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# JOURNAL of SPACE PHILOSOPHY

# Sciences of Law, Policy, and Space





# DEDICATION

We, the Kepler Space Institute Leadership, dedicate this issue of the Journal of Space Philosophy to

# **Stephen Hawking**

(1942 - 2018)

It is important for the human race to spread out into space for the survival of the species. Life on Earth is at the ever-increasing risk of being wiped out by a disaster, such as sudden global warming, nuclear war, a genetically engineered virus or other dangers we have not yet thought of.



Professor Stephen Hawking floating in Zero-G (Photo by Jim Campbell)

Taken from an article, "Stephen Hawking in Zero-G," by Peter Diamandis. See <u>http://www.diamandis.com/blog/stephen-hawking-in-zero-g</u>.

The source for the cover photo, of a simulated black hole in the Large Magellanic Cloud, showing lensing and, by implication, Hawking radiation, is Alain R. – Own work, CC BY-SA 2.5, <u>commons.wikimedia.org/w/index.php?curid=1150148</u>.



# PREFACE By Bob Krone, Gordon Arthur, and Walt Putnam

With this issue, the *Journal of Space Philosophy* enters its 6th year of publication. The feature articles, ## 7 and 8, in this issue describe the recent collaboration of Kepler Space Institute with the Science of Laws Institute.

There is a richness of subject diversity in this issue including a report on How PoWs in the Hanoi Hilton Learned of the Moon Landing by Leo Thorsness, past president of the Medal of Honor Society, the report of the third Annual Recursive Distinctioning Conference, Music and Art in Space, and a Space Renaissance.

The issue concludes with a typical thinking breakthrough by Howard Bloom, "Howard Bloom's Mental Clock." And, as included in all *Journal of Space Philosophy* publications, there is the identification of the forty-two editors volunteering their expertise for the journal.



# JOURNAL OF SPACE PHILOSOPHY

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Access to the Journal of Space Philosophy and free downloading of its articles is available at <u>www.keplerspaceinstitute.com/jsp</u>. Anyone on Earth or in Space may submit an article or Letter to the Editor to <u>BobKrone@aol.com</u>.

# **JSP Explores Black Holes**

# By Walt Putnam

There is no more appropriate figure than Stephen Hawking to be honored by the Spring 2018 edition of the *Journal of Space Philosophy*.

Hawking, who died in March at 76, is the scientist perhaps most commonly associated with theories swirling around black holes. And black holes happen to be an area where science and space philosophy meet.

Being and nothingness: matter, energy, and the void. One discipline explores the mysteries of the cosmos through mathematical precision; the other through words. Can either explain the universe alone?

The online *Journal of Space Philosophy*, produced by Kepler Space Institute, dedicates its spring issue to Hawking, who famously proposed that quantum theory allows for both energy and information to escape from a black hole. Thankfully, some small tidbits of information are around for the Journal to impart some of it here on this planet.

Among other articles in the Spring 2018 edition of the JSP are "The Science of Laws: Essential Foundations of Space Governance," by David Schrunk; and "Maturing Humanity Through the Sciences of Law, Policy, and Space," by Dr. Krone.

Leo Thorsness, who was an American prisoner of war at the time of Apollo 11, recounts "How PoWs in the Hanoi Hilton Learned of the Moon Landing," Madhu Thangavelu takes a look at the rapidly enveloping "Space Renaissance" so vital to humanity, and Richelle Gribble explores the importance of "The Arts for Humans in Space."

Krone, his wife Salena, and his daughter Kat provide a "Report of the Third Annual Recursive Distinctioning Conference – September 2017," and finally, we get a look at "Howard Bloom's Mental Clock."

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# NOTES FROM THE CHAIR

By Gordon Holder, VADM, US Navy (Ret.), Kepler Space Institute Chairman of the Board

As Space science, technology, and exploration have advanced exponentially in the 21st century, the feasibilities of unprecedented positive changes for humanity, as a result of Space exploration, development, and human settlements, are now emerging beyond any previous imagination throughout history.

We in Kepler Space Institute are proud to be a part of this exciting Space Epoch. We invite you to join us, where ever you may be on Earth or in Space.



# The Science of Laws: Essential Foundation of Space Governance

# By David G. Schrunk

### Abstract

This paper discusses the rationale for and the role of the science of laws as the foundation for the rule of law of space governments. The inadequacies of traditional lawmaking are presented and the advantages of scientific lawmaking as a replacement of traditional lawmaking are discussed. Science has proven to be successful in every field of endeavor involving the physical universe, and the science of laws promises to be equally successful. Therefore, to assure that the coming spacefaring age is characterized by prudent, stable, and responsible advances into space for the benefit of the human condition, it is recommended that future space governments adopt science as the foundation of the rule of law.

**Keywords:** Science, laws, space government, space settlement, rule of law, space exploration, spacefaring age.

### Introduction

Before the end of this century, advances in science and engineering will have enabled the establishment of permanent human settlements on the Moon. Since a government is necessary for the security and stability of every organized society of people, a system of governance and rule of law will be required for the people who reside on "Planet Moon." To avoid the poor performance and dysfunction that currently typifies the bodies of laws of Earth governments, a new science, the science of laws, is proposed as the basis for creating and maintaining the bodies of laws of space governments. For the people who become permanent citizens of new worlds in space, the science of laws will produce a consistent and just rule of law that optimally serves their best interests and reflects their highest aspirations.

# The Planet Moon Project

The ongoing successes of science have now brought us to the threshold of the largest and most productive endeavor ever undertaken by humankind: the global exploration, development, and human settlement of the Moon.<sup>1</sup> The "Planet Moon Project" holds great promise because it will establish a link between our scientific expertise and the unlimited resources of space.<sup>2</sup> When that link has been secured, the people of the Earth and the Moon will be supplied with a superabundance of energy and material wealth from space; every region of the solar system will be explored in depth by spacecraft manufactured on and launched from the Moon; Mars will become the third home in space for humankind; and robotic missions will be launched on voyages to the stars. The Planet Moon Project will improve every dimension of the human condition, open

<sup>&</sup>lt;sup>1</sup> David Schrunk, Bonnie L. Cooper, Burton Sharpe, and Madhu Thangavelu, *The Moon: Resources, Future Development, and Colonization* (New York: Wiley-Praxis, 1999). 2nd ed. published by Praxis-Springer, 2007.

<sup>&</sup>lt;sup>2</sup> David Schrunk, Bonnie L. Cooper, Burton Sharpe, and Madhu Thangavelu, "*The Planet Moon Project*," in *Proceedings of the Seventh International Conference on Space 2000* (Reston, VA: American Society of Civil Engineers, 2000), 768-76.

endless frontiers, and guarantee the survival of humankind as a multi-world species and a spacefaring civilization.

### Space Governance

The establishment of permanent settlements on the Moon will require a governing authority for human activities on the Moon and in cis-lunar space.<sup>3</sup> The lunar government will secure human rights and liberty, resolve disputes, oversee lunar resource utilization, and facilitate the peaceful and responsible exploration and development of space. To accomplish its purpose, the lunar government will create a body of laws that solve (solve, mitigate, prevent) the problems that degrade or threaten to degrade the rights and liberty of the people or their survival, growth, and flourishing in space. In accordance with this premise, a Lunar Economic Development Authority (LEDA) has been developed by the United Societies in Space and the World Space Bar Association.<sup>4</sup> If adopted as proposed, LEDA will provide governance for the initial development and immigration phases of Planet Moon, and it will eventually make the transition to a fully sovereign government that serves the permanent residents of the Moon and cis-lunar space.

### **Problem: The Traditional Method of Lawmaking**

Although science has been successful in removing most of the barriers to the planetary development stage of space exploration, one serious problem remains. That problem is the traditional method of lawmaking of government, and it constitutes a serious threat to the permanent human settlement of new worlds in space. Laws are the tools, or means, by which governments solve problems and thereby attain their goals. To meet their problem-solving obligations to the people within their jurisdictions, national, regional, and municipal governments on Earth use the traditional method of lawmaking to create the laws of government.

The traditional method of lawmaking is a relatively simple process.<sup>5</sup> It begins when someone comes up with an idea for a law of government. The idea is transcribed into a written petition (bill), which is then presented to a legislative assembly. After being evaluated by the legislature and, often, modified through debate and compromise, the final version of the bill is voted upon by the legislature. If the legislature approves the bill it is added to the government's body of enforceable laws. The next bill is presented to

<sup>&</sup>lt;sup>3</sup> Schrunk et al., *The Moon*, Chapter 9. Cis-lunar space is the torus formed by the orbit of the Moon around the Earth, with the inner diameter at the average Earth-Moon L-1 Lagrange Point and the outer diameter at L-2. This volume of space includes Lagrange Points L-4 and L-5.

<sup>&</sup>lt;sup>4</sup> See the website for United Societies in Space/World Space Bar Association: <u>www.angelfire.com/space/usis/</u>; Declan J. O'Donnell, "Metaspace: A Design for Governance in Outer Space," *Space Governance* 1, no. 1 (1994): 8-27; Declan J. O'Donnell and Phillip R. Harris, "Legal Strategies for a Lunar Economic Development Authority," *Annals of Air and Space Law* 21 (1996): 121-30; Declan J. O'Donnell, Buzz Aldrin, Brad Blair, and David Schrunk, "The Lunar Economic Development Authority: A Municipal Governance Tool," in *Proceedings of the International Astronomical Congress*, Session IAC-06-A5.1.7, Valencia, Spain, 2006; Declan J. O'Donnell and Phillip R. Harris, "Facilitating Space Commerce Through a Lunar Economic Development Authority," Appendix F in Schrunk et al., *The Moon*, 2nd ed., 355-70.

<sup>&</sup>lt;sup>5</sup> An overview of the legislative process of the United States Congress is at <u>thomas.loc.gov/home/</u> <u>lawsmade.toc.html</u>; an overview of the legislative process of the State of California is at <u>www.leginfo.ca.gov/guide.html#Appendix\_A</u>.

the legislature, and the lawmaking process is then repeated. The traditional method operates as a feed forward control system whose output is new laws as depicted in Figure 1.



Figure 1: Traditional lawmaking. The traditional method of lawmaking is a simple feed forward control system whose output is a continuously growing body of laws. Note that this process can operate indefinitely without reference to societal problems.

Although the governments of the Earth annually create millions of laws, the problems of war, crime, poverty, abuses of human rights, economic crises, pollution, and illiteracy (etc., etc.) continue to plague the people of the Earth. In other words, as a means for enabling governments to satisfy their public-benefit obligations by means of laws, the traditional method of lawmaking is a failure.

To determine the cause of the failure of the traditional method to solve societal problems, an investigation of its structure and function was performed.<sup>6</sup> That investigation disclosed that the traditional method has the following serious flaws and omissions:

- It does not require societal problems to be defined.<sup>7</sup>
- It does not assign priorities to problems for solution.
- It does not require laws to have a statement of purpose in terms of a measurable outcome.
- It does not require law designers to have design expertise.
- It does not require the creation of a model for each law-design.
- It does not require a full accounting of the costs of laws.
- It does not require a full accounting of the risks and side effects of laws.
- It tolerates design defects and intentional vagueness in laws.
- It tolerates the inclusion of "pork barrel" and other special interest provisions in laws.
- It does not require law designers to have knowledge of the subject matter; it is based upon opinions, or ideology, not knowledge.
- It does not require a citation of references and databases.
- It does not require a competent and thorough quality assurance (QA) program that periodically evaluates the outcome of laws, or a regular mechanism for the repeal of laws that have been found to be less than useful to the citizenry.

<sup>&</sup>lt;sup>6</sup> David Schrunk, *The End of Chaos: Quality Laws and the Ascendancy of Democracy* (Powey, CA: QL Press, 2005).

<sup>&</sup>lt;sup>7</sup> It is impossible to solve a problem that has not been defined.

• It incorporates no regular, competent mechanism for improvement of the performance of laws.

The above defects of the traditional method render it completely unacceptable as a problem-solving process. In fact, it is <u>not</u> a problem-solving process; its purpose is to make laws, not to solve problems.<sup>8</sup> It is lacking or deficient in knowledge, expertise, ethics, and quality, and the laws it creates are frequently defective, vague, unnecessary, ineffective, or harmful. On the occasions when it produces laws that are effective (e.g., tax laws that raise revenue), those laws are, as a generalization, unnecessarily costly and complicated. Also, since the traditional method does not evaluate the outcomes of laws, it fails to identify and repeal outmoded, ineffective, redundant, and purposeless laws whose continued enforcement wastes government resources to the detriment of the people. As legislatures enact more laws with each legislative session, the size, cost, and complexity of the bodies of laws increase, and governments are compelled to enforce laws selectively in violation of the rule of law.

The pioneers who become the first permanent inhabitants of the Moon will need a government that solves problems in an efficacious and just manner and that enables the continuing responsible and peaceful exploration and settlement of space; they will not tolerate a failure of government. For the people who are now planning the development of Planet Moon, the concern is that the traditional method of lawmaking will be adopted by the lunar governmental authority as the means for creating the new government's body of laws. The resulting dysfunctional and ever-growing body of laws (created without reference to societal problems, without the benefit of design expertise or knowledge, and without consideration of adverse outcomes) would, by consuming and diverting resources for non-productive purposes, constitute a serious threat to the viability of the new space settlements. Fortunately, this threat can be avoided by substituting scientific lawmaking for the traditional method of lawmaking.

# Solution: The Science of Laws

The need to create an entirely new government for the first permanent settlements in space offers the opportunity for space planners to adopt the science of laws for the design, evaluation, and improvement of the government's body of laws.<sup>9</sup> Laws have a significant impact upon the physical universe, which is the domain of science, and they are eminently suited for inclusion within the purview of science. The science of laws will bring the strengths of science, of knowledge, expertise, integrity, and quality – all of which are deficient or lacking in the traditional method of lawmaking – to bear upon the solution of societal problems. It has two coequal branches: the creative science, or engineering discipline, of laws and the investigative science of laws.<sup>10</sup>

<sup>&</sup>lt;sup>8</sup> The simple explanation for the poor performance of laws is that governments attempt to solve problems with a process (traditional lawmaking) that does not have problem solution as its purpose.

<sup>&</sup>lt;sup>9</sup> David Schrunk, "The Science of Laws: Application to Lunar Governance," paper presented at the Joint Annual Meeting of LEAG-ICEUM-SRR, Cape Canaveral, Florida, October 2008.

<sup>&</sup>lt;sup>10</sup> Schrunk, *End of Chaos*; Schrunk, "Science of Laws"; David Schrunk, "The Science and Engineering of Laws," in *Proceedings of the Seventh International Conference on Space 2000* (Reston, VA: American Society of Civil Engineers, 2000), 133-40; Science of Laws Institute website: <u>www.scienceoflaws.org</u>.

# **Creative Science of Laws**

The creative science of laws develops, accumulates knowledge of, and applies engineering design methodologies and best practices to the solution of societal problems by means of laws. The engineering design process requires inputs from a wide range of fields such as sociology, law, statistics, business, and economics; it is the ultimate example of multidisciplinary engineering.<sup>11</sup> By creating just and efficacious laws, the creative science of laws will enable the space government to satisfy its public benefit obligations to the people it represents.<sup>12</sup> The first step for the engineering discipline of laws of the space government will be to establish quality design (QD) standards<sup>13</sup> that require law designers to observe knowledge-based, problem-solving best practices for the creation of each new law, such as:

- Identify/analyze a societal problem that needs to be solved.
- State the priority of the problem and the goal of the law.
- Create a model of the law based on relevant data and ethical codes.
- Test and refine the model for maximum efficacy.
- Document all sources, methodologies, and observations.

When the final design of the prototype law (bill) has been completed, it will be submitted to the legislature for a vote of acceptance (enactment) or rejection. If the bill is enacted into law, it will be added to the government's enforceable body of laws and will then be subjected to periodic reviews of its performance by a QA program (see below). In addition to creating new laws, the engineering discipline of laws will conduct a quality improvement (QI) program to enhance the structure and performance of existing laws after they have undergone their periodic QA evaluation. The standards of the QI program will be the same as the QD standards for the design of new laws. By this means, the laws of government will be constantly upgraded in their ability to satisfy the problem-solving purpose of government.

# Investigative Science of Laws

The purpose of the investigative branch of the science of laws is to derive reliable knowledge of the mechanics (cause and effect mechanisms) of laws and of methodologies for the measurement and analysis of laws. It regards every law of government as an incomplete experiment in human behavior.<sup>14</sup> Each law has a hypothesis (that it will produce a desired societal outcome) and that hypothesis is tested (i.e., the experiment is carried out) when the law is enforced.

<sup>&</sup>lt;sup>11</sup> To meet the future need for law design engineers, new college curricula to the PhD level will need to be developed; the engineering design of laws is not currently taught in any school.

<sup>&</sup>lt;sup>12</sup> David Schrunk, "Multidisciplinary Engineering Approach to the Design of Laws," paper presented at the American Association for the Advancement of Science Pacific Division, 92nd Annual Meeting, University of San Diego, San Diego, CA, June 14, 2011; David Schrunk, "The Systems Engineering Approach to the Design of Laws," in *Proceedings of the Conference on Systems Engineering Research (CSER)*, St. Louis, MO, 2012 (Amsterdam: Elsevier, 2012), 327-32.

<sup>&</sup>lt;sup>13</sup> David Schrunk, "The Quality Approach to the Science of Laws," paper presented at the 16th Annual International Deming Research Seminar, New York, February 2010; David Schrunk, "Lawmaking Standards for Space Governance," *Space Governance* 4, no. 1 (January 1997).

<sup>&</sup>lt;sup>14</sup> Traditional lawmaking is an incomplete experiment in human behavior, because it does not measure, analyze, and record the results of the experiment, i.e., of law enforcement.

By measuring the results of law enforcement, the investigative science of laws derives knowledge of the mechanics of each law, and the store of scientific knowledge of the structure and function of laws thus grows over time. With this knowledge, governments can avoid the mistakes of the failed laws of the past, and law design engineers can create more effective and just laws in the future. Significantly, the investigative science of laws will be the basis of a rigorous and comprehensive QA program of laws.

# Quality Assurance of Laws

Unless a government measures the outcomes of its laws, it is "flying blind." That is, a government cannot know if it has accomplished anything of value for the public unless it utilizes a reliable process for assessing the outcomes of laws. Therefore, each law must undergo a periodic (e.g., every ten years) QA evaluation to confirm that it is necessary and proper for the well-being of the public.

A major contribution of the investigative science of laws is that it will be the basis of a QA program for laws. The QA program will employ empirical (i.e., scientific) methodologies to measure, analyze, and document the problem-solving outcome of each law, including its costs, burdens, and impact upon the human rights, living standards, and quality of life of the public.<sup>15</sup>

A determination of the net benefit of each law will then be made (the net benefit of a law is the difference between the problem-solving benefit of the law and the sum of its costs, risks, restrictions, and other burdens). If the QA program determines that the net benefit of a law is positive, the law will be referred to the legislature for affirmation and continued enforcement. All other laws will be recommended for repeal by the legislature. By leading to the repeal of non-productive laws (e.g., outmoded, ineffective, conflicting, duplicative, harmful, and unenforced laws) the QA program will more than pay for itself,<sup>16</sup> and the bodies of laws of government will consist of the minimum number of laws that efficaciously satisfy the purpose of government, i.e., that are useful to the well-being of the public.

# Policy Making versus Lawmaking

The use of science for lawmaking will lead to a separation between "policy making" and "lawmaking." The legislature of the new government will consist of legislators who are chosen by the people as representative *trustees* of the people. The purpose of the individuals thus elected (e.g., by popular and competitive elections based on universal suffrage and secret ballots) to the legislature will be to secure the rights and liberties of the people by discussing the great issues of the day and formulating, through debate and deliberation, their recommended priorities and goals for government action in the best interests of the people. However, in their roles as trustees of the people, legislators will not be expected to design laws, for two reasons. First, the position of trustee will be a full-time position, and trustees will not have the time to design laws. Second, the requirements for being a qualified designer of laws (e.g., PhD in law design

<sup>&</sup>lt;sup>15</sup> See the discussion of human rights, living standards, and quality of life standards in Appendix A of Schrunk, *The End of Chaos*.

<sup>&</sup>lt;sup>16</sup> Philip Crosby, *Quality is Free* (New York: McGraw-Hill, 1979).

engineering) are far beyond the typical general-knowledge background of popularly elected legislators. Thus, legislators will set policy, but they will assign, by competitive bidding or other responsible method, the design of laws that carry out their policies to qualified law design engineers (creative scientists).

# The Scientific Control System of Laws

The creative and investigative sciences of laws will act synergistically with the legislature to create a science-based feedback control system for the government's body of laws. By its incorporation of quality standards (QD, QA, and QI) for the creation, evaluation, and optimization of laws, the lawmaking process will be self-correcting in the direction of optimum outcomes, both in terms of the rights and liberties of the people and in the peaceful and responsible exploration and development of space (Figure 2).



Figure 2: Scientific Lawmaking for Space Governance. Science-derived quality programs for laws (QD, QA, and QI) will transform the lawmaking process into a problem-solving <u>feedback control system</u> that is self-correcting in the direction of optimum outcomes for the citizens of space governments (compare with Figure 1).

With each cycle of the scientific lawmaking process, the sophistication of design and evaluation methods will improve, knowledge of the mechanics of laws will increase, the size and complexity of the bodies of laws (and of the government) will be kept to a minimum, and the performance of laws will improve in terms of effective and just problem solution, cost-efficiency, and safety. In other words, the success of the science of laws, as determined by the levels of human rights, living standards, and quality of life standards of the people, and by the advancement of peaceful and responsible space exploration and development activities will, predictably, come to match the patterns of success that now characterize every other field of science such as electronics, aeronautics, and pharmacology.

# Conclusion

The coming exploration, development, and settlement of new worlds in space holds the promise of improving every facet of the human condition. For the governments that are formed to serve the people who live on the new worlds in space, the science of laws is

therefore recommended as the essential foundation for the creation and improvement of their bodies of laws. The science of laws will not only avoid the defects and threat of the traditional method of lawmaking, but it will also produce a rule of law that optimally serves the best interests of the people and facilitates the continued exploration and development of space.

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**About the Author:** David G. Schrunk is the President of the Science of Laws Institute. He is an aerospace engineer and a medical doctor with board certifications in the medical specialties of nuclear medicine and diagnostic radiology. Dr. Schrunk retired from the practice of medicine and now dedicates his time to his two passions: the future exploration and human development of the Moon and the science of laws. He has authored many scientific papers on lunar development issues and is a co-author of the book, *The Moon: Resources, Future Development, and Colonization,* published by Wiley-Praxis in 1999. The second edition of the "*Moonbook*" was released by Springer-Praxis in 2007. Dr. Schrunk founded the Quality of Laws Institute in 1995 and authored the book, *The End of Chaos: Quality Laws and the Ascendancy of Democracy,* published in 2005 by the Quality of Laws Press. Dr. Schrunk lives in Poway, California with his wife, Sijia, son, Erik, and daughter, Brigitte.



**Editor's Notes:** Dr. Schrunk has been contributing to the *Journal of Space Philosophy* and collaborating with us in the Kepler Space Institute for years. Articles #7, by Dr. Schrunk and #8, by Dr. Krone in this issue are further results of their professional sharing. This 2018 year marks the 6th year of the *Journal of Space Philosophy* and the 5th year of annual meetings and online Journal publications of the Science of Laws Institute. **Gordon Arthur.** 

# Maturing Humankind Through the Sciences of Law, Policy, and Space<sup>1</sup>

# By Bob Krone, President, Kepler Space Institute

# Abstract

Humanity's future hinges on the success of efforts to insure a supportive environment, needed resources, and continuous improvement of health and welfare for all its citizens. The Law of Space Abundance was formulated by leadership of Kepler Space Institute in 2009. The Law states: "Space offers an abundance of resources for humankind's needs." This law was not legislated by humans. It accurately describes what exists in the universe. The capturing of those resources has begun. The design and planning for ever increasing multiple resources to meet humanity's needs is also under way. Historically unprecedented efforts to do so will involve entirely new systems for Space exploration, development, and governance systems for human settlements in Lunar Orbits, on the Moon, Mars, and elsewhere in the Solar System. This paper addresses the needs for leadership, law, and governance for the control and management of that massive future effort.

This is not a traditional research paper. The main purpose of the paper is to recommend to leaders of the Science of Laws the addition to their research base of the Policy Sciences and the Space Sciences. That triple knowledge base will provide a mix of the soft and hard sciences, understanding of the political feasibility domain, which will be essential for implementing the Science of Laws and causing significant improvements, and the complex mix of theory and practice needed for society to advance from that valuable vision to real-world achievement of that vision. There is also an invitation from Kepler Space Institute for future partnering with the Science of Laws Institute.

**Keywords:** Humanity's needs and future, science of laws, law making, Policy Sciences, Space sciences, vision, Law of Space Abundance, leadership, science and technology, benefits and risks.

# The Science of Laws Challenge:

Dr. David G. Schrunk, President, Science of Laws Institute, has captured that challenge, which includes Space, in his following paragraph:

To avoid the poor performance and dysfunction that currently typifies the bodies of laws of Earth's governments, a new science, the Science of Laws, is proposed as the basis for creating and maintaining the bodies of laws for Space governments. For the people who become permanent citizens of new worlds in Space, the Science of Laws will produce a consistent and just

<sup>&</sup>lt;sup>1</sup> A paper prepared for the Science of Laws Institute 4th Annual Conference, San Diego, California, December 2, 2017. The Kepler Space Institute thanks Dr. John Wood, editor of the *Science of Laws Journal*, and the Science of Laws Institute, for approving a follow-up publication of this article in this issue of the *Journal of Space Philosophy*.

rule of law that optimally serves their best interest and reflects their highest aspirations.<sup>2</sup>

The Science of Laws Institute research has identified the following flaws and omissions as law has evolved on Earth:<sup>3</sup>

- Societal problems are not required to be defined and solutions to those problems are randomly addressed or inadequately addressed in law.
- War, crime, poverty, discrimination and human rights abuses, economic crises, violence, terrorism, and environmental pollution continue as major problems. The ever-increasing body of laws fails to prioritize or solve those problems adequately. Random amelioration may occur for a while. But failure to include sunset terms consistently insures that the ever-increasing volume of laws makes full implementation administratively impossible.
- Laws seldom define tools to measure or evaluate outcomes of implementation.
- There are no skills required for law design by those drafting the laws.
- Computer modeling or simulation is not a requirement, and accounting of costs of implementation rarely occurs.
- Probabilities of risks, negative results, or side effects are not required.
- Laws that tolerate the inclusion of "pork barrel" and political agenda provisions.
- Laws that are too often based upon opinions (ideology) rather than reliable knowledge, and that do not require the citation of references, are often passed.

These defects of the traditional method of lawmaking render it incapable of solving complex societal problems. It employs speechmaking, debate, and compromise, and it observes parliamentary protocols for the creation of laws. The traditional method of lawmaking continues to fail to resolve societal needs. More ominously, the continued growth in the size and chaos of the bodies of laws causes governments to enforce laws selectively in a drift towards arbitrary rule, in violation of the rule of law.

Avoiding repeats of the historic weaknesses and failures of Earth's governance as humans explore, develop, and settle in Space is an associated huge challenge.

What can rectify this history of lawmaking failures? The most critical first answer is leadership.

<sup>&</sup>lt;sup>2</sup> *The Science of Laws: Essential Foundation of Space Governance*, David G. Schrunk, e-mail to Bob Krone, October 14, 2017.

<sup>&</sup>lt;sup>3</sup> For the following list the author has done some minor editing to David Schrunk, "The Science of Laws: Introduction and History," *Science of Laws Journal* 1, no. 1 (2015): 2-4.

### Leadership Is Needed for Lawmaking Improvement:

A consistent failure throughout human history on Earth has been the employment of destruction, violence, genocide, death, and war. Laws have reduced, but not eliminated, those failures. The subject is public policymaking. So, we must include policymaking knowledge in our analysis. The subject is also linked to the evolution of social culture. Laws are made daily around the world. The culture does not automatically change when laws are passed. Cultural changes sometimes stem from people who need them, but leadership is the predominant catalyst that moves societal changes.

So, we need to look to the Policy Sciences for knowledge about policymaking and about the leadership that makes policy. Our best reference is the co-founder and leading Policy Sciences scholar, Professor Yehezkel Dror, of Hebrew University, Jerusalem, Israel. Ten of his fifteen books, published beginning in the 1960s, are now on Amazon.com. For this article, I reference his two latest works, *Avant-Garde Politician* (2014) and *For Rulers: Priming Political Leaders for Saving Humanity from Itself* (2017), plus his published articles in the *Journal of Space Philosophy*.<sup>4</sup>

I have been driven and inspired to write this missive by three appraisals maturing in my mind on the basis of lifelong multidisciplinary study of senior politicians, combined with intense personal involvement in efforts to mentor them and improve their choice processes, in a variety of countries: (1) There is increasing cause to worry about the future of humanity and its subparts; (2) the importance of senior politicians in influencing the future, for better or worse, is intensifying and becoming fateful; but (3) the qualities of even the all-too-few relatively good historical and contemporary senior politicians are becoming more and more inadequate for coping with the emerging and largely unprecedented challenges facing humanity. These three considerations add up to the conclusion that a new genre of senior politicians is urgently required; and to a personal feeling of moral duty and professional obligation to make whatever contribution I can, however minor, to their gestation.<sup>5</sup>

Dror's three appraisals, above, are valid. Readers wanting the details of Dror's decades of brilliant study, analysis, and prescriptions over the past sixty years can find them in his publications. I concur and accept them as givens for this Science of Laws article. Improved leadership is one third of the formula for achieving future improvement in lawmaking. Moral leadership is the essential need. The three essential variables for breakthrough improvements for humanity are, therefore, shown in Figure 1:

<sup>&</sup>lt;sup>4</sup> See Yehezkel Dror, "Preventing Hell on Earth," *Journal of Space Philosophy* 4, no. 2 (Fall 2014): 16-27. <sup>5</sup> Yehezkel Dror, *For Rulers: Priming Political Leaders for Saving Humanity from Itself* (Washington, DC: Westphalia Press, 2017), "Overture." Bob Krone note to readers: Yehezkel Dror has been my academic mentor and professional colleague since 1968.



Figure 1: Humanity's Future

# Science of Laws Solutions

The science of laws consists of two coequal branches: (1) the creative science of laws and (2) the investigative science of laws. The purpose of the creative (i.e., engineering) branch of the science of laws is to solve societal problems that degrade or threaten the well-being of the people (in terms of human rights, living standards, or quality of life) within the jurisdiction of a government. To accomplish this task, it employs knowledge, tools, and design expertise, such as modeling and simulation, to create and optimize laws of government. It also derives, records, organizes, and promulgates reliable knowledge of design methodologies and best practices that are applicable to the creation of laws of government. The creative science of laws will correct the defects of the traditional method, establish quality design (QD) standards, quality improvement (QI) standards, and ethical standards for the creation and optimization of laws. Quality assurance (QA) will evaluate the process and improve it over time.<sup>6</sup> The process is shown in Figure 2.

<sup>&</sup>lt;sup>6</sup> Source: Science of Laws Journal 1, no. 1 (2015).



Figure 2: Scientific Lawmaking for Space Governance. Science-derived quality programs for laws (QD, QA, and QI) will transform the lawmaking process into a problem-solving <u>feedback control system</u> that is self-correcting in the direction of optimum outcomes for the citizens of space governments.

Readers will find details and descriptions of this process in the articles in the *Science of Laws Journals*, 2015, 2016, and 2017.

# **Policy Sciences Solutions:**

Leaders skilled with governmental and public policymaking skills will be essential for the sciences trilogy herein prescribed: (1) Science of Laws, (2) Policy Sciences, and (3) Space Sciences. Throughout human history, leadership has been the primary variable responsible for outcomes of good or evil, for the creation or extinctions of societies, for progress or decline, for harmony or conflict, for the outcomes of war, for the advances of science and technology, and for the influence of religious theology resulting in happiness or tragedy. It will be the same for the future of humankind.

Yehezkel Dror, in his two latest books, *Avant-Garde Politician: Leaders for a New Epoch* (2014) and *For Rulers: Priming Political Leaders for Saving Humanity from Itself* (2017), uses a long-term evolutionary time horizon and prescribes a radical new model for leadership to put priority on shaping the future of humanity. His six decades of study, writings (in several languages), and teaching on public policymaking systems around the world put him in an exclusive Policy Sciences expertise category.

This article only summarizes Dror's description and prescriptions for leadership. Readers should delve into his writings on Amazon.com for his in-depth introductions, analyses, evaluations, theories, conclusions, and prescriptions.

# Yehezkel Dror's leadership values, understandings, characteristics, talents, and skills:<sup>7</sup>

- 1. Operate from the understanding that Earth's global problems are increasing, that history has no evidence of solution capabilities for those problem, and that some kind of radically innovative global regime will eventually be necessary. If that movement fails, the quality of life for Earth's humanity will decrease and conflicts will result in human catastrophes, ethnic genocide, and an increased probability of human-produced human extinction.
- 2. Have a leadership calling-related inner philosophy that is freely chosen and that dominates the whole of life.<sup>8</sup>
- 3. Have a realistic comprehension of humans and humanity.
- 4. Understand that your legacy for the future will be your positive impact on historic processes.
- 5. Have both ethical basics and utilitarian skills, giving priority to bona fide efforts for the needs of humanity and measures needed to advance them.
- 6. Study to understand the potential future dangers of technology to humanity as well as its blessings.<sup>9</sup>
- 7. Study past and present leaders' successes and failures to cope with serious problems.
- 8. Analyze and forecast the implications of continuing and increasing change in society, including global, and beyond Earth, long-term political issues.
- 9. Be an agent to help to prevent science from providing an immature humanity with instruments to destroy itself.
- 10. Have a capability for research and evaluation of desirable scenarios for the future and for disastrous scenarios, as well as knowledge of the political feasibility domains for decision clusters addressing those scenarios.
- 11. Understand that the preparation and training for people choosing avantgarde leadership as a career will need lifelong formal and real-world learning to a degree that has not previously existed.

In his latest book, For Rulers, Yehezkel Dror states:

a much improved genre of political leaders is urgently needed. Without it survival and thriving requirements cannot be met and the long-term existence of the human species is seriously endangered.<sup>10</sup>

 <sup>&</sup>lt;sup>7</sup> Source: Bob Krone, "Leadership will be Key: Applying Yehezkel Dror's Avant-Garde Politician: Leaders for a New Epoch," Journal of Space Philosophy 3, no. 2 (Fall 2014): 15-16. Minor edits made for this article.
<sup>8</sup> This aspect of Yehezkel Dror's model for avant-garde leadership, innermost philosophy, is the subject of Chapter 19 in his 2014 book.

<sup>&</sup>lt;sup>9</sup> See Yehezkel Dror, "Preventing Hell on Earth," *Journal of Space Philosophy* 4, no. 2 (Fall 2015): 16-27. <sup>10</sup> Dror, *For Rulers*, 2.

Dror created the title Homo Sapiens Governor (in short HSG, plural HSGs) for those who will become leaders for the mission of saving humanity from itself. The 103 pages of the book are dedicated to a definition of leadership and prescriptions for leaders' behavior.

# How Space Will Provide Solutions:

Given the above, what positive impacts could the Space Sciences contribute? Attempts to improve lawmaking within governments have been under way for centuries. The results are not adequately meeting the challenges that face global decision clusters. How could Space offer new original solutions?

Drawing on Space Sciences and the research, exploration, and successful missions over the past half century leads us to entrepreneurial and paradigm shift thinking for proposing needed remedies. These remedies will not be new to the Founders of the Science of Laws Institute – review the quote of President David Schrunk beginning this article. But they will be new to most public policy lawmakers in the United States and throughout the world.

This section of the article begins with the assumption that the improvement and survival of homo sapiens will depend heavily on a successful Space Epoch. In 2017, that assumption is not universally accepted. It can be found today, however, in the visions and missions of major Space organizations around the world, including our Kepler Space Institute.

As knowledge accumulates under the *Law of Space Abundance*<sup>11</sup> – which states: "Space offers abundant resources for humankind's needs," as Earth's non-renewable resources decrease, as Earth's population increases, and as extra-terrestrial threats to Earth are better understood, disagreements with that assumption will disappear. A critically important research question today is:

# Will the potential benefits of the forthcoming Space Epoch be unknown by leaders until beyond the time when those benefits can be captured to solve Earth's and humanity's needs?

The Space environment has many aspects, other than resources, that will be dependent variables, helping to achieve the vision outlined in this article:

- 1. There is no history of war, conflict, or pathological behavior in Space despite the fact that the Star Wars film series was top entertainment. Space is essentially a vacuum waiting for innovative governance, laws, and unprecedented positive human experiences.
- 2. Humans living in Space will be isolated from natural or human-created pollution or disasters on Earth.
- 3. Population growth will not be a problem in Space.

<sup>&</sup>lt;sup>11</sup> The Law of Space Abundance was formulated by Kepler Space Institute leadership in 2009 after studying the extensive research into the resources in our Solar System and beyond. Those resources can be mined for Earth's needs, as well as for constructing human settlements in Space. The Sun's energy is only the most obvious and dramatic resource.

4. Human intelligence, wisdom, and judgment will be the only constraints to achieving this vision for humankind.

# **Concluding Thoughts**

The formation of planet Earth happened 4.5 billion years ago after the Big Bang 13.5 billion years ago. Organisms and the beginning of biology happened 3.5 billion years ago. Living ancestors of humans appeared six million years ago. Humans spread from Africa to Eurasia 2.5 million years ago. Neanderthals evolved in Europe and the Middle East five hundred thousand years ago. Homo Sapiens appeared in East Africa two hundred thousand years ago. Homo Sapiens appeared in East Africa two hundred thousand years ago. Homo Sapiens appeared in East Africa two hundred thousand years ago. Homo Sapiens appeared in East Africa two hundred thousand years ago. Homo Sapiens ago and became the only surviving human species thirteen thousand years ago. The first kingdoms, script, and polytheistic religions began five thousand years ago. Europeans began to conquer America and the oceans five hundred years ago. The Industrial Revolution began two hundred years ago, along with the extinction of many species of plants and animals. Humans transcended the boundaries of planet Earth sixty years ago.<sup>12</sup> In 2017, humans still have not learned to live and grow together in peace and harmony. There exists much social pathology. Humankind has need of much maturing, and it requires much learning to prevent its extermination.

The Science of Laws Institute was incorporated in California in 1995, and it began holding annual conferences and publishing the *Science of Laws Journal* in 2015. Its mission is to establish the science of laws on the conviction that the laws of government may be counted among the most important works of humankind.

This paper is a contribution to the developing Science of Laws knowledge base with the recommendation that the Policy Sciences and Space Sciences join the Science of Laws to form a trilogy working towards a common vision for a future humankind containing the values, principles, legal system, foundations, concepts, and policies necessary for improvement and survival – in perpetuity.

I have a personal invitation to the leadership of the Science of Laws Institute to partner with the Kepler Space Institute to sponsor graduate research toward the "Promethean Mission" in Yehezkel Dror's *For Rulers: Priming Political Leaders for Saving Humanity from Itself.* Dror states that mission as:

The emerging leap in human power, supplied by science and technology, [that] can enable unimaginable pluralistic thriving and perhaps steps toward the stars. But it also poses serious and even fatal risks to human species. Never before has humankind faced such fateful choices on how to use its power.<sup>13</sup>

<sup>&</sup>lt;sup>12</sup> This timeline comes from Yuval Noah Harari in *Sapiens: A Brief History of Humankind* (New York: Harper Collins, 2015).

<sup>&</sup>lt;sup>13</sup> Dror, *For Rulers*, 3.

Legal systems would be the focus for the Science of Laws Institute. The abundance of resources in Space for humankind's needs would be the Kepler Space Institute's focus.

Our joint efforts toward that common vision could contribute to creating a legacy for positive impacts on historic processes. We should always keep in mind Arthur C. Clarke's quote: "One cannot have superior science and inferior morals."<sup>14</sup> That quote is directly linked to this paper's emphasis on required moral leadership.



# Bob Krone, PhD, President, Kepler Space Institute December 2, 2017

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**About the Author:** Dr. Bob Krone, currently 87 years old, is in his fourth professional career. Those four careers were the United States Air Force (1952-1975) where he flew jets, was a Squadron Commander and International Staff Officer; the University of Southern California in Los Angeles (1975-1993); a mixed career with La Sierra University and the University of South Australia (1993-2007); and education and research within the Global Space Community (1980-present). Dr. Krone has been the principal supervisor for forty-three successful doctoral candidates (PhD and DBA) and professor for hundreds of master's degree candidates. His PhD, 1972, was in Political Science and Policy Sciences at UCLA. He has authored or co-authored twelve books and ninety professional journal articles, including twenty-seven articles in the published issues of the *Journal of Space Philosophy* (www.keplerspaceinstitute.com/JSP).

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Bob's complete Curriculum Vitae can also be found on the Kepler Space Institute website and he personally reviews his own 87 years in his article, "A Personal Philosophy: Know Thyself" in the Spring 2015 Issue of the *Journal of Space Philosophy*, 5, no. 1.



<sup>&</sup>lt;sup>14</sup> Bob Krone, "Arthur C. Clarke's Philosophy for the 21st Century," *Journal of Space Philosophy* 3, no. 1 (Spring 2014): 97-102.

**Editor's Notes:** This is an interesting development of David Schrunk's work, and it promises some stimulating collaboration in the future. We look forward to the results of this partnership. **Gordon Arthur.** 

# How PoWs in the Hanoi Hilton Learned of the Moon Landing

# By Leo K. Thorsness, Colonel USAF Retired

**Editor's Note:** Leo K. Thorsness spoke to the attendees of the 2011 International Space Development Conference in Huntsville, Alabama. On May 21, 2011 he told a fascinating story of how the Vietnam prisoners of war held in the Hanoi Hilton found out about America's July 20, 1969 landing on the moon. Col. Thorsness is a recipient of the Congressional Medal of Honor for acts of bravery in Vietnam. Eleven days after the events for which he was awarded the Medal of Honor, he was shot down and spent from April 30, 1967 through March 4, 1973 at the Hanoi Hilton as a prisoner of war. Leo was introduced by Kepler's President **Robert M. Krone**, PhD and Colonel USAF retired.

#### \*\*\*\*\*

Bob and I only go back about 61 years. I'm older than him, I'm not sure I remember how long I've known anyone, but he is one of my great friends. And we served together and flew together a hundred years ago.

Very quickly, I was a Wild Weasel pilot, and I was on my 92nd mission over North Vietnam. I got shot down with an air-to-air missile with a mate, and I spent six years in Hanoi.

And, first, a summary of those six years. Three years were brutal—solitary, small cells, a lot of torture, can't talk to anybody, real bad life. The last three years were mostly boring, big cells, you got to talk out loud, bricks came out of windows, and much different.

The last three years, because of pressures from our families, and a lot of Americans who wore PoW bracelets—and some of you did, some of you may still—the treatment got a lot better. And our wives and families were allowed to send us a six-line letter every two months. And also, they were allowed to send us a two-kilo package every two months. But you found out, most of things they thought we'd like the camp authorities liked, so we didn't get much of that. But, in one of them, maybe not a six pounder or two pounds, there'd be maybe, you know, half a pound with just a couple things.

One day—I'm getting to the story now—one day somebody got a package. If you lived in a cell with a bunch of people, and by now we did, anything you got you shared with everybody else. We were just about like brothers there.

And, within this package was a sugar—like the ones you have on your table now—and this one had a picture it.



And for that picture the Vietnamese failed to realize its significance, It was the picture of you know what I'm going to say? Neil Armstrong stepping on the moon.

Now, as aviators, we knew, before we were shot down in 1965 or 1966, that America was scheduled to try to do this. But we had no idea it happened, we had no news, no radio or anything, no pencils, no papers. And this little package came through. If they caught you communicating, they beat you bad. Within about fifteen seconds, as soon as that happened, we were on the wall communicating with the rest of the camp that we had been contacted.

And here's what it sounded like, I can tap it out for you, it just takes fifteen seconds. Because, if any of you, or your kids, end up in space, listen, they might use the tap code up there, right? And you'll want to know the tap code when you get up there. And what we sent was just eight letters: A M standing for America "A—M—O—N—M—O—O—N." (He tapped out the code with his knuckle on the podium – Ed.) "American on moon."

And those fifteen or twenty seconds, in our mind, just justified the brutality and what we were fighting for as Americans. We were so proud. And it was the happiest twenty seconds of our lives, in that prison setting—other than when we got released to come home. We were so proud to be Americans.

In fact, the next morning when I went out, a Vietnamese guard was out, he said, "The moon is up." And I said, "You can't look at that, that's our moon."



Copyright © 2011, Leo Thorsness. All rights reserved.

**Editor's Note**: We scoured the internet trying to find a picture of that historic sugar packet, but we were unsuccessful. However, we believe it probably looked very much like this matchbook cover from the same historical moment. Leo, his wife Gaylee and I, and my wife, Bencey, lived across the street from each other near Turner Air Force Base, Georgia beginning in early 1954. Our daughters, Kat Krone and Dawn Thorsness, were born within a week of each other at the Turner AFB Hospital. That began a close relationship that lasted until Leo's passing in May 2017. We flew together in Air Force F-84F, F-100, and F-105 jets, worked together in academia, and met socially whenever possible – except for the six and one-half years Leo suffered in the Hanoi prison. He became the President of the Medal of Honor Society.



His book, *Surviving Hell: A POW's Journey* was a beautifully written description of how the Hanoi POWs survived day after day for the longest incarceration of America's military in its history.

# LEO K. THORSNESS

Organization: US Air Force Company: 357th Tactical Fighter Squadron Division: Born: February 14, 1932, Walnut Grove, MN Died: May 02, 2017, St. Augustine, FL Rank at Retirement: Colonel Past President of the Medal of Honor Society

Date of Issue: October 15, 1973 Accredited Place: Over North Vietnam Date: April 19, 1967 Rank: Major



# Medal of Honor Citation



For conspicuous gallantry and intrepidity in action at the risk of his life above and beyond the call of duty.

As pilot of an F-105 aircraft, Lt. Col. Thorsness was on a surface-to-air missile suppression mission over North Vietnam. Lt. Col. Thorsness and his wingman attacked and silenced a surface-to-air missile site with air-to-ground missiles, and then destroyed a second surface-to-air missile site with bombs. In the attack on the second missile site, Lt. Col. Thorsness's wingman was shot down by intensive antiaircraft fire, and the two crewmembers abandoned their aircraft.

Lt. Col. Thorsness circled the descending parachutes to keep the crewmembers in sight and relay their position to the Search and Rescue Center. During this maneuver, a MIG-17 was sighted in the area. Lt. Col. Thorsness immediately initiated an attack and destroyed the MIG. Because his aircraft was low on fuel, he was forced to depart the area in search of a tanker.

Upon being advised that two helicopters were orbiting over the downed crew's position and that there were hostile MIGs in the area posing a serious threat to the helicopters, Lt. Col. Thorsness, despite his low fuel condition, decided to return alone through a hostile environment of surface-to-air missile and antiaircraft defenses to the downed crew's position. As he approached the area, he spotted four MIG-17 aircraft and immediately initiated an attack on the MIGs, damaging one and driving the others away from the rescue scene.

When it became apparent that an aircraft in the area was critically low on fuel and the crew would have to abandon the aircraft unless they could reach a tanker, Lt. Col. Thorsness, although critically short on fuel himself, helped to avert further possible loss of life and a friendly aircraft by recovering at a forward operating base, thus allowing the aircraft in emergency fuel condition to refuel safely.

Lt. Col. Thorsness's extraordinary heroism, self- sacrifice, and personal bravery involving conspicuous risk of life were in the highest traditions of the military service, and they have reflected great credit upon himself and the US Air Force.

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**Editor's Notes:** My daughter Kat, and I attended Leo's interment with full military honors at Arlington Cemetery. Kepler Space Institute has created the Leo K. Thorsness Academic Chair for Space Leadership. Leo credited his family, friends, faith and flying for his many successes in life and for his dedicated service to America. **Bob Krone**.

# Recursive Distinctioning: The 3rd Annual RD Conference, Clayton, Missouri, September 24-27, 2017

# By The Krones: Bob, Salena, and Kat

The *Recursive Distinctioning Team* met for its 2017 Convention at the residence of Dr. and Mrs. Joel Isaacson, 20 Crestwood Drive, Clayton Missouri, 63105, USA, September 24-27, 2017.

Participating were Dr. Joel D. Isaacson, Mrs. Leora Isaacson, Dr. Louis H. Kauffman, Diane Slaviero, Dr. Robert M. Krone, Mrs. Salena Gregory-Krone, Ms. Kat Krone, and Dr. John Barker. Presenters via Skype were Professors Moshe Klein and Oded Maimon (from Tel Aviv University, Israel), Ben Goertzel (United States) and Stephen King (United States)

The Purpose of the Conference was to identify startup strategies.

1. **Bob Krone** had distributed a PowerPoint presentation prior to the meeting, that summarized the discovery, history and knowledge about Recursive Distinctioning (RD). A summary statement in that presentation follows:

# Recursive Distinctioning (RD):

The Root of Nature's Cosmic Intelligence

Bob Krone, Journal of Space Philosophy, Special Science Issue, Spring 2016

"There is strong indication that RD is a basis for many developments in fields, including computing artifacts that mimic natural intelligence. The potentials for significant impacts of RD across many sciences and technologies remain to be identified through research. Dr. Isaacson's discovery that our universe contains information and intelligence in a process that is basic also to human perception and cognition (ie. Thinking) is a scientific knowledge paradigm shift. He has made a huge conribution to Cosmos understanding."

# 2. Joel Isaacson and Louis Kaufmann



Dr. Joel Isaacson



Dr. Louis Kauffman

Dr Isaacson and Dr. Kauffman opened the conference with welcomes. This 3rd Annual RD Conference occurred following the National Space Society's International Space Development Conference (ISDC–2017), held in St. Louis, May 24-29. The Kepler Space Institute (KSI) was fully involved in that Conference.

Scientist and author Howard Bloom presented at that ISDC-2017 in St. Louis on May 28, 2017 the most recent paper authored by Dr. Louis Kauffman and Dr. Joel Isaacson.



That presentation provided the description and current status of research on RD.

3. Dr. Louis H. Kauffman's presentations during the conference included the statement:

Recursive Distinctioning is a potentially explosive topic whose basic principles apply at all levels of biology, cognition, information science, and computation.

**RD Defined**: Recursive Distinctioning means just what it says. A pattern of distinctions is given in a space based on a graphical structure (such as a line of print, a planar lattice, or a given graph). Each node of the graph is occupied by a letter from some arbitrary alphabet. A specialized alphabet is given that can indicate distinctions about neighbors of a given node. The neighbors of a node are all nodes that are connected to the given node by edges in the graph. The letters in the specialized alphabet (call it SA) are used to describe the states of the letters in the given graph and at each stage in the recursion, letters in SA are written at all nodes in the graph, describing its previous state. The recursive structure that results from the iteration of descriptions is called Recursive Distinctioning. Here is an example. We use a line graph and represent it just as a finite row of letters. The Special Alphabet is  $SA = \{=, [, ], O\}$  where "=" means that the letters to the left and to the right are equal to the letter in the middle. Thus, if we had AAA in the line then the middle A would be replaced by =. The symbol "[" means that the letter to the LEFT is different. Thus, in ABB the middle letter would be replaced by [. The symbol "]" means that the letter to the right is different. And finally, the symbol "O" means that the letters both to the left and to the right are different. SA is a tiny language of elementary letter distinctions. Here is an example of this RD in operation where we use the proverbial three dots to indicate a long string of letters in the same pattern. For example.



Note that the element ]O[ appears and it has replicated itself in a kind of mitosis. Elementary RD patterns are fundamental, and they are found in many structures at all levels. To see a cellular automaton example of this phenomenon, go to Wikipedia.<sup>1</sup> Here we see a replicator in HighLife, a modification of John Horton Conway's automaton Life. The HighLife Replicator follows the same pattern as our RD Replicator! We can begin to understand how the RD Replicator works. This gives a foundation for understanding how the more complex HighLife Replicator behaves in its

<sup>&</sup>lt;sup>1</sup> <u>en.m.wikipedia.org/wiki/Highlife\_(cellular\_automaton)</u>.

context. Finally, here is an excerpt from a paper by LK about replication in biology and the role of RD.

Recursive Distinctioning (RD) is the study of those systems that use symbolic alphabetic language that can describe the neighborhood of a locus (in a network) occupied by a given icon or letter or element of language. An icon representing the distinctions between the original icon and its neighbors is formed and replaces the original icon. This process continues recursively.

RD processes encompass a very wide class of recursive processes in this context of language, geometry, and logic. These elements are fundamental to cybernetics, and they cross the boundaries between what is traditionally called first- and second-order cybernetics. This is particularly the case when the observer of the RD system is taken to be a serious aspect of that system. Then the elementary and automatic distinctions within the system are integrated with the higher order discriminations of the observer. The very simplest RD processes have dialectical properties, exhibit counting and they exhibit patterns of self-replication. Thus, one has in the first RD a microcosm of cybernetics and perhaps, a microcosm of the world.

This comes from a Special Issue of JSP, Vol. 5, No. 1, Spring 2016, devoted to RD.

Dr. Louis H. Kauffman Professor of Mathematics, University of Illinois at Chicago, presented on RD via Zoom at the International Space Development Conference – 2016 in San Juan Puerto Rico on May 22, 2016.<sup>2</sup> It will be in the archives maintained by the National Space Society (NSS) and is also available on Researchgate. This presentation, and the formal paper titled "Recursive Distinctioning," co-authored by Louis H. Kauffman and Joel D. Isaacson, published in the *Journal of Space Philosophy*, Spring 2016, create a major milestone in the Information Sciences, Cybernetics, Cellular Automata and Astro Physics.

Bob Krone, Ph.D., President of Kepler Space Institute (KSI) and Editor-in-Chief of the Journal of Space Philosophy.

<sup>&</sup>lt;sup>2</sup> See <u>www.dropbox.com/s/p9urkbf87b18l7s/RecursiveDistinctioning.pdf</u>.

4. Ben Goertzel (Skype Presentation),



Ben Goertzel gave a presentation on graphtropy. It proposed a new conceptual foundation for the notion of information, based on the concept of a *distinction graph*, in which two nodes are connected if and only if a particular interpreter cannot distinguish them. The graphtropy of a distinction graph is the average connection probability of two nodes. He concluded that graphtropy measures how much complexity there is in the environment relative to an observer.

5. **Stephen Paul King** (Skype Presentation), "Adaptive Networks as the Natural implementation substrate for RD processes."

# Abstract

There are a substantial number of examples in nature where networks are the means to implement recursive distinctioning (RD) processes. In this talk, we discuss how an example of an RD process may be occurring in the network of neurons of the brain and how this might be a way to process information in a way that is robust and secure. It can be noted that the usual need for a global clock is ameliorated by the use of "opportunistic" synchronizations in both spatial and temporal orderings. Similarly, networks that can have adaptive neighborhood relations can act to store and use previous RD results in future instances of the RD processing by a variation of topological relations. We hope that this idea is plausible enough for the audience to inspire discussion and comment for the direction of future investigations.

It is believed that the RD process is universal, and it appears in many places, including the brain. Of particular interest is its appearance in the very process of thought and, possibly, consciousness itself. This possibility is mentioned by Joel D. Isaacson and Louis H. Kauffman in a letter to the *Journal of Space Philosophy* 4, no. 1 (Spring 2015).

This recursive process depends, at its base, on the most elementary distinctions possible for character strings. No mathematical calculations are performed. We should mention that distinction-making without mathematical computation is ubiquitous in natural neuronal processing.

Let us look at the patterns....

Looking at the flow of signals in the brain, we note the patterns of synchronization across many cortical columns.

Videos of Brain Synaptic firing patterns. https://www.youtube.com/watch?v=yy994HpFudc https://www.youtube.com/watch?v=toJX5LfFDQA https://www.youtube.com/watch?v=ZQTqvv6HHHY

Topological view:



From anthonybonato.com/2016/08/31/algebraic-topology-and-the-brain/



From <u>www.technologyreview.com/s/602234/how-the-mathematics-of-algebraic-topology-is-revolutionizing-brain-science/</u>

GLC discussion: clips of GLC animations www.youtube.com/watch?v=UDi\_eWa\_Z4Q www.youtube.com/watch?v=Zzsp5TWcAvQ https://www.youtube.com/watch?v=IMH8I-woAiU

It occurred to me, when I first found Marius Buliga's work, that the Graphic Lambda Calculus was remarkably similar to what we see in the patterns of synchronized neuron firings. Could it be that this is a way that the brain is processing an RD based computation? I went on to investigate whether it possible to implement GLC in networks of devices but the details of that is outside the scope of this talk.

# What is GLC?

Graphic lambda calculus is a computational formalism that uses a set GRAPH of oriented, locally planar, trivalent graphs, with nodes decorated with functions (and also connectives, loops, and a termination node) that can represent any lambda calculus expression. Lambda expressions are instances of mathematical logic and computer science for expressing computation by way of variable binding and substitution.

chorasimilarity.wordpress.com/graphic-lambda-calculus/



To understand how GLC processing occurs, we need to introduce the concept of graph rewriting.



In computer science, *graph transformation*, or *graph rewriting*, concerns the technique of creating a new graph out of an original graph algorithmically. It has numerous applications, ranging from software engineering (software construction and also software verification) to layout algorithms and picture generation.

Graph transformations can be used as a computation abstraction. The basic idea is that the state of a computation can be represented as a graph, further steps in that computation can then be represented as transformation rules on that graph. Such rules consist of an original graph, which is to be matched to a subgraph in the complete state, and a replacing graph, which will replace the matched subgraph.

This rewriting process can occur asynchronously and concurrently to overcome the problem of the nonexistence of perpetual global clocking. For more detail on this, we note how when we have a network of mutating connections with a variable signal delay, there is a possibility that spontaneous correlations can occur that are almost simultaneous in time. We call this opportunistic synchronization.

This takes us to the concept of Asynchronous Cellular Automata (ACA) <u>en.wikipedia.org/wiki/Asynchronous\_cellular\_automaton</u> <u>A guided tour of asynchronous cellular automata</u>

In the case of ACAs, there is a possibility that patterns will emerge that happen to be synchronized in time. If additional layers of RD processing can act on these as they occur, we obtain instances of opportunistic synchronization. This may be a temporal form of RD process that we might want to look into further, as it would connect directly to the GLC.

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# Bridge to Recursive Distinctioning and Bisimulation

# Philosophical Concepts

Entities are the products of processes. We can model a process as a stream that, like a current of water – the very thing that inspired Heraclitus – can merge and diverge and most importantly, can form whirlpools, cycles or recursions of interactions.

All interactions between entities can be represented as concurrent processes and, as such, can be seen as organized into orderings to *simultaneous givens* or *sequential givens*, as per Kant's idea.

Lou states the basic idea of RD as "a recursive process that writes the distinctions at time t into a new pattern of distinctions at time t + 1."

This act of taking distinctions recursively leads us to an alternative way of thinking of information.

Following Bateson's idea, we define a bit as the minimal distinction between two entities that makes a difference to a third entity. A distinction could be quantified as a failure to match a pair of bits in any interaction process; we see this in the case of pattern recognition. Computation is the processing of bits and functional relations between bits. Marius Buliga has shown that GLC is Turing universal. Has it been shown that RD automata are Turing universal? This is an open problem in my research so far, but given the large number of examples of CA that are Turing universal, it seems likely.

There is a way to tie RD directly to computation by considering how one can relate pairs of computational processes to each other. This is the concept of bisimilarity and bisimulation. The relations between computations can be captured in the concept of bisimulation. If a pair of computational processes are such that one can exactly simulate the other in the sense that the simulations of the transformation of input bits (and functions) and output bits (and functions) match up, we have an equality relation between computers: bisimilarity.

6. **Moshe Klein and Professor Oded Maimon** (Skype Presentation from Tel Aviv University), "*Axioms of Soft Logic*".



Readers can contact Moshe Klein to request the current version of the Axioms of Soft Logic Presentation at: <a href="mailto:mosheklein@mai

### 7. Two Future Projects

a. Recursive Distinctioning Book Planning. The following Motion was approved:

That this RD Team agrees to launch the first RD book project with the World Scientific Publishers.

Drs. Isaacson and Kauffman will draft the design and contents. Dr. Bob Krone and Dr. Gordon Arthur offered their services as editors.

b. An IBM Watson AI project be investigated to be a foundation for Recursive Distinctioning knowledge and references for future research.

# The Arts for Humans in Space

# By Richelle Gribble

We are exposed to satellite imagery every day, from navigating Google Maps to gazing at Yelp options to find our next meal. We see the world from above through GPS and weather reports on the news. Satellite imagery is integrated into our everyday experience, shaping our perception of the globe—do we take it for granted?

The first satellite images taken from space were photographed on the sub-orbital V-2 rocket launched by the United States on October 24, 1946 (Figure 1). For the first time, we could look outside of ourselves, humbled by the vastness of the connected world. Since then, satellite imagery has infiltrated all facets of our culture, from media to navigation. We have transitioned to mapping, documenting, and imaging Earth from space very quickly. The satellite perspective is part of our recent history.



Figure 1: The first images from space taken on the V-2 rocket flight launched by the United States on October 24, 1946. Source: NASA.

Perhaps the novelty of satellite imagery dwindled as flight travel increased, making these scenes from above familiar to us. Maybe widespread use of satellite imagery made us less sensitive to it. Or, possibly we lost such ecstatic wonder for satellite photos when we interacted with them daily on our phones, after Google Earth launched in 2001 and Street

View launched in 2005. With so much exposure to aerial footage (in a short time), did we numb our senses to its uniqueness?

How can we reawaken *awe* for aerial views? We must personalize these seemingly distant places and consider our role within a greater context. If we maintain our curiosity, we can discover profound meaning from a bird's-eye view: here we see ourselves, our actions, our impact, our future.

I am the 11th artist to be selected for an artist residency at **Planet Labs**, an Earth-imaging satellite company based in San Francisco, CA (Figure 2). I was invited to create site-specific projects at Planet's headquarters inspired by planetary themes. With on-boarding sessions, company meetings and tours, introductions to business executives and engineers, and conversations with rocket scientists, I was fully immersed in Planet's culture and mission.



Figure 2: Artist Richelle Gribble in studio. Photo: J. S. Carson.

After I had conversations with Robert Simmon, Senior Visualization Engineer at Planet and former Lead Visualizer at NASA Earth Observatory, he acknowledged that we need to "humanize satellite imagery," making it comprehensible and relatable to our lives again. This desire to make satellite imagery connect with us in a more personal way became the driving force behind my artistic endeavors at Planet.

I created an interactive puzzle, "Linked," made up of 250 hand-painted pieces (Figure 3). Each puzzle piece depicts a different scene on Earth, ranging from plants, animals, humans, and technology to human-made systems. Employees and visitors at Planet Headquarters and the Terra Bella office were invited to assemble two modular installations comprised of the pieces of our planet. This collaborative puzzle links living and non-living systems in various combinations, reflecting on the hive-like connectivity of Earth.





The next project is comprised of seven 3D mixed-media constructions of satellite imagery captured via Planet Explorer Beta (Figures 4 and 5). My goal was to reconstruct the aerial perspective using everyday, human-made objects (rubber bands, circuit board pieces, plastic figurines, etc.) to make these distant places relatable to the touch. Reconstructing scenes made from material we use daily or discard gave a tactile sensation to satellite imagery.



Figure 4: "Organized Chaos" (top) mixed media paintings by Richelle Gribble with source material from Planet and other sources (bottom).



Figure 5: "Organized Chaos" by Richelle Gribble installed next to SkySat satellite at Planet Headquarters. Photo: Forest Stearns.

As a capstone project to summarize my findings at Planet, I etched artwork onto two "Dove" satellites that were successfully launched to outer space aboard an Orbital-ATK Minotaur-C rocket destined for a Sun synchronous orbit, the first-ever orbiting art show (Figures 6 and 7). This was my second opportunity to send art to space since I created art that flew aboard Blue Origin's New Shepard flight a year earlier. My next art commission for space is developing with Relativity Space, an aerospace startup building 3D-printed rockets based in Los Angeles, CA.



Figure 6: Continuous-line drawing of a crowd of people to reference our human interconnectivity for the "Dove" satellite. Art by Richelle Gribble.



Figure 7: "Dove" satellite with artwork by Richelle Gribble.

After the three-month artist residency at Planet, I was invited to be a Planet Ambassador with access to Planet's Explorer Beta, which provides comparative tools and daily satellite imagery to navigate global changes from space. This tool aids research and artistic projects beyond my residency experience, resulting in several cross-disciplinary collaborations bridging art and science.

Intersections between art and space are crucial to my artistic vision to inspire wonder about the world we inhabit. Perhaps what is most exciting about connecting art and space is they have a similar goal—to expand our human capabilities and imagination to transcend us. There is no better outlet for expressing our humanity and our impact on the planet than in the stars, reflecting back on Earth.

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**About the Author:** Richelle Gribble creates mixed-media paintings and drawings, prints, videos, puzzles, and sculptures. Her artwork is inspired by concepts of virality, ecology, networks, group dynamics, and social trends that connect us all. In 2013, she earned a BFA in Studio Arts from the Roski School of Art and Design with dual minors in Social

Entrepreneurship and Marketing at the University of Southern California. She won the 2016 Grand Prize Award for solo exhibition and representation at Jonathan Ferrara Gallery with inclusion in Art Market San Francisco, Texas Contemporary, and the Miami Project. Her works have been exhibited on an LED screen in Times Square, Christie's Salesroom the Rockefeller Center, John Wayne Airport, and more. Her artwork was etched onto four Dove satellites in the first-ever orbiting art show in outer space facilitated by Planet Labs. Her art has been acquired by the Tides Institute and Museum of Art, Relativity Space, Kala Art Institute, USC Art & Trojan Traditions Collection, Awagami Factory, and various private collections. Her work has been presented in a TEDxTrousdale talk "What Is Our Role Within a Networked Society?" and published in the *Creator's Project*, the *Atlantic*, and *Vice Magazine*.



**Editors' Notes:** We thank Richelle Gribble for her first publication in the *Journal of Space Philosophy*. Her innovative contribution to Space Art literature and her ending comments perfectly reflect our Kepler Space Institute vision:

Intersections between art and space are crucial to my artistic vision to inspire wonder about the world we inhabit. Perhaps what is most exciting about connecting art and space is they have a similar goal—to expand our human capabilities and imagination to transcend us. There is no better outlet for expressing our humanity and our impact on the planet than in the stars, reflecting back on Earth.

There is another personal reason we are pleased to have her join our expanding group of professional Space authors. She is an alumna of Idyllwild Arts, in the San Jacinto Mountains of Southern California. Bob Krone's association with that music and arts school began in 1946, and it has continued until today. Idyllwild Arts has grown over seventy years to be one of the world's leading music and arts schools. The major reason it has done so is the vision of Bob's parents, Founders Dr. Max Krone and Beatrice Perham Krone, that has inspired administration, faculty, staff members, and students and propelled that campus in its beautiful environment to success. **Bob Krone and Gordon Arthur.** 

# A Space Renaissance

# By Madhu Thangavelu

# Abstract

We are entering a new Space renaissance. The US policy to return to the moon offers the opportunity to test and certify technology for extraterrestrial activity, as well as great potential for further exploration of possible human habitats. Developments and private investment in in rocketry are encouraging and enabling economic space access. Consequently, we may be arriving at a critical inflection point; almost all our views of the world and our universe so far have come from Earth. What would it feel like to step out of our only home, and to look back at the Earth from another world? Those who have left the Earth tell us the experience cannot be put into words; it must be experienced directly. So, it appears that we are readier than ever to allow large numbers of people to experience the out-of-this-world experience that philosophers call the Overview Effect. Perhaps, as a result, we will become better neighbors, accepting of a new cosmopolitan worldview, and in the process, become better stewards of our only home, Mother Earth.

**Keywords:** Space renaissance, spaceflight, lining off Earth, Overview Effect, stewardship of the Earth.

We are entering a Renaissance era in human spaceflight. Just as the European masters brought forth a magical period of learning, discovery, invention, fine arts, and music five hundred years ago, with the advances in the science and technologies proliferating today, we expect a rejuvenation in human space activity in this dawn of the 21st century.

The Space Launch System heavy lift launcher and the Orion spacecraft, expressly designed for the purpose, are on track for test flights by Christmas 2018. The new US administration has moved swiftly to reinstate a newly constituted National Space Council, and in its first meeting on October 5, 2017, it directed NASA to conduct a 45-day study with the express aim of returning astronauts to our Moon within five years. On Monday December 11, the president signed the Space Policy Directive #1 to set us on this course. It is not by accident that the president had Apollo astronauts Buzz Aldrin and Sen. Harrison Schmitt by his side when he signed the directive. If we can hold to this five-year schedule and directive, we should have the new generation of 21st-century astronauts step on our Moon on July 20, 2022, to celebrate both the 50th anniversary of the last Apollo landing of December 1972 (Apollo 17) as well as reminding us all of when Apollo 11 landed, and humans took the first step on an extraterrestrial body on July 20, 1969.

This policy is not founded on exploration, science, and technology prowess alone. It is the consensus and culmination of thought leaders that the free world must lead such an effort. And since our Moon is the next logical platform after the International Space Station to fly the *e pluribus unum* banner high, the most suited and capable nations who cherish free speech and freedom of thought, movement, and expression should spearhead the endeavor. Outer Space offers an ultimate arena to express human

freedom, and we believe we should do it now, since the technologies exist today, both in the government agencies involved and within the newly homegrown, innovative, and agile private space sector that is champing at the bit to go.

Visions like those offered in the American Space Renaissance Act and the European Space Agency's Moon Village suggest that a new paradigm is emerging for space activity in general, and for human space activity in particular. A Space Renaissance of sorts is happening right now, especially in human space endeavor, and it appears to have many nations and many sectors, both governmental and private, eager to participate in projects. At the September 2017 International Astronautical Congress in Adelaide, NASA and the Russian Space Agency Roscosmos agreed to pursue a new project called the Deep Space Gateway to locate a crewed orbital station around our Moon. This act alone shows the ties that bind humanity, sans the prevailing thorns in the politics between rivals of the cold war past. With many promising space systems like the private SpaceX Falcon Heavy that has evolved from the Falcon 9 reusable launcher mated to the crew Dragon capsule and NASA's heavy lift Space Launch System coupled with the Orion capsule, being readied for launch in 2018 and 2019 respectively, it is clear that human space activity will now see a healthy catalyst in commercial space sector involvement. In fact, the Falcon Heavy maiden test flight on February 6, 2018 is the harbinger of truly economic space access, providing the much-needed catalyst our spaceflight program needs to spur on the development of human space activity, both on the domestic front and in the international arena.

The private space sector is poised to take advantage of new and emerging technologies like reusable boosters; advanced robotics; secure, wideband, delay and disruption-tolerant communications; agile and advanced manufacturing technologies, all essential to accelerate fielding the innovative and economically viable space systems needed to support crews on long missions away from home. Of special mention are the technological advances in the nuclear thermal power generation industry. For long, space activity and visions of space activity have been constrained by the paucity of power. The deregulation, or rather the ongoing re-regulation of the nuclear power industry, may bring forth new visions of spacecraft and extraterrestrial settlements based on the heritage that NASA pursued and successfully demonstrated decades ago. Long-duration missions, especially those proposals for space vehicles headed for destinations beyond our immediate, warm solar neighborhood would benefit greatly from a new generation of compact nuclear fission power plants. The long nights on our Moon would be a perfect setting to test and certify this technology for safe and sustainable extraterrestrial settlement activity.

Unlike robotic space missions, human space activity has proved to be difficult to budget in the past, with extremely narrow engineering and human factor tolerances that are critical to preserving crew safety. In a global economy that is fast evolving into a multipolar one, aided by the reach and penetration of innovative and agile communication system networks, highly disruptive and distributive technologies like Block Chain and cryptocurrencies like Bitcoin seem to be reshaping economic activity. Perhaps space policy and economics will also be affected positively by the democratic transparency and fluidity we see. Many chapters in the history of modern science and technology may be viewed through the poignant discoveries made by the inventions of the microscope and the telescope. Indeed, the great classical philosophical debates and divides between the biological and life sciences and the physical sciences mark the beginnings of the modern era of scientific thought. While the microscope allows the life sciences to continue to probe deeper and deeper into the living organism, the telescope looks outward into the heavens, toward the beginning of time and space. The James Webb Space Telescope is being readied for launch, and it will soon enhance the revolution in astronomy that the Hubble space telescope started a quarter century ago. Good to recall that astronaut missions were crucial in servicing the Hubble and enhancing performance, time and again.

Armed with the scientific and space instrumentation tools we have today, space science has much to offer humanity, about the origins of our universe, our solar system, the evolution of our Sun, and the origin of life itself. Far from over, after the Apollo era that but scratched the surface, the scientific exploration of our Moon has not yet begun. Our dormant Moon holds an unperturbed record of solar activity over a billion-year span. Return to the Moon and careful extraction of material will bring hard data about solar activity that is of immediate benefit to humanity, as we try to understand and build reliable long-term climate change and solar behavior models that are crucial to preserving our biosphere and our species in particular. The recent discovery of breaches on lunar lava tube roofs called "skylights" would allow exciting exploration of their interiors, long considered for their potential to shelter us from the harsh lunar environment, and safely to locate permanent habitats, from where we could evolve advanced technologies for humanity's expansion into the cosmos.

Information is the lifeblood of the progress of civilization. The flow and freedom of information are the hallmarks of democracy. Information enhances plurality and enriches the colors of diversity. The velocity of information today, aided by advances in information and communications technology, is vital to save lives in jeopardy, for folks caught in the vagaries of daily life and on the common defense fronts. Timely information allows for progressive education of the professional and the new generation alike, and it is the engine that drives new views and exciting innovations and inventions that make new dimensions in civilization possible. Human space activity is at the leading edge of such progressive activity, and it is one such arena of information-driven endeavor.

But we may be arriving at a critical inflection point; a confluence of philosophies of sorts. All our views of the world and our universe so far have been limited by looking out from Earth into our surroundings and peering into the universe from platform Earth. What would it feel like to step out of our only home, the blue planet we call Earth, and to look back at this magical marble floating in the dark and void emptiness of space; to turn our heads and look back from another world, albeit barren and desolate? What would looking into Earth from outside feel like? What would people on Earth feel, looking up at our Moon, the largest, brightest and most visible orb in our night skies, and knowing that people are living, working, and looking at us from there? We already know that people who orbit the Earth or those who have visited our Moon tell us the experience cannot be put into words. Such a view must be experienced directly, they say, and it permanently changes our minds, our lives, and our worldview.

And so, it appears that through the mastery of human space technology, we are readier than ever before now to embark on a journey that would allow large numbers of people to experience the out-of-this-world experience that philosophers call the Overview Effect. We will use the stepping stool of information and the machines that make the technological sublime possible to relish and bask in the spiritual sublime offered by outer space. And in the process, we will become a more refined and sensitive species, appreciative of humanity's predicament on Earth, and we will refine our consciousness and become more aware of our place and purpose in the cosmos. Perhaps we will become better neighbors, accepting of a new cosmopolitan worldview, and in the process, become better stewards of our only home, Mother Earth.



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About the Author: Madhu Thangavelu conducts the ASTE527 Graduate Space Concept Synthesis Studio in the Department of Astronautical Engineering within the Viterbi School of Engineering, and he teaches Space Architecture in the School of Architecture at the University of Southern California. He holds degrees in both disciplines. He is also an adjunct faculty member of the International Space University based in Strasbourg, France, an institution that trains promising young space professionals for leadership in international space activities. Recently, he has been nominated as a director of the National Space Society.

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Editors' Notes: Madhu Thangavelu blesses the Space community with his teaching, research supervision and his long-time support of the National Space Society's annual international Space conventions and activities. His graduate students at the University of Southern California consistently create Space technology designs that will contribute to the Space Renaissance that Madhu describes so well in this article. We thank Madhu for his frequent participation in Kepler Space Institute events and future planning. Bob Krone and Gordon Arthur.

# Jazz for Humans in Space: Let's Trek to Mars Focusing on the Journey and Then the Destination.

# **By Marshall Hawkins**

Louis Armstrong: trumpeter, singer, composer, and occasional actor was instrumental in nicknaming the jazz musicians, "the Cats." He was one of the most influential musicians in terms of creating the new sound known as improvisation. He and his mentor Joe "King" Oliver were jazzmen who paved the way for so many that followed. Louis Armstrong's gift enabled him to rise above the conditions of the time that excluded African Americans from the upper echelons of American society. Jazz was relatively new, and many people had no idea how to internalize this new and innovative sound. Louis Armstrong's legacy enabled him to rise and visit the ionosphere. In his footsteps were musicians such as Thelonious Sphere Monk, John Coltrane, and Sun Ra, who were often considered to be space cadets.

Lift off: the journey has begun.

Looking back on this beautiful blue planet reminds me of Thelonious "Sphere" Monk and his amazing work and the numerous compositions that are second only to the published works of Duke Ellington. The blues is considered to be the platform for jazz in terms of recording the history of the time via improvisation. The simplicity of the blues is a challenge for the musicians to tell a story for the enlightenment of humans. I feel that Thelonious Sphere Monk's "Blue Monk" exemplifies the blue planet Earth, and it is the blues most selected by jazz musicians during jam sessions and concerts. Humans would be the beneficiaries of emotional stability if they could listen to the blues as they trek to parts unknown in the universe. There is a chance to be in contact with Sun Ra, who claimed residence on Saturn and came to earth preaching peace. Ra is the ancient Egyptian God of the Sun. This freestyle approach to jazz by Sun Ra had no time or key signatures, and when listening to or playing this music, it left you orbiting Saturn. When Louis Armstrong played during his time, some people thought his approach to the new sound was "out there" or "far out" like space.

How can humans better coexist with technology, and what role might jazz play in this process?

Because of technology, jazz is more accessible than ever, and the young generation of the world will be instrumental in making sure jazz is not trapped by inertia. In its first session, the 92nd Congress passed a Joint Resolution of the US Senate and the House of Representatives on March 16, 1971 that declared that jazz was the national music of the United States. This declaration has given impetus and catapulted jazz to a state of momentum.

We are 100 days into the journey, and our thoughts are on the idea of a new colony on Mars. Technology has advanced exponentially, and it is responsible for this journey as

we speak. Jazz and space travel have a lot in common, because it takes an enormous amount of concentration to get from point A to point B. You must love music in its authenticity, even if it is not the music of your heritage. Jazz has evolved exponentially, because it has woven music from many cultures of the world, and it has acquired ubiquitous status. The cultural and spiritual journey of this music in many ways is a repository of information about our ancestry and the evolution of this planet, expressed through an expressive and significant art form.

Jazz is the first music that different cultures have embraced and contributed to significantly. Just think, the ocean and space and are similar because there is a preoccupation with survival, which creates a bonding for a prompt return. The bonding when listen to or playing jazz is different, because the journey you take with jazz brings a bonding that lasts for a while and, in some cases, forever. Humans will need to bond to take the journey to Mars. Listening to the music of Sun Ra while on this trek will reflect the universal surroundings, such as the stars and planets.

The idea of a colony on Mars may or may not fit with the past norms of earth's society. On Mars there are no cities, states, countries, or continents, which in itself deters conquest.

Because of jazz, the new colony and the humans who live there will be very close to a pure democracy, which is one of the outstanding properties of jazz. The citizens of the new world will become a repository of human traditions and cultural wealth; these are elements technology lacks. We may not be conscious of how technology has taken the place of our memory. Jazz is memory-based, and it gives humans an opportunity to pursue a healthier memory. Live performances are the perfect events to serve the human memory. The flashbacks that occur long after the music has been heard can serve as an important part of the human repository. Space has its memory bank, because the music that has been played for centuries will be heard on the trek to Mars and other places in the universe. Louis Armstrong and Joe "King" Oliver will be marching in the saints, Thelonious Sphere Monk and Miles Davis will remind us to keep the earth in view by remembering "Blue Monk" and Kind of Blue. Sun Ra's music will encourage us to seek the source. Jazz exemplifies the human characteristics of spontaneity and communication that technology can never replace. It represents the ability to keep information within ourselves and not just on computers. It is also important in maintaining our human identity as technology advances exponentially. Slam Stewart, a renowned bassist, played with many giants from Coleman Hawkins to Dizzy Gillespie and Charlie Parker. His final recording was entitled, "The Cats Are Swingin'." If you think for one moment that the great giants of music no longer exist, then it is time for you to consider taking this amazing journey to Mars and to experience John Coltrane saying ... WELCOME.

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**About the Author:** In his early years, legendary jazz bassist Marshall Raymond Hawkins lived on Eaton and Howard Roads. His exposure to music began with Birney Elementary School and Douglass Junior High School glee clubs. He learned to play drums and piano, and by age 16, he was the organist for church services throughout the Washington Metropolitan area. He asserts that Frank Maxwell, Superintendent of Music in the DC Public Schools, influenced his ultimate choice of instrument, the upright bass.

Marshall played with Shirley Horn for four years in DC, joined the Miles Davis Quintet, played with Eddie Jefferson, toured with Richie Cole in Europe and Japan, performed with Roberta Flack at DC's Mr. Henry's, and eventually formed his own Marshall Hawkins Quintet. His classical credits include performances with the National Symphony as guest soloist for a composition written for jazz bass and woodwind quintet; the San Jacinto Community College Orchestra, and the Idyllwild Arts Chamber and Festival Orchestras.

Marshall now lives in Idyllwild, California where he has established a Jazz Studies program at Idyllwild Arts Academy. Here he teaches Lifestyles of Jazz and brings other art forms to the next generation of aspiring artists. He is Co-Founder and Music Director of Jazz in the Pines Music Festival, which raises scholarship money for students attending the Idyllwild Arts Academy.

The Marshall Hawkins Jazz Building was so named to honor Marshall's more than two decades of service to Idyllwild Arts Academy. He also was the first recipient of the Idyllwild Arts Foundation "Lifetime in Arts Achievement Award." In 2008, he was selected by the Goethe Institute to serve as ambassador to the International Jazzahead Conference in Bremen, Germany, representing the United States, Idyllwild Arts Foundation, and Jazz in the Pines.

Seahawk Modern Jazz Orchestra (MOJO) is his latest venture. MOJO performs throughout Southern California raising money to promote jazz music and educational programs at elementary and secondary schools. "The world would 'b-flat' without music," Marshall quips. Hawk is an avid tennis player and has received several awards for his competitive play. He says one thing is sure, "I'm still East Coast, DC, and an Anacostia homeboy."



**Editors' Notes:** Marshall Hawkins is a Jazz Teacher and Performer hero. He is loved by his students who now circle the world, by his friends, and for the last 25 years by the leadership, administration, teachers and staff at Idyllwild Arts, one of the world's leading music and arts schools. Marshall is more than a jazz legacy. He gives of himself to those in need. We are proud to publish his elegant thoughts about how jazz will also meet the needs of humans in Space. **Bob Krone and Gordon Arthur.** 

# Howard Bloom's Mental Clock: Comments on Howard's Career

# By Bob Krone, PhD, President, Kepler Space Institute

Interacting with Howard Bloom is always a learning experience. He was recognized as having a scientific mind at age eight. He has been using it ever since across a huge array of subjects influencing the human condition. I have been observing Howard's mental clock for three decades.

He wrote an article for my 2006 book, *Beyond Earth: The Future of Humans in Space*, titled "Tennis Time and the Mental Clock." His message was:

In a person with little to do, the mental clock slows down. In a person with a great deal to accomplish—or a person excited about what she's doing it speeds up. Take, for example, the athlete who sees every eighteenth of a second of a tennis' ball's motion and calculates in a wink exactly where the ball is going to be when she attempts to swat it. For her, every microinstant is filled with meaning. But for the person lying on a beach catching some rays, a whole morning can go by without a single meaningful moment.

Howard jumped from that comparison to a comparison between a society on the rise and a society in decline, where the one on a rise is on tennis time, sees each impediment as a challenge, absorbs information quickly, and finds new ways to overcome obstacles.

How has Howard Bloom spent his time? And for what meaningful purposes? One way to answer those questions is to read his books:

1. The Lucifer Principle: A Scientific Expedition into the Forces of History, 1997



2. Global Brain: The Evolution of Mass Mind from the Big Bang to the 21st Century, 2001



3. The Genius of the Beast: A Radical Re-Vision of Capitalism, 2011



4. The God Problem: How A Godless Cosmos Creates, 2016



5. The Muhammad Code: How a Desert Prophet Gave You ISIS, al Qaeda, and Boko Haram—or How Muhammad Invented Jihad, 2016



6. How I Accidentally Started the Sixties. 2017



7. Garden the Solar System: Green the Galaxy. A Visual Manifesto. 2018



Readers of these comments will thank Howard when they absorb his detailed research, diagnosis, and analysis in each of these books. And you will come away with a new indepth understanding of major phenomena in the United States, the world and our universe.

Another way to look at Howard Bloom's mental clock is to see the organizations to which he has devoted time. The following list is illustrative:

The Graduate Institute; Former Visiting Scholar, Graduate Psychology Department, New York University; Co-Founder and Chair, Asian Space Technology Summit; Founder, International Paleopsychology Project; Founder and Chair, Space Development Steering Committee; Founding Board Member, Epic of Evolution Society; Founding Board Member, The Darwin Project; Board of Governors, National Space Society; Founder, Big Bang Tango Media Lab; Member, New York Academy of Sciences; American Association for the Advancement of Science; American Psychological Society; Academy of Political Science; Human Behavior and Evolution Society; International Society for Human Ethology; Scientific Advisory Board Member, Lifeboat Foundation; Editorial Board Member, *Journal of Space Philosophy*; and International Advisory Board Member, *Knowledge Futures: Interdisciplinary Journal of Futures Studies*.

They are all linked to human behavior on Earth or in Space.

He has spent most of his time for the last ten years working with leaders and experts in the activities above and beyond Earth – Space and the Cosmos.

When he talks about Space at major conferences, people listen and learn. I introduced him to speak at the International Space Development Conference 2017, in St. Louis, on May 28, 2017 with the following slide:

# Howard Bloom – Some Quotes

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\* "I doubt there is a stronger intellect on the planet" (Joseph Chilton Pearce, author of *Evolution's End* and *The Crack in the Cosmic Egg*).

\* "Bloom is the Darwin, Einstein, Newton, and Freud of the 21st Century" (Britain's Channel 4 TV).

\* "We need a new horizon, a new sense of purpose, a new set of goals, a new frontier to move once again with might and majesty, with a sense of zest that makes life worth living, through the world in which we live. One of the most challenging frontiers left to us hangs above our heads" (Howard Bloom).

\* "Howard Bloom will bring Recursive Distinctioning to the public in his own unique creative style. We thank him for being our spokesman at the International Space

Development Conference in St. Louis on May 28, 2017" (Joel D. Isaacson and Louis H Kauffman).

### \*\*\*\*\*

If you have a subject needing innovative thought, send it to Howard. His mental clock will give you something valuable that you could never have thought of yourself.

Howard's career legacy will be a gift to humanity. He is a leader championing all our improvement here on Earth and as humans settle in Space.



The author, Dr. Bob Krone, has been blessed by learning from Howard Bloom.

**Editors' Notes:** The Kepler Space Institute awarded Howard Bloom a certificate of appreciation at his book reading event in Hollywood, California the evening of May 22nd, 2018, just before the 2018 National Space Society conducted its 37th International Space Development Conference in Los Angeles. Howard participated there, as he has done for years. He credits Dr. Bob Krone, President of Kepler Space Institute, Founder of the *Journal of Space Philosophy*, and author of this article for his becoming involved full time in the global Space community. One of Howard's recent mental time subjects is his vision for humans "Greening the Solar System." **Gordon Arthur.** 

# Journal of Space Philosophy (JSP) Board of Editors

Kepler Space Institute (KSI) is honored to have 39 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. (e-mail to Bob Krone, March 23, 2013)

The purposes of peer reviews of article submissions to the *Journal of Space Philosophy* are: (1) to determine the relevance to the Vision and Goals of KSI; (2) to help the author(s) improve the article in substance and style or recommend references; and (3) to provide publication recommendations to the Editor-in-Chief.

#### \*\*\*\*\*



**ARTHUR, Gordon, PhD,** JSP Associate Editor, Theology at King's College, London, UK.

For Bio Info: www.linkedin.com/in/gdarthur.



AUTINO, Adriano, Founder, Space Renaissance International.

For Bio Info: www.spaceentrepreneurs.ning.com/profile/AdrianoAutino.



**BELL, Sherry, PhD,** Kepler Space Institute Dean, School of Psychology.

For Bio Info: www.nss.org/about/bios/bell\_sherry/html.



**BLOOM, Howard K., Author, Scientist,** Founder Space Development Group, Publicist, Author on Human Evolution, Science, Technology, and Space. Photo by Luigi Novi.

For Bio Info: www.en.wikipedia.org/wiki/Howard Bloom.



**BOLTON, Jennifer, PhD**, Co-Founder Virtual Space Orbiting Settlement VOSS. Veteran and molecular biologist, Space Pioneers Science Officer.

For Bio Info: Google Jennifer Bolton.



**BURGESS, Lowry, Professor,** Distinguished Fellow at the Studio for Creative Inquiry, Center for the Arts and Society, College of Fine Arts, Carnegie Mellon University.

For Bio Info: See Issue 1, no. 1 (Fall 2012), Article 13.



**CLEMENTS, Douglas H., MD**, American Board of Ophthalmology, "Improving Human Vision for Space Exploration and Settlement".

**For Bio Info:** Board Certified Ophthalmologist, University of Southern California Keck School of Medicine.



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**DOWNING, Lawrence G., DMin,** Senior Pastor, Space Faith and Spirituality Pioneer, University Professor.

For Bio Info: See Issue 1, no. 1, Article 11.

**FITZPATRICK, Susan Beaman, DBA,** Vice Chairman, Oak Family Advisors, LLC based in Chicago. She earned her DBA with the University of South Australia in Zurich Switzerland, where she studied under the supervision of Dr. Bob Krone. She is an international health expert specializing in health risk management. She has consulted with governments, public and private providers, and within health systems projects sponsored by the World Bank, World Health Organisation, and the UK's National Health Service. Susan's research interests include management capacity development and the implementation of complex innovations and programs. She has been a keynote speaker at industry symposiums and professional organizations such as the National Risk Manager's Association, Excess Surplus Lines Claims Association, American Hospital Association, American Bar Association, and State Chambers of Commerce. Kepler Space Institute is proud to have her in the *Journal of Space Philosophy* Board of Editors.



**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.

For Bio Info: Google Yitzhaq Hayut-Man.



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.

For Bio Info: <u>www.nss.org/about/hopkins.html</u>.



**ISAACSON, Joel D., PhD,** *Nature's Cosmic Intelligence*, pioneer of RD Cellular Automata since the 1960s.

For Bio Info: See Issue 1, no. 1 (Fall 2012), Article 7.



**IVEY, Janet,** is a Nashville TV treasure and a friend of Kepler Space Institute. Her *Janet's Planet* show is the recipient of 12 regional Emmys and five Gracie Allen Awards. She is an Ambassador of Buzz Aldrin's *Share Science Foundation.* A Google search will take you to delightful images and video clips of her teaching and entertaining children about Space.



**KHOVANOVA-RUBICONDO, Kseniya, PhD,** University of Chicago, Expert in public economics, innovation, policy and urban planning. Consultant to the Council of Europe and European Commission, proficient in six languages, Space International Economics.

For Bio Info: <a href="http://www.connect.tcp.org/profiles/profile.php?profileid=2296">www.connect.tcp.org/profiles/profile.php?profileid=2296</a>.



**KIM**, **KEE YOUNG**, **PhD**, Republic of Korea Senior University Academician and Administrator. Former President, Kwang Woon University; former Dean of the School of Business and Provost, Yonsei University; currently the Chairman of the Board of the prestigious Samil Foundation, the oldest Korean institution to award and provide scholarships to high-performing scientists, artist and engineers.



**KIKER, Edward, General Engineer, GS-13,** Office of the Chief Scientist, U.S. Army Space and Missile Defense Command/Army Forces Strategic Command, Kepler Space Institute Chief Scientist.

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**KRONE, Bob, PhD,** *Journal of Space Philosophy* Editor-in-Chief, President, Kepler Space Institute (KSI), sponsor of this Journal.

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LIVINGSTON, David, PhD, Founder and host, The Space Show.

For Bio Info: <u>www.thespaceshow.com</u>.

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**MARZWELL, Neville, PhD,** Space Solar Power and Robotics Scientist. Career at JPL as Manager for Advanced Concepts and Technology.

For Bio Info: www.spaceinvestment.com/lcr2 bios.html.

**MATULA, Thomas L., PhD,** Business and Management Professor, Lunar Commercial scholar.

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**MAYNARD, Elliott, PhD**, Founder, ArcoCielos Research Center, Sedona Arizona, <u>www.arcocielos.com</u>.

For Bio Info: <u>www.fasiwalkers.com/featured/ElliottMaynard.html</u>.





**MOOK, William, PE,** Trained in aerospace engineering, 15 years in alternative energy, Space Commerce Technology.

For Bio Info: <u>www.vimeo.com/user1527401</u>.



**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.

For Bio Info: <u>www.marshall.usc.edu/faculty/directory/tholson</u>.



PALMA, Bernardino, Historian, Portuguese Age of Discovery.For Bio Info: See Issue 1, no. 1 (Fall 2012), Article 8.

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**PEART, Kim,** Co-Founder, Virtual Orbiting Space Settlement (VOSS). Artist, visionary, virtual worlds.

For Bio Info: <u>www.independentaustralia.net/about/ia-contributors/kim-peart-bio/</u>.



**ROBINSON, George S., III, LLD,** Space law pioneer and international space expert. Smithsonian Institute Legal Counsel.

For Bio Info: See Issue 1, no. 1 (Fall 2012), Article 14.



**SCHORER, Lonnie Jones,** *Kids to Space* author and teacher. Architect, aviator.

For Bio Info: See Issue 1, no. 1 (Fall 2012), Article 17.



**SCHRUNK, David, MD,** Aerospace engineer, Founder, Quality Laws Institute, KSI Faculty.

For Bio Info: See Issue 1, no. 1 (Fall 2012), Article 18.



**SCHWAB, Martin, PhD,** International Space author, KSI Faculty, Aerospace Technology Working Group.

For Bio Info: See Issue 1, no. 1 (Fall 2012), Article 21.





**SCOTT, Winston E.,** American Astronaut, Vice President for Development, Florida Institute of Technology.

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**STEPHANOU, Stephen E., PhD,** Emeritus Professor of Systems Technology, University of Southern California, Los Angeles, California, USA.

For Bio Info: See Issue 2, no. 2 (Fall 2013), Article 26.



TANG, Terry, PhD, Kepler Space Institute Director of Research.

For Bio Info: See Issue 1, no. 1 (Fall 2012), Article 24.



THORBURN, Stephanie Lynne, Author, Astrosociology.



For Bio Info: See Issue 1, no. 1 (Fall 2012), Article 12.





WERBOS, Paul, PhD, U.S. National Science Foundation, Space scholar.

For Bio Info: See Issue 1, no. 1 (Fall 2012), Article 19.



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WILKINS, John, PhD, Professor of Space Settlements.

For Bio Info: See Issue 1, no. 1 (Fall 2012), Article 9.

WHITE, Frank, MSc, Founder, The Overview Effect Institute.



**WOLFE, Steven**, Space advocate and author of the 2013 Space novel, *The Obligation.* 

For Bio Info: See Issue 2 no. 2 (Fall 2013), Article 26.



**YACOUB, IGNATIUS, PhD,** Founder and first Dean of the School of Business and Management, La Sierra University, Riverside, California. Currently Professor of Graduate Studies, Loma Linda University School of Social Work and Social Ecology, Loma Linda, California.





ZUBRIN, Robert, PhD, President, Mars Society.

For Bio Info: www.en.wikipedia.org/wiki/Robert\_Zubrin.

### In Memoriam



**BEN-JACOB, Eshel, PhD,** Former President of Israel Physical Society; Founder Science of Bacterial Intelligence. Tel Aviv University. We grieve the passing of Dr. Ben-Jacob in 2015.



**MITCHELL, Edgar Dean, ScD,** Captain, U.S. Navy (Ret), Apollo 14 Astronaut, sixth person to walk on the Moon, Founder Institute of Noetic Sciences. We grieve Edgar Mitchell's passing in 2016.



For Bio Info: Google Edgar Mitchell.

For Bio Info: Google Eshel Ben-Jacob.

**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. We grieve Declan's passing in 2015.

"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

