of the normal matter universe on top. And keep your eye peeled for that white gush on the bottom—the anti-matter universe.

But the traveling orders that space gives to matter change as the two universes approach the flatness of the bagel's upper and under hump. The leveling, horizontal curve of space dictates a more leisurely pace. Like a cannonball reaching the high point of its curve, the universe and anti-matter universe begin to run out of the energy that has shot them apart from each other.



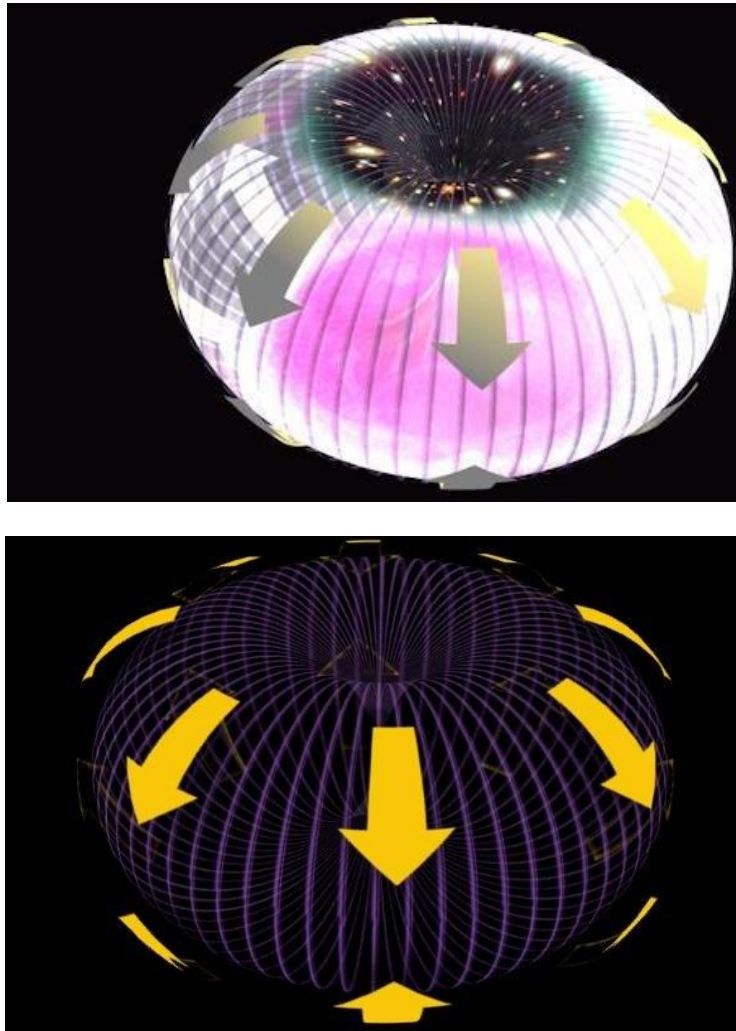
(Illustration: Sabine Allaey)

Which leads to the second physics question of the day. What is dark energy? The two universes reach the bagel's high and low point at the 7.7 billion year mark. Then the downward slope of the bagel tells them to speed up again. Why do they accelerate? Where does the extra energy that rushes galaxies apart from each other come from? The answer? Gravity.



Screenshot from Big Bagel video at [www.youtube.com/watch?v=wdJyafSBCb0](http://www.youtube.com/watch?v=wdJyafSBCb0)  
(Video: Bryan Brandenburg)

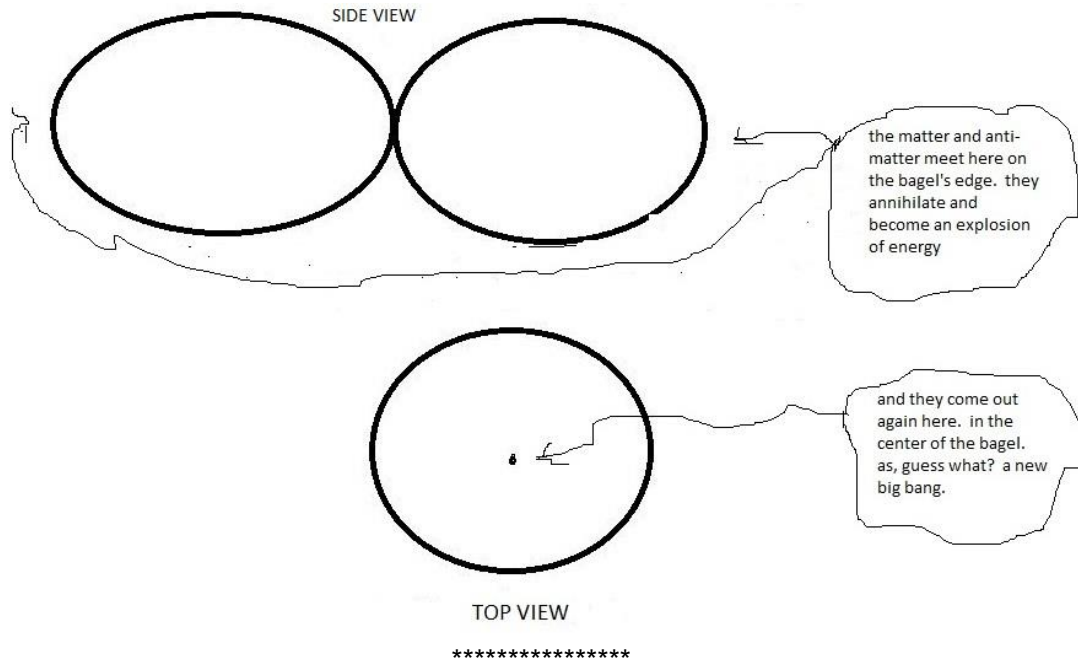
As it slips down the bagel's outer slope, the normal universe falls under the seductive sway of the anti-matter universe's gravity and speeds up. And the anti-matter universe is caught by the come-hither power of the matter universe's gravity. It, too, speeds up.



(Illustrations: Bryan Brandenburg)

How will the universe end? At the bagel's outer edge, the two equal but opposite universes will meet and do what matter and anti-matter always do. They will annihilate. But here is the trick. They will annihilate in a burst of energy. And thanks to a topological trick, the bagel's outer rim is also its center. So the explosion of annihilation will be, guess what? The next big bang.





Where are we on the bagel in 2012? We passed the bagel's hump 6.02 billion years ago, which puts us perilously close to the big smash at the bagel's outer edge. Roughly 1.68 billion years from that smash.

That is it: the Big Bagel. A Bagel that explains dark energy. A Bagel whose shape hints that the end of the cosmos may be nigh.

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Is there support for the big bagel model? In 1984 at the Landau Institute in Moscow, Dr. Alexei Starobinski studied the data available at that point on the cosmic microwave background radiation and concluded, in the words of the *New York Times*, "that the universe could have been born as a doughnut."<sup>3</sup>

In 2003, Max Tegmark, then a cosmologist at the University of Pennsylvania, now at MIT, used far more sophisticated data on the fluctuations in the cosmic background radiation, data from NASA's Wilkinson Microwave Anisotropy Probe, to consider toroidal models in articles in *Science*<sup>4</sup> and in one of the top journals in physics, the *American*

<sup>3</sup> Dennis Overbye, "Universe as Doughnut: New Data, New Debate," *New York Times*, March 11, 2003, [www.nytimes.com/2003/03/11/science/universe-as-doughnut-new-data-new-debate.html](http://www.nytimes.com/2003/03/11/science/universe-as-doughnut-new-data-new-debate.html) (accessed April 16, 2011).

<sup>4</sup> M. Tegmark, "Measuring Spacetime: From the Big Bang to Black Holes," *Science*, May 24, 2002, 1427-33.

Physical Society's *Physical Review D*.<sup>5</sup> Tegmark's work and that of many others hit the *New York Times* in a March 11, 2003 story headlined "Universe as a Doughnut: New Data, New Debate." But in the end, Tegmark "ruled out" what even he called the "bagel" model.<sup>6</sup>

Then the cosmic doughnut hit the headlines again in 2008, this time on the prestige British science journal *Nature's* news site. A German team led by Frank Steiner had run the data from the Wilkinson Microwave Anisotropy Probe through four different forms of analysis<sup>7</sup> and had concluded that "the doughnut gave the best match to the Wilkinson Microwave Anisotropy Probe data."<sup>8</sup>

So the toroidal shape, the bagel shape, was being kicked around. Not in the form I proposed it. Not with two universe separating, then crunching together again. But nonetheless the bagel was in play.

Then there is another aspect of the big bagel theory, the idea of two universes on two separate surfaces saying goodbye to each other and eventually getting back together again: the idea of the matter universe climbing from the bagel's hole up its topside and the antimatter universe sliding down from the hole on the bagel's bottom side.

Several concepts arose that support the notion of two universes on different but adjacent surfaces. Surfaces like the bagel's bottom and the bagel's top. One is the idea of a Saran Wrappish sort of surface that comes from string theory. It's called a brane—named for a membrane. A brane is thin, like plastic wrap. And an entire universe rides on each brane, on each Saran Wrappish sheet.

Princeton's Paul Steinhardt and the director of the Perimeter Institute, Neil Turok, have one brane-based theory that is very reminiscent of the big bagel.<sup>9</sup> In Steinhardt and Turok's model, there are two of these plastic-wrap thin branes. There are two universes a hair's breadth apart. They are separate universes, blithely unaware of each other's existence. Unaware except for one small fact. Dark Energy is a force that pulls them together. Periodically they bump into each other. Yes, every once in a while they collide. And each time they collide, they set off a big bang whose energy sends them rushing away from each other again. So they alternate between big bangs and big crashes. As it says in my 2012 book *The God Problem: How a Godless Cosmos Creates*, "Does this sound big bagelish?"<sup>10</sup>

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<sup>5</sup> A. de Oliveira-Costa, M. Tegmark, M. Zaldarriaga, and Andrew Hamilton, "Significance of the largest scale CMB fluctuations in WMAP," *Physical Review D* 69, 063516 (2004).

<sup>6</sup> Ibid.

<sup>7</sup> Ralf Aurich et al., "Do We Live in a 'Small Universe'?" *Classical Quantum Gravity*, June 21, 2008.

<sup>8</sup> Zeeya Merali, "Doughnut-Shaped Universe Bites Back: Astronomers Say Universe is Small and Finite," *Nature*, May 23, 2008.

<sup>9</sup> Paul L. McFadden, Neil Turok, and Paul J. Steinhardt, "Solution of a Braneworld Big Crunch/Big Bang Cosmology," *Physical Review D* 76, 104038 (2007); Ron Cowen, "Pre-Bang Branes and Bubbles: What Happened Before the Big Bang?" *Science News*, April 23rd, 2011, 22.

<sup>10</sup> Op. cit., 550.

What's more, there are existing cyclic models of the cosmos.<sup>11</sup> Models in which the cosmos annihilates, then is reborn in a new big bang. Martin Bojowald's cosmos<sup>12</sup> is one of these. The University of Pennsylvania loop quantum gravity cosmologist proposes a model in which "branes approach collision and bounce back without actual collision."<sup>13</sup> That near head-on crash ends one universe and starts another one.

In another line of thought that supports the Bloom Toroidal Model, New York University's Georgi Dvali<sup>14</sup> suggests that gravity may leak from branes, an idea that goes one more small step toward the idea that separate universes on separate branes may be able to communicate with each other. One small step toward a universe on the top of a bagel beckoning to a universe on the underside with gravity.

Then there is Alexander Kashlinsky, a senior staff scientist at NASA's Goddard Space Center, who has measured the motion of nearly eight hundred galaxy clusters against the backdrop of the cosmic background radiation and has spotted what he calls "dark flow"—a speed-rush of galaxies that seems to defy the assumptions of what is called the "conventional model" of the cosmos. This rush of galaxies seems to be hurrying toward a goal, and, to Kashlinsky, it seems to hint at something "tugging" on them.

And cosmologists like Anthony Aguirre of the University of California, Santa Cruz, believe that if dark flow is for real, it could be evidence for what Aguirre calls "other universes." Could Kashlinsky's tug come from the pull of just one other universe—an antimatter universe on the bottom of the bagel?<sup>15</sup> And could the antimatter cosmos on the underside of the bagel be responsible for the galaxies' unaccountable speed?

The bottom line? There are a lot of cyclic universe theories doing the rounds. But the big bagel appears to be alone in something crucial: explaining dark energy.

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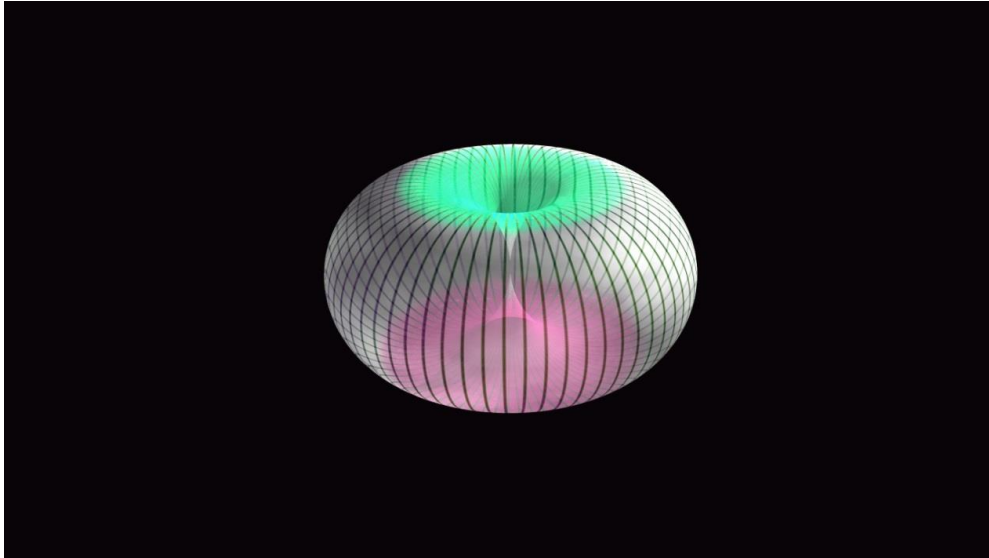
<sup>11</sup> Roger Penrose, *Cycles Of Time: An Extraordinary New View of the Universe* (New York: Random House, 2011); Theo Koupelis, *In Quest of the Universe* (Sudbury MA: Jones & Bartlett, 2011), 532.

<sup>12</sup> Martin Bojowald, *Once Before Time: A Whole Story of the Universe* (New York: Knopf, 2010, Kindle Edition).

<sup>13</sup> Martin Bojowald, Roy Maartens, and Parampreet Singh, "Loop Quantum Gravity and the Cyclic Universe," *Physical Review D* 70, 083517 (2004).

<sup>14</sup> Cédric Deffayet, Gia Dvali, and Gregory Gabadadze, "Accelerated Universe from Gravity Leaking to Extra Dimensions," *Physical Review D* 65, 044023 (2002); Ron Cowen, "Dark Doings Searching for Signs of a Force that May Be Everywhere... or Nowhere," *Science News Online*, May 22, 2004.

<sup>15</sup> Amanda Geffer, "Dark Flow: Proof of another Universe?" *New Scientist*, January 23, 2009, 50-53.



(Illustration: Bryan Brandenburg)

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**About the Author:** Howard K. Bloom is author of: *The Lucifer Principle: A Scientific Expedition into the Forces of History* (“mesmerizing”: *The Washington Post*), *Global Brain: The Evolution of Mass Mind From The Big Bang to the 21st Century* (“reassuring and sobering”: *The New Yorker*), *The Genius of the Beast: A Radical Re-Vision of Capitalism* (“Impressive, stimulating, and tremendously enjoyable”: James Fallows, *The Atlantic*), and *The God Problem: How A Godless Cosmos Creates* (“Bloom’s argument will rock your world”: Barbara Ehrenreich).



Photos by Jondi Whitis (left) and Radic Smykowski (right)

**Editor’s Notes:** Howard K. Bloom is a treasure to the Space Community. Author, Scientist, Founder of the Space Development Steering Committee, Publicist, Author on human evolution, Member of the Journal of Space Philosophy Board of Editors, and supporter of Kepler Space Institute and University since its founding. His bio is fascinating and part of it can be found at [www.en.wikipedia.org/wiki/Howard Bloom](http://www.en.wikipedia.org/wiki/Howard_Bloom).  
*Bob Krone, PhD.*

## **Deep Space II: Taking the Philosophy of the Overview Effect to its Logical Conclusions**

**By Frank White**

What is a “deep philosophy” and how is it different from any other philosophy? Wouldn’t we all consider our intellectual work to be “deep?” The answer is yes, in that when we approach any question from a philosophical point of view, we are committed to examining it in great depth.

In this essay, I am using the term “deep philosophy,” similar to the way the deep ecology movement has used “deep ecology” for the past 40 years. The term was introduced into the environmental movement in 1973 by Norwegian philosopher and mountaineer Arne Naess. He contrasted deep ecology with “shallow environmentalism,” pointing out that the latter focused its arguments on how caring for the environment would benefit human beings, but not necessarily the whole ecological system of which we are a part.<sup>1</sup>

Since there are many different facets to deep ecology, I am not advocating that we apply all of them to a philosophy of space exploration. In fact, there are some aspects of it that I would explicitly reject.

The key connection between “deep ecology” and “deep space” is that both terms are fundamentally non-anthropocentric. As noted in my previous essay for this journal, I discovered this idea while writing my book, *The Overview Effect: Space Exploration and Human Evolution*. At the beginning of the book, I had set out to define a philosophy for space exploration, but as I reached the end, I did not believe I had succeeded. It then occurred to me that most justifications for the space exploration enterprise focused on *benefits to human beings*. But what if our purpose is to more clearly to benefit the universe?

As I wrote in that essay, if we accept that philosophy [of space] only from the self-centered perspective of how space exploration will benefit humanity, it is incomplete. However, if we see ourselves as a holon, a part of a larger system (i.e., the Earth, solar system, galaxy, or beyond), then a more comprehensive philosophy emerges. We can then ask ourselves not only how space exploration benefits us but also how it might benefit those larger “overview systems” of which we are a part.<sup>2</sup>

For that particular essay, the title “Deep Space” seemed appropriate and I regarded the term as a double entendre. After writing it, I decided to look into deep ecology in more detail. It then became clear that that deep ecology took a parallel path to the philosophy of deep space.

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<sup>1</sup> Foundation for Deep Ecology, [www.deepecology.org/deepecology.htm](http://www.deepecology.org/deepecology.htm).

<sup>2</sup> Frank White, “Deep Space: The Philosophy of the Overview Effect,” *Journal of Space Philosophy* 1, No. 1 (Fall 2012): 27.

First and foremost, deep ecology sees every living being on the Earth as a valid entity unto itself. The original distinguishing characteristics of the deep ecology movement were its recognition of the inherent value of all living beings and the use of this view in shaping environmental policies.<sup>3</sup>

Deep ecology does not view human beings as the peak of evolution, nor as being inherently more important than any other living entity. This may sound like a new idea, but it is not utterly foreign to the human mind. For example, indigenous peoples view the world through this lens and have done so for thousands of years. The idea of the Earth being our mother is much more than a metaphor for them, such that the thought of injuring a parent is an anathema. In that sense, there are thousands of deep ecologists living on our planet today. Some of them are doing their best to let us know the error of our ways and how to get on a better path.

The idea of conquering nature and ruling over it for human benefit can be seen as ancient or recent, depending on where you look. For example, Genesis appears to advocate a conquest mentality when it says: "God blessed them, saying to them, 'Be fertile and multiply. Fill the Earth and subdue it.'"<sup>4</sup>

The notion that human beings could actually conquer nature and exploit the planet for their own purposes would have been unrealistic until a few hundred years ago, at the beginning of the Industrial Revolution. Even with the advent of complex civilizations like the Roman, Pre-Columbian, and Chinese empires, our technology proved insufficient to the task of dominating the environment.

Today, as our powers of control have grown stronger, a new environmental consciousness is rapidly emerging, much of it brought about by the Overview Effect. Seeing the Earth from orbit or the moon has had a profound impact on astronauts and terrestrial dwellers alike. In a matter of only a few decades, the environmental movement has made a major shift. It has moved from being a fringe concept into a mainstream consensus.<sup>5</sup>

Deep ecology is something more. It represents a reaction not only to exploitation of the natural world but also to environmentalism that continues to focus on ends that benefit humankind. In its most extreme form, the concept can appear to be "anti-human," evolving into a philosophy that sees the world as being ecologically in balance, except for the human factor. Sadly, it is all too true that we humans can be a disruptive force, by hunting animals to extinction, polluting the atmosphere with excess carbon dioxide, and burning down our rain forests.

In developing the philosophy of deep space, we can and should move away from an anthropocentric view of human purpose in the universe. However, we can also view humans as a positive force in the cosmos, rather than as the primary problem.

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<sup>3</sup> Foundation for Deep Ecology.

<sup>4</sup> Genesis 1:28, New American Bible, Revised (*The Catholic Study Bible*).

<sup>5</sup> R. Poole, *Earthrise: How Man First Saw the Earth* (New Haven, CT: Yale University Press, 2008), 198.



### **A Positive View of Human Purpose**

As humans evolve into the universe, the cosmos itself will also evolve. I call this the “Cosma Hypothesis.” The basic thesis for this hypothesis is that the universe, as the largest whole system we can perceive, evolves. It does so because its parts evolve, human beings and human systems included. The Gaia Hypothesis—a theory advanced by James Lovelock—helped us see Earth as a living system. This theory inspired me to develop the Cosma Hypothesis.

In writing about Gaia, Lovelock said that *Homo sapiens* had “vastly increased Gaia’s range of perception.” He also said: “Gaia is now awake, and aware of herself. She has seen the reflection of her fair face through the eyes of astronauts and through the television cameras of orbiting spacecraft.”<sup>6</sup>

This is a remarkable statement. While calling Gaia “awake and aware of herself” may seem at first glance to be a simple metaphor, it actually describes a monumental benchmark in consciousness that human evolution has brought into being.

It would be useful if the Cosma Hypothesis could function in the same revelatory way for the universe as the Gaia Hypothesis has for the Earth. Within this context, I believe that the common denominator between the Gaia and Cosma theories is “awareness.”

To understand this concept, consider that when we began sending humans and satellites into orbit and to the moon, we created an “overview system.” Prior to these technological achievements, Earth had been the “world” for us and for itself. We couldn’t actually see it any more than a fish can see the water in which it swims.

However, once we experienced the Overview Effect, Earth became established as a planetary entity—both in how we perceived it and how we functioned within its biosphere. We tend to focus on this shift as a fundamental change in human awareness (and it is), but since humans are now aware components of the system, this opens new possibilities for initiating profound changes in the system as well.

The Earth as an overview system has now achieved a level of awareness that could not have existed before the Space Age. I have described this new, enlightened overview system as “Terra,” to distinguish it from “Gaia.” Terra consists of a physical system (Earth), a living system (Gaia), a human system (humanity), and a technological system (*technos*). Please note that this is not an abstract metaphysical statement claiming that the Earth has self-awareness. Rather, that the system of which the Earth is a part has achieved that consciousness through human beings.<sup>7</sup>

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<sup>6</sup> Frank White, *The Overview Effect: Space Exploration and Human Evolution* (Reston, VA: American Institute of Aeronautics and Astronautics, 1998), 108.

<sup>7</sup> *Ibid.*, 108. Another term commonly used for the part/whole relationship that characterizes the overview system is “holon.” Also, another term often used interchangeably with awareness is “consciousness,” which can be problematic for some people. I find it useful to assume that every entity in the universe has a level of consciousness or awareness that is defined by its information-processing capability. The more complex its capability, the more aware or conscious it is.

As humans spread out into the solar system, we will inevitably create new overview systems. The first one might be called “Solarius,” which will include everything that Gaia includes, plus a new spacefaring species, *homo spaciens*.<sup>8</sup> *Homo spaciens* will, like *homo sapiens*, eventually have an overview of the entire solar system. At that point in time, Solarius will become aware of itself.

We almost have the Solarius equivalent of those first views of the Earth from orbit and the moon in the picture taken from the edge of the solar system by the Voyager spacecraft. Carl Sagan called the Earth as seen in this photo “a pale blue dot” and said of that perspective: “Look again at that dot. That’s here. That’s home. That’s us. On it, everyone you love, everyone you know, everyone you ever heard of, every human being who ever was, lived out their lives.”<sup>9</sup>

The pale blue dot image represents a strong counterpoint to any anthropomorphic vision of space exploration. As Sagan points out, all of the past, present, and future, everything we have ever been and done is summed up in a small point of light that is barely noticeable, even within the confines of the solar system.

While this photo does not quite represent a picture of the entire solar system, it does remind us that while the Earth itself is a whole system as seen from orbit, it is also a part of a larger whole system when seen from an even greater distance.

This system is the solar system, and in the words of physicist and science broadcaster Brian Cox, this is the real environment for humanity now. Speaking of the exploration of the solar system that has taken place to date, he says: “Mission by mission, piece by piece, we have learnt that our environment does not stop at the top of our atmosphere.”<sup>10</sup>

We can begin to look ahead to a “galactic overview system” that might be called Galaxia, although at our current level of technology, we do not yet have the means to expand physically beyond the solar system, except through generational starships.

However, if the search for extraterrestrial intelligence (SETI) succeeds, we may begin to communicate with other inhabitants of our galaxy. Assuming that we do eventually make contact with other lifeforms, we and they together will constitute the embryonic beginning of yet another “overview system.”<sup>11</sup>

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<sup>8</sup> *Ibid.*, 109.

<sup>9</sup> Carl Sagan, *Pale Blue Dot: A Vision of the Human Future in Space* (New York: Ballantine Books, 1997), 6.

<sup>10</sup> Brian Cox, *The Wonders of the Solar System* (London: HarperCollins, 2010), 9.

<sup>11</sup> Isaac Asimov wrote a novel about this some years ago, in which individual human minds became a part of an “overmind” and he called it Galaxia as well. This is an ultimate extension of the deep space philosophy, and of a non-anthropocentric view of space exploration. I imagine it will be uncomfortable for many of us to accept, but it is an alternative that must be considered as we search for the ultimate “philosophy of space.”

Beyond Galaxia lies Cosma, the ultimate overview system. At this time in history, we do not know enough to understand the evolution of the universe, or the part we might play in it. How can we shift from our current self-centered and individualistic view of existence to a view of ourselves as part of the great adventure of cosmic evolution? How can we begin to see space exploration as a voyage of self-understanding within the cosmic order?

I will have more to say about this topic in future essays. For now, it is perhaps enough to state that we barely know what it means to be citizens of a planet, much less “citizens of the universe.” However, it may well be that this philosophical concept of “deep space exploration” will be the ultimate result of taking the philosophy of the Overview Effect to its logical conclusions.<sup>12</sup>

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**About the Author:** Frank White is the author of *The Overview Effect: Space Exploration and Human Evolution*, first published in 1987 and re-issued in 1998. A member of the Harvard College Class of 1966, Frank graduated magna cum laude and was elected to Phi Beta Kappa. He attended Oxford University on a Rhodes Scholarship, earning an MPhil in 1969. He is the author or co-author of nine additional books, including *The SETI Factor*, *Decision: Earth*, *Think about Space* and *March of the Millennia* (both with Isaac Asimov), *The Ice Chronicles* (with Paul Mayewski), *Space Stories* (with Kenneth J. Cox and Robbie Davis-Floyd), and *The New Camelot*. He also contributed chapters on the Overview Effect to four recently published books on space exploration, *Return to the Moon*, *Beyond Earth*, *Living in Space*, and *Space Commerce*.



**Editor’s Notes:** Frank White elaborates on his previous essay in the Fall 2012 issue of the Journal of Space Philosophy regarding a space philosophy that was presented as The Overview Effect – the experience of seeing the Earth from space and in space. This second essay explores in more detail the significance of a “deep philosophy” of space exploration and what it would mean to us as we venture off our planet and out into the universe. Frank White is one of the Space Community’s leading philosophers. *Bob Krone, PhD.*

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<sup>12</sup> My friend and colleague Steven Wolfe has explored the idea of a non-anthropomorphic vision of human purpose in the universe brilliantly in his book *The Obligation*, which is now available on Kindle. It includes an in-depth look at holons, the “evolutionary impulse,” and other key concepts and is a must-read for anyone interested in the “why” of space exploration.

## Space Law, Secularism, and the Survival of Humankind “Essence”

by Dr. George S. Robinson

Many domestic and international law practitioners have a tendency to fail or be unwilling to understand the foundations and implications of Natural Law Theory,<sup>1</sup> its expression in a variety of societally parochial jurisprudential concepts, and the implementation of those concepts, through reliance on parochial legal positivisms, that is, implementing rules. In most situations, cultures within societies, within civilizations, etc., simply do not understand and accept, or work with, those dictates for genetic coding survival and evolutionary perpetuation.

*Homo sapiens sapiens*, or modern humans, like all carbon-based life forms as we presently understand the empirical dictates of “life,” stand on the shoulders of the first manifestations of life characteristics or properties and then upon the shoulders of that simplest of life forms... single cell descendants. As is true of all life, humans and humankind (i.e., transhumans and biotechnologically integrated post-humans)<sup>2</sup> must grow, adjust, mutate and adjust, replicate, and migrate and adjust without end in order to survive... or fail in adjustment and become extinct.

The ability to migrate successfully to more survival-compatible environments is an inflexible biological dictate. Migration assumes many forms and is manifest in endless contexts. There is a great tendency for most policy-makers, legislators, and lawyers implementing those policies and laws to raise modern humans all too frequently substantially above their biological origins... their biochemical foundations. For *Homo sapiens sapiens* and its transhuman/post-human descendants, space migration has become an impending critical dictate for survival, not only of the physical embodiment of the specieskind, but for what humans in currently understandable empirical ignorance refer to as “human essence” or “human nature.”<sup>3</sup>

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<sup>1</sup> For purposes of the instant discussion, Natural Law Theory, or *jus natural*, may be defined as denoting a system of rules and principles for the guidelines of human conduct... found to grow out of and conform to [his/her/its] *nature*, meaning by that word [his/her/its] whole mental, moral, and physical constitution. The operative word here is “nature.” The definition of Natural Law and the underlying theory changes almost daily with the empirical and quantifiable results of human physiology and morphology dictates. See Black’s Law Dictionary, 4th ed., 1171.

<sup>2</sup> For a more in-depth discussion of transhumans and post-humans, particularly in the context of application of potentially disparate legal regimes, see G. Robinson, “The Search for Biogenesis and the Lurch Toward Space Law Secularism,” in *Annals of Air and Space Law*, Vol. XXXIV (Montreal, QC: McGill University Press, 2009), 645-712; G. Robinson and R. Lauria, “Legal Aspects and Accountability of Cyberpresence: A Void in Space Law/Astrolaw Jurisprudence,” in *Annals of Air and Space Law*, Vol. XXVIII (Montreal, QC: McGill University Press, 2003), 311-26.

<sup>3</sup> There seem to be endless interpretations and variations of what constitutes “human nature,” e.g., “the psychological and social qualities that characterize humankind, especially in contrast with other living things.” Human nature also has been defined as “a collection of epigenetic rules: the genetic patterns of mental development.” These and other definitions only reflect the overarching disagreement among professionals and among members of the lay public as to just what constitutes the “nature” of *Homo*

Recently, an organization started by the U.S. National Aeronautics and Space Administration, entitled the Space Propulsion Synergy Team (SPST) and consisting of top professionals in a number of space program/project related disciplines and subdisciplines, drafted and published a White Paper that was distributed to Congress and then the public at large. It was entitled “The Justification for Human Space Development and Habitation beyond Low Earth Orbit: An Invitation for an Open National and Global Dialogue.” This position paper addressed the critically motivating factors for human space migration: survival of the human species. Unfortunately, species survival was tied in a limiting fashion to restoration/maintenance of the U.S. leadership in space exploration, migration, and settlement. According to this organization, *humankind* is losing extremely valuable time critical for planning and executing habitation beyond low Earth orbit “as Earth becomes ever less capable of supporting human population growth.”<sup>4</sup>

In the context of real time, the White Paper asserts that “[t]he present country’s leadership has not provided adequately for a compelling long-term objective with a workable, affordable roadmap—one that is needed to enlist the support of the American people.”<sup>5</sup> While the American public’s support is needed at this point in time, the objective of reasonable steps to ensure the survival of *Homo sapiens sapiens* and its biotechnologically-integrated descendants first must be a *global* objective... and then a *transglobal* objective. A global objective would require a somewhat unique form of organizational planning as well as truly innovative fiscal and technological concepts. It also requires significant ongoing research and development relevant to what constitutes the *essence* or *nature* of the human species (terms that are usually flagged with “spiritual” terminology that gives a somewhat ethereal sense to “the whole seeming to be greater than the sum of its parts”), and where that *essence* can and must be embodied in those currently evolving transhuman and post human descendants.

Significant time has been required for those individuals and organizations involved in the engineering and scientific research disciplines, particularly those relevant to all aspects of space exploration, migration, and settlement both in low Earth orbit and on neighboring planets (such as those envisaged for Earth’s moon, Mars, and the like), to accept that their efforts in basic and applied research have been flowing from the requisite for *humankind* migration and survival off-Earth. It is clear that prominent individuals who normally are not inclined to vague speculations have now accepted

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*sapiens sapiens* and perhaps less-developed hominids on the bush of evolution. The “essence” of being human is every bit as ephemeral as human nature, ranging from the scent characteristics of perfumes to the intrinsic “spiritual” properties of being human that serve to distinguish and identify that species... frequently erroneously so. As with all definitions, in order to be useful, words and phrases must always be defined and assessed in the specific contexts in which they appear.

<sup>4</sup> For a published version of the “White Paper” as it appears in the journal *Space and Evolution*, see online [www.eaglehill.us/spaevo](http://www.eaglehill.us/spaevo). The quotation is from page 1. The Space and Propulsion Synergy Team was created by NASA in 1991 and consists of national propulsion multidiscipline experts (research and technology, concept and design development, testing and operations, and program management) with extensive experienced contractors, government, and academic experts assembled to “bridge the communications gap” between technology developers and users [[spacepropulsion.us](http://spacepropulsion.us)].

<sup>5</sup> *Ibid.*

publicly that the role of human activities in all societies and civilizations must be directed toward survival of the human species off-Earth. In fact, the first and most prominent reason offered by the SPST in its White Paper is survival of the human species:

Space exploration is critical and necessary for the survival of the human species *and should be a global undertaking*. Earth has limited resources to support life as we know it. This, along with ever-increasing internal global threats, as well as possible external threats, conceivably could make Earth largely uninhabitable in the foreseeable future. Therefore, Space development and human habitation beyond low Earth orbit are needed urgently to extend life beyond the bonds of Earth. A few compelling issues are: 1) cooperation on a global level is essential; 2) by cooperating, we will learn to work together in peace for humankind; and 3) by opening the Space frontier and its vast resources to sustain us, it will help us optimize diminishing resources on Earth, and, thus, help reduce world conflicts and possibly global wars.<sup>6</sup>

Despite the rather ephemeral views expressed in items 2) and 3), perhaps motivated to satisfy the generally limited vision of the public at large, this organization consisting primarily of empirically-oriented professionals has recognized the critically imminent need for space migration by *humankind*. They see this as providing reasonable assurance of a broader survival potential for the human species and its genome, which embodies an “essence.” It provides for the next step opportunity in the ongoing odyssey of determining the what, why, and possibly “who” of Creation.

To implement the next step in assuring the odyssey of human space migration for *specieskind* survival, attention really must be turned to the design and implementation of a unique form of institutionalizing the necessary migration to and settlement of near and deep space by *humankind*. Query: Should/must it be undertaken by governments, domestic and/or public international organizations, or perhaps by domestic and/or international private sector initiatives and entities? The latter have always been a significant factor in organized human migration... from the earliest of times out of Africa, through the early days of European imperialism, to the present era of economic and military imperialism manifest by countries from all points of the globe.

While President Barack Obama’s first term space policy made it clear that the U.S. space program from a practical perspective would have to rely almost solely on international cooperation for major and costly programs, the pursuit of which has been conducted very successfully over the past 40 or so years, it did not foreclose a “global” potential for extraordinarily expensive space undertakings... perhaps such as that with the underlying philosophic construct of species survival. That, contrary to the hopes set forth in the White Paper, would relinquish much of the traditional leadership characteristics manifest by the American space program; at least the *traditional* forms of such leadership. A creatively unique organizational infrastructure for a truly global undertaking may well be required to ensure an acceptable measure of U.S. control and

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<sup>6</sup> Ibid.



direction. This certainly would be true of the next step required to ensure an ongoing effort that would be embodied in a *transglobal* entity... an off-Earth or cyberspace entity, perhaps just a little like the motivation for, and formulation of, an off-shore corporation.

This discussion has come to the point of *suggesting* the form and substance such a *transglobal* undertaking might well be required to assume... one that could fend off successfully the usual geopolitical constraint manifest in the international community on Earth. Again, as concluded by the SPST in its White Paper, albeit in a rather nationalistic and parochial fashion, “[e]conomic growth resulting from developing Space transportation systems and the exploitation of resources in Space that are needed for exploration [i.e., the initial stages of biological migration] and habitation [successful biological/biochemical adjustment to a more favorable survival oriented location] off Earth will lead to commercializing Space and globally provide countless critically-needed jobs.”<sup>7</sup>

While creating a *transglobal* entity to enhance perpetuation opportunities for humans and their descendants may be a hard political sell to those who must remain on Earth and initially fund the undertaking, the ever-diminishing time available to ensure survival of humans and their descendants, indeed, their “offspring,” should be a significantly suasive factor in pursuing the effort. If there are certain segments of global societies and/or civilizations still functioning on the basis of some “rule of law,” it might be a little easier to enlist the passiveness, if not support, of the stay-at-home public. Principles of law are like all levels of energy-reflecting organized information at all levels of complexity, from the smallest theorized unit on the Planck Scale<sup>8</sup> to the mind-bending complexity of the universe(s) and, indeed, of all existence, itself.

Jurisprudential concepts and implementing positive laws are neurophysiological manifestations of whole body genome and genetic coding perpetuation by individuals of a given society or civilization(s) in competition for resources that are likely to enhance the potential for these individuals, societies, and civilizations being able to perpetuate themselves. But if this collection of individuals and societies, etc., even though all have certain morphological and physiological disparities resulting from comparatively unique ecological and survival oriented “bio-cultural” drivers, determine on a global basis that the shared genome must migrate off Earth for purposes of enhancing the chances of specieskind survival and that of its biotechnologically integrated descendants as guardians of what is called the human “essence,” then a global organizational entity necessary to perpetuate this space migration is critical to that survival in the long term. This, too, may well be a temporary step since the technology now allows for the incipient stages of formulating a *transglobal* implementing organization in cyberspace that could well be free from ongoing geopolitical impositions continuing to be conducted on Earth for purposes of enhancing the survivability of “Earth-sitting” societies and civilizations.

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<sup>7</sup> *Ibid.*, 2.

<sup>8</sup> For working definitions of the Planck Scale in the context of particle physics and physical cosmology, see [en.wikipedia.org/wiki/Planck\\_Scale](http://en.wikipedia.org/wiki/Planck_Scale).

The next step for policy-makers, jurists, and practicing lawyers in the realms of public and private international law, as well as more parochial domestic law, is to begin to formulate and articulate a carefully defined objective and implementing infrastructure for such a cyberspace entity; perhaps a *transglobal* private entrepreneurial organization with quasi-sovereign authority offering private citizenship to investors and conducting its business management practices totally in cyberspace.

Reliance on *international* cooperation/collaboration for ongoing space migration programs and implementing projects is no longer sufficient. The next step is structuring a global entity to perpetuate the migratory and off-Earth settlement efforts for *species survival* and then to begin to formulate a non-public governmental cyberspace entity and implementing infrastructure focused clearly and solely on species survival; survival of *humankind* and its essence and the evolving essence of its descendants. Tinkering with the 1967 Outer Space Treaty solely for geopolitical posturing in an ever-changing global economy and what constitutes national and also parochial defense alliance interests is not acceptable given the critically impending threats to the human population dynamics and the very existence of the species in an Earth constrained environment.

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**About the Author:** Dr. George S. Robinson, III is one of the most distinguished Space Law experts in the world. His book, book chapter and professional article publications – over 100 – are found throughout the aerospace and Space literature and continue in 2013. He served as International Relations Specialist for NASA, legal counsel to the FAA, and legal counsel at the Smithsonian Institution in Washington, DC. He serves on numerous Boards of Directors for science research. Dr. Robinson was a strong supporter of the Aerospace Technology Working Group that was the forum from which Kepler Space Institute and University emerged.



**Editor's Notes:** It has been a privilege to know, and work with, Dr. Robinson over the past ten years. He has been a professional Space Law contributor to the major Space Organizations and leadership. He was an author in the first issue of the Journal of Space Philosophy, Fall 2012, and repeats here his message to global leadership linking the future of Space to humanity's survival. *Bob Krone, PhD.*

## Plato and Aristotle's Ether: Revisited and Redefined

By Declan J. O'Donnell, JD and Sherry E. Bell, PhD

### Is Ether Real?

Is there an Aether/Ether? Yes there is. Although the concept dates back over 2000 years, it is still alive and well and is indeed thriving.

Throughout the centuries, since around 360 BC, philosophers and physicists have been discussing Aether. The manner in which Plato used the word was that Aether (*Αἰθήρ*) referred to the bright, untainted upper atmosphere in which the gods dwell, as distinct from the dense lower atmosphere, which was Aer (*Αήρ*). Plato, in his *Timaeus*, described Aether as that "which God used in the delineation of the universe."<sup>1</sup>

Aristotle expanded on this idea and expressed his view that this force was vital to the terrestrial elements, those being earth, water, air, and fire. He classified Aether as the "fifth element" (the quintessence). Aristotle believed the four terrestrial elements were subject to change and moved naturally in straight lines; whereas no change had been observed in the celestial regions and the heavenly bodies moved in circles. In Aristotle's system, Aether:

- had no qualities (was neither hot, cold, wet, or dry),
- was incapable of change (with the exception of change of place),
- by its nature moved in circles,
- had no contrary, or unnatural, motion.<sup>2</sup>

Today "Aether," also spelled "Ether," is defined as follows: "in physics, a theoretical, universal substance believed during the 19th century to act as the medium for transmission of electromagnetic waves (e.g., light and X rays) much as sound waves are transmitted by elastic media such as air. The Ether was assumed to be weightless, transparent, frictionless, undetectable chemically or physically, and literally permeating all matter and space."<sup>3</sup> It has also recently been described as the medium which fills the "empty space."<sup>4</sup>

In the newer concept as presented here it is spelled Ether, with a capital *E*. This reminds us that Ether is a conduit of Energy and is a product of an *Era* gone by, an Antecedent Estate, an older and *Easier* dimension.

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<sup>1</sup> Plato, *Timaeus*, line 1317, Project Gutenberg edition, [www.doc.ic.ac.uk/~rac101/concord/texts/timaeus/](http://www.doc.ic.ac.uk/~rac101/concord/texts/timaeus/).

<sup>2</sup> Adapted from G. E. R. Lloyd, *Aristotle: The Growth and Structure of his Thought* (Cambridge: Cambridge University Press, 1968) 133-39, [en.wikipedia.org/wiki/Aether\\_\(classical\\_element\)](http://en.wikipedia.org/wiki/Aether_(classical_element)).

<sup>3</sup> *The Free Online Dictionary*, s.v. "Aether/Ether", [dictionary.reference.com/browse/aether?s=t](http://dictionary.reference.com/browse/aether?s=t).

<sup>4</sup> J. Rafelski, "Vacuum, The Primordial Imponderable 'Matter'," paper presented at Ecole Polytechnique, March 20, 2009, [www.physics.arizona.edu/~rafelski/PS/0903EcolPolColl.pdf](http://www.physics.arizona.edu/~rafelski/PS/0903EcolPolColl.pdf).

Albert Einstein claimed that “the special theory of relativity does not compel us to deny Ether.” Einstein further stated, “According to the general theory of relativity space without ether is unthinkable; for in such space there not only would be no propagation of light, but also no possibility of existence for standards of space and time (measuring-rods and clocks), nor therefore any space-time intervals in the physical sense.”<sup>5</sup> According to Robert B. Laughlin, Nobel Laureate in Physics, endowed chair in physics, Stanford University,

It turns out that such matter exists. About the time relativity was becoming accepted, studies of radioactivity began showing that the empty vacuum of space had spectroscopic structure similar to that of ordinary quantum solids and fluids. Subsequent studies with large particle accelerators have now led us to understand that space is more like a piece of window glass than ideal Newtonian emptiness. It is filled with “stuff” that is normally transparent but can be made visible by hitting it sufficiently hard to knock out a part. The modern concept of the vacuum of space, confirmed every day by experiment, is a relativistic Ether.<sup>6</sup>

We propose Ether is the medium that functions to organize, accommodate, and affect all of the elements and forces of nature, both well-understood and not so well understood, including earth, water, air, and fire, as well as gravitation, electromagnetism, the strong nuclear force, and the weak nuclear force.

We contend that there was an Antecedent Estate in our universe prior to the Big Bang and it was filled with Ether. It is and was a solid reservoir of vacuum energy, a force in and of itself, the fifth force in nature, and it formed prior to matter and energy as we know it.

Even if Ether did not have a cause and effect on the entry of matter, at least it constituted the perfect envelope into which matter could be maintained. Nothingness could neither cause nor sustain a Big Bang.

### **Ether and the Antecedent Estate**

There might have been two or more Antecedent Estates in our universe. The first might have been nothingness. The pure void of nothingness might have been partly replaced by many prior estates. However, we are focused discretely on the status of our universe immediately prior to the Big Bang, that point in history 13.82 billion years ago<sup>7</sup> when matter was introduced. This we call the Antecedent Estate.

This estate consists of a six-pack of forces at least: the four natural forces, those being gravitation, electromagnetism, strong nuclear, and weak nuclear; and two special

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<sup>5</sup> Albert Einstein, “Ether and the Theory of Relativity”, address given at the University of Leyden, Netherlands, May 5, 1920, [www.tu-harburg.de/rzt/rzt/it/Ether.html](http://www.tu-harburg.de/rzt/rzt/it/Ether.html).

<sup>6</sup> Robert B. Laughlin, *A Different Universe: Reinventing Physics from the Bottom Down* (New York: Basic Books, 2005), 120-21.

<sup>7</sup> European Space Agency, “Planck Reveals an Almost Perfect Universe,” March 21, 2013, [www.esa.int/Our\\_Activities/Space\\_Science/Planck/Planck\\_reveals\\_an\\_almost\\_perfect\\_Universe](http://www.esa.int/Our_Activities/Space_Science/Planck/Planck_reveals_an_almost_perfect_Universe).

forces. These are believed to be embedded in the Ether. All of these are constant and universal.

The characteristics of the four natural forces are well understood. We can predict with certainty how they will react with matter. Ether, however, is less well understood. We do know that it is real and that it is constant and universal.

Nothingness implies the absence of the four natural forces and the absence of all cosmic constants and, therefore, the absence of Ether. Although nothingness might have been the state of the universe before Ether came in, it was somehow pushed out or consumed or otherwise destroyed. It appears that Ether literally replaced the nothingness estate within our universe before the Big Bang, because within nothingness atoms could not congeal and matter could not gravitate.

Perhaps nothingness still exists outside the borders of our universe. Perhaps there are places within our universe that host nothingness, such as at the bases of black holes. In that place perhaps even Ether could be destroyed and atoms could be reduced to point zero quanta.

### **The Roles of Ether**

Prior to the Big Bang 13.82 billion years ago, there had to have been an evolution of Ether, including its putative essence of the four natural forces: gravitation, electromagnetism, strong nuclear, and weak nuclear; and two special forces. Ether filled our entire universe and settled down with no variations, wobbles, or inconstancies.

The Hubble constant must have been in effect from the beginning. Stars appear to be fairly evenly spaced without any noticeable gaps between them and light is applied evenly throughout the entire universe. Our dimension appears to have had no failure of natural or special forces *ab initio*.

Just as these phenomena apply evenly, constantly and universally for us, so, too, must they have also worked for that prior dimension. However, in the Antecedent Estate they could not have served the purpose of organizing matter because prior to the Big Bang there was no matter. Wholly different objective organizing must have occurred. Even the cosmological constant that causes circular movement for matter had to have played an entirely different role back then: there was no cosmos.

Our conception and perception of energy is inextricably tied to matter. Our formula is as follows:

$$E = mc^2 \text{ (where } m \text{ is mass)}$$

The concept of energy in the Antecedent Estate had to be free from the concept of matter. Therefore, the Ether may consist of energy that is vacuum energy, something unbundled from the above equation as follows:

$$E = c^2$$

or, as to various other natural and special forces

$$E = (f)Fc^2$$

A non-material estate is unnatural to us. Consequently, it has been off the radar screen, so to speak, for the mainstream of science and technology. However, because Ether exists and plays an altogether important role in the universe we must learn to study it.

In the larger context, breakthroughs in science will be required before our species migrates off Earth. We have come a long way, but the way forward is much longer. It is predicted that the essences of the Antecedent Estate will be discovered by scientists who live and work in outer space.

### Conclusion

Ether *qua* Ether is asserted to be a fifth force in nature in our present post-Big Bang universe. It was probably the dominant force in the Antecedent Estate. It survived the Big Bang and continues to thrive. Its apparent function is to organize, accommodate, and affect all of known and unknown forces. What a task! Consider the complexity of not only holding earth, water, air, and fire, but, also, honestly, constantly, and universally hosting gravitation, electromagnetism, strong nuclear, and weak nuclear forces of nature (not to mention any special forces yet to be discovered).

It is time for Ether to be revisited as a scientifically respected force, rather than as a Greek philosophy. The lynchpin of this thesis is to agree that nothingness could not host any version of the Big Bang. Some evolution of a universal vacuum must have resulted in this Antecedent Estate immediately prior to the Big Bang, if not many eons prior to it.

### Postscript

In our soon-to-be-published novel, "*Cosmic Man Coming*," Declan describes Ether and the Antecedent Estate in far greater detail and deftly weaves those descriptions into the narrative. A brief example follows:

Gravity became that force used by the Ether to purge hydrogen, as it eventually was scattered throughout space, away from the pure space life forms, now thought of as souls. These life forms traveled on the electromagnetic waves at or near the speed of light...<sup>8</sup>

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<sup>8</sup> Declan O'Donnell and Sherry Bell (eds.), *Cosmic Man Coming* (in press).

**About the Authors:**

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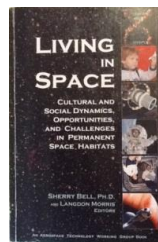


**Sherry E. Bell, PhD**

Dr. Sherry E. Bell received her Master of Science degree (2002) and her PhD (2005) from Capella University. She is an Industrial/Organizational Psychologist. Dr. Bell is the Dean of Psychology at Kepler Space Institute. Currently she is an active member of the National Space Society, [www.nss.org](http://www.nss.org), and plays several other roles in other space-related organizations.

Dr. Bell has written numerous articles and chapters, edited a book, *Living in Space*, and frequently presents at space conferences. She is an avid researcher and has been awarded two research grants. She is a lifetime member of both the Golden Key National Honor Society and Psi Chi (the National Honor Society of Psychology).

Her current interests include Consulting, Evolutionary Psychology, Extrasolar Planets, Genetics, Humans Living in Space, and reading and writing both Science and Science Fiction. She can be reached at [DrSherryBell@aol.com](mailto:DrSherryBell@aol.com).



**Editor's Notes:** Kepler Space Institute is honored to have Declan J. O'Donnell and Sherry Bell contributing to *The Journal of Space Philosophy*. Their professional work over decades has made them top contributors to the global Space Community. Dr. Bell has just joined the Board of Directors for the Kepler Space Institute. [Bob Krone, PhD](#).



## **Flowers of the Cosmos**

**By John A. Bossard, PhD**

Our Life in the Cosmos is a precious thing, probably more precious than we can ever truly appreciate. It contains our consciousness; it is the source of our inspiration. It is where our dreams come from and what inspires our hopes. All of the great things of our humanity find their expression in this cosmic life, our life.

And our life has many facets, many ways in which it may be conceived. Perhaps it begins with our own individual needs to maintain our physical life: air, water, food, shelter. Next comes needs for physical and mental stimulation, social interaction, challenges, puzzles, fun. These are followed by ever-deepening and more complex notions of self-worth and fulfillment, and even spirituality. Transcending these needs and notions, we discover that we have a marvelous and mysterious capacity for the consideration for others, rather than just ourselves. Whether this consideration for others came from basic survival mechanisms to preserve our offspring is not as important as the fact that this capacity for considering others has expanded and grown. Because we can consider others rather than just ourselves, we can consider other creatures and even our environment as entities that we can respect, value, interact with, and also protect and nurture. As our view pans back from our local environment, we begin to see lakes, streams, rivers; then mountain ranges, plains, deserts, oceans; and then we behold this Earth, our island home, shining like a blue-green jewel floating in the cosmic blackness. We are struck with the simultaneous notions of both the vast liveness of our world, tiny in the vastness of the black Cosmos, and also the profound closeness that we are compelled to feel towards our fellow humans, creatures, all life, and even the earth itself.

At this point in our evolution, all of the life that we know about is contained on this single planet. We have not discovered any other life anywhere else, despite our diligent efforts to find it. Perhaps that will change. In fact, maybe we are ready to start thinking about how we can make that change. Maybe we are ready actually to become the life that exists elsewhere in the Cosmos. And maybe we can start to consider *why* we need to make that change, that profound extension when life from Earth is intentionally carried into the Cosmos. But in order to understand the *why* of it all better, we are going to have to expand our thinking and develop broader and more sweeping notions about such seemingly diverse topics as the physical space in which we live, our notions about what defines life, what constitutes consciousness and intelligence, and how will we recognize it. We are going to have to dig a little deeper into what our true motivations are and what are some of the larger and perhaps more important considerations when it comes to our lives in particular and the burning flame that represents all life in general. We are also going to have to discard some of the mental baggage and negative self-image constructs that have been holding us back from more fully realizing our potential, constructs that in some cases have been self-induced, but in other cases have been foisted upon us or sold to us because it was in best interest of other forces, rather than our best interest and that of humanity as well.

By some miracle of chance or otherwise, the terrestrial environment has remained undisturbed or at least insufficiently disturbed so that at least one species (*homo sapiens*, humans) could develop sufficient knowledge and technological mastery to leave the planet. But this situation could change at any moment. Any number of terrestrial or extraterrestrial calamities could snuff out all human progress in an instant and the Cosmos would have to wait hundreds of thousands or millions of years more before the extra-planetary spread of life could try again. The reality of the situation is that we, and all living things on Earth, are small and fragile. We cling tenuously to a small planet orbiting a medium sun, far out on one of the numerous arms of the Milky Way Galaxy. Far from being big and malicious, we are actually puny and ephemeral.

The image that I think symbolizes our situation in the Cosmos is that of a single flower, growing on a volcanic island, a small, fragile creature that has found a foothold in a dangerous, turbulent environment, where at any moment its existence could be snuffed out. That flower is life, it is us. We are, in effect, the flowers of the Cosmos. Here one day, bringing a bit of beauty to the Cosmos, before we wilt and pass away, casting our seeds to the cosmic winds. And as we make the transition from our life on the planet Earth and struggle to make our way out into the Cosmos, we too will be small, fragile creatures facing a dangerous Cosmos, dangerous in the sense of having many unknowns and where our life could be forfeit in an instant. In a time when we feel we are bumbling giants thrashing through the garden, crushing all that is beautiful with our selfishness and stupidity, it is worth remembering that, in terms of even just the neighborhood of our solar system, we are profoundly insignificant. All we have, everyone we know and love, everyone who has ever been, all our history, art, science, and books are pretty much contained on this one planet, our island home. There are a few exceptions. We have got some hardware on the Moon, Mars, Venus, Mercury, one of the Moons of Saturn, stuff in Orbit around Earth, some probes flying outward through the solar system, and a couple even beyond that. But by and large, the Earth is where it is at; we are the endangered species in a small pond.

The symbolism goes deeper, too. A flower is also a symbol of beauty and I think we humans are beautiful too. We do not hear that too much. We hear the opposite a lot. And so we start to believe that we are ugly, that we are a problem. That people are a plague or a blight upon the planet, even a cancer. But it is not true. We have many shortcomings and we create problems for ourselves, our fellow beings, and the Earth itself. But we also create beauty, and harmony, and we value life. And if you hold that all life is sacred and has value, then you must also value your own life, and by extension, the lives of your fellow humans.

This notion of self-value, of self-worth, is important because, as any psychologist will tell you, in order to value others, you also have to value yourself. So when you think of yourself, and humanity, and Earth's ecosystems in general, the image that you should hold on to is that of a small, fragile flower holding uncertainly onto a volcanic shore. My friends, you are the hope of life in the Cosmos, to grow, blossom, and propagate across that shore. Your life has infinite value because it is from you that more life will come. Flowers make seeds which make other flowers. A colony of flowers makes a patch of

soil where other plants and insects came grow and live. That patch of soil becomes a meadow, then a forest, and eventually an entire ecological system emerges. To find beauty in an ecological system is to find beauty in yourself. I bring you the message that you are worthy of salvation, my fellow brothers and sisters, all people, and all life on this our island home. And you are not just worthy of salvation; you are, in fact, an incredibly rare, precious attribute of our Cosmos.

We are at a unique moment in the history of terrestrial life. A few billion years of evolutionary action seems to have created life forms that have learned how to leave the surface of a mid-sized planet and travel arbitrarily far away. And as we leave our planet, I believe that we need to start thinking about our physical expansion off the planet as the new form of environmentalism, a transcendent concept of environmentalism that is far more inclusive, more outward thinking, and growth-oriented, not limit-constrained.

Until we get a better name, I group these notions that connect off-planet expansion and environmentalism under a different philosophical premise, a premise I call *ex*vironmentalism. *Ex*vironmentalism could be defined as a broad philosophy that seeks to develop a perspective which includes, yet transcends terrestrial concerns. Instead of looking inwards only on the Earth, *ex*vironmentalism turns to look outwards, encompassing not just the Earth, but as much of the Cosmos as can be comprehended. Although in a sense, *ex*vironmentalism can be thought of as extending, expanding, and broadening the meaning of environmentalism, *ex*vironmentalism has concerns that cannot be addressed or considered within environmentalism and therefore cannot be extrapolated from environmentalism itself. As such, we need a bigger concept; we need a philosophical basis that can embrace this increased understanding of our life in the Cosmos. The first time humans saw pictures of our blue planet floating in the blackness of space, we had an intuitive understanding that not only was our Earth our island home, but that we were more than just Earthlings, and that the space we lived in was more, infinitely more, than just the surface of our planet. I do not know about you, but the word “environment” just was not big enough to convey the vastness of our life in the Cosmos. And so, whereas environmentalism is focused on conservation and improvement of the environment of the Earth, *ex*vironmentalism seeks to turn the focus outwards, so that the ideas of conservation, and improvements of terrestrial environments are part of much broader and more inclusive notions regarding life not just on Earth, but also of life in our solar system and out into the Cosmos.

The word *ex*vironmentalism has its etymological roots in Latin, just as does the word environmentalism does. In Latin, the word *environ* comes from the words “en”, meaning in, “viro”, meaning circle, and “vertere”, meaning to turn. Thus, *environ* means literally “to turn in a circle inwards”. Your *environs* are therefore what you encircle. Thus, environmentalism is the concern for what one encircles, for one’s surroundings.

By contrast, *ex*vironmentalism would substitute “ex”, meaning out, for “en”. Thus, *ex*vironmentalism would mean to turn in a circle *outwards*. Thus, the concern and focus moves from an inward-gazing to an outward-gazing perspective.

These ideas are more than just words, because we can use these definitions to reframe our considerations, to open up the notions of life-expansion and life preservation, and to use the best of the ideas of environmentalism as we experience this epic transition of mankind off the planet and out into the Cosmos. We can positively combine these ideas, these philosophies, to make something better than the sum of the parts. This then, is the essence of environmentalism: the synergy of the space movement, the environmental movement, and perhaps many other ideas, productively to encourage, identify, and promote the expansion of life outwards from the planet Earth and into the Cosmos.

There is another, more subversive notion that I want you to take with you, that you are valuable, your life has worth, you are a priceless creation, no less so than any other beautiful creature. Life on Earth is counting on you to help it transcend the limitations of a terrestrial planet; to leap over the constraints of gravity and carry life onwards and outwards to moons, other planets, asteroids, and to live in the very fabric of space itself. A far too common misperception is that people are the problem. But I want you to know and to come to understand that you are, in fact, the solution. So this is another important distinction between environmentalism and environmentalism. I believe that environmentalism should see human beings as part of the solution, as opposed to being part of the problem. Humans can and must play an important role in enabling the growth of living creatures, plant, animal, and other, in the otherwise sterile environments of the Cosmos. As such, human life has intrinsic value and worth, like all living and sentient creatures, and therefore is also worthy of respect and should be valued. And someday, if in our far travels and explorations, we should come upon other life forms and intelligences, may we seek to understand, and then be understood.

There is one final aspect or dimension of life that bears particular importance on why your life has value and that aspect is our mortality. By that I mean not just your own personal mortality, but also that of the entire human race. We are here now, in our prime, feeling lively and dominant. But that will not always be the case. Someday, the human race will be no more and we will pass into oblivion. But instead of mourning our inevitable demise, we need to celebrate the life we have now. The very notion of our finiteness adds to the poignancy of our humanity and I think this is a dimension, perhaps infrequently considered, that underscores the intrinsic value of our lives.

And so my friend, if you find nothing else worth reading about in this essay, then it is my wish for you that you begin a journey of understanding and that at some time along that journey, you come to the realization that you are the bearer of a great intention, the intention to carry life into the Cosmos. You bear up the flame of life and all future generations of creatures, plants, animals, machines, art, and song, will owe their existence to your intention. To see further and understand more, we are called, maybe compelled, to turn our gaze outward and look up and out. If environmentalism is to find any resonance with you and with the rest of humanity, then maybe it comes from the fact that each of us already possesses that intuitive knowledge, that primal understanding, and we are merely turning our gaze back to where we came from and where we might go.

We are small, we are fragile. We are the seeds of transcendent terrestrial life. We are the Flowers of the Cosmos.

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**About the Author:** John Bossard has over 25 years of experience in aerospace and advanced-technology industries and has served in a variety of technical, management, and executive leadership positions prior to founding his own company, BSRC, LLC, in 2007. Dr. Bossard's areas of interest include aerospace propulsion and high energy-release rate systems and he has been an active proponent for the off-planet expansion of mankind, promoting the advancement of both technological and philosophical approaches to enable this process. He received his PhD in Mechanical Engineering from Arizona State University in 1996, an MS in Aeronautical Engineering from Rensselaer Polytechnic Institute in 1986, and an Honors BS in Mechanical Engineering from the University of Utah in 1984. He is an Associate Fellow of the AIAA.



**Editor's Notes:** We are proud to have Dr. Bossard publishing in our Spring 2013 Journal of Space Philosophy. Describing humanity as "*The Flowers of the Cosmos*" is consistent with our Kepler Space Institute philosophy, proposed in the Fall 2012 issue, Article #8, which envisions Space settlements as being founded on the reverence of life within ethical civilizations. *Bob Krone, PhD.*

## Widening the Dialogue about Faith in Space

by Rev. Beata Chapman, PhD

It is probably the case that all kinds of people and all kinds of beliefs will find themselves inhabiting space together. Kepler University's Faith Space Program is developing to dialogue about and delineate what might be some kind of core elements of ethics and spirituality that nourish the kind of culture necessary to thrive in this brave new world.

As we continue this dialogue on what may truly be unanswerable questions, it seems important to proceed with care in the words we choose and how they may be received by the many diverse peoples who will inhabit space. For Christians, Muslims, and Jews, for example, "faith" is a word that includes belief in a Supreme Being who exists outside the human experience and in whom people put their belief in salvation or wisdom or just plain problem-solving here and now. The sacred is thought to be separate from and better than the mundane and the goal is to live a life that is in accord with the divine, which is the primary motivation for ethical or moral laws and behavior. Morality is thought to be defined by the Supreme Being and it is required of human beings to comply.

In order to achieve internalized adherence to moral standards or rules, a certain leap of faith is required as to the existence and omnipotence of the Supreme Being. In many Christian belief systems, humans are reliant on the Supreme Being for liberation from suffering, which comes primarily from their obedience with moral standards.

Buddhism and other Eastern religions do not require belief in a Supreme Being. Buddhism does not exclude the possible existence of God, but it is not concerned with experience other than that which is here, now. Therefore, as to the question of what happens after death, the Buddha's response is referred to as "the thunderous silence of the Tatagatha." Salvation is here and now, in this very moment. Damnation, too, is right here, now. The aim of the practice of Buddhism is to be awake here and now so that salvation and damnation are simultaneously included and one experiences the thusness of human experience. Just this is enough. Right here, beyond sacred and profane, good and bad, this and that, beyond divisions of thought and concept, or body and mind, there is just this, one's actual experience here and now.

The famous seventeenth century Zen Buddhist Master Hakuin Zenji defined faith:

*What is this root of faith? It is nothing less than the belief that every man possesses his own intrinsic nature into which he can attain insight, and that there is a Fundamental Principle which can be completely penetrated. Just this.<sup>1</sup>*

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<sup>1</sup> Isshu Miura Roshi, "Seeing Into One's Own Nature (2)," trans. Ruth F. Sasaki, in *Zen Dust: The History of the Koan and Koan Study in Rinzai (Lin-Chi) Zen*, ed. Isshu Miura and Ruth Fuller Sasaki (New York: Harcourt, Brace & World, 1966), 41-45.

One can readily see how differently Buddhists view faith than do Christians and others for whom faith can be “blind” and involves vesting one’s belief in a being outside oneself. As Hakuin said, faith in Zen Buddhism is belief that anyone who practices sincerely and ardently can penetrate his/her own true nature and understand the true nature of reality. Faith and practice cannot be separated. Understanding that all things are empty of inherent self-solidity and co-arise with all other conditions is key to the ethical guidelines Buddhism calls Precepts. Precepts are not commandments or rules that come from someone or someplace more powerful than the individual, but arise from the practice realization of the individual. In other words, ethical behavior arises from practice; it is not imposed by dogma or moral judgment. In this way, practice is in itself an embodiment of faith.

The Buddha taught that there are four noble truths: First, there is dissatisfaction inherent in human form. Because all things born die, discontent or dissatisfaction is inherent. The second noble truth is that the cause of suffering is attachment – to one’s own opinions, preferences, and some solid idea of “self,” “me,” “my,” “mine.” The third noble truth is that there is freedom from suffering, the method for which is the fourth noble truth known as the Noble Eightfold path. Living according to the Noble Eightfold Path encourages and supports practitioners in releasing, grasping, and wishing that things were different than they are. Hence contentment with what is, things as they are, becomes the practitioner’s ground of living. Compassion and wisdom guide skillful use of body, speech, and mind. Practitioners become less attached to their own preferences and more able to follow the dictum of teacher Charlotte Selver, “What comes, comes. Make no fuss whatsoever about it and you will see what happens.”<sup>2</sup> Each moment includes each person, each activity, and the great earth and sky as we encounter them right now. This skillful means is another cornerstone of Buddhism’s ethical structure and, in conjunction with the Precepts, strongly support living an ethical and honest life as a means of ending one’s suffering here and now.

Hence, “great faith” is always accompanied by great doubt and great determination. The three together provide the raw materials through which one can penetrate one’s own mind – revealing the fundamental principle of emptiness. “Faith” is required because we are fooled by apparent separateness, craving, and grasping, the second noble of truth and the cause of suffering. We must believe that it is possible to see through this delusion into the fundamental nature of all things. This is not easy, so great doubt naturally arises. In order to make the effort required to break through our delusion of separateness, even with our doubt, and realize liberation, great determination must also be present. Great faith, great doubt, and great realization are important elements of Buddhist practice.

How do we talk about faith, then, in a way that includes and embraces our various beliefs without homogenizing them or ignoring their important differences? Interfaith dialogue today has moved beyond comparison between religions in an effort to find

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<sup>2</sup> Richard Lowe and Stefan Laeng-Gilliatt, eds., *Reclaiming Vitality and Presence: The Teachings of Charlotte Selver and Charles V. W. Brooks* (Berkeley, CA: North Atlantic Books, 2007), 137.



similarities and toward each system presenting itself as an intact whole and simply learning and continuing the dialogue about how we can work together for the common good, using the differences between us as strengths. Is there room for such a dialogue about how humans might inhabit space harmoniously and ethically without setting up moral rights and wrongs that include and exclude by their very nature? How does religion move people toward individual judgment and accountability and how might that contribute to a thriving, healthy, diverse culture in space? I believe faith and spiritual practice have a great deal to teach and learn about faith and practice in space communities which are likely to be diverse in beliefs, practices, and values.

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**About the Author:** Beata Chapman is an organizational consultant and Zen Buddhist priest. She has been involved in interfaith dialogue for many years and is keenly interested in how wisdom and compassion might be cultivated as the central themes of human societies wherever they may settle. Beata consults in group development to for-profit and non-profit organizations and is the teacher of the Suffering & Delight Sangha of meditation groups for people living with chronic pain ([www.sufferinganddelight.net](http://www.sufferinganddelight.net)).



**Editor's Notes:** Kepler Space Institute welcomes Dr. Chapman to our ongoing study of Space Faith. Dr. (Pastor) Lawrence Downing has been the Chair for a group of theologians sharing their experience and knowledge on this important complex subject for the past five years. Dr. Chapman here brings her Buddhist expertise to this dialogue. Dr. Downing reviewed her submission to the *Journal of Space Philosophy*, had no recommended edits and identified it as a valuable contribution. *Bob Krone, PhD*.

## Space Settlement Minus Human Evil

by Allen Scott Harper

**Editor's Introduction:** Allen Scott Harper's body was found at the foot of Roseburg, Oregon's Mount Nebo on 2 July 2007 by two teenage hikers. There was no identification. Condition of his remains indicated that his death probably occurred about one year earlier. Virginia dental records made the identification during July 2007 at which time The Douglas County Sheriff's Office notified the family.

As Allen's Aunt and Uncle, who had shared his life over the last eight years, Sue and I had his confidence. And we had helped him purchase a 1992 GM bus/van that he renovated to be his mobile home. He departed our home in Fallbrook, California in April 2006, heading his van for Roseburg, Oregon. His purpose was to help a Vietnam veteran colleague who needed help due to a serious medical condition. On May 24, 2006, Allen sent an e-mail to the family stating his intention to depart Roseburg on June 1, 2006 and return to Oceanside, California. That was his last communication. Allen's military Memorial Services were conducted at the Willamette National Cemetery in Portland, Oregon on December 28, 2007.

The following article is by Allen Scott Harper. Almost every sentence in his essay is a direct quote from his e-mails to me from 2003 to 2006. He seriously studied evil, moral leadership, politics, psychology, mental pathologies and the improvement of the human condition. I remember his stories about his Roseburg experience. This article documents for readers Allen's conviction that there was evil in the world and, specifically, in Roseburg, Oregon. We consider his murder as evidence. Allen and I had many chats about the future of humans in Space with hypothesizing how settlements could be created minus human evil. *Bob Krone, PhD.*

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Evil exists. Evil people killed me in Roseburg, Oregon on 26 May 2006. I ask readers to reflect on my understanding of evil. Following that I'll give you my personal story and my thoughts about human Space settlements free of evil.

### Understanding Evil

The key to understanding evil is to understand that it always lies within what is unseen. Some of the unseen places are in the blind spots of the human mind, the shattered places of the mind where repressed, dark personalities live. Hidden are the imprints of acts of omission, indifference, projections, criticism preceding abuse, and self-righteousness. Myths of demon possession or Satanic ritual abuse deceive humanity into thinking evil is not in the mind of the common man. But Aleksandr Solzhenitsyn said: "*The line dividing good and evil cuts through the heart of every human being. And who is willing to destroy a piece of his own heart?*"<sup>1</sup> In his brilliant 1995 *Lucifer Principle*,

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<sup>1</sup> Aleksandr Solzhenitsyn, *The Gulag Archipelago* (London: Collins, 1974), 168.

scientist Howard Bloom writes: "*The Lucifer Principle contends that evil is woven into our most basic biological fabric.*"<sup>2</sup> It is a very old argument made by Thomas Hobbes, anthropologist Raymond Dart, and Saint Paul. The enemy is within us and Nature has placed it there.

The Merriam-Webster Definition of *EVIL* is:

a: morally reprehensible: sinful, wicked <an *evil* impulse>

b: arising from actual or imputed bad character or conduct <a person of *evil* reputation>

Good and evil are ubiquitous subjects in literature, religion, philosophy, military history, entertainment and the media. The most popular films in history have been the Star Wars series where the Force (good) and the Dark Side (evil) are creatively pitted against each other.

On Earth those who kill innocent people and children are evil. Hitler's, Stalin's and Pol Pot's leadership directing mass killings was evil. Genocide is evil. Moral ideologies, societies, and cultures repress much of the evil that was added to humans in the Garden of Eden. But evil in individuals, groups, and even nations persists as the 21st Century begins. I was a victim of evil in Roseburg, Oregon, U.S.A.

### **My Story**

I was born in 1949 in Frankfurt, Germany. My Father was a U.S. Army career officer who had fought with Patton in World War II and later in Korea. His role modeling was a reason I volunteered to be a soldier in the Army's tank forces in the Vietnam War. In many ways combat in Vietnam set the stage for the events that led to my death.

On combat tank patrol, an explosion burned 70% of my body. The next few years of treatment at the Army's Burn Center in San Antonio left permanent physical and mental scars and some learning experiences. I wrote the following about one of those:

#### **"To Live," by Allen Harper**

*The most important experience of my life occurred on a ward. There was a patient on the ward who was a triple amputee and had been in a trauma-induced coma for over two months. I was walking back to my bed, which was next to his, when suddenly I realized he was awake. Then I saw a beautiful aura around him. It was a profound, loving, beautiful, spiritual presence. When I came close enough for him to notice me, he looked me in the eyes and said, "It is good to be alive." For many years I got goose bumps when I thought about that. I now realize that I had witnessed divine mercy. I saw some of the beauty of God.*

When I moved my wife and two children to Oregon in the 1980s, the negatives of my injuries in Vietnam were still with me. I had discovered that pot helped and believed the myth at the time that it was harmless. That and the fact that I knew a couple of the

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<sup>2</sup> Howard K. Bloom, *The Lucifer Principle: A Scientific Expedition Into the Forces of History* (New York: Atlantic Monthly Press, 1995), 3.

Vietnam vets in Roseburg, which gravitated me to a small group of them who were into drugs and alcohol. I soon discovered that they were not only involved in underground illegal activities, but that they had protection from someone with political influence. When reciprocating evil action is compounded by all the members of a group and that group has political power, the result is not pretty. My history studies had convinced me that power elitism and tyrannical oligarchy has been a juggernaut throughout history.

In retrospect I failed to act in time. I knew too much about the evil in Roseburg and was unwilling to participate. I had reached the belief that people are only worth what they are willing to sell out another person for. I had experiences in the military when I was sold out by others. I did not sell out my group. I also believed that Christian theory is a way to counteract evil and that doing no harm will never get you into trouble. Unfortunately most religious theory gets warped by those with evil intentions. It happened in Roseburg.

I was threatened. The threats became more frequent. I told the group leadership, "*Don't count on me going down with a whimper.*" I began to realize that my bravado was not enough and realized that security for me and my family was at stake. I moved to Southern California. The group told me: "*If you ever return you're a dead man.*" From my studies, I had also learned that society creates and nurtures the formation of mental illness to meet its need for scapegoats and when push comes to shove it will exhibit a good deal of blood lust. I was their scapegoat.

Years later my Roseburg best friend was ill and in need. In April 2006, I drove my 1992 GM converted bus north. While in Roseburg I read Job, which brought me much peace. "*There was a man in the land of Uz, whose name was Job and that man was blameless and upright, one who feared God, and turned away from evil*" (Job 1:1). I was reminded of a poem I had written in 2003:

*See it  
In the eyes of fiends  
See it above the fields  
Of horrid dreams  
Bursting through  
Tidal waves of screams  
Vile and foul  
It beams  
Fascination  
Ends all means*

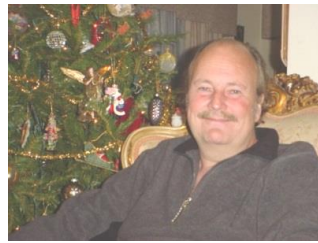
All this brought to mind a conclusion I came to during my burn recovery. I have a purpose and that is to be a better person myself and to help the world live better. I had forgotten this until I got "myself back" during the 1990s in California away from the evil I had endured from that group in Roseburg. And I was fascinated with the vision of my Uncle, Dr. Bob Krone, whose work with the global Space Community at the University of Southern California (USC), 1975-2003, and the editing of the book, *Beyond Earth: The*

*Future of Humans in Space*,<sup>3</sup> beginning in 2004, included the observation that since humans have no history of living in Space, humanity has the exciting option of creating future Space settlements minus the evil that some humans have practiced on Earth throughout recorded history. *Allen Scott Harper*.

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**Editor's Notes:** Readers will accept my inclusion of this personal family story which illustrates the definition and criminal nature of evil on any level – personal to global. The subject needs serious research within the Space Community. The eradication of evil for future human Space settlements ranks as one of the most complex and difficult topics for design and decision making. If it is ignored: 1) the success of future of Space settlements is in doubt; and 2) the probability of humanity's survival beyond the 21st Century will be dangerously low. *Bob Krone, PhD*.



Allen Scott Harper, Christmas 2005



Military Funeral Service in Portland, Oregon, December 28, 2007

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<sup>3</sup> Bob Krone (ed.), *Beyond Earth: The Future of Humans in Space* (Toronto, ON: Apogee Space Press, 2006). See #7 in this Spring issue of *The Journal of Space Philosophy*, "Roots of Kepler Space University."

## **Space 2013: The Exploration Imperative**

**By Rod Pyle**

NASA and the American space program are in a state of remarkable flux. While we currently have a very Buck-Rogers space station passing overhead every 90 minutes, we may only send our own people to it via the use of the Russian Soyuz spacecraft, a design dating back to 1963. Our space shuttles fly no more, but rather adorn wings of aerospace museums on both coasts. The follow-on programs promised by two presidents named Bush – the most recent of which was well into development before it was cancelled – are now just a memory. And our current space policy, which sends hundreds of millions to current and up-and-coming private launch providers and has vague plans to visit an asteroid sometime after 2020, is ill defined and open to interpretation.

These are not inspiring times in space exploration, at least where NASA is concerned. For while the agency still fulfills many laudable scientific missions with great skill, these are old news and primarily inward-looking (as in Earth-centric). The few bright lights are commercial orbital operations and unmanned missions to Mars and a handful of other bodies outside Earth orbit.

While commercial efforts in space are exciting in their own right, most are not exploration in the classic sense. They are private industry doing what it does very, very well: taking a vast and technically competent database left behind by NASA's decades of experience and transforming it into a more affordable and robust commercial presence in low Earth orbit. And that is how it should be... but it lacks "sex appeal," to put it in blunt terms.

### **Pining for the "Golden Era" Of Exploration**

Those of us fortunate (and old) enough to have lived through the years of the space race and the moon landings have a unique – and sometimes conflicted – view of the history of space exploration. A few in the younger generation have studied this era and may share some of these thoughts. But nothing fires the imagination quite like the memory of "being there."

Central to this was that July night in 1969 when ghostly B&W images fluttered across our 19-inch TV screens as Neil Armstrong stepped onto the lunar surface and into history. It was a culmination of a magic time and unparalleled adventure. The future seemed limitless.

Apollo was the pinnacle of space exploration fueled by intense curiosity, a hunger for scientific knowledge, and a limitless drive to explore, right?

No chance. Let us take a look at what drove the space race and the quest for the moon, then the shuttle and ISS, and where we are today.

### **The Cold Reality of a Cold War**

Much has been written of the origins of the space race, so I will not dwell upon historical minutiae (though it makes for fascinating reading). Notables such as John Logsdon have examined this in great detail. But a broad look at the origins of NASA's "Golden Age" is informative when looking ahead.

After the shock and embarrassment of Sputnik and the flight of Vostok 1 and Yuri Gagarin, the new president, John Kennedy, knew he needed to act. He had inherited a new civilian space agency from President Eisenhower along with a struggling Earth-orbital program called Mercury. Historical evidence indicates that Kennedy wished that both would just go away, especially the Mercury program. When the NASA administrator, James Webb, met with Kennedy about NASA's role, he was not optimistic. While a pragmatic man and a consummate politician himself, Webb could see clearly that priorities had changed and not for the better with regard to NASA. As lukewarm towards space as Eisenhower had been, this was a new low. And Kennedy's science advisor, Jerome Wiesner, was downright hostile to manned space.

Of course, this was all before the Bay of Pigs incident. The Kennedy administration supported a secret CIA-directed attempt to overthrow Castro's regime in Cuba. As the invasion rapidly went sour, Cuban "freedom fighters" were trapped on the beaches by troops loyal to Castro, so Kennedy and the US military decided to sit this one out. It was one more embarrassment and a huge one. It was one thing to be second best in space; altogether another to look weak and indecisive in the great struggle against the Red threat.

Of course, all this was played out against the backdrop of a Soviet Union that had caught up with us in terms of nuclear weapons, which supported Castro's Cuba just 90 miles from American shores, which traded openly with the Communist Chinese who had ousted "our" man, Chiang Kai-Shek just a decade before, and which had just beaten us in the race to orbit. In performing this final act, the USSR also showed the world not just that it was first, but that it could loft extremely heavy objects (such as, say, hydrogen bombs) into space and drop them, where it chose. Sputnik 1 had weighed almost 200 pounds... Sputnik 2, almost 1200. The US responses, Explorer one and Vanguard, had come in at 30 pounds and four pounds respectively. And even though the outgoing Eisenhower administration secretly knew that our guidance and control was miles ahead of the Russian efforts, the public relations battle had been lost. America was beginning to smell like a loser. Many other countries were beginning to have second thoughts, their citizens if not their governments, about whom they had sided with in the aftermath of WWII. The new era might be a Communist paradise after all.

So Kennedy gathered his science advisors and key NASA personnel and grilled them: what can we do in space that will guarantee us a win? That became the impetus for Apollo, not any grand sense of adventure or destiny. He was



informed that the Soviets could beat us in launching large masses into orbit; hence a space station was not going to achieve his aims. And they might also be able to beat us to a loop around the moon (everyone assumed an Apollo 13-style free return trajectory for this; making orbit is much more difficult). No, the only way to be sure that we could beat them – which was really another way of saying that this was an area in which both countries were sufficiently weak – would be a manned landing.

Some voices in the administration declaimed the idea, others were more supportive. Webb himself was on the pro-landing side, but alarmed at the speed of the schedule.

Shortly after Al Shepard's flight on May 5, 1961, Kennedy spoke before a special joint session of Congress, committing us to the goal of landing a man on the moon and returning him safely to the Earth. This speech, and a later one at Rice University, served its purpose. He had informed the nation that we were essentially on a wartime footing to achieve this difficult goal and he informed the world that we would not take a back seat to the USSR in any meaningful area (the Cold War, already being fought by proxy in small regions worldwide, was a further and unspoken proof of that). The US was reaching high. We would prove, through technology and not bullets that free enterprise, Capitalism, and self-determination were superior to the "New Soviet Man." And, of course, it helped to bury the embarrassment of the Bay of Pigs and the fact that we were vastly behind in public perception of space accomplishment.

This set the course for NASA for the rest of the decade. It did not assure, however, that the technology could be developed, that the resolve would not wane, and that the funding would continue. From the outset there were contrary voices, but their volume would shortly be squelched.

Then the possibly most pivotal moment in the history of the US moon program occurred on an awful November day in 1963. Kennedy was dead and with him could have gone the dream for the moon. But his successor, Lyndon Johnson, was no fainting violet and along with other programs such as the war on poverty and civil rights legislation, LBJ bullied anyone with a contrary voice into submission. In short, there was for some time not a single politician who would dare question the destiny of a martyred president and Apollo's trajectory was as secure as it would ever be.

Of course, later in the program events such as the Apollo 1 (204) fire and other program delays caused some, Walter Mondale key among them, to decry the race to the moon. But it was too little, too late and the program soldiered on to become a resounding success.

### **The Post-Kennedy Decade Doldrums**

And then it was over. The final three missions, Apollos 18, 19, and 20 were scuttled before the first crew returned from the lunar surface. And it was not just Richard Nixon; voices within NASA, including the redoubtable Chris Kraft, felt that we were pushing our luck with the existing technology and that it was time to back down before we lost a crew in space. The Nixon presidency was all too happy to oblige. Other than the wonderful Skylab project and the PR-driven Apollo/Soyuz linkup, Apollo was dead. The Apollo Applications program, always underfunded but brilliantly developed on paper, drifted into the shredder of history.

Of course, the Space Shuttle went through its slow, challenged evolution and eventually flew in 1981. This was not, however, what anyone had originally conceived for a reusable spaceplane and it had been compromised to the point that it was both more dangerous than predicted and slower and more expensive to operate. Further, with the shuttle shoved into the forefront as the only crewed program within NASA, real crewed exploration was now blunted. We would continue to “explore” the near-reaches of low Earth orbit, as had Mercury and Gemini, and increase flight duration and research conducted (though nothing came close to touching Skylab and Mir for flight duration until the ISS was operational). But this was a far cry from the vision of people like Wernher von Braun, who had envisioned huge space stations as waypoints for departures to a lunar colony, and later, missions to Mars.

That part of the exploration dream was over.

The shuttle ground through its 30-year life with moderate competence and safety. Two failures of the system cost the program far more lives than all of Mercury through Apollo, including astronauts who died of unrelated non-mission incidents such as plane crashes. With the shuttle came a wonderful, if overfunded, space station. But the dream of interplanetary exploration and adventure seemed further out of reach than ever.

### **Constellation Consternation**

July of 2011 saw the final flight of the shuttle and the orbiters were decommissioned and sent off for static display in museums, just like the remaining Saturn launch vehicles of the program that preceded them. The shuttle program had cost, when amortized, about \$1.5 billion per flight.

As the shuttles flew and aged, two presidents, both named Bush, announced bold new visions for space exploration, neither of which stuck. The latter plan involved a replacement launch system and capsule that were designed and begun, but only the capsule survived the congressional budget axe in 2009. Besides the Orion capsule, little remains of Constellation program except for bills to pay contractors *not* to build the system. No matter how hard they tried, Ronald

Reagan, George H. W. Bush and George W. Bush seemed unable to conjure up a “Kennedy moment.” Why?

### **Profound Realities**

This is far from a complete list of why we have not continued to explore; these are simply the broad strokes. The reasons behind our loss of drive to send crews beyond Earth orbit are myriad and can be debated for years. But the major elements are:

- 1) Lack of “Target Celebrity”: The moon was a localized and easily understood goal. Anyone could look skyward and see the pockmarked face of the body and it thus became real and tangible. Mars is simply a winking red dot to most folk and far too distant to seem as meaningful or compelling. The sense of “Why bother” is a major challenge within the lay public, despite recent polls that indicate real motion towards more positive attitudes.
- 2) Economics: While America’s fortunes ebbed and flowed during the Apollo program, it was easier to garner support for a crash program such as the lunar landing initiative. Perhaps it was the relatively recent memory of WWII and the mobilization attendant to that conflict; perhaps it was the deeply-rooted fear of Communism. But whatever the cause, money was made available – at times, up to 5% of the federal budget. Current levels hover at a tenth of that.
- 3) A Profound Enemy: The drums of war were beating, albeit dully, around the time of the announcement of the lunar landing program. The Bay of Pigs, the Cuban missile crisis, and early stirrings of conflict in places like Vietnam and the recent armistice in Korea all pointed to a life-and-death struggle with Communism. Today we have a “frienemy” relationship with China, with whom we trade ourselves into economic oblivion. They are not, and are unlikely to become anytime soon, the kind of lever needed by an administration to fire up another major space exploration initiative.
- 4) A Cause Célèbre: As awful as it is to consider it thus, the death of President Kennedy galvanized NASA and its supporters and probably more than any other single factor set the fate of the program in stone. It was simply unpatriotic and an affront to the memory of JFK to impugn the Apollo program and its primary goal.

### **Unsustainability**

Unfortunately, the very goal that JFK selected for NASA in the 1960s became the undoing of sustainable exploration of space beyond Earth orbit. In fact, there is a reasonable argument to be made that we should be grateful that we even had a shuttle program. With the single-point goal of “landing a man on the moon and returning him safely to the Earth,” Kennedy capped Apollo’s supportable aims and the crash-program nature of Apollo precluded the build-up of a sustainable space exploration architecture. Skylab, an extension of an already strained

Apollo follow-on program, was as far as it got. And it's not as if those in charge at the time were not aware of this limitation. Senior figures from James Webb to von Braun had argued for a slower but far more robust development of space capability from the very beginning.

### **The Space Station's Role**

It's often forgotten by the lay public that an enormous space station is whizzing over their heads every 90 minutes. Unfortunately, great PR is not a part of NASA's charter. The media has done what it will do, with a few specials on the Discovery Channel and a couple of well-produced IMAX films. Beyond that, unless there is a crisis or a visit to the ISS by one of the Kardashians, we should not expect much more.

The ultimate fate of the ISS is uncertain. Various dates for a controlled de-orbit have been considered and the present date of 2020 has been set by an ever-fickle Congress. Let us hope that whatever the decision, it is better considered than the shame of Skylab's uncontrolled descent to Earth. The space station is America's sole remaining icon of crewed spaceflight. Without it, we have little to show for a half-century of grand achievement.

### **Old Goals, New Contenders**

When asked on frequent radio and TV interviews to offer-up an argument as to why America should be in space at all, I have a well-used response which goes something like this: the dollars spent on spaceflight are not shoveled into capsules and shot into space. That money is spent here, on Earth, and in the US. It is one of the few things we do better than anyone else and one of the few areas of endeavor in which the funds expended stay in our own country. The money spent on both crewed and robotic spaceflight goes to support the best of innovative tech industries and tech and science education (NASA is still a huge supporter of academia). The images of US space prowess have inspired generations of young people to go into tech fields and continue to do so at a time when by most measures we are falling desperately behind the rest of the developed world in these areas. And so forth. The wrap-up is usually something about our innate need to explore, to have new adventures, to reach above and beyond to keep our culture healthy and vibrant. And that last part is, of course, the hardest to rationalize... or sometimes even believe.

### **Privateers and Danger**

So where do we stand in 2013? NASA has recently scored a brilliant success in unmanned exploration by landing the Curiosity rover on Mars. The mission has, so far, performed wonderfully, making discovery after discovery just as it was hoped it would. JPL's reward? Thanks very much, and we are cutting your budget by \$100 million (it had earlier been projected at \$300m, but congressional stalwarts put some of it back).

The greater NASA trundles onward. Development on the Orion capsule continues. The question is: on what will it fly? Perhaps the Space Launch System will be completed and the whole stack can start testing in 2017. Of course, we will then need a destination and that has continued to be a vexing decision for the current administration. LEO? The moon? Mars? Recent polls show public support for a journey to an asteroid very soft (the Russian meteor drama notwithstanding) and at the same time over 50% of those polled are in favor of a crewed Mars mission. A reassessment is in order.

And then there are the privateers. While most of the private sector is working to attain some version of LEO (I am including the space tourism companies in this), and with some COTS support from NASA where possible, a few brave souls are tackling grander ventures. And while there is a great and viable need for the private sector to service LEO and activities there such as the space station, it is arguably not exploration, at least not in the classic mold. We have been in LEO in one form or another for over 50 years. While it may be new territory for the private sector, that does not make it exploration.

### **Once Again, Mars**

Then along came Dennis Tito and inspiration Mars. Seeding the new foundation with his own hard-won cash, Tito and his partners have set a brave goal of sending a crew of two in a looping trajectory around Mars with a 2018 departure date and a flight duration of just over 500 days. The spacecraft is slated to consist of a commercial capsule (SpaceX's Dragon has been mentioned), a Bigelow-style habitation module, and possibly a radiation vault. The flyby would last 10 hours.

Make no mistake: if this mission somehow makes it into space, it is fraught with danger. Besides the young technology of the Dragon (though it should be crew-rated by then), besides the relative unknowns of small-system, closed-loop life support for a year and a half (it has been researched on the space station, but not in the life-or-death setting that this voyage requires) and besides the risks of radiation both from our own sun and from beyond the solar system, there are several human physiology and psychological unknowns. They are not likely to be ironed out completely by 2018.

What does this all mean? It means that this journey entails *risk*. It is somewhat dangerous. And for those reasons alone it is a bit of a hot potato for NASA to support. If it all goes well, the agency would share the glory with the private sector. If someone dies, the agency takes another hit in the eye and Mars is off the table for a decade or more.

And yet, what are our other choices? If we wait for a national space agency – be it NASA, ESA, or the Russians or Chinese – we will be waiting a long time. These agencies are highly risk-adverse, underfunded (with the arguable exception of China), and not currently discussing any real plans for a crewed

Mars flight (again, with the possible exception of China). China has discussed the moon and is currently moving through its own Gemini-era learning curve to attain that goal. Other than that, LEO is the domain of a spectacular but aging space station and occasional crew and consumables resupply flights. Hardly the stuff of dreams.

So it would seem that it is in the lap of the private sector. There are no arch-enemies against whom the US government can angle. There is no martyred president whose vision we must uphold. There is no great question of “can it be done,” because for all intents and purposes we, along with the Soviet Union, long ago showed that we are very capable in space. And there would appear to be no real perceived benefit to many minds.

Back to the exploration imperative. And I do not mean the dusty, creaking old adage “Man Must Explore.” I mean the real, burning need to do new things, go new places, and stand on them that has always motivated such efforts. With the struggles of the Golden Age of Apollo behind us, and the hard lessons about the difficulty of ongoing operations we learned from the shuttle, we know that space is hard to do. It is expensive and the returns are often intangible (except for the obvious boons to aerospace and education).

So that leaves the exploration imperative. It is worth remembering that much of the exploration of this planet was done by people who were at least to some degree private operators. Ernest Shackleton’s Antarctic voyages come to mind, as do a number of attempts on the Northwest Passage. The involvement of Great Britain in India began as a private venture. In some cases government funds were involved, in others only some in-kind assistance. But these particular great explorations were primarily the result of one person, or a small group of like minds, who got together and decided that this was a venture worth undertaking. When asked why, their answers were myriad, but always some version of “Because it is there.” And while the new private explorers of space may not have the (often fictional) financial lures that drove explorers of centuries past, they do have the assurance of a place in history and, it must be mentioned, a substantial take of media dollars upon their return.

If this path is followed there will be malfunctions, accidents, and deaths. Risks will be taken and many will be ones that NASA would eschew. But as private operators, these explorers will have certain freedoms from the rules, regulations, and general aversion to risk that can hobble the national space agencies. And that is a good thing, for our current space exploration ennui needs to be lifted. We need, as a culture, to see brave men and women departing these Earthly shores for points unknown. We need to return to the journey we have barely begun through those vast, dark spaces between planetary bodies, well beyond LEO. And if it takes an 18-month flyby of Mars or some other “stunt” to kick-start it, then so be it.

It is time to return to what we as a culture have done so well: dream, innovate and explore.

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**About the Author:** On Rod Pyle's website, [www.rodpylebooks.com](http://www.rodpylebooks.com), he tells us about his motivations for Space: *"Like many of my generation, I was enthralled by the flights of Mercury, Gemini, and especially Apollo. As those ghostly images came down from the moon, improving on each flight, I stayed home from high school to savor every moment the networks aired. As I grew older and matured into a career and family life, fond memories of NASA's 'Golden Years' stayed with me. Since then the opportunity to write numerous books about the space program, as well as to create many documentaries and short media pieces about Apollo and the US Mars Program have provided me with countless hours of fascination and enjoyment. It is my deepest hope that I can impart some of the thrill and enchantment I have experienced to you."*



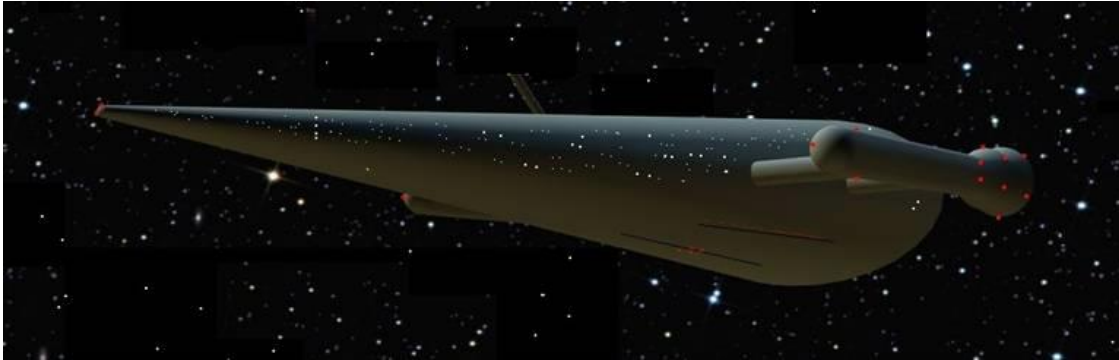
**Editor's Notes:** Rod Pyle is a communications expert. Media Consultant, TV Producer, Space enthusiast and author whose *Destination Mars* was recently added to *Scientific American's* Book Club. In this issue of *The Journal of Space Philosophy*, he articulately covers the history of Space Exploration right up to 2013 – including where and why it has succeeded and where and why it has stalled. Thank you for sharing your expertise, Rod. *Bob Krone, Ph.D.*



## Voyage into the Unknown: God

By Collin Skocik

With the Earth destroyed by a supernova, the Space Star *Silver Streak* moves outward into the heavens, a self-sustaining starship housing thousands, settling colonies on other planets... moving outward into the deepest, unknown reaches of space...



The ancient Greeks put their gods on top of Mount Olympus. But later and more enduring religions more wisely moved their deities away from the Earth, to places where man could never stumble across them in his wanderings. The Jews and the Muslims placed their God in the sky and though the Christians rallied round one very nice man in Judea, even He ascended to join his Divine Father in the sky.

But come 1903, when Orville and Wilbur Wright opened up the Firmament of Heaven for human wandering, there came a conundrum—human beings soared through the clouds, but God didn't seem to be there. Where was He?

In 1971, astronaut Jim Irwin stood at the base of Mount Hadley on the Moon and heard the voice of God speaking to him.

In 1975, astronaut Stuart Roosa, who had orbited the Moon a year before Irwin's epiphany, visited Nepal, where schoolchildren continually asked him, "Who did you see there?" They were devastated when he told them there was *no one* on the Moon. He learned later that the Moon was the place of the Nepalese afterlife.

In 2214, Sergei Luzhin flew a cargo ship into Jupiter's atmosphere, plunging to his death because he'd had a vision that God had spoken to him from deep within the methane layers of the cloud decks.

In 2256, the relativistic colony ship *Kolob* set off with a crew of Mormons for the system of planets they called Kli-flos-is-es, where they believed they would find God.

For millennia, individuals and groups searched the planets and the stars for God. But they never found Him.

Finally the world ended.

When the Earth and the other planets of the Solar System were vaporized by the supernova, the *Silver Streak* carried thousands of survivors on a desperate mission to

colonize other planets in the galaxy. It was the most ambitious and long-range space mission in history, and the most vital to humanity's survival.

But where was God? Why hadn't He intervened? Why had He turned his back on His flock and allowed most of them to perish in the final vengeance of the firmament? As the *Silver Streak* leaped farther and farther into the unknown depths of space, new civilizations presented themselves, new wonders unfolded, new secrets of creation were discovered.

But where was God?

In the aftermath of the destruction of the world, and with the very real possibility of the final extinction of the human race lurking in every new system the *Silver Streak* explored, it could be no surprise that there was a resurgence of religious devotion, even as God repeatedly demonstrated that He either didn't exist or didn't care.

And in what could be final chapter of the story of Man, it could be no surprise that when God finally *did* appear, the people of the *Silver Streak* were prepared to greet Him with the devotion of a dying man meeting his maker...

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"Sensor scans completed," Philippe Stargazer said.

Captain Richard Cameron watched the color-negative display of this section of the galaxy which dominated the forward wall of the bridge. "Okay, good. Frank?"

First Officer Frank Johnson bent over the console of the command intelligence station. "No change. Continuation of the same abnormal absence of habitable planets."

Cameron nodded solemnly. Could the *Silver Streak* have left behind the habitable part of the galaxy? Was there something special about Sol and its neighboring stars, something... something touched by God?

If so, why had dear old Sol betrayed them and exploded when the science of solar processes said it had five billion years left to burn?

The *Silver Streak* was well into its second year of searching the galaxy for planets to colonize, and though several colonies had been established and were thriving, there were still thousands of civilians and crew on the ship, hoping for their chance to forge a new world. It seemed the farther the great ship got from the home cluster of stars, the rarer Earth-type planets became. It was disheartening. Cameron projected calm as he acknowledged the discouraging reports. "I see. Thank you very much. Jack, continue on to the next sector."

Even Jack Hasta, usually so enthusiastic and yearning for each new adventure, was discouraged. "Continuing on."

Frank rose from his station and wandered over to stand next to Cameron. "How disappointing. This is the third solar system we've come across that has absolutely no habitable planet at all."

"Yeah, that one star a while back didn't even *have* any planets." A lot of rocky debris had circled that star, but nothing large enough to be considered anything more than a planetoid. Nothing with an atmosphere.

"I know, how disappointing," Frank was saying.

Having plotted and laid in his course, Jack Hasta propped an elbow on his console and leaned his cheek on his hand. "Will we ever set up a colony again?"

Cameron had begun to have his own doubts, but he wasn't about to add to the general glum mood. "Oh, there are bound to be other habitable planets in this galaxy. We've only covered a small fraction of them."

"Yeah, I'm sure our quest is nowhere near an end." Frank didn't exactly sound thrilled at the prospect.

"Absolutely not."

A light blinked for Stargazer's attention. "I am picking up something rather odd on the sensors."

Cameron came to attention. "What is it?"

"An energy field dead ahead."

"Get a reading."

"It is like..." Stargazer frowned. "Strange. But there appears to be a ship in the center generating it."

In a system with no habitable planets? "Interesting."

"Now I am getting a transmission over S-band!"

*S-band*? Who would be using *that* archaic transmission medium? "Put it on the scanners."

"Putting it on the scanners."

Stargazer slid his hands across his touch-sensitive screen, minimizing squares and switching active programs to access the ancient program that received and transmitted carrier wave signals at the speed of light.

A deep, resonant voice filled the bridge. "*Silver Streak*. Please bring your ship to a halt."

Cameron didn't like being given orders by mysterious aliens, and he didn't like being told what to do with his ship. But he might as well give this alien a chance to explain himself. "Bring us to a halt, Jack."

"All right."

"I have long and hard searched for you," the deep voice went on. "Moving across the galaxy, searching for any sign of you. The *Silver Streak*, my children."

Cameron tried to keep the irritation out of his voice. "Who is this?"

"I'm sure my identity is clear to you. You recognize my voice, my presence."

"Identify yourself!"

"Of course you must know who I am! Your mind simply has difficulty accepting the fact. Welcome, my children, to the Kingdom of Heaven!"

The hero of a science fiction story would no doubt have greeted such a revelation with skepticism, even with sarcasm.

But in an uncharted corner of the universe, on a desperate quest at the end of time, with the light of civilization being extinguished more and more with each dead system encountered, and now encountering an impossible intelligence in a system with no habitable planets, Captain Richard Cameron was a bit more susceptible than usual to believing the incredible.

And so it was with reverence and awe rather than disparagement that Cameron answered, "The Kingdom of Heaven? Uh... who are we addressing?"

“Surely you know by now! I AM THE LORD YOUR GOD!”

Frank was wide-eyed. “Could it be *possible*?”

“I have no idea,” Cameron said honestly. “Um... God... welcome to the *Silver Streak*.” Even as he said it he recognized the absurdity of his worlds, the incongruity of *welcoming* an omnipotent and omnipresent deity. Nor did he immediately register the contradiction of *God* having been *searching the galaxy* for them. But even when desperately in need of some reason to believe in hope, Richard Cameron was not a man to be held in awe for long. “Please explain why you’re in a spaceship.”

“I’ve taken the form of matter,” the resonant voice said, “and put Myself in a spaceship so that I may come aboard your ship, meet with you, mingle with your people. The time has come for Me no longer to be this distant and mysterious God. It’s time for Me to become a friendly, well-known God. Please grant Me this request.”

Cameron drummed his fingers on the arm of his chair. It wasn’t entirely unreasonable—if this alien was a very long-lived creature in possession of advanced technology, it was possible he had visited Earth in ancient times and formed the basis of the major monotheistic religions. What was the difference between an unimaginably advanced alien and a God? “You have my permission to come aboard.” *If this really is “God,” did I just have the temerity to “grant Him permission”?*

“Thank you. God out.”

“Transmission terminated,” Stargazer said.

“This has to be some kind of trick, Dick,” Jack said.

Cameron smiled. “Nobody tricks Dick.” The smile disappeared. “Don’t worry, we’ll get to the bottom of this. Certainly seems strange, but it’s possible.”

“Well, I have a feeling we’re going to soon find out,” Frank said. “His ship is emerging from the energy field.”

Cameron looked up at the screen. He could make out the shape of a very conventional spacecraft; though the specific parts were alien, there was nothing divine or incomprehensible about it. It was generally spherical, a cluster of engines at the rear, spidery landing legs below. From a distance and at a glance, he couldn’t guess what kind of engines those were. This may be a rocket-powered interplanetary craft or a miracle machine capable of leaping across galaxies. But it was no golden chariot.

“The energy field is now disintegrating,” Stargazer said. “Now completely gone.”

Well, the readings of the field were recorded; it should be possible to analyze them later. Cameron watched the approach of the Ship of God. “Open launch tube B.”

“Launch tube B open,” Jack said.

Cameron touched a tab on his armchair. “God, you are cleared to dock in launch tube B. Frank, would you care to come with me to the launch tube?”

“Absolutely.”

“Let’s go.”

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Cameron, Frank, and two security guards stood on the inside of the walled-off section of the hangar deck. Ahead of them, a light switched from red to yellow to green. Pressure was equalized. “Open the airlock.”

“Right.” Frank keyed in a two-digit code. The door slid aside.

From the connecting tube stepped one of the largest humanoids Cameron had ever seen. Garbed in resplendent gold robes, the eight-foot figure was topped by an enormous bald head with sharply angular features. He looked down upon Cameron with sunken eyes. This was far from the cliché white-bearded man, but he was impressive enough. To a primitive people, he might well be considered a god.

Cameron looked up at the enormous creature, intimidated but struggling not to show it. “Welcome aboard the *Silver Streak*. I’m Captain Richard Cameron. This is my executive officer, Frank Johnson.”

A hand to match the scale of the body extended from the folds of the gold robe. And God spake unto Cameron, saying: “I’m pleased to make your acquaintance.” Cameron disliked placing his small, fragile hand into the grasp of that monstrosity, but he did so. God shook his hand, then smiled. “It is indeed a great honor to finally come aboard the *Silver Streak*, that ship which I have studied since it left the Earth.”

*Studied since it left the Earth... that would explain how he knows all about us, about our religions and our language...* For now, the best strategy would be to play along, give the Almighty the benefit of the doubt. Fact-checking and inquisitions could come later. “My deepest apologies for what the human race did to the Earth during the last two thousand years, and for all the faults committed by those aboard the *Silver Streak*.”

“All of that is long forgiven.”

*That’s very New Testament of You.*

“With the Earth destroyed, the sins committed there mean little. And the *Silver Streak* being the last remnants of humanity, they all must be saved. All sins are forgiven.”

It was impossible not to be moved by the words, spoken by that lordly, powerful and authoritative voice. Cameron couldn’t resist the wash of emotion as he said, “Thank you.... Um, why don’t you come with us to the bridge? I’ll introduce you to our leading members of the crew.”

“Of course. I would like the opportunity to meet everyone.”

*“Meet” everyone? Don’t You already know all of us?*

“Quite understandable. Let’s go.”

As Cameron and Frank led God through the halls, Cameron felt awkward as passersby looked curiously at the towering humanoid in his grand robes. He didn’t know how—or when—to announce the arrival of God on the *Silver Streak*, but inevitably rumors would spread.

How to handle it when they did? How would people react? Would they fall to their knees and praise the Father of All Creation? Would they denounce Him as a fraud? Would holy war break out aboard ship? And how would God react to their reaction?

*What if this really was God?*

Jack and Stargazer both turned in their seats as Cameron, Frank, and God entered the bridge. “This is the bridge,” Cameron said as though escorting any human V.I.P.

“I believe you told me this is where we were going,” God said—as though He were any human V.I.P.

“Yeah, this is the main control center of the ship. This is our helmsman, Jack Hasta.”

Jack extended his burly hand. "A sincere pleasure!" As though he were meeting his favorite basketball player.

God shook Jack's hand. "It is indeed a pleasure to meet you."

"And our science officer, Philippe Stargazer."

God extended His massive hand. "A pleasure."

Stargazer, who had little interest in religion and little respect for a finite God, responded as he would to any guest on the *Silver Streak*. "Actually, to be more precise, it is pronounced 'Star-gah-zay.' You see, I come from the country of France, which speaks a different language than—"

"Shut up, Stargazer."

"Yes, sir."

"There was no need for these introductions," God said. "I know all of your names, of course. I've spoken to all of you in the past."

"Spoken to us?"

"Of course. When you have prayed to Me, I have answered."

*Prayed?* Cameron hadn't prayed since he was twelve years old.

"Many times," God went on, "the majority of the time, you have not heard My answers. But I have answered them."

"Unbelievable." Cameron recalled his childhood Bible classes... *For it is written, thou shalt not put the LORD to the test...* But any alien could scan the *Silver Streak's* records and come on board claiming to be God. It was time for some tests, and if God had a problem with that... well, Cameron was prepared to be smited. "Well, I suppose now, the most important thing we should take care of, since You've taken human form, is to inspect You medically to make sure that You contain no diseases."

If God was offended by the suggestion, or detected that Cameron was studying Him for reaction, He gave no sign. He simply smiled softly and said, "I can assure you, I have selected a perfect body."

"But You were in deep space," Cameron pressed, "and I want no danger of infecting the rest of my crew should You have picked up something out there."

God was as agreeable as any guest would have been. "Very well."

Cameron was surprised. "Good. And Frank?"

"Yeah?"

"I'd like you to make an announcement to the entire crew that God is here and explain how we picked Him up and everything."

"Okay."

Cameron gestured toward the doors. "Let's go, God."

God nodded His huge bald head. "Of course."

*Funny how quickly the cosmic becomes commonplace... here I am escorting God down the hall...* Once Frank's announcement rang through the ship, the curious glances he and God received became more pronounced. So far, thankfully, no one had fallen to their knees or burst into hosannas, but now that people knew, or at least guessed, who this huge person was, their looks had become more meaningful.

Dr. Pete Strickland was on his way out of the Intensive Care ward when Cameron led God into the Infirmary. It would have been impossible for anyone not to notice the dazzling robes and enormous stature of the Creator of the Universe, and it was to the

credit of their professionalism that the receptionist went back to work after only a single glance and Strickland merely paused in his stride toward his office.

Cameron stopped him. "Strickland."

"Oh, hi, Dick," Strickland said conversationally. "Come on in."

Cameron and God followed Strickland into his small, cluttered but orderly office.

"Strickland, I believe you heard Frank's announcement."

Strickland settled into his chair, rubbing a hand over his large forehead. "Yes, I did. It's unbelievable."

"Well, this here is God."

Strickland leaned forward and shook the Hand of God. "Pleased to meet You, God."

"A sincere honor to meet you," God said.

Cameron watched the mundane exchange of pleasantries, increasingly aware of the lack of grandeur in this holy visitation. God's style had certainly changed since that Burning Bush thing and that whole affair at the Red Sea. "God, this is our ship's doctor, Pete Strickland."

"Yes, I know."

*Of course you know...* though it hadn't escaped Cameron's notice that God's "I know"s and "introductions are unnecessary"s unflinchingly came *after* the introductions. "Well, an introduction is only the polite thing to do."

"Yes, of course, I understand," God said quickly, "and you may introduce Me to anyone that you show Me."

*Well, now that that's settled...* "Excellent. Strickland, I'd like a general examination made on this man—well, this god—and a report given to me immediately afterwards. I'll be on the bridge."

Strickland rose from his desk. "Okay," he said in a tired voice.

*Man, saw patients all day, operated, wrote prescriptions, filed reports, now gotta examine Yahweh...* Cameron left God with Strickland, his sense of unease growing.

He started for the bridge, then changed his mind and went to his quarters. He touched the intercom tab to the bridge and asked Frank to join him. Then he sat at his desk and let his thoughts tumble. The sudden appearance of God was exactly what the beleaguered survivors of the destruction of Earth needed... but who in the universe would know that except for God?

But he recalled some of Stargazer's philosophical and scientific questions—what *is* God? What is omnipotence? The universe is composed of the known, the unknown, and the unknowable. If God knows *everything*, He must know the unknowable... but if He knows the unknowable, then the known cannot be as observed, for the observable is made of the unknowable. Once known, the base variables change...

There was a knock at the door.

"Come on in."

Frank entered. "What's up, Dick?"

Cameron gestured at the chairs facing his desk. "I wanted to talk to you about... God. What do you think the chances are that he's lying?"

Frank sat in the chair to Cameron's left, folded his hands across his lap, and said, "What are the chances that he's telling the truth?"

“Yeah....” Cameron had been raised Catholic, at one point had even been a Bible literalist (though he had been very young at the time), but with the onset of his teenage years found his own ethics at odds with his religious teachings. Gradually he had fallen away from religion, though a vague belief in God—or some higher order of being governing the universe—had never entirely left him.

The huge humanoid who had come aboard the *Silver Streak*, if He really was God, was, Cameron had to admit, a disappointment. Yet if Cameron’s speculation was correct, and God was an alien with an unimaginably long lifespan, if He had visited Earth in the time of Moses and the Israelites, He might have been taken for the God of Abraham. Indeed, God’s appearance in that time and place would have been as desperately needed as He was here and now, to a group of people in a remarkably similar circumstance. Perhaps it was no coincidence.

“We’ve run into a lot of mysterious, strange things,” Frank was saying. “It’s difficult to tell.”

“Yes, it is. He seems to know a great deal about our beliefs in God.”

“Yeah, He seems familiar with at least the general outlook of all the world religions. The monotheistic ones who worship... God.”

“Yeah, but then again, there are inconsistencies. He claims to have assumed human form, but what if this is His real form? What if God is just an alien, a human-like alien who has a highly advanced technology and a long lifespan? What kind of God is that? How will the people of the *Silver Streak* respond to the revelation that the source of their inspiration and faith is... just a guy?”

Frank nodded. “I’ve thought of that too. And there are inconsistencies with the Christian and Jewish faiths—for instance no one is supposed to be able to look on the face of God.”

Cameron shrugged. “Well, that could just be an ancient superstition that has nothing to do with what really happened. How many centuries after the fact was the Bible written? How many books of the Bible were arbitrarily disregarded? How many mistranslations have there been? Frank, there is not a single primary copy of the Bible in existence anywhere. We have the Dead Sea Scrolls, or what’s left of them, here on the ship, but even those were copies of copies of copies. We just don’t know what we’re dealing with.”

“I know. But what reason would He have for lying?”

“It could be the foreshadowing of some invasion, maybe get in our good confidence and then attack.”

Frank sighed. “That energy field...”

“But the energy field disintegrated. He was flying a spaceship. That is suspicious in itself.”

“Well, obviously God could form the spaceship out of matter and energy around him.”

“Yes. I assume that a survey party has been investigating that ship?”

“Yes, they’ve found it’s made out of what appears to be a regular metalloid alloy. They’re breaking down the exact chemical composition. It’s a material we’ve never seen before, but certainly nothing outside the range of nature.”

“So they haven’t found anything that would... distinguish it?”



“No, nothing. It uses a gravity drive of some sort. The mechanism is alien, but the technology is comprehensible and not really any more advanced than ours. The computers are quantum-based, they use parallel operations like ours. But then again, we’re talking about God here. He created all the metals of the Earth, so He could create a spaceship out of those metals, just the same as He could create them.”

“We could play those games all day, and I’m sure He will, and so will anyone who believes in Him.” Once again Cameron’s mind filled with images of holy war, of armies of followers clashing in the halls, slaughtering one another over belief or denial of the big guy in the Infirmary. But so far there had been no indication of that; so far people seemed to take Him in stride. “Hi, I’m God.” “Pleased to meet you, God, I’m Joe.” “I know.” “Ha-ha-ha.” Perhaps humanity had progressed beyond the need to be impressed or cowed by God. Or perhaps they had seen so much on this epic journey that one more cosmic deity meant little to them. Wonder-fatigue.

Cameron imagined God landing on Earth—pictured that ship of His with its exotic energy field lighting a bush on fire, imagined an external speaker bellowing that powerful voice to an enraptured illegitimate prince of Egypt... Really, it wasn’t so hard to put those pieces together. Even the splitting of the Red Sea could have a logical explanation. “I find myself believing Him. I don’t know why, but I do.”

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Stargazer didn’t share Cameron’s sentiments.

As they sat side-by-side, alone on the bridge as they so often were, Jack took advantage of the amiable silence by asking his old friend what he thought of the coming of God.

“Perfectly absurd,” Stargazer said bluntly.

“You sure sound awfully sure.”

“Open-mindedness is a wonderful thing as long as you don’t open it so wide that your brain falls out.”

“Too late in your case.”

“Honh-honh. Please, Jack. We find a spaceship drifting around in space and bring aboard some guy who claims to be God. You do not need to be a scientist to be a teeny bit skeptical of that. Frankly I am amazed that anyone on board this spacecraft takes this person seriously. It is like the ancient explorer who visits an island of natives and gets into their good graces by proclaiming himself their god. Are we really so gullible?”

“Sure, but what if it’s true? Might tick him off with your blasphemous doubts.”

“I have been listening to arguments like that my entire life. People ask me if I had better not perhaps believe in God, just in case, so that when I die I can go to heaven. It is silly. In the first place, you cannot simply change your beliefs to suit a remote possibility. You either believe in your heart of hearts that there is a God or you do not. Secondly, if you make the decision to believe ‘just in case,’ then which God do you decide to believe in? If you accept Jesus Christ, then you are sinning against the Jewish God. If you accept Muhammad, you are sinning against Jesus. For that matter, why not accept the Norse gods? There is precisely the same amount of evidence for each of these deities: none.”

“Yeah, but what if we’re looking at evidence right now?”

Stargazer shrugged. “He will have to prove it.”

They sat in silence for a moment. Then Jack said, “I never asked you this before, but what *do* you believe?”

“I believe nothing. I look for evidence. If I commit myself to a belief without evidence, I may be prejudiced against that evidence when it comes along. Look at how long it took for the human race to accept such things as evolution or the heliocentric model of the Solar System.”

Another silence. Then Stargazer said, “What do *you* believe?”

Jack shrugged. “I don’t know. I’ve been through good times and bad times, and after the really rough start I got in life, in the long run I’ve been so lucky, I just have to think there’s somebody upstairs watching after me.”

“And so what do you say to billions who have not been as lucky as you? What about billions who were left on Earth to perish? God did not care about them, but He cared about you?”

Jack was affronted. “You asked what I believe!”

“I meant no offense. Just pointing out the logical contradiction.”

“Well, now that He might be on board, let’s just wait and see.”

“My sentiments exactly.”

Jack snorted. “Hmph. Frenchmen.”

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Cameron met Strickland in the analysis room of the Infirmary. A glowing wall filled with interior shots of God’s body. Cameron didn’t know what he was looking at and Strickland didn’t expect him to. “He’s not human.”

“Of course not. If He’s God, he’s the farthest thing from human.”

“Didn’t He say, though, that He had taken on humanoid form?”

“Yes, He said that He’d taken a perfect human body.”

Strickland half-smiled. “I do read a perfect body—in other words, no handicaps, no disease, no problems in his organs. But He is not human. There are some different internal arrangements of organs, His digestive system is a little more complex, He has three lungs.”

“I see. Well, that’s rather strange.”

“Strange isn’t the word for it. Dick, I would personally call it suspicious. I know I’m not a command officer and I have no business telling you anything about that, but I’m simply advising you as ship’s doctor, He is not human.”

That only supported Cameron’s theory. It certainly would seem to eliminate God’s version of events, but it invited a more plausible, more scientific model of God. Now that he thought about it, Cameron wondered if the Mormons were right.

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Others on the *Silver Streak* were as skeptical as Stargazer. The Pope, for instance, had denounced God as a fraud, much to Cameron’s surprise. But although that

effectively cut off most of the Catholic population from reveling in God's presence, He enjoyed a following among other groups, mostly a percentage of the Protestant and Jewish—though many of them, too, rejected God as a lying alien. Muslim imams were split about evenly, those arguing for and against equally vociferous, each finding passages in the Koran to back up their viewpoints, which Cameron found curious.

Interestingly, God's most devoted following was among the agnostic. Evidently the physical arrival of God drove them to discover religion. It was interesting that the skeptical were taken in while the religious tended to be skeptical.

But atheists remained atheists, and there were many shouted arguments in the halls which sounded much like Jack and Stargazer's discussion on the bridge.

Given God's casual attitude, and the casual attitude so many adopted in His presence, Cameron was tempted to discount God's arrival as a nonevent, but it was clearly not. Although there was not a major religious phenomenon occurring, there was no doubt that God's arrival had sparked a resurgence of philosophical and metaphysical debate. In that sense, God's presence on board was unquestionably a good thing.

One thing was for sure: everyone, Jew, Christian, Muslim, Buddhist, Hindu, atheist, Satanist, *everyone* wanted to meet Him.

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President Henry Walden certainly gave no indication that he doubted God's identity. "It is indeed a festive occasion, Captain Cameron. God is aboard the *Silver Streak*! That is indeed the most incredible contact ever made in the history of the human race."

"I'm inclined to agree with your sentiments, Mr. President, but remember there is a possibility that this entity is not actually God."

"I disagree with you, Captain Cameron. I believe that the reason for the presence of those other organs is because God hastily put together His human body without thinking of the importance of certain internal organs. He did it quickly and without care."

*Kind of like when He made your brain.* "Mr. President, God is perfect. And while I agree that there is the possibility that what you're saying is true, we must be cautious." *Which we haven't been so far.*

"Caution is your department. Mine is negotiating. I believe that we should have a celebration aboard the *Silver Streak*."

"Well, Mr. President, that is a harmless suggestion, and if you would like to do that, I certainly won't protest."

"Good. That makes me happy."

"Good. I take it then, Mr. President, that you are authorizing a celebration."

Walden's attention had wandered, and now he stared past Cameron at the wall, his condescending smile having melded into a contented, vacant grin. "Yeeeeees," he droned in that mindless way of his.

"Good. Yeah. Sure. Uh-huh, yeah. Okay. And who is invited?"

"Anyone who wishes to come, of course. The invitations are for everyone."

"Well, Mr. President, we're not going to be able to fit thousands and thousands of people in there. I'm sure everyone is going to want to be there."

“Very well. We can span the celebration out over several days, a few hundred per night.”

“All right, I can agree to that. And where is this celebration to be held?”

“The celebration will be held in the recreation room for the crew.”

“The recreation room for the *crew*? Are you going to allow civilians in the Command Section?”

“Civilians are allowed to pass and go freely however they please.”

“Yes, but that amount of civilians in the command section could be a little bit disturbing to the smooth running of the ship.”

Again came Walden’s condescending smile. “You do whatever you have to to keep the ship running smoothly. My job is to throw the party.”

“Well, if that’s the way you want it. I’m just exercising caution.”

“Very well. You exercise as much caution as you wish.”

Cameron was sure there was an insult in that statement, but he didn’t feel like playing those cute little word games. He wasn’t a politician and didn’t plan on acting like one. Ever. “Good. And I give you the go-ahead to do this party.”

“Thank you,” Walden said in a childlike singsong voice.

Shaking his head, Cameron said, “You’re welcome.” As he left the Council Chamber, he muttered, “Geez....”

In light of Strickland’s discovery, it was long past time to confront God and talk to Him, one organic being to another. God wasn’t difficult to locate. Cameron wondered if it would have been just as easy to spot Yeshueh ben Yosef in Judea by the flocks of followers. “God?”

“Hello, Captain Cameron,” God said, gesturing to him to join the crowd.

“Hello, God... do You like Your quarters?”

“Yes, they are very comfortable. I find them most agreeable.”

“Well, good, I’m glad You do. I just thought I should tell You the President would like to throw You a party.”

“Is that the President Walden who you told me about?”

Again, an odd question from the Almighty Father. “Yes, President Walden.”

“His prayers are not frequent. He hardly ever prays to Me.”

“Do you resent him for that?”

“No, not at all. As I said, all sins are forgiven, and those who do not wish to pray, that is their choice. However, I simply noted that he hardly ever prays. But he is a good man. Irresponsible, somewhat unintelligent, but good.”

“Well, I guess stupidity breeds goodness.”

Cameron meant it as an idle comment, but God seemed to take it seriously. “Very perceptive, Captain Cameron!” God turned his attention upon His attentive disciples. “That is the way it is. Superior intelligence often inspires greed, corruption. Intelligence is evil.”

Cameron wondered about the contradiction there—if intelligence was evil and God was pure good, did that mean that God was utterly stupid? Thinking back on the divine atrocities of the Old Testament... plagues, debauchery, sacrifices, harsh and hideous laws, fire and brimstone... it occurred to Cameron that God might just be admitting that He Himself was pure evil.

That reminded him of another interesting Biblical phenomenon—Man lived in paradise until he dared eat from the Tree of Knowledge; the vain and jealous God retaliated by forever barring Man from Eden. “Interesting.” Perhaps now would be a good time to put God to the test, despite the adoring followers—or indeed *because* of them. “Is the story of Genesis true?”

God’s brow furrowed. “The story of Genesis... are you referring to Adam and Eve in the Garden of Eden, when they ate the Forbidden Fruit?”

“Well, yes, of course I am.”

“Well... yes.”

A gasp rippled through the crowd.

God looked out at them, studying their faces. “Yes,” he repeated. “It’s true.”

“All of it?”

“Yes, it’s all—everything, every word. It’s all true.”

Cameron studied the adoring faces. He saw open skepticism on some of them. Might as well mine that while he had a chance. Disguising his own skepticism, he adopted a wide-eyed wonder and eagerness to learn. “Incredible! A talking snake! But it seems like there’s evidence to back up the idea of evolution on Earth.” *Oh, teach me, Wise One!*

For the first time since He had come aboard, God appeared uncertain. He looked at his followers. Some were beginning to ease away from the crowd. Others were whispering to one another.

“Evolution,” God said as though He had never heard the word before. “You’re referring to humans evolving from apes?”

*Actually I’m referring to the genetic model of random mutation, part of which includes the fossil evidence of divergent species in which apes and humans shared a common ancestor... but not a good idea to patronize the Lord.* “Yes, of course I am,” Cameron said simply.

“Okay, yes.” He looked at the faces of his followers, then intoned in as resonant a voice as He could, “That’s true too. They’re both true.”

“Both of them?” *They’re mutually exclusive.*

“What I mean is the story of Genesis is true, but in other parts of the world, apes were evolving into humans.”

*Any anthropologist could destroy that idea in seconds. In fact you don’t need an anthropologist.* Whoever or whatever this creature was, he wasn’t God. Cameron injected as much humility into his voice as he could manage. “Thank you very much, God.”

“My pleasure.” God turned to resume his sermon, but his flock had by now dispersed.

Cameron returned to the bridge. “Hi.”

Frank rose from the command chair. “Hi, Dick.”

“Hey, how’s God doing?” Jack asked cheerfully.

Cameron sank into his chair, disillusioned, disappointed, angry. “Oh, ‘God’ is fine. I am beginning to wonder...” He trailed off.

“What are you beginning to wonder about?” Stargazer asked.

"Nothing, never mind. Just thinking out loud." Now that the whole ship knew about God's presence, now that a multi-day celebration had been arranged, now that the eager people were prepared to greet their savior and follow Him to the ends of the universe, was now the time for Cameron to dash their hopes?

But he could not allow this creature to take over the ship—if that was indeed his goal. Whoever or whatever "God" was, he was lying, and Cameron had to find out the truth. And the people were entitled to know.

But how to proceed? "Who all is coming to that party tonight?"

"Oh, I've not really taken a real survey of it," Jack said. "But according to the rumors I've heard, a good portion of the people are coming."

They would have to learn the truth for themselves. Perhaps he could arrange to expose God publicly, to catch him in another obvious fallacy. Of course, believers in God were often willing to accept the ridiculous. "Well, they do know that only a hundred people are allowed at a time, right?"

"Yeah, they know that. But a lot of people are applying for that thing, a lot of people have tickets."

"Yeah, well, we can only let a hundred people in. You know that."

"Yeah, I know. Don't worry, I know what to do."

"Good." *I wish I did.* "I should make you security chief. You're very good at security jobs."

Jack laughed. "Three jobs, sure! It's hard enough trying to juggle helmsman and engineer!"

"I can imagine." *Perhaps the people are not as taken in as I'm thinking... after all, as soon as God started spouting that nonsense about Genesis and evolution occurring simultaneously, he seemed to lose them.* The people of the *Silver Streak* were not gullible, they weren't blind religious fanatics. They were the "best people." Scientists, intellectuals, philosophers, all people capable of thinking for themselves. At least so Cameron often told himself.

"I've taken a survey," Frank was saying. "We've got the hundred people selected."

"Now, why didn't you say that while Jack and I were talking?"

"I didn't want to interrupt you."

"Frank, when you have information, cut in anytime."

"All right, I'll keep that in mind."

"And Stargazer, I want you monitoring that party the whole time, just to see that nothing gets out of hand."

"Of course," Stargazer said. "But how could anything get out of hand?"

"Well, there is a small faction of Satanists aboard the *Silver Streak*. We don't want any assassination attempts made on God."

"That is a very good point."

But Jack was cracking up. "Assassination attempts? On *God*? Can you really assassinate *God*?"

Cameron was not amused. "Yes, I think you *can* assassinate this particular God. So keep an eye on things down there and make sure there are always at least ten security guards at a time." *They might be needed when I reveal to the people that this guy is no God.*

"Of course I will do that," Stargazer said.

"Good." *Now, what am I going to do? Challenge God to a theological debate? Quiz him on anthropology or geology? Ask him to turn rocks into bread?* "I've never enjoyed parties."

"No, I've noticed that about you," Frank said. "You don't seem to enjoy social get-togethers."

"They're a big bother. I prefer living my own life, not having interruptions, disturbances."

"You picked a great job."

Cameron laughed at that. Frank had a point. But everyone had their own perception of how to live life. For Cameron, living on the edge, tackling galactic crises on a daily basis... that was his life. How could he stand acting like a private citizen, hanging out at a party, when as the Captain he held in his power the means to determine whether or not this truly was God... and what to do about it in either case.

The proximity alert chimed, pulling all of their attention from the light theological matters. Frank bent over his console. "Picking up something on the scanners."

Cameron stared at the screen, which presently showed only the empty blackness of deep space. "What is it?"

"I'm not exactly sure."

The doors slid aside and God's huge nonhuman body lumbered up next to Cameron. "Do you mind if I come onto the bridge?"

"Not at all, God, come on in."

"I just thought I would hang around here for a little while before the party begins."

*Shootin' the breeze with my pal God...* "It's perfectly fine with me." Cameron turned to Frank. "Can you get a more exact reading?"

"Uh, well, my scanners are limited. Ask Stargazer."

Stargazer had made no acknowledgment of God's arrival on the bridge—and actually, now that Cameron thought of it, had expressed no interest in meeting God. "I am reading it as an energy field similar to the one that God arrived in, but it is not the same one, obviously."

"Obviously."

"Now I am getting a transmission."

The voice that filled the bridge was harsh, malevolent, guttural, and cruel. "I have heard that you have a prisoner aboard your ship. I want him returned to us at once!"

God took two steps back. "Oh, no... not him..."

Cameron glanced from the screen to God, back to the screen again. "What's going on?"

"I'm the one he's referring to! He's trying to trick you!"

"Do not listen to any of his rubbish," the cruel voice cackled. "Return him to this vessel at once!"

Stargazer, no more cowed by this new provocative stranger than by God, continued to analyze his readings. "In the center of that energy field I read a ship exactly like the one that 'God' arrived in."

God sounded almost frantic, his resonant voice assuming a whining tone. "Listen to me!" Then, straightening up, he resumed his divine posture and tone. "You recognize that voice, I'm sure. The voice of pure evil. That is Satan!"

"Satan" sounded vaguely irritated. "Listen, I don't want you to continue to embarrass yourself with this foolishness. Simply return to our ship and we will return to where we come from."

Cameron had had enough. He stood, faced God, and despite the overwhelming height differential, stared him down. "What's going on here?"

"He's trying to trick you," God said defensively. "Do not listen to him. Shun him! He is the devil himself!"

"Captain of the *Silver Streak*," the devil himself said, "identify yourself."

"I'm Captain Richard Cameron."

"If you do not return him to this vessel at once, we will destroy the *Silver Streak*."

The destruction of the *Silver Streak* was the one thing Cameron feared the most. He had nightmares about it constantly. He frequently lay awake at night in a cold sweat worrying about it. He obsessively thought of different ways his ship could be destroyed, searched frantically for solutions to every possible crisis. But one thing he did not respond to favorably was threats. "Satan" provoked in him not his frantic worry for his ship, but angry indignance that any alien would come along and dare tell him what to do. "Everyone on this ship is free. No one makes claims on a person. And if you attack us, we will retaliate."

"Go ahead and retaliate! We will destroy the *Silver Streak*. Is that understood? And now... we open fire!"

Frank gripped the sides of his chair as he watched his readout. "They're opening fire on us, all right!"

The ship shuddered. From several sections forward came the sound of metal tearing.

Cameron pulled himself off the floor. "Man all weapons turrets!"

Stargazer relayed the order.

Again a violent vibration rolled throughout the ship. Lights flashed red.

"Prepare the Carrier for launch." Cameron didn't like the idea of running from a battle, but he had to protect the thousands of civilians on the *Silver Streak*. And that was what the Carrier was for. But until the huge warship with its squadrons of space fighters was prepped and deployed, the *Silver Streak* had to defend herself. "Open fire on that ship."

"Open fire," Stargazer said calmly.

The turrets along the ship's midsection aligned themselves on the target and fired. High-intensity beams of superheated plasma and microwave lasers lashed out.

"Direct hit!" Frank cried.

The voice of "Satan" once again filled the bridge. "You will pay for this disaster, I assure you! That prisoner, Lango, has deceived you! You will learn!"

Stargazer jerked. "That ship has just self-destructed!"

Cameron turned, looked up at God, who was clinging desperately to a panel near the door. "Lango"? A prisoner? Who's Lango?"

God shuffled his foot, shrugged. "I'm Lango."



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An ancient comedian, observing the vast sums of money brought in by churches who paid no taxes, had once quipped that God was “all-seeing, all-knowing, all-present and all-wise... just can’t handle money.”

On his home planet, called Serrus, Lango had gone deep into debt. Unable to pay for his home, his spacecraft, or, most importantly, his taxes, he had fled.

He first found sanctuary on an inhabited planet of superstitious primitives. When Lango realized that his spaceship bore a striking resemblance to their god, he took advantage of their worship and became the leader of their people.

But his own people, led by the fanatic policeman Vair, eventually tracked him down and laid waste to the planet.

Lango managed to escape thanks to survivors who hid him and passed him through an underground railroad, but he soon found himself pursued by his planet’s police force. Failure to pay taxes was a capital crime on Serrus, so Lango had nothing to lose by fleeing from planet to planet, impersonating gods wherever he could. Vair followed, destroying civilizations wherever he tracked Lango down. Sometimes the natives turned against him when they wised up to the fact that he had deceived them, and once he’d had to escape from Vair’s prison ship.

But once he reached this empty, lifeless tract of space, there were no more primitive, superstitious worlds on which to hide. Lucky for him the *Silver Streak* happened along. He had gotten quite good at learning quickly the religious beliefs of civilizations he came across. A quick scan of the ship’s computer banks told him enough about God that he could extrapolate the rest. The energy field, used to protect his ship from interstellar dust, made a handy Kingdom of Heaven.

As usual, Vair pursued, threatened, and finally attacked. Fortunately, in this case, Vair met his match. And as per Serrus custom, when defeated in battle he committed suicide.

Lango was so ashamed, so contrite, that Cameron couldn’t help but be sympathetic. It was a tragic story—of course, Lango had lied before, he might still be lying. But this version had the ring of truth.

When he told the President about it, Walden was not terribly disappointed that God had turned out to be a fraud. In fact his concerns were quite menial. “Does this mean that we cannot throw the party for him?”

“Well... if you’d like to throw a party to welcome a new guest aboard the *Silver Streak*, that’s just fine, though I don’t think the civilian population will react kindly to knowing that he lied to us!”

In the event, however, the general feeling aboard the *Silver Streak* seemed to be relief. The coming of God shook too many worldviews. He was too small for those who believed in Him, too mundane for those who were undecided, too literal for those who did not believe. During this dark time, a savior was needed, and so the people of the *Silver Streak* had become willing participants in the deception; deep down, many of them probably knew they were being deceived. But for this brief time they didn’t care. Lango told them what they needed to be told, and like audiences swept up in a fantastic

but cathartic movie, they willingly lost themselves in the fiction, giving little thought to when or how—or even if—they would awaken back into the real world.

But now that it was over, the end of the deception was welcome. Now everyone knew who “God” *really* was, and the overall feeling was gratitude for the good time he had given them.

There were exceptions, of course, and Lango was given a bodyguard for a few weeks while the whole event was allowed to fade away.

But President Walden did have one practical concern: “What if the rest of his government comes against us?”

“They won’t. He said that Vair was his sole pursuer. Now that he’s destroyed, none of the rest of them will know our location.”

“Excellent. So as we continue to move outward, we’ll even get further away.”

“That’s right. They’ll never find us.” *At least I hope so...* But even if they did, Vair’s ship had proven easy to destroy. Clearly the Serrus technology was no match for the *Silver Streak*. Not that Cameron ever welcomed hostilities with other civilizations, and a confrontation was not something the *Silver Streak* could afford. But it was reassuring to know that, though the Serrus technology was alien, it was not superior.

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“Well, Lango, I guess this explains why your internal organs are differing from any normal human.”

There was no accusation in Dr. Strickland’s voice, yet the words put Lango on edge. There had been a few times in the past when native civilizations had learned of his trickery and been most unhappy. He recalled a time when he had been pinned to a stake and lowered closer and closer to a fire... fortunately Vair’s attacking starship had saved him.

But these people were reasonable and mature, and he had encountered surprisingly little anger over the fact that he had lied to them. “Yes, and I must apologize deeply for lying to you and your people. I thought that I could easily get into your good graces by doing that.”

“Of course you knew eventually we’d figure you out.” Strickland didn’t look at him as he spoke, simply reached for another medical instrument.

“Yes, I figured you would, but after I had already become secure in your hospitality and you’d gotten used to me—possibly accepted me as a friend. And then you would have forgiven me easily for these kinds of things.”

“My people don’t quite work that way, Lango. It’s best we found out now. Our feelings of betrayal run a lot deeper the better we know and the more we trust someone.”

Lango sighed. “I thought I had planned it well.”

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Cameron walked onto the bridge and found himself in the middle of a raging argument. Jack Hasta was turned in his chair, red-faced, his fist pounding on his

console. "Frank, he deceived us, he lied to us, and he impersonated someone he has no business impersonating!"

"Which brings me back to my point about belief," Stargazer said. "Someone 'he has no business impersonating.' Because religion has placed so much reverence on an abstract deity, it is more heinous that Lango impersonated Him than if he impersonated Strickland or me or Captain Cameron—"

"Strickland and you and Captain Cameron are not *God!*"

"Precisely my point. You show such passionate deference to a being you have never met and have no proof of, who has committed such horrible atrocities that I do not see how He is worthy of such devotion. If the argument is we should be grateful to Him for creating us, I point out that science describes natural processes which both created the universe *and* created us. So even if God *did* create us, He was doing no more than what nature could have done anyway."

Jack huffed. "So maybe God *is* nature."

"A matter of semantics. God can be anything you want Him to be. He might even be Lango if it so pleases you."

"But He's *not* Lango, you stubborn French baguette-monger. The point is Lango *lied* to us."

"Now, listen, he was only trying to become a guest of ours, he did nothing really wrong." Frank stood, turning the command chair over to Cameron. "Jack believes that Lango should be punished for impersonating God to get aboard the *Silver Streak*, that he ought to be given back to the Serrans or tossed into space or something—"

"*I didn't say that!*" Jack raged. "I'm just saying he was wrong!"

"With all due respect," Stargazer said, "you *did* say it would serve him right to take him back to Serrus."

"I was just saying! I didn't really mean it literally."

"Then why did you say it?"

Jack growled. "Lord, you're pedantic today."

"And you are uncharacteristically imprecise. Maybe you could pray to God to fix that broken circulator pump."

"Now, Stargazer," Cameron said, "let's not ridicule anyone's beliefs."

"I am not ridiculing. I am making a point."

"Well, so am I," Jack said. "Lango came aboard under a false name, lied to us, deceived us and caused us to be attacked."

"We would have been attacked anyway, whether he'd impersonated God or not," Cameron said.

"But still, there was no need for him to do that. He could have come aboard and told us the truth."

"Jack, why don't you try putting yourself in his position?" Stargazer said. "After escaping from Serrus, the first place he landed was a primitive planet that could never have understood the truth. They started worshipping him right away. He found a system that worked. By the time he came across us, it might never have occurred to him to do things any differently than he had before."

"He scanned us, he knew we were a benevolent people."

“He didn’t know if we would accept him,” Cameron said. “Jack, I’m not saying he was right to do what he did, but I can’t condemn him for it either. When you’re in a tight spot, you do what you feel you need to do. People who weren’t in the situation have an awfully easy time judging you for it.”

“I don’t know, I still don’t agree. I’ve been in tough spots. I know all about that. Nothing beats telling the truth.”

“Jack, as I recall you used to be a gambler.”

“That’s right.”

“Then I think you should be well aware of his logic. Sometimes you bluff to win the game. Set course for the next solar system.”

Jack wasn’t satisfied with the answer, but he knew that the Captain had spoken. And aboard the *Silver Streak*, the Captain was God. “Course is already set.”

“Good. Let’s hope we finally run across something. Light speed factor nine.”

The *Silver Streak* disappeared from the dead sector, its lonely people moving on in their desperate search for meaning and purpose.

But safely tucked aboard the warm and benevolent *Silver Streak*, Lango had found his meaning and purpose.

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**About the Author:** Collin R. Skocik is a prolific author of science fiction and science and space-related articles. In addition to the epic *Voyage Into the Unknown* series, he has also written the short story collection *The Future Lives!*, the disaster novel *The Sunburst Fire*, and the science fiction novel *Dreams of the Stars*. His first print sale was “Asteroid Eterna” in *Encounters* magazine. He is the science fiction writer in residence at Kepler Space University. When he is not writing, he provides closed-captioning for the hearing impaired. He lives in Atlantic Beach, Florida.

Visit [collinskocik.wix.com/collinskocik](http://collinskocik.wix.com/collinskocik)



**Editor’s Notes:** The Kepler Team is pleased to begin fiction publications in the *Journal of Space Philosophy* with author Collin Skocik’s story. Arthur C. Clarke devoted his professional life to science-based fiction that has made huge positive contributions to Space exploration and Space based systems. Today’s fiction is entertaining; and it may be tomorrow’s reality. *Bob Krone, PhD.*

## **Spirituality in the Space Community**

**By Lawrence G. Downing, DMin**

The *Space Journal* editor's assignment, if I cared to accept it (not Mission Impossible), is to write an article on "Space Spiritualism." Let it be said at the start: as a religious professional who has made a life-career of working with religious matters, I'm at a loss to define in succinct terms "spiritualism" or "spiritual." How is it possible to describe, in words, an emotional or intellectual experience? Think of the color blue, the smell of fresh-baked bread, or a love experience. The scientist can tell us what chemicals combine to produce blue pigments and describe the process that produces a smell. The physiologist can explain the hormonal changes that occur when we make love. But put into words, the feelings, emotions, pleasures that arise from within us from these externals, language falls short and equations fail. To add to the mystery, one person's response to a given stimulation may be far different from that of another. The same is true of spirituality or spiritual. The theologian can define spiritual and spirituality and write that definition in a dictionary, but when we have an encounter that takes us into an emotional or physical state that is above or beyond the normal, language is inadequate to convey the full story. What we can say about spirituality and spiritual is this: there are two components in the experience: an initiator and a human receptor. So what does all of this have to do with people who will inhabit a space community? Let me explain.

Thoughts about a community in space require consideration be given to the people who will live there. The candidates will be tested, measured, evaluated. Only the high percentile achievers will make the cut; the best of the best. Real life informs us that the most advanced and skilled vetting is no guarantee that the same problems that bedevil us on earth will not be replicated to one degree or another among those who inhabit a space community. In short, one cannot with 100% accuracy predict human behavior under all circumstances. The most intelligent and competent person can become irrational. None ought to be surprised when negative, hurtful, and violent behavior is evidenced among those who will construct and inhabit space communities. We may think we have human behavior figured. We may do all in our power to assure a compatible blend of people who are emotionally and intellectually competent to fulfill its purposes and goals. We conclude all is well, and ka boom! Something or someone will discombobulate our best efforts. It is human nature to throw monkey wrenches into the most finely tuned mechanisms. Space travel is not an antidote to our humanity. To complicate matters further, there are the children who will be born. It is impossible to determine the traits the second and later generations will exhibit.

The matters described above, I propose, have implicit and explicit spiritual implications. Each decision or event requires us to respond to situations that are not controlled by a formula or scientific theorem. Those who inhabit space communities will continue to make and depend upon laws and the personnel to enforce these laws and will implement consequence for violating the laws. The society will continue to promote moral and ethical behavior and these fall under the spiritual rubric.

The spiritual component within a community has potential to prompt us to strive toward a point beyond our natural inclinations or knowledge. When the human spiritual component functions well, it offers assurance when life events take us into uncharted territory. The inhabitants of space will experience hurt, distress, and loss. When one person is violent towards another, when illness, accident or death occurs, what does science have to say that offers solace or hope? The Periodic Table does not suffice in time of personal need.

How do we explain erratic or irrational behavior and what do we say to those who have been affected by such behavior? The spiritual disciplines speak to those who are in these situations or who are affected by them. A word of comfort and hope to the troubled soul is a good medicine; a word of assurance and hope to the one who has lost a loved one is a boon to the soul. One who employs the spiritual gifts has the courage to assure community members that they are not alone in the vastness of space. How we define that presence is open to interpretation. I believe that in a space community there will be diverse responses to whatever belief system or practice is practiced, just as there is here on earth. When we are there, wherever "there" is, we can expect to find beliefs or practices that are a continuum of those on earth-home. Other individuals may create belief systems that are responses to conditions that emerge from their space-home.

The context of diverse philosophies and religions raises the question of religious liberty. The space community may well struggle with the boundary matters that are implicit within a religious or philosophical matrix. What rituals or practices are acceptable? Which ones are not? Is the sacrifice of virgins to a planetary or sun god compatible with what a space community believes about life and its sacredness? Who and what will determine the taboos that are part of the community's value system? Will there be toleration for the person who chooses to hold one day more sacred than another or does conformity and the need for cohesiveness trump individual desire and belief? Will the space community transport the earth-laws with them?

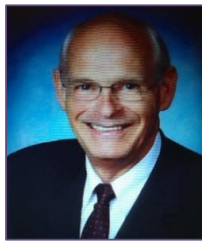
The human spiritual component has been part of space-life since humans first were propelled into space. On December 24, 1968, Bill Andress, Jim Lovell and Frank Borman, the crew of Apollo 8, read in turn the creation story as recorded in Genesis 1. On the Apollo 11 mission, Buzz Aldrin received communion while standing on the moon. Off-air he read from scripture. It is to be expected that other space pioneers will show a similar regard for the spiritual as they venture forth into the unknown. What form the spiritual component will take is quite beyond our scope to predict. What we can say is that the men and women who inhabit space will take with them the values, practices, and beliefs that they held on earth. Likewise, the three philosophical questions await answer: Who am I? Where did I come from? Why am I here? These timeless questions will be part of the baggage space travelers take with them. Each is a spiritual question. Each calls for an individual response. The quest to discover answers is a spiritual journey, unique to each person. It cannot be shared fully with others, not by lack of willingness or desire. Not at all! The limiter is language. How is it possible for us to express, in words, the feelings or experiences that are ours alone? This is the

conundrum that inhibits the ability to define, in precise terms, spiritual or spiritualism. But, as has been stated of other matters, you will know it when you experience it and that experience will be yours alone.

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**About the Author:** Lawrence Downing, DMin, has been a pastor for the Seventh-Day Adventist churches in the United States for more than forty years. He was an Adjunct Professor for both the School of Business and the School of Religion at La Sierra University, Riverside, California, 1990 to 2006. His DMin is from Lancaster Theological Seminary. He is a co-author of 2006, *Beyond Earth: The Future of Humans in Space*. Access [www.bobkrone.com/vcat\\_details/24](http://www.bobkrone.com/vcat_details/24) to see the video interviews of Dr. Downing and Dr. Krone at the 2006 International Space Development Conference in Los Angeles.



**Editor's Notes:** Dr. Lawrence Downing is a pioneer for the complex field of Space Faith. He is Kepler Space Institute's Chair for ongoing research and documentation of Faith and Spirituality for the future of humans in Space. Our relationship since 1993 has been especially rewarding for me. My learning from Larry about Moral and Ethical Leadership continues. He walks his talk. It is an honor to include his article in this Spring 2013 issue of the *Journal Of Space Philosophy*. See, also Dr. Beata Chapman's article, "Widening the Dialogue about Faith in Space," in this issue. *Bob Krone, PhD*.

## **Expanding the Heart: A 21st Century Artronaut Contemplates Spaceflight**

**By Frank Pietronigro**

When I extend myself as a sentient being, a 21st Century *Artronaut*, I will expand my heart, soul, creativity, imagination, joy, and fear and I will face all the challenges of space flight that have been faced by pioneers in every field throughout time. I wish and wonder about the meaning of human expansion off planet Earth as I contemplate my heartfelt excitement imagining the possibilities of living a portion of my life in suborbital flight.

I see a new hope for the future of our world, commensurate with that experienced in 1969, by those millions of people who watched awestruck as our species landed on the Moon for the very first time. We remember it as a significant step for man, in contrast to the amazing adventures we who are privileged can now experience.

As I contemplate the economics of space flight and who shall own the planets, I wonder how that ownership will come about. How will cultural expression unfold off our home planet? Of course the profits from mining the resources on asteroids can bring great wealth and improve the standards of living for larger numbers of people in ways that benefit the labor necessary to produce this new wealth. How will global economies support vast numbers of people going on space adventures? On Earth, we have seen previous human expansions of culture, power, and technology and an incessant pursuit to acquire control of resources. Currently, the United Nations has a space treaty that narrates the collective possession of outer space by all nations for the benefit of humankind.<sup>1</sup> As we approach potential space colonization and appropriation of space resources, hopefully for the betterment of the greatest common good, I wonder, will the expansion be peaceful and egalitarian? I posit that artistic expansion to outer space might lead to an enhanced use, expansion, and capitalization not only of new planets and space, but also of our own planet, Earth. Indeed, I envision space flight as a transformative experience artistically and spiritually.

For artists, parabolic flight and space flight technology offer situations where scientific and artistic methodologies, ritual, economics, and politics can be sculpted as performance. This locale of exchange is as exotic for artists as it is for space scientists and engineers: space presents challenges and opportunities unlike those that artists find in their gravity-bound studios. While scientists and engineers have been able to expand the understanding of natural law and physics, the scientific space experience has kindled a new fire in the human spirit and sparked an artistic yearning: how might artists harness such experiences to create new works of art that respond and contribute to the evolution of cultural activities and creative expression. What crown of creation might exist as artists work alongside the scientists and engineers? How might scientific

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<sup>1</sup> See [en.wikipedia.org/wiki/United\\_Nations\\_Office\\_for\\_Outer\\_Space\\_Affairs](http://en.wikipedia.org/wiki/United_Nations_Office_for_Outer_Space_Affairs).



engineering benefit from the artistic perspective? What will the collaboration of astronaut and artronaut enable?

Everyone has seen the exponential benefits of scientific and technological achievements during the 20th century. The 21st century promises even more articulation between art and science. Digital media, genetics, robotics, nanotechnology, and regenerative medicine have transformed the arts as artists are now transforming their creative processes using new media and technology. Space science and engineering have helped our world directly and that value can be capitalized upon with the renewal of the conception of human expansion into space and its larger meaning for our shared lives here on planet Earth. Just as Venetian nautical science, military development, and economic development led to an artistically enriched and aesthetically sublime Venice, the fusion of art and science in space will enhance all human life here on Earth, given the wealth of mutually developing, say, a planet like Mars. But what will this collaboration and expansion into space look like? How will my essence as a human being, my feelings and my emotions, fare during this expansion and what care do we need to take in order to nurture the heart and human spirit as we move away from home?

I know in my heart that sexism, racism, homophobia, and other forms of bias and prejudice need to be left here on Earth. In accepting these imperfections of our species, in our current genetic manifestation, I anticipate that space scientists, engineers, and artists will work together in the spirit of mutual cooperation by replacing hatred, bigotry, and self-centeredness with cross-cultural generosity, gift giving, a sharing of ideas and shared property, mutual support and mentoring, and cooperative international education in support of a space expansion potlatch. Of course there is always the chance that the reality will be much different. So, how do we guide the conceptualization of the expansion of space today? I must ask: who really owns the sky, the planets, the stars and the universe?

The thought of moving off planet Earth only to do scientific experimentation leaves me needing more; I am already wondering about the expansion of my human heart as I move away from this beautiful home planet Earth. I know I will experience a separation anxiety because I am part of Mother Earth and I am not a child of Mars or other planets; so how can one's heart and body be part of outer space? Is my connection based in the fact I am made of star dust? There is literally no *terra firma*, just the vehicle in which I will be flying through space! How will I feel disconnected from ubiquitous gravity and from my home planet?

I wonder how my thriving heart would last on Mars, being disconnected from Earth. I know that our technologies of the future will recreate the atmosphere and geology of Earth on a planet such as Mars so that distant planets will feel as close as home to those humans who will live there someday. The environment that feels similar and comfortable will encourage artistic creativity; but the frontier, the unknown will obviously inspire and challenge the imagination. There is an exciting cognitive and emotional

disequilibrium that stimulates growth; I invite the dissonance from the harmony of my Earth shell spaceship.

The arts have given so many gifts to our humanity that they must be a part of this pioneering venture. As I venture off-planet, I cannot leave my heart, my soul, or my creativity behind; I cannot separate that from my mind, my intellect, and my analytic characteristics. As a human being striving for expansion and full integration of all my capacities, I do not wish to cut off from my full awakening any aspect of self, despite the fact that during long-distance space exploration I will face perils, as have all pioneers. In my heart I feel courage while not denying the risks.

As a culturally expressive human being, I must honor my essence, express myself freely, and feel the many sensations this quest evokes, knowing today what it feels like to float and create in zero gravity. Such creative expression blossomed in the scientists who constructed and directed the Hubble Space Telescope.<sup>2</sup> Those artists have provided breathtaking visual images and refinement of data regarding the nature of space and the composition of planets and they have inched us closer to understanding the greatest of mysteries of space, including black holes. More importantly, the creative centers of those Hubble scientists have been equally enlivened. Artists who have always dreamed, as da Vinci did, of travel in the heavens now are realizing the moment. Art has flown before in the mind and soul of creative genesis; now artists will join in realized space achievement to complete the vision.

The development of real space vehicles is making space exploration and plans to take our populations into space a reality! Can I go too? Everyone wonders. The creativity employed by a new breed of space exploration entrepreneurs has inspired both the arts and science, making the actualization of the shared dreams of both achievable realities. World citizenship is expanding to become space citizenship, realized by planetary pilgrims. The territories of "Outer Space" are open to enterprise, awakening a new era and hope for humanity. Global politics will point these enterprises towards either private profitable endeavors or collectively beneficial public enterprises that benefit the many. Perhaps there will be a mutually beneficial hybrid that transcends the binary nature of the present competitive nature of earthbound research and development.

The course of history is about to change forever. People around the globe are watching in anticipation, as our planet Earth becomes an entity within a greater planetary system collective and eventually a component of a galactic construct of unimaginable and boundless structure. We have seen the impact of the Overview Effect by looking back at Earth; but what new understanding will come about relative to our relationship to our place in space when we articulate an innate capacity and shift our perceptions in order to see a larger overview effect and see our whole universe as we look back upon the one we currently conceive? Never before has so much depended on our global community successfully developing our capabilities of entering space and seeding culture and civilization on distant celestial bodies, including the Moon and Mars. What

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<sup>2</sup> See [www.nasa.gov/mission\\_pages/hubble/main/index.html](http://www.nasa.gov/mission_pages/hubble/main/index.html).

are the plans for humanity in space over the next ten years and beyond and how will international cultural expression impact this incredible human journey into the cosmos?

Until recent times, our cosmology of self could not be conceived beyond the confines of gravity. Today, however, it is obvious that mankind's imagination, creativity, and technologies have fostered our ability to move outside those confines. I am honored to be one of the initial members of human species liberated and inspired by the phenomenology of space exploration and the sensations of zero gravity. In 1998, I experienced parabolic flight for the first time as a part of the NASA Reduced Gravity Student Flight Program, a project of the Texas Space Grant Program and the California Space Grant Consortium that was flown in conjunction with a team from the San Francisco Art Institute. I am grateful for having access to the technology extended to us artists, who were working in part as scientists, in order to create Research Project Number 33: Investigating the Creative Process in a Microgravity Environment.<sup>3</sup>

My responsibility is to accept the gift of my next opportunity for flight and optimize my creative gifts to the benefit of the continuing process, inspiring and educating others. As an artist I hope to see, feel, and love all the experiences inherent in spaceflight; to feel and assimilate them in my heart, mind, and soul as I bring with me the sense of wonder and the desire to create and act out my own dreams and visions while listening to the "*space wishes*" and dreams of others whose spirit and desire will travel with me during flight.

Space exploration and the necessary technologies for human beings to move off planet Earth are gifts extended to our species because of the special relationship between our individual and collective imaginations and the larger unfolding of the self-creating universe. At the heart of the matter, there appear to be promptings for such adventures that come from some special place beyond our analytical intellect, one that venerates quantified results celebrated within our scientific systems. Granted, the study of such results remains meritorious. Obviously, we see the benefits surrounding us today, especially in this enterprise of exploration, but they are only a portion of our species' vast, complex history and cultural story. We have to remember that the magic produced by the Sorcerer's Apprentice can and has gotten out of hand as we are also experiencing in our world today. Our unbridled collective unconscious can be the caldron of sublime wonder or chaotic devastation. What appears to be a benefit may at some point turn out to be a detriment. For our species to express mutual intellectual and emotional capacities requires not only tapping into our collective unconscious, but also stimulating our collective conscience.

It took 5.7 million years for our species to evolve to the point of expressed functional technology and artistic expression that changed us from a predominantly reactive species to a reflective tribe creating language, technology, mythologies, history, religion, and abstract expression visually in the form of painting on cave walls.<sup>4</sup> It is no

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<sup>3</sup> See [pietronigro.com/space/overview.htm](http://pietronigro.com/space/overview.htm).

<sup>4</sup> See [en.wikipedia.org/wiki/Human\\_evolution](http://en.wikipedia.org/wiki/Human_evolution).

coincidence that those paintings eventually pointed to imaginary journeys in the heavens. Even one of man's co-existent hominids, Neanderthal, developed cave painting in Spain's Costa del Sol, some 42,000 years ago. Scholars now place the oldest paintings of *homo sapiens* in Australia, dating from perhaps 42,000 years ago as well. All expression before these earliest paintings was in the form of petroglyphs or was carved and was functional technology: seed-grinding indentations in stone, arrow flints, and weapons for hunting and protection, some of which date back to 330,000 BC. Since the era of cave paintings – 42,000-10,000 BC – our species has imagined and created the technologies necessary to move us into that sky upon which our species has gazed for six million years. It appears to me that we are a slow-moving species, but there may be some benefit in the slowness our process. At what stage of modern man will these nascent flights to space and other planets be categorized? Will all of what humankind has experienced thus far be considered part of our primitive stage eventually? Where will we be in 42,000 years? Certainly, we are advancing exponentially towards some greater context through space exploration and colonization.

The act of space exploration started when the first primordial cell moved from its place of birth to another location. Space exploration was happening when our species first stood erect on the savannah and we took our first steps to move beyond home to new spaces. Space exploration today offers us similar journeys to new spaces and places, journeys that are inherent in our essence and in the emotional heart of our species. Inner space is equally as challenging.... We may find solutions in such investigations rather than relying solely on our current-day technologies whose roots reside in alchemy and the Industrial Revolution.

In my heart, I know intuitively that an open sharing and cooperation among scientists, space artists, space arts organizations, supporting institutions, and space exploration agencies will foster great outcomes that will inform, amaze, delight, and inspire people of all generations. Images of artists flying in space will provide a new icon for the global community to contemplate. As an artist looking back down to Earth, I will conjure the images published in Frank White's book, *The Overview Effect*: a retrospective of the impact of space travel on astronauts and earthbound observers. The images compiled in his work are from astronauts' experiences and satellite-generated snapshots of the Earth, the Moon and space. Specifically he describes how the physical change of perspective creates a new way of looking and thinking about planet Earth, the planetary system, space, the universe, and ultimately us and our purpose and collective destiny – physically, spiritually, socially, and intellectually. Amazon.com describes his book as follows:

Using interviews with and writings by 29 astronauts and cosmonauts, Frank White shows how experiences such as circling the Earth every 90 minutes and viewing it from the Moon have profoundly affected our space travellers' perceptions of themselves, their world and the future. He shows how they have also affected the rest of us, who have participated in these great adventures, psychologically. He provides a rationale for space

exploration and settlement, describing them as the inevitable next steps in the evolution of human society and human consciousness, as the activities most likely to bring a new perspective to the problems of life on Earth. This text considers the possible consequences of a human presence in space, both for the pioneers who settle there and for those who remain on Earth. White imagines how having a permanent perspective from outer space will affect our politics, our religion, our social relations, our psychology, our economics and our hard sciences. He confronts the possibility of rebellion by a space colony and of contact with extraterrestrial beings. And, finally, he makes it clear that our fate is in our own hands, that we will shape our future in space effectively only by fashioning a human space program, free of excessive nationalism and dedicated to the peaceful exploration of the space frontier.<sup>5</sup>

The Overview Effect impacts today's global environmental conservation movements towards supporting the heart of our home planet Earth and all her life. Artistic expression that reflects the Overview Effect creates new cultural artifacts and icons which will be produced by a technological system that redefines fine art as both aesthetically appealing and practical in effecting a new world order. Such order might be called the first *cosmic order*. The perspective of the new art is one whose overview provides a new context for humankind. The cave paintings and museum galleries give way to "drift paintings" and holographic sculpts of the imagination as an artronaut flies, spies, and creates hundreds or thousands of miles above Earth.<sup>6</sup> His new perspective provides hope and inspires a canvas that depicts a renewed world, refreshed by a boundless, new frontier. Those space scientists and engineers who created the technology that afforded us the Overview Effect were indeed artists like Leonardo. They are scientists, looking to the stars to wondering and wish about life, letting their hearts guide their minds, letting their imaginations filter their present knowledge, providing icons that inspire, inform, entertain, and educate.

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<sup>5</sup> See [www.amazon.com/dp/1563472600](http://www.amazon.com/dp/1563472600).

<sup>6</sup> Carl Gustav Jung, *On Death and Immortality*, ed. Jenny Yates (Princeton, NJ: Princeton University Press, 1999).



Earthrise, NASA Apollo 8 Mission, December 24, 1968 (Image Courtesy of NASA)

Greater international, multicultural, interactive, intergenerational achievement in the arts and humanities and culture will result when we see artists fly into space alongside space scientists. Artists, arguably, should have the same rights to access extant space technology as scientists; however, the access realities of 2013 do not reflect parity of opportunity between the arts and scientific communities. Perhaps this is because, unlike the space adventures of the Venetian culture, art is not valued for its intrinsic, emotive, and creative capacity. Art in 2013 has been commoditized, colonized, and capitalized upon despite its irony. Why is that artworks are offered at auction houses at astronomical sums, while the value placed on artists themselves is negligible? Art

connoisseurs collect trophies in lieu of promoting and preserving spiritual, philosophical, and aesthetic process. Artist must fly into space, leading with their hearts and souls; this is the bridge to creating a systemic adoption of an overview effect.

Since the dawn of history, people have looked to the sky and outer space with wonder while considering where we came from, while contemplating who we are as a species. Humankind has expanded its knowledge of space and the heavens, through artistic expression for thousands of years. We marvel at ancient cities aligned to the starry heavens and to cave paintings and stone carvings depicting our night sky. The celestial sky has been a source of inspiration for artists since the beginning of time and consequently has inspired the creation of new forms of art that reflect our universal fascination with extraterrestrial phenomena. Artists in our distant past painted gods and mysterious beings in flying chariots and flying machines taking flight above our Earth. Our ancestors remind us of how they used their knowledge of space and time to harmonize with the rhythms of the changing seasons and life cycles that benefit the quality of life, even as they articulate our human spirit in relation to the cosmos.

Now more than ever we need a reinvigoration of our global collective imagination and the creation of new archetypes, derivatives of artists, scientists, and engineers working on the Moon and in space together that will foster new creative and communal solutions to the environmental, social, political, and ethical challenges earthlings face today. Why not paint the first asteroid we land upon lavender?

Today, a new breed of contemporary artists has initiated projects to explore outer space on its own terms by creating art beyond our home planet Earth with various media, including artists' own bodies in weightlessness. An incredible adventure has commenced and the symbolic freedom of artists moving into space symbolizes a new release of our imagination as we contemplate a new genre: the Arts, Humanities, and Culture in Space Exploration. As we free the arts from gravity and artists begin to adventure into outer space, the historical perceptions of our own world will drift and change under the charge of our artists, who help us see our living on and beyond our world in a new light. Like the technologies that have created the Overview Effect, our living artronauts will see the world and cosmos in a new way, using the lenses of their artistic histories to inform a new way of seeing our relationship to the universe. The new foci will transcend the older forms of traditional art, but will close the circle on the orbit of artistic experience, reaching back to the awe of cave dwelling painters and projecting forward to the limitless canvass of our universe, more than likely using fractals in their expression of the infinite.

How will new cultures, mythologies, and creative methodologies unfold as our species learns to fly free of gravity? After sharing many dinners with Albert Einstein, Carl Jung contemplated that the human psyche exists outside of time and space, while our bodies reside within this corporeal substance, contained in time and space.<sup>7</sup> He also proposed a "parabola of a projectile" as a metaphor of life's energy process that is focused on our

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<sup>7</sup> Ibid.

body's ultimate transformation. Our bodies are bound to our planet Earth by gravity, but what will become of our art making, our culture, and our species once we are released from gravity's confines?

Our sights are set on new horizons and those horizons are up where *once upon a time* aerial perspective guided our conceptions of space. These perspectives changed into a vision of a linear perspective, envisioned by our Renaissance-era understanding of space, which is being transformed once again, with our linear perspective being turned upside down and inside out, as was the case with kinetic microgravity-based works of art that are expressed in full 360° spheres. How will this creative metamorphosis evolve, given that time and space curve in upon themselves? For artronauts, what will become of our place in and movement through time and space, given the drift and kinetic movement of zero gravity and advanced theories in physics?

A new way of seeing our world conception of space will enhance our art and culture, creating new practices as we articulate a new archetype that relates to new spaces that our future hearts shall inhabit, noting again that psyches and unconsciousness exist outside the confines of time and space, according to Carl Jung and his dinner guest, Albert Einstein.

I believe that renewed creative imagination can be rekindled by the image of our species returning to the Moon once again, but our mission at this time is to ensure that the visit is infused with artistic as well as scientific purpose and achievement. Both shall be celebrated; both shall accomplish giant steps for people kind in outer space. These steps will not be accomplished without difficulties. Our tenaciousness will serve to overcome them.

Imagine the trials and tribulations of painters, dancers, performers, and other artists who are forging ahead into the new creative territory of space exploration. What outcomes and educational learning experiences might be created by adventuresome artists' collaborations with space agency administrators, who as a result, in part, of the political and advocacy work of the artists themselves, help, support, and welcome these artists as they gain access to the International Space Station's operational systems, to astronauts and their research technologies?

What historical evolution will result from this contemporary fusion of interdisciplinary media and the visual arts, whose practitioners will utilize, in part, zero gravity environments, naturally occurring phenomena in outer space, and space exploration technologies? Such ventures can form partnerships with space exploration agencies such as the NASA, ESA, JAXA, the Russian Space Agency, and contemporary space entrepreneurs and companies including SpaceX, Bigelow Aerospace, Virgin Galactic, XCOR Aerospace, and others to create new human potential.

The unprecedented global attention and focus on historical scientific and artistic accomplishments in space has already created an excitement and anticipation that our



communities need today. Just as the Overview Effect began to transform the consciousness of past space explorers and the earthbound observers and beneficiaries of their missions, the journey upon which I am about to engage will catalyze new solutions to our global challenges. NASA's past missions inadvertently made possible the creation of a piece of art, mythic and archetypal in stature: the image of our world as seen from space. By itself it is only an image; as a resonant icon its value and use has become priceless. This iconographic image of our home planet Earth suspended as a single unified entity floating in the vastness of space created a new archetypal concept that catalyzed the global environmental movement and anchored itself in our collective unconscious forever.

I believe that human communities unconsciously yearn to rearticulate old archetypes and recuperate the power of such imagination-empowering imagery. This new mission to space will consciously embrace the quest to expand the effect created by this new space perspective. Conscious creation derived from that new perspective will guide the astronaut and his earthbound audiences' wishes, hopes, and dreams so that our species' future is shared. Together we will co-create more than a physical piece of performance art; we will responsibly baptize ourselves in the salve of imagination and inspiration and experiential meditation that space travel evokes. Together we will find new solutions to obstacles that have stymied our willingness to form a conscious global awareness in the past. This mission nurtures that willingness and renews hope that we can solve these challenges together. We can transform our space wishes into living solutions that will activate a renewed global vigor necessary to the expansion of space exploration. The word art is partially derivative of the Greek word *artzien*, which means *to prepare*. This space venture will prepare us to face our world refreshed with a new perspective, inspired with creative force.

The iconic image of one planet, one people, encoded in that unforgettable first image of the Earth as viewed from the Moon in 1969, will act as a muse to this mission. I believe that art and creative practices in space are the not only the *next* step in space exploration, but also that their presence and purpose are a *necessary* step to erase the artifice that separates science from art. Just as the Earth viewed from the Moon reveals no political boundaries or separation of its people from one another or any other living things, this new gestalt dissolves the separation of mind and soul, mind and heart. Things physical lead us to our metaphysical peace. That center creates our new point of view in which we are no longer only citizens of this or that country but live as a global family.

*Free Enterprise: The Art of Citizen Space Exploration*, an exhibit at the University of California, Riverside (UCR ARTSblock from January 19 to May 18, 2013), is, according to Tyler Stallings, co-curator of the exhibit who worked with Marko Pelejan, "the first contemporary art exhibition in the U.S. to present an international array of artists and organizations who are exploring the potential democratization of space exploration and the intersection between artistic production and civilian space travel."<sup>8</sup>

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<sup>8</sup> See [sites.artsblock.ucr.edu/free-enterprise/](http://sites.artsblock.ucr.edu/free-enterprise/).

Visitors to the exhibit can read fascinating stories about this new breed of artists who are working side by side with the scientists and engineers in the exotic environments of outer space. The artists' works includes narratives and videos that recall their feelings and sensations experienced while engaged in the ups and downs of parabolic flights. Each artist posits the future of spaceflight and its relevance to the artistic nature of humans. Each artist looks forward to artistic endeavors in space within our planetary system and beyond.

This artist looks forward to Space Wishes, a journey of the heart, mind, and soul. The flight will take place in 2014.

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**About the Author:** Frank Pietronigro has achieved international recognition for his work in the Arts, Humanities, and Culture of Space Exploration. He is the co-founder and project director of the Zero Gravity Arts Consortium ([zgac.org](http://zgac.org)) and his website is at [pietronigro.com](http://pietronigro.com). The locus of Frank Pietronigro's work resides at the confluence of fine art practices and space flight technology. As a contemporary fine artist, his concerns, themes, and focus include ephemerality, interactivity, levitation, and biomorphic form. Mood is amplified by color and luminance that evoke the mystical unseen world of interior spaces. Frank Pietronigro moves between painting and digital media, between the tangible and the illusive, between matter and energy, and between transparency and opacity in support of heterogeneity. Created in the spirit of pluralism, the artist executes his work and expresses his creativity using multiple and varied media and styles. Frank Pietronigro has also applied queer theory to promote diversity among future space travelers.



(Photograph: Joe Szymanski)

**Editor's Notes:** Kepler Space Institute (KSI) is proud to publish the thoughts of Frank Pietronigro, a prominent professional artist who has created his art both in and about Space. See [pietronigro.com](http://pietronigro.com) for his current exhibition at the University of California, Riverside, titled "*Free Enterprise: The Art of Citizen Space Exploration*." He is planning a major Space Art Exhibition for 2014 with Professor Lowry Burgess, a participant in most of Kepler Space Institute's events over the past five years and author in the Fall

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2012 issue of the *Journal of Space Philosophy*. Readers can find my chapter, “*Music and Arts for Humans in Space*,” in *Beyond Earth: The Future of Humans in Space*, (Toronto, ON: Apogee Space Press, 2006). KSI will retain Space Arts in its future work.  
*Bob Krone, PhD.*

## **Space Settlement Design and Management: Entropy, Systems and Sub-Optimization**

**By Bob Krone, PhD**

Entropy is an important concept from the thermodynamics of physics and astrophysics to describe the degree of disorder in a closed system over time. In closed thermodynamic systems, entropy will increase, resulting in a decrease of dynamics in the system, without the application of additional energy inputs across the boundaries of the closed system. Effort or energy expended to decrease entropy decreases the amount of ordered energy available in a physical system.

When dealing with thermodynamic systems, it is important to specify whether the system in question is closed or open. Some of the consequences that apply to closed thermodynamic systems do not apply to open thermodynamic systems. The mere act of such specification of boundaries amounts to an act of distinction-making (by a human observer) and its corollary—recursive distinction-making (RD)—as part and parcel of entropy increase. But recursive distinction-making, in itself, promotes creative patterning and generally acts to counter increased disorder.<sup>1</sup> Do we have a paradox in the making? I argue that we can attempt to control local entropy increases and even reverse these into negative entropy, under certain conditions.

It is likely that the Cosmos as a whole is an open system, with pockets of closed systems distributed therein, such that local increases in entropy are common. The imminent distribution of human settlements across the Cosmos calls into action attempts to help control entropy increases with such relatively closed systems.

We observe analogies of entropy phenomena in complex human systems as well, although it is more difficult to measure the true energy sources than with systems occurring in nature. Poorly managed human systems move from organization to chaos; from dynamic interaction to inadequate interaction; from vision, mission and goal focus to drift with wasted energy and resources; and from productive life to energy loss and progressive decline and failure. Weeds will dominate when our gardens lack wise attention. Life in Space takes the effect of entropy to another level.

Humans living in Space currently have no control over the natural forces of entropy in the universe. According to generally accepted cosmological theory, entropy in the universe will increase over time until life, as we know it, will be impossible.<sup>2</sup> Since that is

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<sup>1</sup> The scientist responsible for discovering and researching the autonomous universal function of recursive distinction-making in nature is Dr. Joel Isaacson. See his feature article, "Nature's Cosmic Intelligence," in *The Journal of Space Philosophy* 1, No. 1 (Fall 2012) and his "Letter to the Editor" in this Spring 2013 issue (11-13).

<sup>2</sup> Existing entropy theory has a long history, commencing with the work of German physicist Rudolf Clausius in the 1850s and 1860s. See Rudolph Clausius, "On the Motive Power of Heat, and on the laws which can be deduced from it for the Theory of Heat," *Annalen der Physick*, 79 (March-April 1850): 368, 500 (Dover Reprint).

forecast to take millions of years, odds of other humanity extinction events occurring before the expansion of the universe builds entropy to the human extinction point are much higher.<sup>3</sup>

Strategic Design and Management provides methods to address these issues. One way to interpret the goal of Strategic Design and Management in any organization is to consider it the macro tool for continually creating and sustaining negative entropy, within its own system, to prevent organization failure. That interpretation applies to public or private organizations, to societies, and to civilizations on Earth.

This essay proposes the application of applying entropy thinking and analysis to the planning, and later creation, of human Space settlements. For human systems, as opposed to the natural astrophysics of the Solar System and Universe, there is the capability to control the means that produce ends considered good over time.

**What is the optimum set of criteria for leadership needs, and for resource management tools to include in the design of “Good” (i.e., negative entropy) Space settlements?**

Answers to that research question will require multi-discipline doctoral quality study (i.e., a mix of hard and soft sciences). **The recommendation of this essay is that such study be formally established on a global scope.**

Since the essay’s purpose is to be more heuristic than prescriptive, I will end with a short list of components of that optimum set stemming from my personal experience:

**1. Philosophy for the future of humans in Space.** The Kepler Space Institute Team has created its preferred philosophy and founded *The Journal of Space Philosophy* dedicated to documenting global philosophical knowledge for the future. See Article #8 in *The Journal of Space Philosophy*, Fall 2012 issue, for the initial philosophy of Kepler Space Institute at [www.keplerspaceuniversity.com](http://www.keplerspaceuniversity.com).

**2. The Systems Approach.** Since universal acceptance at the middle of the 20th Century, The Systems Approach to thinking, to research, to analysis and to planning “*Is not a bad idea*.”<sup>4</sup> In reality it has been universally accepted as a research, analysis, and planning model. Systems thinking has its challenges as well as its merits, but can avoid the pitfalls of sub-optimization of a complex subject into focus areas preferred by special interest groups and those in power, which automatically leads to unintended and undesired results.

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<sup>3</sup> A large network of global scientists shares knowledge on the spectrum of human extinction possibilities, and documents “Safeguarding Humanity” at The Lifeboat Foundation, [www.lifeboat.com](http://www.lifeboat.com). Scientific research into the scenarios that could cause the extinction of humanity only began in the late 20th Century. Prior to that, historians, like Arnold J. Toynbee, with his 1948 *Civilization on Trial* (Oxford: Oxford University Press), focused on why differing social-political entities rose and fell over time.

<sup>4</sup> This is a quote from the end of C. West Churchman’s classic work, *The Systems Approach* (New York: Dell, 1968), 232. The literature on systems thinking in 2013 fills library shelves and databases

**3. The Policy Sciences and Quality Sciences.** After invention of the term Policy Sciences by Professor Harold Lasswell in 1951<sup>5</sup> and the Founding of the Science and evolving it to high academic standards by Professor Yehezkel Dror,<sup>6</sup> the Policy Sciences have matured to be the best knowledge sources for implementing Space Settlement strategies. The Quality Sciences, emerging after World War II have seeped into global public and private enterprises under the founding assumption that continuous improvement is the key to sustainable success.<sup>7</sup>

In my 1980 book, *Systems Analysis and Policy Sciences*, I summarized a need for the merging of those two academic disciplines as follows:

Expanding the economic and mathematics based systems analysis of the 1940s to 1970s with the qualitative macro social orientation of policy sciences makes a quantum jump in complexity for the analyst but interjects a corresponding amount of realism. The analysis becomes difficult, less precise, but much more relevant to the real social and political world of human systems. This, in turn, makes policy recommendations and alternatives more feasible and acceptable to decision-makers and clients, as well as more effective in improving or designing systems.<sup>8</sup>

**4. The Law of Space Abundance.** In 2009, the leadership of the Kepler Space University formulated this law and defined it as: “*Space offers abundant resources for human needs.*” Nothing happens without resources. Earth’s resources are limited. Many are non-renewable. Space discoveries over the past 50 years confirm that Earth’s needs for resources can be met from Space. In fact, without mining those resources in Space, humanity’s long-term survival is doubtful.<sup>9</sup>

**5. Humankind Spiritualism.** This fifth essential component is best described by Pastor (Dr.) Lawrence Downing in Article 21 of this Spring 2013 issue of the Journal of Space Philosophy. I quote him from it:

The human spiritual component has been part of space-life since humans first were propelled into space.... What form the spiritual component will take is quite beyond our scope to predict. What we can say is that the men and women who inhabit space will take with them the values, practices

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<sup>5</sup> Harold Lasswell, “The Policy Orientation,” in *Policy Sciences*, ed. Daniel Lerner and Harold D. Lasswell (Stanford, CA: Stanford University Press, 1951).

<sup>6</sup> Professor Yehezkel Dror, Hebrew University of Jerusalem, was the Scholar largely responsible for the formulation and early growth of the Policy Sciences, commencing in 1965 and continuing to today, 2013. His many books and other works can be found through the Internet.

<sup>7</sup> For a review of the history and major subjects of the Quality Sciences, see Robert M. Krone, *Quality Classics*, [www.asq711.org](http://www.asq711.org).

<sup>8</sup> Robert M. Krone, *Systems Analysis and Policy Sciences: Theory and Practice* (New York: John Wiley & Sons, 1980), 36.

<sup>9</sup> See Robert M. Krone, “The Law of Space Abundance and Lunar Cratersville,” *AdAstra, The magazine of the National Space Society* 24, no. 1 (Spring 2012): 46.

and beliefs that they held on earth. Likewise, the three philosophical questions await answer: Who am I? Where did I come from? Why am I here? These timeless questions will be part of the baggage space travelers take with them. Each is a spiritual question.”<sup>10</sup>

Readers will recognize the qualitative nature of those five components. Design and quality management begin with ideas, but are incomplete without the inputs that science, technology, mathematics and commerce add to the essential quantitative inputs.<sup>11</sup>

**HYPOTHESIS: Those five major components of a Space Settlement Design and Management Strategy form a needed set for creating and sustaining future human Space settlements. Reader comments are encouraged.**

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**About the Author:** Dr. Bob Krone is the Co-Founder and Provost of Kepler Space Institute and University and the Editor-in-Chief of *The Journal of Space Philosophy*. His curriculum vitae is at [www.BobKrone.com/node/103](http://www.BobKrone.com/node/103).



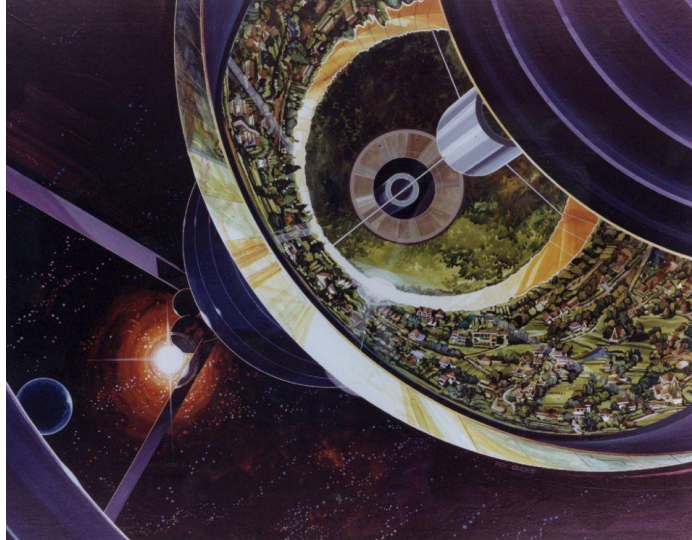
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<sup>10</sup> *Journal of Space Philosophy* 2 no. 1 (2013): 87.

<sup>11</sup> Peer reviewers Dr. Lawrence Downing and Dr. Joel Isaacson provided valuable edits to the draft of this article.

## To Sing Among Stars

By Kim Peart



(Image from [NASA Ames Research Center](#))

I am currently a passenger on a spaceship called Earth.

I can close my eyes and imagine the vast cosmic ocean through which my planet vessel sails on its endless journey among the stars.

In accepting my status as a starfarer, I can also wonder what life would be like for denizens of an orbital space settlement in the outer Solar System or a community of ten thousand souls in a generational starship in deep space.

Earth sails among so many billions of glittering stars, so many galaxies, all shining brightly, where suns explode to shed their raw material into space that will form new stars, planets, and become the raw building blocks of life.

In my inner delving I also contemplate a vaster realm that scientists call the multiverse, in which our Universe floats as if a bubble, like a cosmic womb of life in a much greater ocean, and wonder what this transcendent realm is really like.

There could be an infinite number of other universes in the multiverse.

One way to approach the multiverse is to consider just how bizarre our Universe is.

We are familiar with the four dimensions of our cosmic home, with one for time and three for space.



Scientists now look to another seven dimensions, simply to be able to explain the structure of our Universe.

If it takes eleven dimensions to make a universe, what must the environment of the transcendent multiverse be like?

The multiverse could hardly be less amazing than our Universe.

Our science is great at explaining in detail the workings of the cosmos, but is hard-pressed to tackle the multiverse, as science is focused on the description of the natural laws of the Universe and as cosmic information is confined to the cosmos, it is unable to address questions concerning a realm that transcends our Universe.

Any scientific inquiry into the multiverse is confined to extensions of natural law, which may be no better than a baby in the womb attempting to describe the outside world.

If we cannot use the observational power of science to delve properly into the multiverse, could we look to our inner experience as a way to perceive that which transcends Nature?

There are some basic qualities of our cosmos that offer an indication of how our inner journey can reveal the edge of the Universe and the shoreline of the transcendent realm.

When we consider the most basic quality of our Universe, we find the cosmos begins as an infinitely small point, or singularity, that stretches to become our vast Universe and as there is no difference between space and time, both are stretched toward infinity.

An infinitely small point stretched to infinity is essentially nothing stretched.

So if the Universe is essentially nothing, in which energy dances on a cosmic stage like a play of phantoms, it is the underlying transcendent realm that we must look to for that which is real.

One way to gain an appreciation of the cosmic oneness of the Universe and also the qualities of the transcendent realm is through the discipline of meditation, where the objective is to achieve a quiet mind and a heart that is open to the qualities of a transcendent experience.

In life we face the rigours of cause and effect, action and reaction, as laws work against each other to deliver new beginnings, with science being confined to the observation and description of this process.

There is much more to life than the laws that confine and in the human experience we delight in love, happiness and beauty, giving expression to these qualities in our relationships, the raising of our children, and in the making of the arts.

When our experience of happiness connects with a sense of cosmic oneness, then we can go beyond the limitations of law and be open to the transcendent realm.

We may come upon this experience in a work of art, which Kenneth Clarke once described as able to lift us to “a higher plane of reality.”<sup>1</sup>

We may find the experience in music that carries our heart and soul to great height through its rising movement of ethereal sound.

We might feel the experience wash over us in a place of natural beauty and be enthralled at what the Universe can offer.

For some, the steady discipline of meditation allows an inner journey into the cosmic heart, to win a quiet mind that is open to the transcendent realm.

My journey into meditation included a pilgrimage to India in 1986, following which I moved from the city to be close to Nature by a bay of the sea amidst forests, farmlands and mountainous hills.<sup>2</sup>

As an artist, I was ever sensitive to Nature’s beauty and after living in the hamlet of Murdunna for a time, I began to feel the life-force of the Earth, which I like to describe as the magic of Nature.

This feeling has never left and brings me a sense of connection with Nature.

It was from this time that I sought to see how we humans could live in harmony with the Earth and wondered if the key lay in the culture in which we live.

Looking to indigenous wisdom, I heard the words of William Takaku of Papua New Guinea in 1993, when he said on the radio, “Nature is culture. We must learn from Nature. When man sees himself as separate from Nature, he is doomed.”<sup>3</sup>

I embraced these words of indigenous wisdom and began to wonder how they applied to the Western scientific mind-set, with our views of evolution and cosmic expansion.

I began to wonder if the life-force of Nature was seeking the expansion of life beyond Earth, but how could this happen?

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<sup>1</sup> Kenneth Clark, *Landscape into Art* (London: Murray, 1976), 33. “Facts become art through love, which unifies and lifts them to a higher plane of reality; and in landscape, this all embracing love is expressed as light.”

<sup>2</sup> This pilgrimage was to the ashram of Sathya Sai Baba in southern India.

<sup>3</sup> William Takaku was heard speaking on Radio Nation in 1993. At the time, William was the director of the Papua New Guinea National Theatre Company and had been travelling his homeland, collecting traditional stories. He later starred as Man Friday in a film of Robinson Crusoe with Pierce Brosnan in 1997.

Could the emergence in Nature of a clever toolmaker that could build spaceships be the means to expand life beyond Earth?

Carl Sagan once said, "Since, in the long run, every planetary society will be endangered by impacts from space, every surviving civilization is obliged to become spacefaring – not because of exploratory or romantic zeal, but for the most practical reason imaginable: staying alive."<sup>4</sup>

There is a high probability that the dinosaurs met their demise when a monster asteroid struck the Earth 65 million years ago and even a small 15-metre asteroid can pack a powerful punch, as happened over the Russian city of Chelyabinsk in February 2013.

If this small asteroid had exploded a little closer to the ground, the city could have been flattened, with thousands killed.

When I look back at our recent history, I can see that we could have initiated our expansion beyond Earth in the 1970s by building solar power stations in space and launching industry beyond Earth, which would have enabled the construction of orbital space settlements that generate an Earth-gravity via rotation.

Earth-gravity space settlements could also become the basis for a starship that carries life from Earth to the stars on a journey lasting generations.

By failing to make the transition from carbon to stellar energy, we have burnt too much fossil fuel, releasing vast volumes of carbon dioxide into our planet's biosphere, which has now become a toxin in the body of Nature.

We have made the Earth sick and if this goes on for too long, we may wonder if the Earth will die.

Astronomers look out among the stars and wonder why they find no evidence of alien civilizations.

Carl Sagan believed that there could be as many as a million extra-terrestrial civilizations in our galaxy and given a few million years, some of them should have spread out to all the stars in the Milky Way.

Should we wonder if this silence from the stars is a warning for us?

Have a million civilizations emerged on planets like Earth, only to burn their fossil fuel too long and brought on the heat death of their planet and their own extinction?

If killer asteroids from space are not enough to wake us up, maybe the stellar silence will.

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<sup>4</sup> *Pale Blue Dot* (New York: Random House, 1994), 371.

I wonder if our survival may now be in the hands of the ordinary people of spaceship Earth, demanding that we get on with the building of solar power stations in space, so that industry can be launched beyond Earth and the first Earth-gravity space settlement constructed in the Solar System.

If ten million people demanded action on building our celestial future and helped make it happen, we might avoid adding to the silence of the stars.

A teacher once said, "The meek shall inherit the Earth."

I now wonder if the meek will inherit the Earth and the stars; but they had better get smart and be quick about it, as time may not be on our side.

I would not mind moving into space and living in an orbital settlement, where I would close my eyes and feel the life-force of Nature expanding from Earth among the stars.

In meditation in deep space I would also ponder upon the transcendent realm and be open to an experience of the underlying reality of the cosmos.

In deep space we may sing as whales in the ocean and share our song with distant islands among the stars.

I am in deep space now, on spaceship Earth, connected through cosmic oneness with all of space and time and through the underlying reality, with the transcendent realm as well.

When we open our hearts to the experience, we can feel the heart of Nature and allow this beauty of life to flow through us, to empower us to move with Nature to expand life beyond Earth.

In this hour of danger, when our foolishness is causing harm to life on Earth, we might take note of the words of James Lovelock when he says, "We are deeply impressed with the power of our weapons, yet they are puny compared with the most powerful weapon of all: creative intelligence."<sup>5</sup>

Appreciating that we now travel on a starship may help to give us the vision to do that which we must for human survival and a healthy Earth.

By expanding beyond Earth and securing our future in the celestial realm, we will gain a confident survival position to deal with all problems on Earth.

With direct access to stellar energy from the Sun, we will be able to extract excess carbon from the Earth's biosphere and even reprocess the carbon back into a useful resource.

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<sup>5</sup> James Lovelock, *The Vanishing Face of Gaia* (New York: Basic Books, 2009), 157.

With the energy of the Sun, we could also create a stellar economy without poverty, which would be the way to achieve peace on Earth and deliver security among the stars.

For those who can, practicing the discipline of meditation will help individuals connect to the heart of life and become empowered to live beyond fear.

When we are free of fear and empowered by love, we will find the freedom to take action for survival and the expansion of life from Earth among the stars.

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**About the Author:** Kim Peart first became engaged with space advocacy with the L5 Society in 1976, wrote his vision for space futures with *Creating a Solar Civilization* in 2006, and is currently the director of Space Pioneers. In March 2012, working with research scientist Dr Jennifer Bolton, Kim identified a way to build a working model of an orbital space settlement in the virtual world, called the VOSS (virtual orbital space settlement), which will allow any number of people to be involved in a space-like virtual environment. The VOSS is located above their island called Sprite in the virtual world called InWorldz, where interested people can participate in the virtual space program, planning globally for local action toward building our future among the stars. See [www.islandearth.com.au/](http://www.islandearth.com.au/)



**Editor's Notes:** The collaboration of Kepler Space Institute (KSI) with Kim Peart's VOSS and InWorldz has created excitement and progress for both. Our President Dr. Robert Frantz has been Kepler's VOSS pioneer. The Virtual Orbiting Space Center is the simulation platform for the future of humans in space. KSI has a classroom in the VOSS and the InWorldz membership continually climbs. *Bob Krone, PhD.*

## Research Questions and Hypotheses

by Kseniya Khovanova-Rubicondo, PhD

The *Journal of Space Philosophy* was launched in the Fall of 2012 within the framework of the Kepler Space Institute's mission and values. One of the overarching goals of the Journal is to gather together a community of space scientists, experienced academics and professionals, young scholars, and practitioners in relevant disciplines and to offer a platform for a dynamic dialogue, ideas, and practices exchange. For this reason, the Research Questions and Hypotheses section of this Journal is particularly important, as the assumptions and research queries collected from the Journal contributors help to guide its future scientific focus and to design future issues of the magazine.

Thus, the current section of the Journal additionally represents a depository of future research ideas, suggestions, questions, and notes or conclusions on the remaining gaps in today's science, which could be consulted, analyzed, and used in the future for more focused inquiries in all aspects of basic and applied research in space and Earth sciences, including theory, data analysis, and modeling. The "depository of questions" of our Journal may thus assist young researchers in shaping their future scientific inquiries and increase their opportunities for gaining financial support for their initiatives from such bodies as NASA.<sup>1</sup>

The first issue of our Journal (Fall 2012) focused primarily on the task of defining space faith and/or philosophy and their links with policy science, astrophysics, biology, and others. A number of pertinent research questions and hypotheses were proposed by the authors. They covered a large array of issues in space engineering, science, management, governance, and policy.

The Research questions and hypothesis proposed for the current issue of the Journal fall under a common theme of "Competence and Capacities of Human Civilization." This is because all of them focus either on such features of human civilizations as their life-cycles, the cost of civilization's loss, their extension or spiritual component, or the ability of *homo sapiens* to reach out to other planets and assure survival of the species existing on Earth.

As an editor of the Research Section of the *Journal of Space Philosophy*, I would like to say a special thank you to the authors Dr. John Bossard, Dr. Lawrence Downing, Dr. George Robinson, and Dr. Bob Krone for the submission of the research questions and hypotheses presented below.

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<sup>1</sup> See the list of funding opportunities at [cce.nasa.gov/cce/announce.htm#post2013\\_09](http://cce.nasa.gov/cce/announce.htm#post2013_09)

## **Competence and Capacities of Human Civilization**

### **Dr. John Bossard**

#### ***Hypothesis:***

Throughout history, human civilizations have been largely confined to the Earth's surface. These civilizations come and go, undergoing rises and falls of a cyclical nature, with time periods that may cover millennia. Sometimes their collapse is self-induced; other times it appears to be caused by environmental factors. In either case, the collapse of human civilizations comes at a great cost in terms of loss of treasure, knowledge, and history. By remaining on the Earth's surface, these cycles can be expected to continue. One hope for transcending these cycles of collapse is to extend human civilizations off of this planet's surface and out into the neighboring solar system and beyond. While this is still no guarantee of the long-term survival of human civilizations, the development of extra-terrestrial human civilizations may greatly extend the time period prior to the next collapse.

#### ***Research Question:***

- Will humankind be able to extend itself off-planet in a permanent, self-sustaining way in this current cycle of civilization before a widespread systematic collapse delays this extension once again?

### **Dr. Bob Krone**

#### ***Research Question:***

- What is the optimum set of philosophy, leadership needs, and resource management tools to include in the design of "Good" (i.e., negative entropy) Space settlements?

### **Dr. Lawrence Downing**

#### ***Research Questions:***

- What manifestations of the human spiritual component are found among those whose life-philosophy is guided by scientific principles and the laws of science?
- How are the spiritual components evidenced?

### **Dr. Kseniya Khovanova-Rubicondo**

#### ***Hypothesis:***

Resource distribution has been always a burning issue for human beings, although we tend to agree on what resources are valuable for us and what are not. Given that some material and immaterial resources highly valued by human beings – such as gold (material) or time (immaterial) – may be valued differently or may not represent any value at all for other civilizations existing beyond the Earth, our bargaining power over the resources existing beyond the Earth as well as their value to other civilizations is unknown. This value-uncertainty puts human beings at risk of being misunderstood and

even rejected at their first contact with the inhabitants of space.... I hypothesize that such features as curiosity, i.e., eagerness to learn more about odd, novel, strange, or even unexpected phenomena, could serve as a basis for a first contact with other civilizations.

***Research Question:***

- Could simple curiosity bridge different civilizations?

**Dr. George Robinson**

***Research Question:***

- All relevant issues considered, how much time would be necessary to ensure permanent off-Earth habitation of *homo sapiens* as a means of reasonable assurance of species survival?








## Journal of Space Philosophy (JSP) Board of Editors


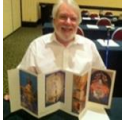






Kepler Space Institute is honored to have 36 of the world's Space Community professionals as members of the Board of Editors for the Journal of Space Philosophy.









Dr. Elliott Maynard, our Journal of Space Philosophy Board of Editors colleague, has beautifully stated both the purpose and the style for our peer reviews:









*"This is such a hi-caliber group of leading edge thinkers and supercharged individuals, it should be natural for each of us to wish to provide a supportive and synergistic environment for the others. I have also learned always to have someone else proof read any material I write, as I have discovered that the brain tends not to "see" my own simple mistakes. Ergo, within the new Kepler context I feel editors should be there to support our writers in the most creative and positive ways possible."* Elliot Maynard, e-mail to Bob Krone, 23 March 2013.








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1.  **ARTHUR, Gordon, PhD**, JSP Associate Editor, Theology at King's College, London, UK.  
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3.  **BELL, Sherry, PhD**, KSI Dean, School of Psychology.  
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4.  **BEN-JACOB, Eshel, PhD**, Former President of Israel Physical Society; Founder Science of Bacterial Intelligence. Tel Aviv University.  
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5.  **BLOOM, Howard K., Author, Scientist**, Founder Space Development Group, Publicist, Author on Human Evolution, Science, Technology, and Space. Photo by Luigi Novi.  
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6.  **BOLTON, Jennifer, PhD**, Co-Founder Virtual Space Orbiting Settlement VOSS. Veteran and molecular biologist, Space Pioneers Science Officer.  
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7.  **BURGESS, Lowry, Professor**. Distinguished Fellow at the Studio for Creative Inquiry, Center for the Arts and Society, College of Fine Arts, Carnegie Mellon University.  
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8.  **CLEMENTS, Douglas H., MD**, American Board of Ophthalmology, *"Improving Human Vision for Space Exploration and settlement"*.  
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9.  **DOWNING, Lawrence G., DMin**, Senior Pastor, Space Faith and Spirituality pioneer, University Professor.  
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10.  **HAYUT-MAN, Yitzhaq (Isaac), PhD**, Architect for the Universe, The Jerusalem Dome of the Rock as a memory site for theology, philosophy and humanity past, present and future.  
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11.  **HOPKINS, Mark, Chairman of the Executive Committee, National Space Society (NSS)**. Space Economics. Important in founding of the L-5 Society and collaboration of the NSS with the Kepler Space Institute.  
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12.  **ISAACSON, Joel, PhD**, Nature's Cosmic Intelligence, pioneer of RD Cellular Automata since the 1960s.  
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13.  **KHOVANOVA-RUBICONDO, Kseniya, PhD**, University of Chicago, Expert in Public economics, innovation, policy and urban planning. Consultant Council of Europe and European Commission, Proficient in six languages, Space International Economics.

14.  **For Bio Info:** [www.connect.tcp.org/profiles/profile.php?profileid=2296](http://www.connect.tcp.org/profiles/profile.php?profileid=2296).  
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15.  **KRONE, Bob, PhD**, Journal of Space Philosophy Editor in Chief, Provost Kepler Space Institute.  
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16.  **LIVINGSTON, David, PhD**, Founder & Host, The Space Show.  
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17.  **MARZWELL, Neville, PhD**, Space Solar Power and Robotics Scientist. Career at JPL as Manager for Advanced Concepts and Technology.  
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18.  **MATULA, Thomas L., PhD**, Business and Management Professor, Lunar Commercial scholar.  
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19.  **MAYNARD, Elliott, PhD**, Founder, ArcoCielos Research Center, Sedona Arizona, [www.arcocielos.com](http://www.arcocielos.com).  
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20.  **MITCHELL, Edgar Dean, ScD**, Captain, US Navy (Ret), Apollo 14 Astronaut, 6th person to walk on the Moon, Founder Institute of Noetic Sciences.  
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21.  **MOOK, William P.E.**, Trained in aerospace engineering, 15 years in alternative energy, Space Commerce Technology.  
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22.  **O'DONNELL, Declan J., JD**, Space Law attorney, Fifty publications in Space Law and Policy, Publisher, Space Governance Journal, President, United Societies in Space, Inc.
23.  **OLSON, Thomas H., PhD, DBA**, Professor of Clinical Management and Organization, University of Southern California Marshall School of Business, Los Angeles, California, USA. Dr. Olson's specialty in research and consulting is on strategy, development, organization and human capital. He has authored four books and 100 professional articles.  
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24.  **PALMA, Bernardino**, Historian, Portuguese Age of Discovery.  
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25.  **PEART, Kim**, Co-Founder, Virtual Orbiting Space Settlement (VOSS). Artist, Visionary, virtual worlds.  
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26.  **ROBINSON, George S., III, LLD**, Space Law Pioneer and International Space Expert. Smithsonian Institute Legal Counsel.  
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27.  **SCHORER, Lonnie Jones**, Kids to Space Author and Teacher. Architect, Aviator.  
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28.  **SCHRUNK, David, MD**, Aerospace Engineer, Founder, Quality Laws Institute, KSI Faculty.  
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29.  **SCHWAB, Martin, PhD**, International Space Author, KSI Faculty, Aerospace Technology Working Group.  
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30.  **SCOTT, Winston E.**, American Astronaut, Vice President for Development, Florida Institute of Technology.  
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31.  **TANG, Terry, PhD**, KSI Director of Research.  
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32.  **THORBURN, Stephanie Lynne**, Author, Astrosociology.  
**For Bio Info:** See Issue 1.1, Article 12.
33.  **WERBOS, Paul, PhD**, United States National Science Foundation, Space Scholar.  
**For Bio Info:** See Issue 1.1, Article 19.
34.  **WHITE, Frank, MSc**, Founder, The Overview Effect Institute.  
**For Bio Info:** See Issue 1.1, Article 9.
35.  **WILKINS, John, PhD**, Professor of Space Settlements.
36.  **ZUBRIN, Robert, PhD**, President, MARS Society.  
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*“The greatest use of a life is to spend it for something positive that outlasts it.”*

Dr. Max T. Krone, Dean, Institute of the Arts, University of Southern California and Founder, Idyllwild School of Music and the Arts, 1950



