

Al Brunsting, Ph.D.-physics (one of the two authors)

Fermilab Society of Philosophy

Feb. 16, 2018, noon – 1:00,

Location: WH4NW

See <<https://wipfandstock.com>>

**Key endorsement (1 of 10):**

“In God and Randomness, the authors explore the presence of randomness in processes that encompass everything in the universe, from the world of subatomic particles all the way to the solar

system and the galaxies, as well as human life and human history, all the way to the twentieth century, including two world wars, the Great Depression, and jihadi terrorism. Is randomness compatible with human self-awareness and free will? All these issues and many more are examined in depth in God and Randomness, yet using very readable language.”

Francisco J. Ayala. Donald Bren Professor of Biological Sciences, U. of California, Irvine. He is the 2001 National Medal of Science Laureate, 2010 Templeton Prize Laureate, and member of the National Academy of Sciences.

## **Abstract**

Assuming a theistic starting point, how can God be influential in human lives and human history in the presence of an overwhelming amount of randomness? We will summarize examples of randomness in the natural world, at size scales from the neutrino to galaxies; in our lives; and in the 20-th Century. A speculative answer to this question will be suggested in the second presentation."

## **What if you are an atheist or agnostic?**

Please listen anyway & participate in the discussion. I hope there are a few "ah ha" moments for you. -- Al

## Outline, Feb. 2, '18

1. 3 personal stories: (a) sister, (b) uncle, & (c) brother.
2. Micro- & macro size scales.
3. Universe & solar system. Evidence of randomness.
4. Discussion.

## Outline, Feb. 16, '18

1. Conscious, self-aware, & mindful humans.  
Randomness?
2. 20<sup>th</sup> Century history. 3 global & random elements.
3. Speculation.
4. Discussion.

## BEFORE ORIGIN OF LIFE, EARTH'S ENVIRONMENT & RANDOMNESS

Time: Formation of Earth, about 4.1BYA, to about 3.8BYA.

Late Heavy Bombardment. Momentum, collision type, size, material type of each impactor was mostly random.

>billions of impactors.

Source of impactors: asteroid belt, Kuiper belt, & other locations.

Trajectories of impactors were influenced by gravitational fields of randomly positioned planetoid, asteroid, & other impactors.

Speculation: Randomness was key.

What the early solar system may have looked like: →





## **SUMMARY: ORIGIN OF LIFE**

Origin of life occurred about 3.8BYA.

There are at least 7 current hypotheses for origin. None are completely accepted.

Scientific American: This is the #1 unsolved question in science today.

Before: Lifeless, inanimate matter. Boundary. After: sustainable, replicating, evolving life.

Q: How does a diverse collection of nonliving molecules randomly and with guidance come together & start to function in order to morph into the 1<sup>st</sup> living cells?

Tough problem: 3.8BYA, environment is mostly unknown, & chemistry hasn't been worked out. Almost impossible to replicate conditions.

Speculation: Randomness was key.

### **3 EXAMPLES FROM 20<sup>TH</sup> CENTURY HISTORY**

No one living in 1900 could have predicted events in 1900's. Due mostly to randomness.

Cherry-pick 3 major events. Global in scope.

World War I

Great Depression & New Deal

World War II

## WORLD WAR I

European alliances in response to Napoleonic Wars.

Social Darwinism reinforced emerging spirit of imperialism.

Triple Entente: Britain, France, & Russia. Triple Alliance: Germany, Austria-Hungary, & Italy.

Unpredictable, random event: June 28,'14. Sarajevo. Gavrilo Princip assassinated Austria-Hungary's heir to the throne, Archduke Franz Ferdinand & wife Duchess Sophie.

Unpredictable, random event:: German U-boat sank British passenger liner Lusitania. May 7,'15. 128 US citizens drowned.

April 6,'17 America declared war on Germany.

Treaty of Versailles, June 28,'19.

Speculation: Randomness was key for much of what happened.

## GREAT DEPRESSION & NEW DEAL

Unpredictable: Oct. 29,'29. "Black Tuesday." US stock market crashed.

By 1932 stock prices fell by 89% compared to before Black Tuesday.

From 1929 to 1933 unemployment rate climbed to 25%.

Gross Domestic Product: \$103 to \$55 billion, 1929 to 1933.

Dust Bowl drought of 1930's force large number of farm foreclosures.  
John Steinbeck, *Grapes of Wrath*.

Because of New Deal, US economy grew by 11% in '34, 9% in '35, & 13% in '36.

Speculation: Randomness was key for initiation of Great Depression.



## WORLD WAR II

Unpredictable: devastating effects of Treaty of Versailles & Great Depression, especially on Germany.

Unpredictable: Adolf Hitler was appointed Chancellor Germany. Jan. 30, '33. His rise to power.

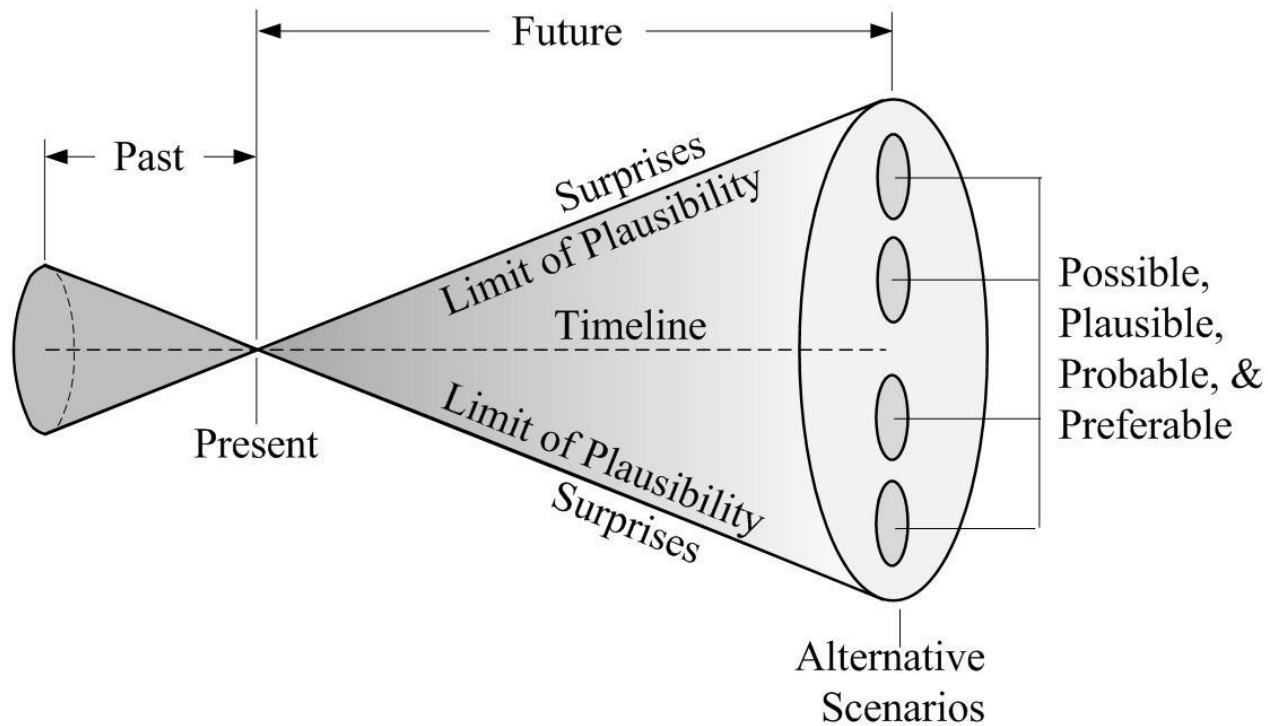
At conclusion of WWII: 66 million people died.

Surprise Japanese attack on Pearl harbor. Dec.7,'41. 2,500 people were killed.

US dropped 2 atomic bombs on Japan. Aug. 6 & 9, '45. On Aug. 15,'45, Japan surrendered.

Speculation: Randomness was key for events that led to World War II.

## RANDOMNESS & THE FUTURE



Examples of methods: trends, models & simulations, experts, and scenarios.

Width of cone of plausibility & width of alternative scenarios represent randomness & uncertainties.

## CONCLUSIONS SO FAR:

The best empirical evidence so far supports the conclusion that unpredictability plays a significant role in virtually every area of existence.

- Space scales: QM to our galaxy.
- Time scales: QM to evolution of the universe.
- Our personal lives.
- Human history. 3 examples.
- Our future.

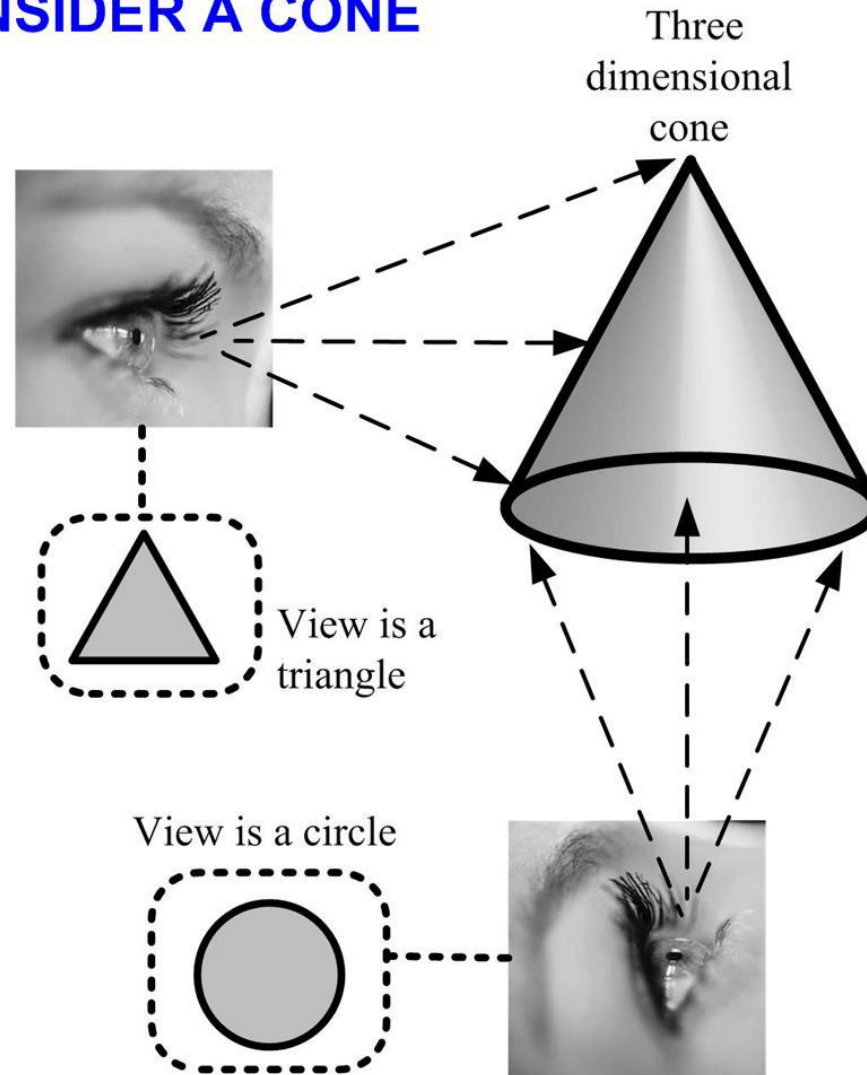
Randomness co-exists with the structure of our cosmos. Q1: How can God play a role in the presence of all this randomness? Q2: Is atheism or agnosticism the only answer?

## CONSIDER A CONE

3-dim. Cone viewed in 2-dim. appears to be (1) triangle or (2) circle.

Q: if you exist in only one of these pairs of dimensions, can you really determine the cone's real shape?

A: I contend the answer is "no."



## **Q: IS GOD ACTIVE IN DIMENSIONS THAT ARE UNAVAILABLE TO US?**

Speculation: Yes

String theory: All particles & all forms of energy in the universe might exist as 1-dimensional “strings,” infinitesimal building-blocks that have only the dim. of length but not height or width. Mathematical consistency requires that strings must exist & must have 10-dim.

Recent success in simulating thought patterns in the human brain. Extra dimensions were required.



## Continued...

Wm. James studied individuals across diverse religious traditions. They all claimed to have mystical encounters with God. They were all convinced these experiences were real & beyond rational inquiry. (Ref: Wm. James, *The Varieties of Religions Experience*. 1923)

Near death experiences. E.g., Dr. Eben Alexander, Neurologist. *Proof of Heaven*, 2012.

My contention: Our speculation is superior to “God’s ways are not our ways.” Why? Because our speculation provides a STEM-consistent speculation for God’s interaction in our lives, history, & our physical world. Difficulties with atheism and/or agnosticism are avoided.

## Discussion

## Unanswered questions regarding the Multiverse Hypothesis

Email thread to:

Kathryn Jepsen | Editor-in-Chief, Symmetry Magazine  
SLAC National Accelerator Laboratory | Menlo Park, CA  
Fermi National Accelerator Laboratory | Batavia, IL  
(650) 926-2289 | [kjepsen@slac.stanford.edu](mailto:kjepsen@slac.stanford.edu)  
[www.symmetrismagazine.org](http://www.symmetrismagazine.org)

Kathryn [Nov. 3, 2016],

Here are some of my follow-up questions to the responses from Leonardo Senatore [Cosmologist, article in Symmetry Mag.]:

Since you didn't mention any verifiable evidence for the multiverse hypothesis, I assume there is no verifiable evidence. Is this an accurate assumption?

If my assumption is correct, why is the percentage of acceptance of multiple universes so high (90%)? What percentage of those who accept are theorists?

If there are other universes, why wouldn't we observe some type of lumpiness in our universe associated with external universes affecting energy, field, and/or mass distributions in our universe?



## Unanswered questions regarding the Multiverse Hypothesis, cont.

It was announced on Oct. 13, '16, that the observable universe contains ten times more galaxies than previously thought. Doesn't this push the boundaries for other universes farther away from us? Consider all possible galaxies in all universes, what percentage of those galaxies are in our universe?

If there are other universes, what is their distribution in all possible locations in space?

How do quantum mechanical fields, currently thought to extend throughout our universe, extend to all other universes through the spaces between those universes?

What is the mass/energy density of those fields throughout our universe, throughout the spaces between universes, and within those other universes? What are the total mass/energies?

Isn't it true that if you are unconstrained by accepted observational evidence, theories can be developed that lead to shaky conclusions and those theories can be subsequently discarded?

What role do accepted observational evidences play in filtering out (or significantly modifying) proposed theories about multiple universes?

Kindest regards,  
-- Al

**Statement of theism**, Ref: *The Language of God* (2006) by Francis S. Collins, pp. 81-82



Francis S. Collins, M.D., Ph.D. is the current Dir. of Natl. Inst. of Health (NIH). He oversees the work of the largest supporter of biomedical research in the world, spanning the spectrum from basic to clinical research.

Dr. Collins is a physician-geneticist noted for his landmark discoveries of disease genes and his leadership of the international Human Genome Project, which culminated in Apr.'03 with the completion of a finished sequence of the human DNA instruction book. He served as dir. of the Natl. Human Genome Res. Inst. at NIH from '93-'08.

Before coming to NIH, Dr. Collins was a Howard Hughes Medical Institute investigator at the Univ. of Mich. He is an elected member of the Natl. Acad. Med. & Natl. Acad. Sci., was awarded the Presidential Medal of Freedom in Nov. 2007, and received the National Medal of Science in 2009.

If God exists, then He is supernatural.

If He is supernatural, then He is not limited by natural laws.

If He is not limited by natural laws, there is no reason He should be limited by time.

He could know the precise outcome of the formation of the universe even before it started.



### **Statement of theism, cont.**

He could have foreknowledge of a planet near the outer rim of an average spiral galaxy that would have just the right characteristics to allow life.

If He is not limited by time, then He is in the past, the present, and the future.

The consequence of those conclusions would include:

He could exist before the Big Bang and He could exist after the universe fades away, if it ever does.

He could have foreknowledge that that planet would lead to the development of sentient creatures, through the mechanism of evolution by natural selection.

He could even know in advance the thoughts and actions of those creatures, even though they themselves have free will.